Office of the Independent Planning Commission NSW
Level 3, 201 Elizabeth Street
SYDNEY NSW 2000

9th August 2020

Narrabri Gas Project, Commission Public Hearing

Objection

I draw the Commission's attention to the following statement by the Chairman of Santos, Keith Spence at the Santos 2020 AGM, in which he stated that Santos was not interested (would not be producing from) the shallow Hoskissons seam at Narrabri as it contains a high proportion of carbon dioxide in the coal seam gas (CSG). The statement was made by the Chairman in response to a shareholder question on the high level of carbon dioxide that public data reveals in both the deeper Maules Creek Formation and the shallower Hoskissons formation in the NGP area:

Keith Spence, Santos Chairman

> *"…. The assumption that 10% carbon dioxide in the EIS is actually a conservative estimate. Typically when you put an EIS together you try and paint a fairly bad case to make sure you really kind of stress test it. The actual Narrabri exploration and appraisal data from around 250 gas samples that were taken across the area between 2014 and 2019* have an average carbon dioxide content between them of just under 5%, not 10, 5%, erm,* ***the areas where we would expect elevated levels of carbon dioxide are typically in the shallower coal seams where, we're not really interested to be quite honest with you, these are near the surface and typically something that a coal mine might look at,*** *so basically we intend to develop the Narrabri project to maximize the value of the asset but minimizing the carbon emissions, noting that the EIS has allowed for carbon dioxide to be removed to ensure that we meet pipeline specifications as well."*

The response by Keith Spence above clearly states that Santos will not be producing from the shallower coal seam (the Hoskissons), which is the coal seam with 90% carbon dioxide in the gas form coal mined at the adjacent Narrabri Coal Mine. The statement however, also appears to carefully refer to the EIS as both justification and permission for being able to remove and vent an unspecified volume of carbon dioxide to meet pipeline (sales) specifications.

Keith Spence's statement that Santos is "not really interested" in the Hoskissons coal seam is totally at odds with the Santos' EIS which states clearly the Hoskissons is a key Santos coal seam target.

Santos NGP EIS:

> *"The Bohena Trough contains two well-developed coal measures, which are the primary coal seam gas targets for the proposed development. These are: (a) The Late Permian Black Jack Group, which contains the Hoskissons Seam (between 6 to 10 metres thick, a laterally extensive seam, located at a depth of less than 700 metres) (b) The Early Permian Maules Creek Formation, which contains the Bohena coal seam (up to 22 metres thick, a laterally extensive seam, located at depths of between 600 and 1,200 metres)."*

If this public stated commitment by Santos (that it is not interested in the shallower Hoskissons seam) it taken as formally representing the Company's view, then the EIS submitted for the project should be ruled invalid, as it clearly includes the Hoskissons (Black Jack) shallow coals as a target,

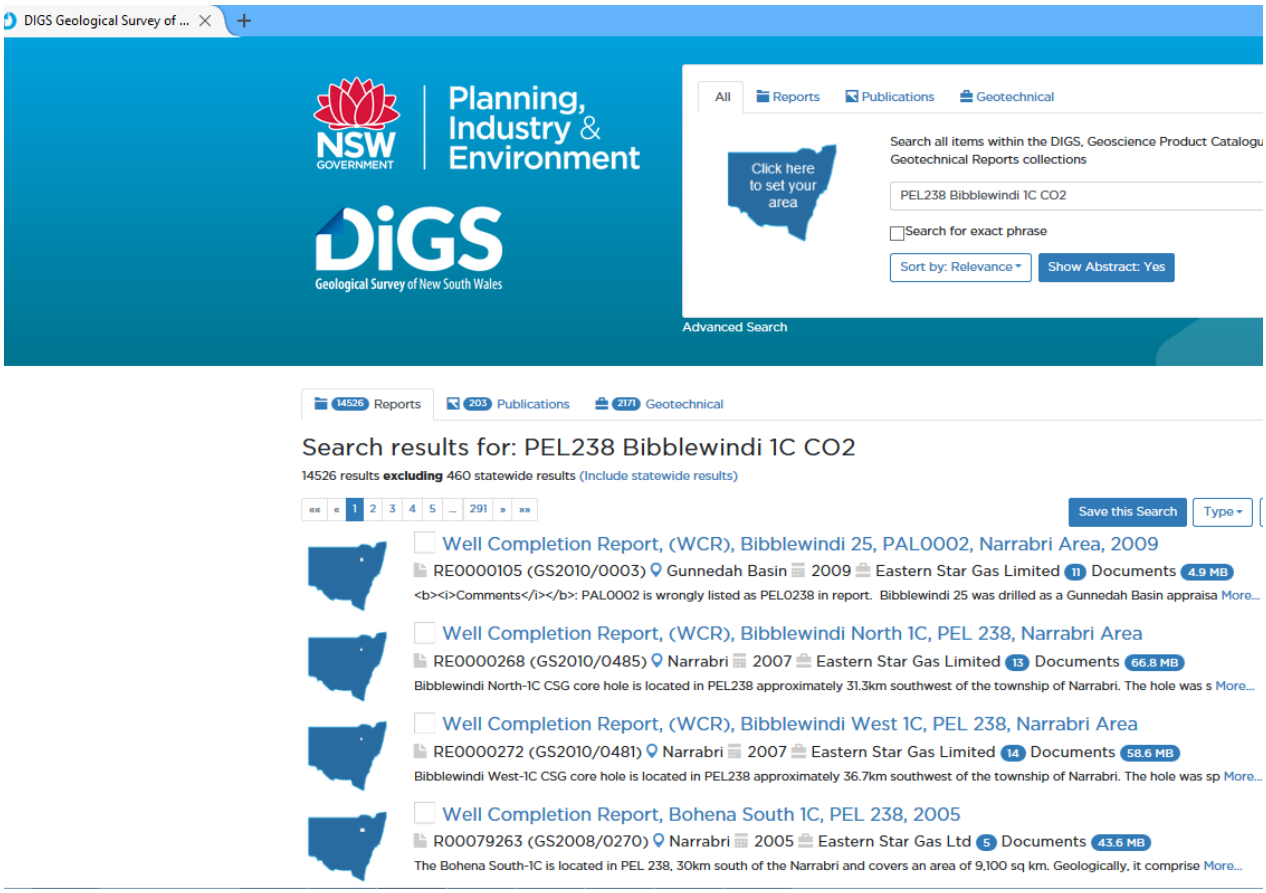
Officers of Public Companies should be bound by such public verbal undertakings; otherwise these may simply be perceived as statements of convenience rather than commitment. A video and transcript of the Santos Chairman's AGM statement (on no interest in the Hoskissons) is available.

