

**APPENDIX A
ADDITIONAL TABLES**

LIST OF TABLES

Table A.1 Condamine River Gas Seep Investigation – Phase and Task List A-3
Table A.2 Field Reconnaissance Observations A-4
Table A.3 Water and Coal Bores A-9
Table A.4 Occurrence of Gas and Coal in Water and Coal Exploration Bores A-13
Table A.5 Soil Gas Field Measurements A-17
Table A.6 Soil Gas - Laboratory Analytical Results A-24
Table A.7 Soil Gas: Methane Concentrations Laboratory and Field Measurements A-25

TABLE A.1
CONDAMINE RIVER GAS SEEP INVESTIGATION – PHASE AND TASK LIST

Phase	Tasks	Origin	Industry	Government
Phase 1	Task 1: Status of surrounding CSG wells -completion intervals, production status, completion type, CBL, history of any wellbore problems, Bradenhead pressure. This should be extended to include Origin and other operator wells within 5 km (Note : 5km radius only includes the 4 Orana pilot wells)	✓		
Phase 1	Task 2: Status of surrounding landowner and Government monitoring bores within 5 km radius - Immediate priority (RM/A Moser) Information to include as much information described in Item 1 above. Include resampling and possibly ongoing monitoring - need to test water levels etc. (LNG Enforcement Unit may extend coverage to 10 km radius)	✓		✓
Phase 1	Task 3: Isotopic work on gas sample to identify potential source of gas.	✓		
Phase 1	Task 6: Initial landholder interviews and field reconnaissance, and mapping of known bubbles, including photographic survey and record of vegetation health and mapping of these areas.	✓	✓	
Phase 1	Task 7: Review of history of bubbles in the Condamine River including further interviews and literature search (library, coal mines, DNRM, etc.)	✓		✓
Phase 1	Task 8: Extend existing review of Government historical records of gas noted during drilling or operation of groundwater supply bores (extension of existing Hopelands "Flaming Feedlot Bore")			✓
Phase 1	Task 11: Map showing the surface geology in the area of the incident.	✓		✓
Phase 1	Task 12: Inferred geological cross-section in area of seep	✓		✓
Phase 1	Task 13: Plan for down hole video in a well/s and landowner bore/s near to seepage area (depending on outcome of Task 2)	✓		
Phase 1	Task 18: Review of rainfall and river level information to assess possible relationships with seepage events (includes integrating data from item 7 and 8)	✓		✓
Phase 2	Task 4: Scoping and commencement of a surface water quality sampling programme including review of existing data and government sampling	✓		
Phase 2	Task 5: Aquatic ecosystem survey (flora, fauna, and any additional water quality) including review of existing data and government sampling	✓		
Phase 2	Task 9: Installation and operation of temporary gas quality and quantity measurement points within the seeps	✓		
Phase 2	Task 10: Install a temporary water level gauging station (transducer/logger and height gauge)	✓		
Phase 2	Task 14: Review of CSG/CBM industry (AU and International) for similar events in other basins close to outcrop.	✓	✓	✓
Phase 2	Task 15: Focused shallow soil gas survey around seep area (In vehicle gas monitor survey and focused shallow soil gas probing and measurements). Delineate any identified gas discharges on individual seep maps.	✓		
Phase 2	Task 17: Bathymetric contouring (side scan sonar) and sediment grab sampling	✓		
Phase 3	Task 16: New observation bore/s proximal to seep/s. To include mud logging wire line, photo and video)	✓		

TABLE A.2
FIELD RECONNAISSANCE OBSERVATIONS

ID	Date	Feature	Feature type	Easting	Northing	UTM	Sample	Methane (ppm)
1	19/6/2012	Camping Ground Seep	significant seep site	254822	7032787	56		
2	19/6/2012	Fenceline Seep	significant seep site	255473	7032959	56		
3	19/6/2012	Continuation of Camping Ground Seep approx 150m downstream	significant seep site					
4	22/6/2012	RN 19949 water bore	water bore	257129	7036194	56		869,000
5	19/6/2012	stressed vegetation	stressed vegetation	254710.190	7038999.985			
6	19/6/2012	stressed tree near Camping Ground Seep	stressed vegetation					
7	19/6/2012	Lagoon outcrop	rock outcrop	254049.072	7034614			
8	6/19/2012	Charleys Creek Weir	gas bubbles					
9	20/6/2012	stressed vegetation in swamp	stressed vegetation	259697	7034772	56		
10	20/6/2012	Coal Hole	rock outcrop	252751	7032810	56		
11	20/6/2012	Barracks fishing hole sandstone/conglomerate rock outcrop	rock outcrop	252623	7032025	56	rock	
12	6/20/2012	minor bubbling	gas bubbles	252397	7032180	56		
13	20/6/2012	sandstone outcrop	rock outcrop	252145	7032353	56		
14	20/6/2012	stressed vegetation	stressed vegetation	252145	7032353	56		
15	21/6/2012	minor bubbling	gas bubbles					
16	20/6/2012	minor bubbling	gas bubbles	252073	7032483	56		
17	20/6/2012	sandstone outcrop	rock outcrop	251917	7032539	56		
18	6/20/2012	minor bubbling	gas bubbles	251875	7032677	56		
19	20/6/2012	sandstone/conglomerate outcrop	rock outcrop	251875	7032677	56		
20	20/6/2012	no grass/vegetation	stressed vegetation	252642	7032106	56		
21	20/6/2012	minor bubbling	gas bubbles	252325	7033427	56		
22	20/6/2012	sandstone and conglomerate escarpment	rock outcrop	249603	7032224	56		
23	20/6/2012	sandstone and conglomerate outcrop	rock outcrop	249109	7031171	56		
24	21/6/2012	RN #147393 water bore	water bore	253875	7032240	56		0
25	21/6/2012	RN #8665 (Chinta Bore)	water bore	252085	7029451	56		
26	21/6/2012	RN #83627 (Chinta Bore)	water bore	253515	7028039	56		11,300
27	21/6/2012	conglomerate outcrop	rock outcrop	251902	7030869	56	RS5 - palynology	
28	21/6/2012	stressed vegetation	stressed vegetation	251902	7030869	56		
29	21/6/2012	minor bubbling	gas bubbles	251397	7031058	56		

