Well Completion Report

Murdoch 1

ATP 965P

Document No: PRJ-WCR-MUR-001-01

UWI No: 100000744858

Issued Date: 07-01-2014

Originator:
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1 WELL DATA CARD

Well Name	**Murdoch 1**	**Rigs**	TCL 1 (8 1/2" Surface Section) Spaulding 8 (6 1/8" and 3 7/8" Sections)
Well Type	CSG Appraisal	**Ground Level**	346.43m
Licence	ATP 965P	**Rotary Table**	347.43m
Joint Venture	QGC Pty Limited Tokyo Gas QCLNG Pty Ltd Pure energy Resources Pty Limited CNOOC Coal Seam Gas Company Pty Ltd	**Spud Date**	11:15 hours on the 13-01-2013
		Rig Release (8 ½" Section)	08:45 hours on the 14-01-2013
		Start 6 1/8" Section	06:00 hours on the 29-03-2013
Latitude	27° 59' 08.8235" S	**Final TD (m MDRT)**	853.60 (Driller); 854.04 (Logger)
Longitude	150° 38' 58.4841" E	**TD Date**	08:45 hours on the 16-04-2013
Easting	268 833.804 mE	**Rig Release**	00:00 hours on the 23-04-2013
Northing	6 902 146.596 mE	**Status at Rig Release**	Suspended
Map Zone / Sheet	56 (GDA-94) / Waar Waar (9042)		

Well Summary

Murdoch 1 is a coal seam gas appraisal well operated by QGC Pty Limited (QGC), in Authority to Prospect, ATP 965P (Refer *Figure 1*). The aim of the well was to intersect, evaluate and test coals of the Juandah and Taroom coal Measures of the Walloon Subgroup. This was achieved through the capture of HQ core from above the Upper Juandah Coal Measures to TD. The well was drilled/cored to 853.60m and encountered coals in the Juandah and Taroom coal Measures. One Wireline runs and six DSTs were preformed post drilling. The well was plugged and suspended.

Hole and Casing Design (Drillers Depths) - *Refer to Figure.2*

Type	Hole Size	Depth (m MDRT)	Casing Size	Shoe (m MDRT)	Shoe (m TVDRT)
Conductor	12 ¼"	7.00	9 5/8"	7.00	7.00
Surface	8 ½"	72.00	7"	71.00	71.00
Intermediate	6 1/8"	565.15	4 ½"	563.24	563.24
Core	3 7/8"	853.60	None		

Drilling Fluid

Hole Size	Mud Type
12 ¼"	Not recorded
8 ½"	
6 1/8"	
3 7/8"	

Stratigraphy - Formation Tops (Loggers Depths)

Formation	Depth mMDRT	Depth m TVDRT	Depth mTVDGL
Gubberamunda Sandstone	1.00	1.00	0.00
Westbourne Formation	127.66	127.66	126.66
Norwood Mudstone	421.44	421.44	420.44
Springbok Sandstone	550.62	550.62	549.62
Upper Juandah Coal Measures	601.11	601.11	600.11
Lower Juandah Coal Measures	671.68	671.68	670.68
Tangalooma Sandstone	744.73	744.73	743.73
Taroom Coal Measures	759.29	759.29	758.29
Eurombah Formation	823.17	823.17	822.17

Formation Evaluation

Run	Measurement	Depth Interval From (mMDRT)	To (mMDRT)
1	GR-MLE-MSS-MDN-MPD(HiRes)	849.44	5.00
	CMI	837.00	563.48

Mud Logging

Cuttings were monitored from 72.00mRT to coring depth at 565.15mRT. Ditch gas was not monitored or recorded during drilling. Samples were not retained.

Formation Testing

Six DSTs were performed:

- DST #1: 804.00 - 812.10m MDRT(Taroom)
- DST #2: 705.00 - 713.01m MDRT(Lower Juandah)
- DST #3: 705.00 - 713.01m MDRT(Lower Juandah)
- DST #4: 635.00 - 643.01m MDRT(Upper Juandah)
- DST #5: 634.40 - 642.41m MDRT(Upper Juandah)
- DST #6: 620.00 – 6628.01m MDRT(Upper Juandah)

Coring

The section from 65.67mRT to 406.60mRT was fully cored in order to select suitable coal seams for desorption tests. A total of 565.15mRT of core was cut and retrieved from the Walloon Subgroup with only minor core loss (See Appendix 4 for core run totals).

Under-Reaming

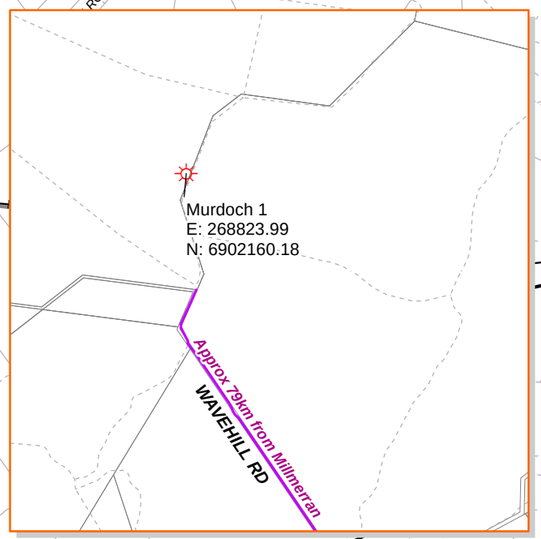
None

Completion

Suspended with Cement Plug 1 from 528.70 - 630.00mRT, Cement Plug 2 from 398.70 - 528.70mRT, Cement Plug 3 from 268.70 - 398.70mRT, Cement Plug 4 from 119.00 - 268.70mRT and Cement Plug 5 from 1.20 - 119.00mRT.

Other Information / Remarks

Mud Map of Selected Murdoch Well from Millmerran



- Well location
- Route to Town
- Railway
- Principal Road
- Secondary Road
- Minor Road
- Track
- Built Up Area

DATE:	21/11/2012	**MAP NO:**	M_22075_05
CREATED BY:	WP	**REV NO:**	A
CHECKED BY:		**MAP TYPE:**	v4 Other
PLAN REF:			

N

0 5 10 15 20
Kilometres

Map Projection: GDA 94 SCALE: 1:400,000 (A3)

DATA SOURCE:

Tenements - DME

Note: Every effort has been made to ensure this information is spatially accurate. The location of this information should not be relied on as the exact field location.

QGC
A BG Group business

2. WELL SCHEMATIC AND SUMMARY

Well Schematic and Summary for Murdoch 1

On location : 13-01-2013 (TCL Rig 1)	**Rigs : TCL 1 (8 1/2" Surface Section) and Spaulding 8 (6 1/8" and 3 7/8" Sections)**
Spud Date : 13-01-2013 (TCL Rig 1)	**Permit : ATP 965P**
GL : +346.43m	**RT : +347.43m**
Proposed TD : 867.00mRT	**Longitude : 150° 38' 58.4841" E**
Actual TD : 853.60mRT	**Latitude : 27° 59' 08.8235" S**

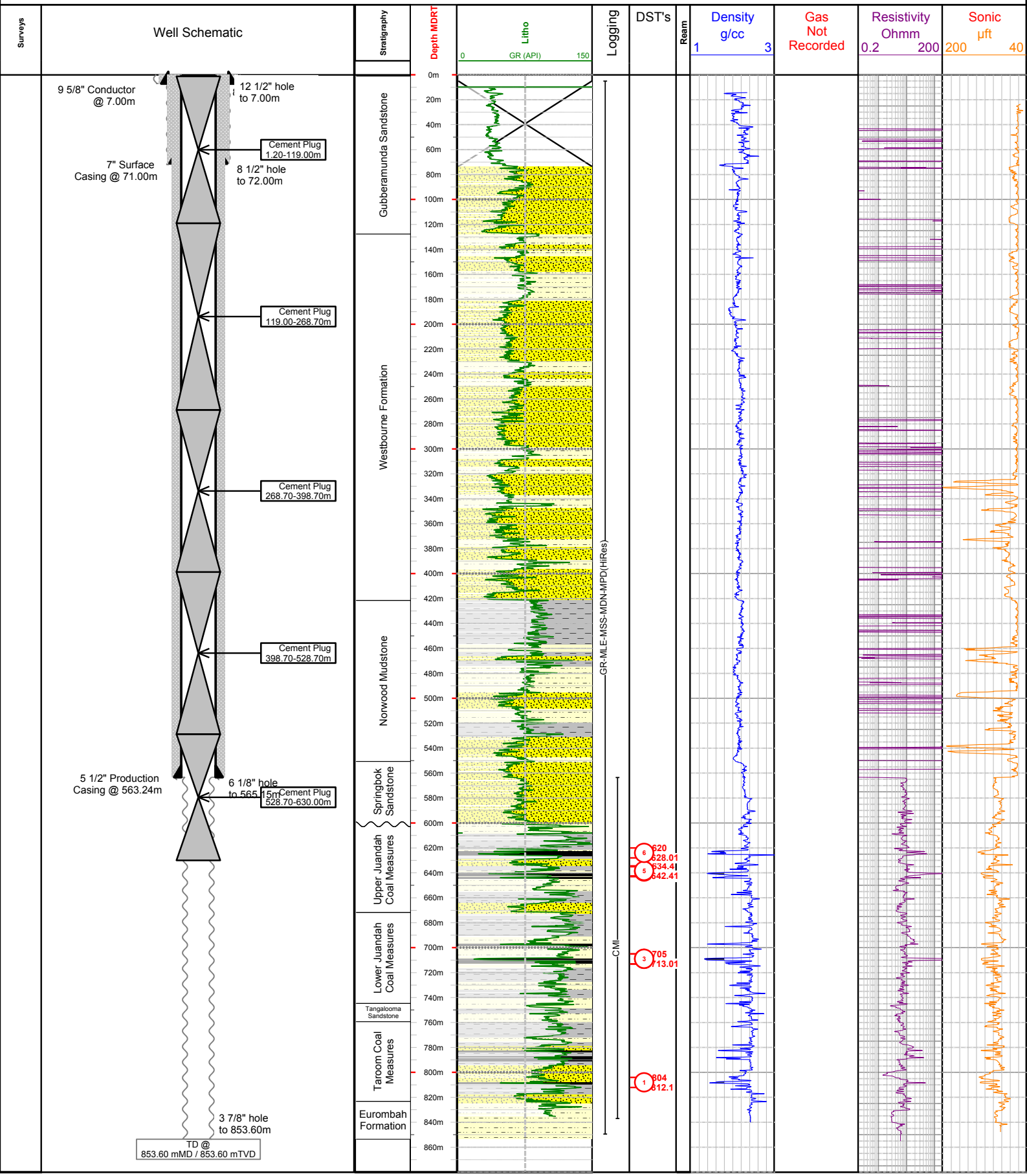


Figure 2. Well Schematic and Summary

2 DRILLING DATA

2.1 Drill Bit Record

Bit Number	Size	Make	Type	Serial No.	In (m MDRT)	Out (m MDRT)	Meters Drilled	Drilled Hours	ROP (m/hr)	Bit Dull Grading
1	8 ½"	Not recorded			7.00	72.00	65.00	2.0	32.5	Not recorded
2	6 1/8"	Stealth	PDC	X23635D	72.00	565.15	493.15	30.5	16.2	1-1-ER-A-X-0-NO-TD
3	3.7"	Tercel	HQ-3 Core	S2M3197	565.15	680.10	11.95	67.0	1.7	Not recorded
4	3 7/8"	Boart Longyear	HQ-3 Core	738212-2	680.10	853.60	173.50	29.55	5.9	Not recorded

2.2 Drilling Mud Data

Top (m MDRT)	Base (m MDRT)	Hole Size	Mud Type	Mud Weight (ppg)	Viscosity (s/qt)	Additives
7.00	72.00	8 ½"	Not recorded			
72.00	565.15	6 1/8"	KCl and Polymer	8.7 – 8.8	33 – 35	KCl Polymer CRP
680.10	853.60	3 7/8"	KCl and Polymer	8.6 – 8.7	32 – 33	KCl Polymer CRP

2.3 Deviation / Surveys

Depth (m MDRT)	Inclination (°)	Azimuth (°)	m TVDRT	m TVDSS
845.00	0.50	164.10	844.98	-497.55

2.4 Under-Reaming

None

2.5 Perforations

None

2.6 Casing and Cementing

Casing Interval	OD	Shoe (m MDRT)	Weight (lbs/ft)	Grade	Thread
Conductor	9 5/8"	7.00	36lbs/ft	K55	BTC
Surface	7"	71.00	23lbs/ft	K55	BTC
Production	5 1/2"	563.24	11.6lbs/ft	K55	BTC

Cementing Interval	Class	Slurry Volume (bbls)	Weight (ppg)	Additives	Displacement Water Volume (bbls)	Cement Returns Volume (bbls)	Cemented By
Surface	A	15.0	14.8	Not recorded	12.0	Not recorded. Cement tagged at 63.00mRT	TCL / QGC
Intermediate Lead	VanCem	48.8	12.0	Defoamer – 1gal Flocele – 56lbs HALAD-344 – 56lbs Cement friction reducer – 45lbs	29.2	13.4bbls into displacement	Halliburton
Intermediate Tail	VarCem	12.2	12.9	Defoamer – 1gal Flocele – 15lbs HALAD-344 – 16lbs Cement friction reducer – 13lbs			

**Refer to Appendices for Cementing Report*

Top Cement Plug (m MDRT)	Bottom (m MDRT)	Comments
528.70	630.00	Mix and pump 7bbls cement @ 15.6ppg. Displace with 6.1bbls water. Tagged cement at 528.70mRT.
398.70	528.70	Mix and pump 6.6bls cement @ 15.6ppg. Displace with 2.5bbls
268.70	398.70	Mix and pump 6.6bbls cement @ 15.6ppg. Displace with 2.5bbls water.
119.00	268.70	Mix and pump 6.6bbls cement at 15.6ppg. Displace with 1.2bbls water. Tagged top of cement at 119.00mRT.
1.20	119.00	Mix and pump 5.6bbls cement @ 15.6ppg.

3 GEOLOGY AND EVALUATION

3.1 Surat Basin Setting

The Surat Basin is a large intracratonic basin of Mesozoic age covering approximately 300,000km² of south-eastern Queensland and northern New South Wales. The basin forms part of the larger Great Australian Basin, and interfingers westward across the Nebine Ridge with the Eromanga Basin, and eastward across the Kumbarilla Ridge with the Clarence-Moreton Basin. Basement blocks consisting of the Central West Fold Belt and the New England Fold Belt limit the basin to the south, while in the north the basin has been eroded and unconformably overlies Triassic and Permian sediments of the Bowen Basin. The Surat Basin contains up to 2500m of sedimentary rocks deposited during the Latest Triassic to Early Cretaceous periods (Figure 3). The Latest Triassic to Earliest Cretaceous succession in the basin consists of five fining-upwards sedimentary cycles dominated by fluvio-lacustrine deposits. The lower part of each cycle typically comprises coarse-grained mature sandstone, grading up into more labile sandstone and siltstone, mudstone and coal in the upper part. In the Cretaceous, inundation of the land through an increase in sea level led to deposition of predominantly coastal plain and shallow marine sediments in two cycles.

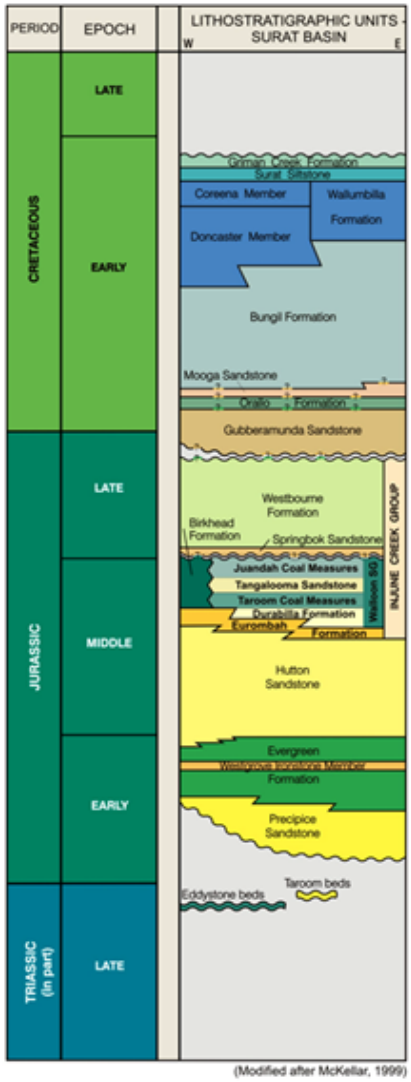


Figure 3. Stratigraphy Surat Basin

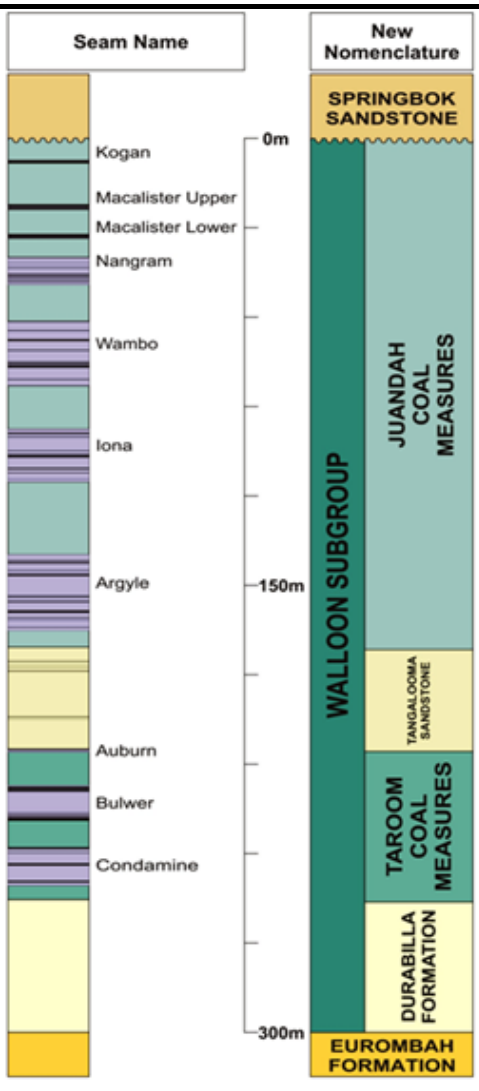


Figure 4. Stratigraphy - Walloon Subgroup

Structurally the Surat Basin is relatively simple, with the area of maximum deposition, the Mimosa Syncline, overlying the thickest Permian-Triassic rocks in the Taroom Trough of the underlying Bowen Basin. Major faulting within the basin predominantly mirrors basinal boundary faults of the underlying Bowen Basin. There is substantial folding across the basin, which is due to compaction and draping, as well as some rejuvenation of older pre-Jurassic structures and faults. Formations outcrop along the northern erosional boundary and dip gently to the south and southwest at less than 5°.

The middle Jurassic Walloon Subgroup forms part of the Injune Creek Group and is developed throughout the Surat Basin, ranging in thickness from less than 50m to greater than 700m. It comprises very-fine to medium grained, argillaceous sandstone, siltstone, mudstone and coal with minor calcareous sandstone, impure limestone and ironstone. In the northeast Surat Basin, the formation is divided into the Taroom Coal Measures, Tangalooma Sandstone and Juandah Coal Measures.

The Juandah Coal Measures generally comprise six named coal groups or seams. In descending stratigraphic order these are the Kogan, Macalister, Nangram, Wambo, Iona and Argyle Seams (Figure 4). The Macalister Seam can occur as two distinctive intervals and have been informally referred to as the Macalister Upper and Macalister Lower Seams by QGC. The Taroom Coal Measures generally comprises three coal groups or seams, informally referred to by QGC as the Auburn, Bulwer and Condamine Seams. The section of the Walloon Subgroup beneath the Taroom Coal Measures is defined by QGC as the Durabilla Formation, from exploration work by QGC.

References

SCOTT, S., ANDERSON, B., CROSDALE, P., DINGWALL, J. AND LEBLANG G., 2004: Revised geology and coal seam gas characteristics of the Walloon Subgroup - Surat Basin, Queensland. In: Boult, P.J., Johns, D.R. and Lang, S.C. (Eds), Eastern Australasian Basins Symposium II, Petroleum Exploration Society of Australia, Special Publication, 345-355.

3.2 Stratigraphic Units Drilled

Age	Unit	Depth (m MDRT)	Depth (m TVDSS)	Thickness (m)	Net Coal (m)
Late Jurassic	Gubberamunda Sandstone	1.00	346.43	126.66	
Late Jurassic	Westbourne Formation	127.66	219.77	293.78	0.00
Late Jurassic	Norwood Mudstone	421.44	-74.01	129.18	0.00
Late Jurassic	Springbok Sandstone	550.62	-203.19	50.49	2.12
Middle Jurassic	Upper Juandah Coal Measures	601.11	-253.68	70.57	5.69
Middle Jurassic	Lower Juandah Coal Measures	671.68	-324.25	73.05	4.77
Middle Jurassic	Tangalooma Sandstone	744.73	-397.3	14.56	0.35
Middle Jurassic	Taroom Coal Measures	759.29	-411.86	63.88	4.33
Middle Jurassic	Eurombah Formation	823.17	-475.74	-	0.00
	TD	853.60	-506.17		

3.3 Mudlogging

Ditch gas was not monitored or recorded. Ditch cuttings were monitored from 72.00mRT to 565.15mRT.

3.4 Coring and Analysis

Core samples were logged in detail from 565.15mRT to TD by the onsite geologists (see Appendix 5 for Lithology Descriptions). All significant coal of the Juandah Coal Measures were sealed in desorption canisters and underwent desorption testing to measure gas content. The coal samples were allowed to fully desorb, and the coal core then tested for gas adsorption, coal quality and maturity to assist the characterisation of the CSG reservoir. Sample Reports include Gas Desorption Analysis Report (Appendix 6) and Methane and Carbon Dioxide Adsorption Isotherms Report (Appendix 7). Unsampled core was retained and sent to a QGC storage facility.

3.5 Wireline Logs

Run	Date	Measurement	From (m MDRT)	To (m MDRT)	BHT (degC)	Time since last circulation	Contractor
1	17-04-2013	GR-MLE-MSS-MDN-MPD(HiRes)	849.44	5.00	44°C BHT	420 minutes	Weatherford
		CMI	837.00	563.48			

3.6 Formation Test (DST / Wireline)

Test	Unit/Seam Tested	From (m MDRT)	To (m MDRT)	Pre Flow (psi)	Pre Flow Shut In (psi)	Final Flow (psi)	Final Flow Shut In (psi)	Comments	Recovery (Formation Fluid)
1	Taroom	804.00	812.10	458.90	1195.80	467.50	1186.80	PF: Very weak blow for 5 seconds then dying for the rest of the Pre-Flow MF: Very weak blow for 5 seconds then dying for the rest of the Main Flow	8m
2	Lower Juandah	705.00	713.01	N/A	N/A	N/A	N/A	Tool failure - unable to inflate packer.	N/A
3	Lower Juandah	705.00	713.01	772.30	804.20	N/A	N/A	PF: A very weak blow was observed.	N/A
4	Upper Juandah	635.00	643.01	N/A	N/A	N/A	N/A	PF: Weak flow steady on surface of bucket decreasing throughout flow. Incomplete - Tool failure	N/A
5	Upper Juandah	634.40	642.41	338.30	462.20	339.90	392.60	PF: Very weak Blow on the surface of the bucket for 10 seconds. MF: as above	N/A
6	Upper Juandah	620.00	628.01	411.20	716.00	642.50	734.20	PF: Very strong blow straight to the bottom of the bucket. No gas to surface MF: as above	129m

LIST OF APPENDICES

LIST OF ENCLOSURES

APPENDIX 1

SURVEY LOCATION PLAN

WARNING – PLAN MAY BE ROLLED – A FOLDED OR MUTILATED PLAN WILL NOT BE ACCEPTED

SURVEY PLAN

Sheet 1 of 2

DISTANCES ARE GRID.

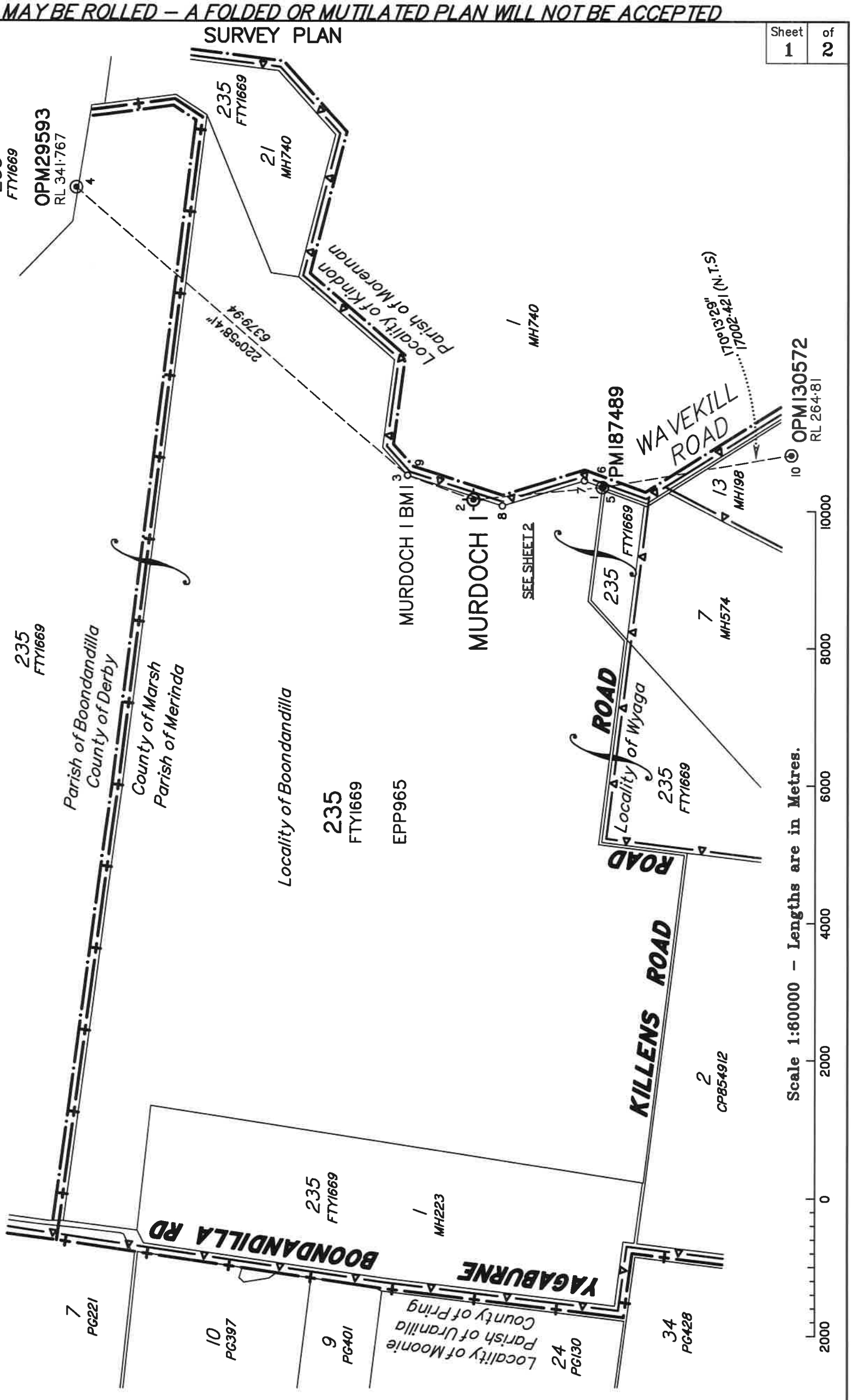
Corners and boundaries have not been reinstated. Connections have been made to the marks shown on this plan only.

Co-ordinates and Levels obtained by Static & RTK GNSS traverse from OPM130572

Bench Marks are deep driven Iron Star Pickets with Witness posts

DERIVED M.G.A. CO-ORDINATES (GDA-94)

STN	DESCRIPTION	EASTING	NORTHING	ZONE
1	PM187489	269 012·304	6 900 269·955	56
2	MURDOCH 1	268 833·804	6 902 146·596	56
3	MURDOCH 1 BM1	269 187·114	6 903 103·424	56
4	OPM29593	273 370·882	6 907 920·033	56
10	OPM130572	271 899·070	6 883 514·392	56



Scale 1:60000 – Lengths are in Metres.

Fyfe Pty Ltd (ACN 008 116 130) hereby certify that the location of the petroleum well shown on this plan was surveyed by the corporation, by Donald Otto LANTZ, Cadastral Surveyor, for whose work the corporation accepts responsibility, and that the plan is accurate, that the said survey was performed in accordance with the Petroleum and Gas (Production and Safety) Act 2004, the Survey and Mapping Infrastructure Act 2003, the Surveyors Act 2003 and associated Regulations and Standards and that the said survey was completed on 30/03/2013.

Authorised Delegate

Date 14/5/2013

0 50mm 100mm 150mm

MINING RESOURCES

Plan of PWL of Murdoch 1

SCALE: *1:60000*

Mining District: *Dalby*

PARISH: ***MERINDA*** COUNTY: ***Marsh***

LOCALITY: *BOONDANDILLA* LOCAL AUTHORITY: *GOONDIWINDI R C*

MP43782

Catalogued:	Examined:	Registered:	Drawn by:	Meridian:	Field Notes:
../../....	../../....	../../.... Chief Surveyor	PJO	MGA Zone 56 by GNSS	NO

41083-4-1
RR00-350240

WARNING – PLAN MAY BE ROLLED – A FOLDED OR MUTILATED PLAN WILL NOT BE ACCEPTED

ADDITIONAL SHEET

Sheet 2 of 2

DIAGRAM A

SCALE 1:50

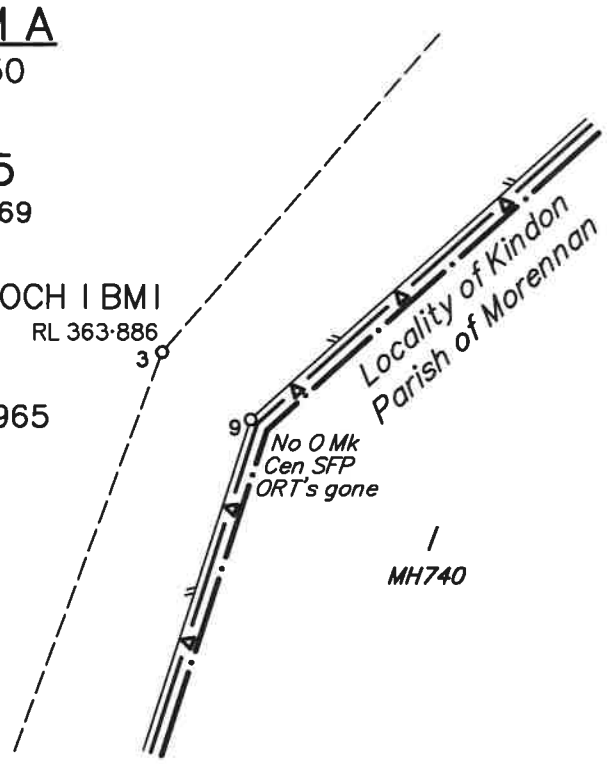
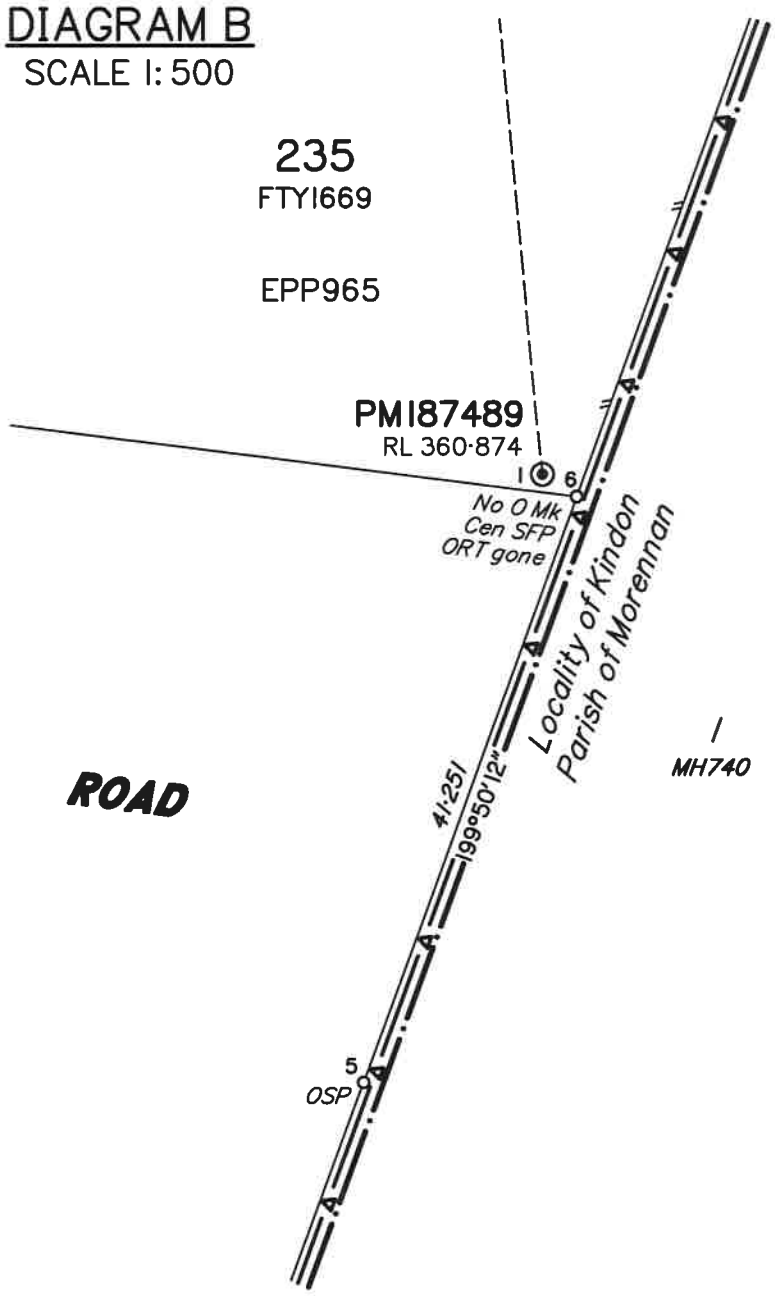
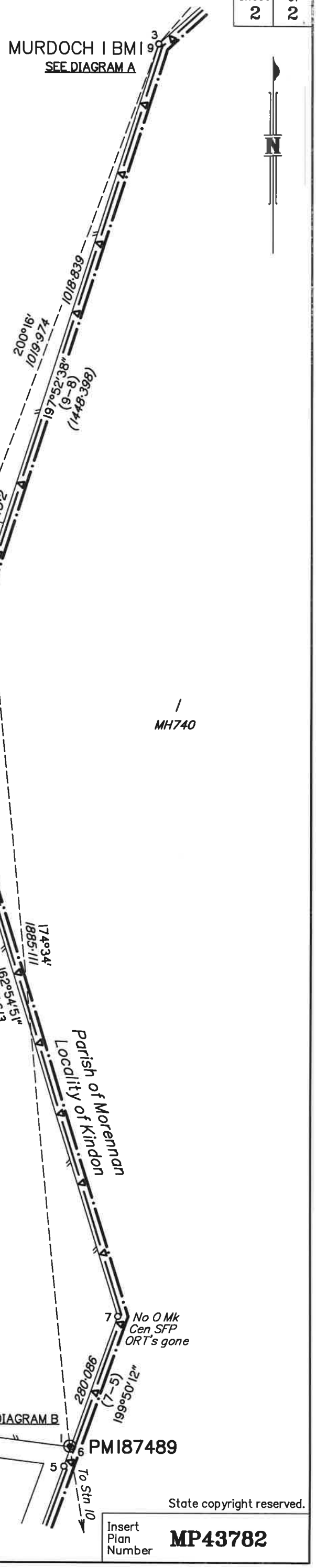


DIAGRAM B

SCALE 1:500





Scale 1:8000 – Lengths are in Metres.

100 0 100 200 300 400 500 600 700 800 900 1000 1100

0 50 mm 100 mm 150 mm

Insert Plan Number **MP43782**

APPENDIX 2

DAILY DRILLING REPORTS

DAILY DRILLING REPORT

Murdoch_1

TRC: 565.00

Report Start Date: 13-Jan-13

Report #: 1

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	13-Jan-13 09:30	14-Jan-13 08:45

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	0.35	0.00	0.00	0.00	0.00

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
1.21	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
TCL 1	568.00	853.60	72.00	65.00		

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
565.00	565.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date

DAILY CONTACTS

Contact Name	Title	Mobile

POB

Company	Service Type	Head Count

DAILY REPORT

Last 24hr Op's Summary

Rig Moved in

Summary 00:00 - 06:00

Wait on daylight

Planned Op's

Drill case and cement

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
09:30	10:30	1.00	P			RMI	RM	Rig moved in
10:30	11:15	0.75	P			SH	RU	Rigged up
11:15	13:15	2.00	P			SH	RDR	Drilled ahead 8.5 surface hole to 71mGL
13:15	13:45	0.50	P			SH	CIC	Circulated hole clean
13:45	14:30	0.75	P			SH	TO	POOH
14:30	14:45	0.25	P			SC	TBT	Held TT for Casing run
14:45	15:30	0.75	P			SC	RC	Ran 12 jts casing c/w 6m shoe track
15:30	15:45	0.25	P			SC	CIC	Circulated casing
15:45	18:00	2.25	P			SC	CMC	Performed surface cement job, mixeed and pumped 15 bbls 14.8 ppg x 2% Bentonite cement slurry, dispalced same with 12 bbls drill water
18:00	00:00	6.00	P				WOD	WOD

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

1, OIME, H500

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
500.0		8.00

DAILY DRILLING REPORT

Murdoch_1

TRC: 565.00

Report Start Date: 13-Jan-13

Report #: 1

Liner Size (in)		Volume Per Stroke Override (bbl/stk)	
Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
1	8 1/2	Security DBS	TT593	M724		

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
		32.5

String Components

Security DBS TT593

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	7.00	72.00	65.00	2.00	2.00	32.5	

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 566.00

Report Start Date: 14-Jan-13

Report #: 2

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	13-Jan-13 09:30	14-Jan-13 08:45

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	0.73	0.00	0.00	0.00	0.00

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
1.21	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
TCL 1	568.00	853.60	72.00	0.00		

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
566.00	566.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date

DAILY CONTACTS

Contact Name	Title	Mobile

POB

Company	Service Type	Head Count

DAILY REPORT

Last 24hr Op's Summary

Drill case and cement

Summary 00:00 - 06:00

Wait on daylight

Planned Op's

Rig down rig move out

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	P			SC	WOD	WOD
06:00	06:15	0.25	P			SC	SM	Held PTSM
06:15	08:45	2.50	P			SC	CSE	Cleaned surface equipment
08:45	09:00	0.25	P			RMO	RM	Rig Moved out

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, OIME, H500

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
500.0		8.00

Liner Size (in)	Volume Per Stroke Override (bbl/stk)

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 566.00

Report Start Date: 14-Jan-13

Report #: 2

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1274.00

Report Start Date: 29-Mar-13

Report #: 1

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		159,065.66	159,065.66		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	0.75	6.00	6.00	33.33	33.33

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1274.00	1274.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting			
Risk Assessment			
Toolbox Talk	29-Mar-13	0	30-Mar-13
Weekly Safety Meeting			

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	5
QGC	DSV	1

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight to commence rig move. First load out at 06:00 29/03/2013 - start of Murdoch 1 reporting. Mobilize Spaulding 8 rig and equipment to site. Unload 3 Roma Transport road trains onto lease, spot day water tank, Spaulding rig and site shacks arrived with Spaulding trucks. Wait on daylight to begin set up.

Summary 00:00 - 06:00

Wait on daylight

Planned Op's

Set up equipment, rig up as much as possible until we get surface hole equipment from Spaulding 94 when it is released from Hornby 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
06:00	18:00	12.00	P			RMI	RM	First load out at 06:00 29/03/2013 - start of Murdoch 1 reporting. Mobilize Spaulding 8 rig and equipment to site. Unload 3 Roma Transport road trains onto lease, spot day water tank, Spaulding rig and site shacks arrived with Spaulding trucks.
18:00	00:00	6.00	TP		6.00	RMI	WOD	Wait on daylight to continue set up on Murdoch 1.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

DAILY DRILLING REPORT

Murdoch_1

TRC: 1274.00

Report Start Date: 29-Mar-13

Report #: 1

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		8.0	0.0	8.0	
Potassium Chloride	sacks		384.0	0.0	384.0	

MUD PUMP

1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1275.00

Report Start Date: 30-Mar-13

Report #: 2

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,300.08	175,365.74		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	1.75	12.00	18.00	50.00	42.86

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Light rain

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1275.00	1275.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting			
Risk Assessment			
Toolbox Talk	30-Mar-13	0	31-Mar-13
Weekly Safety Meeting			

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	5
QGC	DSV	1

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight. Power up and plumb in rig camp, set up on Murdoch 1. Wait on daylight.

Summary 00:00 - 06:00

Wait on daylight

Planned Op's

Set up equipment, rig up as much as possible until we get surface hole equipment from Spaulding 94 when it is released from Hornby 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMI	WOD	Wait on daylight.
06:00	18:00	12.00	P			RMI	RU	Rig up as much as possible, take on potable water at rig camp.
18:00	00:00	6.00	TP		6.00	RMI	WOD	Wait on daylight

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

DAILY DRILLING REPORT

Murdoch_1

TRC: 1275.00

Report Start Date: 30-Mar-13

Report #: 2

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note
Drilling Water	157.0	Gleneden Pond		Murdoch 1		Roma Tpt	Site Instruction 24452	

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1276.00

Report Start Date: 31-Mar-13

Report #: 3

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,300.08	191,665.82		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	2.75	22.00	40.00	91.67	60.61

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1276.00	1276.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting			
Risk Assessment			
Toolbox Talk	31-Mar-13	0	01-Apr-13
Weekly Safety Meeting	31-Mar-13	0	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	5
QGC	DSV	1
Earth Data	Geologists	2

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight. Rain overnight on Hornby 1 black soil lease apron prevents transfer of top hole tubulars and equipment, plus triplex mud pump, Koomey Unit and Bourne annular BOP to Hornby 1. QGC HSE Safety advisors visited site for QGC Icebreaker. Wait on daylight.

