

NORTHERN TERRITORY WATERS

GAS EXPORT PIPELINE OPERATIONS

OVERVIEW FACTSHEET

INTRODUCTION

Santos' NT Waters Gas Export Pipeline (GEP) Operations Environmental Management Plan (OEMP) covers operation of the Barossa GEP in NT waters, including the:

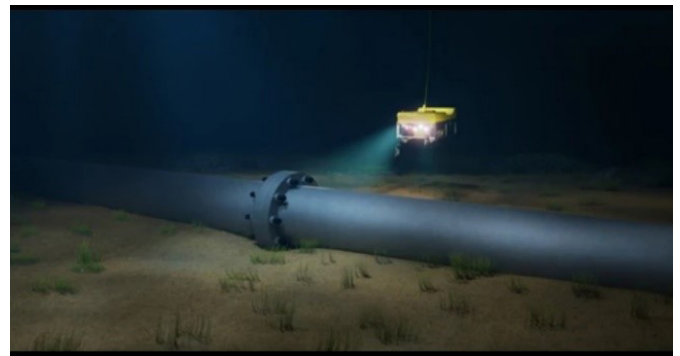
- 8.26km section of the GEP in NT coastal waters - covered by the Petroleum (Submerged Lands Act) 1981 (NT) (PSL Act); and
- ~92km section of the GEP in NT waters - covered by the Energy Pipelines Act 1981 (NT) (Energy Pipelines Act)

The purpose of the Barossa GEP is to transport dry natural gas (not oil or condensate) from the Barossa gas field to the existing Darwin Liquefied Natural Gas (DLNG) facility.

In December 2023, the NT Government approved the construction of the GEP in NT waters under the NT Environment Protection Act 2019 (NT EP Act) following assessment by the NT Environment Protection Authority (EPA). To obtain authorisation for operation of the GEP in NT waters, Santos will now submit the OEMP to the NT Department of Industry, Tourism and Trade (DITT) for assessment and approval under the PSL Act and the Energy Pipelines Act.

The estimated duration of Barossa Production Operations is 25 years. This factsheet provides a summary of the activity, environmental values and sensitivities relevant to operation of the GEP in NT waters and the impacts, risks and control measures associated with the activity.

The operation of the GEP in Commonwealth waters will be covered by an Environment Plan (EP) requiring acceptance by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA). Information on the Commonwealth waters Barossa Production Operations EP can be found in a separate information booklet on the Santos website (Production-Operations-Information-Booklet.pdf (santos.com))



KEY ACTIVITY

Inspection, Monitoring, Maintenance & Repair (IMMR)

Inspection, maintenance, monitoring and repair (IMMR) activities are the key activities related to operation of the Barossa GEP.