TABLE A.2
FIELD RECONNAISSANCE OBSERVATIONS
(CONTINUED)

ID	Date	Feature	Feature type	Easting	Northing	UTM	Sample	Methane (ppm)
30	21/6/2012	minor bubbling	gas bubbles	251292	7031070	56		
31	21/6/2012	minor bubbling	gas bubbles	251069	7031089	56		
32	21/6/2012	minor bubbling	gas bubbles	250848	7031089	56		
33	21/6/2012	sandstone outcrop	rock outcrop	250758	7031069	56		
34	21/6/2012	sandstone outcrop	rock outcrop	250620	7031124	56		
35	21/6/2012	minor bubbling	gas bubbles	250620	7031124	56		
36	21/6/2012	minor bubbling	gas bubbles	250552	7031173	56		
37	21/6/2012	stressed vegetation	stressed vegetation	250552	7031173	56		
38	21/6/2012	conglomerate outcrop	rock outcrop	250112	7031374	56		
39	21/6/2012	minor bubbling	gas bubbles	250004	7031829	56		
40	21/6/2012	Rock Hole Seep	significant seep site	250092	7032042	56		
41	21/6/2012	conglomerate outcrop	rock outcrop	250092	7032042	56		
42	21/6/2012	Rock Hole Seep	significant seep site	250030	7032075	56		
43	21/6/2012	stressed vegetation	stressed vegetation	250030	7032075	56		
44	22/6/2012	Greenswamp Creek Paddock Bore	water bore	256147	7037212	56		0
45	22/6/2012	Greenswamp Coal Bore West	water bore	258607	7036689	56		13,200
46	22/6/2012	Greenswamp Coal Bore East	water bore	259614	7036675	56		0
47	22/6/2012	RN #19958 (Greenswamp Bore)	water bore	259544	7036690	56		0
48	22/6/2012	conglomerate outcrop	rock outcrop	256855	7036369	56		
49		stressed vegetation	stressed vegetation	252436	7033241	56		
50		sandstone outcrop	rock outcrop	252210	7033435	56		
51		sandstone outcrop	rock outcrop	251636	7033016	56		
52	9/7/2012	conglomerate outcrop	rock outcrop	248506	7030964	56		
53		minor bubbles	gas bubbles	247671	7030110			
54		minor bubbles	gas bubbles	245629	7028314			
55		minor bubbles	gas bubbles	245560	7028418			
56		sandstone/ conglomerate outcrop	rock outcrop	245199	7028115			
57		sandstone/ conglomerate outcrop	rock outcrop	244594	7028063			
58		sandstone/ conglomerate outcrop	rock outcrop					

TABLE A.2
FIELD RECONNAISSANCE OBSERVATIONS
(CONTINUED)

ID	Date	Feature	Feature type	Easting	Northing	UTM	Sample	Methane (ppm)
59		sandstone/ conglomerate outcrop	rock outcrop	242769	7027188			
60		minor bubbles	gas bubbles	242543	7027450			
61		rock outcrop	rock outcrop	241434	7027865			
62		mudstone rock outcrop	rock outcrop	241963	7027141			
63		minor bubbles	gas bubbles	241400	7027308			
64		sandstone rock outcrop	rock outcrop	241102	7027246			
65		rock outcrop	rock outcrop	241043	7026956			
66		minor bubbles	gas bubbles	240464	7027088			
67		rock outcrop	rock outcrop	240191	7027225			
68		sandstone outcrop	rock outcrop	239958	7027447			
69		minor bubbles	gas bubbles	239500	7027763			
70		sandstone outcrop	rock outcrop	239500	7027763			
71	10/7/2012	sandstone rock outcrop, with some conglomerate	rock outcrop	236560	7027419			
72		minor bubbles	gas bubbles	236358	7027718			
73		rock outcrop- siltstone	rock outcrop	236192	7028425			
74		sandstone outcrop - large outcrop start point	rock outcrop	234661	7027708			
75		sandstone outcrop - large outcrop end point	rock outcrop	233983	7028168			
76		minor bubbles	gas bubbles	233100	7029010			
77		sandstone outcrop	rock outcrop	232643	7029190			
78		sandstone outcrop	rock outcrop	231437	7030212			
79		sandstone outcrop- large	rock outcrop	230812	7030353			
80		minor bubbles	gas bubbles	230714	7030297			
81		sandstone	rock outcrop	229243	7030339			
82		sandstone outcrop	rock outcrop	228742	7030375			
83		sandstone outcrop	rock outcrop	228040	7030346			
84		sandstone outcrop	rock outcrop	227465	7030130			
85		minor bubbles and sandstone outcrop	gas bubbles	227135	7030298			
86		sandstone outcrop- large	rock outcrop	226894	7030641			
87		minor bubbles	gas bubbles	226778	7031639			

TABLE A.2
FIELD RECONNAISSANCE OBSERVATIONS
(CONTINUED)