Summary 00:00 - 06:00

Wait on daylight.

Planned Op's

Set up equipment, rig up as much as possible until we get surface hole equipment from Spaulding 94 when their lease drys, and rig is released from Hornby 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMI	WOD	Wait on daylight.
06:00	12:00	6.00	TP		6.00	RMI	WOE	Wait on lease to dry, and Rig 94 to be released, to transfer top hole equipment, BOP, Koomey unit, triplex mud pump to Murdoch 1. QGC Safety Advisors visited the site for QGC Icebreaker. Discussions with DSV on site, then inspected forest track and met crew there for Icebreaker presentation. Some of the crew had been off for 5 weeks.
12:00	14:00	2.00	P			RMI	SM	QGC Safety Advisors visited the site for QGC Icebreaker. Discussions with DSV on site, then inspected forest track and met crew there for Icebreaker presentation. Some of the crew had been off for 5 weeks.
14:00	18:00	4.00	TP		4.00	RMI	WOE	Wait on lease to dry, and Rig 94 to be released, to transfer top hole equipment, BOP, Koomey unit, triplex mud pump to Murdoch 1.
18:00	00:00	6.00	TP		6.00	RMI	WOD	Wait on daylight.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1276.00

Report Start Date: 31-Mar-13

Report #: 3

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1277.00

Report Start Date: 01-Apr-13

Report #: 4

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,300.08	207,965.90		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	3.75	24.00	64.00	100.00	71.11

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1277.00	1277.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting			
Risk Assessment			
Toolbox Talk	01-Apr-13	0	02-Apr-13
Weekly Safety Meeting	31-Mar-13	1	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	5
QGC	DSV	1
Earth Data	Geologists	2

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight. Wait on equipment, Rig 94 release delayed. Wait on daylight.

Summary 00:00 - 06:00

Wait on daylight.

Planned Op's

Set up equipment, rig up as much as possible until we get surface hole equipment from Spaulding 94 when that rig is released from Hornby 1, and semi-tilt available to move mud pump across.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMI	WOD	Wait on daylight
06:00	18:00	12.00	TP		12.00	RMI	WOE	Continue setting up lease while wait on Rig 94 to be released, to allow equipment to be transferred to Murdoch 1.
18:00	00:00	6.00	TP		6.00	RMI	WOD	Wait on daylight.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1277.00

Report Start Date: 01-Apr-13

Report #: 4

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1278.00

Report Start Date: 02-Apr-13

Report #: 5

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,300.08	224,265.98		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	4.75	12.00	76.00	50.00	66.67

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1278.00	1278.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting			
Risk Assessment			
Toolbox Talk	02-Apr-13	0	03-Apr-13
Weekly Safety Meeting	31-Mar-13	2	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	5
QGC	DSV	1
Earth Data	Geologists	2
Keyways	Catering staff	3

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight. Commence load out of equipment to transfer from Hornby 1. Roma Tpt Semi-tilt tray arrived on site at 12:30. Load out triplex mud pump, tubulars and chemicals to Murdoch 1. Wait on daylight.

Summary 00:00 - 06:00

Wait on daylight

Planned Op's

Complete equipment transfer, rig up, prepare to spud Murdoch 1 intermediate hole, test BOP, drill out, drill 6 1/8" hole to proposed depth of 597m, run 4 1/2" casing, cement casing, WOC, nipple down BOP, change adaptor to 4 1/2", nipple up BOP, test BOP connections, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMI	WOD	Wait on daylight to continue rig up.
06:00	13:00	7.00	P			RMI	RU	TBT - Complete transfer equipment from Hornby 1, continue rig up.
13:00	17:00	4.00	P			RMI	PT	TBT - when crossovers etc received from Hornby 1, make up assembly to test 7" surface casing to 600psi. Adjust position of rig to align with casing to allow top drive to be connected. Test casing to 600psi 10 mins, pressure held straight line. Rig down test equipment.
17:00	18:00	1.00	P			RMI	RU	Continue rig up.
18:00	00:00	6.00	TP		6.00	RMI	WOD	Wait on daylight to continue rig up on Murdoch 1.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1278.00

Report Start Date: 02-Apr-13

Report #: 5

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	0.0	8.0	
Potassium Chloride	sacks		0.0	0.0	384.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	151.0	0.0	151.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1279.00

Report Start Date: 03-Apr-13

Report #: 6

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,300.08	240,566.06		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	5.75	12.00	88.00	50.00	63.77

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1279.00	1279.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting			
Risk Assessment			
Toolbox Talk	03-Apr-13	0	04-Apr-13
Weekly Safety Meeting	31-Mar-13	3	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	5
QGC	DSV	1
Earth Data	Geologists	2
Keyways	Catering staff	3

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight. Continue transfer equipment from Hornby 1. Rig up on Murdoch 1. Test 7" surface casing to 600psi 10mins, good test. Continue rig up. Wait on daylight.

Summary 00:00 - 06:00

Wait on daylight. Crews starting tour at 06:00

Planned Op's

Complete rig up, prepare to spud Murdoch 1 intermediate hole, test BOP, drill out, drill 6 1/8" hole to proposed depth of 597m, run 4 1/2" casing, cement casing, WOC, nipple down BOP, change adaptor to 4 1/2", nipple up BOP, test BOP connections, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMI	WOD	Wait on daylight to complete rig up.
06:00	13:00	7.00	P			RMI	RU	TBT - Complete transfer of equipment from Hornby 1, continue to rig up.
13:00	17:00	4.00	P			RMI	PT	TBT - when crossovers etc received from Hornby 1, make up assembly to test 7" surface casing to 600psi. Adjust position of rig to align with casing to allow to drive to be connected. Test casing top 600psi 10 mins, pressure held straight line, recorded on Crystal Gauge chart. Rig down test equipment.
17:00	18:00	1.00	P			RMI	RU	Continue rig up.
18:00	00:00	6.00	TP		6.00	RMI	WOD	Wait on daylight to continue to rig up on Murdoch 1.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1279.00

Report Start Date: 03-Apr-13

Report #: 6

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	0.0	8.0	
Potassium Chloride	sacks		0.0	0.0	384.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	4,123.0	323.0	3,951.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1280.00

Report Start Date: 04-Apr-13

Report #: 7

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		30,150.08	270,716.14		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	6.75	8.50	96.50	35.42	59.57

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	0.00			Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1280.00	1280.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	04-Apr-13	0	05-Apr-13
Risk Assessment			
Toolbox Talk	04-Apr-13	0	05-Apr-13
Weekly Safety Meeting	31-Mar-13	4	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	12
QGC	DSV	1
Earth Data	Geologists	2
Keyways	Catering staff	3

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight. PTSM. Nipple up BOP on 7" surface casing set at 71m. Stand mast and rig up work platform. Set up for drilling 6 1/8" intermediate hole. Conduct pre-spud meeting with DSV, Geo, 2 Spaulding Rig Managers and crew. Test ESDs - all shut down immediate, Hazard hunt. Commence BOP test - numerous leaks in surface equipment - repairing leaks in progress.

Summary 00:00 - 06:00

Continue repair leaks (replace 4 ball vaves) on standpipe and choke manifold. Complete pressure testing - good tests. SPUD intermediate hole at 05:00, RIH 6 1/8" BHA.

Planned Op's

Drill float and shoe track, drill 6 1/8" hole from 72m to proposed depth of 597m, run 4 1/2" casing, cement casing, WOC, nipple down BOP, change adaptor to 4 1/2", nipple up BOP, test BOP connections, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMI	WOD	Wait on daylight to continue rig up - start tours.
06:00	19:00	13.00	P			RMI	RU	TBT - continue general rig up, raise mast and rig up work platform, mix mud, spot and rig up Koomey unit, nipple up BOP, set up for drilling 6 1/8" intermediate hole.
19:00	19:30	0.50	P			RMI	SM	Conduct pre-spud meeting with Geologist, Spaulding Rig Managers and crew, test ESDs (all immediate shut down) conduct hazard hunt.
19:30	21:30	2.00	P			BOP	HBH	TBT - make up 6 1/8" BHA, RIH to 14m.
21:30	00:00	2.50	TP		2.50	BOP	RR	TBT - commence pressure testing BOP and associated equipment. Numerous leaking valves - replace leaking valves on standpipe and choke manifold in progress

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1280.00

Report Start Date: 04-Apr-13

Report #: 7

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	23:00	72.00	8.60	33

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	2.0	6.0	
Potassium Chloride	sacks		0.0	140.0	244.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	401.0	3,550.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1281.00

Report Start Date: 05-Apr-13

Report #: 8

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		31,791.27	302,507.41		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	7.75	5.50	102.00	22.92	54.84

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	271.15	199.15		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1281.00	1281.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	05-Apr-13	0	06-Apr-13
Risk Assessment			
Toolbox Talk	05-Apr-13	0	06-Apr-13
Weekly Safety Meeting	31-Mar-13	5	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	12
QGC	DSV	1
Earth Data	Geologists	2
Keyways	Catering staff	3

DAILY REPORT

Last 24hr Op's Summary

Repair leaking standpipe and choke mainfold valves. Full BOP test 200/600psi 5/10mins. Good tests. SPUD intermediate hole at 05:00, RIH 6 1/8" drilling assembly, drill float and shoe track, new formation from 72m to 271.15m. Triplex mud pump noisy - work pipe and circulate with bean pump while repair mud pump.

Summary 00:00 - 06:00

Complete mud pump repairs (full fluid end check, found two sprays not working in power end oiler, clear suction strainer, discharge dampener checked) - pump operating satisfactorily - resume drilling 6 1/8" hole from 271.15m to 391.15m.

Planned Op's

Drill 6 1/8" hole from 72m to proposed depth of 597m, wiper trip, run 4 1/2" casing, cement casing, WOC, nipple down BOP, change adaptor to 4 1/2", nipple up BOP, test BOP connections, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	01:45	1.75	TP		1.75	BOP	RR	TBT - Complete repairs to standpipe and choke manifolds - replaced 4 leaking valves
01:45	05:00	3.25	P			BOP	BOP	TBT - complete full pressure test of BOP and associated equipment 200/600psi 5/10mins - good tests.
05:00	06:30	1.50	P			IH1	DFS	TBT - RIH tag plug at 63m. Drill float and shoe track, clean to bottom at 72.00m
06:30	20:15	13.75	P			IH1	RDR	TBT - drill 6 1/8" intermediate hole from 72m to 271.15m. Triplex mud pump making excessive noise.
20:15	00:00	3.75	TP		3.75	IH1	RR	TBT - pull up one single, circulate bottoms up. Switch to bean pump to circulate hole while working string. Full check of mud pump to troubleshoot problem - fluid end, power end, discharge dampener, suction strainer.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1281.00

Report Start Date: 05-Apr-13

Report #: 8

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	23:00	271.00	8.70	33

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		2.0	1.0	7.0	
Potassium Chloride	sacks		240.0	20.0	464.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)
100.0	Yes	112	95

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	366.0	3,184.0

DRILL STRING AND BIT INFORMATION

BHA #2, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
2	6 1/8	Stealth	SS055	___	X23635D	0.20

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
12/12/12/12/12	0.55	1-1-ER-A-X-0-NO-TD

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
565.15	33	16.2

String Components

Stealth SS055, Drill Pipe, XO Sub, Drill Collar, Stabilizer, Drill Collar, Stabilizer - Near Bit

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	72.00	271.15	199.15	13.75	13.75	14.5	200

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
3	150	350.0	12	17	13	600	250

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1282.00

Report Start Date: 06-Apr-13

Report #: 9

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,832.37	325,339.78		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	8.75	0.50	102.50	2.08	48.81

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	565.15	294.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1282.00	1282.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation			
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	06-Apr-13	0	07-Apr-13
Risk Assessment			
Toolbox Talk	06-Apr-13	0	07-Apr-13
Weekly Safety Meeting	31-Mar-13	6	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	12
QGC	DSV	1
Earth Data	Geologists	2
Keyways	Catering staff	3

DAILY REPORT

Last 24hr Op's Summary

Complete troubleshoot triplex pump noise. Drill 6 1/8" hole from 271.15m to 565.15m (Section TD) Sweep hole clean. POH to shoe wiper trip, flow check at shoe, losing 5bbls/hr to hole.

Summary 00:00 - 06:00

Crew changeover. PTSM. Flow check. RIH to bottom - .. fill. Sweep hole with 5 bbl hi-vis pill circulate hole clean prior POH to run 4 1/2" casing.

Planned Op's

POH to run 4 1/2" casing, cement casing, WOC, nipple down BOP, change adaptor to 4 1/2", nipple up BOP, test BOP connections, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	TP		0.50	IH1	RR	TBT - complete mud pump repairs, function test satisfactory.
00:30	17:15	16.75	P			IH1	RDR	TBT - resume drill 6 1/8" intermediate hole from 271.15m to 565.15m with occasional hi-vis sweeps to ensure cuttings removal. (intermediate hole TD).
17:15	18:30	1.25	P			IH1	CIC	TBT - Pump 5 bbl hi-vis sweep, circulate to clean hole, flow check, PJSM. Hole taking approx. 5 bbls/hr
18:30	00:00	5.50	P			IH1	WT	POH to shoe with flow checks, keeping hole full, back-ream tight spots 540m to 521m, 397m to 361m. Flow check at shoe.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1282.00

Report Start Date: 06-Apr-13

Report #: 9

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	23:00	565.00	8.70	35

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	1.0	6.0	
Potassium Chloride	sacks		0.0	27.0	437.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)
100.0	Yes	72	95

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note
Drilling Water	157.0	Roma Town Supply		Murdoch 1		Roma Tpt	Site Instruction 20843	

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	1,384.0	1,800.0

DRILL STRING AND BIT INFORMATION

BHA #2, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
2	6 1/8	Stealth	SS055	___	X23635D	0.20

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
12/12/12/12/12	0.55	1-1-ER-A-X-0-NO-TD

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
565.15	33	16.2

String Components

Stealth SS055, Drill Pipe, XO Sub, Drill Collar, Stabilizer, Drill Collar, Stabilizer - Near Bit

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	271.15	565.15	493.15	16.75	30.50	17.6	200

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
3	150	600.0	15	20	16	1,250	600

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1283.00

Report Start Date: 07-Apr-13

Report #: 10

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		89,940.84	415,280.62		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	9.75	0.00	102.50	0.00	43.80

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	565.15	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1283.00	1283.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	07-Apr-13	0	08-Apr-13
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	07-Apr-13	0	08-Apr-13
Risk Assessment			
Toolbox Talk	07-Apr-13	0	08-Apr-13
Weekly Safety Meeting	31-Mar-13	7	01-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	12
QGC	DSV	1
Earth Data	Geologists	2
Keyways	Catering staff	3
B.R.T.	Catering Staff	3
Roma Transport	Water carter	1
Halliburton	Cementers	2

DAILY REPORT

Last 24hr Op's Summary

Complete wiper trip, no fill on bottom, POH to run casing. Rig up and run 4 1/2" intermediate casing, set at 563.24m. Circulate casing. Cement and displace, (15.8 bbls cement to surface) bump plug to 2000psi, hold 10 mins OK, bleed back, floats holding. WOC.

Summary 00:00 - 06:00

Wait on cement samples to harden.

Planned Op's

WOC, nipple down BOP, change adaptor to 4 1/2", nipple up BOP, test BOP connections, pump out cement contaminated mud, excavate cuttings from pits #1 and #2, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	01:00	1.00	P			IH1	SM	PJSM, rig prestart. Develop and review JSA running drill tods with pipe spinner.
01:00	05:30	4.50	P			IH1	WT	TBT - RIH to bottom, no fill.
05:30	06:30	1.00	P			IH1	CIC	TBT - Sweep hole with 5 bbls hi-vis, circulate hole clean - flow check. Hole still taking fluid at same rate.
06:30	11:00	4.50	P			IC1	TO	TBT - POH with flow checks to run 4 1/2" casing. Hole good.
11:00	13:15	2.25	P			IC1	RRC	TBT - move drilling tubulars, rack 4 1/2" casing, rig up to run casing. PJSM - review SOP running casing.
13:15	19:00	5.75	P			IC1	RC	TBT - pick up shoe joint, float collar. Check circulation, run 4 1/2" casing, adding centralisers every third joint, filling pipe, set casing at 563.24m
19:00	20:00	1.00	P			IC1	CIC	TBT - break circulation with bean pump, then circulate casing volume x 2 at 150gpm, then circulate with bean pump while access made for cement truck and water tanker, rig up cementing equipment on the ground,,
20:00	20:30	0.50	P			IC1	RU	PJSM, PTW with Halliburton, load top plug, head up and rig in surface line, prepare additives.

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1283.00

Report Start Date: 07-Apr-13

Report #: 10

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
20:30	22:00	1.50	P			IC1	CMC	Pump 5 bbls fresh water, test surface lines to 3000psi - good, pump 5 bbls fresh water, 20bbls econolite liquid, 10bbls fresh water spacer. Mix and pump 48.8bbls of 12.0ppg lead slurry, mix and pump 12.2bbls of 12.9ppg tail slurry. Displace with 29.2bbls fresh water, bump plug at 2bpm with 560psi, pressure to 2000psi held 10mins good. Bleed off 0.2bbls return, floats holding.
22:00	23:00	1.00	P			IC1	RD	Rig down surface lines, head down, prepare job tickets, remove cementing equipment and water tanker, flush BOP and lines.
23:00	00:00	1.00	P			IC1	WOC	Wait on cement samples to harden.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	06:00	565.00	8.80	35

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	0.0	6.0	
Potassium Chloride	sacks		0.0	0.0	437.0	

MUD PUMP

1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	735.0	1,065.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1284.00

Report Start Date: 08-Apr-13

Report #: 11

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	438,180.70		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	10.75	11.50	114.00	47.92	44.19

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	565.15	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1284.00	1284.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	07-Apr-13	1	08-Apr-13
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	08-Apr-13	0	09-Apr-13
Risk Assessment			
Toolbox Talk	08-Apr-13	0	09-Apr-13
Weekly Safety Meeting	08-Apr-13	0	09-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Wait on cement, slack off casing, nipple down BOP, perform top up cement job, clean top hole drill tubulars while wait for equipment for restoration of mud pits.

Summary 00:00 - 06:00

Wait on equipment. General maintenance, cleaning of tubulars.

Planned Op's

Nipple up BOP on 4 1/2" casing, function test, pressure test BOP connections, pump out cement contaminated mud, excavate cuttings from pits #1 and #2, core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	09:30	9.50	P			IC1	WOC	Wait on cement to fully harden. (Note : 3 of 4 samples were hard by 06:00, left for extra time for last sample to fully harden before slacking off, as we have to get mud pits sucked and excavated before we can progress).
09:30	10:30	1.00	P			IC1	RRC	TBT - slack off on casing, remove landing joint and clear casing handling equipment.
10:30	11:30	1.00	P			IC1	BOP	TBT - nipple down BOP, remove from 7" casing.
11:30	12:30	1.00	TP			IC1	CMC	TBT - once BOP removed to gain access to annulus, checked level of cement in 7" x 4 1/2" annulus, found top of cement at 11m. Hand mix 12 sacks of cement with fresh water for 1.0bbl of 14.00ppg slurry, pour into annulus to top up to the brim, cement to surface, with a few litres of slurry surplus. BOP will be installed in the morning once top up cement fully set.
12:30	00:00	11.50	TP		11.50	BOP	WOE	TBT - wait on equipment to clear mud pits. Pit #1 full of cuttings, pit #2 full of cuttings and cement (15.8bbls cement returns while cementing casing) Pit #3 full of contaminated mud, flare pit full of contaminated mud. One Tresed tanker sucked out 25,000 lites of contaminated mud, another tanker expected in the morning, along with an excavator to clear pits.

DAILY DRILLING REPORT

Murdoch_1

TRC: 1284.00

Report Start Date: 08-Apr-13

Report #: 11

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	0.0	6.0	
Potassium Chloride	sacks		0.0	0.0	437.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note
Contaminated mud			157.0	Kenya Big Pond		Tresed	Site Instruction 28508	
Drilling Water	157.0	Gleneden Pond		Murdoch 1		Roma Tpt	Site Instruction 20843	

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	112.0	953.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1285.00

Report Start Date: 09-Apr-13

Report #: 12

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		29,178.58	467,359.28		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	11.75	23.00	137.00	95.83	48.58

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	565.15	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1285.00	1285.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	07-Apr-13	2	08-Apr-13
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	09-Apr-13	0	10-Apr-13
Risk Assessment			
Toolbox Talk	09-Apr-13	0	10-Apr-13
Weekly Safety Meeting	08-Apr-13	1	09-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	10
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3
Roma Transport	Water Carter	1

DAILY REPORT

Last 24hr Op's Summary

Wait on equipment. General maintenance, cleaning of tubulars. Nipple up, function test, and pressure test BOP connections - good. Suck out mud pits, excavate mud pits. Take on water to pits #1 and #2. Prepare new drilling fluid for core section while setting up to core float and shoe track. RIH with core assembly on HQ rods to 496.6m.

Summary 00:00 - 06:00

Crew handover, PTSM, RIH HQ3 core assembly, tag cement at 555m core float and shoe track, rathole, expected new formation 565.15m to 565.60m. Recovering core in progress.

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	12:30	12.50	TP		12.50	BOP	WOE	Wait on equipment to restore mud pits.
12:30	17:00	4.50	TP		4.50	BOP	CSE	Group induction of 3rd party personnel involved in restoration of mud pits. PJSM, arrange equipment, suck out Pit #3, and as much fluid as possible from others, excavate cuttings and cement from pits #1 and #2. Change water swivel, test BOP connections 200/600psi 5/10mins - good.
17:00	23:00	6.00	TP		6.00	BOP	RU	TBT - Take on water to pits #1 and #2, commence mixing mud. Pre-start rig, set up for coring while taking on water and mixing new mud.
23:00	00:00	1.00	P			BOP	TI	TBT - trip in HQ3 core assembly to 496.6m

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1285.00

Report Start Date: 09-Apr-13

Report #: 12

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	23:00	565.00	8.60	35

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	1.0	5.0	
Potassium Chloride	sacks		0.0	100.0	337.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note
Contaminated mud			220.0	Kenya Big Pond		Corbetts		
Drilling Water	157.0	Gleneden Pond				Roma Transport Services	Site Instruction 20843	

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	4,330.0	485.0	4,798.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1286.00

Report Start Date: 10-Apr-13

Report #: 13

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		24,900.08	492,259.36		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	12.75	0.00	137.00	0.00	44.77

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	614.80	49.65		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1286.00	1286.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	10-Apr-13	0	11-Apr-13
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	10-Apr-13	0	11-Apr-13
Risk Assessment			
Toolbox Talk	10-Apr-13	0	11-Apr-13
Weekly Safety Meeting	08-Apr-13	2	09-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

RIH to tag cement at 555m. Drill float and shoe track, core HQ3 from 565.15m to 614.8m, flow checking each connection.

Summary 00:00 - 06:00

Core HQ3 from 614.8m to 621.6m, attempting to retrieve tube stuck in the core barrel, retieving cable parted at 05:15. POH with core assembly on HQ rods to retrieve cable, core and change bit due to poor performance.

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			BOP	SM	PTSM, crew changeover.
00:30	03:00	2.50	P			BOP	TI	TBT - Trip in HQ3 core assembly on rods, tag cement at 555m
03:00	06:15	3.25	P			COR	DFS	TBT - Core float and shoe track, cement to 565.15, recover 2 x cores, flow check.
06:15	12:00	5.75	P			COR	COR	TBT - core HQ3 from 565.15m to 586.6m, flow checking each connection. Problem with lifters being worn smooth and failing to recover core, scored, undersize, and missing core sections.
12:00	12:30	0.50	P			COR	SM	PTSM, crew changeover.
12:30	00:00	11.50	P			COR	COR	TBT - retrieve core from 580.60m. Core HQ# to 614.80m, changing core lifter each core, some undersize and scored, and missing core.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1286.00

Report Start Date: 10-Apr-13

Report #: 13

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	03:00	565.00	8.60	35
KCl/Polymer	15:45	604.00	8.70	32

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Polymer CRP	Buckets		0.0	1.0	4.0	
Potassium Chloride	sacks		0.0	102.0	235.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note
						Corbetts		
Drilling Water	157.0	Broadwater		Murdoch 1		Roma Transport Services		

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	548.0	4,250.0

DRILL STRING AND BIT INFORMATION

BHA #3, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
3	3.7	Tercel	HQ3-CSP813	___	S2M3197	0.11

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
658.60		2.4

String Components: Tercel HQ3-CSP813, Core Barrel, HQ Rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	565.15	614.80	49.65	17.25	17.25	2.9	21

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
3	650	250.0	11	14	13	2,000	1,500

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1287.00

Report Start Date: 11-Apr-13

Report #: 14

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		24,900.08	517,159.44		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	13.75	17.25	154.25	71.87	46.74

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	625.20	10.40		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1287.00	1287.00

Safety Observations

Type	# Rpts
Good Observations	4

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	11-Apr-13	0	12-Apr-13
Drills/Exercise			
Induction			
Permit to Work			
Post/Pre Shift Meeting	11-Apr-13	0	12-Apr-13
Risk Assessment			
Toolbox Talk	10-Apr-13	1	11-Apr-13
Weekly Safety Meeting	08-Apr-13	3	09-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Core HQ to 621.1m. Trip out to retrieve tube. Core to 625.2m Trip to retrieve tube.

Summary 00:00 - 06:00

Trip in to TD, coring ahead @ 628 m.

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			COR	SM	PTSM- Shift handover.
00:30	04:15	3.75	P			COR	COR	Core HQ3 from 614.8m to 621.6m
04:15	05:15	1.00	TP		1.00	COR	COR	Work wireline to retrieve tube stuck in the core barrel, retieving cable parted at 05:15.
05:15	08:15	3.00	TP		3.00	COR	TO	POOH with core assembly on HQ rods to retrieve cable & core assembly.
08:15	11:00	2.75	TP		2.75	COR	HBH	Relace core BHA;
11:00	12:15	1.25	TP		1.25	COR	TI	Trip in to 304m.
12:15	12:45	0.50	P			COR	SM	PTSM- Shift handover.
12:45	14:30	1.75	TP		1.75	COR	TI	Trip to 619.6m
14:30	16:45	2.25	TP		2.25	COR	CIC	Circulate to bottom- 2m fill in hole.
16:45	18:45	2.00	P			COR	COR	Core from 621.6m to 625.2 m.
18:45	19:45	1.00	TP		1.00	COR	COR	Unablle to retrieve tube with wireline.
19:45	22:30	2.75	TP		2.75	COR	TO	Trip out of hole to retrieve core.
22:30	00:00	1.50	TP		1.50	COR	HBH	Break down coring BHA & retrieve tube.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

DAILY DRILLING REPORT

Murdoch_1

TRC: 1287.00

Report Start Date: 11-Apr-13

Report #: 14

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	01:45	619.00	8.70	34
KCl/Polymer	03:30	621.00	8.70	34
KCl/Polymer	18:30	625.00	8.60	34

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note
						Corbetts		
Drilling Water	157.0	Broadwater				Roma Transport Services		

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	572.0	3,678.0
Diesel Fuel	L	Rig	IOR	0.0	592.0	3,086.0

DRILL STRING AND BIT INFORMATION

BHA #3, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
3	3.7	Tercel	HQ3-CSP813	___	S2M3197	0.11

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
658.60		2.4

String Components

Tercel HQ3-CSP813, Core Barrel, HQ Rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	614.80	625.20	60.05	5.75	23.00	1.8	20

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
3	500	300.0	11	14	13	1,600	1,400

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1288.00

Report Start Date: 12-Apr-13

Report #: 15

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	540,059.52		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	14.75	3.00	157.25	12.50	44.42

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	658.60	33.40		Fine,overcast.

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1288.00	1288.00

Safety Observations

Type	# Rpts
Good Observations	4

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	12-Apr-13	0	13-Apr-13
Drills/Exercise	12-Apr-13	0	13-Apr-13
Induction			
Permit to Work			
Post/Pre Shift Meeting	12-Apr-13	0	13-Apr-13
Risk Assessment			
Toolbox Talk	10-Apr-13	2	11-Apr-13
Weekly Safety Meeting	08-Apr-13	4	09-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Trip in to 631m.Circ & flush to bottom.Core HQ from 625.2 to 658.6m RKB.

Summary 00:00 - 06:00

Coring ahead HQ from 658.6 to 667.6m RKB.

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			COR	SM	PTSM, shift handover
00:30	03:15	2.75	TP		2.75	COR	TI	Trip in to 631m.
03:15	03:30	0.25	TP		0.25	COR	CIC	Circ & flush to bottom.
03:30	12:00	8.50	P			COR	COR	Core HQ from 625.2 to 637.6m RKB.
12:00	12:30	0.50	P			COR	SM	PTSM, shift handover
12:30	00:00	11.50	P			COR	COR	Core HQ from 637.6 to 658.6 m RKB

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1288.00

Report Start Date: 12-Apr-13

Report #: 15

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	03:30	631.00	8.70	34
KCl/Polymer	13:00	642.00	8.70	32
KCl/Polymer	15:00	649.00	8.70	32
KCl/Polymer	23:45	658.00	8.70	34

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Potassium Chloride	sacks		0.0	18.0	217.0	

MUD PUMP

1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	664.0	2,422.0

DRILL STRING AND BIT INFORMATION

BHA #3, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
3	3.7	Tercel	HQ3-CSP813	___	S2M3197	0.11

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
658.60		2.4

String Components

Tercel HQ3-CSP813, Core Barrel, HQ Rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	625.20	658.60	93.45	11.50	34.50	2.9	20

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
3	400	300.0	11	14	13	1,400	1,200

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1289.00

Report Start Date: 13-Apr-13

Report #: 16

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	562,959.60		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	15.75	0.00	157.25	0.00	41.60

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	681.20	22.60		Fine,overcast.

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1289.00	1289.00

Safety Observations

Type	# Rpts
Good Observations	11

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	13-Apr-13	0	14-Apr-13
Drills/Exercise	12-Apr-13	1	13-Apr-13
Induction			
Permit to Work			
Post/Pre Shift Meeting	13-Apr-13	0	14-Apr-13
Risk Assessment			
Toolbox Talk	13-Apr-13	0	14-Apr-13
Weekly Safety Meeting	08-Apr-13	5	09-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Coring ahead PDC from 658.6m to 680.1m RKB.Trip out to change bit, Change to impreg HQ-3 bit.Trip in . Slack off on trip in@ 664m.Ream 16m to bottom of well @ 680.1m .Core from 680.1m to 681.2 m RKB

Summary 00:00 - 06:00

Core from 681.2m to 697.6m RKB

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			COR	SM	Shift handover,Review BOP drill, Coring ahead & hazards.
00:30	12:00	11.50	P			COR	COR	Coring ahead from 658.6m to 673.6m RKB.
12:00	12:30	0.50	P			COR	SM	Shift handover, coring & hazards.
12:30	15:00	2.50	P			COR	COR	Coring HQ from 673.6 to 680.1 m RKB.Dropping core on sequential runs.Core loss in competent ground.
15:00	18:00	3.00	P			COR	TO	Trip out to change bit, PDC Bit trial finished. Change to impreg HQ-3 bit.
18:00	21:00	3.00	P			COR	TI	Trip in to 664 m. Slack off on trip in@ 664m..
21:00	22:30	1.50	P			COR	RW	Ream 16m to bottom of well @ 680.1m.
22:30	00:00	1.50	P			COR	COR	Core from 680.1m to 681.2 m RKB

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1289.00

Report Start Date: 13-Apr-13

Report #: 16

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	01:00	663.00	8.70	34
KCl/Polymer	03:30	667.00	8.70	34
KCl/Polymer	12:00	673.00	8.70	34
KCl/Polymer	14:00	680.00	8.60	32

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	684.0	1,738.0

DRILL STRING AND BIT INFORMATION

BHA #3, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
3	3.7	Tercel	HQ3-CSP813	___	S2M3197	0.11

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
658.60		2.4

String Components

Tercel HQ3-CSP813, Core Barrel, HQ Rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	658.60	680.10	114.95	14.00	48.50	1.5	15

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
6	300	300.0	11	14	13	1,400	1,200

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

BHA #4, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
4	3 7/8	Boart Longyear	9MUXSCC128	___	738212-2	0.12

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
853.61		5.9

String Components

Boart Longyear 9MUXSCC128, Core Barrel, HQ rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	680.10	681.20	1.10	0.30	0.30	3.7	20

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
2	800	200.0					

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1290.00

Report Start Date: 14-Apr-13

Report #: 17

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	585,859.68		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	16.75	0.00	157.25	0.00	39.12

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	754.60	73.40		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1290.00	1290.00

Safety Observations

Type	# Rpts
Good Observations	5

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	13-Apr-13	1	14-Apr-13
Drills/Exercise	12-Apr-13	2	13-Apr-13
Induction			
Permit to Work			
Post/Pre Shift Meeting	14-Apr-13	0	15-Apr-13
Risk Assessment			
Toolbox Talk	13-Apr-13	1	14-Apr-13
Weekly Safety Meeting	14-Apr-13	0	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Core HQ-3 from 681.2 to 754.6m

Summary 00:00 - 06:00

Core HQ-3 from 754.6 to 766.6m.

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			COR	SM	Shift handover. Coring with new bit.
00:30	12:00	11.50	P			COR	COR	Core from 681.2 to 715.6m.
12:00	12:30	0.50	P			COR	SM	Weekly group safety meeting Shift handover.Rig checks Coring ahead, new bit cutting good,no core loss problems..
12:30	00:00	11.50	P			COR	COR	Core from 715.6m to 754.6m RKB.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	01:30	685.60	8.60	33

DAILY DRILLING REPORT

Murdoch_1

TRC: 1290.00

Report Start Date: 14-Apr-13

Report #: 17

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	06:45	703.60	8.60	33
KCl/Polymer	13:00	721.60	8.70	33
KCl/Polymer	14:45	727.60	8.60	32
KCl/Polymer	20:00	742.60	8.60	32

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	537.0	1,201.0

DRILL STRING AND BIT INFORMATION

BHA #4, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
4	3 7/8	Boart Longyear	9MUXSCC128	___	738212-2	0.12

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
853.61		5.9

String Components

Boart Longyear 9MUXSCC128, Core Barrel, HQ rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	681.20	754.60	74.50	12.75	13.05	5.8	20

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
5	900	500.0					

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1291.00

Report Start Date: 15-Apr-13

Report #: 18

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	608,759.76		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	17.75	0.00	157.25	0.00	36.91

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	823.60	69.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1291.00	1291.00

Safety Observations

Type	# Rpts
Good Observations	3

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test			
Daily Observation	15-Apr-13	0	16-Apr-13
Drills/Exercise	12-Apr-13	3	13-Apr-13
Induction			
Permit to Work			
Post/Pre Shift Meeting	15-Apr-13	0	16-Apr-13
Risk Assessment			
Toolbox Talk	13-Apr-13	2	14-Apr-13
Weekly Safety Meeting	14-Apr-13	1	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Core from 754.6m to 823.6 mRKB..

Summary 00:00 - 06:00

Core from 823.6m to 835.6 mRKB..

Planned Op's

Core to proposed TD of 867m, log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			COR	SM	Shift handover
00:30	12:00	11.50	P			COR	COR	Core from 754.6m to 790.6 m.
12:00	12:30	0.50	P			COR	SM	Shift handover
12:30	00:00	11.50	P			COR	COR	Core from 790.6m to 823.6 mRKB..

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	02:00	766.00	8.70	33

DAILY DRILLING REPORT

Murdoch_1

TRC: 1291.00

Report Start Date: 15-Apr-13

Report #: 18

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	09:30	784.00	8.70	33
KCl/Polymer	11:00	790.00	8.70	33
KCl/Polymer	18:30	810.00	8.70	33

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)
Potassium Chloride	sacks		0.0	28.0	189.0	

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	862.0	339.0

DRILL STRING AND BIT INFORMATION

BHA #4, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
4	3 7/8	Boart Longyear	9MUXSCC128	___	738212-2	0.12

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
853.61		5.9

String Components

Boart Longyear 9MUXSCC128, Core Barrel, HQ rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	754.60	823.60	143.50	12.75	25.80	5.4	20

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
5	900	500.0					

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1292.00

Report Start Date: 16-Apr-13

Report #: 19

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	631,659.84		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	18.75	7.00	164.25	29.17	36.50

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	30.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1292.00	1292.00

Safety Observations

Type	# Rpts
Good Observations	5

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test	16-Apr-13	0	17-Apr-13
Daily Observation	16-Apr-13	0	17-Apr-13
Drills/Exercise	12-Apr-13	4	13-Apr-13
Induction			
Permit to Work			
Post/Pre Shift Meeting	16-Apr-13	0	17-Apr-13
Risk Assessment	16-Apr-13	0	17-Apr-13
Toolbox Talk	16-Apr-13	0	17-Apr-13
Weekly Safety Meeting	14-Apr-13	2	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
Earth Data	Geologists	4
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Core from 823.6m to 853.6 mRKB.. Well TD @ 08:45 hrs, 16th April,2013.Circ well to trip out.TBT-Review JSA. Trip out coring sting to shoe. Flow check.Logging truck delayed, Trip in DST string to flush pipe while waiting on E-logs.Wait on logging truck. Pick up & run NUE string to flush out scale while wait on loggers

Summary 00:00 - 06:00

Wait on logging truck.

Planned Op's

E-log, DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			COR	SM	Shift handover.
00:30	08:45	8.25	P			COR	COR	Core from 823.6m to 853.6 mRKB.. Well TD @ 08:45 hrs, 16th April,2013.
08:45	10:00	1.25	P			COR	CIC	Circ well to trip out.
10:00	12:00	2.00	P			COR	TO	TBT-Review JSA. Trip out coring sting to shoe. Flow check.Logging truck delayed, Trip in DST string to flush pipe while waiting on E-logs.
12:00	12:30	0.50	P			COR	SM	Shift handover. Pre-tour safety meeting. review JSA.
12:30	17:00	4.50	P			COR	TO	Trip out HQ pipe & coring BHA. Core bit in new condition.
17:00	00:00	7.00	TP		7.00	ELS	WOE	Wait on logging truck. Pick up & run NUE string to flush out scale while wait on loggers.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

DAILY DRILLING REPORT

Murdoch_1

TRC: 1292.00

Report Start Date: 16-Apr-13

Report #: 19

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	01:30	829.00	8.70	33
KCl/Polymer	05:30	841.00	8.70	33
KCl/Polymer	08:45		8.70	33

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	5,001.0	868.0	4,472.0

DRILL STRING AND BIT INFORMATION

BHA #4, Packed Hole

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)
4	3 7/8	Boart Longyear	9MUXSCC128	___	738212-2	0.12

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull
		-------

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)
853.61		5.9

String Components

Boart Longyear 9MUXSCC128, Core Barrel, HQ rods

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Original Hole	823.60	853.60	173.50	3.75	29.55	8.0	20

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)
5	900	500.0					

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1293.00

Report Start Date: 17-Apr-13

Report #: 20

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		31,434.08	663,093.92		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	19.75	14.00	178.25	58.33	37.61

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1293.00	1293.00

Safety Observations

Type	# Rpts
Good Observations	4

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test	16-Apr-13	1	17-Apr-13
Daily Observation	17-Apr-13	0	18-Apr-13
Drills/Exercise	12-Apr-13	5	13-Apr-13
Induction	17-Apr-13	0	18-Apr-13
Permit to Work	17-Apr-13	0	18-Apr-13
Post/Pre Shift Meeting	17-Apr-13	0	18-Apr-13
Risk Assessment	16-Apr-13	1	17-Apr-13
Toolbox Talk	17-Apr-13	0	18-Apr-13
Weekly Safety Meeting	14-Apr-13	3	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
Earth Data	Geologists	0
B.R.T.	Catering Staff	3
Pro-Test	DST crew	5
Weatherford	Logging crew	4

DAILY REPORT

Last 24hr Op's Summary

Wait on logging unit. Trip out NUE string to run e-logs.. Test logging tools. Pre-job safety meeting &rig up sheaves.PTW issued.Run MCG,CMI, MDN, MPD,MSS,& MDL tools.Log casing seat & TD at correct depths.Rig down; process data.Pre-job safety meeting-DST operations. PTW issued.Pick up DST tools & test @ surface.

Summary 00:00 - 06:00

Run in DST tools to test interval 812.01m to 804mRKB.

