

Introduction

INPEX Ichthys Pty Ltd (INPEX), on behalf of the Ichthys Upstream Unincorporated Joint Venture Participants, is developing the Ichthys Field in the Browse Basin off the north-west coast of Western Australia (WA). Condensate produced offshore is exported approximately every 7-10 days by offtake tankers, predominantly to Japan, and export gas is transported via a 890-kilometre subsea pipeline for further processing at the Ichthys liquefied natural gas (LNG) plant near Darwin.

The Ichthys LNG offshore facilities were constructed, installed and commissioned from 2014 through 2018 with the assets commencing production in July 2018.

Location

Production licence WA-50-L, is located within the Browse Basin in Commonwealth waters offshore WA. It is approximately 230 kilometres north west of the Kimberley coastline, at its closest point (refer Figure 2). Water depths in the licence area range between 235 metres and 275 metres at lowest astronomical tide (LAT). The closest major town is Derby, located approximately 390 kilometres south of the licence area.



Figure 1: Ichthys offshore facilities in WA 50-L.

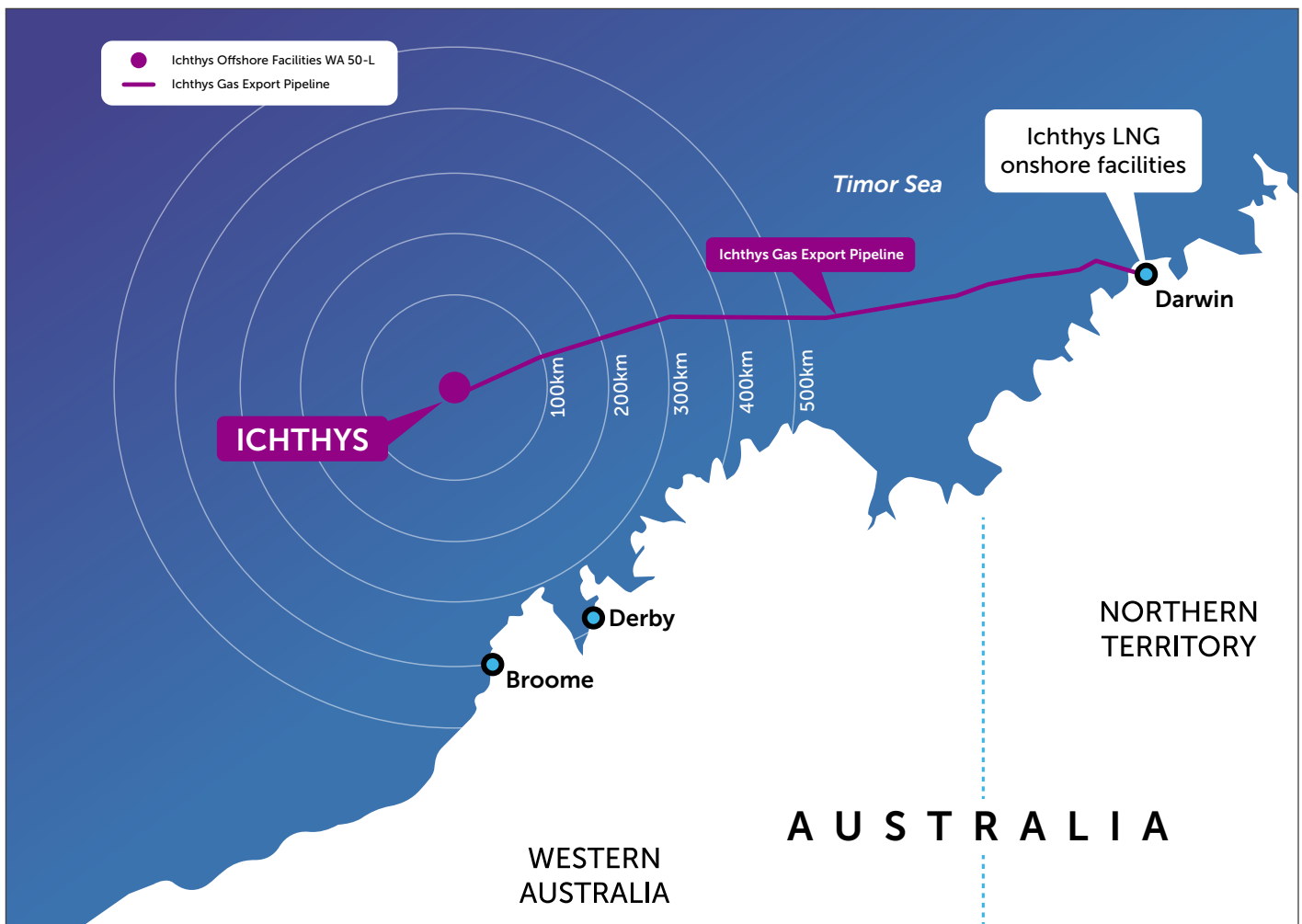


Figure 2: Location of Ichthys operations in WA-50-L.