**Regardless of the Chairman's position that the carbon dioxide content is 5% from 250 samples which are stated to have been taken after all drilling was completed in 2014, the evidence from publicly available information from all wells prior to 2015 on the DPIE's own DIGS (geological data site) reveals otherwise.*

IN view the Santos Chairman's statement and evidence presented below, there needs to be, when the EIS is resubmitted without the Hoskissons (or ideally immediately), an independent and transparent reconciliation of the "5%" carbon dioxide Santos claim (from the vague and unknown source samples) with the high carbon dioxide levels observed across the permit (see DIGS data presented in this Objection).

DPIE provides access to all the well high carbon dioxide data from 1998 to 2014 (over 40 wells) as per the example screen shot from the DPIE site below; and the attached gas composition examples taken from DIGS for just a few of the 40 wells which have gas composition data available.

https://search.geoscience.nsw.gov.au/



From an analysis of both the shallower Hoskissons and deeper Maules Creek data on DIGS, these formations are highly carbon dioxide prone across much of the proposed project area (see graphic below).

There are some areas in PEL 238 (the NGP proposed area) with low carbon dioxide, but this cannot be said of the whole project area. An average carbon dioxide calculation should use data across the entire proposed development area.

On the Chairman's claim at the AGM, repeated by CEO Gallagher in a video presentation to the Commission, that the NGP carbon dioxide content is around 5%, I refer to these and a subsequent assertion by a David Kitto [DPIE] (without any data or study) to claim that the carbon dioxide content of all the gas in the Narrabri Gas Project area is only 5%.

There is no study or data that Santos or DPIE have ever tabled to support this "5%" assertion; or even the 10% carbon dioxide "assumption".

There is much freely available data and evidence to the contrary. Please find presented below a cross section across the NGP area and the actual well carbon dioxide analysis data from the wells shown on the cross section.

This indicates a 25%-30% average carbon dioxide level in the NGP area, or even higher.

The Commission should require Santos and the DPIE to provide the data supporting a 5% carbon dioxide claim; the attached evidence indicates this will be difficult but is a core factor that needs to be transparently and publicly assessed before any project approval.

IN view of Santos claim that the NGP CSG has a 5% carbon dioxide content, the total carbon dioxide emissions should also be limited to 5% (on a composition basis) of the produced gas; that would tie the project emissions limits to Santos claim of 5%.

And, as per the Santos Chairman's statement, as Santos has publicly stated it has no interest in the shallower Hoskissons seam, any production from this seam now needs to be excised from any project approval; and a new EIS submitted.

