

ENVIRONMENT PROTECTION LICENCE 20350 MONITORING DATA

Licence Holder:	Santos NSW (Eastern) Pty Ltd
Premises:	Narrabri Gas Field X-Line Road, Narrabri, NSW 2390
Licence No:	20350
EPL LINK:	https://apps.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=20350&id=20350&option=licence&searchrange=licence&range=POEO%20lice Version 28SEP2023
EPL Period:	November 1st 2024 to January 31st 2025
Reporting Period:	Quarter 3 November 2024 - January 2025
Published Date:	Feb-25
Monitoring Location:	Refer to Table 1
Scheduled Activity:	Coal seam gas exploration, assessment and production
General Notes:	Monitoring Point 80, 81 & 82 - no sample required in accordance with EPL20350 Condition M2.7 . Monitoring Point 77 - no sample required in accordance with EPL20350 Condition M2.7 (Plant not operating). Monitoring Point 69, 70 & 76 - no sample required in accordance with EPL20350 Condition M2.8 and M2.9. Monitoring Point 83, 84, 85 & 86 - no sample required in accordance with EPL20350 Condition M2.6. Monitoring points visited and reported dry : 18,26, 28, 38, 39, 40, 43, 62, 66 and 78. Monitoring points 47, 48 and 49: water pressure recorded in PSI. Water level results (SWL) have been calculated. Locations 110, 112-116 not yet commissioned. Grab samples for monitoring points with "Special Frequency 2" are taken annually in June unless results trigger above baseline values - one sample taken within the monitoring period.

Table 1: EPL20350 Water Monitoring Locations

EPA Identification No	Monitoring Type	Location	Latitude	Longitude
7	Groundwater Quality Monitoring	BWD27PRUPS02	-30.66325	149.66586
8	Groundwater Quality Monitoring	BWD27PRLPS03	-30.66313	149.66589
9	Groundwater Quality Monitoring	BWD26PRUPS01	-30.62224	149.60153
10	Groundwater Quality Monitoring	BWD26PRLPS02	-30.62236	149.60145
11	Groundwater Quality Monitoring	DWH14PRUPS01	-30.54892	149.75932
12	Groundwater Quality Monitoring	DWH14PRLPS02	-30.54917	149.75918
13	Groundwater Quality Monitoring	DWH14PRPUR03	-30.54904	149.75925
14	Groundwater Quality Monitoring	DWH3PRUPS01	-30.65363	149.73657
15	Groundwater Quality Monitoring	DWH3PRLPS02	-30.65354	149.73671
18	Groundwater Quality Monitoring	BWD27PRORA01	-30.66339	149.66583
20	Groundwater Quality Monitoring	BHN14PRORA01	-30.47186	149.57446
21	Groundwater Quality Monitoring	BHN14PRUPS02	-30.47173	149.57440
26	Groundwater Quality Monitoring	BWDMW12S	-30.63189	149.64828
27	Groundwater Quality Monitoring	BWDMW12D	-30.63188	149.64829
28	Groundwater Quality Monitoring	BWDMW12I	-30.63189	149.64830
37	Groundwater Quality Monitoring	LWDMW1D	-30.49124	149.61902
38	Groundwater Quality Monitoring	LWDMW1S	-30.49124	149.61903
39	Groundwater Quality Monitoring	LWDMW1I	-30.49125	149.61905
40	Groundwater Quality Monitoring	LWDMW2S	-30.50545	149.61643
41	Groundwater Quality Monitoring	LWDMW2D	-30.50545	149.61642
42	Groundwater Quality Monitoring	LWDMW3D	-30.50645	149.62451
43	Groundwater Quality Monitoring	LWDMW3S	-30.50644	149.62452
44	Groundwater Level Monitoring	DWH8AQGDGY01	-30.55016	149.76832
45	Groundwater Level Monitoring	DWH8AQGARK02	-30.55016	149.76832
46	Groundwater Level Monitoring	DWH8AQGPOR03	-30.55016	149.76832
47	Groundwater Level Monitoring	BWD28QGUPS01	-30.66802	149.64007
48	Groundwater Level Monitoring	BWD28QGLPS01	-30.66802	149.64007
49	Groundwater Level Monitoring	BWD28QGPUR01	-30.66802	149.64007
56	Groundwater Quality Monitoring	WPKMW9D	-30.36301	149.66006
57	Groundwater Quality Monitoring	WPKMW9S	-30.36299	149.66007
59	Groundwater Quality Monitoring	WPKMW13I	-30.36122	149.65886
60	Groundwater Quality Monitoring	WPKMW13S	-30.36122	149.65889
61	Groundwater Quality Monitoring	WPKMW14D	-30.36252	149.65694
62	Groundwater Quality Monitoring	WPKMW14S	-30.36253	149.65695
63	Groundwater Quality Monitoring	WPKMW15D	-30.36086	149.65691
64	Groundwater Quality Monitoring	WPKMW15S	-30.36088	149.65691
65	Groundwater Quality Monitoring	WPKMW16D	-30.36313	149.65370
66	Groundwater Quality Monitoring	WPKMW16S	-30.36315	149.65369
69	Produced Water Storage Pond	BWDPD2	-30.63370	149.64930
70	Produced Water Storage Pond	BWDPD3	-30.63240	149.64890
71	Produced Water Storage Pond	LWDPD1CELL4	-30.49437	149.62000
72	Produced Water Storage Pond	LWDPD1CELL3	-30.49608	149.61991
73	Produced Water Storage Pond	LWDPD1CELL2	-30.49788	149.61962