Planned Op's

DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			ELS	SM	PTSM-shift handover
00:30	12:00	11.50	TP		11.50	ELS	WOE	Wait on logging unit. Circ at TD with NUE stringt to flush string. Commence trip out at 10:00 hrs .
12:00	12:30	0.50	P			ELS	SM	PTSM-shift handover
12:30	15:00	2.50	TP		2.50	ELS	WOE	Wait on logging unit. Complete trip out of NUE string to run e-logs..
15:00	16:00	1.00	P			ELS	RU	Test tools. Pre-job safety meeting &rig up sheaves.PTW issued.
16:00	16:45	0.75	P			ELS	HT	Pick up & run in hole logging tools.
16:45	21:00	4.25	P			ELS	LOG	Run MCG,CMI, MDN, MPD,MSS,& MDL tools.Log casing seat & TD at correct depths.
21:00	21:30	0.50	P			ELS	HT	Break down; lay out tools.
21:30	23:15	1.75	P			ELS	RD	Rig down; process data.
23:15	23:30	0.25	P			PDS	SM	Pre-job safety meeting-DST operations. PTW issued.
23:30	00:00	0.50	P			PDS	HBH	Pick up DST tools & test @ surface.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00

DAILY DRILLING REPORT

Murdoch_1

TRC: 1293.00

Report Start Date: 17-Apr-13

Report #: 20

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)
KCl/Polymer	06:00	850.00	8.70	32
KCl/Polymer	10:00	850.00	8.70	32

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	549.0	3,923.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1294.00

Report Start Date: 18-Apr-13

Report #: 21

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		111,100.08	774,194.00		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	20.75	11.50	189.75	47.92	38.10

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1294.00	1294.00

Safety Observations

Type	# Rpts
Good Observations	3

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test	16-Apr-13	2	17-Apr-13
Daily Observation	18-Apr-13	0	19-Apr-13
Drills/Exercise	12-Apr-13	6	13-Apr-13
Induction	17-Apr-13	1	18-Apr-13
Permit to Work	18-Apr-13	0	19-Apr-13
Post/Pre Shift Meeting	18-Apr-13	0	19-Apr-13
Risk Assessment	16-Apr-13	2	17-Apr-13
Toolbox Talk	18-Apr-13	0	19-Apr-13
Weekly Safety Meeting	14-Apr-13	4	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
B.R.T.	Catering Staff	3
Pro-Test	DST crew	5

DAILY REPORT

Last 24hr Op's Summary

Trip in tools to DST#1 test interval; 812m to 804mRKB.Space out over interval, set packers to displace string to buffer height.Packers not inflating.Trip out to find problem with packer inflationBreak down tools, check operation of tools at surface.Trip in,Space out over interval, set packers ,Displace string to buffer height .DST #1 @ 812.01 to 804 m. Inital Flow: 10 min. Inital Shut: 90 min.

Summary 00:00 - 06:00

Pull DST#1 free, Trip to DST#2 interval,

Planned Op's

DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:30	0.50	P			PDS	SM	Shift handover,Pre-job safety meeting-DST operations. PTW issued.
00:30	06:30	6.00	P			PDS	TI	Trip in tools to DST#1 test interval; 812m to 804mRKB
06:30	07:15	0.75	P			PDS	RU	Rig up surface equipment & test.
07:15	07:30	0.25	P			PDS	SM	Toolbox - DSTOperation next phase. PTW issue.
07:30	08:45	1.25	P			PDS	DTD	Space out over interval, set packers to displace string to buffer height.Packers not inflating.
08:45	12:00	3.25	TP		3.25	PDS	TO	Trip out to find problem with packer inflation.
12:00	12:15	0.25	P			PDS	SM	Shift handover,Pre-job safety meeting. PTW issued.
12:15	15:00	2.75	TP		2.75	PDS	TO	Trip out to find problem with packer inflation
15:00	16:00	1.00	TP		1.00	PDS	HBH	Break down tools, check operation of tools at surface.
16:00	20:30	4.50	TP		4.50	PDS	TI	Trip in DST #1 ,Inflate packers @ casing shoe, Continue trip to test interval.
20:30	20:45	0.25	P			PDS	SM	Toolbox - DST Operation next phase.
20:45	22:15	1.50	P			PDS	DTD	Space out over interval, set packers ,Displace string to buffer height.
22:15	00:00	1.75	P			PDS	DST	DST #1 @ 812.01 to 804 m. Inital Flow: 10 min. Inital Shut: 90 min.

DAILY DRILLING REPORT

Murdoch_1

TRC: 1294.00

Report Start Date: 18-Apr-13

Report #: 21

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	807.0	3,116.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1295.00

Report Start Date: 19-Apr-13

Report #: 22

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	797,094.08		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	21.75	10.00	199.75	41.67	38.27

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1295.00	1295.00

Safety Observations

Type	# Rpts
Good Observations	3

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test			
BOP Function Test	16-Apr-13	3	17-Apr-13
Daily Observation	19-Apr-13	0	20-Apr-13
Drills/Exercise	12-Apr-13	7	13-Apr-13
Induction	17-Apr-13	2	18-Apr-13
Permit to Work	19-Apr-13	0	20-Apr-13
Post/Pre Shift Meeting	19-Apr-13	0	20-Apr-13
Risk Assessment	16-Apr-13	3	17-Apr-13
Toolbox Talk	19-Apr-13	0	20-Apr-13
Weekly Safety Meeting	14-Apr-13	5	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
B.R.T.	Catering Staff	3
Pro-Test	DST crew	5

DAILY REPORT

Last 24hr Op's Summary

Continue DST#1.Deflate packers,Trip tools to #2 interval. Set packers ,Displace string to buffer height. Tools not opening.Trip out,Break down tools & change out to service.Trip tools in to DST interval 713m to 705m.Displace CushionOpen tools; Inital flow, 10min. Inital shut:50 min. Test DST#2 terminated by Brisbane.Trip out to surface ,Break down tools,service, makeup & test @ surface.

Summary 00:00 - 06:00

Trip in DST# 3 to test interval 646m to 638 m.Inflating packers.

Planned Op's

DSTs, P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	04:00	4.00	P			PDS	DST	DST #1 Inital shut: 45mins, Mainflow:30 mins; Final Shut 160 min
04:00	05:45	1.75	P			PDS	TO	Deflate packers,Trip tools to DST#2 interval 713m to 705m.
05:45	07:30	1.75	P			PDS	DTD	Space out over interval, set packers ,Displace string to buffer height. Tools not opening.
07:30	12:00	4.50	TP		4.50	PDS	TO	Trip out to tools.
12:00	13:30	1.50	TP		1.50	PDS	HBH	Break down tools & change out to service.Heavy scale in screen of tool.
13:30	17:30	4.00	TP		4.00	PDS	TI	Trip tools in to DST #3 interval 713m to 705m.
17:30	19:00	1.50	P			PDS	DTD	Hold Toolbox talk on this phase of operation. Space out over interval, set packers ,Displace string to buffer height.
19:00	20:00	1.00	P			PDS	DST	Open tools; Inital flow, 10min. Inital shut:50 min. Test DST#3 terminated by Brisbane.
20:00	22:30	2.50	P			PDS	TO	Deflate packers, trip out to surface.
22:30	00:00	1.50	P			PDS	HBH	Break down tools,service, makeup & test @ surface.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

DAILY DRILLING REPORT

Murdoch_1

TRC: 1295.00

Report Start Date: 19-Apr-13

Report #: 22

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	451.0	2,665.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1296.00

Report Start Date: 20-Apr-13

Report #: 23

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		52,190.08	849,284.16		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	22.75	1.00	200.75	4.17	36.77

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1296.00	1296.00

Safety Observations

Type	# Rpts
Good Observations	4

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test	20-Apr-13	0	21-Apr-13
BOP Function Test	16-Apr-13	4	17-Apr-13
Daily Observation	20-Apr-13	0	21-Apr-13
Drills/Exercise	12-Apr-13	8	13-Apr-13
Induction	17-Apr-13	3	18-Apr-13
Permit to Work	19-Apr-13	1	20-Apr-13
Post/Pre Shift Meeting	20-Apr-13	0	21-Apr-13
Risk Assessment	16-Apr-13	4	17-Apr-13
Toolbox Talk	20-Apr-13	0	21-Apr-13
Weekly Safety Meeting	14-Apr-13	6	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
B.R.T.	Catering Staff	3
Pro-Test	DST crew	5

DAILY REPORT

Last 24hr Op's Summary

Trip in DST#5 to test interval 646m to638m. Toolbox talk. Space out, set packers ,Displace string .Open tools; Inital flow, 10min. Inital shut:30 min. Stop testing to reset packers.Open tools; Inital flow, 10min. Inital shut:30 min. Packers sliding down hole.Wait On Instruction.Space out new interval 642.41 to 634.4, set packers ,Displace string.Open tools; Initial flow, 10min. Inital shut:120 min.Main Flow 30 min Main Shut:65 min. Telemetry not continuious operation Trip to DST #6 interval 628m to 620m.Toolbox meeting Inflate packers DST #6 at 620 to 628.01 m.Open toolsDST#6; Initial flow, 5 min. Inital shut:100 min.

Summary 00:00 - 06:00

Reset cushion height, DST #6, main flow:2min Final shut90min ;Strong flow. circ well, Trip out of hole.

Planned Op's

P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	05:30	5.50	P			PDS	TI	Trip in DST#4 to test interval 646m to638m.
05:30	07:45	2.25	P			PDS	DTD	Hold Toolbox talk on this phase of operation. Space out over interval, set packers ,Displace string to buffer height.
07:45	08:30	0.75	P			PDS	DST	Open tools; Inital flow, 10min. Inital shut:30 min. Stop testing to reset packers & cushion ht.
08:30	10:30	2.00	P			PDS	DTD	Space out over interval, set packers ,Displace string to buffer height at DST#4 interval. Physical measure of displacement.
10:30	12:00	1.50	P			PDS	DST	Open tools; Inital flow, 10min. Inital shut:30 min. Packers sliding down hole on opening of tool.
12:00	13:00	1.00	TP		1.00	PDS	WOI	Wait On Instruction
13:00	16:45	3.75	P			PDS	DST	Open tools; Initial flow, 10min. Inital shut:120 min.Main Flow 30 min Main Shut:65 min. Telemetry not continuious operation.
16:45	20:45	4.00	P			PDS	DTD	Space out over new interval 642.41 to 634.4, set packers ,Displace string to buffer height at DST#4 interval. Physical measure of displacement.
20:45	21:30	0.75	P			PDS	TO	Free packers, Trip to DST #6 interval628m to 620m.
21:30	22:15	0.75	P			PDS	DTD	Toolbox meeting Inflate packers DST #6 at 620 to 628.01 m.

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1296.00

Report Start Date: 20-Apr-13

Report #: 23

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
22:15	00:00	1.75	P			PDS	DST	Open tools; Initial flow, 5 min. Inital shut:100 min.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	480.0	2,185.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1297.00

Report Start Date: 21-Apr-13

Report #: 24

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		87,545.08	936,829.24		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	23.75	0.00	200.75	0.00	35.22

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1297.00	1297.00

Safety Observations

Type	# Rpts
Good Observations	6

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test	20-Apr-13	1	21-Apr-13
BOP Function Test	16-Apr-13	5	17-Apr-13
Daily Observation	21-Apr-13	0	22-Apr-13
Drills/Exercise	12-Apr-13	9	13-Apr-13
Induction	17-Apr-13	4	18-Apr-13
Permit to Work	19-Apr-13	2	20-Apr-13
Post/Pre Shift Meeting	21-Apr-13	0	22-Apr-13
Risk Assessment	21-Apr-13	0	22-Apr-13
Toolbox Talk	21-Apr-13	0	22-Apr-13
Weekly Safety Meeting	14-Apr-13	7	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
B.R.T.	Catering Staff	3
Halliburton	Cementers	2

DAILY REPORT

Last 24hr Op's Summary

DST #6 Shut-in 45 min.Displace cushion DST#6 to 100m.DST #6 Inital Flow: 2min. Inital shut: 88 min.Trip out DST string to surface.Break out & lay down DST tools. DST program completed.Trip in cementing string.Weekly safety meeting.Pressure test to 1000psi BOP with 4 1/2"cup tester. Chart test good.Circ well bottoms up,pump away hi-vis pill, displace with drill fluid.Trip out to plug depth, 630 m.Pre- job safety meeting with cementers. Rig up to well.Pump 5bbl spacer,pressure test lines,, 3000psi. Mix & pump 7bbls cement @ 15.6ppg.Flush surface lines, displace with 6.1 water. Rig out cementing lines from well. Trip out 30 stds to 451.5m.Wait on cement.

Summary 00:00 - 06:00

Wait on cement.

Planned Op's

P & A, release rig to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:45	0.75	P			PDS	DST	DST #5 Shut-in 45 min.
00:45	02:30	1.75	P			PDS	DTD	Displace cushion DST#6 to 100m.
02:30	04:00	1.50	P			PDS	DST	DST #6 Inital Flow: 2min. Inital shut: 88 min.
04:00	05:30	1.50	P			PDS	CIC	Free packers, trip in 4 stands,fill string. Drop bar & circulate.
05:30	09:30	4.00	P			PDS	TO	Trip out DST string to surface.
09:30	10:30	1.00	P			PDS	HBH	Break out & lay down DST tools. DST program completed.
10:30	12:00	1.50	P			ABN	TI	Trip in cementing string to 270 m.
12:00	12:30	0.50	P			ABN	SM	Weekly safety meeting.
12:30	14:00	1.50	P			ABN	TI	Trip in cementing string , 270 m to 360m.
14:00	14:30	0.50	P			ABN	CPT	Pressure test to 1000psi BOP with 4 1/2"cup tester. Chart test good.
14:30	17:00	2.50	P			ABN	TI	Trip cementing string to TD.
17:00	18:30	1.50	P			ABN	CIC	Circ well bottoms up,pump away hi-vis pill, displace with drill fluid.
18:30	19:15	0.75	P			ABN	TO	Trip out to plug depth, 630 m.
19:15	19:45	0.50	P			ABN	CIC	Circ @ 632.1m
19:45	20:15	0.50	P			ABN	SM	Pre- job safety meeting with cementers. Rig up to well.

DAILY DRILLING REPORT

Murdoch_1

TRC: 1297.00

Report Start Date: 21-Apr-13

Report #: 24

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
20:15	21:00	0.75	P			ABN	CMC	Pump 5bbl spacer,pressure test lines,, 3000psi. Mix & pump 7bbls cement @ 15.6ppg.Flush surface lines, displace with 6.1 bbls water.
21:00	22:00	1.00	P			ABN	TO	Rig out cementing lines from well. Trip out 30 stds to 451.5m.
22:00	23:00	1.00	P			ABN	CIC	Circ well clear of cement excess.
23:00	00:00	1.00	P			ABN	WOC	Wait on cement.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	420.0	1,765.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1298.00

Report Start Date: 22-Apr-13

Report #: 25

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		22,900.08	959,729.32		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	24.75	0.00	200.75	0.00	33.80

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1298.00	1298.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test	20-Apr-13	2	21-Apr-13
BOP Function Test	16-Apr-13	6	17-Apr-13
Daily Observation	22-Apr-13	0	23-Apr-13
Drills/Exercise	12-Apr-13	10	13-Apr-13
Induction	17-Apr-13	5	18-Apr-13
Permit to Work	19-Apr-13	3	20-Apr-13
Post/Pre Shift Meeting	22-Apr-13	0	23-Apr-13
Risk Assessment	22-Apr-13	0	23-Apr-13
Toolbox Talk	22-Apr-13	0	23-Apr-13
Weekly Safety Meeting	14-Apr-13	8	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
B.R.T.	Catering Staff	3
Halliburton	cementers	2

DAILY REPORT

Last 24hr Op's Summary

Wait on cement.Tag cement at 528.7 m.PJSM - Pressure testing cement plug, Cementing well plugs #2;#3:#4.PTW issue.Pressure test Plug #1.- 1000psi. Good test - charted. Pump cement Plug #2 from 528.7 to 398.7m, Plug#3 from398.7m to 268.7m.Plug# 4 from268.7 m to 138.7m.Wait on cement.Trip in to tag cement,tag at 119 m , wt test 2000lbs. Flush off top of cement.Plug# 5 :Cement from119 m to 1.2m. - Pump 5bbl spacer, Mix & pump 5.6 bbls cement @ 15.6ppg.Nipple down BOP's.Rig released at 00:00 hrs; 23rd April 2013.

Summary 00:00 - 06:00

Rig down,prepare to move .

Planned Op's

Rig released to move to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	P			ABN	WOC	Pre-tour safety meeting. Wait on cement.
06:00	07:00	1.00	P			ABN	TI	Trip in to tag cement. Tag at 528.7 m.
07:00	08:00	1.00	P			ABN	CIC	Circ well clean of cement colour.
08:00	08:30	0.50	P			ABN	RU	Rig in Halliburton to well. Rig in to pressure test plug.Confirm water supply. Transfer fluids for cementing.
08:30	09:00	0.50	P			ABN	SM	PJSM - Pressure testing cement plug, Cementing well plugs #2;#3:#4.PTW issue.
09:00	09:30	0.50	P			ABN	PT	Pressure test Plug #1. Good test - charted.
09:30	10:15	0.75	P			ABN	CMC	Plug #2 from 528.7 to 398.7m-Pump 5bbl spacer,pressure test lines, 3000psi. Mix & pump 6.6 bbls cement @ 15.6ppg.Flush surface lines, displace with 2.5 bbls water.
10:15	11:00	0.75	P			ABN	TO	Trip out of cement to 397.32m. Flush off top of cement.
11:00	11:30	0.50	P			ABN	CMC	Plug#3 from398.7m to 268.7m. - Pump 5bbl spacer, Mix & pump 6.6 bbls cement @ 15.6ppg.Flush surface lines, displace with 2.5 bbls water.
11:30	12:00	0.50	P			ABN	TO	Trip out of cement to 264.8m. Flush off top of cement.
12:00	12:45	0.75	P			ABN	SM	PTSM shift handover Service company on site. PJSM - Halliburton cementing well plug :#4.PTW issue.Review cementing JSA.

DAILY DRILLING REPORT

Murdoch_1

TRC: 1298.00

Report Start Date: 22-Apr-13

Report #: 25

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
12:45	13:15	0.50	P			ABN	CMC	Plug# 4 from268.7 m to 138.7m. - Pump 5bbl spacer, Mix & pump 6.6 bbls cement @ 15.6ppg.Flush surface lines, displace with 1.2 bbls water.
13:15	14:00	0.75	P			ABN	TO	Trip out of cement to 114.4mm. Flush off top of cement.
14:00	20:00	6.00	P			ABN	WOC	Wait on cement.
20:00	20:30	0.50	P			ABN	TI	Trip in to tag cement,tag at 119 m , wt test 2000lbs. Flush off top of cement.
20:30	20:45	0.25	P			ABN	SM	Cementing JSA review on cement job.
20:45	21:15	0.50	P			ABN	CMC	Plug# 5 :Cement from119 m to 1.2m. - Pump 5bbl spacer, Mix & pump 5.6 bbls cement @ 15.6ppg.
21:15	22:15	1.00	P			ABN	TO	Trip out surface.Wash out pipe & stinger.
22:15	00:00	1.75	P			ABN	BOP	Nipple down BOP's. Rig released at 00:00 hrs; 23rd April 2013.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc
Diesel Fuel	L	Rig	IOR	0.0	412.0	1,353.0

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1298.00

Report Start Date: 22-Apr-13

Report #: 25

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)
Weight on Bit (1000lbf)	**Surface RPM (rpm)**	**SPP (psi)**	**Drill Str Wt (1000lbf)**	**PU Str Wt (1000lbf)**	**SO Str Wt (1000lbf)**	**Drilling Torque (ft•lb)**	**Off Bottom Torque (ft•lb)**

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1299.00

Report Start Date: 23-Apr-13

Report #: 26

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,368.83	976,098.15		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	25.75	6.00	206.75	25.00	33.45

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1299.00	1299.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test	20-Apr-13	3	21-Apr-13
BOP Function Test	16-Apr-13	7	17-Apr-13
Daily Observation	22-Apr-13	1	23-Apr-13
Drills/Exercise	12-Apr-13	11	13-Apr-13
Induction	17-Apr-13	6	18-Apr-13
Permit to Work	19-Apr-13	4	20-Apr-13
Post/Pre Shift Meeting	23-Apr-13	0	24-Apr-13
Risk Assessment	23-Apr-13	0	24-Apr-13
Toolbox Talk	22-Apr-13	1	23-Apr-13
Weekly Safety Meeting	14-Apr-13	9	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
B.R.T.	Catering Staff	3
Halliburton	cementers	0

DAILY REPORT

Last 24hr Op's Summary

Rig down, prepare loading for rig move to Horan 1. Crews break tour. Wait on daylight.

Summary 00:00 - 06:00

Wait on daylight.

Planned Op's

Rig released to move to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	00:15	0.25	P			RMO	SM	Shift handover, Rig released. Rigging down operations .Work as a team. Stop job if unsure.
00:15	12:00	11.75	P			RMO	RM	Rig down, prepare loading for rig move to Horan 1.
12:00	12:15	0.25	P			RMO	SM	Shift handover,Continue rigging down operations .Work as a team. Stop job if unsure. Review JSA on loader operations, use of spotters.
12:15	18:00	5.75	P			RMO	RM	Rig down, prepare loading for rig move to Horan 1.
18:00	00:00	6.00	TP		6.00	RMO	WOD	Crews break tour. Wait on daylight.

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1299.00

Report Start Date: 23-Apr-13

Report #: 26

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1300.00

Report Start Date: 24-Apr-13

Report #: 27

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		16,300.08	992,398.23		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	26.75	12.00	218.75	50.00	34.07

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1300.00	1300.00

Safety Observations

Type	# Rpts
Good Observations	4

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test	20-Apr-13	4	21-Apr-13
BOP Function Test	16-Apr-13	8	17-Apr-13
Daily Observation	24-Apr-13	0	25-Apr-13
Drills/Exercise	12-Apr-13	12	13-Apr-13
Induction	17-Apr-13	7	18-Apr-13
Permit to Work	19-Apr-13	5	20-Apr-13
Post/Pre Shift Meeting	24-Apr-13	0	25-Apr-13
Risk Assessment	24-Apr-13	0	25-Apr-13
Toolbox Talk	24-Apr-13	0	25-Apr-13
Weekly Safety Meeting	14-Apr-13	10	15-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	8
QGC	DSV	1
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Rig down, prepare loading for rig move to Horan #1.Wash equip for loading. Maint.

Summary 00:00 - 06:00

Wait on daylight.

Planned Op's

Rig released to move to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMO	WOD	Wait On Daylight
06:00	18:00	12.00	P			RMO	RM	Rig down, prepare loading for rig move to Horan 1.Wash equip for loading. Maint.
18:00	00:00	6.00	TP		6.00	RMO	WOD	Wait On Daylight

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1300.00

Report Start Date: 24-Apr-13

Report #: 27

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

DAILY DRILLING REPORT

Murdoch_1

TRC: 1301.00

Report Start Date: 25-Apr-13

Report #: 28

UWI	Well PID	Tenure	Field Name	Well Type	State/Province	Country
100000744858	MUR_WH001	ATP 965P		Core	Queensland	AUS
Well Configuration Type	**Well Status**	**Well Sub-Status**	**Spud Date**	**Rig Release Date**	**Job Start Date**	**Job End Date**
Vertical	Abandoned	Drilled	13-Jan-13 11:15	23-Apr-13 00:00	29-Mar-13 06:00	25-Apr-13 11:00

JOB DETAILS

AFE Number	Total AFE + Supp Amount (Cost)	Daily Field Est Total (Cost)	Cum Field Est To Date (Cost)	Daily Mud Field Est (Cost)	Cum Mud Field Est (Cost)
		0.00	992,398.23		
Target Formation	**Cum Time Log Days (days)**	**Problem Time Hours (hr)**	**Cum Problem Time Hours (hr)**	**Percent Problem Time (%)**	**Cum Percent Problem Time (%)**
	27.21	6.00	224.75	54.55	34.42

DAILY OPERATIONS

Most Likely Duration (no plan ch...	Original Elevation (m)	Ground Elevation (m)	KB-Ground Distance (m)	Latitude (°)	Longitude (°)
8.13	353.00	352.00	1.00	27° 59' 8.3" S	150° 38' 58.1" E

Rig (Names)	Planned TD (mKB)	TD (max) (mKB)	End Depth (m...	Depth Progress (m)	Rig Move (km)	Weather
Spaulding 8	867.00	853.60	853.60	0.00		Fine

HSSE

Days Since Lost Time Incident (days)	Days Since Recordable Incident (days)
1301.00	1301.00

Safety Observations

Type	# Rpts

SAFETY CHECK SUMMARY

Type	Last Date	Days Last Chk (days)	Next Date
BOP Connection Test	20-Apr-13	4	22-Apr-13
BOP Function Test	16-Apr-13	8	18-Apr-13
Daily Observation	24-Apr-13	0	26-Apr-13
Drills/Exercise	12-Apr-13	12	14-Apr-13
Induction	17-Apr-13	7	19-Apr-13
Permit to Work	19-Apr-13	5	21-Apr-13
Post/Pre Shift Meeting	24-Apr-13	0	26-Apr-13
Risk Assessment	24-Apr-13	0	26-Apr-13
Toolbox Talk	24-Apr-13	0	26-Apr-13
Weekly Safety Meeting	14-Apr-13	10	16-Apr-13

DAILY CONTACTS

Contact Name	Title	Mobile
Graham Cole	DSV	0437334803
Noel Harvey	Rig Manager	

POB

Company	Service Type	Head Count
Spaulding	Drill crew	9
QGC	DSV	1
B.R.T.	Catering Staff	3

DAILY REPORT

Last 24hr Op's Summary

Wait on daylight PTSM Rig move to Horan 1.Transport meeting with drivers. Load Spaulding body trucks & secure. Rig move to Horan commences @ 1100hrs, 25th, April 2013.

Summary 00:00 - 06:00

Planned Op's

Rig & camp move to Horan 1.

HOURLY OPERATIONS SUMMARY 00:00 TO 24:00

Start Time	End Time	Dur (hr)	Class	Ops Cat	NPT (hr)	Phase	Op	Act Desc
00:00	06:00	6.00	TP		6.00	RMO	WOD	Wait on daylight.
06:00	06:15	0.25	P			RMO	SM	Rig move to Horan .Transport meeting with drivers. Route to taken led by rig manager, putting out signs on road intersectioons.Hydration on journey.Road traffic, Speed.
06:15	11:00	4.75	P			RMO	RM	Load Spaulding body trucks & secure. Rig move to Horan commences @ 1100hrs, 25th, April 2013.
11:00	11:00							

CASING STRINGS

Csg Des	OD (in)	SD (mKB)
Conductor	9 5/8	7.00
Surface Casing	7	71.00
Intermediate Casing (1)	4 1/2	563.24

SERIAL NUMBERS

Item Des	Make	Model	SN
Float Collar			
Float Collar			

Type	SubTyp	Com

QGC
A BG Group business

DAILY DRILLING REPORT

Murdoch_1

TRC: 1301.00

Report Start Date: 25-Apr-13

Report #: 28

MUD PROPERTIES

Mud Type	Time	Depth (mKB)	Weight (lb/gal)	Funnel Viscosity (s/qt)

MUD USED

Des	Units	Vendor	Rec	Consumed	On Loc	Daily Field Est (Cost)

MUD PUMP

 # 1, Ellis Williams Co, W-440

Pump Rating (hp)	Rod Diameter (in)	Stroke Length (in)
440.0	0.0	5.98

Liner Size (in)	Volume Per Stroke Override (bbl/stk)
4 1/2	0.030

Pressure (psi)	Slow Speed Check?	Strokes (spm)	Volumetric Efficiency (%)

FORMATIONS (LAST 5)

Formation Name	Prog Top MD (mKB)	Drill Top MD (mKB)
Springbok Sandstone	46.00	565.15
Upper Juandah Coal Measures	213.00	621.60
Lower Juandah Coal Measures	285.00	640.10
Tangalooma	387.00	745.80
Taroom Coal Measures	511.00	776.82
Base Taroom Coal Measures		816.53

LEASE FLUIDS

Fluid	To Lease (bbl)	Source	From Lease (bbl)	Dest	BS&W (%)	Carrier	Ref #	Note

JOB SUPPLIES

Supply Item Des	Unit Label	Loc	Vendor	Received	Consumed	Cum On Loc

DRILL STRING AND BIT INFORMATION

BHA #<stringno>, <des>

Bit Run	Size (in)	Make	Model	IADC Codes	Serial Number	Length (m)

Nozzles (1/32")	Bit Total Fluid Area (nozzles) (in²)	IADC Bit Dull

Drill String Length (m)	BHA Weight in Air (1000lbf)	BHA ROP (m/hr)

String Components

DRILLING PARAMETERS

Wellbore	Start Depth (mKB)	End Depth (mKB)	Cum Depth Drilled (m)	Drilling Time (hr)	Cum Drilling Time (hr)	Interval ROP (m/hr)	Flow Rate (gpm)

Weight on Bit (1000lbf)	Surface RPM (rpm)	SPP (psi)	Drill Str Wt (1000lbf)	PU Str Wt (1000lbf)	SO Str Wt (1000lbf)	Drilling Torque (ft•lb)	Off Bottom Torque (ft•lb)

ANNULAR VELOCITIES (DP & DC)

Inner Bound	Sz Inner Bound (in)	Outer Boundary	Sz Outer Bound (in)	Top (mKB)	Btm (mKB)	AV (m/min)

SURVEY DATA

Date	MD (mKB)	Incl (°)	Azm (°)	TVD (mKB)

UNDERREAMING INTERVALS

Top (mKB)	Btm (mKB)	OD (in)	Com

APPENDIX 3

EARTH DATA STRIP LOG

Murdoch 1

1:20 Scale Geology

Well Name	Murdoch 1			Drilling Data	From (m)	To (m)	Size/Type
Operator	QGC Pty Limited			Non Cored	0.000	10.000	14" Auger
Prospect/Field	ATP 965P			Cored			
Location Data	Easting	Northing	Zone	Non Cored	10.000	72.000	8 1/2" PDC
MGA	268824.000	6902160.000	56	Cored			
ISG				Non Cored	72.000	565.150	6 1/8" PDC
RL (GL - AHD)	352.000	RL (RKB - AHD)	353.000	Cored	565.150	853.860	3 7/8" HQ
Survey Accuracy	Pre-Spud Survey	Survey Source	Well Proposal	Non Cored			
Spud Date	31/03/2013	TD Date	16/04/2013	Cored			
Unconsolidated To		Weathered To					
TD (m)	853.860	Hole Status	P & A				
Geology	Earth Data Pty Ltd			Casing	To (m)	Size	Material
Geologist(s)	Danielle Higgins, Janelle Hurrell			String 1	10.000	9 5/8"	Steel
Drilling Contractor	Spaulding Drilling			String 2	71.750	7"	Steel
Logging Company	Weatherford Precision Wireline Services			String 3	563.950	4 1/2"	Steel
Analytical Lab	Earth Data Pty Ltd, ACIRL, ERC			String 4			

Wireline Logging	From (m)	To (m)	Logging Tool Description
Log Run 1	5.000	853.860	Gamma, Density, Neutron, Sonic, Induction Resistivity
Log Run 2	563.950	853.860	CMI
Log Run 3			
Log Run 4			
Log Run 5			
Log Run 6			

Conglomerate
Sandstone
Siltstone
Mudstone
Shale
Claystone
Tuff

Dolerite
Basalt
Siderite
Carb Mudstone/Shale
Coal Undifferentiated
Coal Weathered
Coal Heat Affected

Coal Bright
Coal Bright banded
Coal Dull and bright
Coal Dull banded
Coal Dull minor bright
Coal Dull
Coal Stony

Non Coal and Coal
Coal and Non Coal
Breccia
Carbonate
Alluvium
No Sample
Core Loss

Casing Shoe
Gas Show
Oil Show
Water Flow
Lost Circ.

Group | Sub Group | Formation | Seam or Member | Gas Content | Casing/Shows | Mineral Free Fracture Index (0 – 500) | Depth (m) | Lithology

Gamma (0 – 300 API) | Caliper (50 – 250 mm) | Short Spaced Density (1 – 3 gm/cc) | Sonic Velocity (2000 – 6000 m/s)

Temperature (20 – 60 C) | Neutron SSt Porosity (90 – 30 %) | Density SSt Porosity (90 – 30 %) | Mud Gas (0 – 50 % LEL)

Shallow Resistivity (1 – 1000 OhmM) | Deep Resistivity (1 – 1000 OhmM)

Lithology depths reconciled to downhole logs

Geological Description of Strata

Springbok Sandstone

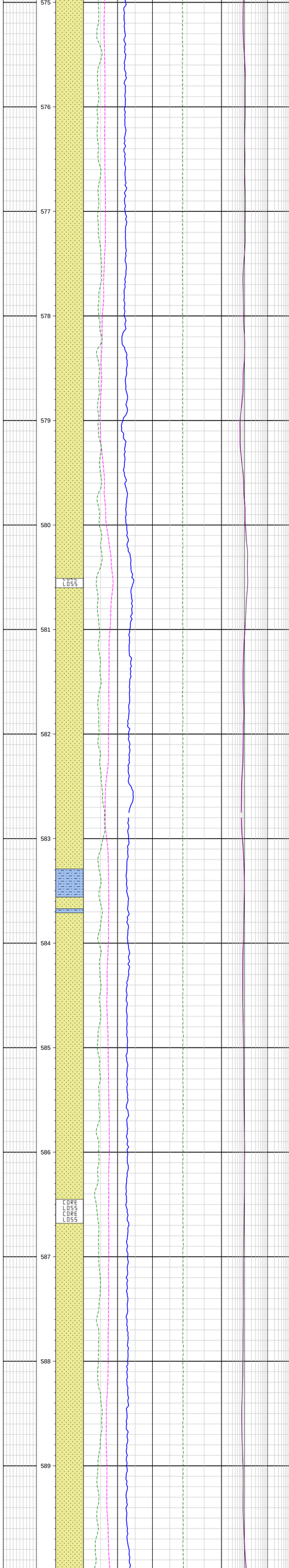
565.150-566.480: NO SAMPLE:

566.480-569.200: SANDSTONE: light grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, thinly bedded, minor carbonaceous wisps throughout common towards base, carbonaceous laminae in localised bands within unit, medium to high strength, 4 fractures, spin marks on one break.

569.200-573.940: SANDSTONE: light grey to grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, thinly bedded, upper half of unit us abundant in carbonaceous laminae and wisps, medium to high strength, core broken in middle of unit, 7 fractures.

573.940-574.600: CORE LOSS:

574.600-580.510: SANDSTONE: light grey to grey brown, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, thickly bedded, fining up sequences, minor localised carbonaceous laminae in middle of unit, muddy brown content in middle of unit, with coaly , medium to high strength, core ground in middle of unit, 6 fractures.



580.510-580.600: CORE LOSS:

580.600-583.290: SANDSTONE: light grey to grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, massive, minor carbonaceous laminae, medium to high strength, odd drilling cut in middle of unit, erosional basal contact.

583.290-583.560: SILTSTONE: brown to grey, thinly laminated, medium to high strength, erosional basal contact.

583.560-583.670: SANDSTONE: light grey to grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, medium to high strength, sharp irregular basal contact.

583.670-583.710: SILTSTONE: dark grey, thinly laminated, sharp irregular basal contact.

583.710-586.450: SANDSTONE: grey, medium to coarse grained, sub angular to sub rounded sub spherical, quartz lithic, calcareous cement, moderate visible porosity, rare carbonaceous laminae throughout unit.

586.450-586.680: CORE LOSS:

586.680-590.760: SANDSTONE: grey, medium to coarse grained, sub angular to sub rounded sub spherical, moderate sorting, quartz to quartz lithic, localised common carbonaceous laminae at top and middle of unit, tends to a muddy brown cement with coarser grains in lower unit, high strength, erosional basal contact.

Upper Juandah Coal Measures

590.760-590.850: SIDERITE: brown, medium grained, sub rounded sub spherical, lithic, argillaceous cement, minor carbonaceous laminae towards base, medium to high strength, gradational basal contact.

590.850-592.210: SANDSTONE: grey, fine to medium grained, sub angular sub spherical, moderate sorting, quartz to quartz lithic, argillaceous cement, sideritic clasts in a 0.10m thick band at 0.41m from top of unit, erosional basal contact.

592.210-592.250: SIDERITE: tan brown, very high strength, erosional basal contact.

592.250-592.440: SANDSTONE: grey, fine to medium grained, sub rounded sub spherical, moderate sorting, quartz lithic, argillaceous cement, carbonaceous laminae common throughout unit.

592.440-592.680: CORE LOSS:

592.680-594.950: SANDSTONE: grey, fine to medium grained, sub rounded sub spherical, moderate sorting, quartz lithic, argillaceous cement, carbonaceous laminae common in localised bands in middle of unit, siltstone band at 0.52m from top of unit with minor siltstone clasts above and below, low to medium strength, gradational basal contact.

594.950-595.340: SANDSTONE: light brown grey, fine to coarse grained, sub rounded sub spherical, moderate sorting, quartz minor lithic, argillaceous cement, carbonaceous laminae and coal laminae abundant throughout unit, broken in part, sharp basal contact.

595.340-595.530: SILTSTONE: light brown grey, carbonaceous laminae common at top of unit, minor sandy laminae towards base, medium strength, 2 fractures, gradational basal contact.

595.530-598.110: SANDSTONE: grey, fine to coarse grained, sub angular to sub rounded, sub spherical moderate sorting, quartz to quartz lithic, argillaceous to calcareous cement in part, common carbonaceous wisps and laminae throughout, minor siltstone beds at top of unit.

598.110-598.680: CORE LOSS:

598.680-598.840: SANDSTONE: grey, fine to coarse grained, sub angular to sub rounded, sub spherical moderate sorting, quartz to quartz lithic, argillaceous to calcareous cement in part, common carbonaceous wisps throughout, sharp basal contact.

598.840-598.940: SILTSTONE: brown, minor carbonaceous wisps, sharp irregular basal contact.

598.940-600.120: SANDSTONE: grey, medium to very coarse grained, sub angular to sub rounded, sub spherical, poorly to moderate sorting, quartzose to minor quartz lithic, argillaceous cement, common localised carbonaceous laminae and wisps at top of unit, greenish matrix towards base of unit.

600.120-600.310: CONGLOMERATE: mottled, pebble sized, lithic, brown to greenish matrix, coaly clasts, core ground and friable, gradational basal contact.

600.310-601.270: SANDSTONE: grey to greenish, medium to very coarse grained, sub angular to sub rounded, sub spherical, poorly to moderate sorting, quartzose to minor quartz lithic, argillaceous cement, lithic pebbles abundant in band at base of unit, minor carbonaceous laminae throughout, brown to green matrix, low to medium strength, sharp irregular basal contact.

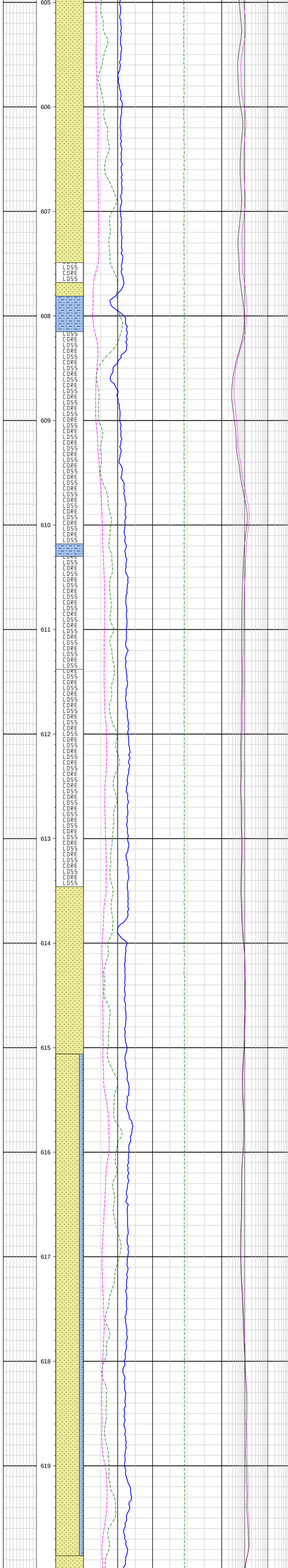
601.270-602.850: SANDSTONE 60%: grey green, fine to medium grained, sub rounded sub spherical, well sorted, quartz lithic, argillaceous cement. SILTSTONE 40%: grey, sandy at top of unit, thinly interlaminated towards middle of unit, silty at base of unit, medium strength, sharp basal contact.

602.850-603.710: SANDSTONE: light grey, medium to coarse grained, sub rounded sub spherical, well sorted, quartzose to quartz minor lithic, argillaceous cement, rare carbonaceous wisps, very low strength, core ground and friable.

603.710-604.180: CORE LOSS:

604.180-604.360: SANDSTONE: light grey, fine grained, sub rounded, sub spherical, moderate sorting, poorly cemented, moderate visible porosity, thinly to thickly laminated, low strength, gradational basal contact.

604.360-607.490: SANDSTONE: light grey, course grained, quartz lithic, sub angular to sub rounded, sub spherical, well sorted, poorly cemented, moderate visible porosity, , massive, low to medium strength.



607.490-607.680: CORE LOSS:

607.680-607.810: SANDSTONE: dark grey, coarse grained, quartz lithic, sub angular to sub rounded, sub spherical, well sorted, poorly cemented, moderate visible porosity. , thickly laminated, low to medium strength, gradational basal contact.

607.810-608.150: SILTSTONE: dark grey, thinly laminated, occasional sandy laminae at middle of unit, low strength, core ground at middle of unit.

608.150-610.180: CORE LOSS:

610.180-610.300: SILTSTONE: grey, occasional sandy laminae at base of unit, low to medium strength.

610.300-611.380: CORE LOSS:

611.380-613.460: CORE LOSS:

613.460-615.060: SANDSTONE: light grey, fine to coarse grained, angular to sub angular, sub elongate to sub spherical, moderate sorting, moderately cemented, moderate visible porosity, thinly to thickly laminated, carbonaceous laminae at top of unit, low to medium strength, over drill at top of unit.

615.060-619.860: SANDSTONE 85%: light grey, medium grained, sub angular to sub rounded, sub spherical, well sorted, moderately cemented, moderate visible porosity. SILTSTONE 15%: dark grey brown, thinly laminated to very thinly bedded, occasional carbonaceous laminae throughout, fissile at middle, high carbon content at base of unit, low to medium strength.

619.860-621.860: SANDSTONE: light grey, medium grained, sub angular to sub rounded, sub spherical, well sorted, poor to moderately cemented, high visible porosity, thinly laminated to thinly bedded, occasional carbonaceous laminae throughout, fining upwards, low to medium strength, badly

broken at base of unit.