The existing facilities comprise a subsea production system (SPS), including drill centres, manifolds, subsea control systems, umbilicals, risers and flowlines (URF), and the gas export riser base.

These facilities connect the production wells to the *Ichthys Explorer* Central Processing Facility (CPF) and the *Ichthys Venturer* Floating Production, Storage and Offloading (FPSO) facility, enabling the export of gas to the Ichthys LNG onshore processing facilities in Darwin.

INPEX manages the environmental aspects of operating the offshore facilities in accordance with the *Ichthys Offshore Facility (Operation) environment plan (EP)* which has been accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). As required by the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations*, INPEX is now preparing the five-year revision to this EP.



Figure 3: Ichthys LNG subsea production system overview.

The scope of this five-year revision includes:

- Continued operation of the offshore production facilities within WA-50-L, comprising continuous 24-hour-per-day operations.
- Inspection, maintenance and repair (IMR) activities undertaken using support vessels. Activities may include, but are not limited to, pigging operations, infrastructure repair or replacement, marine growth removal, seabed intervention, acoustic surveys, and mattress/rock replacement.
- Operation of support vessels used to transport equipment, materials and supplies to WA-50-L and back-load waste to shore.
- Major maintenance campaigns, including the use of accommodation support vessels.

- Updates to environmental management practices incorporating operational learnings from the previous five years, including the outcomes of audits and inspections, regulatory developments, and continuous improvement initiatives.

The ongoing operational activities will continue to be subject to regulation by NOPSEMA, the national regulatory body for health and safety, well integrity and environmental management for all offshore petroleum and greenhouse gas storage activities. The EP and an Oil Pollution Emergency Plan (OPEP) will describe all the potential environmental impacts and risks associated with the operations of the interlinked offshore facility, and how they will be managed to meet the requirements of the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.

Overview of activity description

Table 1: Summary of proposed activities

Summary of activity (Offshore facility operation)	
Petroleum production licence area	WA-50-L
Basin	Browse
Activity location	Wholly located within WA-50-L in Commonwealth waters approximately 390 km north of Derby, WA in the Northwest Marine Region (NWMR) of the Timor Sea.
Water depth	Ranges from 235–275 m at Lowest Astronomical Tide.
Vessels	Accommodation support vessel, survey vessels and remotely operated vehicles and autonomous underwater vehicles.
Activities	Operation of a facility, inspection maintenance and repair.
Duration of the EP	Five-years from the date this EP is accepted by NOPSEMA.

Environment

WA 50-L (Operational area)

- WA-50-L does not overlap any important bird habitats, with the nearest known breeding and roosting sites located more than 50 kilometres from the operational area.
- Browse Island (the closest turtle nesting habitat) is located more than 26 kilometres from the operational area.
- There are no known marine fauna aggregation areas in WA-50-L.
- Data available on commercial fishing effort indicates no commercial fishing activity occurs in WA 50-L.
- The seabed within WA-50-L is relatively flat and featureless, with broadly homogeneous geology dominated by soft sandy silt sediments. Previous surveys have reported no boulders, reef pinnacles, rock outcrops or exposed hard substrate.

EMBA

The Environment That May Be Affected (EMBA) defines the maximum geographical area within which an unplanned event could potentially result in environmental and social impacts. Its overall extent considers both routine project activities and worst-case unplanned incidents. The EMBA has been established using a range of hydrocarbon spill modelling scenarios that assess the potential movement of hydrocarbons following highly unlikely release events. The largest modelled extent is associated with a vessel collision scenario, specifically the loss of fuel resulting from a collision involving an offtake tanker.

It is important to note that the EMBA does not represent the area that would be directly impacted by a hydrocarbon release. Rather, it represents the combined footprint of more than 300 individual spill trajectories modelled under a range of meteorological and oceanographic conditions. As a result, in the highly unlikely event of a hydrocarbon release, only a portion of the EMBA would be affected. The location and extent of any impacts would depend on the environmental conditions present at the time of the release, including prevailing winds, currents and sea state.