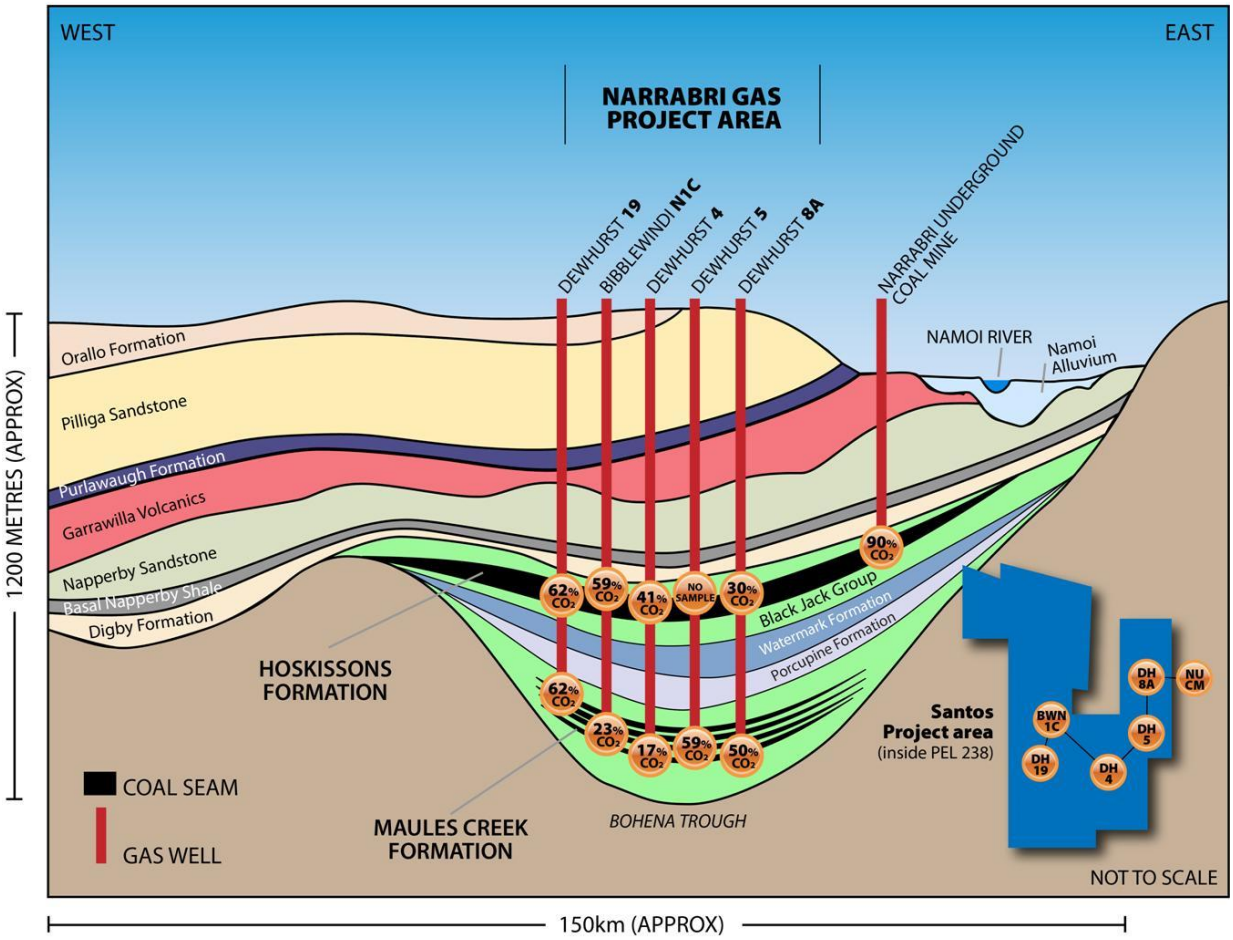
The development will otherwise be one of Australia's high emissions emitters, approaching 2 million tonnes p.a. of carbon dioxide emitted each year.

Sincerely

Waverley NSW Resident

CO_2 CONTENT IN THE COAL SEAMS THAT SANTOS ARE TARGETTING IN THE NARRABRI PROJECT

Well data spread across the project area, showing very high CO_2 in both shallow (Black Jack Group) and deeper (Maules Creek Formation) coal seams targetted by Santos for the project.



Dewhurst-19 Data (from DPIE DIGS Geological Data)