621.860-622.210: SILTSTONE: dark grey, thinly laminated, common carbonaceous wisps throughout unit, low strength, over drilled, sharp basal contact.

622.210-622.320: COAL Dull: mudstone laminae near top of unit, core ground at top of unit, sharp basal contact, face cleat, average spacing 10mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 15mm, penetrating 10% of unit, no visible mineralisation, dips 80 degrees with azimuth 80 degrees to face cleat.

622.320-622.410: CARBONACEOUS MUDSTONE: light brown, thinly to thickly laminated, common carbonaceous wisps throughout, common carbonaceous laminae at base of unit, low strength, sharp basal contact.

622.410-622.440: COAL Dull: face cleat, average spacing 15mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 70% of unit, no visible mineralisation, dips 90 degrees with azimuth 45 degrees to face cleat, fracture set 1, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

622.440-622.590: COAL Dull minor bright: tending to carbonaceous mudstone in part, 1 fracture, gradational basal contact, face cleat, average spacing 10mm, penetrating 5% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 7mm, penetrating 5% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

622.590-622.690: CARBONACEOUS MUDSTONE: dark brown, coaly in part, 1 fracture, gradational basal contact.

622.690-623.190: COAL Dull: tuff lenses and laminae rare, coaly in part, 2 fractures, no visible cleat or fractures.

623.190-623.280: COAL Stony: core ground at top of unit, gradational basal contact, no visible cleat or fractures.

623.280-623.460: CARBONACEOUS MUDSTONE: dark brown black, common carbonaceous laminae throughout, tending to stony coal at parts, low strength.

623.460-623.530: TUFF: cream, badly broken, low strength, basal parting.

623.530-623.610: COAL Stony: tuffaceous laminae common, gradational basal contact, no visible cleat or fractures.

623.610-623.640: TUFF: light grey, coaly wisps rare, sharp basal contact.

623.640-623.650: COAL Stony: tuff laminae common, sharp basal contact, no visible cleat or fractures.

623.650-623.670: TUFF: light grey, coaly wisps rare, sharp basal contact.

623.670-623.710: COAL Stony: tuff laminae common at top, basal parting, no visible cleat or fractures.

623.710-623.745: TUFF: cream, coaly wisps abundant in part, sharp basal contact.

623.745-623.860: COAL Dull minor bright: 1 fracture, sharp basal contact, face cleat, average spacing 5mm, penetrating 2% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

623.860-623.870: TUFF: coaly lenses and laminae common, sharp basal contact.

623.870-624.020: COAL Dull minor bright: tuff laminae rare, 2 fractures, basal parting, face cleat, average spacing 10mm, penetrating 2% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

624.020-624.100: TUFF: brown, carbonaceous, broken in part, sharp basal contact.

624.100-624.340: CARBONACEOUS MUDSTONE: dark grey black, thinly laminated, tending to stony coal throughout, medium strength, core ground at top of unit, sharp basal contact.

624.340-624.555: COAL Dull and bright: low strength, 2 fractures, sharp basal contact, face cleat, average spacing 4mm, penetrating 10% of unit, 90% clay filled, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 10% of unit, 90% clay filled, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 30mm, penetrating 90% of unit, 50% carbonate filled, dips 90 degrees.

624.555-624.565: CARBONACEOUS MUDSTONE: dark brown, coaly, medium strength, sharp basal contact.

624.565-624.585: COAL Dull minor bright: medium strength, sharp basal contact, no visible cleat or fractures.

624.585-624.625: COAL Dull: medium strength, sharp basal contact, face cleat, average spacing 15mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

624.625-624.690: COAL Dull banded: medium strength, basal parting, face cleat, average spacing 6mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 15mm, penetrating 60% of unit, no visible mineralisation, dips 90 degrees, secondary butt cleat, average spacing 30mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

624.690-624.740: CORE LOSS:

624.740-624.840: COAL Dull: gradational basal contact, no visible cleat or fractures.

624.840-624.935: COAL Dull banded: sharp basal contact, face cleat, average spacing 10mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 5mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

624.935-624.970: TUFF: white, coaly wisps rare, basal parting.

624.970-625.210: COAL Dull minor bright: broken in part, gradational basal contact, no visible cleat or fractures.

625.210-625.240: CARBONACEOUS MUDSTONE: dark brown, badly broken, sharp basal contact.

625.240-625.270: COAL Stony: gradational basal contact, no visible cleat or fractures.

625.270-625.380: MUDSTONE: brown, tending carbonaceous mud in part, core is undersized, with spin marks at the base .

625.380-625.420: SILTSTONE: dark grey brown, minor carbonaceous wisps, gradational basal contact.

625.420-625.840: SIDERITE: dark brown, very high strength, erosional basal contact.

625.840-626.270: SANDSTONE 30%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement, SILTSTONE 70%: dark brown grey, thinly interlaminated with some larger silty beds, common carbonaceous laminae throughout, slickensided fracture at base, medium to high strength.

626.270-626.660: CORE LOSS:

626.660-629.200: SANDSTONE 30%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement. SILTSTONE 70%: dark grey, thinly interlaminated to thickly interbedded, carbonaceous laminae common throughout, major silty bed at 0.40m from top of unit, , medium to high strength, core broken and partially redrilled, 5 fractures, spin marks on upper core, sharp irregular basal contact.

629.200-631.430: SANDSTONE: light grey to grey, medium to coarse grained, quartz to quartz lithic, sub rounded sub spherical, moderate sorting calcareous cement, abundant carbonaceous laminae in localised bands at top of unit, becoming common to minor towards base.

631.430-632.120: SANDSTONE: light grey, medium to coarse grained, quartz to quartz lithic, sub rounded sub spherical, moderate sorting calcareous cement, abundant carbonaceous laminae towards base, sharp basal contact.

632.120-632.190: CORE LOSS:

632.190-632.270: COAL Stony: sharp irregular basal contact, face cleat, average spacing 10mm, penetrating 20% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 25% of unit, 15% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

632.270-632.520: SANDSTONE: light grey, medium to coarse grained, quartz to quartz lithic, sub rounded sub spherical, moderate sorting calcareous cement, minor siltstone bands abundant carbonaceous wisps and coal lenses towards base, medium to high strength, erosional basal contact.

632.520-632.610: COAL Stony: gradational basal contact, no visible cleat or fractures.

632.610-632.680: COAL Dull minor bright: erosional basal contact, face cleat, average spacing 30mm, penetrating 50% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 30% of unit, 20% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

632.680-633.260: SANDSTONE 40%: grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement. SILTSTONE 60%: dark grey, thinly to thickly interbedded, carbonaceous wisps minor throughout, , 2 slickensided fractures at 0.39m and 0.49m from top of unit, erosional basal contact.

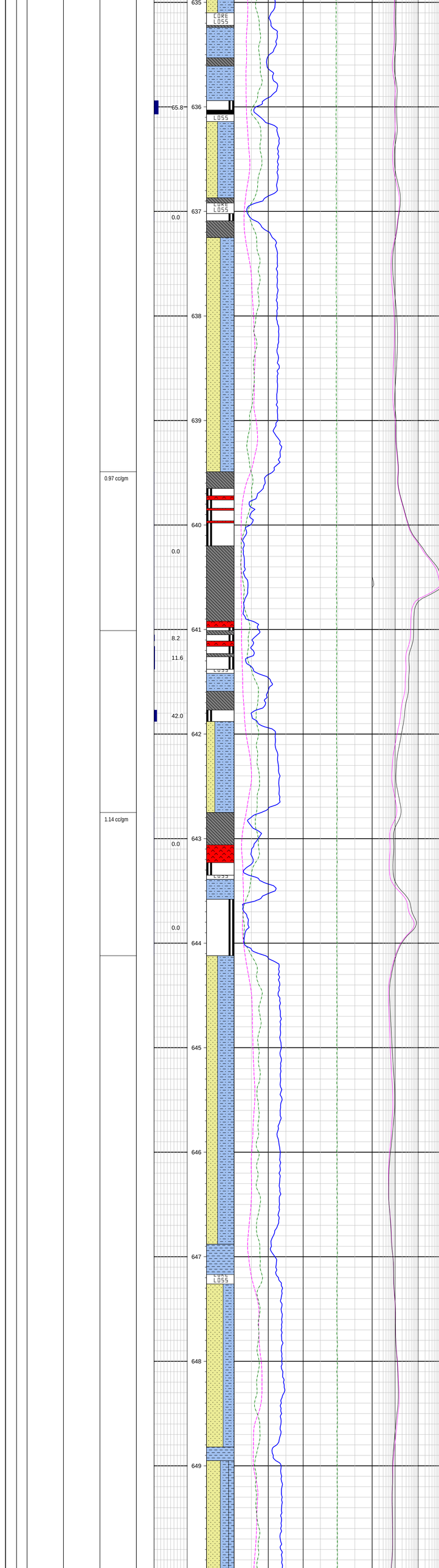
633.260-633.620: SIDERITE: dark brown and mottled, calcite veins at top of unit, very high strength, gradational basal contact.

633.620-634.430: SANDSTONE 50%: grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement. SILTSTONE 50%: dark grey, thinly to thickly bedded, sandy at top silty towards base, carbonaceous laminae throughout, sideritic clasts a top of unit, medium strength, sharp basal contact.

634.430-634.480: CARBONACEOUS MUDSTONE: dark brown, coaly laminae, medium strength, sharp basal contact.

634.480-634.540: COAL Dull banded: sharp basal contact, face cleat, average spacing 60mm, penetrating 100% of unit, 20% carbonate filled, dips 90 degrees, butt cleat, average spacing 15mm, penetrating 80% of unit, 20% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

634.540-635.100: SANDSTONE 40%: grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement. SILTSTONE 60%: dark grey, thinly interbedded at top of unit, silt towards base, minor carbonaceous wisps throughout, sharp basal contact.



635.100-635.220: CORE LOSS:

635.220-635.240: CARBONACEOUS MUDSTONE: dark brown, sharp basal contact.

635.240-635.530: SILTSTONE: dark grey brown, medium strength, gradational basal contact.

635.530-635.610: CARBONACEOUS MUDSTONE: dark grey brown, carbonaceous laminae.

635.610-635.940: SILTSTONE: dark grey brownish, increasing carbonaceous content towards base, coal flares at base of unit, minor slickensided fracture at 0.27m from top of unit, erosional basal contact.

635.940-636.030: COAL Stony: gradational basal contact, no visible cleat or fractures.

636.030-636.070: COAL Bright: sharp basal contact, face cleat, average spacing 10mm, penetrating 100% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 5mm, penetrating 80% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

636.070-636.140: CORE LOSS:

636.140-636.870: SANDSTONE 40%: grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement. SILTSTONE 60%: dark grey, thinly to thickly interbedded, minor cross bedding towards base, carbonaceous laminae throughout, sharp basal contact.

636.870-636.920: CARBONACEOUS MUDSTONE: dark brown, carbonaceous laminae throughout.

636.920-637.020: CORE LOSS:

637.020-637.090: COAL Stony: sharp basal contact, no visible cleat or fractures.

637.090-637.250: CARBONACEOUS MUDSTONE: dark brown, carbonaceous laminae and wisps throughout, gradational basal contact.

637.250-639.490: SANDSTONE 50%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted argillaceous cement. SILTSTONE 50%: dark grey, thinly interlaminated to thickly interbedded, silty at top of unit, sandier towards base of unit, minor cross bedding throughout.

639.490-639.650: CARBONACEOUS MUDSTONE: dark brown, tuffaceous in part, sharp basal contact.

639.650-639.720: COAL Dull: 1 fracture, sharp basal contact, no visible cleat or fractures.

639.720-639.760: TUFF: cream, coaly lenses abundant, 1 fracture, sharp basal contact.

639.760-639.840: COAL Dull: 1 fracture, sharp basal contact, no visible cleat or fractures.

639.840-639.860: TUFF: grey, coaly laminae common, sharp basal contact.

639.860-639.960: COAL Dull: tuff laminae occasional, basal parting, no visible cleat or fractures.

639.960-639.980: TUFF: light grey, coaly wisps rare, sharp basal contact.

639.980-640.200: COAL Dull: badly broken, no visible cleat or fractures.

640.200-640.920: CARBONACEOUS MUDSTONE: dark brown, bright flecks occasional, coaly, subvertical calcite veining rare, gradational basal contact.

640.920-640.980: TUFF: cream, coaly wisps occasional, sharp basal contact.

640.980-641.010: COAL Stony: no visible cleat or fractures.

641.010-641.050: CARBONACEOUS MUDSTONE: dark brown, tuffaceous in part, coaly towards base, medium strength, gradational basal contact.

641.050-641.110: COAL Stony: face cleat, average spacing 60mm, penetrating 70% of unit, 30% carbonate filled, dips 90 degrees, no visible butt cleat.

641.110-641.160: TUFF: cream, carbonaceous wisps minor throughout unit, erosional basal contact.

641.160-641.230: COAL Stony: face cleat, average spacing 60mm, penetrating 60% of unit, 10% carbonate filled, dips 90 degrees, no visible butt cleat.

641.230-641.260: CARBONACEOUS MUDSTONE: dark brown, carbonaceous content throughout unit, no visible cleat or fractures.

641.260-641.380: COAL Stony: face cleat, average spacing 30mm, penetrating 40% of unit, 15% carbonate filled, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 10% of unit, 5% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

641.380-641.420: CORE LOSS:

641.420-641.590: SILTSTONE: dark grey, carbonaceous wisps throughout, sharp basal contact.

641.590-641.770: CARBONACEOUS MUDSTONE: dark brown grey, coaly lenses and laminae abundant throughout, minor silty bands, sharp basal contact.

641.770-641.880: COAL Dull: face cleat, average spacing 60mm, penetrating 90% of unit, 20% carbonate filled, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 100% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

641.880-642.750: SILTSTONE 70%: dark grey. SANDSTONE 30%: grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting argillaceous cement, coaly at top of unit, coal lenses and laminae abundant at top of unit, thinly interlaminated tending , sharp basal contact.

642.750-643.060: CARBONACEOUS MUDSTONE: dark brown, coaly at top of unit, sharp basal contact.

643.060-643.230: TUFF: cream, sandy, coaly wisps occasional, 1 fracture, basal parting.

643.230-643.350: COAL Dull: stony in part, sharp basal contact, no visible cleat or fractures.

643.350-643.390: CORE LOSS:

643.390-643.580: SILTSTONE: dark grey, tuffaceous at top of unit.

643.580-644.120: COAL Stony: rare, bright flecks throughout, tending to carbonaceous mudstone in part, subvertical calcite veining occasional, 3 fractures, no visible cleat or fractures.

644.120-646.880: SANDSTONE 40%: light grey, fine to medium grained, quartz lithic sub rounded sub spherical, well sorted, argillaceous cement. SILTSTONE 60%: dark grey, thinly interlaminated with a larger bed of siltstone at the top of the unit, and minor disturbed bedding throughout, larger beds of sandstone towards the base of the unit, medium to high strength, erosional basal contact.

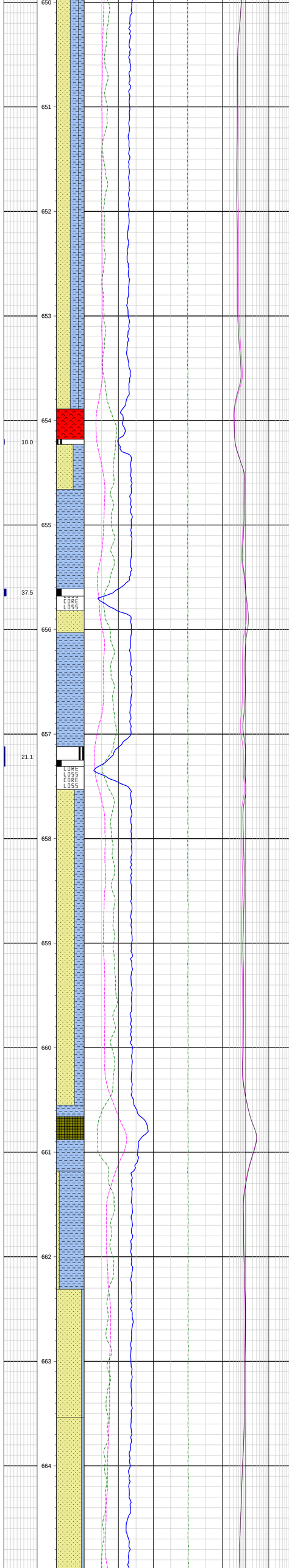
646.880-647.170: MUDSTONE: dark brown, tends carbonaceous mudstone throughout unit, 2 bedding plane factures, medium strength, slickensided fractures occur at 0.09m and 0.19m, gradational basal contact.

647.170-647.260: CORE LOSS:

647.260-648.820: SANDSTONE 60%: light grey, fine to medium grained, quartz lithic sub rounded sub spherical, well sorted, argillaceous cement. SILTSTONE 40%: dark grey, sandy at top of unit, with thinly interlaminated and thinly interbedded throughout rest of unit, medium strength, slickensided fracture at base of unit, erosional basal contact.

648.820-648.950: MUDSTONE: dark brown to dark grey, carbonaceous wisps throughout unit with increasing carbonaceous content towards base of unit,.

648.950-653.890: SANDSTONE 50%: grey, fine grained, sub rounded, spherical, well sorted, quartz lithic, argillaceous cement, well cemented, poor visible porosity. SILTSTONE 30%: grey. MUDSTONE 20%: dark grey, carbonaceous at parts thinly to thickly laminated, common fossiliferous rootlets at top and base, medium to high strength, 3 fractures.



653.890-654.180: TUFF: beige grey, common carbonaceous wisps throughout unit, medium strength, over drilled throughout, sharp basal contact.

654.180-654.230: COAL Dull: core ground at middle, broken at base, sharp basal contact, face cleat, average spacing 30mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

654.230-654.660: SANDSTONE 60%: grey, fine grained, rounded, spherical, well sorted, argillaceous cement, well cemented, poor visible porosity. MUDSTONE 40%: dark grey, thinly laminated, occasional carbonaceous laminae throughout, common carbonaceous wisps at top, low strength, core ground at top, 1 fracture, gradational basal contact.

654.660-655.610: MUDSTONE: dark grey, carbonaceous at parts, occasional sandy laminae at base, occasional carbonaceous wisps throughout unit, low strength, 2 fractures, sharp basal contact.

655.610-655.680: COAL Dull minor bright: core ground at middle, broken at base, sharp basal contact, face cleat, average spacing 8mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 4mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

655.680-655.820: CORE LOSS:

655.820-656.030: SANDSTONE: light grey, fine grained, sub rounded, rounded, well sorted, well cemented, poor visible porosity, common carbonaceous wisps at top of unit, medium strength, gradational basal contact.

656.030-657.120: MUDSTONE: dark grey brown, thinly laminated, tending to carbonaceous mudstone at parts, low strength, 3 fractures, 45 degree slickensided fracture at 1.02m from top of unit, gradational basal contact.

657.120-657.250: COAL Stony: tending to carbonaceous mudstone at parts, sharp basal contact, no visible cleat or fractures.

657.250-657.310: COAL Dull minor bright: face cleat, average spacing 30mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

657.310-657.530: CORE LOSS:

657.530-660.550: SANDSTONE 65%: light grey, fine grained. rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic. MUDSTONE 35%: dark grey, thinly laminated to very thinly bedded, common fossiliferous rootlets at top and middle, rare dewatering structures at base of unit, low to medium strength, core ground at top of unit, 5 fractures, 45 degree slickensided fracture at 2.39m from top of unit, gradational basal contact.

660.550-660.660: MUDSTONE: dark grey, abundant secondary calcite infill throughout unit, high strength, gradational basal contact.

660.660-660.880: SIDERITE: beige grey, high strength, gradational basal contact.

660.880-661.180: MUDSTONE: dark grey, abundant secondary calcite infill throughout unit, high strength, gradational basal contact.

661.180-662.310: SANDSTONE 10%: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic. MUDSTONE 90%: grey, thinly to thickly laminated, medium strength, gradational basal contact.

662.310-663.540: SANDSTONE 90%: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic. SILTSTONE 10%: grey, thinly to thickly laminated, occasional cross bedding at top of unit, medium to high strength.

663.540-667.540: SANDSTONE 90%: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic. SILTSTONE 10%: grey, sandstone with minor siltstone laminae and beds, carbonaceous laminae common throughout becoming rare at the base of the unit.

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667.540-671.190: SANDSTONE: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic, rare silty laminae towards base, abundant carbonaceous laminae and coaly laminae in lower half of the unit, medium strength, erosional basal contact.

671.190-671.310: MUDSTONE: brown , tends carbonaceous mudstone in part, spin marks and core undersize, gradational basal contact.

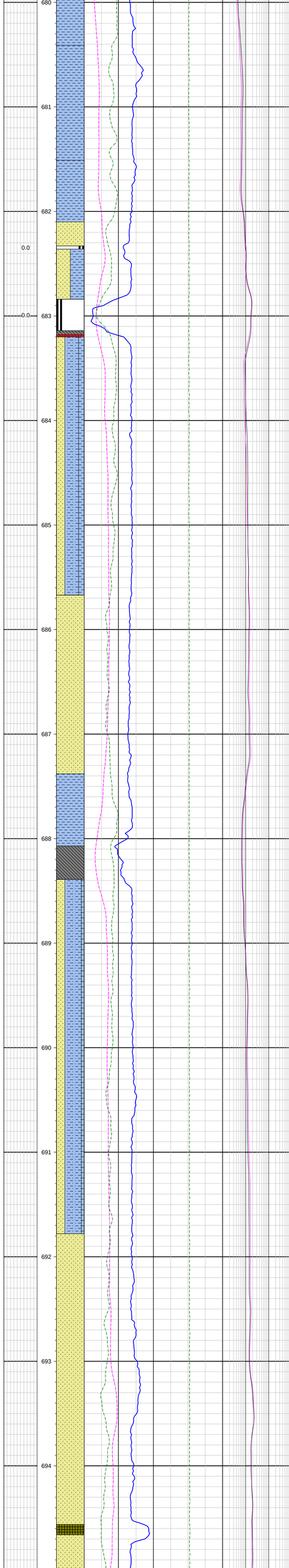
671.310-673.360: SANDSTONE 60%: grey, fine grained, sub rounded sub spherical, well sorted argillaceous cement. SILTSTONE 40%: dark grey, thinly interlaminated to thinly interbedded, minor carbonaceous wisps and laminae throughout increasing towards base.

673.360-673.540: CORE LOSS:

673.540-678.210: SANDSTONE 50%: light grey, fine grained, sub rounded sub spherical, well sorted argillaceous cement. SILTSTONE 45%: dark grey. MUDSTONE 5%: brown thinly interlaminated to thinly interbedded, carbonaceous laminae throughout, mudstone beds in middle of unit, medium strength, badly broken due to core retrieval.

678.210-679.870: CORE LOSS:

679.870-680.410: MUDSTONE: dark grey brown, thinly laminae, carbonaceous laminae throughout, tending carbonaceous mudstone in part.



680.410-681.510: MUDSTONE: dark grey brown, thinly laminated, rare convoluted laminae near middle, occasional tuffaceous laminae throughout, low strength, core ground at top and middle of unit, 4 fractures.

681.510-682.100: MUDSTONE: dark grey black, thinly laminated, common tuffaceous laminae throughout, low strength, sharp basal contact.

682.100-682.330: SANDSTONE: light grey, medium grained, rounded, sub elongate, moderate sorting, argillaceous cement, well cemented, poor visible porosity, quartz lithic, occasional carbonaceous laminae throughout unit, medium strength, irregular sharp basal contact.

682.330-682.360: COAL Stony: tending to carbonaceous mudstone, sharp basal contact, no visible cleat or fractures.

682.360-682.840: SANDSTONE 50%: grey, fine grained, sub rounded, sub spherical, well sorted, argillaceous cement, poor visible porosity. quartz lithic. MUDSTONE 50%: dark grey, thinly to thickly laminated, occasional carbonaceous wisps throughout, rare coal lens at base of unit, low strength, sharp basal contact.

682.840-683.140: COAL Dull: tending to carbonaceous mudstone rarely, bright flecks occasional, no visible cleat or fractures.

683.140-683.180: CARBONACEOUS MUDSTONE: dark grey black, low strength, sharp basal contact.

683.180-683.200: TUFF: beige, medium strength, sharp basal contact.

683.200-685.670: SANDSTONE 30%: light grey, fine grained, rounded, spherical, well sorted, argillaceous cement, well cemented, poor visible porosity. SILTSTONE 50%: grey. MUDSTONE 20%: dark grey thinly to thickly laminated, common disturbed laminae throughout, occasional carbonaceous wisps at top, , low to medium strength.

685.670-687.380: SANDSTONE: light grey, medium grained, subrounded, sun spherical, well sorted, argillaceous cement, well cemented, poor visible porosity, rare silty laminae at middle of unit, common carbonaceous laminae at base, common coal fragments at base of unit, medium strength, 2 fractures, sharp basal contact.

687.380-688.070: MUDSTONE: dark grey black, occasional, sandy laminae at top, occasional clay nodules at middle and base of unit, low strength, 1 fracture, 20 degree slickensided fracture at 0.58m from top of unit, gradational basal contact.

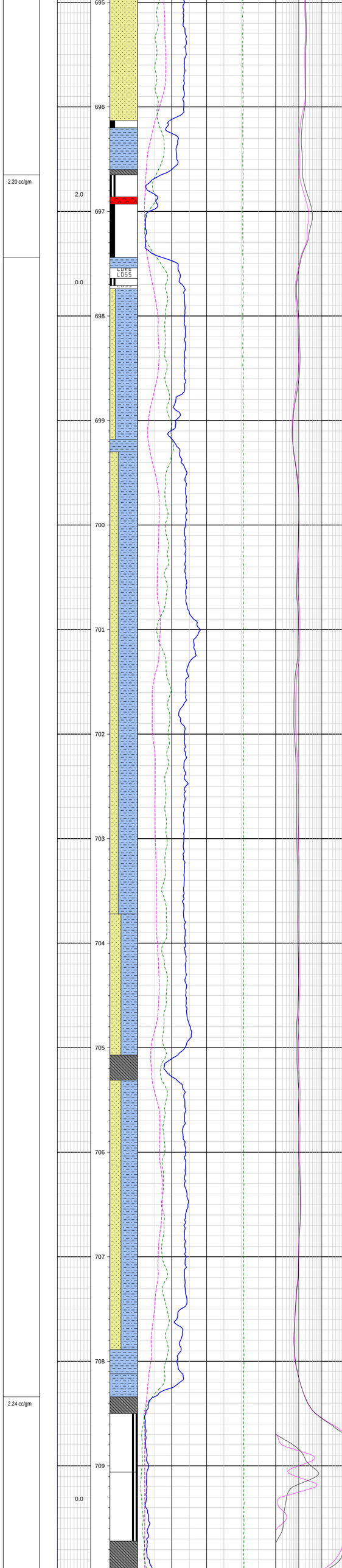
688.070-688.390: CARBONACEOUS MUDSTONE: dark grey brown, thinly laminated, tending to stony coal at base of unit, low strength, gradational basal contact.

688.390-691.780: SANDSTONE 30%: grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 60%: grey. MUDSTONE 10%: dark grey thinly to thickly laminated, common carbonaceous laminae at base, medium strength, ridged throughout.

691.780-694.560: SANDSTONE: light grey, medium grained subrounded, sub spherical, well sorted, well cemented, quartz lithic, poor visible porosity, thinly to thickly laminated, occasional carbonaceous laminae at top, slight sideritic alteration at middle, rare clay modules near base of unit, medium strength, 2 fractures, gradational basal contact.

694.560-694.660: SIDERITE: beige, occasional calcite veins at middle of unit, high strength, sharp basal contact.

694.660-696.130: SANDSTONE: light grey, medium grained subrounded, sub spherical, well sorted, well cemented, quartz lithic, poor visible porosity, common carbonaceous laminae at top, rare clay clast near base of unit, medium strength, 1 fracture, sharp basal contact.



696.130-696.200: COAL Dull minor bright: sharp basal contact, face cleat, average spacing 8mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

696.200-696.600: MUDSTONE: dark grey black, abundant carbonaceous wisps throughout, common coal lenses at middle and base of unit, low strength, gradational basal contact.

696.600-696.650: CARBONACEOUS MUDSTONE: dark grey brown, common carbonaceous wisps throughout unit, low strength, sharp basal contact.

696.650-696.860: COAL Dull: subvertical, calcite veining occasional, broken in part, 2 fractures, sharp basal contact, no visible cleat or fractures.

696.860-696.930: TUFF: light brown, coaly wisps rare.

696.930-697.440: COAL Dull minor bright: badly broken in part, tuffaceous nodules rare, no visible cleat or fractures.

697.440-697.540: MUDSTONE: dark grey, common carbonaceous wisps throughout unit, low strength, sharp basal contact.

697.540-697.640: CORE LOSS:

697.640-697.710: COAL Dull: no visible cleat or fractures.

697.710-697.740: CORE LOSS:

697.740-699.180: SANDSTONE 20%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 80%: dark grey, silty with minor sandy beds, carbonaceous wisps common throughout, sideritic nodules within unit and a coal lens towards the base, gradational basal contact.

699.180-699.300: MUDSTONE: dark grey brown, tends carbonaceous mudstone throughout.

699.300-703.720: SANDSTONE 30%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 70%: dark grey, thinly interlaminated to thinly interbedded silty at top of unit, minor mudstone bands throughout, tends sideritic in middle of unit with calcite rich sandstone beds .

703.720-705.070: SANDSTONE 40%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 60%: dark grey, thinly interlaminated to thinly interbedded, sandy at top of unit, siltier at base of unit, carbonaceous laminae throughout, gradational basal contact.

705.070-705.310: CARBONACEOUS MUDSTONE: dark brown, mudstone laminae with carbonaceous laminae throughout, gradational basal contact.

705.310-707.890: SANDSTONE 40%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 60%: dark grey, thinly interlaminated to thinly interbedded mudstone laminae common throughout with sideritic nodules towards base of unit, carbonaceous laminae throughout, gradational basal contact.

707.890-708.120: MUDSTONE: brown, carbonaceous wisps minor, tending carbonaceous mudstone in part, erosional basal contact.

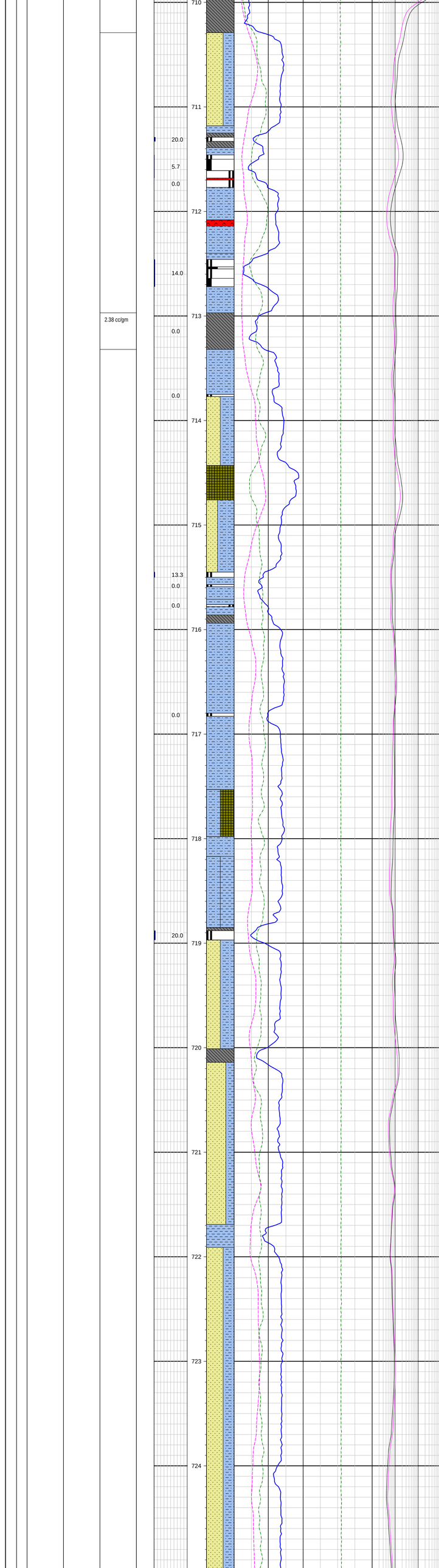
708.120-708.340: SILTSTONE: dark grey.

708.340-708.500: CARBONACEOUS MUDSTONE: dark brown, tending to stony coal at base, gradational basal contact.

708.500-709.060: COAL Stony: tending to carbonaceous mudstone in part, 3 fractures, no visible cleat or fractures.

709.060-709.720: COAL Stony: tending to carbonaceous mudstone in part, badly broken at base, bright lenses and flecks occasional, 70 degree calcite veining rare, 3 fractures, no visible cleat or fractures.

709.720-710.290: CARBONACEOUS MUDSTONE: dark brown, coaly in part, tuffaceous lenses occasional, 2 fractures, closed, subvertical fracture in upper 0.30m.



710.290-711.180: SANDSTONE 60%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 40%: dark grey, thinly interbedded with fining up sequences, carbonaceous wisps towards base of unit and at top.

711.180-711.250: MUDSTONE: dark grey, carbonaceous wisps throughout.

711.250-711.290: CARBONACEOUS MUDSTONE: dark brown grey.

711.290-711.330: COAL Dull: face cleat, average spacing 60mm, penetrating 80% of unit, 10% carbonate filled, dips 90 degrees, butt cleat, average spacing 45mm, penetrating 40% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

711.330-711.390: CARBONACEOUS MUDSTONE: dark brown, tending mudstone at the base minor coal laminae.

711.390-711.460: MUDSTONE: grey, carbonaceous wisps throughout.

711.460-711.500: COAL Dull: no visible cleat or fractures.

711.500-711.610: COAL Dull minor bright: face cleat, average spacing 60mm, penetrating 80% of unit, 15% carbonate filled, dips 90 degrees, no visible butt cleat.

711.610-711.680: COAL Stony: tending carbonaceous mudstone in part, no visible cleat or fractures.

711.680-711.700: TUFF: cream, carbonaceous wisps throughout.

711.700-711.770: COAL Stony: no visible cleat or fractures.

711.770-712.080: SILTSTONE: light grey, carbonaceous wisps throughout, erosional basal contact.

712.080-712.140: TUFF: cream, carbonaceous wisps throughout, erosional basal contact.

712.140-712.400: SILTSTONE: light grey, tending carbonaceous towards base.

712.400-712.460: MUDSTONE: dark grey, tending carbonaceous mudstone in part.

712.460-712.530: COAL Dull: face cleat, average spacing 60mm, penetrating 90% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

712.530-712.550: COAL Dull banded: face cleat, average spacing 45mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

712.550-712.640: COAL Dull: face cleat, average spacing 60mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

712.640-712.720: COAL Dull minor bright: face cleat, average spacing 30mm, penetrating 30% of unit, 20% carbonate filled, dips 90 degrees, no visible butt cleat.

712.720-712.970: SILTSTONE: grey, carbonaceous laminae throughout.

712.970-713.320: CARBONACEOUS MUDSTONE: dark brown, coaly lenses rare, 3 fractures.

713.320-713.750: SILTSTONE: grey, carbonaceous wisps and coaly lenses throughout.

713.750-713.770: COAL Dull: no visible cleat or fractures.

713.770-714.430: SANDSTONE 50%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 50%: grey, thinly interlaminated to thinly interbedded carbonaceous laminae carbonaceous wisps throughout, unit tends to carbonaceous mudstone at base.

714.430-714.760: SIDERITE: tan grey, calcite cement.

714.760-715.450: SANDSTONE 40%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 60%: dark grey, thinly interlaminated to thinly interbedded carbonaceous wisps throughout sideritic nodules throughout.

715.450-715.500: COAL Dull: face cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.

715.500-715.570: SILTSTONE: grey, carbonaceous wisps minor throughout.

715.570-715.590: COAL Dull: no visible cleat or fractures.

715.590-715.710: SILTSTONE: grey, carbonaceous wisps and laminae throughout.

715.710-715.760: SILTSTONE: grey, carbonaceous laminae throughout.

715.760-715.780: COAL Stony: no visible cleat or fractures.

715.780-715.860: MUDSTONE: dark grey, carbonaceous laminae and wisps throughout.

715.860-715.940: CARBONACEOUS MUDSTONE: brown, coal wisps and lenses.

715.940-716.800: SILTSTONE: grey, minor sandy beds throughout, carbonaceous laminae throughout with carbonaceous wisps at top and base of unit.

716.800-716.830: COAL Dull: no visible cleat or fractures.

716.830-717.530: SILTSTONE: dark grey, minor sandy laminae, sideritic nodules at top of unit.

717.530-717.980: SILTSTONE 50%: dark grey. SIDERITE 50%: tan brown, sideritic nodules and alteration throughout siltstone, minor sandy laminae.

717.980-718.170: SILTSTONE: dark grey, carbonaceous laminae common.

718.170-718.850: SILTSTONE 50%: grey. MUDSTONE 50%: light brown, thinly interlaminated to thickly interbedded, carbonaceous wisps abundant at top and base of unit.

718.850-718.880: CARBONACEOUS MUDSTONE: dark brown, coaly lenses and laminae abundant.

718.880-718.970: COAL Dull: face cleat, average spacing 30mm, penetrating 100% of unit, 40% carbonate filled, dips 90 degrees, no visible butt cleat.

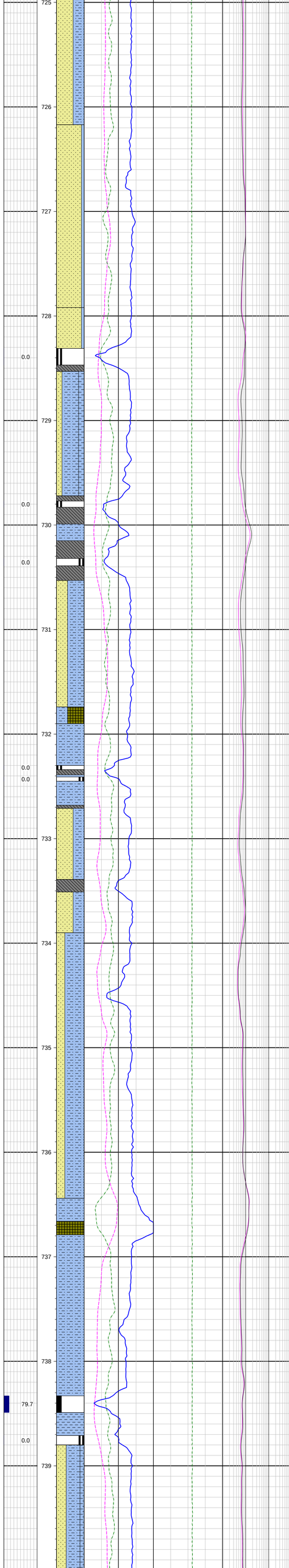
718.970-720.010: SILTSTONE 50%: dark grey. SANDSTONE 50%: grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted, thinly interlaminated to thinly interbedded sandier in middle of unit, carbonaceous wisps and laminae throughout, complex slickensided fractures at 1.00m from top of unit.

720.010-720.140: CARBONACEOUS MUDSTONE: dark brown, coal laminae, wisp and lenses abundant throughout.

720.140-721.690: SANDSTONE 70%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical well sorted. SILTSTONE 30%: dark grey, thickly interbedded to thinly interlaminated, minor disturbed bedding, minor coal lenses in middle of unit, carbonaceous wisps throughout.

721.690-721.910: MUDSTONE: dark brown, tending carbonaceous mudstone in part, carbonaceous laminae and wisps throughout, erosional basal contact.

721.910-726.170: SANDSTONE 60%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 40%: dark grey, thinly interlaminated to thickly interbedded, carbonaceous wisps throughout, minor mudstone beds in middle of unit, sharp irregular basal contact.



726.170-727.920: SANDSTONE 90%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement, . SILTSTONE 10%: grey, thinly interlaminated to thinly interbedded carbonaceous wisps common at top of unit, coal lenses abundant from 0.4 to 0.5m and common til 0.6m from top of unit.

727.920-728.310: SANDSTONE 90%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement. SILTSTONE 10%: dark grey, thinly interlaminated to thinly interbedded minor carbonaceous laminae.

728.310-728.470: COAL Dull: 30 degree fracture at 0.06m from top of unit, no visible cleat or fractures.

728.470-728.530: CARBONACEOUS MUDSTONE: light brown, common carbonaceous wisps.

728.530-729.720: SANDSTONE 20%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 60%: dark grey. MUDSTONE 20%: brown thinly interlaminated to thinly interbedded minor carbonaceous laminae throughout coaly wisps in middle of unit, slickensided fracture at 0.90m from top of unit, and complex fractures at 1.00m to 1.20m from top of unit, sharp irregular basal contact.

729.720-729.770: CARBONACEOUS MUDSTONE: dark brown, common coal lenses and wisps , sharp irregular basal contact.

729.770-729.830: COAL Dull: no visible cleat or fractures.

729.830-729.990: CARBONACEOUS MUDSTONE: dark brown, coaly laminae and wisps, carbonaceous laminae throughout, sharp irregular basal contact.

729.990-730.150: SILTSTONE: dark grey, carbonaceous wisps and carbonaceous laminae throughout, slickensided fracture at 0.04m from top of unit, sharp basal contact.

730.150-730.320: CARBONACEOUS MUDSTONE: dark brown, minor bright coal laminae.

730.320-730.390: COAL Stony: no visible cleat or fractures.

730.390-730.530: CARBONACEOUS MUDSTONE: dark brown, carbonaceous wisps and carbonaceous laminae, sharp irregular basal contact.