The specific area affected could only be determined following an actual release event.

Environmentally sensitive areas, including distances to WA-50-L, within the EMBA are described in Table 2 and shown in Figure 4. In addition to these, the environmental values that may be impacted by the proposed planned and unplanned activities include:

- Benthic and shoreline habitats e.g. Browse Island, Cartier Island and Scott Reef.
- Marine fauna including listed and migratory species identified under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and biologically important areas associated with those species.
- Cultural heritage including underwater cultural heritage.
- Socio-economic receptors such as commercial fisheries.

Table 2: Environmental sensitivities in the EMBA

Key Ecological Features	Distance from WA-50-L
Carbonate bank and terrace system of the Sahul Shelf	211 km north-east
Continental slope demersal fish communities	Overlaps WA-50-L
Ancient coastline at 125 m depth contour	18 km south
Ashmore Reef and Cartier Island and surrounding Commonwealth waters	132 km north
Seringapatam Reef and Commonwealth waters in the Scott Reef complex	109 km west
Pinnacles of the Bonaparte Basin	468 km north-east
Canyons linking the Argo Abyssal Plain with the Scott Plateau	207 km west
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	488 km south-east
Carbonate bank and terrace system of the Van Diemen Rise	590 km north-east
Shelf break and slope of the Arufura Shelf	774 km north-east
Marine parks/nature reserves (Commonwealth and State)	
Browse Island Nature Reserve	26 km south-east
Scott Reef Nature Reserve	114 km west
Cartier Island Australian Marine Park	132 km north
Argo-Rowley Terrace Australian Marine Park	297 km west
Kimberley Australian Marine Park	96 km south-east
Ashmore Reef Australian Marine Park	158 km north
Oceanic Shoals Australian Marine Park	330 km north-east
Christmas Island Australian Marine Park	1604 km north-west
Mermaid Reef Australian Marine Park	486 km south-west
North Kimberley Marine Park	176 km south-east
Lalang-gaddam Marine Park	163 km south-east
Coral reefs	
Browse Island	26 km south-east
Cartier Island	139 km north
Scott Reef	114 km west