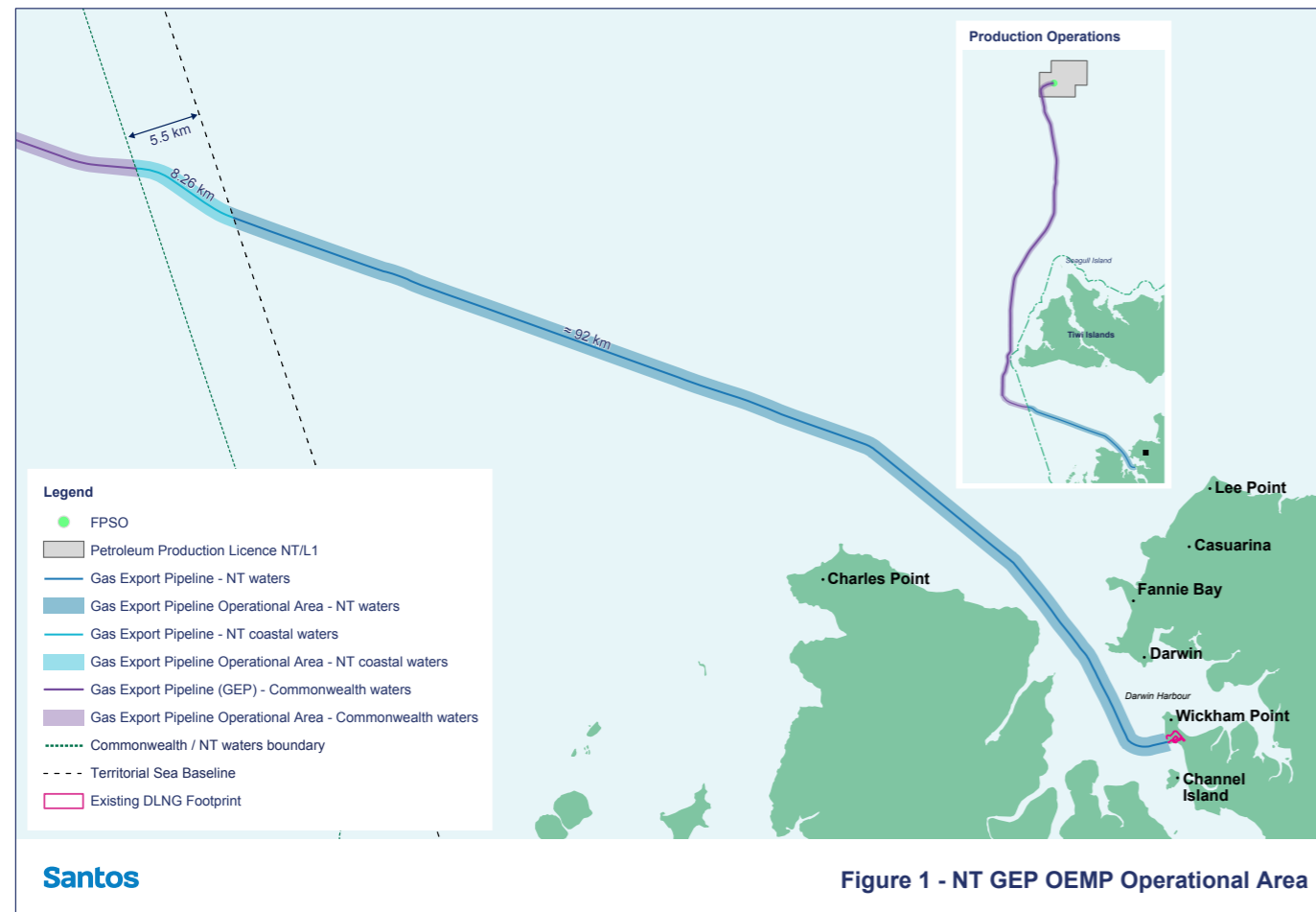
IMMR activities are performed to assure the ongoing integrity of the GEP and safe and reliable operations. The activities will occur within an Operational Area approximately 500m either side of the pipeline. The Operational Area and location of the GEP in NT waters are shown in Figure 1.

These activities will be infrequent and of relatively short duration (approximately three weeks), occurring approximately every three years, consistent with industry standards. Inspections during the first year of operations will confirm post-construction integrity of the GEP and inform the frequency of subsequent planned inspections.

Additional inspections may be performed following extreme weather events, seismic activity, or unplanned third-party interactions. Maintenance and repair activities may be undertaken if required.

Inspection activities typically include general visual inspection and close visual inspection. This is conducted using remotely operated vehicles (ROVs) from one or more vessels that have dynamic positioning capabilities. Sidescan sonar or multibeam echo sounder may be used as a screening tool to inform further targeted inspections by ROV.

Maintenance activities may include correction of free spans by targeted placement of sand or grout bags. Repair activities may include repair of damaged sections of pipe.



EXISTING ENVIRONMENT

Darwin Harbour is a large, drowned river system approximately 500km² in extent. It is comprised of three arms (East Arm, West Arm, and Middle Arm), which converge into a single unit before opening to the ocean and into Beagle Gulf in the north. Freshwater inflow from the Elizabeth River into the East Arm and the Blackmore and Darwin Rivers into the Middle Arm generally occurs between January and April creating more estuarine conditions.

The Darwin region supports several benthic habitats including mangroves, coral, seagrass and macroalgae. The bathymetry of the Operational Area in NT waters has been thoroughly investigated and is well understood. Recent surveys have shown that the seabed along the GEP route in NT waters is generally flat and featureless and typically less than 30m in depth.

Port Darwin's main channel is approximately 1,525m wide and 15 - 25m deep, with a maximum recorded depth of 36m (Lowest Astronomical Tide). The channel is generally deeper on the eastern side of the Harbour, while the western side is broader with shallower areas with intertidal flats and shoal being more extensive.

The benthic habitats along the pipeline route were found to be silty shelly sand habitat, with burrows and polychaete worm tubes. Biota commonly associated with this habitat type is sparse, including hydroids, soft corals (gorgonians, *Juncella* and *Alcyoniidae*), sea stars and sponges.

