

# Statement of Reasons

## CONOCOPHILLIPS PIPELINE AUSTRALIA PTY LTD – DARWIN LIQUEFIED NATURAL GAS TRANSITION WORK PROGRAM

---

### PROPOSAL

ConocoPhillips Pipeline Australia Pty Ltd (the Proponent), submitted a Notice of Intent (NOI) for the Darwin Liquefied Natural Gas (DLNG) Transition Work Program (the Proposal) to the Northern Territory Environment Protection Authority (NT EPA) on 22 October 2019 for consideration under the *Environmental Assessment Act 1982* (EA Act). Additional information in relation to the NOI was requested on 28 January 2020 and 6 March 2020. The Proponent's responses were received on 17 February 2020 and 17 March 2020 respectively.

The Proposal is:

- for installation and operation of a new sanitary treatment plant (STP) to accommodate the increased workforce of up to 500 people during the transition work program
- to modify and refurbish the existing 3.7 million tonnes per annum (MTPA) DLNG facility to extend its operational life and support the transition to a new offshore feed gas supply (transition work program)
- for onshore production at DLNG from 2024 to 2050 following replacement of the current offshore gas supply from the Bayu-Undan field (expected to be depleted in 2022) with a new offshore feed gas supply (future operations).

The Proposal would cease production at DLNG for a transition period of about 27 months from 2022 to 2024, during which time the plant would remain on standby with some process units taken offline to enable key work scopes to be undertaken. Main activities include:

- preservation works – ramp down, purging, preservation, routine shutdown activities to enable warm standby for an extended period; recommissioning of preserved equipment prior to start-up
- feed gas modifications – replacement of the acid gas incinerator with thermal oxidiser technology, amine systems upgrades, installation of new analysers, valves, instruments and decommissioning the nitrogen rejection unit
- asset integrity – equipment maintenance, replacement, repairs and modifications; painting and insulation; upgrades of electrical and instrumentation system; and replacement or upgrade of obsolete systems.

The Proposal would extend DLNG operations by about 25 years to 2050 with an anticipated operational workforce of 100 - 150 people. During future operations, the DLNG facility would continue to produce LNG for export to international markets and would operate in a broadly similar manner to current operations.

The DLNG facility is located at Wickham Point within the Middle Arm Peninsula industrial area, approximately 6 km southeast of Darwin and 12 km southwest of Palmerston.

Construction and operation of the DLNG facility was previously assessed under the EA Act at the level of an Environmental Impact Statement in 1998 (3 MTPA), and a modified proposal (10 MTPA) was assessed at the level of a Public Environmental Report in 2002. The NT EPA recognises that the existing DLNG facility operates under various statutory authorisations, including an

Environment Protection Licence (EPL) issued under the *Waste Management and Pollution Control Act 1998* (WMPC Act).

A comparison of the existing operations with the proposed transition work program and future operations is provided in Table 1.

*Table 1 Comparison of current operations, transition works and future operations*