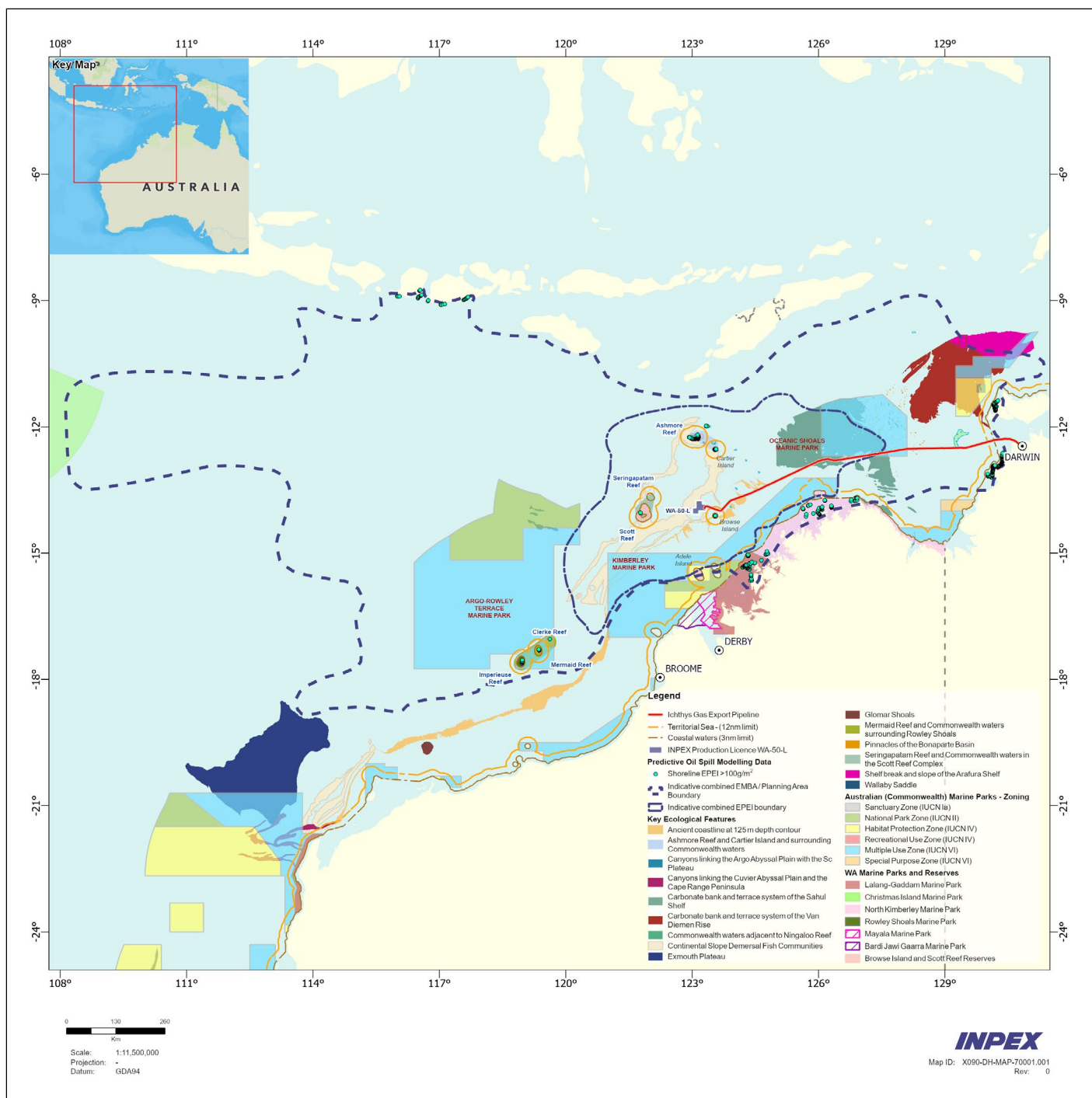


Figure 4: Environmental sensitivities in the EMBA (Key Ecological Features, marine parks and reserves, banks and shoals).

Environmental management of key aspects

In developing the EP, INPEX intends to minimise any potential environmental, social and cultural impacts and risks associated with the proposed activity. We welcome your feedback on the proposed management measures and any matters you consider relevant to the assessment and management of potential impacts.

Table 3: Management of key aspects

Aspect	Potential impacts	Proposed controls/outcomes
Air and greenhouse gas (GHG) emissions	Operation of the offshore facilities produces GHG and air emissions from equipment used to process gas and condensate. These emissions contribute to overall GHG levels and may cause temporary, localised reductions in air quality close to the facilities. Seabirds passing through the area may be exposed to air pollutants. Any effects are expected to be short term and limited to individual birds near the facilities as seabirds are highly mobile and can readily move away from emission sources. Important seabird breeding and resting habitats are not present within or near the operational area.	INPEX Australia will implement a 'plan, do, check, act' philosophy for GHG emissions, to ensure legislative obligations are met, and INPEX Australia contributes to INPEX Corporation's goal of net zero by 2050 of Scope 1 and 2 emissions. INPEX will meet the legislative reporting requirements for the <i>National Greenhouse and Energy Reporting Act 2007</i> (Cth) (NGER Act) in relation to the Ichthys Project.
Flaring	Flaring can occur during operations, maintenance activities and emergency situations. Flaring produces light, noise and air emissions that may temporarily affect nearby marine wildlife, including seabirds and marine fauna. These effects are expected to be short term and limited to the area surrounding the facilities. Flaring also contributes to GHG emissions.	A flaring management plan will be implemented to reduce the amount of flared gas from the Ichthys offshore facility. This will contribute to reducing INPEX's global GHG emissions in line with the corporate goal to be net zero by 2050. A Flaring Management Plan provides a framework to manage risk from flaring to the environment through adaptive management. This program will be used to develop, monitor, and continuously improve on: • monthly leading indicators which will be used to drive performance; • annual flaring target which the facilities will reported on and be assessed against; and • flaring guidelines for operations for specific identified events.
Light	Lighting used to operate safely can increase light levels at night. Some marine animals, including turtles, seabirds, fish and plankton, may be attracted to or disturbed by artificial light.	Lighting limited to the minimum required for navigational and safe operating requirements offshore and on vessels.
Routine discharges	The CPF, FPSO and support vessels release routine discharges including treated wastewater, cooling water, desalination brine, oily water, produced water, food waste and other operational discharges. These discharges may affect water quality close to the discharge point which could result in impacts in marine flora and fauna. At the open ocean location, discharges are dispersed quickly and expected to have only localised, short-term effects on marine biota.	INPEX has monitored the liquid effluent discharges from the facility since it was installed almost 10 years ago. A Liquid Effluent Management Plan: 1. provides an indicator of potential impacts from liquid effluent discharges to the marine environment; 2. confirms, with field-based monitoring of water and sediment quality, that the risk from liquid effluent discharges from the operations of the Ichthys offshore facility is as predicted and acceptable; and 3. provides a framework to manage risk from liquid effluent discharges to the environment through adaptive management based on an integrated monitoring program so risks are managed to ALARP. INPEX conducts whole of effluent testing to a 99% species protection level. This data assists with identifying the mixing zone and quantifying the nature of impact to marine biota in the effluent mixing in close proximity to the CPF and FPSO. All planned discharges from support vessels will comply with relevant requirements of MARPOL 73/78, the <i>Navigation Act 2012</i> (Cth), <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> and any subsequent Marine Orders requirements.