ID	Date	Feature	Feature type	Easting	Northing	UTM	Sample	Methane (ppm)
88		sandstone outcrop- large	rock outcrop	226608	7031806			
89		small bubbles- intermittent	gas bubbles	225768	7031651			
90		small bubbles- intermittent	gas bubbles	225400	7031517			
91		sandstone outcrop	rock outcrop	224453	7029651			
92	11/7/2012	small bubbles- intermittent	gas bubbles	253736.807	7033381.987			
93		small bubbles- consistent	gas bubbles	255670.260	7035974.393			
94		small bubbles- inconsistent	gas bubbles	254773.134	7033612.127			
95		sandstone/ silstone rock outcrop	rock outcrop	254724.035	7034342.178			
96		sandstone outcrop	rock outcrop	254688.111	7034854.869			
97		sandy conglomerate outcrop	rock outcrop	255221.888	7033885.233			
98	16/7/2012	RN #87611 (North Bore)	water bore	250000	7037326			1,100
99	16/7/2012	RN #107222 (South Bore)	water bore	251690	7035644			25,000
100	17/7/2012	RN #14042 (Aspley Meadows 2)	water bore	261838	7029999			>50250
101	17/7/2012	RN #19989 (Aspley Meadows 3)	water bore	261867	7028909			None
102	17/7/2012	RN #119484 (Aspley Meadows 1)	water bore	261846	7030002			32,750
103	7/17/2012	RN #147140A (Linc Bore 1)	water bore	261611	7026736			None
104	17/7/2012	RN #147140B (Linc Bore 2)	water bore	261613	7026741			None
105	17/7/2012	RN #11550 (Bealla Bore)	water bore	256716	7029826			None
106	17/7/2012	RN #19984 (Bealla Bore)	water bore	258397	7028584			None
107	17/7/2012	RN #19985 (Bealla Bore)	water bore	256621	7029867			None
108	17/7/2012	RN #26083 (Hartz 5 Paddock Bore)	water bore	261074	7029251			>50250
109	17/7/2012	RN #34846 (Windmill Bore)	water bore	256623	7029870			>50250
110	17/7/2012	RN #38191 (Solar Bore)	water bore	260097	7028277			>50250
111	17/7/2012	Bealla Bore RN#48528	water bore	260596	7027517			None
112	17/7/2012	RN #24481 (Eldnarvale Bore)	water bore	258218	7032986			0
113	17/7/2012	RN #19983 or RN #22020	water bore	259882	7026225			>50250
114	1/8/2012	RN #19954	water bore	257263	7034640			1,000
115	1/8/2012	Grassdale Bore	water bore	258042	7034640			0
116	1/8/2012	RN #15083 Mylo 1 Bore)	water bore	256090	7032473			1,000

TABLE A.2
FIELD RECONNAISSANCE OBSERVATIONS
(CONTINUED)

ID	Date	Feature	Feature type	Easting	Northing	UTM	Sample	Methane (ppm)
117	2/8/2012	RN #24504 (Glenhope Bore)	water bore	265800	7025105			4,100
118	2/8/2012	RN #24479	water bore	263231	7023272			None
119	2/8/2012	RN #107760 (Creek Bore Bore)	water bore	258353	7023634			0
120	2/8/2012	RN #107761a (Short Bore)	water bore	259507	7023467			514,000
121	2/8/2012	RN #107761b (Long Bore)	water bore	259511	7023465			12,000
122	21/11/2012	conglomerate and siltstone outcrop on Laguna, Charleys Creek	rock outcrop	S 2647.713	E 15032.262		RS3 - palynology	
123	21/11/2012	siltstone/sandstone outcrop in Charleys Creek	rock outcrop	S 2647.145	E 15031.938		RS7 - palynology	
124	21/11/2012	sandstone and banded ironstone outcrop	rock outcrop	S 2646.310	E 15032.538		RS6 - palynology	
125	21/11/2012	private conglomerate/siltstone quarry	rock outcrop	S 2646.545	E 15032.316			
126	21/11/2012	large commercial conglomerate/siltstone quarry	rock outcrop	S 2644.242	E 15032.634			
127	21/11/2012	conglomerate outcrop	rock outcrop	S 2645.053	E 15031.818			
128	21/11/2012	fossilised wood fossicking site	rock outcrop	S 2646.519	E 15031.446			
129	21/11/2012	siltstone/sandstone/conglomerate outcrop	rock outcrop	S 2647.822	E 15029.304			
130	21/11/2012	conglomerate ledge outcrop	rock outcrop	S 2647.799	E 15031.146			850
131	21/11/2012	RN #147393 (Elsme 1 Bore)	water bore	253875	7032240	56		12,000
132	21/11/2012	Coal exploration bore	Coal Bore					
133	21/11/2012	RN #7444 (House Bore)	water bore	-26.82506	150.57594			0
134	21/11/2012	RN #11550 (Back Bore)	water bore	-26.83036	150.55277			0
135	11/12/2012	conglomerate outcrop in Wambo Creek	rock outcrop	S 2651.424	E 15028.812		RS4 - palynology	
136	11/12/2012	QGC Well	CSG well	S 2651.588	E 15028.680			
137	11/12/2012	QGC Well Argyle 121	CSG well	S 2650.711	E 15029.022			
138	11/12/2012	conglomerate outcrop	rock outcrop	S 2648.624	E 15031.056			
140	11/12/2012	private quarry	rock outcrop	S 2710.321	E 15116.842		RS2 - palynology	
141	11/12/2012	Pump Hole Seep	significant seep site	S 2648.044	E 15032.897			
142	11/12/2012	Pump Hole Seep rock outcrop	rock outcrop	S 2648.045	E 15032.898		RS1 - palynology	

TABLE A.3
WATER AND COAL BORES

RN	Easting (m) UTM 56	Northing (m) UTM 56	Possible Completion Zone (source: Origin or Norwest)	Depth (m)	Distance from Closest Seep		Bore Located & Inspected	Comments
					Approximate Distance (km)	Seep name		
5906	251773	7029808	WCM or Springbok	<i>not known</i>	2.8	Rock Hole	No	coords from DGWDB
7444	259082	7030640	Alluvium or Springbok	<i>not known</i>	3.9	Pump Hole	No	not used
8119	252337	7029432	WCM	153.9	3.4	Rock Hole	No	coords from DGWDB. Opeh hole 148.4 - 153.9
8665	252085	7029451	WCM	160.6	3.3	Rock Hole	Yes	Welded cap, could not access interior of bore
8685	265413	7029114	WCM or Springbok		10.0	Pump Hole	No	no landowner access
10898	265915	7029869	WCM or Springbok		10.2	Pump Hole	No	no landowner access
14042	261838	7029999	WCM	182	6.5	Pump Hole	Yes	Audibly bubbling. Drilled depth of 182m, ran video camera to DTB 158m, could not go deeper as bore potentially collapsed or obstruction. Gas bubbles observed entering through hole in casing.
15083	256090	7032473	Springbok	84.73	0.8	Fenceline	Yes	DTB 28.385 - potentially collapsed or obstruction
19949	257129	7036194	WCM or Springbok	66.1	3.0	Pump Hole	Yes	Bubbling vigorously. Recently been pumped. Used regularly for farming activities such as washing out sheds. Open hole 65.5-66.1m from DGWDB.
19954	257263	7034640	WCM or Springbok	<i>not known</i>	1.7	Pump Hole	Yes	Collapsed at 0.5m. No water.
19958	259543	7036691	WCM	106.7	4.7	Pump Hole	Yes	Bore was gassy historically. "Roaring like Brisbane airport". DTB 106.21m. No audible bubbling and no methane detected with meter.
19984	258397	7028584	Springbok	82.3	5.2	Pump Hole	No	could not be located
19985	256621	7029867	Springbok	<i>not known</i>	3.3	Fenceline	Yes	could not be located
19989	261867	7028909	Springbok	40.29	7.1	Pump Hole	No	Has been ploughed over, could not be located
24479	263231	7023272	WCM	167.6	12.2	Pump Hole	Yes	Bore obstruction at 7m.

