



REPORT

Fairymeadow Road Irrigation Project Water Quality Report Jan - Mar 2015 (Quarter 1)

Q-4130-15-RP-0022

Australia Pacific LNG Upstream

This quarterly report provides the reporting requirements as described under the Water Supply Agreement, Beneficial Use Approval (Irrigation of associated water), and Beneficial Use Approval (Livestock drinking water) for water supplied via the Fairymeadow Road Irrigation Project .

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- **Should** indicates a recommended course of action
- **May or can** indicate a possible course of action.

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Terms, Abbreviations and Definitions

Term/Abbreviation	Definition
Australia Pacific LNG	Australia Pacific LNG Pty Limited
BUA	Beneficial use approval
CSG	Coal seam gas
CSG water	Refers to all CSG water streams, including untreated and treated CSG water
DEHP	Department of Environment and Heritage Protection (formerly part of DERM)
Fairymeadow Road Irrigation pipeline	Refers to the distribution water pipeline which will transfer treated CSG water, in either direction, between the Monreagh dam and the Condabri WTF
Monreagh dam	Refers to the irrigation storage dam of operating capacity 1873 ML treated water storage located on the Monreagh property
Supplier	Australia Pacific LNG
Treated CSG water	CSG water stream that has been treated to a quality such that it is suitable for its end use

1. Introduction

Australia Pacific LNG Pty Limited (Australia Pacific LNG) is a coal seam gas (CSG) to liquefied natural gas (LNG) joint venture between Origin Energy, Conoco Phillips and the Sinopec Group. The Australia Pacific LNG project proposes to supply CSG from the Walloons gas fields in south central Queensland to an LNG plant located on Curtis Island, near Gladstone, on the central Queensland coast.

To produce gas from a coal seam, the CSG water in the reservoir must first be withdrawn using a lift pump installed in the gas well. Flow from the gas well is separated into water and gas, from which the CSG water is distributed to a Water Treatment Facility (WTF). Water supplied to the Fairymeadow Road Irrigation Project (FRIP) is sourced from two WTFs - the Talinga WTF, and the Condabri WTF.

In supplying water to landholders via the FRIP, Australia Pacific LNG is obliged to comply with the following instruments:

- Water Supply Agreements (WSAs),
- General Beneficial Use Approval - Irrigation of associated water (the Irrigation General BUA) issued by (DEHP) in December 2013; and
- The General Beneficial Use Approval - Associated water (including coal seam gas water), otherwise known as Stock General BUA issued by DEHP in May 2014.

The *Stock General BUA* still requires domestic, stock, stock intensive drinking water and water for incidental land management activities to be compliant with the requirements of the ANZECC guidelines Tables 4.3.1 - 4.3.3 inclusive.

2. Executive Summary

This Quarter 1 report covers sampling from January 2015 to end March 2015 i.e. first quarter of 2015.

Laboratory testing of radionuclides in water samples take approximately 4 to 6 weeks. This waiting time contributes to the publication date of these quarterly reports.

The tests for radionuclides at both Talinga and Condabri WTFs are now conducted on a 6-monthly basis as mentioned in the FRIP Quality Report 2014 Quarter 2. This was attributed to the fact that three consecutive samples were shown to be less than 50% of the Stock BUA water quality limits

Water Quality Ex- Talinga WTF (Sample Point 4120-2)

35 water quality parameters including radionuclides were sampled (Table 2). The radionuclides sampled were radium 226, radium 228, uranium 238, gross alpha and gross beta.

None of the parameters exceeded any of the specified irrigation or stock drinking water limits stated within the WSA and the BUAs (refer Section 7).

Water Quality Ex- Condabri WTF (Sample Point 4520-4)

30 water quality parameters were sampled (Table 3). None of the 30 parameters exceeded any of the specified irrigation or stock drinking water limits stated within the WSA and the BUAs (refer Section 7).

Radionuclide results were provided in the FRIP Quality Report 2014 Quarter 3, hence not a requirement for inclusion in this report.

3. Water Supply Agreements

Australia Pacific LNG as the Supplier must comply with the WSA's *Water Quality Notification Clause* as follows:

From the Supply commencement Date, the Supplier must:

- a) once every fortnight (or in accordance with the requirements of the Beneficial Use Approval) conduct a water quality test on water treated at and discharged from the Condabri WTF and the Talinga WTF;
- b) at least once each Quarter, give the Customer a copy of the results of the water quality tests carried out in accordance with clause (a) (*this report*); and
- c) as soon as reasonably practicable after the Supplier becomes aware that water treated at and discharge from the Condabri WTF or the Talinga WTF exceeds the ANZECC Specifications - detailed as the specifications listed in Table 1 in Schedule 5 (provided that the Supplier reasonably believes the Customer has taken such water);
 - i. notify the Customer of that occurrence;
 - ii. ensure that a risk assessment is undertaken in accordance with the ANZECC Guidelines to assess the potential impact of that water to standing crops and the potential for excessive accumulation of contaminants in surface soils
 - iii. use reasonable endeavours to consult with the Customer about the risk assessment;
 - iv. ensure that, based on the results of that risk assessment, such action that the Supplier considers appropriate (in accordance with good industry practice) is taken to mitigate the risks identified in the risk assessment; and
 - v. notify the Customer of the outcome of the risk assessment and the nature of any actions taken by the Supplier in accordance with clause (iv)

Water quality results for Quarter 1 of 2015 are attached in Section 7. All water quality results were compliant with the WSA. Section 2 discusses these results.

4. General Beneficial Use Approval (Irrigation of Associated Water)

Further to the WSA, the Department of Environment and Heritage Protection (DEHP) issued the standards expected for the irrigation of CSG water via the Irrigation General BUA in December 2013. DEHP has designed these standards to ensure that the irrigation of CSG water carries no greater risk than what is acceptable for any other irrigation scheme.

The Irrigation General BUA can be accessed at

<http://www.ehp.qld.gov.au/management/non-mining/documents/general-bua-irrigation-of-associated-water.pdf>

The BUA monitoring requires at a minimum:

- fortnightly sampling for SAR, pH and EC; and
- initially monthly for other parameters, and then six-monthly after three consecutive detects which is less than 50 per cent of the water quality parameters listed in the BUA Appendix 1.

Water quality results for the Quarter 1 of 2015 are attached in Section 7. **All** water quality results sampled were compliant with the Irrigation General BUA. Section 2 discusses these results.

5. General Beneficial use Approval (Livestock Drinking Water)

DEHP has detailed the standards expected for a range of other beneficial uses of CSG water, including livestock watering. These standards were designed to ensure that CSG water is appropriately conditioned for the purpose authorised.

The Stock General BUA can be accessed at

<http://www.ehp.qld.gov.au/management/non-mining/documents/general-bua.pdf>

Water quality results for the Quarter 1 of 2015 are attached in Section 7. All water quality results sampled were compliant with the Stock General BUA. Section 2 discusses these results.