Aspect	Potential impacts	Proposed controls/outcomes
Waste	Vessel and facility operations generate a range of wastes, including domestic rubbish, maintenance materials and small amounts of hazardous waste such as waste oil, naturally occurring radioactive materials (NORMS), mercury, batteries and chemicals. Waste is not intended to enter the marine environment. However, in the event waste is accidentally discharged or lost overboard, it could affect water quality as materials break down or release contaminants into the surrounding marine environment. Marine wildlife may also become entangled in, or mistake waste for food, which could result in injury or death to individual animals. Any impacts would be localised and are not expected to affect populations of protected species.	Hazardous and non-hazardous waste from the CPF and FPSO is segregated offshore and transferred via the support vessels to licenced waste facilities. For some operational activities e.g. during major shutdowns or maintenance/repair works hazardous waste can be generated and require specific management plans such as Mercury and NORMS handling and disposal. Support vessels comply with MARPOL requirements and implement vessel specific garbage management plans in accordance with Marine Order 95.
Biosecurity - invasive marine species (IMS)	Vessels travelling from other locations can potentially introduce marine plants or animals that are not naturally found in the area. If established, these species could compete with native species, change marine habitats and affect local ecosystems and fisheries.	A biofouling risk assessment will be completed by an independent IMS expert for all vessels including immersible equipment, prior to mobilisation from international waters. Where required, mitigation measures commensurate to the risk will be implemented to ensure the vessel mobilisation poses a low risk of introducing IMS. Support vessels will: • comply with the Australian Ballast Water Requirements. • have an approved ballast water management plan and valid ballast water management certificate, unless an exemption applies or is obtained. • have a biofouling management plan in accordance with the Biosecurity Amendment (Biofouling Management) Regulations 2021 and the Australian Biofouling Management requirements.
Interactions with marine fauna	Vessels operating in WA 50-L (operational area) may occasionally interact with marine animals. There is a small risk that vessels could collide with marine fauna such as turtles, whale sharks or whales, potentially causing injury or death to individual animals. Vessel activities may also temporarily disturb animals while they are feeding, resting or travelling through the area. Any impacts are expected to be localised and are not expected to affect overall populations.	Vessel speeds are low or stationary when offloading or loading from the CPF or FPSO. EPBC Regulations 2025 Part 8, Division 8.1 will be implemented. Any vessel strikes to marine fauna will be reported as an environmental incident.
Seabed intervention	Some maintenance or repair activities may require work on the seabed to access, stabilise or protect infrastructure. This work may temporarily disturb seabed sediments and create small sediment plumes in the surrounding area. These plumes may temporarily affect plants and animals living on or within the seabed close to the work site. Although no known protected underwater cultural heritage sites occur within the operational area, there is a small possibility that previously unknown underwater cultural heritage could be encountered or disturbed during seabed works outside areas that have been disturbed before.	Support vessels will not anchor within the operational area. Accurate positioning of vessels will be maintained using Differential Global Positioning Systems (DGPS) or other subsea positioning equipment to ensure seabed intervention IMR activities are undertaken within the pre-designed disturbance area.