| Component   | Existing operations                     | Transition work program                 | Future operations   |
|---|---|---|---|
| LNG production capacity                               | 3.7 MTPA                                | Production ceased                       | 3.7 MTPA  |
| DLNG footprint  | 65 ha                                   | 65 ha                                   | 65 ha   |
| Workforce   | Up to 200 people                        | Up to 500 people                        | 100-150 people  |
| <b>Air emissions</b>                                  |   |   |   |
| Carbon dioxide equivalent (tonnes CO <sub>2</sub> -e) | 1,578,692                               | Not provided                            | 1,341,888<br>(~15% decrease from existing operations)   |
| Nitrogen Dioxide (NO <sub>2</sub> ) <sup>1</sup>      | 27.2%                                   | Not provided                            | 30.5%   |
| Carbon Monoxide (CO) <sup>1</sup>                     | 0.1%                                    | Not provided                            | 0.1%  |
| Sulfur Dioxide (SO <sub>2</sub> ) <sup>1</sup>        | 2.7%                                    | Not provided                            | 0.9%  |
| Hydrogen Sulfide (H <sub>2</sub> S) <sup>2</sup>      | 1.5%                                    | Not provided                            | 1.2%  |
| Benzene <sup>1</sup>                                  | 1.1%                                    | Not provided                            | 1.1%  |
| Mercury (Hg) <sup>3</sup> (µg/Nm <sup>3</sup> )       | 2.37                                    | Not provided                            | 1.19  |
| <b>Annual wastewater discharge to harbour</b>         |   |   |   |
| Water discharge source at jetty outfall               | Reverse osmosis (RO) plant reject water | Reverse osmosis (RO) plant reject water | Comingled wastewater stream combining RO reject water, oily water and treated sewage effluent |
| - RO reject water (~ML/yr)                            | 51                                      | 13                                      | 51  |
| - treated sewage effluent (~ML/yr)                    | 0                                       | 0                                       | 4.7   |
| - oily water effluent (~ML/yr)                        | 0                                       | 0                                       | 27.4  |
| Total   | 51                                      | 51                                      | 83.1  |
| <b>Annual wastewater discharge to land</b>            |   |   |   |
| - comingled irrigation stream (~ML/yr)                | 28                                      | 12.8                                    | 0 <sup>4</sup>  |

<sup>1</sup> 1-hour averaging period maximum ground level concentration (from DLNG facility only) as a percentage of ambient air quality National Environmental Protection Measure (Air quality NEPM) criterion.

<sup>2</sup> 30-minute averaging period maximum ground level concentration as a percentage of Air quality NEPM criterion.

<sup>3</sup> Hg concentration in thermal oxidiser exhaust. Emission limit is 200 µg/Nm<sup>3</sup> [NSW Protection of the Environment Operations \(Clean Air\) Regulation 2010](#).

<sup>4</sup> Irrigation maintained as a disposal option for comingled wastewater stream during future operations.

## CONSULTATION

The NOI and further information has been reviewed as a notification under the EA Act in consultation with Northern Territory Government advisory bodies (listed in Attachment 1) in accordance with clause 8(1) of the Environmental Assessment Administrative Procedures 1984 (EAAP).

## JUSTIFICATION

Having regard to the NOI and further information, the NT EPA evaluated the potentially significant environmental impacts and risks associated with the Proposal in line with the NT EPA's environmental factors and objectives, and in accordance with the requirements under the EA Act. The NT EPA identified two environmental factors (Table 2) that could potentially be significantly impacted by the Proposal. The NT EPA considered the importance of other environmental factors during the course of its assessment; however, those factors were not identified as being potentially significantly impacted.

Table 2: Key environmental factors

| Theme | Environmental factor             | Objective  |
|-------|----------------------------------|--|
| Sea   | Marine environmental quality     | Maintain the quality and productivity of water, sediment and biota so that environmental values are protected. |
| Air   | Air Quality and Greenhouse Gases | Maintain air quality and minimise emissions and their impact so that environmental values are protected.       |

### 1. Marine environmental quality

**Objective:** Maintain the quality and productivity of water, sediment and biota so that environmental values are protected.

The Proposal has the potential to impact on marine environmental quality values through changes in the volume and quality of wastewater discharged via the jetty outfall discharge point during future operations. Marine wastewater discharge of reverse osmosis (RO) reject water from the jetty outfall is currently authorised under the EPL (EPL 217-02) up to a maximum annual volume of 61 ML with a 20 m mixing zone. This volume is equivalent to about 0.2% of wastewater discharges to Darwin Harbour under all NT EPA issued licences for the 2018-2019 reporting period, and equivalent to 18% of wastewater discharges to Darwin Harbour reported by INPEX for the Ichthys LNG facility during that period.

The Proposal includes the potential discharge of up to 228 m<sup>3</sup>/day (~83 ML/year) of a new comingled wastewater stream via the jetty outfall under a revised EPL during future operations, which would combine:

- RO reject water that is currently discharged from the jetty outfall (140 m<sup>3</sup>/d 51.1 ML/year)
- two additional wastewater streams that are currently discharged to land via irrigation:
  - treated sewage effluent from the STP (13 m<sup>3</sup>/d, 4.7 ML/year)
  - oily water effluent from process area sumps, the turbine air humidification system (TAHS) and boiler blowdown (75 m<sup>3</sup>/d, 27.4 ML/year)

Oily water effluent would be treated via the oil/water separation and solids removal system (corrugated plate interceptor and dissolved air flotation) prior to discharge.