Gas Composition Analysis Report

Analysis Batch: 2011/666

Report Date: 13/05/2011

				Air Included															Air Corrected									
Sample ID	Canister ID	Depth From (m)	Depth To (m)	Oxygen+Argon (%)	Nitrogen (%)	Carbon Dioxide (%)	Methane (%)	Ethane (%)	Propane (%)	i-Butane (%)	n-Butane (%)	i-Pentane (%)	n-Pentane (%)	Hexane (%)	Purge Gas (%)	Total (%)	Air Content (%)	Nitrogen (%)	Carbon Dioxide (%)	Methane (%)	Ethane (%)	Propane (%)	i-Butane (%)	n-Butane (%)	i-Pentane (%)	n-Pentane (%)	Hexane (%)	Total (%)
DWH019_0010805111007A1	DWH019_001	417.080	417.880	7.42	22.11	20.07	10.57	0.02	ND	ND	ND	<0.01	<0.01	ND	39.82	100.00	33.90	0.00	65.45	34.48	0.07	ND	ND	ND	<0.01	<0.01	ND	100.00
DWH019_0011105110927B1	DWH019_001	417.080	417.880	2.45	16.17	23.93	10.81	0.02	<0.01	ND	ND	<0.01	<0.01	ND	46.62	100.00	11.18	17.62	56.69	25.61	0.05	<0.01	ND	ND	<0.01	<0.01	ND	100.00
DWH019_0020805111013A1	DWH019_002	417.880	418.670	6.26	20.09	22.55	10.15	0.02	ND	ND	ND	ND	ND	ND	40.93	100.00	28.61	0.00	68.91	31.02	0.07	ND	ND	ND	ND	ND	ND	100.00
DWH019_0021105110930B1	DWH019_002	417.880	418.670	2.56	17.98	26.97	10.27	0.02	ND	ND	ND	ND	ND	ND	42.20	100.00	11.69	19.20	58.48	22.28	0.05	ND	ND	ND	ND	ND	ND	100.00
DWH019_0030805111017A1	DWH019_003	424.360	425.150	9.33	32.99	12.84	4.08	0.01	ND	ND	ND	ND	ND	ND	40.75	100.00	42.62	0.00	75.82	24.11	0.08	ND	ND	ND	ND	ND	ND	100.00
DWH019_0031105110932B1	DWH019_003	424.360	425.150	1.32	21.20	20.58	6.16	0.02	ND	ND	ND	ND	ND	ND	50.72	100.00	6.02	38.14	47.56	14.25	0.05	ND	ND	ND	ND	ND	ND	100.00
DWH019_0040805111021A1	DWH019_004	427.060	427.860	6.76	24.25	25.93	7.35	0.01	<0.01	ND	ND	ND	ND	ND	35.70	100.00	30.87	0.41	77.55	22.00	0.03	<0.01	ND	ND	ND	ND	ND	100.00
DWH019_0041105110935B1*	DWH019_004	427.060	427.860	21.91	77.99	0.10	<0.01	ND	ND	ND	ND	ND	ND	ND	0.00	100.00	100.00	-	-	-	-	-	-	-	-	-	-	-
DWH019_0050805111023A1	DWH019_005	439.410	439.950	10.95	33.29	7.45	2.22	<0.01	ND	ND	ND	ND	ND	<0.01	46.10	100.00	50.02	0.00	76.97	22.98	<0.01	ND	ND	ND	ND	ND	<0.01	100.00
DWH019_0051105110937B1	DWH019_005	439.410	439.950	2.78	17.33	13.24	3.69	<0.01	ND	<0.01	<0.01	ND	ND	<0.01	62.94	100.00	12.72	30.39	54.40	15.18	<0.01	ND	<0.01	<0.01	ND	ND	<0.01	100.00
DWH019_0060805111027A1	DWH019_006	446.070	446.880	7.53	23.02	9.41	3.16	<0.01	<0.01	ND	ND	ND	ND	ND	56.87	100.00	34.42	0.00	74.78	25.15	<0.01	<0.01	ND	ND	ND	ND	ND	100.00
DWH019_0061105110939B1	DWH019_006	446.070	446.880	2.53	17.50	11.95	3.39	0.01	<0.01	ND	ND	ND	ND	ND	64.63	100.00	11.54	35.63	50.12	14.20	0.05	<0.01	ND	ND	ND	ND	ND	100.00
DWH019_0070805111032A1_1	DWH019_007	448.090	448.890	6.35	23.08	14.32	5.20	<0.01	<0.01	ND	ND	<0.01	<0.01	ND	51.04	100.00	29.03	2.03	71.83	26.10	<0.01	<0.01	ND	ND	<0.01	<0.01	ND	100.00
DWH019_0070805111032A1_2	DWH019_007	448.090	448.890	6.37	23.13	14.35	5.21	<0.01	<0.01	ND	ND	<0.01	<0.01	ND	50.93	100.00	29.11	1.99	71.85	26.12	<0.01	<0.01	ND	ND	<0.01	<0.01	ND	100.00
DWH019_0071105110942B1_1	DWH019_007	448.090	448.890	1.79	20.40	13.96	4.26	<0.01	ND	ND	ND	ND	ND	ND	59.59	100.00	8.19	43.45	43.32	13.21	<0.01	ND	ND	ND	ND	ND	ND	100.00
DWH019_0071105110942B1_2	DWH019_007	448.090	448.890	1.80	20.43	13.95	4.25	<0.01	ND	ND	ND	ND	ND	ND	59.56	100.00	8.21	43.50	43.28	13.20	<0.01	ND	ND	ND	ND	ND	ND	100.00
DWH019_0080805111036A1	DWH019_008	451.380	452.170	12.87	38.04	7.11	2.02	<0.01	<0.01	ND	ND	ND	ND	ND	39.95	100.00	58.81	0.00	77.77	22.16	<0.01	<0.01	ND	ND	ND	ND	ND	100.00
DWH019_0081105110944B1	DWH019_008	451.380	452.170	2.59	20.75	10.50	2.88	<0.01	<0.01	ND	ND	ND	ND	ND	63.27	100.00	11.83	46.23	42.16	11.57	<0.01	<0.01	ND	ND	ND	ND	ND	100.00
DWH019_0091105111203A1	DWH019_009	613.990	614.780	1.48	3.90	60.01	3.77	0.03	<0.01	ND	ND	<0.01	<0.01	<0.01	30.81	100.00	6.76	0.00	94.04	5.90	0.04	<0.01	ND	ND	<0.01	<0.01	<0.01	100.00
DWH019_0091205110612B1	DWH019_009	613.990	614.780	1.79	5.45	71.41	4.36	0.02	ND	ND	ND	ND	ND	ND	16.97	100.00	8.19	0.00	94.22	5.75	0.03	ND	ND	ND	ND	ND	ND	100.00
DWH019_0101105110714A1	DWH019_010	616.070	616.870	5.39	16.08	8.29	0.63	<0.01	ND	ND	ND	ND	ND	ND	69.61	100.00	24.64	0.00	92.90	7.08	<0.01	ND	ND	ND	ND	ND	ND	100.00
DWH019_0101105111204B1	DWH019_010	616.070	616.870	0.93	2.95	71.27	4.45	0.02	<0.01	ND	ND	<0.01	<0.01	<0.01	20.38	100.00	4.26	0.00	94.10	5.87	0.02	<0.01	ND	ND	<0.01	<0.01	<0.01	100.00
DWH019_0101205110615C1	DWH019_010	616.070	616.870	0.74	3.54	79.09	4.91	0.02	ND	ND	ND	ND	ND	ND	11.69	100.00	3.39	1.05	93.14	5.78	0.03	ND	ND	ND	ND	ND	ND	100.00
DWH019_0111105111205A1	DWH019_011	616.870	617.650	2.87	9.68	54.24	3.31	0.01	<0.01	ND	ND	ND	ND	ND	29.88	100.00	13.14	0.00	94.22	5.75	0.02	<0.01	ND	ND	ND	ND	ND	100.00
DWH019_0111205110618B1	DWH019_011	616.870	617.650	0.94	3.48	76.56	4.28	0.02	ND	ND	ND	ND	ND	ND	14.72	100.00	4.29	0.17	94.52	5.29	0.03	ND	ND	ND	ND	ND	ND	100.00