Dolphin species are the most recorded marine mammal in Darwin Harbour, with the Australian snubfin (*Orcaella*

heinsohni), Indo-Pacific humpback (*Sousa chinensis*) and Indo-Pacific spotted bottlenose (*Tursiops aduncus*) known to occur. Dugongs are also present, as monitoring estimates that approximately 180 to 300 individuals inhabit the Darwin Region.

There are six protected species of marine turtle known to occur in NT waters; of these only green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and flatback (*Natator depressus*) turtles are known to occur in Darwin Harbour regularly. Olive ridley (*Lepidochelys olivacea*) and loggerhead (*Caretta caretta*) turtles are known to occasionally occur in Darwin Harbour, and leatherback turtles (*Dermochelys coriacea*) are found offshore as they are an oceanic species. The closest nesting sites are located at Cox Peninsula and Casuarina Beach, although these are not considered significant nesting areas.

Darwin Harbour supports an abundance of fish species across an array of habitats. There is a diverse range from small site-specific species such as gobies, cardinals, and pipefish to larger species of recreational and commercial importance such as mackerel, trevallies and barramundi. Barramundi account for 26% of all recreational fishing in the Northern Territory, making it the most targeted species.

Three protected sawfish species have been recorded within the Darwin Harbour region—the dwarf sawfish (*Pristis clavata*), freshwater sawfish (*Pristis pristis* or *Prisit microdon*) and green sawfish (*Pristis zijsron*). However, they are unlikely to be encountered in the Operational Area.

Threatened Fauna

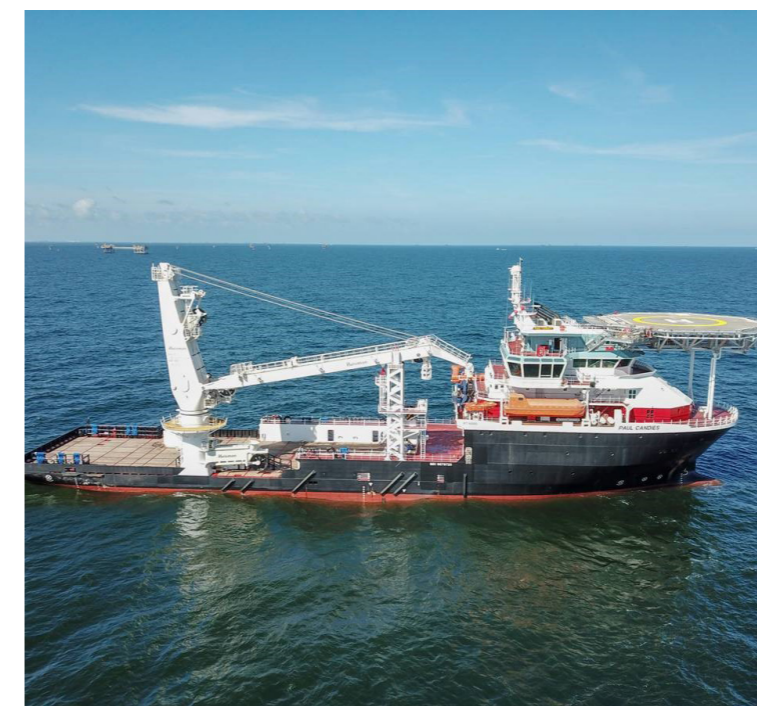
Fauna that are listed as threatened or migratory species under the Environment Protection and *Biodiversity Conservation Act 1999* (Cth) and which have been identified as potentially relevant to the Activity are listed in the table below.

Marine Reptiles	Marine Mammals	Birds
Flatback turtle	Australian snubfin dolphin	Asian dowitcher
Olive ridley turtle	Dugong	Common sandpiper
Green turtle	Indo-Pacific humpback dolphin	Grey plover
Hawksbill turtle	Spotted bottlenose dolphin	Oriental plover
Leatherback turtle		Osprey
Loggerhead turtle		
Salt-water crocodile		

Socio-Economic

Socio-economic values that are potentially relevant to the Activity are summarised in the table below.



