

APPENDIX B –DLNG ENVIRONMENT PROTECTION LICENCE TABLES

Table 1 – Authorised wastewater discharge points at DLNG

Authorised Discharge Point	Description	Location	Discharge Source
SC 2914	Jetty Outfall (Composite Sampler)	12.5235 S 130.8500 E	Reverse osmosis (RO) plant reject water
SC 2920	Jetty Outfall	12.3121 S 130.5154 E	
SC 2913	Irrigation Water (Composite Sampler)	12.5217 S 130.8680 E	Turbine air humidification system / boiler blowdown and water from the treated water holding tank (including tertiary treated sewage effluent)
SC 2919	Irrigation Water	12.3121 S 130.5154 E	
SC 2915	Sedimentation Pond Outfall 1	12.5236 S 138.8670 E	Stormwater runoff from process area (including the RO green sand filter backwash and discharge).
SC 2916	Sedimentation Pond Outfall 2	12.5175 S 130.8690 E	
SC 2917	Sedimentation Pond Outfall 3	12.5237 S 130.8730 E	

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Table 2 – Authorised wastewater discharge trigger values

Parameter	Units	Discharge Location							
		Irrigation Discharge ¹		Jetty Outfall				Sediment Ponds 1, 2 and 3 Discharge	
		Trigger Value	Frequency ²	Discharge Trigger Value	Frequency	Mixing Zone Trigger Value ³	Frequency ⁴	Trigger Value	Frequency ⁵
Field Measurements									
pH	-	pH 7-8.5	Monthly	pH 7-8.5	Monthly	7 - 8.5	Quarterly	pH 6-8.5	Monthly
Electrical conductivity	µs/cm	Not available	Monthly	Not available	Monthly	Not available	Quarterly	Not available	Monthly
Total suspended solids	mg/L	≤ 30	Monthly	≤ 30	Monthly	<10	Quarterly	≤ 75	Monthly
Turbidity	NTU	n	Monthly	20	Monthly	20	Quarterly	28	Monthly
Dissolved oxygen	DO% saturation	Not available	Monthly	Not available	Monthly	80 - 100	Quarterly	Not available	Monthly
Temperature	°C	Not available	Monthly	Not available	Monthly	Not available	Quarterly	Not available	Monthly
Environmental Indicators									
Ammonia nitrogen (NH ₃ -N)	µg/L	20	Annual	337	Quarterly	<20	Quarterly	94	Annual
Nitrate (NO ₃ -N)	µg/L	17	Annual	764	Quarterly	700	Quarterly	145	Annual
Nitrite (NO ₂ -N)	µg/L	17	Annual	27	Quarterly	Not available	Quarterly	17	Annual
Dissolved reactive phosphorous (PO ₄ -P)	µg/L	5	Annual	51	Biannually	5	Biannually	5	Annual
Chlorophyll-a	µg/L	2	Initial and then as required for biannual groundwater monitoring only	NA ⁶	NA ⁶	<2	Quarterly	NA ⁶	NA ⁶
Biological oxygen demand	mg/L	≤ 25	Monthly	≤ 25	Biannually	Not available	Biannually	≤ 25	Monthly