EARTH DATA

Analysis Batch: 2011/666 Page 1 of 3

Bibblewindi North 1C Data (from DPIE DIGS Geological Data)

UPDATED GAS CONTENT RESULTS - Eastern Star Gas

Borehole: BWN1C

GeoGAS Contact: Geoff Williams (02 42 259 279)

GeoGAS PTY.LTD.

					Measured Gas Content Qm (m^3/t)				Desorption Rate @ Sample Ash		Ash/Density		Gas Composition				
GeoGAS Sample Number	Client Sample Number	Seam	Depth from (m)	Depth to (m)	at Sample Ash	at 15% Ash	Ash Free	Dry Ash Free	GeoGAS DRI	IDR30 (m^3/t)	RD (g/cc)	Sample Ash (% ad)	H_2S Detected	CH_4/CH_4+CO_2	CH_4% Air Free	CO_2% Air Free	N_2% Air Free
ES0001	BWNI-ESG01	Upper Black Jack	610.02	610.68	2.59	6.51	7.66	7.85	388	0.07	1.98	66.2	No	0.31	18.82	41.94	39.23
ES0002	BWNI-ESG03	Upper Black Jack	612.12	612.90	4.58	6.70	7.88	8.08	574	0.12	1.78	41.8	No	0.33	27.75	56.98	15.27
ES0003	BWNI-ESG03	Upper Black Jack	613.95	614.59	2.11	6.04	7.10	7.28	236	0.07	2.10	70.3	No	0.29	15.65	38.01	46.34
ES0004	BWNI-ESG04	Upper Black Jack	619.00	619.74	3.13	5.80	6.82	6.97	487	0.13	1.90	54.1	No	0.21	17.57	66.86	15.57
ES0005	BWNI-ESG05	Upper Black Jack	622.85	623.63	5.98	7.21	8.49	8.72	740	0.18	1.60	29.6	No	0.21	15.92	60.98	23.11
ES0006	BWNI-ESG06	Upper Black Jack	624.13	624.89	6.21	6.96	8.19	8.42	726	0.23	1.50	24.2	No	0.21	16.03	60.25	23.72
ES0007	BWNI-ESG07	Upper Black Jack	632.79	633.27	3.91	6.08	7.16	7.38	511	0.11	1.76	45.4	No	0.19	13.86	60.32	25.83
ES0008	BWNI-ESG08	Hoskissons	645.20	645.98	5.36	11.27	13.25	13.56	616	0.09	2.04	59.6	No	0.19	14.22	60.73	25.05
ES0009	BWNI- ESG09	Hoskissons	645.98	646.76	6.72	8.21	9.66	9.92	863	0.17	1.59	30.4	No	0.19	14.59	60.44	24.97
ES0010	BWNI-ESG10	Hoskissons	646.76	647.54	6.18	7.01	8.25	8.46	746	0.22	1.49	25.1	No	0.20	15.29	62.31	22.40
ES0011	BWNI-ESG11	Hoskissons	647.54	648.30	6.85	6.77	7.97	8.22	912	0.41	1.41	14.0	No	0.21	16.53	61.22	22.25
ES0012	BWNI-ESG12	Hoskissons	648.30	649.07	7.02	6.53	7.68	7.99	851	0.59	1.40	8.5	No	**0.22**	**21.81**	**78.19**	**0.00**
ES0013	BWNI-ESG13	Hoskissons	649.07	649.85	7.36	7.11	8.36	8.68	943	0.42	1.49	11.9	No	0.23	17.35	59.45	23.19
ES0014	BWNI-ESG14	Hoskissons	649.85	650.62	7.52	6.93	8.16	8.50	954	0.40	1.40	7.8	No	0.22	17.38	60.19	22.43
Weighted Averages		**Hoskissons**	**645.20**	**650.62**	**6.66**	**7.82**	**9.20**	**9.49**	**832**	**0.31**		**24.1**		**0.22**	**21.81**	**78.19**	**0.00**
ES0015	BWNI-ESG15	Upper Maules Creek	795.35	796.13	8.87	8.50	9.99	10.24	849	1.33	1.40	11.2	No	0.78	62.49	17.79	19.72
ES0016	BWNI-ESG16	Upper Maules Creek	796.13	796.91	7.88	7.11	8.37	8.60	689	1.05	1.32	5.9	No	0.76	59.66	18.41	21.94
ES0017	BWNI-ESG17	Upper Maules Creek	796.91	797.69	8.73	8.07	9.50	9.77	802	1.50	1.31	8.1	No	0.79	63.03	16.74	20.23
Weighted Averages		**Upper Maules Creek**	**795.35**	**797.69**	**8.51**	**7.91**	**9.31**	**9.55**	**782**	**1.30**		**8.5**		**0.78**	**61.76**	**17.63**	**20.60**
ES0018	BWNI-ESG18	Bohena	832.15	832.93	8.36	7.46	8.78	9.03	732	0.99	1.30	4.8	No	**0.73**	**72.72**	**27.28**	**0.00**
ES0019	BWNI-ESG19	Bohena	832.93	833.71	8.46	7.65	9.00	9.22	752	0.94	1.32	5.9	No	0.73	59.52	21.58	18.90
ES0020	BWNI-ESG20	Bohena	833.71	834.49	8.32	7.42	8.74	8.98	762	1.01	1.30	4.7	No	0.73	59.34	22.16	18.50
ES0021	BWNI-ESG21	Bohena	834.49	835.27	6.34	5.68	6.68	6.83	560	1.25	1.30	5.1	No	**0.70**	**69.81**	**30.19**	**0.00**
ES0022	BWNI-ESG22	Bohena	835.27	836.05	9.12	8.29	9.75	10.00	850	1.31	1.40	6.4	No	0.73	59.74	21.57	18.70
ES0023	BWNI-ESG23	Bohena	836.05	836.83	8.76	7.89	9.28	9.48	845	1.29	1.40	5.6	No	**0.72**	**72.08**	**27.92**	**0.00**
Weighted Averages		**Bohena**	**832.15**	**836.83**	**8.21**	**7.39**	**8.69**	**8.91**	**748**	**1.13**		**5.4**		**0.72**	**71.52**	**28.48**	**0.00**