Aspect	Potential impacts	Proposed controls/outcomes
Loss of containment – accidental release	A loss of containment could occur through an accidental spill from a vessel or equipment, or from damage to subsea production lines. If hydrocarbons or chemicals were released to the marine environment, they could temporarily affect water quality and expose marine animals, fish, seabed habitats and plankton to contaminants. A significant rupture could result in a larger release, potentially affecting marine life and commercial, recreational and traditional fishing activities in the surrounding area. Such events are unlikely, and controls are in place to minimise the risk and respond effectively if they occur.	Subsea production equipment is inspected, maintained and repaired (if required) to prevent leaks. Bunded areas or other secondary containment will be available and used for the storage and handling of hydrocarbons and chemicals (including waste constituents). Spill kits will be available on board the CPF, FPSO and vessels including ASVs. Chemicals will be assessed via the INPEX Chemical Assessment and Approval Procedure prior to their use. Bunkering procedures will be implemented for all bulk hydrocarbon and chemical transfers, specifically: • use of dry-break, breakaway couplings, visual monitoring of hoses, couplings and the sea surface will be undertaken • offloading procedures implemented including: – watch keeping and regular rounds on tanker deck during an offtake – open radio contact between tanker bridge, FPSO Control Room and Deck and supporting vessel – weather monitoring in field for the duration of offtake. – continuous hawser tension monitoring during an offtake.
Emergency scenarios – (vessel collision / loss of containment)	A significant spill or rupture could result in a larger release, potentially affecting marine life and commercial, recreational and traditional fishing activities in the surrounding area and potentially at a regional scale. Such events are highly unlikely, and controls are in place to minimise the risk and respond effectively if they occur. The highly unlikely vessel collision scenario that creates the EMBA assumes a loss of 776m³ of heavy fuel oil from an offtake tanker (while stationary in WA 50-L). This fuel type typically results in floating oil at the sea surface and high in the water column that can persist in the marine environment for an extended period before breaking down.	INPEX maintains a Petroleum Safety Zone around the CPF and FPSO. A field management plan requires that vessels make radio contact and seek permission prior to approaching. Vessels take direction from the INPEX Field Manager who co-ordinates all vessel movements within the field area to avoid vessel collisions. Vessels use various navigation aids including radar, lighting, dynamic position equipment and geographic information systems to plan routes and avoid collisions. INPEX maintains appropriate oil spill response preparedness and capability which is described in an Oil Pollution Emergency Plan (OPEP), including the provision of dispersant held in the Ichthys Field. The regional OPEP has been developed in consultation with the Commonwealth, State and territory control agencies and has been previously accepted by NOPSEMA. The regional OPEP describes the control measures in place for a timely response to an oil pollution emergency, the arrangements and response capability to implement a timely implementation of those controls (including ongoing maintenance of that capability), and the arrangements and capability for monitoring the effectiveness of the controls.

Footnote: These proposed controls are subject to change through the consultation and subsequent assessment process and may not represent content in the publicly available EP or in the final plan once accepted.

Not all proposed controls are listed.

Further information

Further information can be found online:

Via QR Code

Instructions for accessing QR code:



1. Open your camera app on your Apple or Android device.
2. Point your camera at the QR code as if you are about to take a picture of it.
3. If your device recognises the code, a link will appear at the top of your screen. Tap on the link when it appears.

Via website

<https://anz.planengage.com/ichthysurfconstruction/page/Home>

Alternatively, you can request further information by calling 1800 705 010.

Comments and enquiries

INPEX welcomes your feedback on the proposed five-year revision of the Offshore facility (Operation) Environment Plan.

You can provide comment about the proposed Ichthys Offshore facility (Operation) in the following ways:

Via email

Contact: INPEX Environment Plan Consultation Team
Subject: Proposed Ichthys Offshore facility (Operation) EP
E-mail: consultation@inpex.com.au

Via website

www.INPEX.com.au

Via phone

Call 1800 705 010 regarding proposed Ichthys Offshore facility (Operation) EP.

How is your feedback used?

Your feedback assists INPEX with understanding the environment, identifying potential environmental impacts and risks, and enables INPEX to refine its management measures if needed to reduce potential impacts.

All communications will be logged, assessed and acknowledged with a response.

To ensure transparency and in accordance with regulatory requirements, INPEX provides NOPSEMA with full copies of all feedback within the EP submission, together with INPEX's initial correspondence and responses to feedback.

Petroleum titleholders are required to publish full copies of new EPs on the NOPSEMA website. Accordingly, those who provide feedback should advise INPEX if any part of their feedback is not suitable for public disclosure (i.e. is 'sensitive information'). Sensitive information will be removed or redacted from the published EP and provided to NOPSEMA in a separate, private document.

Any stakeholder feedback received after acceptance of an EP will be managed through INPEX's formal stakeholder engagement process.