730.530-731.740: SILTSTONE 60%: grey. SANDSTONE 40%: light grey, fine to medium grained, quartz lithic sub rounded sub spherical moderate sorting, thinly interlaminated to thinly interbedded minor disturbed bedding, calcareous cement in part.

731.740-731.900: SILTSTONE 40%: dark grey. SIDERITE 60%: tan brown, sideritic siltstone with sideritic clasts throughout.

731.900-732.300: SILTSTONE: grey, carbonaceous wisps and coaly wisps common throughout.

732.300-732.340: COAL Dull: no visible cleat or fractures.

732.340-732.390: CARBONACEOUS MUDSTONE: dark brown, carbonaceous laminae and wisps.

732.390-732.410: SILTSTONE: grey, minor carbonaceous wisps.

732.410-732.450: COAL Stony: minor bright coal laminae, no visible cleat or fractures.

732.450-732.680: SILTSTONE: grey, carbonaceous wisps.

732.680-732.710: CARBONACEOUS MUDSTONE: brown, coal lenses, tending mudstone in part.

732.710-733.390: SILTSTONE 40%: dark grey. SANDSTONE 60%: grey, fine to medium grained, quartz lithic sub rounded sub spherical moderate sorting, thinly interlaminated to thinly interbedded, minor disturbed bedding and carbonaceous wisps.

733.390-733.510: CARBONACEOUS MUDSTONE: dark brown, carbonaceous laminae and wisps throughout.

733.510-733.900: SANDSTONE 60%: grey, fine to medium grained, quartz lithic sub rounded sub spherical moderate sorting. SILTSTONE 40%: dark grey, thinly interlaminated to thinly interbedded, carbonaceous wisps and laminae, minor disturbed bedding.

733.900-736.440: SANDSTONE 30%: grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 70%: grey, thinly to thickly laminated, occasional erosional contacts between laminae, common carbonaceous wisps throughout, common coal fragments in localised area, low to medium strength, 4 fractures, irregular slickensided fracture at 0.47m, 0.57m and 1.44m from top of unit, gradational basal contact.

736.440-736.660: SILTSTONE: light grey white, 90% secondary calcite infill throughout unit, high strength, gradational basal contact.

736.660-736.790: SIDERITE: beige, high strength.

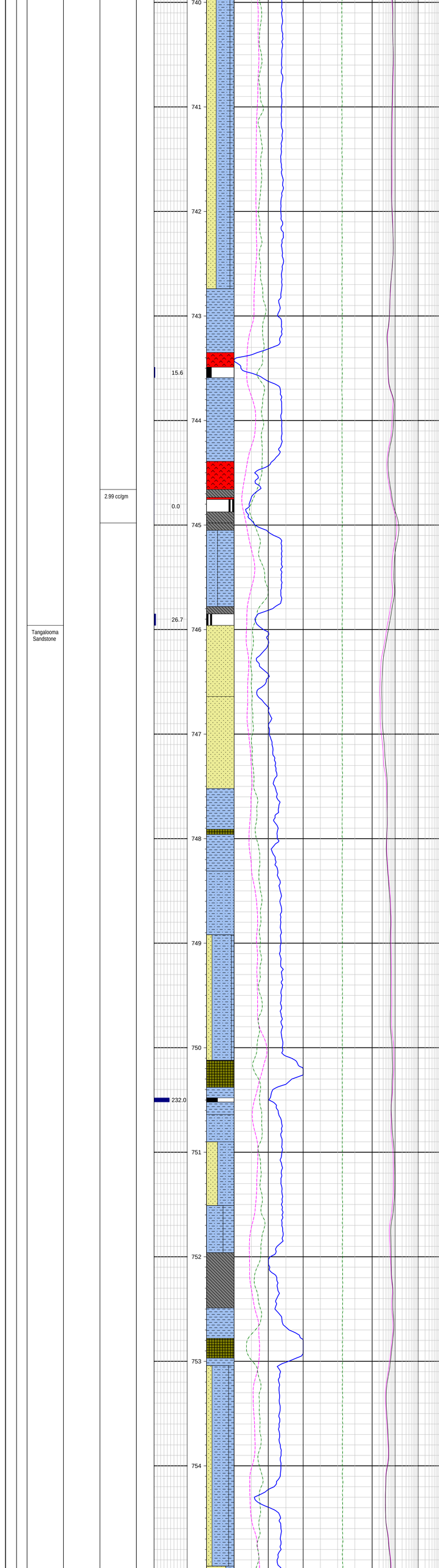
736.790-738.330: SILTSTONE: dark grey, tending to mudstone at parts, thinly laminated, occasional clay nodules at top, common coaly wisps throughout unit, low strength, 5 fractures, 45 degree slickensided fracture at 0.52m , sharp basal contact.

738.330-738.490: COAL Dull minor bright: face cleat, average spacing 4mm, penetrating 20% of unit, 10% carbonate filled, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 20% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 30mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, secondary butt cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

738.490-738.710: MUDSTONE: dark grey, thinly laminated, common carbonaceous wisps throughout unit, low strength, sharp basal contact.

738.710-738.800: COAL Stony: no visible cleat or fractures.

738.800-742.740: SANDSTONE 35%: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 50%: grey. MUDSTONE 15%: dark grey thinly to thickly laminated, common fossiliferous rootlets at top, common coal lenses at top, medium strength.



742.740-743.350: MUDSTONE: dark grey, thinly laminated, common bioturbation throughout, low strength, 1 fracture, 60 degree slickensided fracture at 0.56m from top of unit, gradational basal contact.

743.350-743.490: TUFF: beige, thinly laminated, low strength, sharp basal contact.

743.490-743.590: COAL Dull minor bright: face cleat, average spacing 30mm, penetrating 30% of unit, 15% carbonate filled, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 25% of unit, 15% carbonate filled, dips 90 degrees with azimuth 45 degrees to face cleat.

743.590-744.390: MUDSTONE: dark grey, thinly laminated, occasional sideritic alteration throughout unit, low strength, 3 fractures, 60 degree slickensided fracture at 0.78m from top of unit, gradational basal contact.

744.390-744.660: TUFF: beige grey, thinly laminated, occasional coal fragments throughout, low strength, sharp basal contact.

744.660-744.735: CARBONACEOUS MUDSTONE: dark brown, coaly lenses occasional, 1 fracture, gradational basal contact.

744.735-744.755: TUFF: cream, coaly wisps rare, sharp basal contact.

744.755-744.875: COAL Stony: bright flecks common, broken in part, sharp basal contact, no visible cleat or fractures.

744.875-744.980: CARBONACEOUS MUDSTONE: dark brown, coaly lenses rare.

744.980-745.050: CARBONACEOUS MUDSTONE: dark grey black, common carbonaceous wisps throughout unit, low strength, sharp basal contact.

745.050-745.780: SILTSTONE 40%: grey. MUDSTONE 60%: dark grey, , thinly laminated, rare fossiliferous rootlets at middle of unit, low strength, 1 fracture, sharp basal contact.

745.780-745.850: CARBONACEOUS MUDSTONE: dark grey brown, tending to stony coal , medium strength, sharp basal contact.

745.850-745.960: COAL Dull: tending to stony coal at parts, occasional tuffaceous laminae and nodules at base, face cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 30 degrees to face cleat.

745.960-746.640: SANDSTONE: beige grey, very fine grained, thickly laminated, occasional fossiliferous rootlets throughout unit, low to medium strength, gradational basal contact.

746.640-747.520: SANDSTONE: light grey, fine grained, sub angular to sub rounded, sub spherical, medium sorting, calcite cement, poor visible porosity, thinly to thickly laminated, common carbonaceous laminae at middle, occasional fossiliferous rootlets at top of unit, medium to high strength, gradational basal contact.

747.520-747.910: MUDSTONE: dark grey, thinly laminated, common carbonaceous wisps throughout unit, low strength, 1 fracture, irregular slickensided fracture at 0.32m from top of unit, gradational basal contact.

747.910-747.960: SIDERITE: beige, thinly laminated, high strength, sharp basal contact.

747.960-748.310: MUDSTONE: dark grey, thinly laminated, common carbonaceous wisps throughout, tending to carbonaceous mudstone at base of unit, low strength, 1 fracture, 45 degree slickensided fracture at 0.03m from top of unit, gradational basal contact.

748.310-748.920: SILTSTONE: dark grey, occasional sandy laminae at middle, common carbonaceous wisps and fossiliferous rootlets throughout unit, low strength.

748.920-750.120: SANDSTONE 20%: light grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 70%: grey. MUDSTONE 10%: dark grey thinly laminated, rare carbonaceous laminae at middle, occasional fossiliferous rootlets at middle, occasional sideritic alteration throughout, coarsening upwards, medium strength, 2 fractures, irregular basal contact.

750.120-750.380: SIDERITE: beige, rare calcite vein at middle of unit, high strength, irregular sharp basal contact.

750.380-750.480: MUDSTONE: dark grey, common sideritic alteration throughout, occasional coal fragments at base of unit, low strength, 2 fractures, irregular slickensided fracture at 0.08m from top of unit, sharp basal contact.

750.480-750.520: COAL Dull banded: face cleat, average spacing 5mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 5mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 30mm, penetrating 60% of unit, 20% carbonate filled, dips 90 degrees, secondary butt cleat, average spacing 30mm, penetrating 60% of unit, 20% carbonate filled, dips 90 degrees with azimuth 80 degrees to face cleat.

750.520-750.640: MUDSTONE: grey, tending to carbonaceous mudstone at base of unit, low strength, gradational basal contact.

750.640-750.900: SILTSTONE: grey, thinly laminated, common carbonaceous wisps at top of unit, low strength, gradational basal contact.

750.900-751.510: SANDSTONE 40%: grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 60%: dark grey, thinly laminated, common carbonaceous laminae at middle of unit, rare fossiliferous rootlets and cross bedding at middle of unit, thinly laminated, common carbonaceous laminae at middle of unit, rare fossiliferous rootlets and cross bedding at middle of unit, low strength, 2 fractures, gradational basal contact.

751.510-751.960: SILTSTONE 60%: grey. MUDSTONE 40%: dark grey, thinly laminated, occasional sandy laminae throughout unit, occasional sideritic alteration at base of unit, low strength, gradational basal contact.

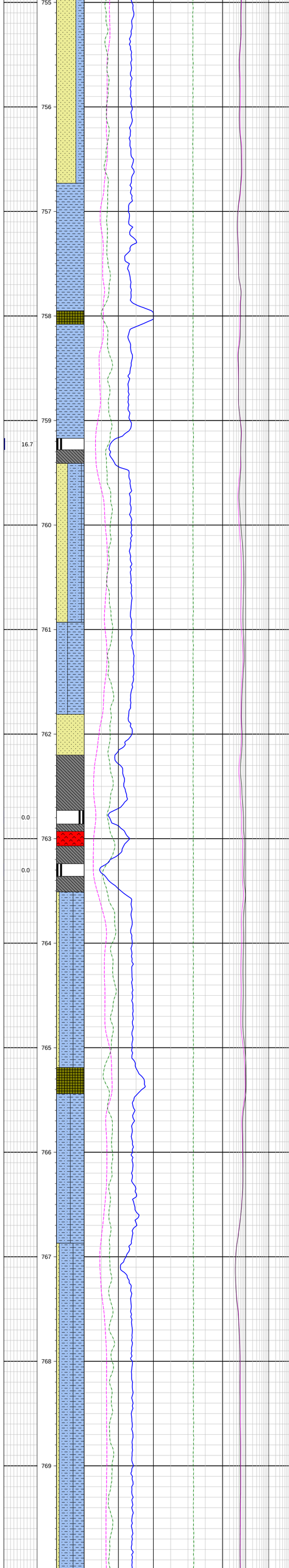
751.960-752.490: CARBONACEOUS MUDSTONE: dark grey black, occasional coal lenses at top of unit, common carbonaceous wisps throughout unit, low strength, 5 fractures, gradational basal contact.

752.490-752.780: MUDSTONE: dark grey, common sideritic alteration throughout, common coal lenses throughout unit, low strength, 5 fractures, fracture zone at base of unit, irregular fractures in multiple orientations, irregular sharp basal contact.

752.780-752.970: SIDERITE: beige, rare coal fragments at top of unit, high strength, irregular basal contact.

752.970-753.040: MUDSTONE: dark grey, rare coal fragments throughout unit, low strength, 1 fracture, gradational basal contact.

753.040-754.960: SANDSTONE 20%: light grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 60%: grey. MUDSTONE 20%: dark grey thinly laminated, common fossiliferous rootlets at top, tending to carbonaceous mudstone at parts, low to medium strength, 3 fractures.



754.960-756.730: SANDSTONE 70%: light grey, fine grained, rounded, sub spherical, quartz lithic, well sorted, well cemented, poor visible porosity. SILTSTONE 30%: grey, thinly to thickly laminated, common disturbed laminae throughout, common carbonaceous wisps throughout, occasional sideritic alteration at middle of unit, medium strength, 3 fractures, gradational basal contact.

756.730-757.950: MUDSTONE: dark grey, thinly laminated, occasional sandy laminae at top, common sideritic alteration throughout unit, low strength, 7 fractures, stepped slickensided fractures at 0.20m, 0.35m, 0.56m, 0.64m and 0.75m from top of unit, 60 degree slickensided fractures at 1.00m and 1.16m from top of unit, 40 degree slickensided fracture basal contact.

757.950-758.080: SIDERITE: beige, thinly laminated, high strength, 45 degree slickensided basal contact.

758.080-759.170: MUDSTONE: grey, thinly laminated, occasional sandy laminae at base of unit, low to medium strength, 2 fractures, 60 degree slickensided fracture at 0.64m from top of unit, gradational basal contact.

Taroom Coal Measures

759.170-759.280: COAL Dull: tending to stony coal, face cleat, average spacing 30mm, penetrating 30% of unit, no visible mineralisation, dips 80 degrees, butt cleat, average spacing 30mm, penetrating 20% of unit, no visible mineralisation, dips 60 degrees with azimuth 80 degrees to face cleat.

759.280-759.410: CARBONACEOUS MUDSTONE: black brown, thinly laminated, low strength, 1 fracture, gradational basal contact.

759.410-760.930: SANDSTONE 40%: grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 50%: grey. MUDSTONE 10%: dark grey thinly to thickly laminated, common fossiliferous rootlets at top, low to medium strength, 2 fractures.

760.930-761.810: SILTSTONE 40%: grey. MUDSTONE 60%: dark grey, common sideritic alteration throughout unit, low strength, 3 fractures, gradational basal contact.

761.810-762.200: SANDSTONE: grey, fine grained, rounded, spherical, well sorted, moderately cemented, moderate visible porosity, occasional carbonaceous laminae throughout, slight sideritic alteration throughout, medium strength, erosional basal contact.

762.200-762.730: CARBONACEOUS MUDSTONE: dark grey brown, common carbonaceous wisps and coal lenses throughout unit, low strength, 2 fractures. 20 degree slickensided fracture at 0.08m from top of unit, gradational basal contact.

762.730-762.860: COAL Stony: gradational basal contact, no visible cleat or fractures.

762.860-762.930: CARBONACEOUS MUDSTONE: dark brown, thinly laminated, common carbonaceous wisps throughout unit, low strength, erosional basal contact.

762.930-763.070: TUFF: grey beige, thinly laminated, low strength, gradational basal contact.

763.070-763.240: CARBONACEOUS MUDSTONE: dark brown black, thinly laminated, low strength, gradational basal contact.

763.240-763.360: COAL Dull: no visible cleat or fractures.

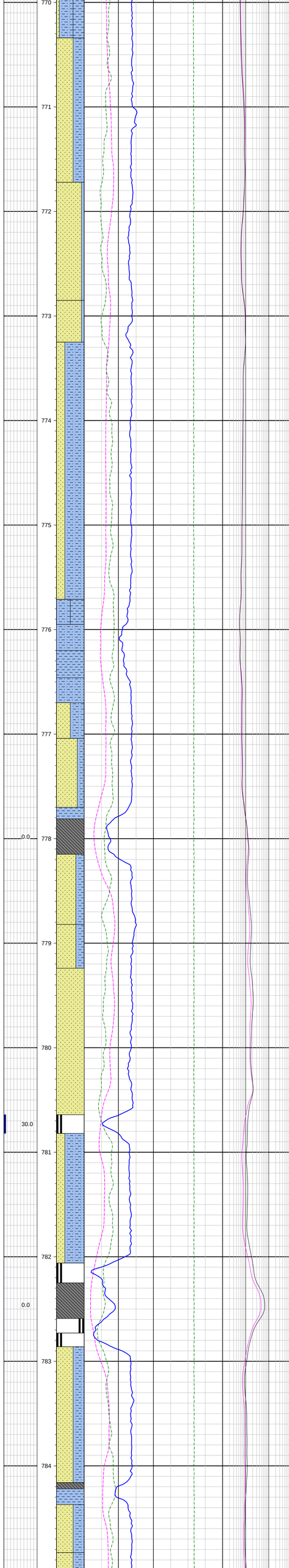
763.360-763.510: CARBONACEOUS MUDSTONE: dark grey, medium strength, sharp basal contact.

763.510-765.190: SANDSTONE 10%: grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 50%: grey. MUDSTONE 40%: dark grey thinly to thickly laminated, common fossiliferous rootlets at top of unit, low strength, 3 fractures, gradational basal contact.

765.190-765.440: SIDERITE: beige white, abundant calcite veins and cone in cone structures at base of unit, medium to high strength, irregular basal contact.

765.440-766.870: SILTSTONE 50%: grey. MUDSTONE 50%: dark grey, thinly laminated, occasional sandy laminae at middle, occasional bioturbation at middle, abundant sideritic alteration throughout unit, low strength.

766.870-770.340: SILTSTONE 50%: dark grey. SANDSTONE 10%: grey, very fine grained, well rounded. sub spherical. well sorted. MUDSTONE 40%: grey brown thinly interlaminated with intermixed silt and mudstone at top of unit, sand laminae increasing towards base of unit, slickensided fracture at top of unit, gradational basal contact.



770.340-771.720: SANDSTONE 60%: grey, very fine grained to fine grained, sub rounded sub spherical, moderate sorting, quartz lithic. SILTSTONE 40%: dark grey, thinly interlaminated to thinly interbedded, calcareous cement in sand towards base of unit, common sideritic clasts throughout, common carbonaceous wisps with disturbed bedding.

771.720-772.850: SANDSTONE 90%: light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 10%: dark grey, thinly interlaminated, abundant carbonaceous laminae throughout, minor siltstone clasts towards base of unit, rare coal wisp.

772.850-773.250: SANDSTONE 90%: light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 10%: dark grey, thinly interlaminated, abundant carbonaceous laminae throughout, abundant coal lenses towards base of unit, erosional basal contact.

773.250-775.710: SILTSTONE 70%: dark grey. SANDSTONE 30%: grey, very fine to fine grained, quartz lithic, sub rounded sub spherical, moderate sorting, thinly interlaminated to intermixed with angled bedding, carbonaceous laminae and wisps throughout, with minor mudstone laminae and minor sideritic nodules at base of unit.

775.710-775.950: MUDSTONE 50%: brown. SILTSTONE 50%: grey, mottled intermixed unit, with very coarse grained sized coal fragments , slickensided fracture at 0.20m from top of unit, faulted basal contact.

775.950-776.200: SILTSTONE: grey, thinly laminated, minor carbonaceous wisps throughout, complex fractures throughout unit, faulted basal contact.

776.200-776.460: MUDSTONE: brown, common coal fragments at base, carbonaceous wisps throughout, faulted basal contact.

776.460-776.700: SILTSTONE: grey, minor sand beds, friable band at 0.10m from top of unit, minor carbonaceous wisps and disturbed bedding, complex slickensided fractures at base of unit, faulted basal contact.

776.700-777.040: SANDSTONE 50%: light grey, fine to medium grained, sub rounded sub spherical, moderate sorting. SILTSTONE 50%: grey, intermixed with disturbed bedding at base, sharp basal contact.

777.040-777.700: SANDSTONE 75%: light grey, fine to medium grained, sub rounded sub spherical, moderate sorting. SILTSTONE 25%: grey, thinly interlaminated to thinly interbedded, gradational basal contact.

777.700-777.810: MUDSTONE: dark grey, minor coaly laminae, complex slickensided fractures throughout, gradational basal contact.

777.810-778.150: CARBONACEOUS MUDSTONE: dark brown, tuffaceous in part, coaly lenses abundant in bottom 0.20m, sharp basal contact.

778.150-778.820: SANDSTONE 70%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 30%: dark grey, silty at top, sandy at base, with interbedding in middle of unit, minor cross bedding in part.

778.820-779.240: SANDSTONE 70%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 30%: dark grey, silty at top, sandy at base, with interbedding in middle of unit, minor cross bedding in part.

779.240-780.640: SANDSTONE: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted, common carbonaceous laminae at top and base of unit, large siltstone clasts throughout middle of unit.

780.640-780.820: COAL Dull: face cleat, average spacing 30mm, penetrating 100% of unit, 10% carbonate filled, dips 90 degrees, no visible butt cleat.

780.820-782.060: SILTSTONE 70%: dark grey. SANDSTONE 30%: light grey, fine grained, sub rounded sub spherical, moderate sorting, thinly interlaminated to thinly interbedded, carbonaceous wisps at of unit, carbonaceous laminae in upper half of unit, silty in lower half of unit, sharp basal contact.

782.060-782.250: COAL Dull: tending to stony coal in part, no visible cleat or fractures.

782.250-782.590: CARBONACEOUS MUDSTONE: dark brown, bright lenses rare, tuffaceous in part occasionally, coaly in part occasionally, 1 fracture, open, coarse 80 degree fracture at 0.75m from top.

782.590-782.730: COAL Stony: no visible cleat or fractures.

782.730-782.860: COAL Dull: no visible cleat or fractures.

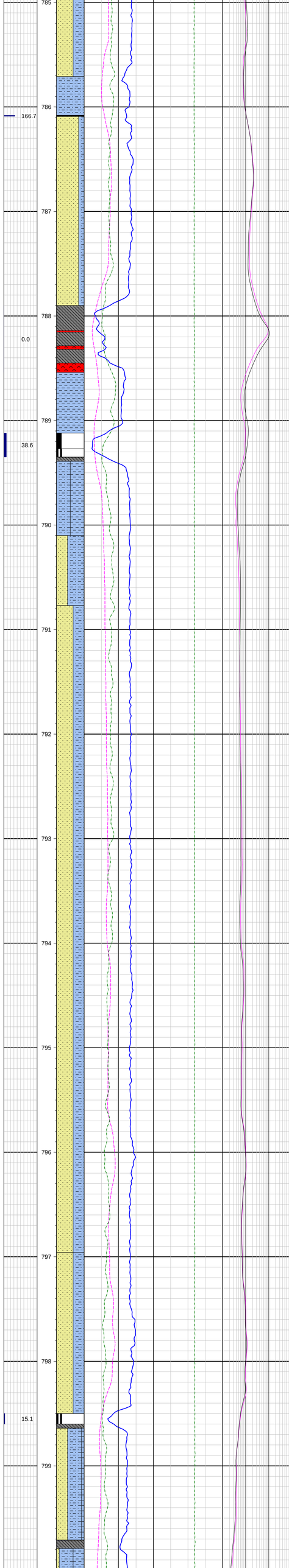
782.860-784.160: SANDSTONE 60%: light grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 40%: dark grey, thinly interlaminated to thinly interbedded common carbonaceous wisps throughout top half of unit, gradational basal contact.

784.160-784.220: CARBONACEOUS MUDSTONE: dark grey, coaly fragments throughout.

784.220-784.370: MUDSTONE: dark brown to brown, tending carbonaceous mudstone at top of unit, gradational basal contact.

784.370-784.830: SILTSTONE 40%: grey brown. SANDSTONE 60%: grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, silty at top of unit, sandy at base of unit, intermixed in middle of unit.

784.830-785.710: SANDSTONE 60%: light grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 40%: dark grey, thinly interlaminated to thinly interbedded, minor cross bedding in part, common carbonaceous laminae throughout.



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785.710-786.080: SILTSTONE: dark grey, coal laminae at top of unit and common towards base of unit, becomes sandy at base of unit, complex fractures around coaly laminae at the top of the unit, slickensided fracture 0.14m from top of unit.

786.080-786.090: COAL Bright: face cleat, average spacing 10mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 15mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

786.090-787.900: SANDSTONE 80%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 20%: grey, sandstone with minor siltstone laminae and beds throughout, abundant carbonaceous laminae at base of unit, .

787.900-788.140: CARBONACEOUS MUDSTONE: dark brown, coaly lenses common, 1 fracture, sharp basal contact.

788.140-788.155: TUFF: brown, sandy, sharp basal contact.

788.155-788.285: CARBONACEOUS MUDSTONE: dark brown, tuffaceous in part, 1 fracture, sharp basal contact.

788.285-788.320: TUFF: brown, coaly wisps occasional, sharp basal contact.

788.320-788.450: CARBONACEOUS MUDSTONE: dark brown, tuffaceous in part, 1 fracture, gradational basal contact.

788.450-788.540: TUFF: light brown, sandy, coaly root structure occasional.

788.540-789.120: MUDSTONE: brown, coal wisps and minor sideritic nodules.

789.120-789.270: COAL Dull minor bright: face cleat, average spacing 25mm, penetrating 100% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 40% of unit, 15% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.

789.270-789.350: COAL Dull: face cleat, average spacing 30mm, penetrating 100% of unit, 20% carbonate filled, dips 90 degrees, no visible butt cleat.

789.350-789.390: CARBONACEOUS MUDSTONE: dark brown, coal laminae and lenses throughout.

789.390-790.100: MUDSTONE 50%: brown. SILTSTONE 50%: grey, carbonaceous wisps abundant at top of unit rare towards base, mudstone at top of unit, siltstone at base of unit, gradational basal contact.

790.100-790.770: SILTSTONE 60%: dark grey. SANDSTONE 40%: light grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting, thinly interlaminated minor cross bedding with carbonaceous laminae throughout.

790.770-796.960: SANDSTONE 60%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 40%: grey, thinly interlaminated to thinly interbedded, minor mudstone laminae at top of unit, with carbonaceous laminae becoming common towards base of unit.

796.960-798.500: SANDSTONE 60%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 40%: dark grey, thinly interlaminated, minor mudstone laminae, high angled bedding, abundant carbonaceous laminae throughout,, healed fault at 1.67m from top of unit, sharp angled basal contact.

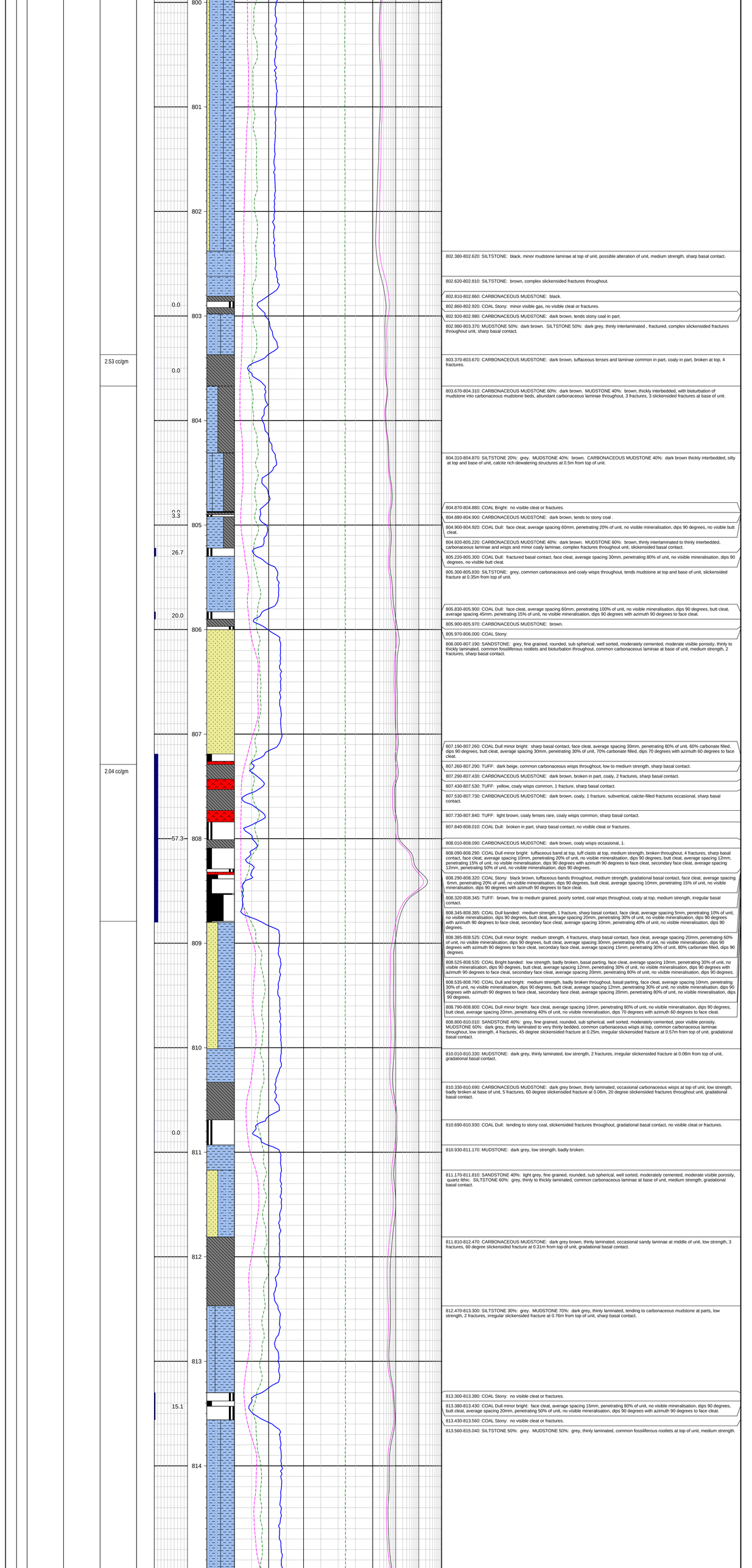
798.500-798.600: COAL Dull: gradational basal contact, face cleat, average spacing 45mm, penetrating 80% of unit, 15% carbonate filled, dips 90 degrees, no visible butt cleat.

798.600-798.640: CARBONACEOUS MUDSTONE: brown, abundant carbonaceous laminae at top of unit.

798.640-799.710: SANDSTONE 40%: light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. SILTSTONE 50%: dark grey. MUDSTONE 10%: dark brown thinly interlaminated, minor carbonaceous laminae, minor disturbed bedding in part,, healed micro faults visible throughout, slickensided fractures at 0.20m, 0.35m and 1.00m from top of unit.

799.710-799.790: CARBONACEOUS MUDSTONE: dark brown, coaly fragments and laminae throughout.

799.790-802.380: MUDSTONE 40%: light brown. SILTSTONE 50%: light brown grey. SANDSTONE 10%: grey, fine grained, lithic minor carbonaceous laminae and wisps throughout, very pale when dry, possible alteration of formation, very high strength, gradational basal contact.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0.0
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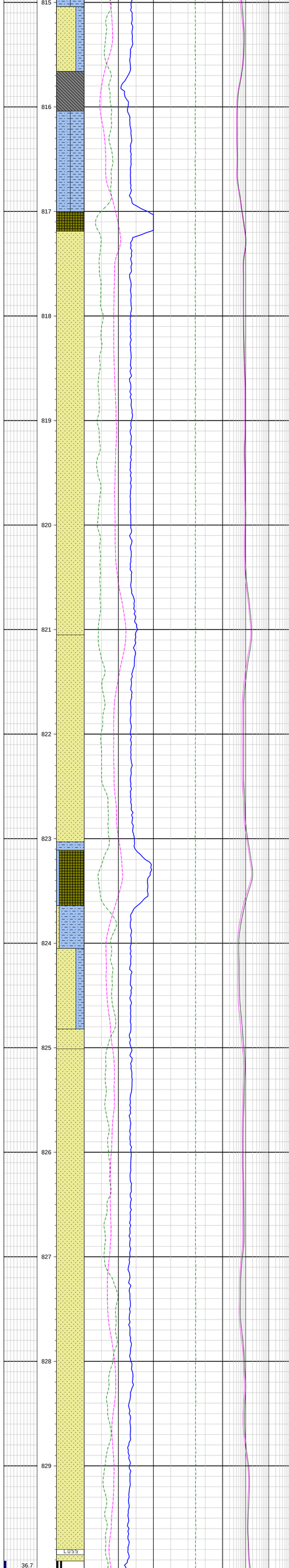
2.04 cc/gm
802.380-802.620: SILTSTONE: black, minor mudstone laminae at top of unit, possible alteration of unit, medium strength, sharp basal contact.
802.620-802.810: SILTSTONE: brown, complex slickensided fractures throughout.
802.810-802.860: CARBONACEOUS MUDSTONE: black.
802.860-802.920: COAL Stony: minor visible gas, no visible cleat or fractures.
802.920-802.980: CARBONACEOUS MUDSTONE: dark brown, tends stony coal in part.
802.980-803.370: MUDSTONE 50%: dark brown. SILTSTONE 50%: dark grey, thinly interlaminated , fractured, complex slickensided fractures throughout unit, sharp basal contact.
803.370-803.670: CARBONACEOUS MUDSTONE: dark brown, tuffaceous lenses and laminae common in part, coaly in part, broken at top, 4 fractures.
803.670-804.310: CARBONACEOUS MUDSTONE 60%: dark brown. MUDSTONE 40%: brown, thickly interbedded, with bioturbation of mudstone into carbonaceous mudstone beds, abundant carbonaceous laminae throughout, 3 fractures, 3 slickensided fractures at base of unit.
804.310-804.870: SILTSTONE 20%: grey. MUDSTONE 40%: brown. CARBONACEOUS MUDSTONE 40%: dark brown thickly interbedded, silty at top and base of unit, calcite rich dewatering structures at 0.5m from top of unit.
804.870-804.880: COAL Bright: no visible cleat or fractures.
804.880-804.900: CARBONACEOUS MUDSTONE: dark brown, tends to stony coal .
804.900-804.920: COAL Dull: face cleat, average spacing 60mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.
804.920-805.220: CARBONACEOUS MUDSTONE 40%: dark brown. MUDSTONE 60%: brown, thinly interlaminated to thinly interbedded, carbonaceous laminae and wisps and minor coaly laminae, complex fractures throughout unit, slickensided basal contact.
805.220-805.300: COAL Dull: fractured basal contact, face cleat, average spacing 30mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.
805.300-805.830: SILTSTONE: grey, common carbonaceous and coaly wisps throughout, tends mudstone at top and base of unit, slickensided fracture at 0.35m from top of unit.
805.830-805.900: COAL Dull: face cleat, average spacing 60mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 45mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.
805.900-805.970: CARBONACEOUS MUDSTONE: brown.
805.970-806.000: COAL Stony:
806.000-807.190: SANDSTONE: grey, fine grained, rounded, sub spherical, well sorted, moderately cemented, moderate visible porosity, thinly to thickly laminated, common fossiliferous rootlets and bioturbation throughout, common carbonaceous laminae at base of unit, medium strength, 2 fractures, sharp basal contact.
807.190-807.260: COAL Dull minor bright: sharp basal contact, face cleat, average spacing 30mm, penetrating 80% of unit, 60% carbonate filled, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 30% of unit, 70% carbonate filled, dips 70 degrees with azimuth 60 degrees to face cleat.
807.260-807.290: TUFF: dark beige, common carbonaceous wisps throughout, low to medium strength, sharp basal contact.
807.290-807.430: CARBONACEOUS MUDSTONE: dark brown, broken in part, coaly, 2 fractures, sharp basal contact.
807.430-807.530: TUFF: yellow, coaly wisps common, 1 fracture, sharp basal contact.
807.530-807.730: CARBONACEOUS MUDSTONE: dark brown, coaly, 1 fracture, subvertical, calcite-filled fractures occasional, sharp basal contact.
807.730-807.840: TUFF: light brown, coaly lenses rare, coaly wisps common, sharp basal contact.
807.840-808.010: COAL Dull: broken in part, sharp basal contact, no visible cleat or fractures.
808.010-808.090: CARBONACEOUS MUDSTONE: dark brown, coaly wisps occasional, 1.
808.090-808.290: COAL Dull minor bright: tuffaceous band at top, tuff clasts at top, medium strength, broken throughout, 4 fractures, sharp basal contact, face cleat, average spacing 10mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 12mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees.
808.290-808.320: COAL Stony: black brown, tuffaceous bands throughout, medium strength, gradational basal contact, face cleat, average spacing 6mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.
808.320-808.345: TUFF: brown, fine to medium grained, poorly sorted, coal wisps throughout, coaly at top, medium strength, irregular basal contact.
808.345-808.385: COAL Dull banded: medium strength, 1 fracture, sharp basal contact, face cleat, average spacing 5mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 10mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees.
808.385-808.525: COAL Dull minor bright: medium strength, 4 fractures, sharp basal contact, face cleat, average spacing 20mm, penetrating 60% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 15mm, penetrating 30% of unit, 80% carbonate filled, dips 90 degrees.
808.525-808.535: COAL Bright banded: low strength, badly broken, basal parting, face cleat, average spacing 10mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 20mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees.
808.535-808.790: COAL Dull and bright: medium strength, badly broken throughout, basal parting, face cleat, average spacing 10mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 20mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees.
808.790-808.800: COAL Dull minor bright: face cleat, average spacing 10mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 40% of unit, no visible mineralisation, dips 70 degrees with azimuth 60 degrees to face cleat.
808.800-810.010: SANDSTONE 40%: grey, fine grained, rounded, sub spherical, well sorted, moderately cemented, poor visible porosity. MUDSTONE 60%: dark grey, thinly laminated to very thinly bedded, common carbonaceous wisps at top, common carbonaceous laminae throughout, low strength, 4 fractures, 45 degree slickensided fracture at 0.25m, irregular slickensided fracture at 0.57m from top of unit, gradational basal contact.
810.010-810.330: MUDSTONE: dark grey, thinly laminated, low strength, 2 fractures, irregular slickensided fracture at 0.08m from top of unit, gradational basal contact.
810.330-810.690: CARBONACEOUS MUDSTONE: dark grey brown, thinly laminated, occasional carbonaceous wisps at top of unit, low strength, badly broken at base of unit, 5 fractures, 60 degree slickensided fracture at 0.06m, 20 degree slickensided fractures throughout unit, gradational basal contact.
810.690-810.930: COAL Dull: tending to stony coal, slickensided fractures throughout, gradational basal contact, no visible cleat or fractures.
810.930-811.170: MUDSTONE: dark grey, low strength, badly broken.
811.170-811.810: SANDSTONE 40%: light grey, fine grained, rounded, sub spherical, well sorted, moderately cemented, moderate visible porosity, quartz lithic. SILTSTONE 60%: grey, thinly to thickly laminated, common carbonaceous laminae at base of unit, medium strength, gradational basal contact.
811.810-812.470: CARBONACEOUS MUDSTONE: dark grey brown, thinly laminated, occasional sandy laminae at middle of unit, low strength, 3 fractures, 60 degree slickensided fracture at 0.31m from top of unit, gradational basal contact.
812.470-813.300: SILTSTONE 30%: grey. MUDSTONE 70%: dark grey, thinly laminated, tending to carbonaceous mudstone at parts, low strength, 2 fractures, irregular slickensided fracture at 0.76m from top of unit, sharp basal contact.
813.300-813.380: COAL Stony: no visible cleat or fractures.
813.380-813.430: COAL Dull minor bright: face cleat, average spacing 15mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.
813.430-813.560: COAL Stony: no visible cleat or fractures.
813.560-815.040: SILTSTONE 50%: grey. MUDSTONE 50%: grey, thinly laminated, common fossiliferous rootlets at top of unit, medium strength.



Eurombah Formation

815.040-815.660: SANDSTONE 70%: light grey, fine grained, sub rounded, sub spherical, well sorted, moderately cemented, calcite cement at parts, poor to moderate visible porosity. SILTSTONE 30%: grey, thinly to thickly laminated, 0.015m coal lens near base of unit, medium strength, gradational basal contact.

815.660-816.040: CARBONACEOUS MUDSTONE: dark grey brown, thinly to thickly laminated, 0.01m coal lens near top, common carbonaceous wisps throughout unit, low strength, 2 fractures, irregular slickensided fracture at 0.30m from top of unit, gradational basal contact.

816.040-817.000: SILTSTONE 50%: grey. MUDSTONE 50%: grey, thinly laminated, medium strength, gradational basal contact.

817.000-817.190: SIDERITE: beige, high strength, gradational basal contact.

817.190-821.050: SANDSTONE: light grey, medium grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, thinly laminated to medium bedded, occasional siltstone clasts near top, common carbonaceous laminae and carbonaceous wisps in localised areas near bottom of unit, medium to high strength, 1 fracture.

821.050-823.030: SANDSTONE: light grey, medium grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, common carbonaceous laminae at middle, occasional sideritic alteration at middle, medium to high strength, gradational basal contact.

823.030-823.110: SILTSTONE: grey, thinly laminated, common carbonaceous wisps throughout, occasional claystone clasts at base of unit, low strength, sharp basal contact.

823.110-823.640: SILTSTONE 10%: grey. SIDERITE 90%: beige white, significant sideritic alteration throughout unit, abundant coal lenses and carbonaceous wisps throughout unit, high strength, sharp basal contact.

823.640-824.050: SANDSTONE 10%: grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 90%: dark grey, thinly to thickly laminated, rare convolute laminae at middle of unit, medium strength.