Notes: Gas composition in bold blue are the helium flush results

Sample validation to be completed at end of project when all results received

Dewhurst 4 Data (from DPIE DIGS Geological Data)

Borehole Details					Sample Details					Gas Composition A - Air Free (weighted average)				Gas Composition B - Air Free (weighted average)			
Well Name	SampleID	Date Sample Collected	Gas Testing Contractor	Gas Testing Lab	Seam	Elevation (GL)	Top (m)	Base (m)	Thickness (m)	CO2%	CH4%	N2%	Ethane C2H6%	CO2%	CH4%	N2%	Ethane C2H6%
Dewhurst-4	GC01	3/6/08	GeoConsult	Simtars	Upper Black Jack	301.99	676.01	676.7	0.69	43.55	55.76	0	0.67	37.96	61.85	0.00	0.19
Dewhurst-4	GC02	3/6/08	GeoConsult	Simtars	Upper Black Jack	301.99	677.52	678.24	0.72	45.3	54.66	0	0.02	41.16	58.79	0.00	0.02
Dewhurst-4	GC03	4/6/08	GeoConsult	Simtars	Upper Black Jack	301.99	682.25	682.93	0.68	28.92	53.18	17.87	0.02	Not enough gas			
Dewhurst-4	GC04	4/6/08	GeoConsult	Simtars	Upper Black Jack	301.99	688.03	688.75	0.72	Not enough gas				Not enough gas			
Dewhurst-4	GC05	4/6/08	GeoConsult	Simtars	Hoskissons	301.99	711.27	712.3	1.03	47.64	48.12	4.04	0.09	36.44	63.28	0.00	0.26
Dewhurst-4	GC06	4/6/08	GeoConsult	Simtars	Hoskissons	301.99	713.14	714.14	1	45.78	50.65	3.45	0.11	46.37	53.49	0.00	0.12
Dewhurst-4	GC07	5/6/08	GeoConsult	Simtars	Hoskissons	301.99	714.24	715.24	0	49.37	40.86	9.37	0.10	43.74	49.15	6.82	0.12
Dewhurst-4	GC08	14/6/08	GeoConsult	Simtars	Maules Creek	301.99	952.69	953.16	0.47	37.27	62.65	0.00	0.08	35.46	64.36	0.00	0.16
Dewhurst-4	GC09	14/6/08	GeoConsult	Simtars	Maules Creek	301.99	955.53	956.13	0.6	33.91	66.01	0.00	0.08	20.19	71.29	8.27	0.21
Dewhurst-4	GC10	15/6/08	GeoConsult	Simtars	Maules Creek	301.99	962.61	963.6	0.99	29.90	69.91	0.00	0.19	17.34	77.94	4.42	0.23
Dewhurst-4	GC11	15/6/08	GeoConsult	Simtars	Maules Creek	301.99	976.06	976.74	0.68	25.64	74.25	0.01	0.09	13.91	80.77	5.02	0.24
Dewhurst-4	GC12	16/6/08	GeoConsult	Simtars	Bohena	301.99	985.21	985.96	0.75	24.77	75.14	0.00	0.00	8.13	90.29	1.17	0.36
Dewhurst-4	GC13	16/6/08	GeoConsult	Simtars	Bohena	301.99	988.34	989.34	1	22.98	76.92	0.00	0.10	14.91	71.84	12.91	0.29
Dewhurst-4	GC14	16/6/08	GeoConsult	Simtars	Bohena	301.99	991.45	992.16	0.71	25.06	74.54	0.00	0.10	Taken off test, not enough gas			
Dewhurst-4	GC15	21/6/08	GeoConsult	Simtars	Bohena	301.99	995.15	996.15	1	21.47	78.57	0.00	0.11	12.44	84.6	2.54	0.40