EPA Identification No	Monitoring Type	Location	Latitude	Longitude
74	Produced Water Storage Pond	LWDPD1CELL1	-30.49960	149.61927
75	Produced Water Storage Pond	TFDPD1	-30.36180	149.65950
76	Produced Water Storage Pond	TFDPD2	-30.36130	149.65830
77	Treated Water Quality Monitoring	LWWTPDM1	-30.50339	149.62206
78	Groundwater Quality Monitoring	WPKMW18S	-30.36193	149.66295
79	Groundwater Quality Monitoring	WPKMW18I	-30.36189	149.66296
80	Groundwater Quality Monitoring	LWDMW4	-30.49852	149.62643
81	Groundwater Quality Monitoring	LWDMW5	-30.49607	149.63064
82	Groundwater Quality Monitoring	LWDMW6	-30.49726	149.63251
83	Soil Quality Monitoring	LWDSMP1	-30.49943	149.62502
84	Soil Quality Monitoring	LWDSMP2	-30.49756	149.62727
85	Soil Quality Monitoring	LWDSMP3	-30.49763	149.63153
86	Soil Quality Monitoring	LWDSMP4	-30.50092	149.63042
87	Groundwater Level Monitoring	BHNS1PRLPS01		
88	Groundwater Level Monitoring	BHNS1PRDGY02		
89	Groundwater Level Monitoring	BHNS1PRPOR03		
90	Groundwater Level Monitoring	BHNS1PRMCF04		
91	Groundwater Level Monitoring	BHNS1PRMCF05		
92	Groundwater Level Monitoring	BHNS1PRMCF06		
93	Groundwater Level Monitoring	BWD6PRLPS01		
94	Groundwater Level Monitoring	BWD6PRDGY02		
95	Groundwater Level Monitoring	BWD6PRMCF03C		
96	Groundwater Level Monitoring	BWD6PRMCF03D		
97	Groundwater Level Monitoring	BWD6PRMCF04		
98	Groundwater Level Monitoring	BWD6PRMCF05		
99	Groundwater Level Monitoring	DWH9PRLPS01		
100	Groundwater Level Monitoring	DWH9PRDGY02		
101	Groundwater Level Monitoring	DWH9PRPOP03		
102	Groundwater Level Monitoring	DWH9PRMCF03		
103	Groundwater Level Monitoring	DWH9PRMCF04		
104	Groundwater Level Monitoring	DWH9PRMCF05		
105	Groundwater Level Monitoring	DWH43PRLPS01		
106	Groundwater Level Monitoring	DWH43PRDGY02		
107	Groundwater Level Monitoring	DWH43PRPOR03		
108	Groundwater Level Monitoring	DWH43PRMCF03		
109	Groundwater Level Monitoring	DWH43PRMCF04		
110	Groundwater Quality Monitoring	DWH43PRMCF05		
111	Groundwater Quality Monitoring	DWH35PRLPS01		
112	Groundwater Quality Monitoring	DWH35PRDGY02		
113	Groundwater Quality Monitoring	DWH35PRPOR03		
114	Groundwater Quality Monitoring	DWH35PRMCF04		
115	Groundwater Quality Monitoring	DWH35PRMCF05		
116	Groundwater Quality Monitoring	DWH35PRMCF06		

Note:

Monitoring points removed in accordance with Environmental Protection Licence (EPL) 23050 amended 11th April 2021 (16, 17, 22, 23, 24, 25, 29, 30, 31, 32, 33, 34, 35, 36, 50, 51, 52, 53, 55, 58, 67 and 68).

Monitoring points 110, 112-116 coordinates to be confirmed.

TABLE 2: GROUNDWATER QUALITY MONITORING (In situ - Quarterly)

		EPA Identification No	7	8	9	10	11	12
		Location	BWD27PRUPS02	BWD27PRLPS03	BWD26PRUPS01	BWD26PRLPS02	DWH14PRUPS01	DWH14PRLPS02
		Date	15/01/2025	15/01/2025	17/01/2025	17/01/2025	14/01/2025	14/01/2025
		Sample Method	in situ	in situ	in situ	in situ	in situ	in situ
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	3.9	1.9	1.02	1.3	1.41	3.3
Electrical Conductivity	µS/cm	-	135	204	76	136	219	188
pH	pH Unit	-	5.26	5.28	5.36	5.8	5.26	5.24
Redox Potential	mV	-	65	24	27	33	85	37
Standing Water Level	mTOC	-	39.07	38.67	29.69	29.14	53.67	54.31

		EPA Identification No	13	14	15	18	20	21
		Location	DWH14PRPUR03	DWH3PRUPS01	DWH3PRLPS02	BWD27PRORA01	BHN14PRORA01	BHN14PRUPS02
		Date	14/01/2025	13/01/2025	13/01/2025	15/01/2025	13/12/2024	13/12/2024
		Sample Method	in situ	in situ	in situ	No sample - dry	in situ	in situ
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	1	1.77	1.8	-	1.6	0.4
Electrical Conductivity	µS/cm	-	752	125	130	-	536	452
pH	pH Unit	-	7.08	5.06	5.01	-	6.74	7.1
Redox Potential	mV	-	-111	93	-45	-	87	-48
Standing Water Level	mTOC	-	53.69	67.62	67.82	-	26.51	15.1

		EPA Identification No	26	27	28	37	38	39
		Location	BWDMW12S	BWDMW12D	BWDMW12I	LWDMW1D	LWDMW1S	LWDMW1I
		Date	12/12/2024	12/12/2024	12/12/2024	13/12/2024	13/12/2024	13/12/2024
		Sample Method	No sample - dry	in situ	No sample - dry	in situ	No sample - dry	No sample - dry
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	-	5.3	-	0.99	-	-
Electrical Conductivity	µS/cm	-	-	4321	-	2260	-	-
pH	pH Unit	-	-	6.93	-	6.33	-	-
Redox Potential	mV	-	-	-90	-	25	-	-
Standing Water Level	mTOC	-	-	30.97	-	30.03	-	-

		EPA Identification No	40	41	42	43	56	57
		Location	LWDMW2S	LWDMW2D	LWDMW3D	LWDMW3S	WPKMW9D	WPKMW9S
		Date	13/12/2024	13/12/2024	13/12/2024	13/12/2024	10/12/2024	10/12/2024
		Sample Method	No sample - dry	in situ	in situ	No sample - dry	in situ	in situ
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	-	1.1	1.2	-	0.9	0.62
Electrical Conductivity	µS/cm	-	-	1310	955	-	1220	3510
pH	pH Unit	-	-	6.7	6.15	-	7.88	7.79
Redox Potential	mV	-	-	48	51	-	28	-35
Standing Water Level	mTOC	-	-	26.1	21.13	-	15.36	15.64

TABLE 2: GROUNDWATER QUALITY MONITORING (In situ - Quarterly)

		EPA Identification No	59	60	61	62	63	64
		Location	WPKMW13I	WPKMW13S	WPKMW14D	WPKMW14S	WPKMW15D	WPKMW15S
		Date	10/12/2024	10/12/2024	10/12/2024	10/12/2024	10/12/2024	10/12/2024
		Sample Method	in situ	in situ	in situ	No sample - dry	in situ	in situ
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	0.58	1.3	2.1	-	0.51	2.73
Electrical Conductivity	µS/cm	-	1290	3115	1203	-	1285	8035
pH	pH Unit	-	7.91	7.43	8.21	-	7.86	7.77
Redox Potential	mV	-	-81	-91	26	-	38	49
Standing Water Level	mTOC	-	16.72	16.89	20.85	-	22.16	22.4

		EPA Identification No	65	66	78	79	87	93
		Location	WPKMW16D	WPKMW16S	WPKMW18S	WPKMW18I	BHNS1PRLPS01	BWD6PRLPS01
		Date	10/12/2024	10/12/2024	10/12/2024	10/12/2024	15/01/2025	17/01/2025
		Sample Method	in situ	No sample - dry	No sample - dry	in situ	in situ	in situ
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	2.61	-	-	-	1.8	1.1
Electrical Conductivity	µS/cm	-	1221	-	-	-	377	175
pH	pH Unit	-	7.65	-	-	-	7.42	6.6
Redox Potential	mV	-	71	-	-	-	-127	71
Standing Water Level	mTOC	-	26.55	-	-	16.02	23.09	28.53

		EPA Identification No	98	99	104	105	111
		Location	BWD6PRMCF05	DWH9PRLPS01	DWH9PRMCF05	DWH43PRLPS01	DWH35PRLPS01
		Date		16/01/2025		16/01/2025	17/01/2025
		Sample Method	No sample available	in situ	No sample available	in situ	in situ
Parameter	Units	LOR	RESULT	RESULT	RESULT	RESULT	RESULT
Dissolved Oxygen	mg/L	-	result not required	-	result not required	-	-
Electrical Conductivity	µS/cm	-	result not required	235	result not required	348	182
pH	pH Unit	-	result not required	6.52	result not required	7.47	6.86
Redox Potential	mV	-	result not required	-125	result not required	-127	61
Standing Water Level	mTOC	-	-	46.48	-	118.37	43.4

TABLE 2: GROUNDWATER QUALITY MONITORING (Representative Sample - Special Frequency 2)

		EPA Identification No
		Location
		Date
		Sample Method
Parameter	Units	LOR
Aluminium	mg/L	0.01
Ammonia as N	mg/L	0.01
Arsenic	mg/L	0.001
Barium	mg/L	0.001
Beryllium	mg/L	0.001
Bicarbonate Alkalinity as CaCO ₃	mg/L	1
Boron	mg/L	0.05
Bromide	mg/L	0.010
Cadmium	mg/L	0.0001
Calcium	mg/L	1
Carbonate Alkalinity as CaCO ₃	mg/L	1
Chloride	mg/L	1
Chromium	mg/L	0.001
Cobalt	mg/L	0.001
Copper	mg/L	0.001
Fluoride	mg/L	0.1
Iron	mg/L	0.05
Lead	mg/L	0.001
Magnesium	mg/L	1
Manganese	mg/L	0.001
Mercury	mg/L	0.0001
Methane	mg/L	0.010
Molybdenum	mg/L	0.001
Nickel	mg/L	0.001
Nitrate as N	mg/L	0.01
Nitrite as N	mg/L	0.01
Potassium	mg/L	1
Reactive Phosphorus	mg/L	0.01
Selenium	mg/L	0.01
Sodium	mg/L	1
Strontium (Dissolved)	mg/L	0.001
Sulfate as SO ₄ 2-	mg/L	1
Total Dissolved Solids @ 180°C	mg/L	10
Uranium	mg/L	0.001
Vanadium	mg/L	0.01
Zinc	mg/L	0.005

TABLE 3: TREATED WATER QUALITY MONITORING

		EPA Identification No	77 LWWTPDM1	77 LWWTPDM1	77 LWWTPDM1
		Location	No sample - plant not operating	No sample - plant not operating	No sample - plant not operating
		Date			
		Sample Method			
Parameter	Units	LOR	RESULT	RESULT	RESULT
Ammonia as N	mg/L	0.01	-	-	-
Bicarbonate Alkalinity as CaCO ₃	mg/L	1	-	-	-
Boron	mg/L	0.05	-	-	-
Calcium	mg/L	1	-	-	-
Carbonate Alkalinity as CaCO ₃	mg/L	1	-	-	-
Chloride	mg/L	1	-	-	-
Electrical Conductivity	µS/cm	-	-	-	-
Fluoride	mg/L	0.1	-	-	-
Magnesium	mg/L	1	-	-	-
Nitrate as N	mg/L	0.01	-	-	-
Nitrite as N	mg/L	0.01	-	-	-
pH	pH Unit	-	-	-	-
Potassium	mg/L	1	-	-	-
Reactive Silica	mg/L	1	-	-	-
Sodium Adsorption Ratio	-	0.01	-	-	-
Sodium	mg/L	1	-	-	-
Sulfate as SO ₄ 2-	mg/L	1	-	-	-
Total Alkalinity (as CaCO ₃)	mg/L	1	-	-	-
Total Dissolved Solids @180°C	mg/L	10	-	-	-
Total Hardness (as CaCO ₃)	mg/L	1	-	-	-
Total Nitrogen (as N)	mg/L	0.5	-	-	-
Total Phosphorus (as P)	mg/L	0.01	-	-	-
Total Residual Chlorine	mg/L		-	-	-
Turbidity	NTU	0.1	-	-	-

TABLE 4: PRODUCED WATER STORAGE QUALITY MONITORING

		EPA Identification No	71	EPA Identification No	72	EPA Identification No	73	EPA Identification No	74	EPA Identification No	75
		Location	LWDPD1CELL4	Location	LWDPD1CELL3	Location	LWDPD1CELL2	Location	LWDPD1CELL1	Location	TFDPD1
		Date	18/01/2025	Date	18/01/2025	Date	18/01/2025	Date	18/01/2025	Date	18/01/2025
		Sample Method	Field Sample	Sample Method	Field Sample	Sample Method	Field Sample	Sample Method	Field Sample	Sample Method	Field Sample
Parameter	Units	LOR	RESULT	LOR	RESULT	LOR	RESULT	LOR	RESULT	LOR	RESULT
Aluminium	mg/L	0.10		0.10		0.10		0.10		0.01	
Ammonia as N	mg/L	0.01		0.01		0.01		0.01		0.01	
Arsenic	mg/L	0.010		0.010		0.010		0.010		0.001	
Barium	mg/L	0.010		0.010		0.010		0.010		0.001	
Beryllium	mg/L	0.010		0.010		0.010		0.010		0.001	
Bicarbonate Alkalinity as CaCO3	mg/L	1		1		1		1		1	
Boron	mg/L	0.10		0.10		0.10		0.10		0.05	
Bromide	mg/L	0.010		0.010		0.010		0.010		0.010	
Cadmium	mg/L	0.0010		0.0010		0.0010		0.0010		0.0001	
Calcium	mg/L	1		1		1		1		1	
Carbonate Alkalinity as CaCO3	mg/L	1		1		1		1		1	
Chloride	mg/L	1		1		1		1		1	
Chromium	mg/L	0.010		0.010		0.010		0.010		0.001	
Cobalt	mg/L	0.010		0.010		0.010		0.010		0.001	
Copper	mg/L	0.010		0.010		0.010		0.010		0.001	
Dissolved Oxygen	mg/L		7.8		6.5		7.3		6.1		0.35
Electrical Conductivity	µS/cm	1	32356	1	56103	1	44789	1	39141	1	14381
Iron	mg/L	0.10		0.10		0.10		0.10		0.05	
Lead	mg/L	0.010		0.010		0.010		0.010		0.001	
Magnesium	mg/L	1		1		1		1		1	
Manganese	mg/L	0.010		0.010		0.010		0.010		0.001	
Mercury	mg/L	0.0001		0.0001		0.0001		0.0001		0.0001	
Molybdenum	mg/L	0.010		0.010		0.010		0.010		0.001	
Nickel	mg/L	0.010		0.010		0.010		0.010		0.001	
Nitrate as N	mg/L	0.10		0.01		0.01		0.10		0.01	
Nitrite as N	mg/L	0.01		0.01		0.01		0.10		0.01	
pH	pH Unit	0.01	9.61	0.01	9.53	0.01	9.51	0.01	9.28	0.01	8.64
Potassium	mg/L	1		1		1		1		1	
Redox potential	mV		-96		-81		-93		-110		-28
Selenium	mg/L	0.10		0.10		0.10		0.10		0.01	
Sodium	mg/L	1		1		1		1		1	
Sodium Adsorption Ratio	-	0.10		0.10		0.10		0.10		0.01	
Strontium	mg/L	0.010		0.010		0.010		0.010		0.001	
Sulfate as SO4 2-	mg/L	10		1		1		1		10	
Total Dissolved Solids @180°C	mg/L	10		10		10		10		10	
Total Organic Carbon	mg/L	1		100		1		1		1	
Total Phosphorus as P	mg/L	0.01		0.01		0.01		0.01		0.01	
Uranium	mg/L	0.010		0.010		0.010		0.010		0.001	
Vanadium	mg/L	0.10		0.10		0.10		0.10		0.01	
Zinc	mg/L	0.050		0.050		0.050		0.050		0.005	

TABLE 6: GROUNDWATER LEVEL MONITORING

EPA Identification No	44	45	46	47	48	49
Location	Dewhurst 8A-1 (DWH8AQGDGY01)	Dewhurst 8A-2 (DWH8AQGARK02)	Dewhurst 8A-3 (DWH8AQGPOR03)	Bibbiewindi 28A (BWD28QGUPS01)	Bibbiewindi 28B (BWD28QGLPS01)	Bibbiewindi 28C (BWD28QGPUR01)
Start Date	1/11/2024	1/11/2024	1/11/2024	1/11/2024	1/11/2024	1/11/2024
End Date	31/01/2025	31/01/2025	31/01/2025	31/01/2025	31/01/2025	31/01/2025
Sample Obtained	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level
Number of Samples Required	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous*
Lowest sample value	-37.005	21.646	-38.403	-13.213	-0.635	-4.304
Mean of sample	-36.954	21.905	-38.172	-13.072	-0.564	-4.234
Highest sample value	-36.882	22.29	-37.435	-13.002	-0.494	-4.093

Note: Monitoring points 47,48 and 49: Sensor is recording pressure data in psi since 21 September 2022. The water levels (SWL) have been calculated.