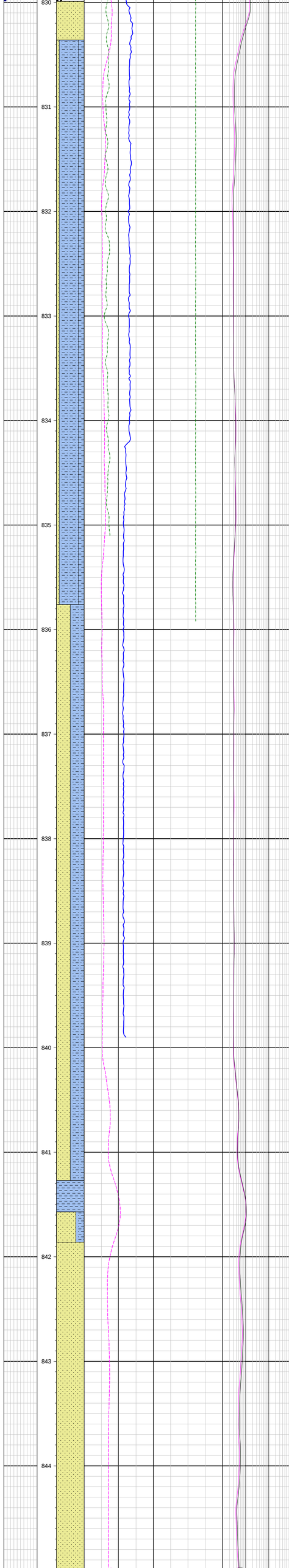
824.050-824.820: SANDSTONE 70%: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 30%: grey, thinly to thickly laminated, rare bioturbation at top, occasional dewatering structures at base, medium strength, gradational basal contact.

824.820-825.010: SANDSTONE: light grey, very coarse grained, angular, sub elongate, poorly sorted, well cemented, poor visible porosity, abundant silt drop stones throughout, common carbonaceous wisps throughout unit, high strength, gradational basal contact.

825.010-829.800: SANDSTONE: light grey, fine to medium grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, abundant silt clasts, coal fragments and carbonaceous laminae in localised areas throughout unit, medium to high strength, 1 fracture.

829.800-829.850: CORE LOSS:

829.850-829.910: SANDSTONE: light grey, medium to coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, medium strength, 45 degree sharp basal contact.



829.910-829.990: COAL Dull: carbonaceous mudstone laminae at middle of unit, face cleat, average spacing 10mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.

829.990-830.360: SANDSTONE: light grey, medium to very coarse grained, quartz lithic, poorly sorted, well cemented, poor visible porosity, rare coal lens at top of unit, high strength, sharp basal contact.

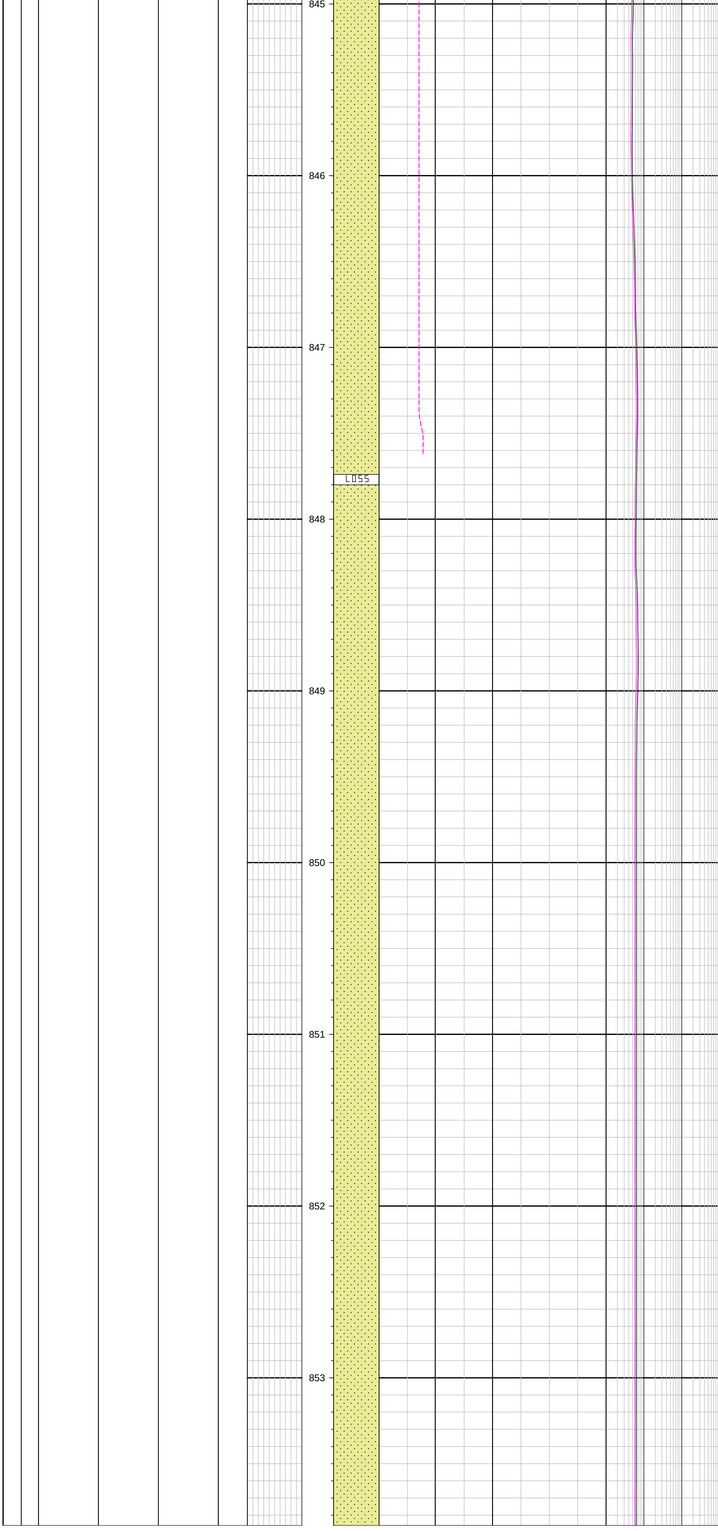
830.360-835.760: SANDSTONE 10%: light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity. SILTSTONE 70%: grey. MUDSTONE 20%: grey thinly laminated to medium bedded, rare bioturbation at top, occasional carbonaceous wisps throughout unit, tending to carbonaceous mudstone at base of unit, low to medium strength, 3 fractures.

835.760-841.270: SANDSTONE 50%: light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 50%: dark grey, thinly interlaminated to thickly interbedded, silty at top of unit, minor carbonaceous wisps at top of unit, rare coal laminae at 4.89m from top of unit, medium strength, slickensided fractures at top and middle of unit within siltstone, gradational basal contact.

841.270-841.570: MUDSTONE: brown, medium strength.

841.570-841.860: SANDSTONE 70%: light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted. SILTSTONE 30%: dark grey, thinly interlaminated to thickly interbedded, minor carbonaceous wisps, sandy at base.

841.860-847.740: SANDSTONE: light grey, medium to coarse grained, quartz lithic, sub rounded sub spherical, moderate sorting, minor siltstone laminae at top of unit, abundant coal fragments and laminae at top of unit with coarser sand, silt laminae common in middle of unit between, medium strength, fractured in middle of unit.



847.740-847.800: CORE LOSS:

847.800-853.860: SANDSTONE: light grey, medium to very coarse grained, quartz lithic, sub rounded sub spherical, moderate sorting, minor carbonaceous laminae in top half of unit with coal laminae, last 1.0m of core is very coarse grained sand.

EARTH DATA

Murdoch 1

Log prepared by Earth Data Pty Ltd
www.earth-data.com.au

Log Format Wide Format CBM Log 20 Scale.ldf

APPENDIX 4

FORMATION TESTING REPORTS

DST Field Report

Date Issued: 21 Apr 2013

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Well Information

Test Number:	1	**Well Name:**	Murdoch 1	**Formation:**	Taroom
Date:	18 Apr 2013	**Customer:**	QGC	**Test Interval:**	804.00mRT-812.01mRT
Job Number:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit / Lease:**	ATP 965P	**Interval Length:**	8.01m
km's to Rig:	400	**State:**	Qld	**Zero Reference:**	RT
Company Man:	Graham Cole	**Test Result:**	Successful	**Test Supervisor:**	Jacob Wells
				Test Supervisor:	Craig Brown
		Tool String:	SI-3	**RT Supervisor:**	Leight Sparks
Mobilised by:	Graham Cole			**RT Supervisor:**	Gustavo Fernandez

			OD	ID
Main Hole Size:				
Hole Size at Top Packer:		DP / Rods / Tubing:	2.375"	1.995"
Hole Size at Bottom Packer:				
Element Size:	3.5"			
Mud Weight:	8.7ppg	Mud Type:		
Caliper Log Run:		DST Tool Wt:	klbs	
Caliper Type:		Total String Wt:	klbs	
General Hole Condition:		Prior Rig Operations:	Logging	

Drill Stem Test Information

Serial Number:	1292	Gauge not RIH	1248/1198	
Pressure Rating:	6000psi		6000/6000psi	
Battery Serial No.:	389	-	392/349	
Position:	Fluid Recorder	WLRT Recorder	Outside Recorder	
Depth:	799.01mRT	Gauge not RIH	804.52mRT	
Initial Hydrostatic:	443.8 psig		1199 psig	
Start of Pre Flow:			458.2 psig	
End of Pre Flow:			461.4 psig	
Initial Shut-in:	456.7 psig		1194.6 psig	
Start of Main Flow:			466.5 psig	
End of Main Flow:			467.4 psig	
Final Shut-in:	462.5 psig		1186.2 psig	
Final Hydrostatic:	506 psig		1198.9 psig	
Maximum Temp. during Test:	43.4 °C		44.6 °C	

	Start	Finish		Duration		Weight to function tool
Pre Flow :	22:32	22:42	hrs	10	mins	klbs
Initial Shut In:	22:42	0:44	hrs	122	mins	
Main Flow:	0:44	1:14	hrs	30	mins	klbs
Final Shut In:	1:14	3:54	hrs	160	mins	

Pre-Flow Description

Very weak blow for 5 seconds then dying for the rest of the Pre-Flow

Main Flow Description

Very weak blow for 5 seconds then dying for the rest of the Main Flow

Total Fluid Recovered: 8m plus 312m drilling mud cushion.

calculated from: ☑ Fluid Recorder ☐ Outside Recorder ☐ Actual (Pulled to Fluid) ☐ Pump Strokes

Formation Fluid Consisted of:

DST Field Report

Date Issued: 21 Apr 2013

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Drill Stem Test Information

☑ Drop Bar Released	☐ Impact Type Circ. Sub Activated	☐ Well Circulated before deflating	☐ Hollow Shear Pin Recovered	☐ Closed Chamber
☐ Drop Ball Released	☐ Sleeve Type Circ. Sub Activated	☐ Well Circulated after deflating	☐ Pulled to Fluid then Circulated	☐ EMRT Run

Top Packer Re-use / Condition: Yes - Good
Bottom Packer Re-use / Condition: Yes - Good

Comments

Sequence of Events

17 Apr 2013	08:30 hrs	Test crew depart base / previous well.	17 Apr 2013	13:30 hrs	Test crew arrive at rig / camp.
	13:30 hrs	Arrive at rig and await DST		18:45 hrs	Decision made by QGC representive to RIH
	20:55 hrs	Logging tools at surface await Intervals		20:47 hrs	Tools on test depth
	22:02 hrs	PT against rig KV to ensure rig lines are holding		20:55 hrs	M/U surface equipment
	22:12 hrs	Start memory gauges		21:00 hrs	PJSM
	22:25 hrs	PJSM - M/U tools		21:07 hrs	Apply pressure from nitrogen pack to inflate packers
	22:30 hrs	Commence M/U of tools		21:10 hrs	Stroke tool down: move DHV to circulating position
	23:18 hrs	PT tools at surface		21:11 hrs	Commence displacement with nitrogen
	23:19 hrs	XO leaking Bleed off		22:20 hrs	Complete cushion setting - pumped to 690psi
	11:26 hrs	PT tools at surface		22:21 hrs	Stroke tool down: move DHV to shut in position
	11:32 hrs	PT sucessful RIH		22:22 hrs	Bleed off air / nitrogen from string through choke
18 Apr 2013	06:25 hrs	Tools on test depth		22:32 hrs	Stroke tool down: DHV open - start pre-flow
	06:40 hrs	M/U surface equipment		22:42 hrs	Stroke tool up: DHV closed - end pre-flow
	07:15 hrs	Shut bottom KV and PT surface lines	19 Apr 2013	00:44 hrs	Stroke tool down: DHV open - start main flow
	07:28 hrs	PJSM Conduct DST		01:14 hrs	Stroke tool up: DHV closed - end main flow
	07:40 hrs	Apply pressure from nitrogen pack to inflate packers		03:54 hrs	Stroke tool up: DHV moved to deflate position
	07:41 hrs	Instant returns		04:00 hrs	POOH to DST 2 test depth
	07:45 hrs	Stroke tool down and back up to ensure stage tool is in inflate position, and repeat			
	08:10 hrs	RIH 1 x 6m rod to POOH to try move stage tool to inflate position			
	08:20 hrs	Decision made to POOH and PT every 5 joints for the first 15 joints, to see if tool moved to inflate position			
	10:30 hrs	POOH			
	11:00 hrs	Pulled out of hole 39 joints when a pipe is found with a hole in it, suspected to be the problem			
	11:05 hrs	Check logs for PT			
	11:08 hrs	M/U DST head			
	11:13 hrs	PT, Still leaking			
	11:28 hrs	Continue POOH			
	12:35 hrs	Attempt to PT again, Failed Continue POOH			
	14:47 hrs	Tools at surface			
	15:04 hrs	Stage tool is seen to be in the right position			
	15:05 hrs	PT tools with 1 x 6m rod			
	15:12 hrs	PT Good			
	15:22 hrs	Decision made to RIH to 500m to PT in casing			
	18:24 hrs	Tools on PT depth			
	18:25 hrs	M/U DST head			
	18:30 hrs	PT			
	18:40 hrs	PT sucessful, small returns from leaking pipe			

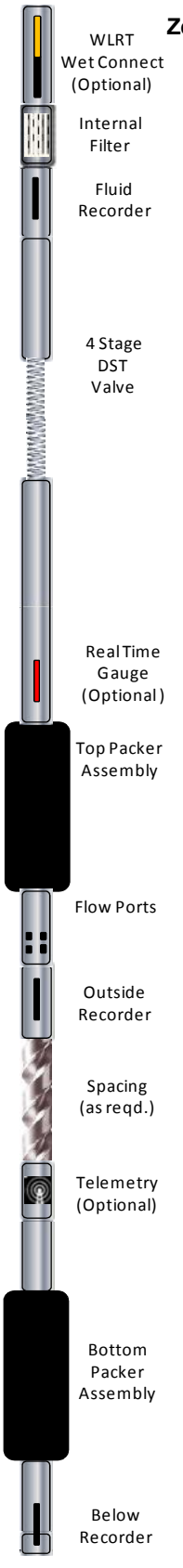
Test Tool Tally

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Australian - Accredited - Committed

Test No:	1	**Well Name:**	Murdoch 1	**Formation:**	Taroom
Date:	18 Apr 2013	**Customer:**	QGC	**Test Interval:**	804.00mRT-812.01mRT
Job No:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit:**	ATP 965P	**Interval Length:**	8.01m
Ground Level:		**Cushion Type:**	drilling mud	**Test Supervisor:**	Jacob Wells
RT Level:	0.7m	**Cushion Wt:**	8.7ppg	**Company Man:**	Graham Cole
Zero Reference:	RT	**Cushion Amount:**	312m		



Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Tubing	1	1.995	2.375	6.02	-1.03	0.00387	0.1
Pup Joint	2 x 2.2m	1.995	2.375	4.40	4.99	0.00387	0.1
Tubing	131	1.995	2.375	787.62	9.39	0.00387	10.0
Hollow Pin Circ. Sub				0.50	797.01	**Total:**	**10.1bbls**
Internal Filter Carrier				1.50	797.51		
Fluid Recorder - # 1292				0.60	799.01		
Stage Tool				3.17	799.61		
Top Packer (Element Serial #: IPI-35-24)				1.22	802.78		
PACKER SEAL DEPTH					**804.00 mRT**		
Stick Down (with Flow Ports)				0.52	804.00		
Outside Recorder - # 1248/1198				0.30	804.52		
Spacing				1.00	804.82		
Telemetry Tool				5.84	805.82		
Stick Up				0.35	811.66		
PACKER SEAL DEPTH					**812.01 mRT**		
Bottom Packer (Element Serial #: IPI-35-36)				1.37	812.01		
Bottom of Tool String (with Below Recorder - # 1122)					813.38		

**Please note that depths listed are to top of tool **

PIPE TALLY	
Interval	8.01
Test Tools above Interval	6.99
Drill Stem above Interval	798.04
Drill Stem in Interval	0.00
Test Tools in Interval	8.01
Stick up	**-1.03** m

TESTING NOTES:

RIH total 132 x 6m rods, 2 x 2.2m pup joints.
10 x 6m left at surface.

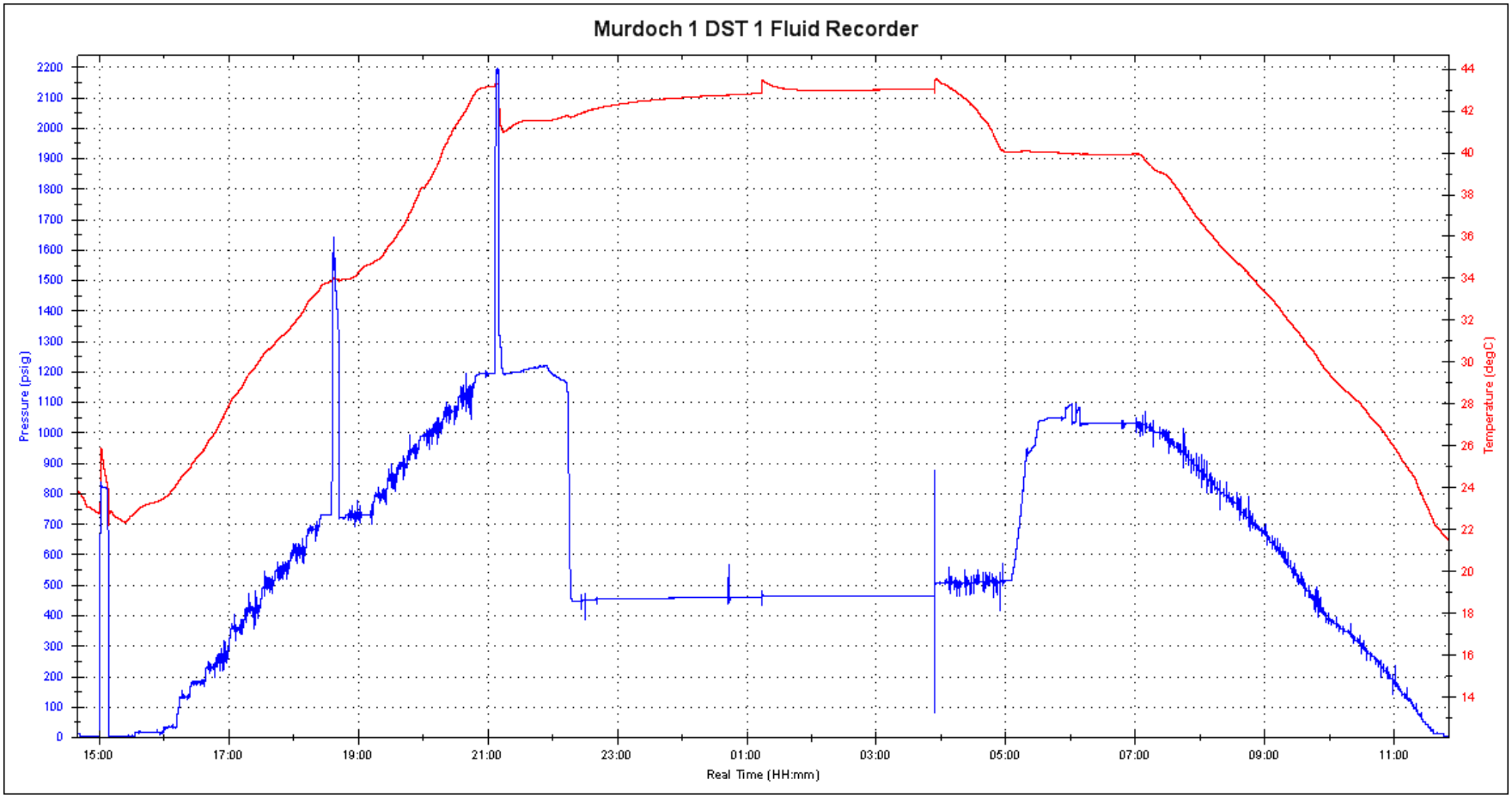
ONSITE TUBULAR COUNT COMPLETED BY:
Wellsy/Holbie
142 DP on rack

COMPANY REPRESENTATIVE:

Indicative Tool Schematic Only

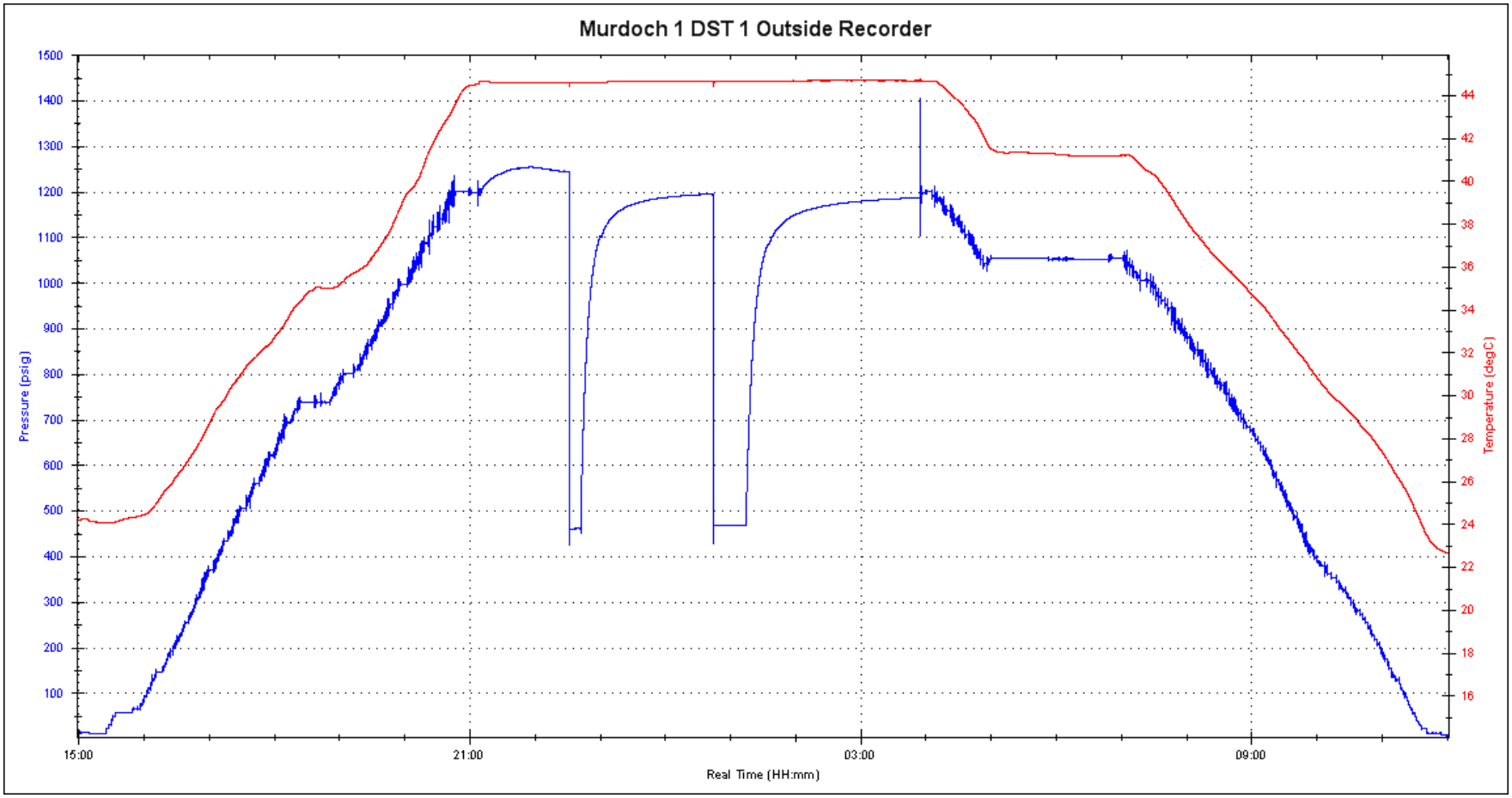
DataCan

Test Date:	04/18/2013 - 04/19/2013	**Serial Number:**	P1292
Max Pressure:	2196.369 psig	**Max Temperature:**	43.523 degC



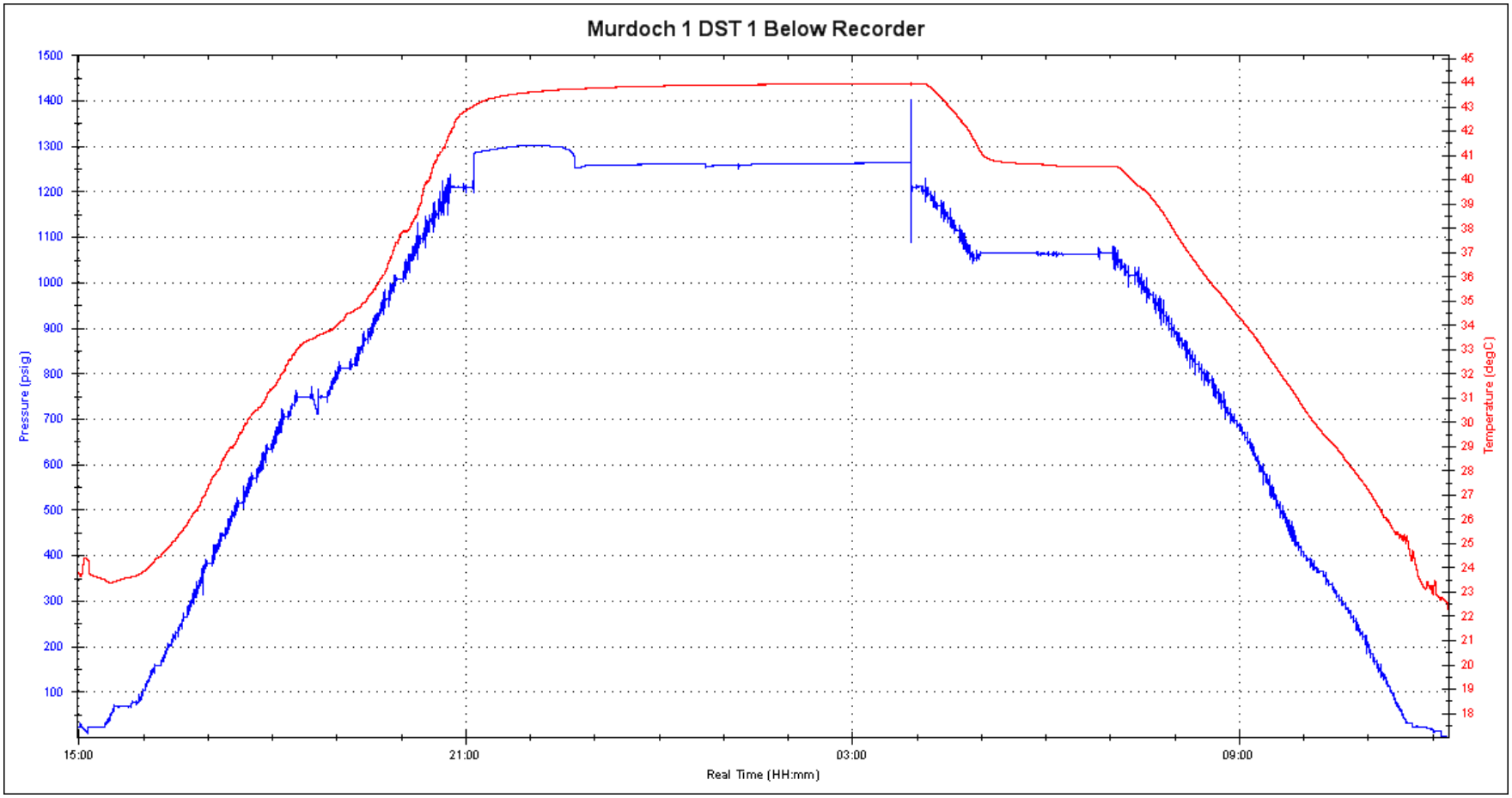
DataCan

Test Date:	04/18/2013 - 04/19/2013	**Serial Number:**	P1198
Max Pressure:	1405.433 psig	**Max Temperature:**	44.750 degC



DataCan

Test Date:	04/18/2013 - 04/20/2013	**Serial Number:**	P1122
Max Pressure:	1401.440 psig	**Max Temperature:**	43.983 degC



DST Field Report

Date Issued: 21 Apr 2013

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Well Information

Test Number:	2	**Well Name:**	Murdoch 1	**Formation:**	Lwr Juandah
Date:	19 Apr 2013	**Customer:**	QGC	**Test Interval:**	705.00mRT-713.01mRT
Job Number:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit / Lease:**	ATP 965P	**Interval Length:**	8.01m
km's to Rig:	400	**State:**	Qld	**Zero Reference:**	RT
Company Man:	Graham Cole	**Test Result:**	Unsuccessful	**Test Supervisor:**	Jacob Wells
		Reason:	Tools plugged RIH	**Test Supervisor:**	Craig Brown
		Tool String:	SI-3	**RT Supervisor:**	Leight Sparks
Mobilised by:	Graham Cole			**RT Supervisor:**	Gustavo Fernandez

			OD	ID
Main Hole Size:				
Hole Size at Top Packer:		DP / Rods / Tubing:	2.375"	1.995"
Hole Size at Bottom Packer:				
Element Size:	3.5"			
Mud Weight:	8.7ppg	Mud Type:	KCL	
Caliper Log Run:		DST Tool Wt:	klbs	
Caliper Type:		Total String Wt:	klbs	
General Hole Condition:		Prior Rig Operations:	DST	

Drill Stem Test Information

Serial Number:	1292	Gauge not RIH	1248/1198	
Pressure Rating:	6000psi		6000/6000psi	
Battery Serial No.:	389	-	392/349	
Position:	Fluid Recorder	WLRT Recorder	Outside Recorder	
Depth:	700.01mRT	Gauge not RIH	705.52mRT	
Initial Hydrostatic:	psig		psig	
Start of Pre Flow:			psig	
End of Pre Flow:			psig	
Initial Shut-in:	psig		psig	
Start of Main Flow:			psig	
End of Main Flow:			psig	
Final Shut-in:	psig		psig	
Final Hydrostatic:	psig		psig	
Maximum Temp. during Test:	°C		°C	

	Start	Finish	Duration	Weight to function tool
Pre Flow :		hrs	mins	klbs
Initial Shut In:		hrs	mins	
Main Flow:		hrs	mins	klbs
Final Shut In:		hrs	mins	

Pre-Flow Description

Main Flow Description

Total Fluid Recovered: plus 300m drilling mud cushion.

calculated from: ☐ Fluid Recorder ☐ Outside Recorder ☐ Actual (Pulled to Fluid) ☐ Pump Strokes

Formation Fluid Consisted of:

DST Field Report

Date Issued: 21 Apr 2013

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Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Drill Stem Test Information

☑ Drop Bar Released	☑ Impact Type Circ. Sub Activated	☑ Well Circulated before deflating	☑ Hollow Shear Pin Recovered	☐ Closed Chamber
☐ Drop Ball Released	☐ Sleeve Type Circ. Sub Activated	☐ Well Circulated after deflating	☐ Pulled to Fluid then Circulated	☐ EMRT Run

Top Packer Re-use / Condition: Yes - Good
Bottom Packer Re-use / Condition: Yes - Good

Comments

Sequence of Events

17 Apr 2013	08:30 hrs	Test crew depart base / previous well.	17 Apr 2013	13:30 hrs	Test crew arrive at rig / camp.
19 Apr 2013	05:50 hrs	Could not inflate after a number of attempts			
	07:00 hrs	B/D test head POOH to surface			
	07:20 hrs	Drop bar for rig crew no fluid was circulated			
	11:40 hrs	Tools at surface			
	11:50 hrs	B/D tools and service			
		Sequence of events continue in test 2 A			

Test Tool Tally

Field Copy

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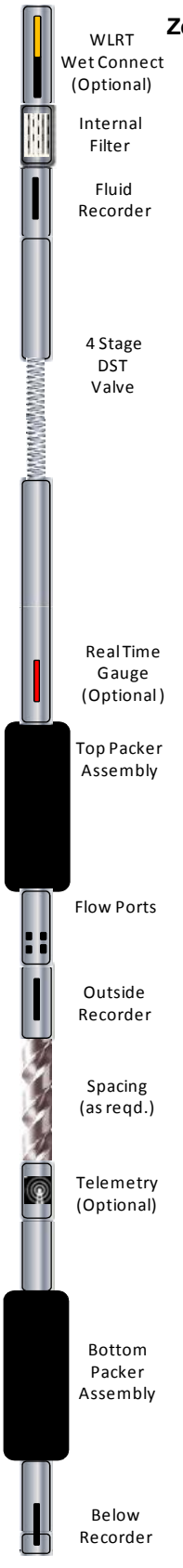
Test No:	2	**Well Name:**	Murdoch 1	**Formation:**	Lwr Juandah
Date:	19 Apr 2013	**Customer:**	QGC	**Test Interval:**	705.00mRT-713.01mRT
Job No:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit:**	ATP 965P	**Interval Length:**	8.01m
Ground Level:		**Cushion Type:**	drilling mud	**Test Supervisor:**	Jacob Wells
RT Level:	0.7m	**Cushion Wt:**	8.7ppg	**Company Man:**	Graham Cole
Zero Reference:	RT	**Cushion Amount:**	300m		



Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Tubing	1 x 6m	1.995	2.375	6.02	-1.50	0.00387	0.1
Pup Joint	1 x 2.2m	1.995	2.375	2.20	4.52	0.00387	0.0
Tubing	115 x 6m	1.995	2.375	691.29	6.72	0.00387	8.8
Hollow Pin Circ. Sub				0.50	698.01	**Total:**	**8.9bbls**
Internal Filter Carrier				1.50	698.51		
Fluid Recorder - # 1292				0.60	700.01		
Stage Tool				3.17	700.61		
Top Packer (Element Serial #: IPI-35-24)				1.22	703.78		
PACKER SEAL DEPTH					**705.00 mRT**		
Stick Down (with Flow Ports)				0.52	705.00		
Outside Recorder - # 1248/1198				0.30	705.52		
Spacing				1.00	705.82		
Telemetry Tool				5.84	706.82		
Stick Up				0.35	712.66		
PACKER SEAL DEPTH					**713.01 mRT**		
Bottom Packer (Element Serial #: IPI-35-36)				1.37	713.01		
Bottom of Tool String (with Below Recorder - # 1122)					714.38		

**Please note that depths listed are to top of tool **

PIPE TALLY	
Interval	8.01
Test Tools above Interval	6.99
Drill Stem above Interval	699.51
Drill Stem in Interval	0.00
Test Tools in Interval	8.01
Stick up	**-1.50 m**

TESTING NOTES:

RIH total 116 x 6m rods, 1 x 2.2m pup joints.
26 x 6m left at surface.

ONSITE TUBULAR COUNT COMPLETED BY:
Wellsy
142 DP on rack

COMPANY REPRESENTATIVE:

Indicative Tool Schematic Only

DST Field Report

Date Issued: 21 Apr 2013

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Well Information

Test Number:	3	**Well Name:**	Murdoch 1	**Formation:**	Lwr Juandah
Date:	19 Apr 2013	**Customer:**	QGC	**Test Interval:**	705.00mRT-713.01mRT
Job Number:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit / Lease:**	ATP 965P	**Interval Length:**	8.01m
km's to Rig:	400	**State:**	Qld	**Zero Reference:**	RT
Company Man:	Graham Cole	**Test Result:**	Unsuccessful	**Test Supervisor:**	Jacob Wells
		Reason:	Tools plugged RIH	**Test Supervisor:**	Craig Brown
		Tool String:	SI-3	**RT Supervisor:**	Leight Sparks
Mobilised by:	Graham Cole			**RT Supervisor:**	Gustavo Fernandez

			OD	ID
Main Hole Size:				
Hole Size at Top Packer:		DP / Rods / Tubing:	2.375"	1.995"
Hole Size at Bottom Packer:				
Element Size:	3.5"			
Mud Weight:	8.7ppg	Mud Type:	KCL	
Caliper Log Run:		DST Tool Wt:	klbs	
Caliper Type:		Total String Wt:	klbs	
General Hole Condition:		Prior Rig Operations:	DST	

Drill Stem Test Information

Serial Number:	1292	Gauge not RIH	1248/1198
Pressure Rating:	6000psi		6000/6000psi
Battery Serial No.:	389	-	392/349
Position:	Fluid Recorder	WLRT Recorder	Outside Recorder
Depth:	700.01mRT	Gauge not RIH	705.52mRT
Initial Hydrostatic:	763.5 psig		1050 psig
Start of Pre Flow:			772.3 psig
End of Pre Flow:			772.5 psig
Initial Shut-in:	777.3 psig		803 psig
Start of Main Flow:			psig
End of Main Flow:			psig
Final Shut-in:	psig		psig
Final Hydrostatic:	779 psig		1043 psig
Maximum Temp. during Test:	39.4 °C		40.97 °C

	Start	Finish		Duration		Weight to function tool
Pre Flow :	19:11	19:21	hrs	10	mins	klbs
Initial Shut In:	19:21	20:10	hrs	49	mins	
Main Flow:			hrs		mins	klbs
Final Shut In:			hrs		mins	

Pre-Flow Description

Main Flow Description

Total Fluid Recovered: plus 300m drilling mud cushion.

calculated from: ☐ Fluid Recorder ☐ Outside Recorder ☐ Actual (Pulled to Fluid) ☐ Pump Strokes

Formation Fluid Consisted of:

DST Field Report

Date Issued: 21 Apr 2013

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Drill Stem Test Information

☑ Drop Bar Released	☑ Impact Type Circ. Sub Activated	☑ Well Circulated before deflating	☑ Hollow Shear Pin Recovered	☐ Closed Chamber
☐ Drop Ball Released	☐ Sleeve Type Circ. Sub Activated	☐ Well Circulated after deflating	☐ Pulled to Fluid then Circulated	☐ EMRT Run

Top Packer Re-use / Condition: Yes - Good
Bottom Packer Re-use / Condition: Yes - Good

Comments

Sequence of Events

17 Apr 2013	08:30	hrs	Test crew depart base / previous well.	17 Apr 2013	13:30 hrs Test crew arrive at rig / camp.
19 Apr 2013	12:45	hrs	Start memory gauges		
	13:00	hrs	Commence M/U of tools		
	13:20	hrs	PT Tools at surface to 1206Psi		
	13:30	hrs	PT good Bleed off at 1201psi		
	13:35	hrs	B/D head RIH to test depth		
	17:15	hrs	Tools on test depth		
	17:20	hrs	M/U head		
	17:24	hrs	Mark out stick up		
	17:30	hrs	PJSM		
	17:42	hrs	Apply pressure from nitrogen pack to inflate packers		
	17:47	hrs	Stroke tool down: move DHV to circulating position		
	17:48	hrs	Commence displacement with nitrogen		
	18:57	hrs	Complete cushion setting - pumped to 562psi		
	18:58	hrs	Stroke tool down: move DHV to shut in position		
	19:11	hrs	Stroke tool down: DHV open - start pre-flow		
	19:21	hrs	Stroke tool up: DHV closed - end pre-flow		
	19:22	hrs	Discuss with QGC representatives under displacement problems		
	20:00	hrs	Decision made to end test and POOH to check tool and run back in hole for DST 3		
	20:10	hrs	Stroke tool up: DHV moved to deflate position		
	20:17	hrs	Drop bar to hollow shear pin		
	20:19	hrs	Allow to U tube to allow crew to POOH dry		
	20:25	hrs	B/D surface equipment		
	20:30	hrs	POOH		
	22:45	hrs	Tools at surface, change Real Time battery and clean screen filter and flush tools		
			Sequence of events continue in test 3		

Test Tool Tally

Field Copy

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76 Spencer St
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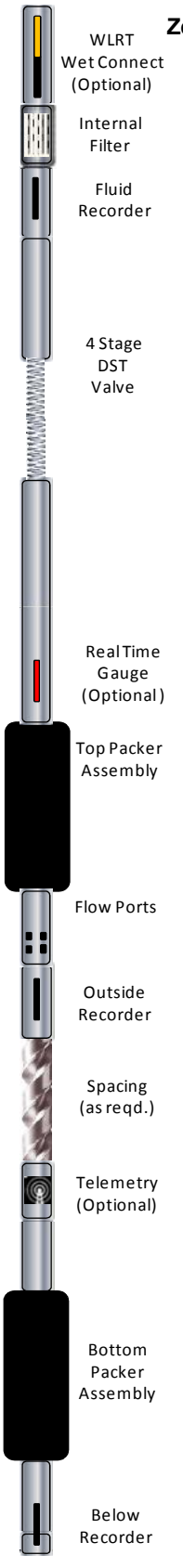
P: (07) 4622 6800
ABN: 22 134 641 240

Australian - Accredited - Committed

Test No:	3	**Well Name:**	Murdoch 1	**Formation:**	Lwr Juandah
Date:	19 Apr 2013	**Customer:**	QGC	**Test Interval:**	705.00mRT-713.01mRT
Job No:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit:**	ATP 965P	**Interval Length:**	8.01m
Ground Level:		**Cushion Type:**	drilling mud	**Test Supervisor:**	Jacob Wells
RT Level:	0.7m	**Cushion Wt:**	8.7ppg	**Company Man:**	Graham Cole
Zero Reference:	RT	**Cushion Amount:**	300m		



Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Tubing	1 x 6m	1.995	2.375	6.02	-1.50	0.00387	0.1
Pup Joint	1 x 2.2m	1.995	2.375	2.20	4.52	0.00387	0.0
Tubing	115 x 6m	1.995	2.375	691.29	6.72	0.00387	8.8
Hollow Pin Circ. Sub				0.50	698.01	**Total:**	**8.9bbls**
Internal Filter Carrier				1.50	698.51		
Fluid Recorder - # 1292				0.60	700.01		
Stage Tool				3.17	700.61		
Top Packer (Element Serial #: IPI-35-24)				1.22	703.78		
PACKER SEAL DEPTH					**705.00 mRT**		
Stick Down (with Flow Ports)				0.52	705.00		
Outside Recorder - # 1248/1198				0.30	705.52		
Spacing				1.00	705.82		
Telemetry Tool				5.84	706.82		
Stick Up				0.35	712.66		
PACKER SEAL DEPTH					**713.01 mRT**		
Bottom Packer (Element Serial #: IPI-35-36)				1.37	713.01		
Bottom of Tool String (with Below Recorder - # 1122)					714.38		

**Please note that depths listed are to top of tool **

PIPE TALLY	
Interval	8.01
Test Tools above Interval	6.99
Drill Stem above Interval	699.51
Drill Stem in Interval	0.00
Test Tools in Interval	8.01
Stick up	**-1.50 m**

TESTING NOTES:

RIH total 116 x 6m rods, 1 x 2.2m pup joints.
26 x 6m left at surface.