Dewhurst 5 Data (from DPIE DIGS Geological Data)

Borehole Details					Sample Details					Gas Composition A - not corrected (RAW)					Gas Composition A - Air Free (weighted average)										Composition B - Air Free (weighted av			
Well Name	SampleID	Date Sample Collected	Gas Testing Contractor	Gas Testing Lab	Seam	Elevation (GL)	Top (m)	Base (m)	Thickness (m)	CO2%	CH4%	N2%	O2%	Ethane C2H6%	Lapsed days	Time Since TD	Date CompA sample Collected	Time CompA sample Collected	Volume of gas desorbed at time Comp A collected	Ratio CH4/(CH4+CO2+N2)	CO2%	CH4%	N2%	Ethane C2H6%	CO2%	CH4%	N2%	Ethane C2H6%
Dewhurst-5	GC01	28/09/2008	GeoConsult	Simtars	Up Maules Ck		749.4	750.1	0.7	37.3	37.5	20.2	5	0.154							57.41	42.34	0	0.24	35.12	52.45	0	0.72
Dewhurst-5	GC02	29/09/2008	GeoConsult	Simtars	Up Maules Ck		759.36	760.06	0.7	49.3	35.1	22.3	6.4	0.095							64.49	35.35	0.01	0.13	58.95	40.75	0	0.26
Dewhurst-5	GC03	30/09/2008	GeoConsult	Simtars	Bohena		778.58	779.38	0.8	59.6	20.2	18.7	5.2	0.025							73.29	26.63	0	0.03	68.09	31.64	0	0.03
Dewhurst-5	GC04	30/09/2008	GeoConsult	Simtars	Bohena		779.68	780.68	1	51.1	25.3	17.5	4.8	0.027							67.3	32.62	0	0.03	68.63	31.16	0	0.05
Dewhurst-5	GC05	30/09/2008	GeoConsult	Simtars	Bohena		781.49	782.49	1	55.1	23.7	16.3	4.5	0.03							69.92	30.02	0	0.04	69.39	30.28	0	0.03
Dewhurst-5	GC06	30/09/2008	GeoConsult	Simtars	Bohena		783.66	784.36	0.7	62.7	25.5	8.9	2.6	0.036							70.98	28.87	0	0.04	67.69	31.97	0	0.08
Dewhurst-5	GC07	30/09/2008	GeoConsult	Simtars	Bohena		785.25	786.25	1	62.2	27.3	8.3	2.1	0.031							69.1	30.33	0.52	0.03	72.02	27.69	0	0.03
Dewhurst-5	GC08	30/09/2008	GeoConsult	Simtars	Bohena		786.31	787.03	0.72	64.5	24.2	8.6	2.5	0.044							72.64	27.26	0	0.05	53.01	46.52	0	0.16
Dewhurst-5	GC09	30/09/2008	GeoConsult	Simtars	Bohena		787.73	788.73	1	58.5	23.1	14.2	4	0.031							71.63	28.29	0.02	0.04	60.3	39.3	0	0.08
Dewhurst-5	GC10	30/09/2008	GeoConsult	Simtars	Bohena		792.98	793.98	1	66.2	23.8	7.7	2.1	0.044							73.5	26.42	0	0.05	73.08	26.66	0	0.08
Dewhurst-5	GC11	30/09/2008	GeoConsult	Simtars	Bohena		794.65	795.35	0.7	68.3	22.6	7.1	1.9	0.04							75.08	24.84	0.02	0.04	50.48	49.09	0	0.19