The Proponent conducted water quality and wastewater dispersion modelling to predict discharge water quality based on monitoring data from existing operations, and to determine the dilution and extent of the mixing zone at the jetty outfall required to achieve compliance with current EPL discharge trigger values. Modelled predictions indicate that the comingled discharge concentrations of nutrients (ammonia nitrogen, nitrate, nitrite and dissolved reactive phosphorus), Enterococci and *Escherichia coli* and some heavy metals (zinc and copper) would exceed current EPL limits.

The Proponent expects that a 50 m mixing zone would be required to meet the relevant discharge trigger values, derived from the Darwin Harbour Water Quality Objectives and the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018). The current EPL mixing zone is 20 m. The Proponent's near-field modelling predicts under normal operations a 6 to 12 m diameter plume would surface about 4 to 45.6 m from the jetty outfall, and during the shutdown a 1 to 7 m underwater plume about 7 to 19 m from the jetty outfall, depending on tides.

Prior to applying for a revised EPL, the Proponent has committed to developing and implementing a new Jetty Outfall Water Quality Monitoring Program (JOWQMP) to demonstrate that liquid discharges would be within acceptable limits and a Performance Improvement Plan (PIP) to improve discharge dispersion and mixing. A Receiving Environment Monitoring Plan (REMP) would also be developed to monitor and assess risks and impacts to water, sediment quality, and benthic communities and to validate modelled predictions.

The Proponent recognises the potential for water treatment chemicals used upstream of the proposed discharge point, including their constituents and breakdown products, to be present in the comingled wastewater stream such as biocides, demulsifiers, oxygen scavengers, sodium hypochlorite, sodium hydroxide, sodium metabisulfite, and ferric sulfate. It also acknowledged that any revision to the current EPL would need to be supported by a thorough technical assessment to adequately detect all potential pollutants present in the comingled wastewater stream and assist in establishing trigger parameters as indicators of potential local and regional impacts from the Proposal to mid-estuary marine and estuarine systems of the Middle Arm Peninsula and Darwin Harbour.

The NT EPA considers that provided the proposed marine discharge is appropriately licensed and undertaken in conjunction with water quality testing and verification, water quality monitoring and receiving environment monitoring to detect potential impacts, the risk to marine environmental quality is low. The NT EPA supports the Proponent's commitment to develop and implement the JOWQMP, PIP and REMP, with assistance from specialist environmental consultants with expertise in marine wastewater discharge. The NT EPA is also supportive of the Proponent's commitment to consult with the Department of Environment and Natural Resources (DENR) during development of the plans and any proposed variation to the existing EPL.

The NT EPA is satisfied that the potential impacts and risks to marine environmental quality are not significant with implementation of the proposed mitigation and management measures presented in the NOI and Additional Information. The NT EPA considers that its objective for marine environmental quality is likely to be met.

## **2. Air quality and greenhouse gases**

**Objective:** Maintain air quality and minimise emissions and their impact so that environmental values are protected.

The Proposal would produce a number of atmospheric pollutants including CO, CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>S, benzene, mercury and other volatile organic compounds (VOCs). Atmospheric emissions would be generated from the acid gas thermal oxidiser, refrigeration turbines, power generation turbines and steam boiler, and are expected to be comparable to existing DLNG operations. The Proposal would result in an overall decrease in CO<sub>2</sub> equivalent emissions, due to installation of a new Battery Energy Storage System which would reduce greenhouse gas (GHG) emissions from

power generation by 20%. This would offset the ~5% increase in fuel consumption for operation of the new thermal oxidiser and upgraded utilities systems.