ONSITE TUBULAR COUNT COMPLETED BY:
Wellsy
142 DP on rack

COMPANY REPRESENTATIVE:

Indicative Tool Schematic Only

DST Field Report

Date Issued: 21 Apr 2013

Field Copy

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ABN: 22 134 641 240

Well Information

Test Number:	4	**Well Name:**	Murdoch 1	**Formation:**	Upp Juandah
Date:	19 Apr 2013	**Customer:**	QGC	**Test Interval:**	635.00mRT-643.01mRT
Job Number:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit / Lease:**	ATP 965P	**Interval Length:**	8.01m
km's to Rig:	400	**State:**	Qld	**Zero Reference:**	RT
Company Man:	Graham Cole	**Test Result:**	Mechanical Success	**Test Supervisor:**	Jacob Wells
		Reason:	Hole Conditions	**Test Supervisor:**	Craig Brown
		Tool String:	SI-3	**RT Supervisor:**	Leight Sparks
Mobilised by:	Graham Cole			**RT Supervisor:**	Gustavo Fernandez

			OD	ID
Main Hole Size:				
Hole Size at Top Packer:		DP / Rods / Tubing:	2.375"	1.995"
Hole Size at Bottom Packer:				
Element Size:	3.5"			
Mud Weight:	8.7ppg	Mud Type:		
Caliper Log Run:		DST Tool Wt:	klbs	
Caliper Type:		Total String Wt:	klbs	
General Hole Condition:		Prior Rig Operations:	DST	

Drill Stem Test Information

Serial Number:	1292	Gauge not RIH	1248/1198	
Pressure Rating:	6000psi		6000/6000psi	
Battery Serial No.:	389	-	392/349	
Position:	Fluid Recorder	WLRT Recorder	Outside Recorder	
Depth:	630.01mRT	Gauge not RIH	635.52mRT	
Initial Hydrostatic:	641 psig		946 psig	
Start of Pre Flow:			180 psig	
End of Pre Flow:			180.8 psig	
Initial Shut-in:	psig		psig	
Start of Main Flow:			psig	
End of Main Flow:			psig	
Final Shut-in:	psig		psig	
Final Hydrostatic:	psig		951.5 psig	
Maximum Temp. during Test:	36.5 °C		38.6 °C	

	Start	Finish		Duration		Weight to function tool
Pre Flow :	10:30	10:40	hrs	10	mins	klbs
Initial Shut In:	10:40	10:48	hrs	8	mins	
Main Flow:			hrs		mins	klbs
Final Shut In:			hrs		mins	

Pre-Flow Description

Weak flow steady on surface of bucket decresing throughtout flow

Main Flow Description

Total Fluid Recovered: plus 200m drilling mud cushion.

calculated from: ☐ Fluid Recorder ☐ Outside Recorder ☐ Actual (Pulled to Fluid) ☐ Pump Strokes

Formation Fluid Consisted of:

DST Field Report

Date Issued: 21 Apr 2013

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Drill Stem Test Information

☐ Drop Bar Released	☐ Impact Type Circ. Sub Activated	☐ Well Circulated before deflating	☐ Hollow Shear Pin Recovered	☐ Closed Chamber
☐ Drop Ball Released	☐ Sleeve Type Circ. Sub Activated	☐ Well Circulated after deflating	☐ Pulled to Fluid then Circulated	☐ EMRT Run

Top Packer Re-use / Condition: N/A - Packers still downhole
Bottom Packer Re-use / Condition: N/A - Packers still downhole

Comments

Continually inflated and repeatedly had problems skidding down hole while functioning tool. Causing the tool to deflate. Decision was made to pull up 3m and try again.

Sequence of Events

17 Apr 2013	08:30 hrs	Test crew depart base / previous well.	17 Apr 2013	13:30 hrs	Test crew arrive at rig / camp.
	05:20 hrs	Tools on depth			
	05:25 hrs	M/U head			
	05:27 hrs	Mark out stick up			
	05:35 hrs	PJSM			
	05:41 hrs	Apply pressure from nitrogen pack to inflate packers			
	05:44 hrs	Attempt to move to Displace position			
	05:50 hrs	Pull back up and Apply pressure from nitrogen pack			
		to inflate packers			
	05:53 hrs	Stroke tool down: move DHV to circulating position			
	05:54 hrs	Commence displacement with nitrogen			
	07:38 hrs	Stroke tool down: move DHV to shut in position			
	07:43 hrs	Stroke tool down: DHV open - start pre-flow			
	07:58 hrs	Stroke tool up: DHV closed - end pre-flow			
	08:38 hrs	Pick up tool to deflate			
	08:35 hrs	B/D head			
	08:36 hrs	Re fill string			
	09:03 hrs	M/U head			
	09:08 hrs	Mark out stick up			
	09:09 hrs	Apply pressure from nitrogen pack to inflate packers			
	09:19 hrs	Stroke tool down: move DHV to circulating position			
	09:20 hrs	Commence displacement with nitrogen			
		Fluid was displaced into 1000l tank			
	10:14 hrs	Finished displacement open bag			
	10:16 hrs	Stroke tool down: move DHV to shut in position			
	10:17 hrs	Bleed off pressure 730psi			
	10:30 hrs	Stroke tool down: DHV open - start pre-flow			
	10:40 hrs	Stroke tool up: DHV closed - end pre-flow			
	11:50 hrs	Attempted to start main flow, worked tool no seat			
		Tool stroked all the way down no packer seat,			
		Work tool to keep free and wait on decision			

Test Tool Tally

Field Copy

Pro-Test Pty Ltd
76 Spencer St
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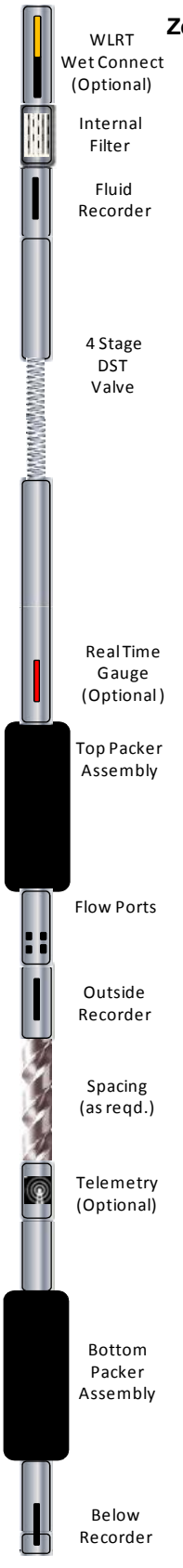
P: (07) 4622 6800
ABN: 22 134 641 240

Test No:	4	**Well Name:**	Murdoch 1	**Formation:**	Upp Juandah
Date:	19 Apr 2013	**Customer:**	QGC	**Test Interval:**	635.00mRT-643.01mRT
Job No:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit:**	ATP 965P	**Interval Length:**	8.01m
Ground Level:		**Cushion Type:**	drilling mud	**Test Supervisor:**	Jacob Wells
RT Level:	0.7m	**Cushion Wt:**	8.7ppg	**Company Man:**	Graham Cole
Zero Reference:	RT	**Cushion Amount:**	200m		



Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Tubing	104 x 6m	1.995	2.375	631.09	-3.08	0.00387	8.0
Hollow Pin Circ. Sub				0.50	628.01	**Total:**	**8bbls**
Internal Filter Carrier				1.50	628.51		
Fluid Recorder - # 1292				0.60	630.01		
Stage Tool				3.17	630.61		
Top Packer (Element Serial #: IPI-35-24)				1.22	633.78		
PACKER SEAL DEPTH					**635.00 mRT**		
Stick Down (with Flow Ports)				0.52	635.00		
Outside Recorder - # 1248/1198				0.30	635.52		
Spacing				1.00	635.82		
Telemetry Tool				5.84	636.82		
Stick Up				0.35	642.66		
PACKER SEAL DEPTH					**643.01 mRT**		
Bottom Packer (Element Serial #: IPI-35-36)				1.37	643.01		
Bottom of Tool String (with Below Recorder - # 1122)					644.38		

**Please note that depths listed are to top of tool **

PIPE TALLY	
Interval	8.01
Test Tools above Interval	6.99
Drill Stem above Interval	631.09
Drill Stem in Interval	0.00
Test Tools in Interval	8.01
Stick up	**-3.08 m**

TESTING NOTES:

RIH total 105 x 6m rods, 1 x 2.2m pup joints.
POOH 16 x 6m rods from DST 2

ONSITE TUBULAR COUNT COMPLETED BY:

Wellsy

COMPANY REPRESENTATIVE:

Indicative Tool Schematic Only

DST Field Report

Date Issued: 21 Apr 2013

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Well Information

Test Number:	5	**Well Name:**	Murdoch 1	**Formation:**	Upp Juandah
Date:	20 Apr 2013	**Customer:**	QGC	**Test Interval:**	634.40mRT-642.41mRT
Job Number:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit / Lease:**	ATP 965P	**Interval Length:**	8.01m
km's to Rig:	400	**State:**	Qld	**Zero Reference:**	RT
Company Man:	Graham Cole	**Test Result:**	Successful	**Test Supervisor:**	Jacob Wells
				Test Supervisor:	Craig Brown
		Tool String:	SI-3	**RT Supervisor:**	Leight Sparks
Mobilised by:	Graham Cole			**RT Supervisor:**	Gustavo Fernandez

			OD	ID
Main Hole Size:				
Hole Size at Top Packer:		DP / Rods / Tubing:	2.375"	1.995"
Hole Size at Bottom Packer:				
Element Size:	3.5"			
Mud Weight:	8.7ppg	Mud Type:		
Caliper Log Run:		DST Tool Wt:	klbs	
Caliper Type:		Total String Wt:	klbs	
General Hole Condition:		Prior Rig Operations:	DST	

Drill Stem Test Information

Serial Number:	1292	Gauge not RIH	1248/1198
Pressure Rating:	6000psi		6000/6000psi
Battery Serial No.:	389	-	392/349
Position:	Fluid Recorder	WLRT Recorder	Outside Recorder
Depth:	629.41mRT	Gauge not RIH	634.92mRT
Initial Hydrostatic:	329 psig		947 psig
Start of Pre Flow:			338 psig
End of Pre Flow:			338.6 psig
Initial Shut-in:	330 psig		462 psig
Start of Main Flow:			339 psig
End of Main Flow:			339.7 psig
Final Shut-in:	331 psig		392 psig
Final Hydrostatic:	347 psig		925 psig
Maximum Temp. during Test:	36.8 °C		38.2 °C

	Start	Finish	Duration	Weight to function tool
Pre Flow :	17:11	17:21 hrs	10 mins	klbs
Initial Shut In:	17:21	19:21 hrs	120 mins	
Main Flow:	19:21	19:51 hrs	30 mins	klbs
Final Shut In:	19:51	21:07 hrs	76 mins	

Pre-Flow Description

Very weak Blow on the surface of the bucket for 10 seconds

Main Flow Description

Very weak Blow on the surface of the bucket for 10 seconds

Total Fluid Recovered: plus 230m drilling mud cushion.

calculated from: ☐ Fluid Recorder ☐ Outside Recorder ☐ Actual (Pulled to Fluid) ☐ Pump Strokes

Formation Fluid Consisted of:

DST Field Report

Date Issued: 21 Apr 2013

Field Copy

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Roma Qld 4455
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Drill Stem Test Information

☐ Drop Bar Released	☐ Impact Type Circ. Sub Activated	☐ Well Circulated before deflating	☐ Hollow Shear Pin Recovered	☐ Closed Chamber
☐ Drop Ball Released	☐ Sleeve Type Circ. Sub Activated	☐ Well Circulated after deflating	☐ Pulled to Fluid then Circulated	☐ EMRT Run

Top Packer Re-use / Condition: N/A - Packers still downhole
Bottom Packer Re-use / Condition: N/A - Packers still downhole

Comments

Sequence of Events

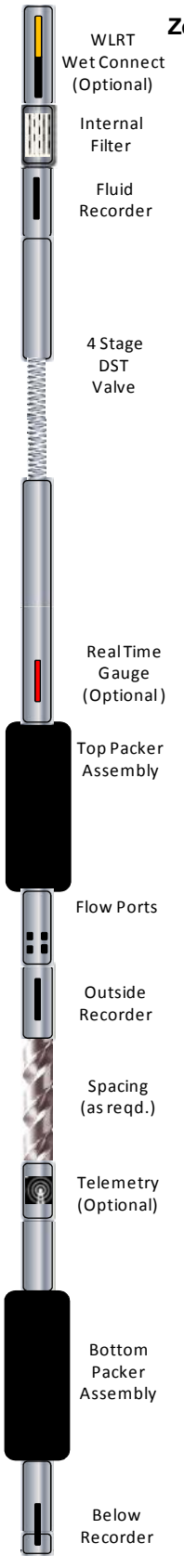
17 Apr 2013	08:30 hrs	Test crew depart base / previous well.	17 Apr 2013	13:30 hrs	Test crew arrive at rig / camp.
20 Apr 2013	17:55 hrs	B/D head POOH			
	13:25 hrs	Top fill string			
	13:42 hrs	Top fill string			
	14:45 hrs	M/U head			
	14:49 hrs	Inflate packers 926 psi			
	14:57 hrs	Start displement			
		Sliding down hole couldn't find displacment position			
	15:24 hrs	Pick back up to inflate position and pull overpull,			
		top inflation up to 1200			
	15:26 hrs	Stroke tool down: move DHV to circulating position			
	15:27 hrs	Start displement			
	17:03 hrs	Stroke tool down: move DHV to shut in position			
		Bleed off air / nitrogen from string through choke			
	17:11 hrs	Stroke tool down: DHV open - start pre-flow			
	17:21 hrs	Stroke tool up: DHV closed - end pre-flow			
	19:21 hrs	Stroke tool down: DHV open - start main flow			
	19:51 hrs	Stroke tool up: DHV closed - end main flow			
	21:07 hrs	Stroke tool up: DHV moved to deflate position			
	21:08 hrs	POOH to DST 5			

Test Tool Tally

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Test No:	5	**Well Name:**	Murdoch 1	**Formation:**	Upp Juandah
Date:	20 Apr 2013	**Customer:**	QGC	**Test Interval:**	634.40mRT-642.41mRT
Job No:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle	**Permit:**	ATP 965P	**Interval Length:**	8.01m
Ground Level:		**Cushion Type:**	drilling mud	**Test Supervisor:**	Jacob Wells
RT Level:	0.7m	**Cushion Wt:**	8.7ppg	**Company Man:**	Graham Cole
Zero Reference:	RT	**Cushion Amount:**	230m		



Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Tubing	105 x 6m	1.995	2.375	631.09	-3.68	0.00387	8.0
Hollow Pin Circ. Sub				0.50	627.41	**Total:**	**8bbls**
Internal Filter Carrier				1.50	627.91		
Fluid Recorder - # 1292				0.60	629.41		
Stage Tool				3.17	630.01		
Top Packer (Element Serial #: IPI-35-24)				1.22	633.18		
PACKER SEAL DEPTH					**634.40 mRT**		
Stick Down (with Flow Ports)				0.52	634.40		
Outside Recorder - # 1248/1198				0.30	634.92		
Spacing				1.00	635.22		
Telemetry Tool				5.84	636.22		
Stick Up				0.35	642.06		
PACKER SEAL DEPTH					**642.41 mRT**		
Bottom Packer (Element Serial #: IPI-35-36)				1.37	642.41		
Bottom of Tool String (with Below Recorder - # 1122)					643.78		

**Please note that depths listed are to top of tool **

PIPE TALLY	
Interval	8.01
Test Tools above Interval	6.99
Drill Stem above Interval	631.09
Drill Stem in Interval	0.00
Test Tools in Interval	8.01
Stick up	**-3.68 m**

TESTING NOTES:

POOH 1x2m pup joint

ONSITE TUBULAR COUNT COMPLETED BY:

Wellsy

COMPANY REPRESENTATIVE:

Indicative Tool Schematic Only

DST Field Report

Date Issued: 21 Apr 2013

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Well Information

Test Number:	6	**Well Name:**	Murdoch 1	**Formation:**	Upp Juandah
Date:	20 Apr 2013	**Customer:**	QGC	**Test Interval:**	620.00mRT-628.01mRT
Job Number:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle Reset	**Permit / Lease:**	ATP 965P	**Interval Length:**	8.01m
km's to Rig:	400	**State:**	Qld	**Zero Reference:**	RT
Company Man:	Graham Cole	**Test Result:**	Successful	**Test Supervisor:**	Jacob Wells
				Test Supervisor:	Craig Brown
		Tool String:	SI-3	**RT Supervisor:**	Leight Sparks
Mobilised by:	Graham Cole			**RT Supervisor:**	Gustavo Fernandez

			OD	ID
Main Hole Size:				
Hole Size at Top Packer:		DP / Rods / Tubing:	2.375"	1.995"
Hole Size at Bottom Packer:				
Element Size:	3.5"			
Mud Weight:	8.7ppg	Mud Type:		
Caliper Log Run:		DST Tool Wt:	klbs	
Caliper Type:		Total String Wt:	klbs	
General Hole Condition:		Prior Rig Operations:	DST	

Drill Stem Test Information

Serial Number:	1292	Gauge not RIH	1248/1198	
Pressure Rating:	6000psi		6000/6000psi	
Battery Serial No.:	389	-	392/349	
Position:	Fluid Recorder	WLRT Recorder	Outside Recorder	
Depth:	615.01mRT	Gauge not RIH	620.52mRT	
Initial Hydrostatic:	307.9 psig		925 psig	
Start of Pre Flow:			psig	
End of Pre Flow:			psig	
Initial Shut-in:	psig		psig	
Start of Main Flow:			399 psig	
End of Main Flow:			508 psig	
Final Shut-in:	491.2 psig		721.5 psig	
Final Hydrostatic:	527 psig		944 psig	
Maximum Temp. during Test:	36.4 °C		37.5 °C	

	Start	Finish		Duration		Weight to function tool
Pre Flow :			hrs		mins	klbs
Initial Shut In:			hrs		mins	
Main Flow:	2:41	2:43	hrs	2	mins	klbs
Final Shut In:	2:43	4:07	hrs	84	mins	

Pre-Flow Description

Very strong blow straight to the bottom of the bucket. No gas to surface

Main Flow Description

Very strong blow straight to the bottom of the bucket. No gas to surface

Total Fluid Recovered: 129m plus 200m drilling mud cushion.

calculated from: ☑ Fluid Recorder ☐ Outside Recorder ☐ Actual (Pulled to Fluid) ☐ Pump Strokes

Formation Fluid Consisted of:

DST Field Report

Date Issued: 21 Apr 2013

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Drill Stem Test Information

☑ Drop Bar Released	☑ Impact Type Circ. Sub Activated	☐ Well Circulated before deflating	☑ Hollow Shear Pin Recovered	☐ Closed Chamber
☐ Drop Ball Released	☐ Sleeve Type Circ. Sub Activated	☐ Well Circulated after deflating	☐ Pulled to Fluid then Circulated	☐ EMRT Run

Top Packer Re-use / Condition: Yes - Good
Bottom Packer Re-use / Condition: Yes - Good

Comments

Sequence of Events

17 Apr 2013	08:30 hrs	Test crew depart base / previous well.	17 Apr 2013	13:30 hrs	Test crew arrive at rig / camp.
20 Apr 2013	21:22 hrs	Tools on test depth			
	21:25 hrs	PJSM			
	21:27 hrs	Apply pressure from air pack to inflate packers 900psi			
	22:00 hrs	Change to nitrogen banks at 900psi			
	22:02 hrs	Continue to Inflate to 1500psi with nitrogen			
	22:22 hrs	Stroke tool down: move DHV to shut in position			
	22:34 hrs	Stroke tool down: DHV open - start pre-flow			
	22:37 hrs	Stroke tool up: DHV closed - end pre-flow			
	23:35 hrs	Stroke tool down: DHV open - start main flow			
	23:37 hrs	Stroke tool up: DHV closed - end main flow			
21 Apr 2013	00:25 hrs	Pressure up in Shut position to 520psi see			
		comments for reason			
	00:47 hrs	Finish pressure up			
	00:48 hrs	Stroke tool down: move DHV to circulating position			
	00:49 hrs	Commence displacement with nitrogen			
	00:50 hrs	Displace fluid to reach 100m WC			
	02:30 hrs	Stroke tool down: move DHV to shut in position			
	02:31 hrs	Bleed off air / nitrogen from string through choke			
	02:41 hrs	Stroke tool down: DHV open - start main flow			
	02:43 hrs	Stroke tool up: DHV closed - end main flow			
	04:07 hrs	Stroke tool up: DHV moved to deflate position			
	04:08 hrs	Allow elements time to deflate			
	04:15 hrs	RIH 2 x 6m			
	04:16 hrs	Fill pipe			
	05:00 hrs	Drop bar to hollow shear pin			
	05:05 hrs	Commence reverse circulation			
	05:47 hrs	POOH			

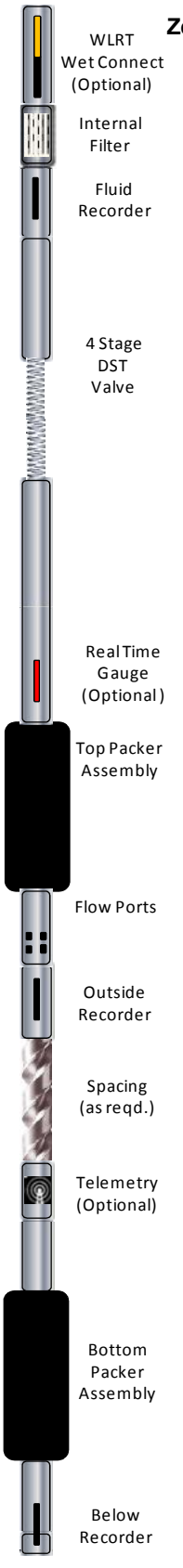
Test Tool Tally

Field Copy

Pro-Test Pty Ltd
76 Spencer St
Roma Qld 4455
P: (07) 4622 6800
ABN: 22 134 641 240

Australian - Accredited - Committed

Test No:	6	**Well Name:**	Murdoch 1	**Formation:**	Upp Juandah
Date:	20 Apr 2013	**Customer:**	QGC	**Test Interval:**	620.00mRT-628.01mRT
Job No:	469-QGC-SI	**Drilling Rig:**	Spaulding 8	**Well TD:**	853.60mRT
Test Type:	SI Straddle Reset	**Permit:**	ATP 965P	**Interval Length:**	8.01m
Ground Level:		**Cushion Type:**	drilling mud	**Test Supervisor:**	Jacob Wells
RT Level:	0.7m	**Cushion Wt:**	8.7ppg	**Company Man:**	Graham Cole
Zero Reference:	RT	**Cushion Amount:**	300m		



Description	Qty	ID	OD	Length	Depth	bbls/ft	bbls
Tubing	1 x 6m	1.995	2.375	6.03	-2.22	0.00387	0.1
Pup Joint	1 x 2.2m	1.995	2.375	2.20	3.81	0.00387	0.0
Tubing	101 x 6m	1.995	2.375	607.00	6.01	0.00387	7.7
Hollow Pin Circ. Sub				0.50	613.01	**Total:**	**7.8bbls**
Internal Filter Carrier				1.50	613.51		
Fluid Recorder - # 1292				0.60	615.01		
Stage Tool				3.17	615.61		
Top Packer (Element Serial #: IPI-35-24)				1.22	618.78		
PACKER SEAL DEPTH					**620.00 mRT**		
Stick Down (with Flow Ports)				0.52	620.00		
Outside Recorder - # 1248/1198				0.30	620.52		
Spacing				1.00	620.82		
Telemetry Tool				5.84	621.82		
Stick Up				0.35	627.66		
PACKER SEAL DEPTH					**628.01 mRT**		
Bottom Packer (Element Serial #: IPI-35-36)				1.37	628.01		
Bottom of Tool String (with Below Recorder - # 1122)					629.38		

**Please note that depths listed are to top of tool **

PIPE TALLY	
Interval	8.01
Test Tools above Interval	6.99
Drill Stem above Interval	615.23
Drill Stem in Interval	0.00
Test Tools in Interval	8.01
Stick up	**-2.22 m**

TESTING NOTES:

Total of 102x6m rods in hole, 1 x 2.2m pup joints. POOH 3 joints, 40 joints to be left on rack

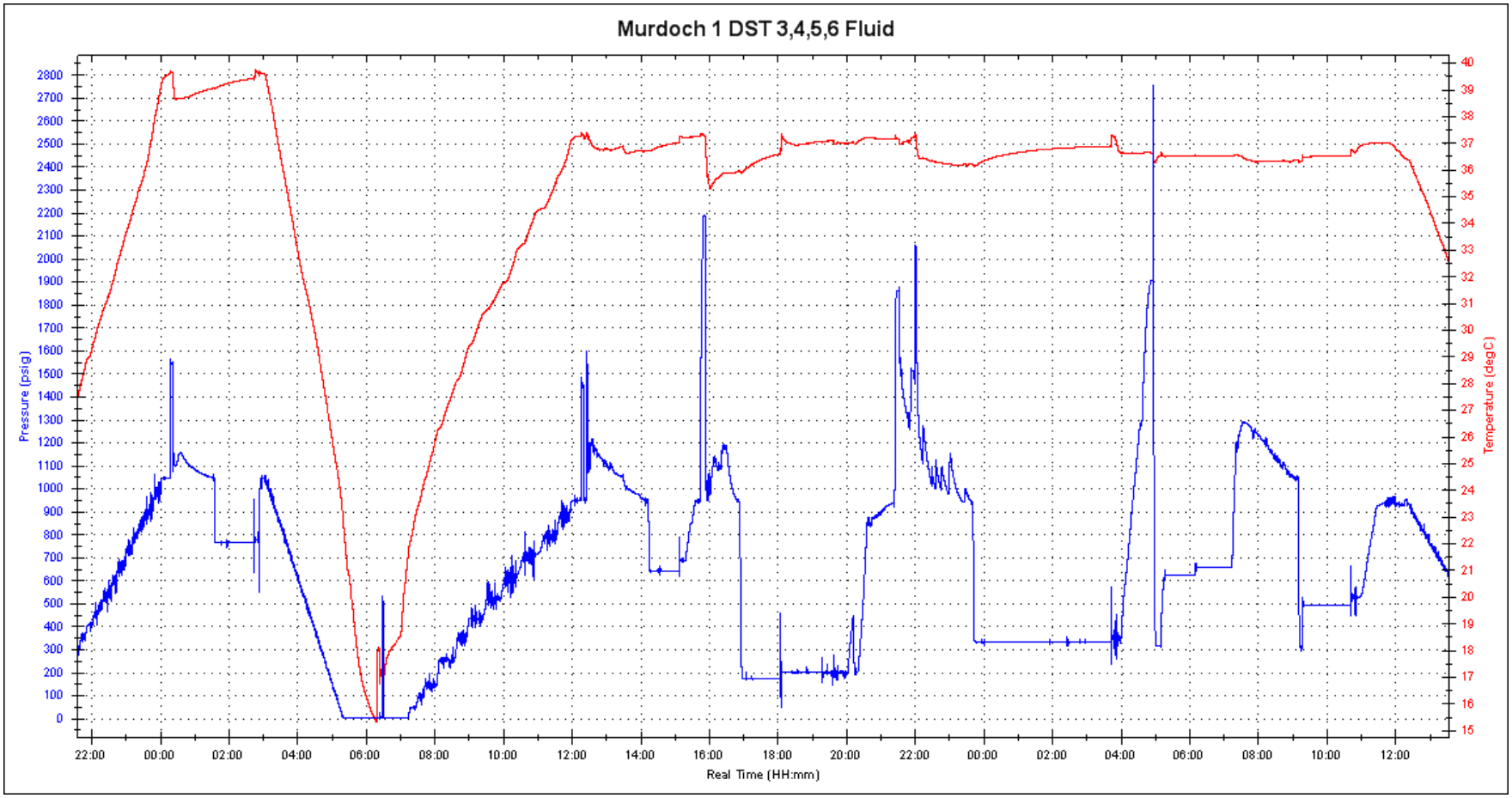
ONSITE TUBULAR COUNT COMPLETED BY:
Wellsy
142 DP on rack

COMPANY REPRESENTATIVE:

Indicative Tool Schematic Only

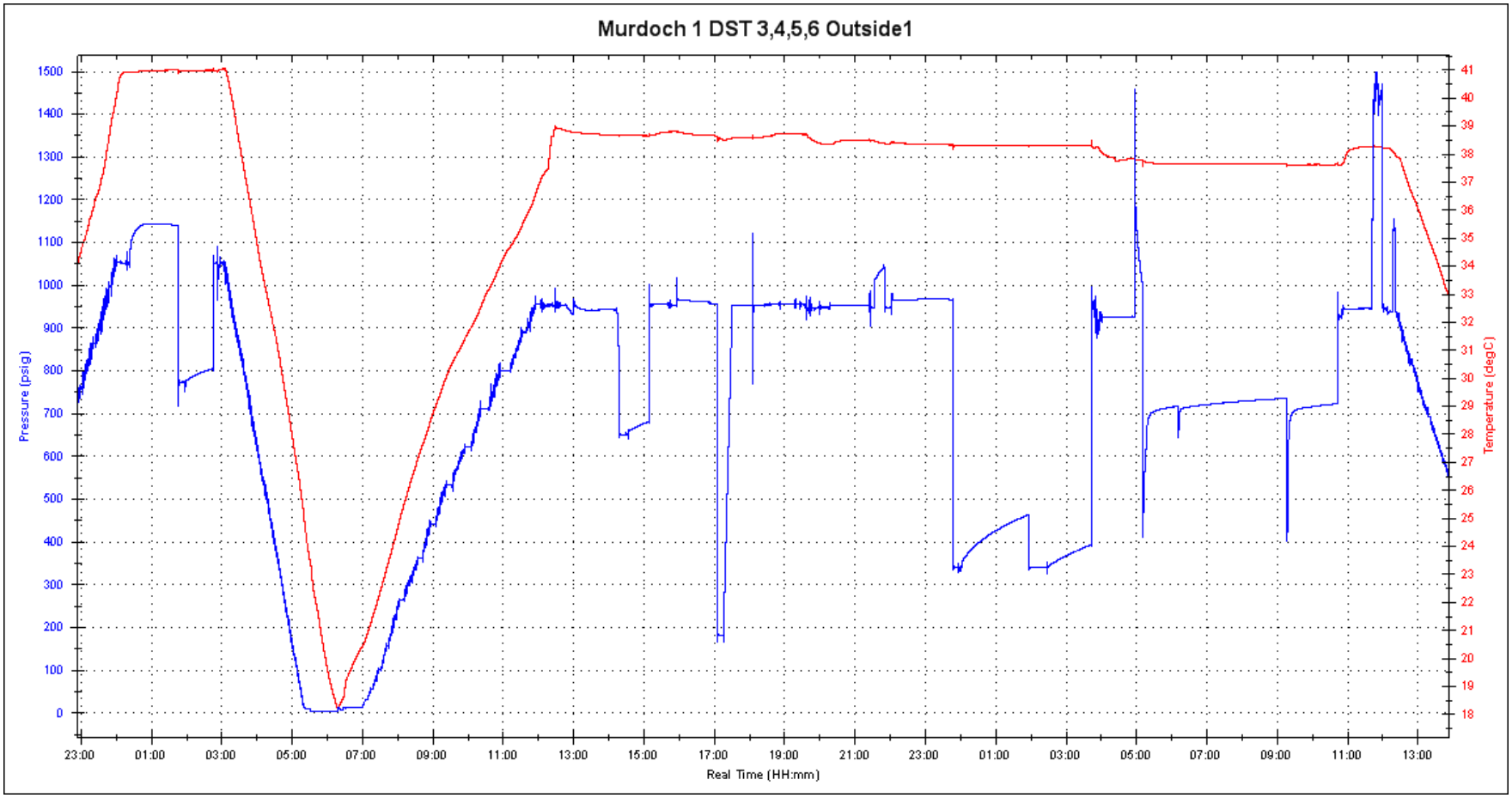
DataCan

Test Date:	04/18/2013 - 04/20/2013	**Serial Number:**	P1292
Max Pressure:	2755.019 psig	**Max Temperature:**	39.714 degC



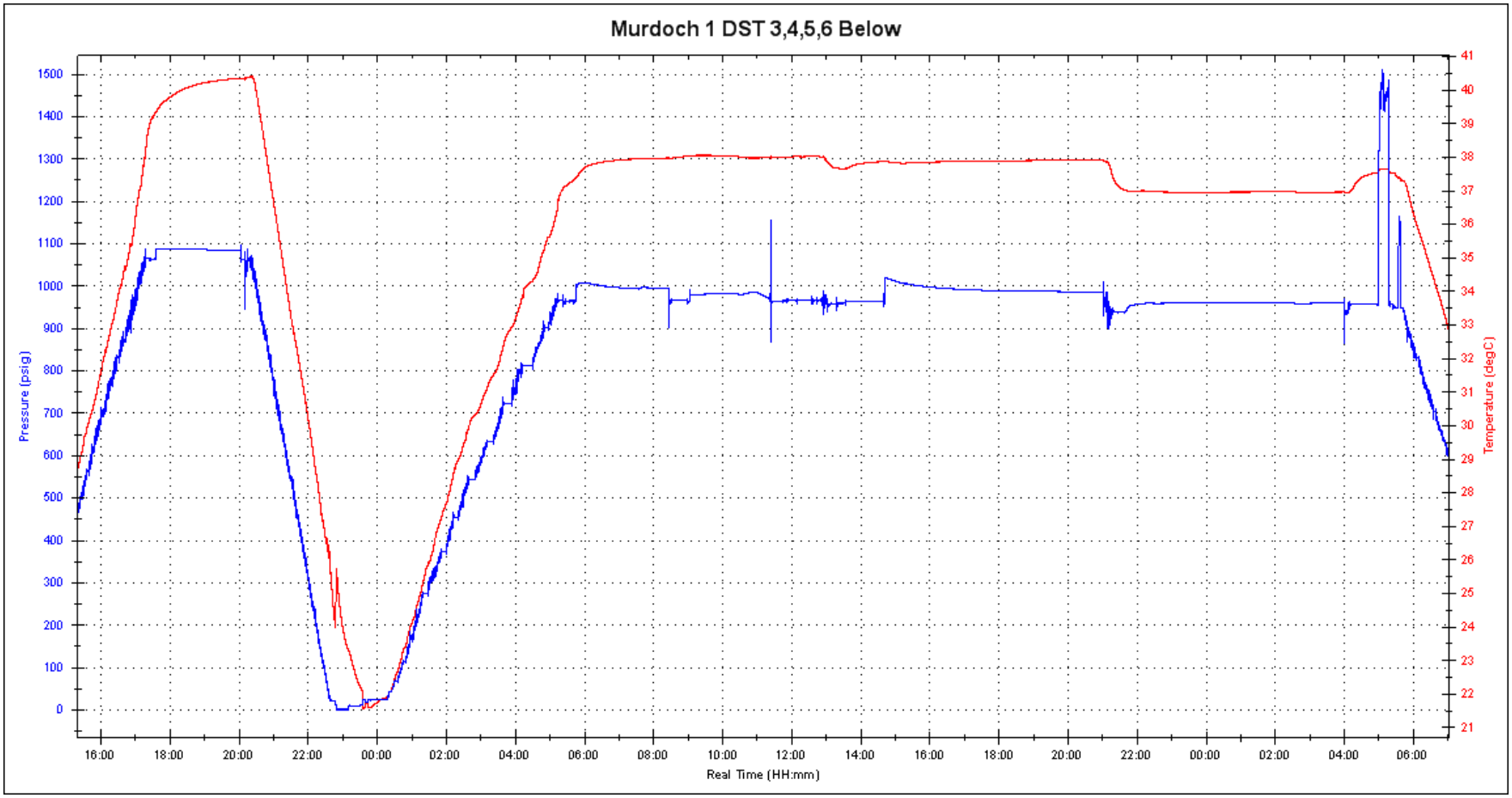
DataCan

Test Date:	04/18/2013 - 04/20/2013	**Serial Number:**	P1198
Max Pressure:	1497.919 psig	**Max Temperature:**	41.083 degC



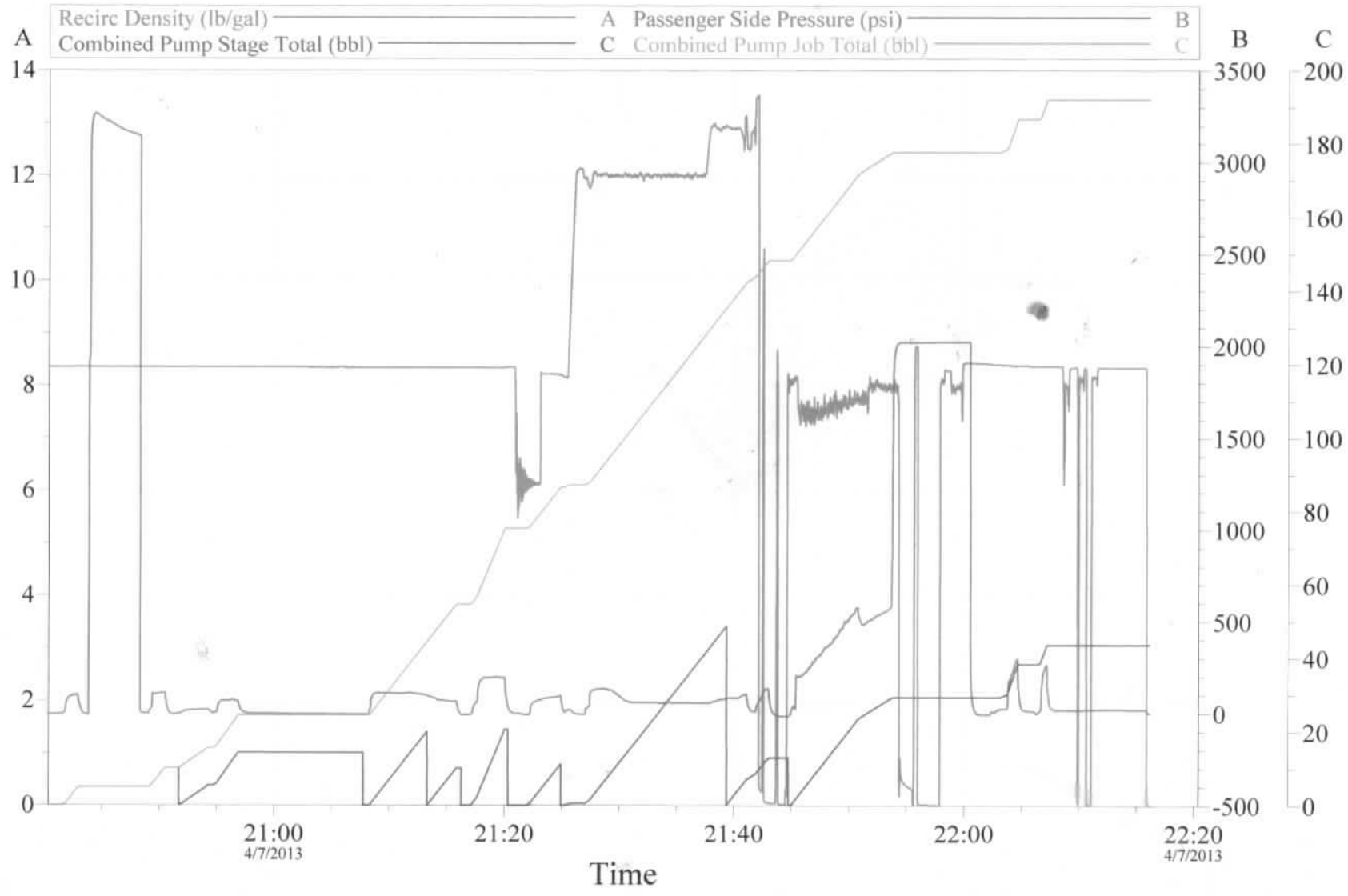
DataCan

Test Date:	04/20/2013 - 04/21/2013	**Serial Number:**	P1122
Max Pressure:	1509.470 psig	**Max Temperature:**	40.391 degC



APPENDIX 5

CEMENTING REPORT



Customer: QGC	Job Date: 04/07/2013	Ticket #: 900310405

CemWin v1.7.2
07-Apr-13 22:28

HALLIBURTON	CUSTOMER	SALES ORDER No.	DATE
	QGC	900310415	8 April 2013

CEMENT/PUMPING JOB SUMMARY

WELL	LOCATION/FIELD NAME	COUNTRY	HES REP	CUSTOMER REP	WELL TYPE
Murdoch 1	Murdoch 1	Australia	Bradley Alexander	Ray Berkit	Coal Bed Methane
JOB TYPE		**JOB PURPOSE CODE**		**BDA**	**RIG**
Production Casing		CEMENT PRODUCTION CASING 600M 7521		Brisbane	Spaiding 8

PERSONELL

PERSONNEL / EXPOSURE		hrs	PERSONNEL / EXPOSURE		hrs	PERSONNEL / EXPOSURE	hrs	PERSONNEL / EXPOSURE	hrs
#N/A	Bradley Alexaner	24	#N/A	Mick Scott	24				

EQUIPMENT

SAP#	PUMPING / MIXING	HOURS	SAP#	BULK SUPPLY / TANKS	HOURS
#N/A	Cement Unit Elite 11923912	48			
SAP#	**VEHICLES / TRAILERS**	**HOURS**	**SAP#**	**OTHER EQUIPMENT**	**HOURS**
#N/A	Kenworth T#408 11669792	48	#N/A	4.5in CEMENT HEAD	48
#N/A	LANDCRUISER UTE 11767244	48			

WELL PROFILE

NEW CASING	OPEN HOLE + EXCESS OR CALIPER DATA	PREVIOUS CASINGS
Non Tapered Casing , Conventional, m shoe track		
4.5in 11.6ppf K55 BTC 0m to 563.24m MD, m TVD	4.5in, 100 percent excess, 0m to 563.24m	

CEMENT DESIGN

Lead				Tail			
DENSITY	12.0ppg	WATER	11.86gal/sk	DENSITY	12.9ppg	WATER	8.73gal/sk
YIELD	2.14cuft/ft	MIX FLUID	36.2bbls	YIELD	1.71cuft/ft	MIX FLUID	7.7bbls
WATER SOURCE	Day Tank			WATER SOURCE	Day Tank		
CEMENT TYPE	VanCem at 90lb/sk			CEMENT TYPE	VarCem at 90lb/sk		
Total Cement Used	128sks			Total Cement Used	37sks		
Estimated TOC	0m			Estimated TOC	100m		

Additive	Concentration	Total Used	Additive	Concentration	Total Used
CFR-3	0.4 %BWOC	45lbs	CFR-3	0.4 %BWOC	13lbs
HALAD-344	0.5 %BWOC	56lbs	HALAD-344	0.5 %BWOC	16lbs
Flocele	0.5 %BWOC	56lbs	Flocele	0.5 %BWOC	16lbs
NF-6	0.25 gal/10bbl	1gals	NF-6	0.25 gal/10bbl	1gals

JOB LOGS

DATE	TIME	VOLUME	PRESSURE (psi)		RATE	JOB DESCRIPTION
07-Apr-12	11:00					Mobilise to rig
	14:10					arrive location
	15:00					Stand by at camp
	18:35					called to rig
	19:20					Arrive rig
	19:25					spot gear
	19:45					rig up
	20:10					Saftey Meeting
	20:20					Rig up Head up
	20:37	5			4	pump fresh water spacer
	20:39		3000			Pressure test iron 3000psi
	20:44	5			4	pump fresh water space
	21:03	20				Mix and pump econolite liquid
	21:07	10				pump fresh water space
	21:13	10				mix and pump Gelled spacer
	21:21	48.8	120		4	Mix and pump lead cement @ 12ppg
	21:35	12.2			4	mix and pump tail cement @ 12.9 ppg
	21:39					Drop top plug
	21:41	29.2	487		4	Displace plug with fresh water
	15:48	29.2			2	Bump plug
	21:50		2000			pPressure test casing to 2000psi
	21:56	0.2				bleed off moniter returns
	22:00					end job rig down
	22:30					Prepare job tickets
	23:30					Return to camp
						Cement Returns 13.4bbl into displacement

QGC

POST JOB REPORTS
CEMENTING/PUMPING

Well Name : MURDOCH #1

Rig: SPAULDING#8

CEMENT PLUG AND ABANDON 1600M 7527

Prepared for GRAHAM COLE

4/23/2013

Prepared by Seyfettin Guldal

HALLIBURTON

The Future is Working Together.