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		Irrigation Discharge ¹		Jetty Outfall				Sediment Ponds 1, 2 and 3 Discharge	
		Trigger Value	Frequency ²	Discharge Trigger Value	Frequency	Mixing Zone Trigger Value ³	Frequency ⁴	Trigger Value	Frequency ⁵
Total Recoverable Hydrocarbons	mg/L	< 6	Annual	< 6	Biannually	≤ laboratory reporting limit ⁷	Biannually	< 6	Annual
Total nitrogen	mg/L	≤ 40	Annual	≤ 40	Quarterly	<0.27	Quarterly	≤ 40	Annual
Total phosphorus	mg/L	≤ 10	Annual	≤ 10	Biannually	<0.020	Biannually	≤ 10	Annual
<i>E.coli</i>	MPN /100mL	≤ 75	Initial and then as required for biannual groundwater monitoring only	≤ 75	Biannually	<200	Biannually	≤ 305	Initial and then as required for in-field monitoring (biannually in first year)
<i>Enterococci</i>	MPN /100mL	50	Initial and then as required for biannual groundwater monitoring only	50	Biannually	50	Biannually	261	Initial and then as required for in-field monitoring (biannually in first year)
Metals & BTEX									
Arsenic	µg/L	10	Annual	Not available ⁸	Biannually	Not available	Biannually	Not available	Annual
Cadmium	µg/L	3.2	Monthly	5.5	Quarterly	5.5	Quarterly	5.5	Monthly
Chromium	µg/L	10	Annual	4.4	Biannually	4.4	Biannually	4.4	Annual
Copper	µg/L	69	Monthly	1.3	Quarterly	1.3	Quarterly	2.0	Monthly
Iron	µg/L	1,300	Annual	Not available	Biannually	Not available	Biannually	Not available	Annual
Lead	µg/L	10	Annual	4.4	Biannually	4.4	Biannually	4.4	Annual
Manganese	µg/L	15,500	Annual	Not available	Biannually	Not available	Biannually	Not available	Annual

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		Trigger Value	Frequency ²	Discharge Trigger Value	Frequency	Mixing Zone Trigger Value ³	Frequency ⁴	Trigger Value	Frequency ⁵
Mercury	µg/L	0.1	Monthly	0.4	Biannually	0.4	Biannually	0.4	Monthly
Nickel	µg/L	290	Annual	70	Quarterly	70	Quarterly	70	Annual
Silver	µg/L	1.4	Annual	1.4	Biannually	1.4	Biannually	1.4	Annual
Zinc	µg/L	1780	Monthly	15	Quarterly	15	Quarterly	1000	Monthly
BTEX	µg/L	700	Monthly	700	Biannually	700	Biannually	700	Monthly

¹ The Irrigation Discharge Trigger Values for Field Measurements, Environmental Indicators and BTEX are adopted from the Darwin Harbour Water Quality Objectives (DHWQO) and are intended to be applied at the source as Interim values for the purpose of this EPL Renewal. The Irrigation Discharge Trigger Values for Metals are interim trigger values developed by ConocoPhillips using the 80th percentile value of the current groundwater reference bore (BH1) dataset, which comprises of 16 data points including 11 consecutive data points collected as part of the development of the final site specific trigger values. The estimated completion date for the final site specific trigger values for the long term irrigation discharge management is June 2019.

² The monitoring frequency presented correlates to monitoring at the source. The frequency of groundwater monitoring is included in Table 4.

³ Relevant trigger values are to be applied at the mixing zone per conditions of the licence (Condition 59, Table 2 of this EPL). Trigger Values relating to the mixing zone are adopted from both the DHWQO for priority ambient water quality indicators for mid-estuary marine and estuarine systems of the Darwin Harbour Region, Interim Recreational Guidelines and Objectives for Primary Contact and default trigger values for toxicants and BTEX at 95% species level of protection for marine water as it relates to metals. Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra (ANZECC and ARMCANZ, 2000).

⁴ The licensee must ensure that all samples and field environmental data collected are representative of the discharge conditions at the time of sampling.

⁵ Monitoring to be conducted at least one month prior to first flush sediment pond discharge and monthly during sediment pond discharge events.

⁶ Trigger value for Chlorophyll-a is not applicable, given the context of the nature of the discharges. Chlorophyll-a is an in-field response indicator to eutrophication and not a stressor or toxicant, therefore N/A for sediment ponds.

⁷ If Total Recoverable Hydrocarbons are detected over the prescribed limits, per monitoring conditions of the licence, a silica gel clean-up is to be undertaken and samples re-analysed to remove false positive from natural, normally occurring hydrocarbons. Advice from analytical laboratories regarding the limit of reporting (LOR) for TRH in receiving environment surface waters shows significant variability depending on the method used and the chain length of the hydrocarbons analysed, and will range between 100 to 500 µg/L.