TABLE A.3
WATER AND COAL BORES
(CONTINUED)

RN	Easting (m) UTM 56	Northing (m) UTM 56	Possible Completion Zone (source: Origin or Norwest)	Depth (m)	Distance from Closest Seep		Bore Located & Inspected	Comments
					Approximate Distance (km)	Seep name		
24481	258218	7032986	Springbok or alluvium	36.6	2.0	Pump Hole	Yes	Operational windmill.
24504	265800	7025105	WCM	165.27	12.5	Pump Hole	Yes	No audibly bubbling. Depth from baseline. walked to bore so could not use video camera.
26063	251805	7028267	WCM or Springbok	80.8	4.1	Rock Hole	No	could not be located
26083	261074	7029251	Springbok	79.2	6.3	Pump Hole	Yes	Not used. Audibly bubbling. Ran camera to above SWL but too much bacterial slime and sludge to go deeper with video camera. Collapsed at 32.9 m. DERM Bore Card 79.2
34846	256623	7029870	WCM or Springbok	137.16	3.3	Fenceline	No	Could not measure water level due to bacterial slime in bore.
38191	260097	7028277	WCM	151.7	6.3	Pump Hole	Yes	Gassy water. Pumped regularly for agricultural purposes.
48528	260596	7027517	WCM	152.4	7.2	Pump Hole	No	Abandoned and destroyed. Could not be located
83627	253515	7028039	Springbok	<i>not known</i>	4.9	Camping Ground	Yes	Bubbling. Ran video camera. Observed bubbles from casing shoe at around 125m
87611	250000	7037326	WCM	100	5.3	Rock Hole	No	Old coal exploration bore. Could not measure water level due to bacterial slime in bore.
107222	251690	7035644	WCM	<i>not known</i>	3.9	Rock Hole	No	Could not measure water level due to bacterial slime in bore.
107739	262389	7023552	WCM or Springbok	<i>not known</i>	11.5	Pump Hole	Yes	Landowner believed bore is about 70m deep and was drilled into a "seep". Given measured DTB of 42.9m it has likely collapsed or filled up with runoff from adjacent pond and feedlot yards. Bore is uncapped, casing at groundlevel, and in a low point. PVC

TABLE A.3
WATER AND COAL BORES
(CONTINUED)

RN	Easting (m) UTM 56	Northing (m) UTM 56	Possible Completion Zone (source: Origin or Norwest)	Depth (m)	Distance from Closest Seep		Bore Located & Inspected	Comments
					Approximate Distance (km)	Seep name		
119484	261846	7030002	Springbok	186	6.5	Pump Hole	Yes	Probably collapsed or obstructed.
147393	253875	7032240	WCM	<i>not known</i>	1.1	Camping Ground	Yes	Formerly bubbling and flowing. No bubbles or methane detected in June 2012. 212.6m DTB. Ran camera. Free methane detected in Dec 2012 (12,000ppm through hole in cap; 1450 inside casing after cap released)
(Burnsdale 1)	265410	7029102	WCM or Springbok		10.0	Pump Hole	No	no landowner access
(Chinta Bore 1)	250892	7027756	WCM	24.3	4.4	Rock Hole	No	no landowner access
(Chinta Bore 2)	250897	7027753	WCM	21.03	4.4	Rock Hole	No	no landowner access
(Creek paddock Bore)	256145	7037213	Tertiary alluvium (conglomerate)	<i>not known</i>	3.9	Pump Hole	Yes	Landcare monitoring bore
(Grassdale Bore)	258042	7034640	Springbok	<i>not known</i>	2.2	Pump Hole	Yes	Jet pump. Abandoned windmill. Used for stock. Old coal exploration bore.
(GS Coal Bore East)	259612	7036673	WCM	<i>not known</i>	4.8	Pump Hole	Yes	
(GS Coal Bore West)	258606	7036688	WCM	25.26	4.1	Pump Hole	Yes	Bubbling. Formed geyser when drilled. DTB 26m. Ran camera - gas coming from hole in bottom (collapsed zone). PVC Casing to bottom.

TABLE A.3
WATER AND COAL BORES
(CONTINUED)

RN	Easting (m) UTM 56	Northing (m) UTM 56	Possible Completion Zone (source: Origin or Norwest)	Depth (m)	Distance from Closest Seep		Bore Located & Inspected	Comments
					Approximate Distance (km)	Seep name		
107761a	259507	7023467	WCM or Springbok	156	10.3	Fenceline	Yes	Methane audibly bubbling. DTB 140.425. Signs of an explosion or fire with a lot of PVC and polypipe fragments and melted sections. Water very muddy on water level probe so did not run video camera.
107761b	259511	7023465	WCM or Springbok	<i>not known</i>	10.3	Fenceline	Yes	Uncapped with logger in bore. No audible bubbling. DNRM personnel mentioned that this bore was drilled to replace RN #107761a, because it made excessive gas so RN #107761b was drilled and completed avoid the gas
11550? (Back Bore)	256790	7030008	WCM	131.98	3.2	Fenceline	No	collapsed and not used
11550? (Bealla Bore)	256716	7029826	Springbok	<i>not known</i>	3.4	Fenceline	No	could not be located
147140A	261611	7026736	WCM	148	8.4	Pump Hole	No	no landowner access
147140B	261613	7026741	WCM	148	8.4	Pump Hole	No	no landowner access
19983? or 22020?	259882	7026225	Springbok	<i>not known</i>	7.9	Pump Hole	Yes	Gas audibly bubbling. DTB measured at 79.25m. Many metres of bacterial slime and sludge on water level meter. Could not run video camera. Casing corroded and rusted out 300mm below surface. Unknown which of the 2 RNs relates to this bore.