6. Sample Points and Period

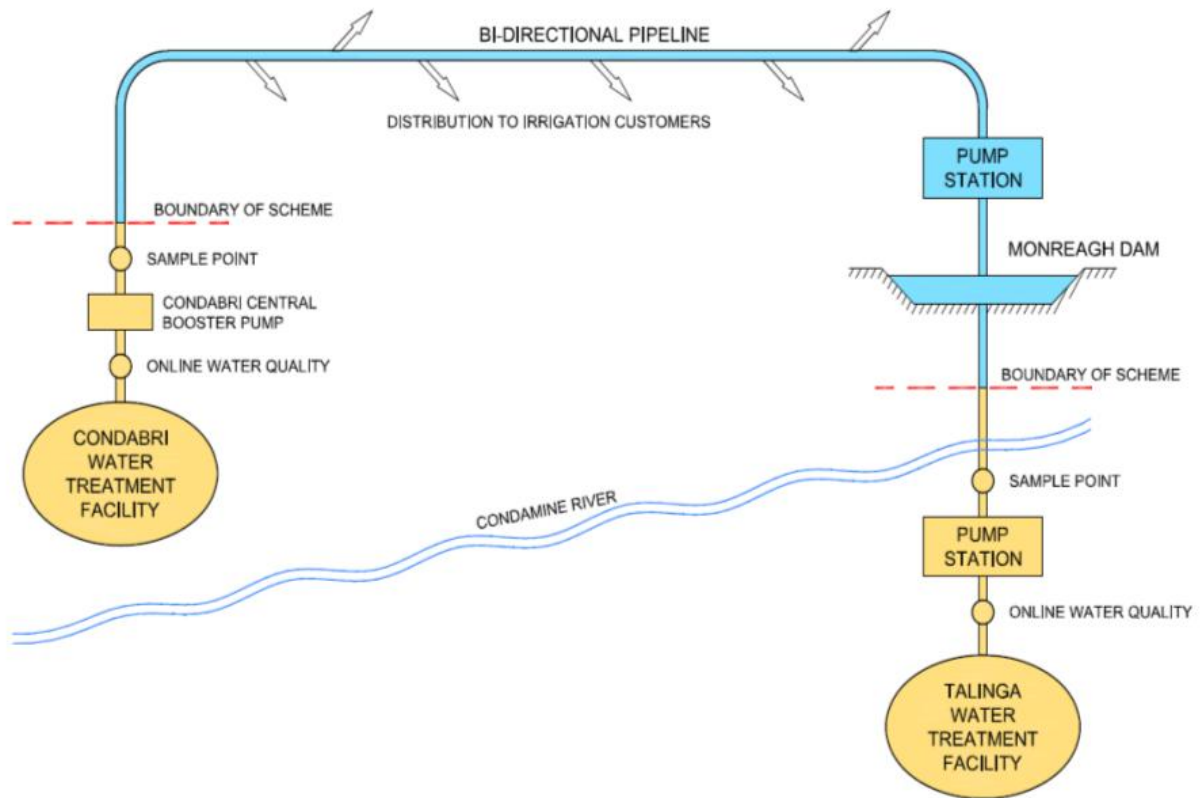


Figure 1: Fairymeadow Road Irrigation sample points

As the Scheme Operator, Australia Pacific LNG monitors the quality of the Resource entering the Scheme at two (2) Points of Supply as shown in Figure 1. Their locations are described in Table 1.

Table 1: Points of Supply

Point of Supply Sample point No.	Description	Longitude	Latitude
4520-4	Downstream of Condabri WTF	150°11'26.53830"	-26°48'11.33383"
4120-2	Downstream of Talinga WTF	150°20'52.37844"	-26°45'14.95502"

The water sampling results in this report are from:

- Talinga sample point 4120-2 between January 2015 to March 2015; and
- Condabri sample point 4520-4 for the same period.

7. Sampling Results

Table 2: FRIP Water Quality Report for Quarter 1 2015 at Sample Point 4120-2 ex Talinga WTF

Sample Point 4120-2	WSA Water Quality Limit	Irrigation BU A Water Quality Limit	Stock BU A Water Quality Limit	Units	Monitoring Results for the Quarter 1 Reporting Period						Sampling Frequency (F-fortnightly; M-monthly)
					Total Number of Samples Taken	Number of Times Parameter Detected	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	95 th Percentile	
pH	6.0 - 8.5	6.0 - 8.5	-	-	7	7	7.6	8.4	8	8.3	F
Electrical Conductivity	1000	950	-	µS/cm	7	7	440	500	461	488	F
Sodium Absorption Ratio	6	6	-	-	7	7	5	5	5	5	F
Total Dissolved Solids			4000*	mg/L	7	7	230	250	239	250	F
Aluminium	5	20	5	mg/L	7	0	Not Detected				M
Arsenic	0.5	2	0.5	mg/L	7	0	Not Detected				M
Boron	1	1	5	mg/L	7	7	0.57	0.68	0.61	0.68	M
Cadmium	0.01	0.05	0.01	mg/L	7	0	Not Detected				M
Calcium	1000	-	-	mg/L	7	7	9.4	11	10	10.7	F
Chloride	175	-	-	mg/L	7	7	80	92	85	91	F
4	1	-	-	mg/L	6	0	Not Detected				M
Chromium (Total)	-	1	1	mg/L	7	1	0.0011	0.0011	0.0011	0.0011	M
Cobalt	-	0.1	1	mg/L	7	0	Not Detected				M
Copper	0.4	5	1*	mg/L	7	2	0.0005	0.003	0.0018	0.0029	M
Fluoride	2	2	2	mg/L	7	7	0.15	0.2	0.17	0.197	M

Sample Point 4120-2	WSA Water Quality Limit	Irrigation BUA Water Quality Limit	Stock BUA Water Quality Limit	Units	Monitoring Results for the Quarter 1 Reporting Period						Sampling Frequency (F-for fortnightly; M-monthly)
					Total Number of Samples Taken	Number of Times Parameter Detected	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	95 th Percentile	
Hardness as CaCO3	60	-	-	mg/L	7	7	45	53	48	52	F
Iron	10	10	-	mg/L	7	7	0.0057	1	0.163	0.719	M
Lead	0.12	5	0.1	mg/L	7	1	0.00012	0.00012	0.00012	0.00012	M
Lithium	2.5	2.5	-	mg/L	7	2	0.0075	0.026	0.0168	0.0251	M
Manganese	10	10	-	mg/L	7	5	0.0006	0.026	0.0065	0.0214	M
Mercury	0.002	0.002	0.002	mg/L	7	0	Not Detected				M
Molybdenum	0.05	0.05	0.15	mg/L	7	1	0.00021	0.00021	0.00021	0.00021	M
Nickel	1	2	1	mg/L	7	5	0.00033	0.009	0.0045	0.0088	M
Nitrogen (Total)	110	-	-	mg/L	7	7	0.32	0.5	0.39	0.49	F
Phosphorus	12	-	-	mg/L	7	2	0.026	0.026	0.026	0.026	F
Selenium	0.02	-	0.02	mg/L	7	0	Not Detected				M
Sodium	115	-	-	mg/L	7	7	73	82	77	81	F
Sulphate as SO4	1000	-	-	mg/L	7	3	1	3.2	1.8	3	F
Uranium	0.1	-	0.2	mg/L	7	0	Not Detected				M
Zinc	20	5	20	mg/L	7	4	0.001	0.017	0.0065	0.0154	M
Radium-226	-	-	5	Bq/L	1	0	Not Detected				M
Radium-228	-	-	2	Bq/L	1	0	Not Detected				M
Uranium-238	-	-	0.2	Bq/L	1	0	Not Detected				M
Gross Alpha	-	-	0.5	Bq/L	1	0	Not Detected				M
Gross Beta (excluding K-40)	-	-	0.5	Bq/L	1	0	Not Detected				M

* For beef cattle - other limits apply for other livestock

Table 3: FRIP Water Quality Report for Quarter 1 2015 at Sample Point 4520-2 ex Condabri WTF

Sample Point 4520-4	WSA Water Quality Limit	Irrigation BUA Water Quality Limit	Stock BUA Water Quality Limit	Units	Monitoring Results for the Quarter 1 Reporting Period						Sampling Frequency (F-formightly; M-monthly)
					Total Number of Samples Taken	Number of Times Parameter Detected	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	95 th Percentile	
pH	6.0 - 8.5	6.0 - 8.5	-		7	7	7.6	8	7.7	7.9	F
Electrical Conductivity	1000	950	-	µS/cm	7	7	280	320	300	317	F
Sodium Absorption Ratio	6	6	-	-	7	7	2	4	3	4	F
Total Dissolved Solids			4000*	mg/L	7	7	140	160	150	160	F
Aluminium	5	20	5	mg/L	7	0	Not Detected				M
Arsenic	0.5	2	0.5	mg/L	7	0	Not Detected				M
Boron	1	1	5	mg/L	7	7	0.14	0.26	0.22	0.254	M
Cadmium	0.01	0.05	0.01	mg/L	7	0	Not Detected				M
Calcium	1000	-	-	mg/L	7	7	7.7	10	8.4	9.5	F
Chloride	175	-	-	mg/L	7	7	50	65	56	63	F
Chromium (VI)	-	1	1	mg/L	7	0	Not Detected				M
Chromium (Total)	1	-	-	mg/L	7	0	Not Detected				M
Cobalt	-	0.1	1	mg/L	7	0	Not Detected				M
Copper	0.4	5	1*	mg/L	7	0	Not Detected				M
Fluoride	2	2	2	mg/L	7	7	0.069	0.11	0.094	0.11	M

Sample Point 4520-4	WSA Water Quality Limit	Irrigation BUA Water Quality Limit	Stock BUA Water Quality Limit	Units	Monitoring Results for the Quarter 1 Reporting Period						Sampling Frequency (F-for-nightly; M-monthly)
					Total Number of Samples Taken	Number of Times Parameter Detected	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	95 th Percentile	
Hardness as CaCO ₃	60	-	-	mg/L	7	7	29	47	39	45	F
Iron	10	10	-	mg/L	7	1	0.001	0.001	0.001	0.001	M
Lead	0.12	5	0.1	mg/L	7	0	Not Detected				M
Lithium	2.5	2.5	-	mg/L	7	1	0.021	0.021	0.021	0.021	M
Manganese	10	10	-	mg/L	7	0	Not Detected				M
Mercury	0.002	0.002	0.002	mg/L	7	0	Not Detected				M
Molybdenum	0.05	0.05	0.15	mg/L	7	0	Not Detected				M
Nickel	1	2	1	mg/L	7	0	Not Detected				M
Nitrogen (Total)	110	-	-	mg/L	7	7	0.18	0.44	0.27	0.43	F
Phosphorus	12	-	-	mg/L	7	1	0.025	0.025	0.025	0.025	F
Selenium	0.02	-	0.02	mg/L	7	0	Not Detected				M
Sodium	115	-	-	mg/L	7	7	36	55	45	53	F
Sulphate as SO ₄	1000	-	-	mg/L	7	0	Not Detected				F
Uranium	0.1	-	0.2	mg/L	7	0	Not Detected				M
Zinc	20	5	20	mg/L	7	0	Not Detected				M
Radium-226	-	-	5	Bq/L	0						M
Radium-228	-	-	2	Bq/L	0						M
Uranium-238	-	-	0.2	Bq/L	0						M
Gross Alpha	-	-	0.5	Bq/L	0						M
Gross Beta (excluding K-40)	-	-	0.5	Bq/L	0						M

* For beef cattle - other limits apply for other livestock