⁸ The Aquatic Health Unit has advised that the DHWQO are currently being reviewed and may be released by March/April 2019. DHWQO state that “*Local guidelines in this document have been derived for physico-chemical indicators and potential stressors, and do not address toxicants (such as heavy metals). Guideline values for toxicant indicators in water and sediment will continue to be sourced from ANZECC (2000) Guidelines.*” The ANZECC guidelines advise that there was insufficient data to derive a reliable trigger value for Arsenic, Iron and Manganese.

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Table 3 – Authorised air emission points

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Release Point Number	Source	Pollutant	Concentration Limit	Maximum mass emission rate ¹	Monitoring frequency ²
			mg/Nm ³	g/s	
U3101, U3102, U3103, U3104 and U3105	Power generation turbines	NO _x as NO ₂	70 @ 15% O ₂ dry	1	Biannually
		CO	32 @ 15% O ₂ dry	0.4	Biannually
		SO ₂	23 @ 15% O ₂ dry	0.2	Biannually
U1411, U1421, U1511, U1521, U1611 and U1621	Compressor turbines	NO _x as NO ₂	212 @ 15% O ₂ dry	25	Biannually
		CO	70 @ 15% O ₂ dry	5	Biannually
		SO ₂	65 @ 15% O ₂ dry	4.7	Biannually
K-1904	Acid gas incinerator	NO _x as NO ₂	64 @ 15% O ₂ dry	1.5	Quarterly
		CO	339 @ 15% O ₂ dry	3	Quarterly
		H ₂ S	5 @ 15% O ₂ dry	0.1	Quarterly
		SO ₂	194 @ 15% O ₂ dry	4.6	Quarterly
V1206 ^{4,5}	Solvent Regenerator Reflux Drum (Acid gas removal unit (vent) ³)	H ₂ S	136 Nm ³	1.5	Quarterly
		Benzene	16 Nm ³	0.18	Quarterly
B3801	Boiler	NO _x as NO ₂	190 @ 3% O ₂ dry	0.7	Biannually
		CO	42 @ 3% O ₂ dry	0.2	Biannually
		SO ₂	65 @ 3% O ₂ dry	0.25	Biannually

¹ Maximum mass emission rate per stack

² Stack testing methods in accordance with NSW EPA-recognised sampling standards and frequency in Table 3

³ For the purposes of the acid gas hot venting trial H₂S and benzene at the acid gas removal unit vent may exceed the concentration limits provided that the maximum mass emission rate is not exceeded.

⁴ For the purpose of condition 45 and the hot vent trial, the hot vent is angled at 45 degrees for improved dispersion.

⁵ The Acid Gas Removal Vent (V-1207) has no sample point. Samples are therefore taken from the Solvent Regenerator Reflux Drum (V-1206). There is no compositional difference between V1207 and V1206 as there is no opportunity for compositional change, acid gas travels between the two vessels via pipe of approximately 500m distance.

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Table 4 – Groundwater monitoring bore locations and frequency

Bore	Location	Monitoring frequency¹
BH1	12.52388 S 130.8753 E	Monthly ²
BH2	12.52099 S 130.8635 E	Biannually
BH3	12.52204 S 130.8637 E	Biannually
BH4	12.52316 S 130.8628 E	Biannually
BH5	12.52424 S 130.8638 E	Biannually
BH6	12.52455 S 130.8651 E	Biannually
BH7	12.52558 S 130.8641 E	Biannually

¹Biannual groundwater monitoring to be undertaken once in the wet season and once in the dry season for the analytes specified in Table 2 with the exception of chlorophyll-a, which does not need to be monitored in groundwater.

² Monthly monitoring to establish a baseline data set over a 24-month period, then reverting to Biannually thereafter.