The feed gas for the Proposal would be required to meet DLNG specifications. Feed gas specification limits were not provided by the Proponent, except for H<sub>2</sub>S and CO<sub>2</sub> which are 17 ppm and 6 mol % respectively. Air pollutant emissions estimates from the Proposal compared with current operations are provided at Table 1. The feed gas is likely to have a higher concentration of H<sub>2</sub>S (10-17 ppm) compared to the current feed gas (4-6 ppm). However, the upgrade of the acid gas removal system would result in an overall minor decrease in H<sub>2</sub>S emissions due to the new thermal oxidiser technology which optimises acid gas disposal, has increased reliability (>95%) and is designed to convert H<sub>2</sub>S to SO<sub>2</sub> and H<sub>2</sub>O, benzene to CO<sub>2</sub> and H<sub>2</sub>O and reduce emissions to as low as reasonably practical (ALARP). There would be an increase in SO<sub>2</sub> emissions from future operations compared to existing operations due to the new acid gas disposal system. The Proponent acknowledges that the anticipated concentration and rate of SO<sub>2</sub> emissions during future operation would likely exceed current EPL limits.

The Proponent conducted an air quality assessment and air dispersion modelling to determine ambient concentrations of atmospheric pollutants and to identify and assess the potential impacts to sensitive receptors. Modelling was undertaken consistent with the New South Wales (NSW) guideline for modelling and assessment of air pollutants<sup>5</sup>. Modelling predicted that, in a worst-case scenario, the maximum 30-minute average ground level concentration of H<sub>2</sub>S at the nearest sensitive receptor would be equivalent to 2.7% of the criterion (7.5 µg/m<sup>3</sup>)<sup>6</sup>. The 99<sup>th</sup> percentile nose-response-time average concentrations of H<sub>2</sub>S comply with the NSW criterion<sup>5</sup> at sensitive receptor locations for in-spec feed gas if the hourly average emission rate of H<sub>2</sub>S is 2.85 g/s or lower, which the Proponent committed to comply with during future operations.

Emissions of benzene were not assessed in the Proponent's modelling as the concentration of benzene in the acid gas is expected to remain the same as current levels. Predicted ground-level concentrations of benzene are expected to be lower than current levels as only 50% of the acid gas would be vented at any one time, and the percentage of time that the direct fired thermal oxidiser would be operating would be significantly higher than that of the current acid gas incinerator.

The Proponent compared worst-case scenario concentrations of NO<sub>2</sub>, SO<sub>2</sub>, CO and H<sub>2</sub>S (with consideration of cumulative impacts from DLNG and Ichthys LNG) and expressed these as a percentage of the ambient air quality NEPM<sup>7</sup> criteria. Results predict that:

- NO<sub>2</sub> 1-hour and annual average concentrations comply with the Air NEPM standards at sensitive receptors. Predicted concentrations at sensitive receptors are less than 57% of the respective criteria
- CO 15-minute, 1-hour and 8-hour concentrations comply with the Air NEPM standards and NSW criteria at sensitive receptors. Predicted concentrations at sensitive receptors are less than 62% of the respective criteria
- SO<sub>2</sub> 10-minute, 1-hour, 24-hour and annual average concentrations comply with the Air NEPM standards and NSW Approved Methods criteria at sensitive receptors. Predicted concentrations at sensitive receptors are less than 25% of the respective criteria

---

<sup>5</sup> NSW EPA, 2016. [Approved methods for the modelling and assessment of air pollutants in NSW](#) (NSW Approved Methods)

<sup>6</sup> Queensland Government, 2019. [Environmental Protection \(Air\) Policy \(Air EPP\)](#). (QLD Air EPP)

<sup>7</sup> National Environmental Protection Council 1998, [National Environment Protection \(Ambient Air Quality\) Measure](#) (Air NEPM).

- H<sub>2</sub>S 99th percentile nose-response-time average concentrations exceed the Approved Methods criterion at sensitive receptors. Predicted concentrations at sensitive receptors are 101% of the Approved Methods criterion
- H<sub>2</sub>S maximum 30-minute average concentrations comply with the Air EPP objective at sensitive receptors. Predicted concentrations at sensitive receptors are less than 31% of the QLD Air EPP objective.

Although the Proponent predicted that peak concentrations of H<sub>2</sub>S may be detected at sensitive receptors, it considered that this would be unlikely to result in odour nuisance, and committed to limit throughput rates when the direct fired thermal oxidiser is offline to manage H<sub>2</sub>S emissions. Based on the modelling and calculations outlined above, the Proponent concluded that air emissions from the Proposal would not impact on receptors and would have no material effect on the ambient air quality of the Darwin region. The proposed changes to operation of the DLNG facility are not expected to contribute a significant portion of, or increase to, annual greenhouse gas emissions in the NT.

The NT EPA supports the Proponent's commitment to continue the ambient air monitoring program, which would be revised as necessary to ensure monitoring is able to detect any potential impacts to receptors or ambient air quality, and to verify that actual emissions correlate with modelled predictions and meet air quality criteria. Taking into consideration that air emissions from the Proposal would be monitored and regulated through an EPL under the WMPC Act, and that about two thirds of the Proposal's GHG emissions would continue to be offset through the Proponent's carbon offset program, the NT EPA concludes that the Proposal is highly likely to meet its objective for air quality and greenhouse gases.

## **CONCLUSION**

Based on the information provided in the NOI and additional information, the NT EPA concludes that the potential environmental impacts and risks of the proposed changes to the existing operation of the DLNG facility would be mitigated to such an extent that they are not considered to be significant. The NT EPA considers that residual risks can be regulated through the Operations Environmental Management Plan, an EPL under the WMPC Act and other relevant legislation and policies.

Comments from Northern Territory Government advisory bodies have been provided to the Proponent. The NT EPA has provided advice to the Proponent to ensure that potential impacts and risks to the environment are minimised and responsibilities under the legislation can be met.

## **DECISION**

The proposed action, which was referred to the NT EPA by ConocoPhillips Pipeline Australia Pty Ltd, has been examined by the NT EPA and preliminary investigations and inquiries conducted. The NT EPA has decided that the potential environmental impacts and risks of the proposed action are not so significant as to warrant environmental impact assessment by the NT EPA under provisions of the EA Act at the level of a Public Environmental Report or Environmental Impact Statement. Environmental management of the potential environmental impacts is the responsibility of ConocoPhillips Pipeline Australia Pty Ltd through preparation and implementation of procedures and management plans specified in the NOI, and through compliance with an EPL granted under the *Waste Management and Pollution Control Act 1998*, and other relevant legislation.

This decision is made in accordance with clause 8(2) of EAAP, and subject to clause 14A the administrative procedures under the EA Act are at an end with respect to the proposed action.

A handwritten signature in blue ink, appearing to read 'P. Vogel', with a horizontal line underneath.

DR PAUL VOGEL AM MAICD

CHAIRPERSON

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

6 MAY 2020

**Attachment 1 – Northern Territory Government advisory bodies consulted on the Notice of Intent**

| Department  | Division   |
|---|--|
| Department of Environment and Natural Resources                   | Flora and Fauna<br>Water Resources<br>Weeds<br>Environment<br>Bushfires NT<br>Rangelands |
| Department of Infrastructure, Planning and Logistics              | Lands Planning<br>Infrastructure<br>Transport Civil Services                             |
| Department of Primary Industry and Resources                      | Fisheries<br>Mining Compliance<br>Petroleum<br>Primary Industry                          |
| Department of Tourism, Sport and Culture                          | Heritage<br>Tourism NT<br>Arts and Museums<br>Parks and Wildlife                         |
| NT Police, Fire and Emergency Services                            | Business Improvement and Planning  |
| Department of Health  | Environmental Health<br>Medical Entomology   |
| Department of Trade, Business and Innovation                      | Economics and Policy<br>Strategic Policy and Research                                    |
| Department of Local Government, Housing and Community Development | Maintenance Planning<br>Housing supply   |
| Power and Water Corporation                                       |  |
| Aboriginal Areas Protection Authority                             | Technical  |
| Department of the Attorney-General and Justice                    | Commercial Division<br>NT Worksafe   |
| Land Development Corporation                                      |  |
| Department of the Chief Minister                                  | Economic and Environmental Policy  |