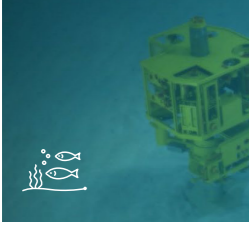



Activity/Value	Description
NT commercial fisheries	Offshore Net and Line Fishery, the Spanish Mackerel Fishery, the Coastal Line Fishery, and the Demersal Fishery and Aquarium Fishery
Recreational fishing	The Darwin Harbour/Surrounds fishing zone supports 63% of total Darwin fishing
Traditional fishing	Traditional Australian Indigenous fishing in NT waters occurs within inshore tidal waters
Shipping	Darwin Port – cruises, naval, livestock, dry bulk ore, oil and gas, general cargo/containers
Tourism	Fishing, boating, scuba-diving, sailing, water-skiing, and beach use
Defence	Darwin air weapons range, North Australian exercise area, Defence training area
Other industries	Telecommunications (e.g. Telstra cables)
Maritime heritage	Numerous shipwrecks and sunken aircraft are located in Darwin Harbour. Most wrecks are associated with either the bombing of Darwin in 1942 or Cyclone Tracy in 1974.
First Nations heritage	The Darwin region was traditionally occupied by the Larrakia people, they maintain an innate connection to the land and sea in the region. Cultural, spiritual and heritage sites of significance are located throughout the region where traditional fishing and hunting continue to be practiced.




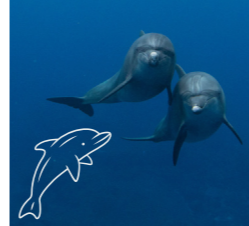



IMPACTS & RISKS

The key environmental impacts and risks from planned activities and unplanned events associated with GEP Operations are detailed below. As the key activities associated with GEP Operations, IMMR vessel activities are expected to occur approximately once every three years for approximately three weeks.

PLANNED ACTIVITIES

Planned Activity	Impact	How will Santos manage impacts
LIGHT EMISSIONS 	Behavioural impact to marine life (e.g. attraction and behavioural changes)	Lighting is to be limited on the activity vessels to what is required for safe operations and navigation. Lighting will be compliant with maritime regulations (similar to other commercial vessels operating in the region).
NOISE EMISSIONS 	Behavioural impact to marine life (e.g. avoidance)	Activity vessels are required to comply with Santos' Protected Marine Fauna Interaction and Sighting Procedure to comply with regulatory requirements for managing fauna noise impacts. Marine assurance standards and planned vessel maintenance will minimise noise generated from vessels by ensuring contracted vessels are operated, maintained, and crewed in accordance with industry standards and regulatory requirements.
SEABED DISTURBANCE 	Behavioural impact to marine life (e.g. avoidance)	Activity vessels are required to comply with Santos' Protected Marine Fauna Interaction and Sighting Procedure to comply with regulatory requirements for managing fauna noise impacts. Marine assurance standards and planned vessel maintenance will minimise noise generated from vessels by ensuring contracted vessels are operated, maintained, and crewed in accordance with industry standards and regulatory requirements.
VESSEL DISCHARGES 	Sensitive receptors that may be impacted include plankton, fish, seabirds, marine turtles, and mammals. Impacts to water quality will be localised and temporary occurring only during discharge.	Vessel discharges are to be managed to acceptable levels, as regulated by applicable laws and conventions. Santos selects chemicals that are environmentally acceptable and limits their use to only what is needed. Vessels will have routine discharges such as small volumes of treated sewage, treated bilge water and macerated food scraps. Vessel discharges will be compliant with MARPOL requirements. ('MARPOL' is a reference to the International Convention for the Prevention of Pollution from Ships.)
AIR EMISSIONS 	Impact to air quality, contribution to national greenhouse gas levels, from IMMR vessel emissions	Santos proposes to adopt various control measures to manage vessel emissions, including vessel compliance with MARPOL requirements for low-sulphur fuel and air pollution prevention certifications.
INTERACTIONS WITH OTHER MARINE USERS 	Other marine users will be temporarily restricted from the area around vessels when performing IMMR activities. The GEP may also present a hazard to marine users due to the potential for snagging.	Santos will notify and communicate with other marine users using standard maritime notifications (e.g. Notice to Mariners) before, during and at the end of IMMR activities. Infrastructure locations will be marked on nautical charts. These proposed control measures are consistent with maritime regulations and industry practices.