Dewhurst 8 A Data (from DPIE DIGS Geological Data

Table ES-2: Gas Composition Results

Desorption Sample ID	Composition Sample ID	Sample Timing (Days from Time Zero)	Air Content (mol%)	Methane (mol% Air Free)	C_2+ (mol% Air Free)	CO_2 (mol% Air Free)	N_2 (mol% Air Free)
DWH8A_001D	A	0.3	4.57	92.00	0.07	5.64	2.29
	B	0.5	9.84	94.50	0.02	5.48	0.00
DWH8A_002D	A	0.3	4.57	78.90	0.03	20.00	1.07
	B	0.6	4.34	77.40	0.01	21.40	1.19
DWH8A_003D	A	0.4	2.88	78.60	0.00	19.70	1.76
	B	0.6	3.64	77.10	0.00	21.50	1.40
DWH8A_004D	A	0.4	7.01	79.70	0.00	20.10	0.21
	B	0.7	4.80	77.40	0.06	21.30	1.24
DWH8A_005D	A	0.4	2.61	72.20	0.02	26.20	1.58

Desorption Sample ID	Composition Sample ID	Sample Timing (Days from Time Zero)	Air Content (mol%)	Methane (mol% Air Free)	C_2+ (mol% Air Free)	CO_2 (mol% Air Free)	N_2 (mol% Air Free)
	B	0.6	2.66	71.00	0.05	27.30	1.65
DWH8A_006D	A*	0.4	84.88	-	-	-	-
	B	0.6	15.93	71.80	0.10	28.10	0.00
DWH8A_007D	A	0.3	3.07	70.70	0.10	27.40	1.80
	B	0.6	1.96	70.00	0.06	28.30	1.64
DWH8A_008D	A	0.4	2.09	68.60	0.25	29.70	1.45
	B	0.6	1.67	68.60	0.17	29.90	1.33
DWH8A_009D	A	0.3	2.27	56.80	0.06	41.90	1.24
	B	0.5	2.78	55.90	0.00	43.20	0.91
DWH8A_010D	A	0.4	7.46	54.30	0.00	45.70	0.00
	B	0.9	3.84	54.00	0.00	44.90	1.14
DWH8A_011D	A	0.4	3.38	56.80	0.05	41.80	1.35
	B	0.9	2.86	56.10	0.03	42.60	1.27
DWH8A_012D	A	0.3	2.78	55.90	0.05	43.10	0.95
	B	0.7	5.81	55.00	0.00	45.00	0.00
DWH8A_013D	A	0.3	6.21	73.80	0.10	25.90	0.20
	B	0.6	2.32	72.40	0.01	26.30	1.29
DWH8A_014D	A	0.3	6.31	75.70	0.00	24.00	0.34
	B	0.6	1.62	75.00	0.01	23.60	1.39
DWH8A_015D	A	0.3	3.17	56.40	0.30	43.30	0.00
	B	0.6	10.05	53.50	0.30	44.40	1.80
DWH8A_016D	A	0.3	1.67	57.50	0.28	42.20	0.02
	B	0.6	3.51	56.40	0.20	43.40	0.00
DWH8A_017D	A	0.3	1.33	57.90	0.23	41.80	0.07
	B	0.6	3.73	56.70	0.30	43.00	0.00
DWH8A_018D	A	0.3	1.22	55.70	0.24	44.00	0.06
	B	0.5	2.98	55.40	0.30	44.30	0.00
DWH8A_019D	A	0.3	1.80	53.10	0.40	46.50	0.00
	B	0.5	3.29	52.50	0.40	47.10	0.00
DWH8A_020D	A	0.3	2.01	52.60	0.50	46.90	0.00
	B	0.5	5.09	51.60	0.50	47.90	0.00
DWH8A_021D	A	0.3	62.47	44.30	0.50	55.20	0.00
	B	0.5	1.84	53.70	0.40	45.90	0.00
DWH8A_022D	A	0.3	1.83	43.10	1.00	55.90	0.00
	B	0.5	2.23	42.30	1.10	56.60	0.00
DWH8A_023D	A	0.3	1.18	44.80	1.30	53.90	0.00
	B	0.5	1.58	43.30	1.40	55.30	0.00
DWH8A_024D	A	0.3	0.83	46.20	1.38	52.30	0.12
	B	0.6	1.14	42.60	1.60	55.80	0.00
DWH8A_025D	A	0.3	0.66	45.50	1.20	53.10	0.20
	B	0.6	1.23	42.20	1.50	56.30	0.00
DWH8A_026D	A	0.3	55.03	36.90	0.70	62.40	0.00
	B	0.6	5.42	40.20	0.90	58.90	0.00
DWH8A_027D	A	0.3	40.19	40.00	1.10	58.90	0.00
	B	0.5	3.57	42.10	1.20	56.70	0.00

*Gas Composition results unable to be reported as sample contains <5% of measured components after air and purge gas corrections. This could be due to the following issues; (i) failure of a vessel or a leak, or (ii) low gas content of a desorption sample.

Note: Air content calculated using N_2:O_2+Ar ratio of 3.57 based on results obtained using He carrier gas.