TABLE A.4
OCCURRENCE OF GAS AND COAL IN WATER AND COAL EXPLORATION BORES

RN#	Possible Completion Zone (source: Origin or Norwest)	Distance from Closest Seep		Bore Card Report	Bore Card Report	Bore Card Report
		Approximate Distance (km)	Seep name	Date Drilled	Evidence of Gas	Comments
5906	WCM or Springbok	2.8	Rock Hole	1937		1937 - Comment from driller - supply struck in seam of low grade coal about 3 feet thick, water salty & slightly bitter
7444	Alluvium or Springbok	3.9	Pump Hole	1966, but casing detailed lists date as 1935		
8119	WCM	3.4	Rock Hole	1940		
8642	WCM	15.2	Pump hole	1938	1975 - Comment from licensee - gas blows water out every 5 hours approximately	1966 - Comment from Dept. staff - (gas bore) blowing
8665	WCM	3.3	Rock Hole	1941	1941 - Comment from driller - rotten coal with flow of gas at 146.3 m	
8685	WCM or Springbok	10.0	Pump Hole	1936		1936 - Comment from driller - coals encounters at 56.4 & 121.3 metres; aquifer listed as coal 121.3-122.6 metres
10790	WCM	16.1	Pump hole	1946	1964 - Comment from District Engineer - the water in the coal bed at approx. 140m could have been salty and possibly carry gas.	1986 - Comment from licensee - bore started blowing gas around 1960; drilled to a deeper water bed and pumped for about 3 years before bore started blowing gas again
11550? (Back Bore)	WCM	3.2	Fenceline	1936		
11550? (Bealla Bore)	Springbok	3.4	Fenceline			
13600	WCM	7.8	Pump hole	1958	1958 - Comment from driller - blow of gas at 54 m; water and gas struck at 111 m	
14042	WCM	6.5	Pump Hole	1959	1959 - Comment from driller - shale coal & gas at 148.74-149.65; grey shale carbonated at 156.97-160.02; coal & gas at 177.09-181.96	1959 - Comment from driller - coals encountered at 148.74, 149.65, 154.84, 177.09 metres; aquifer listed as coal 177.20-182 metres, potable.
15083	Springbok	0.8	Fenceline	1952		No strata details in bore card report
19949	WCM or Springbok	3.0	Pump Hole	prior to 1948		No strata details in bore card report
19954	WCM or Springbok	1.7	Pump Hole	prior to 1940		No strata details in bore card report

TABLE A.4
OCCURRENCE OF GAS AND COAL IN WATER AND COAL EXPLORATION BORES
(CONTINUED)

RN#	Possible Completion Zone (source: Origin or Norwest)	Distance from Closest Seep		Bore Card Report	Bore Card Report	Bore Card Report
		Approximate Distance (km)	Seep name	Date Drilled	Evidence of Gas	Comments
19958	WCM	4.7	Pump Hole	1966		1966 - Comment from driller - coals encountered at 24.4 met, small seams to 106.7 met.
19984	Springbok	5.2	Pump Hole	1937		No strata details in bore card report
19985	Springbok	3.3	Fenceline	1932		No details in bore card report
19989	Springbok	7.1	Pump Hole	prior to 1944		No casing or strata details in bore card report.
24465	WCM	6.9	Fence line	1946	1966 - Comment from Dept. staff - will blow gas in very humid weather	
24479	WCM	12.2	Pump Hole	1966		1966 - Comment from driller - coals encountered at 166.11 metres; aquifer listed as coal 166.20-167.7 metres
24481	Springbok or alluvium	2.0	Pump Hole	1952		
24485	WCM	14.9	Pump hole	1966	1966 - Comment from Dept. staff - gas blowing water supply	
24504	WCM	12.5	Pump Hole	prior to 1940		No strata or aquifer details in bore card report
26063	WCM or Springbok	4.1	Rock Hole	1963		1963 - Comment from driller - coals encountered at 71 and 79.9 metres
26083	Springbok	6.3	Pump Hole	1936		No strata details in bore card report
33553	Springbok	15.9	Pump hole	1969	1969 - Comment from Boring Inspector - presence of gas in water made it difficult to measure recovery after four hours of air lifting	1970 - Comment from driller - some gas present in water
38191	WCM	6.3	Pump Hole	1971		1971 - Comment from driller - coals encountered at 82.6, 99.67, 113.38, 135.94, 138.99, 141.73 metres; aquifer listed as coal from 82.6-84.6, 99.7-102.10, 113.4-118.3, 136-137.8, 139-140.6, 141.8-142.7 metres

TABLE A.4
OCCURRENCE OF GAS AND COAL IN WATER AND COAL EXPLORATION BORES
(CONTINUED)

RN#	Possible Completion Zone (source: Origin or Norwest)	Distance from Closest Seep		Bore Card Report		Bore Card Report	
		Approximate Distance (km)	Seep name	Date Drilled	Evidence of Gas	Comments	
34846	WCM or Springbok	3.3	Fenceline	1970		1970 - Comment from driller - coals encountered at 94.79, 128.93, and 131.19 metres; aquifer listed as coal from 129-130.5 metres	
48528	WCM	7.2	Pump Hole	1966		No strata details in bore card report	
83627	Springbok	4.9	Camping Ground				
87611	WCM	5.3	Rock Hole	1988		1988 - Comment from bore card report - strata not known bore drilled for coal exploration	
107222	WCM	3.9	Rock Hole			Bore card report not provided	
107739	WCM or Springbok	11.5	Pump Hole	2003		2003 - Comment from driller - coals encountered at 40, 66, and 160 metres; aquifer listed as 66-72 metres - salty, and 160-165 metres - brackish	
119484	Springbok	6.5	Pump Hole	2007		2003 - Comment from driller - coals at 86, 140, 174, 180 metres; aquifer details not provided in bore card report	
147148	WCM	39.6	Pump hole		No record of gas being present		
147158	WCM	66.4	Fence line	2008	2008 - Comment from driller - gas and water struck at 160m		
147393	WCM	1.1	Camping Ground			No casing or strata details in bore card report. 8 April 2011, baseline assessment comment - artesian conditions exist, appears to be gas lifted. Photograph shows water and gas bubbles at the top of the open casing.	
(Bursdale 1)	WCM or Springbok	10.0	Pump Hole				
10898	WCM or Springbok	10.2	Pump Hole	1946		1946 - Comment from driller - coals encountered at 64, 89.91, 94.79, 99.36 metres; aquifers listed as coal 64-64.9, 94.8-98.5, 99.4-101.8 metres	

TABLE A.4
OCCURRENCE OF GAS AND COAL IN WATER AND COAL EXPLORATION BORES
(CONTINUED)

RN#	Possible Completion Zone (source: Origin or Norwest)	Distance from Closest Seep		Bore Card Report		Bore Card Report
		Approximate Distance (km)	Seep name	Date Drilled	Evidence of Gas	Comments
<i>(Chinta Bore 1)</i>	WCM	4.4	Rock Hole			
<i>(Chinta Bore 2)</i>	WCM	4.4	Rock Hole			
<i>(Creek paddock Bore)</i>	Tertiary alluvium (conglomerate)	3.9	Pump Hole			Bore card report not provided
<i>(Grassdale Bore)</i>	Springbok	2.2	Pump Hole			Bore card report not provided. 5 August 2010, baseline assessment comment - groundwater had slight rotten egg smell and was blackish colour
<i>(GS Coal Bore East)</i>	WCM	4.8	Pump Hole			Bore card report not provided
<i>(GS Coal Bore West)</i>	WCM	4.1	Pump Hole			Bore card report not provided
107761a	WCM or Springbok	10.3	Fenceline	2001		2001 - Comment from driller - coals encountered at 72, 86, 133, 144 metres; aquifer listed as coal 133-150 metres, water brackish.
107761b	WCM or Springbok	10.3	Fenceline			
147140A	WCM	8.4	Pump Hole	2008		2008 - Comment from driller - coals encountered at 102 and 130 metres; aquifer listed as coal 130-144 metres.
147140B	WCM	8.4	Pump Hole	2008		
19983? or 22020?	Springbok	7.9	Pump Hole	prior to 1926		No strata or aquifer details in bore card report

TABLE A.5
SOIL GAS FIELD MEASUREMENTS

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
Pump Hole Seep						
PNSG1	0	18.8	2.5	0	0	
PNSG2	0	18.6	2.8	0	0	
PNSG3	79.4	1.9	1.5	0	0	Yes
PNSG4	0	16.7	5.1	0	0	
PNSG5	0	15.2	4	0	0	
PNSG6	0	16.3	4.7	0	0	
PNSG7	0	19.5	1.3	0	0	
PSSG1	0	18.1	2.8	0	0	
PSSG2	0.1	5.6	9.3	0	0	Yes
PSSG3	20.7	13.7	1.8	0	0	
PSSG4	0	18.6	1.7	0	0	
PSSG5	73.1	6.3	0.6	0	0	Yes
PSSG6	0	20.8	0.6	0	0	
PSSG7	0	20.5	0.7	0	0	
PSSG8	29.3	0	10.3	0	1	
PSSG9	0	18.9	2.5	0	0	
PSSG10	0	20.5	1.2	0	4	
PSSG11	0	19	2.2	0	1	Yes

TABLE A.5
SOIL GAS MEASUREMENTS
(CONTINUED)

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
Fenceline Seep						
FNSG1	0	19.3	1.4	0	0	
FNSG2	0	18.6	1.5	0	0	
FNSG3	0	17.8	2.1	0	0	
FNSG4	0	16.2	3.1	0	0	
FNSG5	0	18	2.2	0	0	
FNSG6	0	19	1	0	0	
FNSG7	0	17.6	2.4	0	0	
FNSG8	0	19.7	0.7	0	1	
FSSG1	0	17.6	2.7	0	1	
FSSG2	0	19.6	1.2	0	2	
FSSG3	0	15.5	5.1	0	0	
FSSG4	0	20.1	0.9	0	2	
FSSG5	0	20.3	0.8	0	1	
FSSG6	0	19.4	1.5	0	0	
FSSG7	0.1	10.2	8	0	1	Yes
FSSG8	0	19.9	0.9	0	2	
FSSG9	0	20.3	0.5	0	2	

TABLE A.5
SOIL GAS MEASUREMENTS
(CONTINUED)

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
Camping Ground Seep						
CNSG1	0	0	0	0	0	
CNSG2	0	21.6	0.2	0	8	
CNSG3	0	21.3	0.6	0	6	
CNSG4	0	21.6	0.2	0	4	
CNSG5	0	16.5	4	0	0	
CNSG6	0	17.6	2.3	0	0	
CNSG7	0	19.9	0.7	0	0	
CNSG7A	0	21.8	0	0	0	
CNSG8	0	20	0.7	0	1	
CNSG9	0	19.3	1.6	0	1	
CNSG10	0	6.9	8.3	0	1	
CNSG11	0	20.1	0.4	0	0	
CNSG12	0.1	19.6	1.1	0	0	Yes
CNSG13	0.1	16	8	0	1	
CNSG14	0	20.6	0.3	0	2	
CNSG15	0	0.8	19.4	0	1	Yes
CNSG16	0	18.1	2.3	0	1	

TABLE A.5
SOIL GAS MEASUREMENTS
(CONTINUED)

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
CNSG17	0	19.8	0.7	0	0	
CNSG18	0	18	2.8	0	2	Yes
CNSG19	0	19.9	1.2	0	7	
CSSG1	0.1	19.1	1.2	0	0	Yes
CSSG2	0.2	19.5	2.2	0	0	Yes
CSSG3	0	18.7	2.5	0	1	
CSSG4	0	18.6	1.4	0	0	Yes
CSSG5	0	18.6	2.4	0	0	
CSSG6	0.4	14.1	6.5	0	1	Yes
CSSG7	0	20.3	1.6	0	0	
CSSG8	0	20.1	1.3	0	0	
CSSG9	0	19.8	1.1	0	1	
CSSG10	0	18.7	0.3	0	0	
CSSG11	0	18.6	2.6	0	2	
CSSG12	0	1.4	18.8	0	8	
CSSG13	0.7	8.8	7.5	0	7	Yes and Duplicate
CSSG14	0	17.9	2.4	0	1	
CSSG15	0	19	1.7	0	0	

TABLE A.5
SOIL GAS MEASUREMENTS
(CONTINUED)

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
Rock Hole Seep						
RNSG1	0	20.1	1.3	0	0	
RNSG2	0	20.1	0.9	0	0	
RNSG3	0	20	1.4	0	0	
RNSG4	0	17.5	4.4	0	0	
RSSG1	0	16.3	4.1	0	0	
RSSG2	0	17.2	3.2	0	0	
RSSG3	0.1	17	1.9	0	1	Yes
RSSG4	0	19	2.2	0	0	Yes
RSSG5	0	18.8	2.2	0	0	
Orana Pilot Well 8						
O8SG1	0	19.3	0.2	0	0	Yes
O8SG2	0	19.8	0.2	0	0	
O8SG3	0	19.6	0.4	0	0	
O8SG4	0	19.5	0.2	0	0	
RSSG6	0	16.3	3.4	0	0	

TABLE A.5
SOIL GAS MEASUREMENTS
(CONTINUED)

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
Orana Pilot Well 9						
O9SG1	0	20.1	0.9	0	1	
O9SG2	0	20.2	0.6	0	0	
O9SG3	0	19.6	1.7	0	1	
O9SG4	0	19.3	1.6	0	1	
Orana Pilot Well 10						
O10SG1	0	20.4	0.4	0	0	
O10SG2	0	20.4	1.1	0	0	
O10SG3	0.1	20	0.6	0	0	
O10SG4	0	20.2	1	0	1	
Orana Pilot Well 11						
O11SG1	0	19.3	0.5	0	0	
O11SG2	0	19.2	0.6	0	0	Yes and Duplicate
O11SG3	0	18.7	0.8	0	0	
O11SG4	0	19.3	0.3	0	0	

TABLE A.5
SOIL GAS MEASUREMENTS
(CONTINUED)

Location ID	Gas and Units					Sampled for Gas Composition and Isotope Analyses
	CH4 (%)	O2 (%)	CO2 (%)	H2S (ppm)	CO (ppm)	
Stressed Vegetation Site 1						
RRSG1	0	20.3	1.6	0	3	Yes
RRSG2	0	21	0.9	0	0	
RRSG3	0	21.1	0.2	0	12	Yes
Stressed Vegetation Site 2						
PVSG1	0	19.5	0.5	0	0	
PVSG2	0	19.1	1.4	0	0	Yes
PVSG3	0	20.1	1	0	0	Yes
PVSG4	0	17.2	2.4	0	1	
PVSG5	0	19.7	0.3	0	0	Yes
PVSG6	0	19.8	0.3	0	0	
Stressed Vegetation Site 3						
BSSG1	0	20.2	0.5	0	0	
BSSG2	0	19.7	0.5	0	1	
BSSG3	0.1	20.2	0	0	0	