UNPLANNED EVENTS

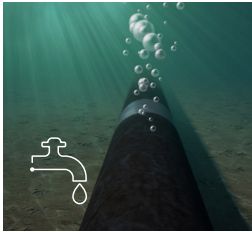
Unplanned Event	Impact	How will Santos manage impacts
DROPPED OBJECTS 	Impacts to water quality, disturbance to seabed and marine life	Procedures are in place to reduce the likelihood of tools and other equipment being dropped during lifting operations. Waste management procedures reduce the likelihood of windblown waste entering the marine environment. Dropped objects, regardless of size, will be reported and attempts to recover the object will occur, according to safety and environment criteria.
MARINE FAUNA INTERACTION 	Disturbance to marine animals (e.g. fauna strike and behavioural changes such as avoidance)	Santos' Protected Marine Fauna Interaction and Sighting Procedure limits marine fauna approach distances and speed, allowing marine fauna to be avoided or to move away. Vessel speed restrictions will also be in place in the Operational Area to reduce the likelihood of an unplanned interaction. It is unlikely that IMMR vessels will adversely interact with any individuals due to the slow vessel speeds, short duration/low frequency of activities, existing maritime traffic, and fauna mobility.
INVASIVE MARINE SPECIES (IMS) 	<p>If established, IMS can:</p> <ul style="list-style-type: none"> • Outcompete native species for food or space • Prey on native species • Impact fisheries • Impact on human health through released toxins • Cause damage to maritime equipment and infrastructure. 	Vessels contracted to Santos are managed according to control measures that comply with maritime regulations, industry practices, and biosecurity legislation. Vessels will also have ballast water management, vessel biofouling management and anti-fouling systems in place.
NON-HYDROCARBON LIQUID RELEASE 	An accidental release of non-hydrocarbon liquids such as chemicals, may result in impacts to water quality and any sensitive environmental receptors (such as fauna and habitat).	Santos has a suite of procedures to manage the selection, storage, handling, and clean-up of non-hydrocarbon liquids releases. Vessels also have spill response plans. All chemicals are reviewed and accepted for use, and any chemical that might be discharged to the environment is assessed under the Santos chemical selection procedure to ensure environmental acceptability.
MINOR LIQUID HYDROCARBON RELEASE 	A localised decrease in water quality may occur from minor hydrocarbon releases, such as, hydraulic fluids from vessel equipment. However due to the relatively small volumes, impacts are expected to be short term as the hydrocarbon would rapidly dilute and dissolve into the ocean.	A suite of procedures will be in place to manage the handling and storage of hydrocarbons on vessels. Response procedures such as stopping the source of the release and cleaning it up on deck to prevent it entering the ocean will be in place to manage minor releases should they occur.

Unplanned Event

Impact

How will Santos manage impacts

PIPELINE GAS RELEASE

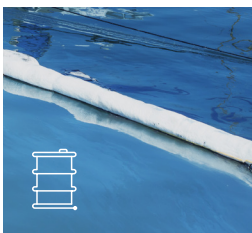


In the unlikely event of a gas release from the gas export pipeline (GEP), gas would move vertically toward the sea surface resulting in a visible bubble zone at the sea surface and an associated gas cloud before rapidly dispersing into the atmosphere. Any marine fauna or marine users in the vicinity of the gas release and future repairs of the pipeline may be impacted.

Santos has proposed preventative and mitigation measures to manage the impacts and risks of an unplanned gas release from the GEP, such as

- Pipeline integrity management plan, monitoring procedures and emergency response procedures
- Procedures and standards for lifting equipment, IMMR procedures and contractor management standards
- Maritime notifications to ensure marine users are informed of a gas release event
- The GEP will be marked on nautical charts
- Emergency response procedures, pipeline depressurisation procedures (stop gas from flowing into the pipeline) and emergency pipeline repair plans will be implemented to minimise impacts in the event of a loss of containment from the Barossa GEP.

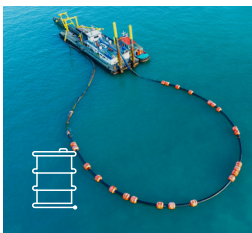
MARINE DIESEL SPILL



Although highly unlikely, a spill from a collision between two vessels could rupture a fuel tank resulting in the release of vessel fuel to the sea. This would impact water quality and may cause chemical/physical impacts to marine species.

The risk of collision is reduced by managing interactions with marine users before and during the activity, with maritime notifications, automatic identification systems, navigational lighting, and exclusion zones in place. Operational procedures are designed to minimise refuelling incidents and spill response plans will be in place.

SPILL RESPONSE OPERATIONS



If a spill occurs, response operations may be required at any location surrounding the Operational Area. Potential environmental impacts include those listed in the Planned Activities table.

Santos will rely on its Oil Pollution Emergency Plan (OPEP) to manage the impacts from a spill response event. Control measures would include:

- Procedure for interacting with marine fauna
- Chemical selection process
- Minimum lighting
- Air pollution prevention certification
- Sewage and oily water treatment systems on vessels
- Notification to agreed stakeholders



CONTACT US

For further information or queries on the Production Operations activity, please contact Santos.

Phone 1800 267 600 or email offshore.consultation@santos.com

For more information about PO activity please scan this QR Code:

