INPEX Response to additional Middle Arm Sustainable Development Precinct Questions on Notice

1. ***Limits of toxins outlined in INPEX's licence.***

Ichthys LNG does not have specific volatile organic compound (VOC) limits within Environment Protection Licence 228-05 (EPL228-05). Under EPL228-05, INPEX is only required to monitor VOCs at certain stationary emission points located at Ichthys LNG. The license permits hydrocarbon processing provided conditions are met.

INPEX measures several air emission parameters in accordance with Appendix 3 of EPL228-05 and reports on stationary emission sources as part of the Annual Environmental Monitoring Review (AEMR) which is endorsed by a third party; and issued to NT EPA. Specifically, INPEX measures stationary air emissions in accordance with:

- Table 5 of Appendix 3 of EPL228-05, which outlines INPEX's authorised stationary emission release points and contaminant release limits for oxides of nitrogen as nitrogen dioxide (NOx as NO2). Concentration limits are outlined in Column 5 of Table 5, Appendix 3 of EPL228-05.
- Table 6 of Appendix 3 of EPL228-05, which outlines INPEX's stationary air emissions monitoring program for NOx as NO2, carbon monoxide (CO), benzene, toluene, ethylbenzene, xylenes (BTEX), and hydrogen sulfide (H2S)

INPEX notes that previous revisions of EPL228 have contained limits for potential air toxics. Prior to the current EPL228-05, EPL228 required INPEX to verify that Ichthys LNG did not cause "*ground level concentrations of contaminants to contribute to more than 27% of the standards for pollutants specified in National Environment Protection (Ambient Air Quality) Measure and monitoring investigation levels for air toxicants specified in National Environment Protection (Air Toxics) Measure*".

This verification required INPEX to undertake ground level ambient air quality monitoring for air toxics within the broader Darwin community (i.e. Stokes Hill/Francis Bay, Winnellie and Palmerston) and compare results to the air toxics criteria specified in *National Environment Protection (Air Toxics) Measure*. Once this verification monitoring was completed and endorsed by a qualified third party, it was removed from EPL228.

Since Q1 2023, during periods in which both acid gas incinerators are offline, INPEX has been undertaking contingency ground level ambient air monitoring and comparing results to the criteria in *National Environment Protection (Air Toxics) Measure.* This contingency monitoring is not in EPL228-05. Section 3 of INPEX Annual Environmental Monitoring Reports for Ichthys LNG outline air quality monitoring results for their respective reporting periods and demonstrate where relevant reporting criteria has been met.

Monitoring reports are publicly available here:

- https://www.inpex.com.au/media/tf3fsrwx/l060-ah-rep-60029-epl228-annual-environmental-monitoring-report-2018-2019-1.pdf
- https://www.inpex.com.au/media/kxolqyub/l060-ah-rep-70011_0_reviewed_ifu.pdf
- https://www.inpex.com.au/media/nwvbwmbc/l060-ah-rep-70018_0_reviewed_ifu-1.pdf
- https://www.inpex.com.au/media/zj2ptuei/onshore-aemr21-22-l060-ah-rep-70027_0_reviewed_ifu.pdf

- https://www.inpex.com.au/media/yezn5da3/epl228-annual-environmental-monitoring-report-22-23_l060-ah-rep-70055-rv1.pdf

2. ***Urinary testing for INPEX's workers to pick up levels of toxins and pollutants and what type of testing of employees exists and what you're testing for.***

INPEX has been undertaking occupational hygiene monitoring at the Ichthys LNG onshore processing facility in Darwin since 2018. This monitoring is a combination of personal and static (area) monitoring to determine the level of exposure to various contaminants.

INPEX's approach to health monitoring for hazardous process contaminants (using biological testing e.g. urine or blood), takes a risk-based approach in line with Safe Work Australia guidance. Testing will occur following a potential exposure to a hazardous agent(s) (mercury, benzene etc) identified following an incident/ event or based on statistical analysis of occupational exposure monitoring data collected overtime.

In 2022, INPEX conducted a targeted program on our floating production, storage, and offloading vessel (FPSO), where 22 personnel participated in the health monitoring campaign for mercury in urine. Health monitoring data beyond this is available, however, limited as it is largely carried out for contractors who INPEX engages to undertake specific high-risk work, for example tank entries. Contractors may have samples collected on our operating facilities, however, the surveillance aspect of this is the responsibility of relevant contract companies.

Personal monitoring is conducted to determine workers' exposure to various contaminants and is assessed against the Work Safe Australia Workplace Exposure Standards.

Static (Area) monitoring is conducted to determine if fugitive emissions may be present. These are indirectly assessed against the Work Safe Australia Workplace Exposure Standards.

The monitoring plans have been developed based on the contaminants that maybe present within the ILNG plant. The monitoring plan is developed in accordance with the INPEX Health Exposure Assessment Guideline (Doc 0000-AH-GLN-60027) and is reviewed annually.

In addition to the onsite monitoring, our Environmental Protection Licence requires that we monitor locations outside of the facility, which have been consistently aligned with our on-site results, showing no concern.

As part of the monitoring program the following Volatile Organic Compounds are monitored for: benzene, toluene, ethylbenzene, and xylene (BTEX).

3. **Whether the dolphin monitoring program was part of the Ichthys voluntary offset agreement with the NT Government.**

An integrated coastal dolphin monitoring program between INPEX (on behalf of the Ichthys Joint Venture) and the Northern Territory Government (NTG) was undertaken between 2011 and 2015. The monitoring commenced prior to any construction activities and concluded following the completion of marine piling activities. Field surveys were completed every six months during this period (eight surveys in total) with INPEX funding three of the four field teams required to undertake monitoring in accordance with the monitoring plan, the fourth field team was funded by NTG. Funding was also

provided by INPEX to the NTG to undertake the required data analysis and reporting associated with the monitoring program. This coastal dolphin monitoring program was included in both NTG and Commonwealth approved management plans.

Following the completion of the above mentioned integrated coastal dolphin monitoring program between INPEX and NTG, annual coastal dolphin monitoring was then conducted from 2016 to 2019 (four surveys in total). This annual coastal dolphin monitoring was a NTG managed program paid for and completed under the Ichthys Project Voluntary Offset Agreement (IPVOA). The IPVOA is a commitment of $91 million over 40 years for a range of environmental, social, and cultural offsets voluntarily entered into by INPEX, with offset programs mutually agreed with the NTG. Implementation of annual coastal dolphin monitoring between 2016 and 2019 was not a requirement of Commonwealth or NTG approvals or management plans.

4. Days that INPEX's supply of gas to Darwin hit the maximum.

Emergency supply of gas from Ichthys LNG is provided into the Wickham Point Pipeline (WPP) and is entirely consumed at the Channel Island Power Station and/or Weddell Power Station, ensuring sufficient supply to sustain Darwin's energy needs where required. Supply rates are often at a minimum of around 15TJ/d to supplement gas that is in the WPP from other sources. The table below groups the supply days by different supply rate intervals, with the 30-45TJ/d interval deemed as the days that INPEX provided emergency gas to a maximum level.

Table 1: Supply numbers since April 2022, when export mode was commissioned

Supply rate, TJ/d	Days
0 – 15	118 - the majority of these days occurred between December 2022 to June 2023
15 - 30	68 – all of which occurred between December 2022 to June 2023
30 - 45	74 • 53 days over December 2022 to June 2023 • 6 days in August 2023 • 6 days in December 2023 • 9 days in February 2024

Attachment 1 – Table 5 of EPL228-05 for 2023-2024 - Operational status and air emissions acceptability

Release Point Number	Sampling Location Number	Source	Pollutant	Concentration limit		Test Date	Measured Concentration		Status	Air emissions
				mg/Nm^3	ppmv		mg/Nm^3	ppmv		
A1	L-641-A-001	LNG Train 1 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)	NO_x as NO_2	70@ 15% O_2 dry	35@ 15% O_2 dry	02/11/2023 09:56	50	24	Operational	Acceptable
A2	L-642-A-001	LNG Train 2 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)				02/11/2023 13:19	15	7.2	Operational	Acceptable
A3	L-641-A-002	LNG Train 1 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)				03/11/2023 12:11	6.7	3.3	Operational	Acceptable
A4	L-642-A-002	LNG Train 2 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)				04/11/2023 09:22	11	5.3	Operational	Acceptable
A5-1	L-780-GT-001	CCPP Gas Turbine Generator #1 (GE Frame 6) – conventional stack	NOx as NO_2	70@ 15% O_2 dry	35@ 15% O_2 dry	-	-	-	Intermittent use, when HRSG offline	Not tested in this survey
A6-1	L-780-GT-002	CCPP Gas Turbine Generator #2 (GE Frame 6) – conventional stack				-	-	-	Intermittent use, when HRSG offline	Not tested in this survey
A7-1	L-780-GT-003	CCPP Gas Turbine Generator #3 (GE Frame 6) – conventional stack				-	-	-	Intermittent use, when HRSG offline	Not tested in this survey
A8-1	L-780-GT-004	CCPP Gas Turbine Generator #4 (GE Frame 6) – conventional stack				-	-	-	Intermittent use, when HRSG offline	Not tested in this survey
A9-1	L-780-GT-005	CCPP Gas Turbine Generator #5 (GE Frame 6) – conventional stack				-	-	-	Intermittent use, when HRSG offline	Not tested in this survey
A5-2	L-630-F-001	CCPP Gas Turbine Generator #1 (GE Frame 6) – HRSG stack	NOx as NO_2	350@ 15% O2 dry	175@ 15% O2 dry	01/11/2023 13:27	12	6	Operational	Acceptable
A6-2	L-630-F-002	CCPP Gas Turbine Generator #2 (GE Frame 6) – HRSG stack				01/11/2023 13:10	9.4	4.6	Operational	Acceptable
A7-2	L-630-F-003	CCPP Gas Turbine Generator #3 (GE Frame 6) – HRSG stack				-	-	-	Off-line during survey	Not tested in this survey
A8-2	L-630-F-004	CCPP Gas Turbine Generator #4 (GE Frame 6) – HRSG stack				01/11/2023 10:47	9.2	4.5	Operational	Acceptable
A9-2	L-630-F-005	CCPP Gas Turbine Generator #5 (GE Frame 6) – HRSG stack				01/11/2023 09:56	10	5.1	Operational	Acceptable
A13-1	L-551-FT-031	AGRU Incinerator – LNG Train 1	NO_x	350@ 15% O2 dry	175@ 15% O2 dry	-	-	-	Intermittently Online	Not tested in this survey
A14-1	L-552-FT-031	AGRU Incinerator – LNG Train 2				-	-	-	Intermittently Online	Not tested in this survey
A15	L-640-A-001-A	Heating Medium Furnaces	NO_x	350@ 15% O2 dry	175@ 15% O2 dry	03/11/2023 10:01	140	70	Operational	Acceptable
A16	L-640-A-001-B	Heating Medium Furnaces				03/11/2023 09:54	130	61	Operational	Acceptable

Attachment 2 - Table 6 of EPL228-05 for 2023-2024 – Stationary air emissions 2023-2024

Release Point Number	Sampling Location Number	Source	Monitoring Frequency	Parameter	Identified Air Quality Parameter	NOx as NO2 [mg/m^3]	CO [mg/m^3]	BTEX	H2S	Hg	Comments
A1	L-641-A-001	LNG Train 1 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)	Annually	NO_x as NO_2, CO, temperature, efflux velocity, volumetric flow rate	NO_x as NO_2 CO	50	50	NA	NA	NA	
A2	L-642-A-001	LNG Train 2 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)				15	12	NA	NA	NA	
A3	L-641-A-002	LNG Train 1 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)				6.7	13	NA	NA	NA	
A4	L-642-A-002	LNG Train 2 Refrigerant Compressor Driver Gas Turbine (GE Frame 7)				11	37	NA	NA	NA	
A5-1	L-780-GT-001	CCPP Gas Turbine Generator #1 (GE Frame 6) – conventional stack	Annually	NOx as NO2, CO, temperature, efflux velocity, volumetric flow rate	NOx as NO2 CO	-	-	NA	NA	NA	Off-line during survey / Intermittent use, when HRSG offline
A6-1	L-780-GT-002	CCPP Gas Turbine Generator #2 (GE Frame 6) – conventional stack				-	-	NA	NA	NA	Off-line during survey / Intermittent use, when HRSG offline
A7-1	L-780-GT-003	CCPP Gas Turbine Generator #3 (GE Frame 6) – conventional stack				-	-	NA	NA	NA	Off-line during survey / Intermittent use, when HRSG offline
A8-1	L-780-GT-004	CCPP Gas Turbine Generator #4 (GE Frame 6) – conventional stack				-	-	NA	NA	NA	Off-line during survey / Intermittent use, when HRSG offline
A9-1	L-780-GT-005	CCPP Gas Turbine Generator #5 (GE Frame 6) – conventional stack				-	-	NA	NA	NA	Off-line during survey / Intermittent use, when HRSG offline
A5-2	L-630-F-001	CCPP Gas Turbine Generator #1 (GE Frame 6) – HRSG stack				12	49	NA	NA	NA	
A6-2	L-630-F-002	CCPP Gas Turbine Generator #2 (GE Frame 6) – HRSG stack				9.4	140	NA	NA	NA	
A7-2	L-630-F-003	CCPP Gas Turbine Generator #3 (GE Frame 6) – HRSG stack				-	-	NA	NA	NA	Off-line during survey
A8-2	L-630-F-004	CCPP Gas Turbine Generator #4 (GE Frame 6) – HRSG stack				9.2	60	NA	NA	NA	
A9-2	L-630-F-005	CCPP Gas Turbine Generator #5 (GE Frame 6) – HRSG stack				10	59	NA	NA	NA	
A13-1	L-551-FT-031	AGRU Incinerator – LNG Train 1	Annually	NOx as NO2, CO, temperature, efflux velocity, volumetric flow rate	NOx as NO2 CO	-	-	NA	NA	NA	Off-line during survey
A13-2	L-551-SC-003	Acid Gas ex AGRU LP Flash OVHD Accumulator 551-V-004 to Acid Gas Heater 551-E-031	Monthly	BTEX, H2S, volumetric flow rate	BTEX H2S	NA	NA	See Note		NA	Monthly feed gas is available separately
A13-3	L-541-SC-001	Mercury free gas ex 541-S-001 Mercury Removal After Filter to AGRU Absorber 551-C-001	Monthly	Hg	Hg	NA	NA	NA	NA	See note	Monthly feed gas is available separately
A14-1	L-552-FT-031	AGRU Incinerator – LNG Train 2	Annually	NOx as NO2, CO, temperature, efflux velocity, volumetric flow rate	NOx as NO2 CO	-	-	NA	NA	NA	Off-line during survey
A14-2	L-552-SC-003	Acid Gas ex AGRU LP Flash OVHD Accumulator 552-V-004 to Acid Gas Heater 552-E-031	Monthly	BTEX, H2S, volumetric flow rate	BTEX H2S	NA	NA	See Note		NA	Monthly feed gas is available separately
A14-3	L-542-SC-001	Mercury free gas ex 542-S-001 Mercury Removal After Filter to AGRU Absorber 552-C-001	Monthly	Hg	Hg	NA	NA	NA	NA	See note	Monthly feed gas is available separately
A15	L-640-A-001-A	Heating Medium Furnaces	Annually	NOx as NO2, CO, temperature, efflux velocity, volumetric flow rate	NOx as NO2 CO	140	69	NA	NA	NA	
A16	L-640-A-001-B	Heating Medium Furnaces	Annually	NOx as NO2, CO, temperature, efflux velocity, volumetric flow rate	NOx as NO2 CO	130	63	NA	NA	NA	
A17	L-700-F-002	Ground flare #5 warm	all flare events	mass of hydrocarbons flared	N/A	NA	NA	NA	NA	NA	
A18	L-700-F-001-A/B	Ground flare #2 cold				NA	NA	NA	NA	NA	
A19	L-700-F-003	Ground flare #1 spare				NA	NA	NA	NA	NA	
A20	L-700-F-005-A/B	Tank flare #1 LNG				NA	NA	NA	NA	NA	
A21	L-700-F-005-A/B	Tank flare #2 LPG				NA	NA	NA	NA	NA	
A22	L-700-F-005-A/B	Tank flare #3 LNG/LPG				NA	NA	NA	NA	NA	
A23	L-700-F-005-A/B	Liquid flare				NA	NA	NA	NA	NA	