TABLE A.6
SOIL GAS - LABORATORY ANALYTICAL RESULTS

Location	Sample Name	H ₂ ppm	O ₂ + Ar ppm	CO ₂ ppm	N ₂ ppm	CO ppm	C ₁ ppm	C ₂ ppm	C ₂ H ₄ ppm	C ₃ ppm	C ₃ H ₆ ppm	iC ₄ ppm	nC ₄ ppm	iC ₅ ppm	nC ₅ ppm	C ₆ + ppm	δ ¹³ C ₁ ‰	δDC ₁ ‰	δ ¹³ CO ₂ ‰
Pump Hole Seep	PS SG 2	ND	91,800	87,500	819,400	ND	1,280	1	ND	ND	ND	ND	ND	ND	ND	5	-27.3	62	-52.6
Pump Hole Seep	PN SG 3	ND	109,200	16,200	500,100	ND	374,500	6	ND	ND	ND	ND	ND	ND	ND	1	-43.8		
Pump Hole Seep	PS SG 5	ND	100,600	6,400	386,600	ND	506,400	6	ND	ND	ND	ND	ND	ND	ND	1	-57.7	-205	-12.7
Pump Hole Seep	PS SG 8	ND	60,600	74,000	643,700	ND	221,700	3	ND	ND	ND	ND	ND	ND	ND	ND	-39.4	-134	-54.4
Pump Hole Seep	PS SG 11	ND	205,200	9,900	784,900	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND			-23.4
Fenceline Seep	FS SG 7	ND	118,100	81,500	799,900	ND	461	ND	ND	ND	ND	ND	ND	ND	ND	1			-39.8
Camping Ground Seep	CS SG 1	ND	197,700	21,700	779,800	ND	783	ND	ND	ND	ND	ND	ND	ND	ND	ND	-39.8		-25.6
Camping Ground Seep	CS SG 2	ND	199,300	22,400	776,500	ND	1,750	ND	ND	ND	ND	ND	ND	ND	ND	1	-33.9	-118	-21.3
Camping Ground Seep	CS SG 4	ND	205,700	15,100	778,700	ND	505	ND	ND	ND	ND	ND	ND	ND	ND	1	-51.6		
Camping Ground Seep	CS SG 6	ND	120,500	65,100	810,600	ND	3,810	ND	ND	ND	ND	ND	ND	ND	ND	1	-39.7	-132	-47.1
Camping Ground Seep	CS SG 6 – Dup	ND	140,500	54,100	803,000	ND	2,430	ND	ND	ND	ND	ND	ND	ND	ND	ND	-42.4	-143	-47.4
Camping Ground Seep	CN SG 12	ND	210,000	6,600	783,200	ND	156	17	ND	14	ND	2	8	2	3	4			-40.7
Camping Ground Seep	CS SG 13	ND	129,900	59,300	804,800	ND	5,960	ND	ND	ND	ND	ND	ND	ND	ND	ND	-34.4	36	-49.1
Camping Ground Seep	CS SG 13 DUP	ND	127,300	60,000	807,100	ND	5,580	ND	ND	ND	ND	ND	ND	ND	ND	ND	-33.9	50	-48.9
Camping Ground Seep	CN SG 18	ND	198,900	20,200	780,900	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND			-20.6
Camping Ground Seep	CS SG 15	ND	208,200	14,100	777,700	ND	38	ND	ND	ND	ND	ND	ND	ND	ND	ND			-21.3
Camping Ground Seep	Campground C2 C2 seep gas	ND	208,200	2,300	746,600	ND	42,900	1	ND	ND	ND	ND	ND	ND	ND	ND	-13.6		
Rock Hole Seep	RS SG 3	ND	191,500	15,300	792,700	ND	453	ND	ND	ND	ND	ND	ND	ND	ND	ND			-30.7
Rock Hole Seep	RS SG 4	ND	190,800	25,000	784,200	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND			-19.7
Orana 8 Pilot Well	08 SG 1	ND	212,700	1,200	786,100	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND			-16.1
Orana 11 Pilot Well	011 SG 2	ND	210,000	3,800	786,200	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND			-17.9
Orana 11 Pilot Well	011 SG 2-DUP	ND	209,100	4,000	786,900	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND			-18.2
Stressed Vegetation Site 1	RR SG 1	ND	213,200	7,000	779,800	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND			-19.6
Stressed Vegetation Site 1	RR SG 3	ND	217,900	1,200	780,900	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND			-15.9
Stressed Vegetation Site 2	PV SG 2	ND	210,300	8,300	781,400	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND			-18.7
Stressed Vegetation Site 2	PV SG 3	ND	212,400	5,800	781,800	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND			-17.9
Stressed Vegetation Site 2	PV SG 5	ND	215,800	3,000	781,200	ND	2	ND	ND	ND	ND	ND	ND	ND	ND	ND			-18.0
Stressed Vegetation Site 3	BS SG 1	ND	216,700	2,700	780,600	ND	50	ND	ND	ND	ND	ND	ND	ND	ND	ND			-17.3
Stressed Vegetation Site 3	BS SG 2	ND	214,500	4,700	780,800	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND			-17.7
Stressed Vegetation Site 3	BS SG 3	ND	218,400	1,000	780,600	ND	6	ND	ND	ND	ND	ND	ND	ND	ND	ND			-17.6
Pump Hole Seep	Pump Hole Seep																-59.6	-208	0.1
Fenceline Seep	Fenceline Seep																-58.6	-209	-23.5
Camping Ground Seep	Camping Ground Seep																-59.2	-210	-14.1
Rock Hole Seep	Rock Hole Seep																-57.2	-215	-21.2

TABLE A.7
SOIL GAS: METHANE CONCENTRATIONS LABORATORY AND FIELD MEASUREMENTS

Company	Isotech	Sample	GC (Laboratory)	Methane (Laboratory)	Methane (Field)
Lab No.	Lab No.	Name	Date	ppm	(ppm calc. from %)
Pump Hole Seep					
4516-009	313531	PNSG 3	26/10/2012	374,500	794,000
4516-010	313532	PSSG 2	26/10/2012	1,280	1,000
4516-011	313533	PSSG 5	26/10/2012	506,400	731,000
4524-011	315454	PS SG 8	9/11/2012	221,700	293,000
4524-012	315455	PS SG 11	9/11/2012	5	<1000
Fenceline Seep					
4516-008	313530	FS SG 7	26/10/2012	461	1,000
Camping Ground Seep					
4516-001	313523	CN SG 12	26/10/2012	156	1,000
4524-007	315450	CN SG 18	9/11/2012	2	<1000
4516-002	313524	C2 C2 seep gas	26/10/2012	42,900	Not Measured
4516-003	313525	CS SG 1	26/10/2012	783	1,000
4516-004	313526	CS SG 2	26/10/2012	1,750	2,000
4516-005	313527	CS SG 4	26/10/2012	505	<1000
4516-006	313528	CS SG 6	26/10/2012	3,810	4,000
4516-007	313529	CS SG 6 - Dup	26/10/2012	2,430	4,000
4524-008	315451	CS SG 13	9/11/2012	5,960	7,000
4524-009	315452	CS SG 13 DUP	9/11/2012	5,580	7,000
4524-010	315453	CS SG 15	9/11/2012	38	<1000
Rock Hole Seep					
4524-018	315461	RS SG 3	9/11/2012	453	1,000
4524-019	315462	RS SG 4	9/11/2012	5	<1000
Orana Pilot Well 8					
4524-001	315444	08 SG 1	9/11/2012	7	<1000
Orana Pilot Well 11					
4524-002	315445	011 SG 2	9/11/2012	5	<1000
4524-003	315446	011 SG 2-DUP	9/11/2012	31	<1000
Stressed Vegetation Site 1					
4524-016	315459	RR SG 1	9/11/2012	10	<1000
4524-017	315460	RR SG 3	9/11/2012	4	<1000
Stressed Vegetation Site 2					
4524-013	315456	PV SG 2	9/11/2012	4	<1000
4524-014	315457	PV SG 3	9/11/2012	7	<1000
4524-015	315458	PV SG 5	9/11/2012	2	<1000
Stressed Vegetation Site 3					
4524-004	315447	BS SG 1	9/11/2012	50	<1000
4524-005	315448	BS SG 2	9/11/2012	14	<1000
4524-006	315449	BS SG 3	9/11/2012	6	1,000