HALLIBURTON

CUSTOMER	SALES ORDER No.	DATE
QGC	900346580	23 April 2013

CEMENT/PUMPING JOB SUMMARY

WELL	LOCATION/FIELD NAME	COUNTRY	HES REP	CUSTOMER REP	WELL TYPE
MURDOCH #1	MURDOCH	Australia	Seyfettin Guldal	GRAHAM COLE	Exploration
JOB TYPE	**BOD NUMBER**	**JOB PURPOSE CODE**		**BDA**	**RIG**
P&A Plugs	0	CEMENT PLUG AND ABANDON 1600M 7527		Brisbane	SPAULDING#8

PERSONELL

PERSONNEL / EXPOSURE		hrs	PERSONNEL / EXPOSURE		hrs	PERSONNEL / EXPOSURE	hrs	PERSONNEL / EXPOSURE	hrs
515559	Seyfettin Guldal	48	533110	Dennis Brennan	48				

EQUIPMENT

SAP#	PUMPING / MIXING	HOURS	SAP#	BULK SUPPLY / TANKS	HOURS
11064756	CEMENT UNIT ELITE #11064756 (SY-40-AS)	48	10048618	BULKER #10048618 (TDG-056)	48
SAP#	**VEHICLES / TRAILERS**	**HOURS**	**SAP#**	**OTHER EQUIPMENT**	**HOURS**
11061442	DOLLY #11061442 (SY-89-AP)	48			
10885457	KENWORTH T950 TRUCK #10885457 (585-KPO)	48			
11996089	LANDCRUISER UTE #11996089 (689-APU)	48			

FLOAT EQUIPMENT AND CASING EQUIPMENT

SAP#	CASING ATTACHMENTS	SUPPLIER	QTY	SAP#	OTHER	SUPPLIER	QTY
				#N/A	2 3/8 in SWAGE		1

WELL PROFILE

NEW CASING	OPEN HOLE + EXCESS OR CALIPER DATA	PREVIOUS CASINGS
4.5in 11.6ppf : 0m to 563.2m MD, 563.2m TVD	3.7in, 0 percent excess, 563.2m to 853m	

FOR PLUG AND LINER JOBS PLEASE INDICATE WORKSTRING 2.375in 4.7ppf Drill Pipe with m of in ppf Stinger

CEMENT DESIGN

PLUG 1		SLURRY ID	0
DENSITY	15.6 ppg	WATER	5.26 gal/sk
YIELD	1.18 cuft/sk	MIX FLUID	5 bbl
WATER SOURCE	Day Tank		
CEMENT TYPE	Standard Cement at 94lb/sk		
Total Cement Used	33 sks		
Estimated TOC	528 m		

Additive	Concentration	Total Used
CFR-3	0.3 %BWOC	9lbs
Halad 413	0.6 %BWOC	19lbs
NF-6	0.25 gal/10bbl	1gals

PLUG 2		SLURRY ID	0
DENSITY	15.6 ppg	WATER	5.26 gal/sk
YIELD	1.18 cuft/sk	MIX FLUID	4 bbl
WATER SOURCE	Day Tank		
CEMENT TYPE	Standard Cement at 94lb/sk		
Total Cement Used	32 sks		
Estimated TOC	398 m		

Additive	Concentration	Total Used
CFR-3	0.3 %BWOC	9lbs
NF-6	0.25 gal/10bbl	1gals

PLUG 3		SLURRY ID	0
DENSITY	15.6 ppg	WATER	5.26 gal/sk
YIELD	1.18 cuft/sk	MIX FLUID	4 bbl
WATER SOURCE	Day Tank		
CEMENT TYPE	Standard Cement at 94lb/sk		
Total Cement Used	32 sks		
Estimated TOC	268 m		

Additive	Concentration	Total Used
CFR-3	0.3 %BWOC	9lbs
NF-6	0.25 gal/10bbl	1gals

PLUG 4		SLURRY ID	0
DENSITY	15.6	WATER	5.26 gal/sk
YIELD	1.19 cuft/sk	MIX FLUID	3.9 bbl
WATER SOURCE	Day Tank		
CEMENT TYPE	Standard Cement at 94lb/sk		
Total Cement Used	31 MT		
Estimated TOC	138 m		

Additive	Concentration	Total Used
Calcium Chloride	1 %BWOC	29lbs
NF-6	0.25 gal/10bbl	1gals

PLUG 5		SLURRY ID	0
DENSITY	15.6 ppg	WATER	5.26 gal/sk
YIELD	1.19 cuft/sk	MIX FLUID	3.3 bbl
WATER SOURCE	Day Tank		
CEMENT TYPE	Standard Cement at 94lb/sk		
Total Cement Used	26MT		
Estimated TOC	0m		

Additive	Concentration	Total Used
Calcium Chloride	1 %BWOC	26lbs
NF-6	0.25 gal/10bbl	1gals

0		SLURRY ID	0

JOB LOGS

DATE DAY-MTH-YR	TIME HRS:MIN	VOLUME (BBLS)	PRESSURE (psi) HIGH	PRESSURE (psi) LOW	RATE BPM	JOB DESCRIPTION
21-Apr-13	11;30					DEPART FROM CHINCHILLA YARD
	17;30					ARRIVE WELL LOCATION
	17;30					MEET QGC CO. MAN
	17;30					DISCUSS VOLUMES AND CEMENT PLUG PROCEDURES
	18;00					SPOT EQUIPMENT / RIG UP CEMENT LINE
	19;00					SPOT HIGH VISS PILL / POH PLUG DEPTH 630 M
						CIRCULATE HOLE WITH 8.7 PPG KCL BRINE
	20;00					PRE JOB SAFTEY MEETING WITH RIG CREW
	20;30					RIG UP CEMENT LINE
						PLUG # 1 630 M TO 528 M
	20;35	5	450		4	PUMP 5.0 BBLS AHEAD
	20;50					PRESSURE TEST CEMENT LINE 3,000 PSI

HALLIBURTON				CUSTOMER	SALES ORDER No.	DATE
				QGC	900346580	23 April 2013

CEMENT/PUMPING JOB SUMMARY

WELL	LOCATION/FIELD NAME	COUNTRY	HES REP	CUSTOMER REP	WELL TYPE
MURDOCH #1	MURDOCH	Australia	Seyfettin Guldal	GRAHAM COLE	Exploration
JOB TYPE	**BOD NUMBER**	**JOB PURPOSE CODE**		**BDA**	**RIG**
P&A Plugs	0	CEMENT PLUG AND ABANDON 1600M 7527		Brisbane	SPAULDING#8

	21:00					BATCH MIX 7.0 BBLS 33 SKS CEMENT SLURRY AT 15.6 PPG
	21:05	7	750		3.5	PUMP CEMENT SLURRY
	21:10	1.9	750		3.5	PUMP 1.9 BBLS WATER BEHIND
	21:13	4.2	750		3.5	DISPLACE CEMENT
	21:15					OPEN VALVE ON UNIT CHECK BALANCE OF CEMENT PLUG
	21:30					POH ABOVE CEMENT / CIRCULATE CLEAN PIPE
	22:00					WASH UP UNIT / GO TO RIG CAMP FOR REST
						WOC / 8 HRS
22-Apr-13	06:00					CALL OUT TO THE RIG SITE
	06:45					ARRIVE WELL LOCATION
	07:00					START UNIT / PRIME UNIT
	08:00					SAFTEY MEETING
	08:00					RIG CIRCULATE HOLE
	09:00	1		150	3	RIG UP CEMENT LINE / PUMP WATER
	09:05		3,000			PRESSURE TEST CEMENT LINE TO 3000 PSI / OK
			500			CLOSE RAMS / HYDRILL
	09:15		900			PRESSURE TEST CASING AND CEMENT PLUG#1 AT 528 M
	09:20					GOOD TEST
	09:20					BLEED OFF
						PLUG # 2
						528 M TO 398 M
	09:25	5	350		3	PUMP 5 BBLS WATER
	09:35					BATCH 6.6 BBLS CEMENT SLURRY32 SKS AT 15.6 PPG
	10:00	6.6	650		3	PUMP CEMENT SLURRY
	10:02					PUMP 1.9 BBLS WATER BEHIND
	10:04					DISPLACE 2.5 BBLS WATER
						CHECK BALANCE OF PLUG
	10:30					POH ABOVE CEMENT / CIRCULATE THROUGH TUBING
						PLUG # 3
						398 M TO 268 M
	11:15	5	350		3	PUMP 5 BBLS WATER AHEAD
	11:20					BATCH MIX 6.6 BBLS 32 SKS SLURRY AT 15.6 PPG
	11:25	6.6	650		3.5	PUMP CEMENT SLURRY
	11:30	2.5	350		3	DISPLACE WITH WATER
	11:31					CHECK BALANCE OF CEMENT / OK
	12:00					POH ABOVE CEMENT
						CIRCULATE THROUGH TUBING / PIPE CLEAN
	12:45					PLUG # 4
						268 M TO 138 M
	12:55	5	350		3	PUMP 5.0 BBLS WATER AHEAD
	13:00					BATCH MIX 6.6 BBLS 31 SKS CEMENT SLURRY AT 15.6 PPG
	13:07	6.6	650		3.5	PUMP 6.6 BBLS SLURRY
	13:08	1.2	250		2.5	DISPLACE WITH WATER
	13:10					CHECK BALANCE OF CEMENT / OK
	13:20					POH ABOVE CEMENT PLUG
	13:30					CIRCULATE THROUGH TUBING / WITH RIG PUMP
						WASH UP UNIT
	14:45					WOC
						GO TO RIG CAMP FOR REST
	19:30					CALL OUT TO RIG SITE
						PLUG # 5
	19:45					119 M TO SURFACE
						ARRIVE TO WELL LOCATION
	20:30					CIRCULATE CASE HOLE
	20:45					SAFTEY MEETING WITH RIG CREW
	21:00					RIG UP CEMENT LINE
						PUMP 5 BBLS WATER AHEAD
	21:35					

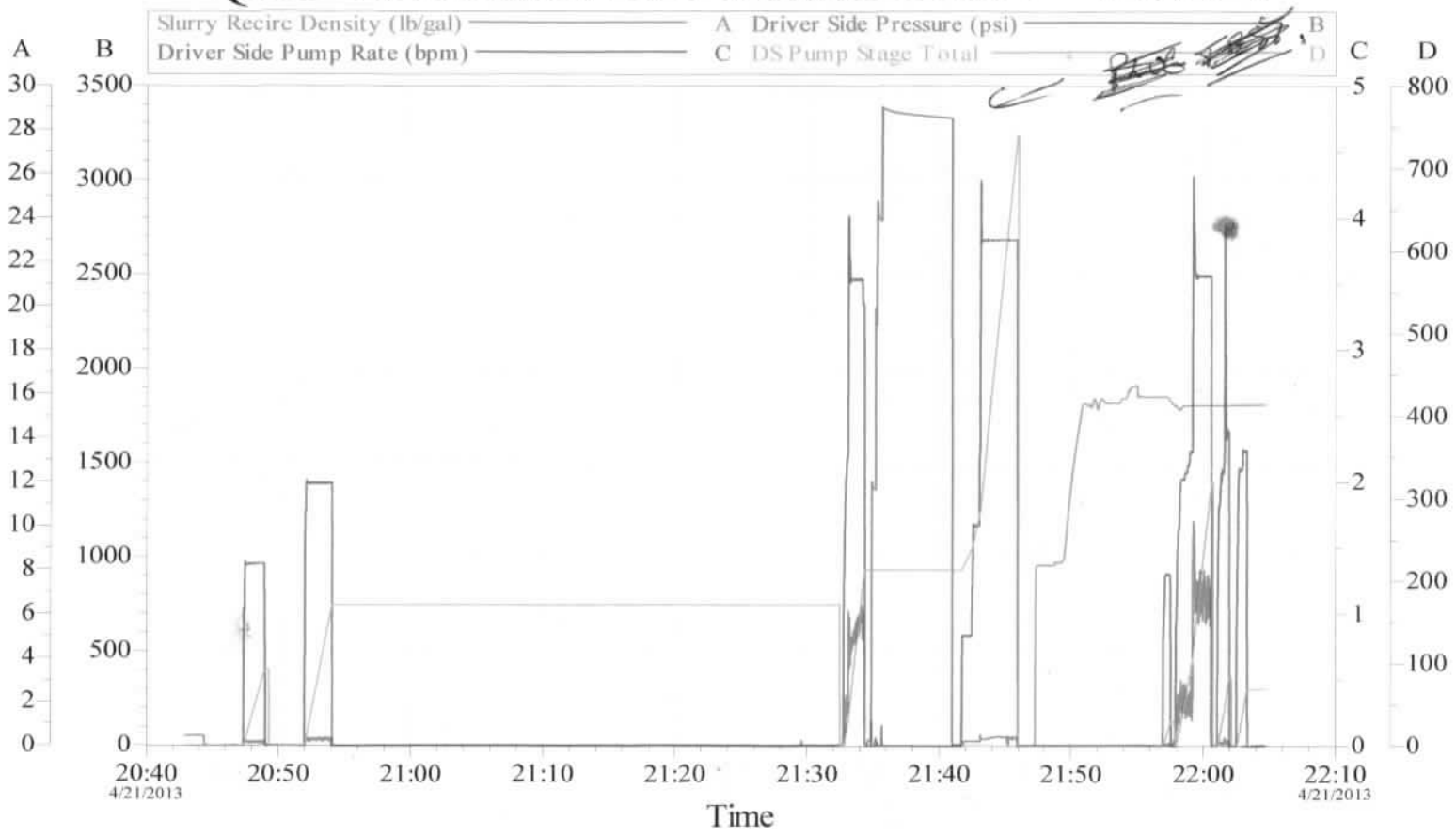
HALLIBURTON	CUSTOMER	SALES ORDER No.	DATE
	QGC	900346580	23 April 2013

CEMENT/PUMPING JOB SUMMARY

WELL	LOCATION/FIELD NAME	COUNTRY	HES REP	CUSTOMER REP	WELL TYPE
MURDOCH #1	MURDOCH	Australia	Seyfettin Guldal	GRAHAM COLE	Exploration
JOB TYPE	**BOD NUMBER**	**JOB PURPOSE CODE**		**BDA**	**RIG**
P&A Plugs	0	CEMENT PLUG AND ABANDON 1600M 7527		Brisbane	SPAULDING#8

						BATCH MIX 5.6 BBLS 26 SKS CEMENT SLURRY
	21:45					1.0% CALCIUM CHLORIDE AT 15.6 PPG
	22:00	5.6		150	2	PUMP CEMENT SLURRY
	22:04	0.15		0	1	DISPLACE 0.015 BBLS JUST CLEAR CEMENT SLURRY
						POH TUBING TO SURFACE
	23:00					TOP UP CASING WITH CEMENT SLURRY / MIXED IN EMTY BARREL
						WASH UP UNIT
	23:15					RIG DOWN
	23:45					MOVE EQUIPMENT FROM WELL LOCATION
						JOB COMPLETED
						GO TO RIG CAMP / STAY OVER NIGHT
23-Apr-13						WRITE TICKET
	11:00					DEPART FROM RIG TO CHINCHILLA YARD
						THANK YOU

QGC SPAULDING 8 MURDOCH 1 - P&A 1

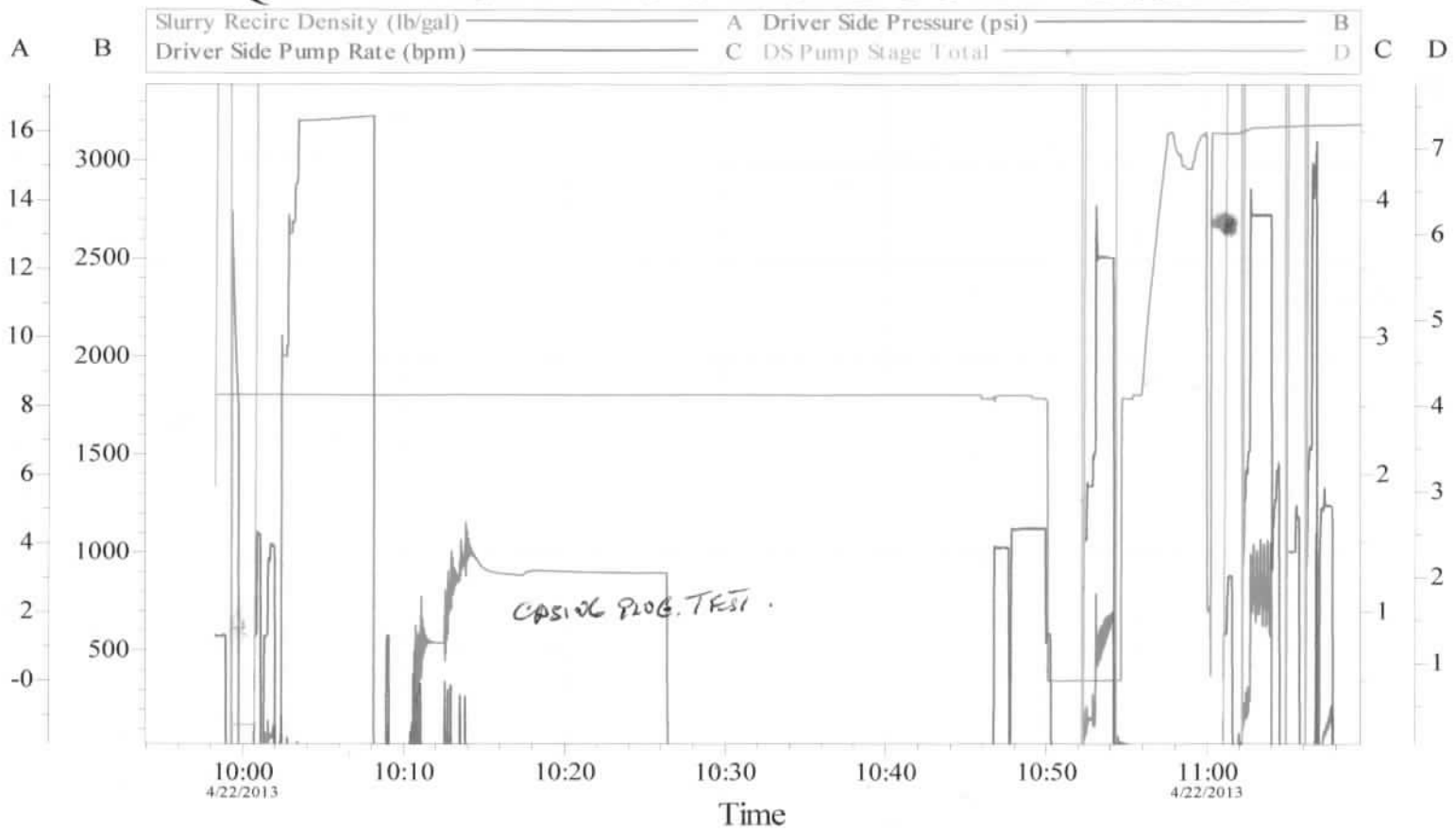


Customer: QGC	Job Date: 04/21/13	Ticket #: 900346580
Well Desc: MURDOCH 1	QGC REP: GRAHAM	HALCO OPR: S.GULDAL

‰
23-Apr-13 07:59

COMMENTS

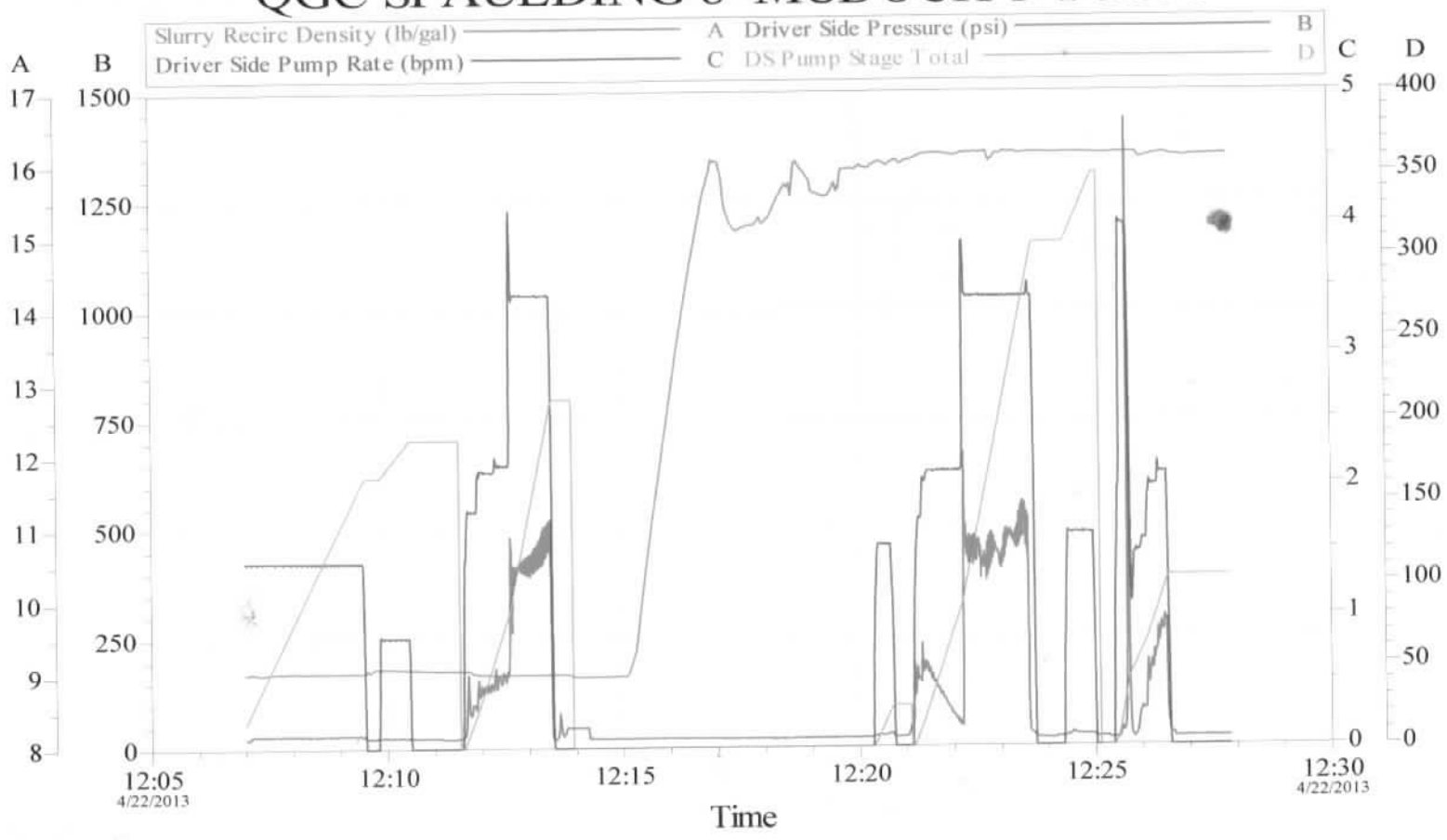
QGC-SPAULDING 8-MURDOCH 1 - P&A 2



Customer: Halliburton	Job Date: 04/22/13	Ticket #: 09:58:15	‰
Well Desc: Technology #RTD Stg GOLD	UWI:	Control ver 4.20, Display ver 4.20	23-Apr-13 08:00

COMMENTS

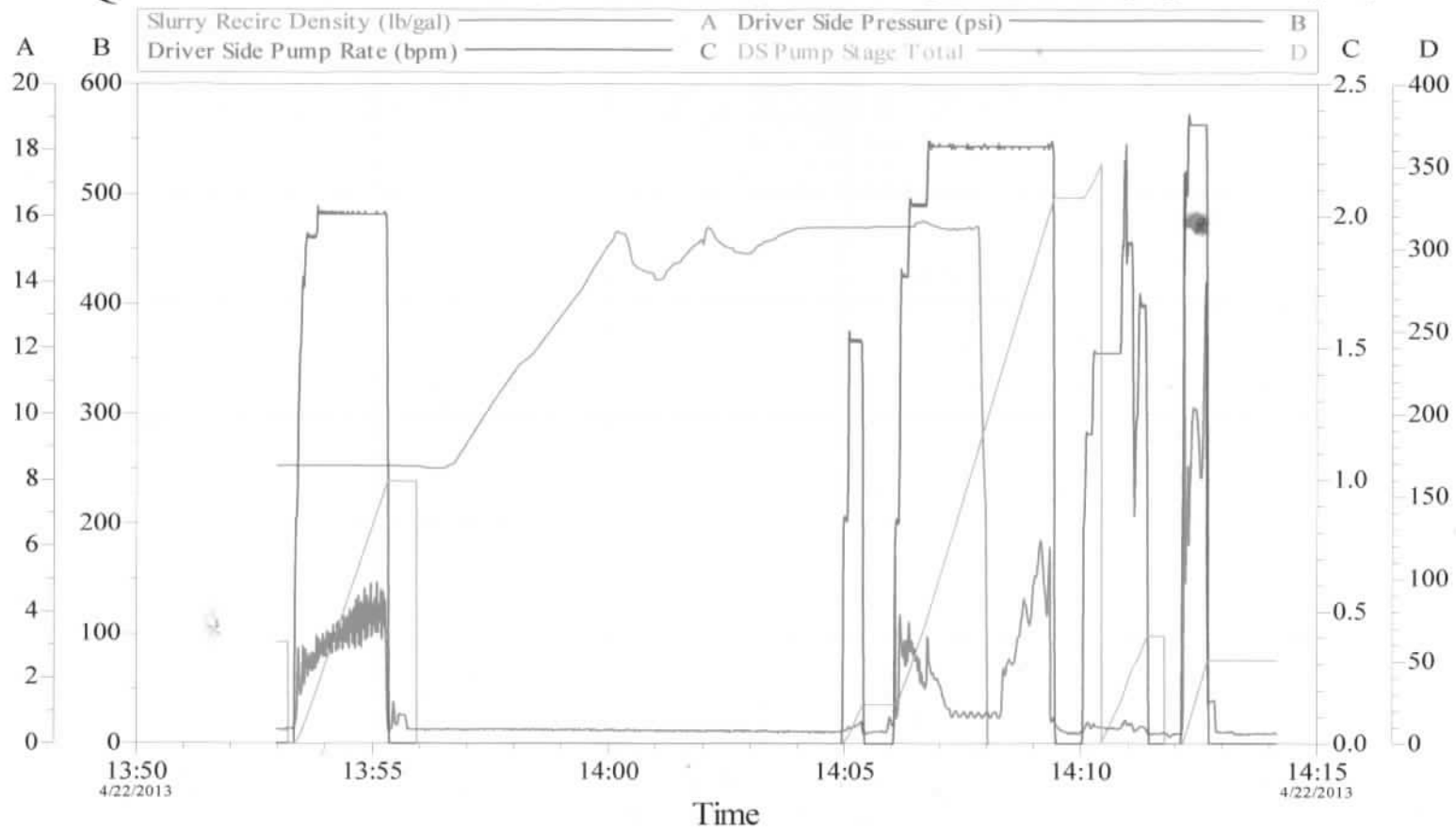
QGC SPAULDING 8 MUDOCH 1 P&A 3



Customer: QGC	Job Date: 04/22/13	Ticket #: 900346580	‰
Well Desc: MURDOCH 1	QGC REP: GRAHAM	HALCO OPR: S.GULDAL	23-Apr-13 08:00

COMMENTS

QGC-SPAULDING 8-MURDOCH 1-CMT PLUG # 4

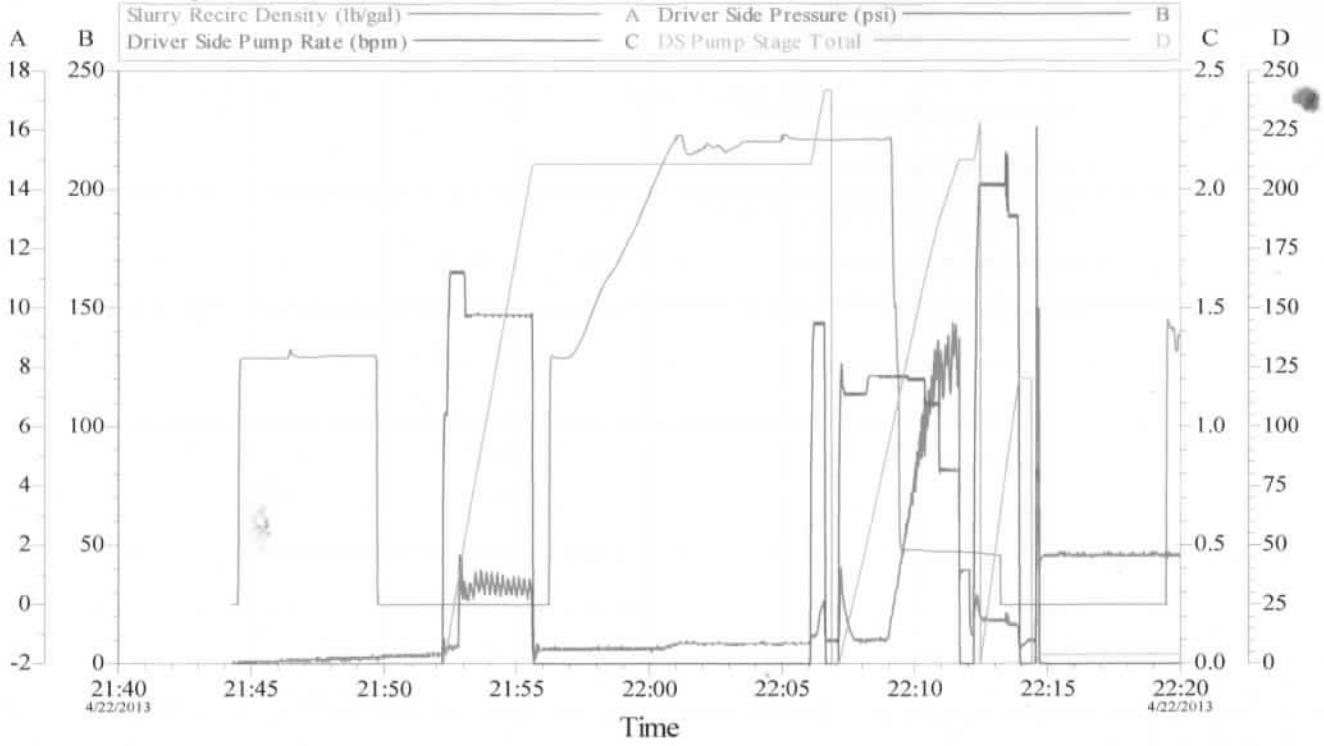


Customer: QGC	Job Date: 04/22/13	Ticket #: 900346580
Well Desc: Muldoch 1	QGC Rep: Graham	Halco Opr: S.Guldal

‰
23-Apr-13 08:01

COMMENTS

QGC SPAULDING 8 MURDOUCH 1 P&A 5



Customer: QGC	Job Date: 04/22/13	Ticket #: 900346580
Well Desc: MURDOCH 1	QGC REP: GRAHAM COLE	HALCO OPR: S.GULDAL

‰
23-Apr-13 08:03

APPENDIX 6

GAS DESORPTION ANALYSIS REPORT

EARTH DATA

PROFESSIONAL RELIABLE SUPPORTIVE

QGC Pty Ltd

Murdoch 1

Gas Desorption Analysis Report

Prepared by
Earth Data Pty Ltd
August 2013

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Executive Summary

In March 2013, Earth Data Pty Ltd was engaged by QGC Pty Limited to provide well site and gas desorption analysis services for the well Murdoch 1 in Queensland, Australia. Gas desorption properties were measured on twenty-one (21) core samples, with a combined thickness totalling 12.190 m, collected from the cored interval of Murdoch 1. Additional analyses were performed on the core samples once the desorption measurements were completed.

Gas Content

Confidence in these results has been determined as high as defined in Table A in Appendix VI. Total gas content, on a dry, ash-free (DAF) basis, varies between 0.70 m^3/tonne and 3.42 m^3/tonne. These results are presented in Table ES-1.

Gas Composition

Three (3) gas composition samples were scheduled for collection from each extended desorption sample at 12-24 hours after the first desorption measurement (A), 14 days after the first desorption measurement (B), and at the time of the final desorption measurement (C). Not all desorption samples were sampled for gas composition as scheduled due to insufficient volumes of gas produced at the scheduled times.

Five (5) gas composition samples were scheduled for collection from the express desorption samples MUR001_003 and MUR001_021; one (1) approximately 1 day after the first desorption measurement (A), one (1) approximately 14 days after the first desorption measurement (B), one (1) at the time of the final desorption measurement (C) and a further two (2) when the core samples were crushed to liberate residual gas (D and E). Not all samples were collected due to insufficient volumes of gas produced at the scheduled times.

The confidence in the results for cases where the air contents exceed 40 mol% is considered low as defined in Table A in Appendix VI.

Methane concentrations are between 39.70 mol% and 99.60 mol% on an air-free basis.

Concentrations of methane, higher order hydrocarbons, carbon dioxide and nitrogen for all samples are presented in Table ES-2.

Table ES-1: Desorption Sample Properties

Sample ID	Depth From (mMD)	Depth To (mMD)	Formation	Time on Test (Days)	Reservoir Temperature (°C)*	Total Raw Gas Content (m3/tonne) #	Total DAF Gas Content (m3/tonne)	Sorption Time (Days) ^	Diffusivity (sec^{-1})	Relative Density	Ash (% ad)
MUR001_001	622.440	623.190	Upper Juandah CM	104	38.0	0.48	0.70	18.84	1.18E-05	1.47	24.8
MUR001_002	623.460	624.100	Upper Juandah CM	104	38.0	0.64	1.57	0.82	9.48E-05	1.79	52.5
MUR001_003	624.340	624.690	Upper Juandah CM	32	38.0	1.65	1.94	1.60	7.35E-05	1.33	8.6
MUR001_004	624.740	625.240	Upper Juandah CM	105	38.0	0.83	1.19	1.60	8.58E-05	1.47	24.1
MUR001_005	639.490	640.200	Upper Juandah CM	104	38.0	0.56	1.08	9.90	2.07E-05	1.66	42.8
MUR001_006	640.200	641.010	Upper Juandah CM	104	38.0	0.63	0.87	33.90	1.40E-05	1.45	22.2
MUR001_007	642.750	643.350	Upper Juandah CM	104	38.0	0.47	1.10	23.84	1.64E-05	1.75	50.8
MUR001_008	643.580	644.120	Upper Juandah CM	104	38.0	0.97	1.20	17.97	3.16E-05	1.37	14.5
MUR001_009	682.840	683.140	Lower Juandah CM	102	42.0	2.20	2.48	25.46	1.31E-05	1.28	3.7
MUR001_010	696.650	697.440	Lower Juandah CM	102	42.0	1.71	2.20	8.29	2.89E-05	1.38	16.0
MUR001_011	708.340	709.060	Lower Juandah CM	102	42.0	1.67	2.11	39.27	3.10E-06	1.36	14.5
MUR001_012	709.060	709.720	Lower Juandah CM	102	42.0	1.91	2.25	25.13	5.70E-06	1.33	10.2
MUR001_013	709.720	710.290	Lower Juandah CM	102	42.0	1.88	2.41	16.14	8.31E-06	1.39	17.0
MUR001_014	712.970	713.320	Lower Juandah CM	102	42.0	1.15	2.38	8.03	1.22E-05	1.68	45.6
MUR001_015	744.660	744.980	Lower Juandah CM	103	42.0	1.81	2.99	15.67	1.49E-05	1.55	35.3

Sample ID	Depth From (mMD)	Depth To (mMD)	Formation	Time on Test (Days)	Reservoir Temperature (°C)*	Total Raw Gas Content (m3/tonne) #	Total DAF Gas Content (m3/tonne)	Sorption Time (Days)^	Diffusivity (sec^{-1})	Relative Density	Ash (% ad)
MUR001_016	777.810	778.150	Taroom CM	102	45.5	1.43	3.42	3.04	3.07E-05	1.79	53.7
MUR001_017	782.060	782.860	Taroom CM	102	45.5	1.15	2.06	31.08	4.00E-06	1.57	40.0
MUR001_018	787.900	788.540	Taroom CM	102	45.5	1.11	2.05	38.15	5.65E-06	1.63	42.5
MUR001_019	803.370	803.670	Taroom CM	102	45.5	1.03	2.53	10.70	3.98E-05	1.74	50.5
MUR001_020	807.290	808.090	Taroom CM	102	45.5	0.94	1.89	13.67	1.74E-05	1.66	43.5
MUR001_021	808.090	808.790	Taroom CM	28	45.5	1.72	2.26	NR	7.54E-06	1.42	19.1

*As prescribed by QGC Pty Limited
#Raw Gas Content is back-calculated from the Total DAF Gas Content using moisture and ash values from both the desorption sample and the sub sample used to measure residual gas. This is not equal to the sum of Q1 (Raw), Q2 (Raw) and Q3 (Raw).
^NR - Not Reached

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)
MUR001_001	B	34.7	44.67	99.40	0.22	0.38	0.00
	C	103.8	19.80	84.70	0.22	0.48	14.60
MUR001_002	C	103.7	21.80	78.20	0.55	0.65	20.60
MUR001_003	C	31.6	9.16	65.00	0.32	1.78	32.90
	D*	31.6	99.76	-	-	-	-
	E	31.6	93.53	85.80	0.70	1.10	12.40
MUR001_004	B	34.7	38.68	99.60	0.12	0.28	0.00
	C	103.8	24.24	77.60	0.43	0.57	21.40
MUR001_005	B	33.9	35.27	97.40	0.43	0.42	1.75
	C	103.1	16.81	76.00	2.46	1.04	20.50
MUR001_006	B	33.9	48.91	98.10	1.37	0.53	0.00
	C	103.8	70.24	95.10	4.12	0.78	0.00
MUR001_007	B	33.9	45.45	99.00	0.50	0.50	0.00
	C	103.8	14.90	76.40	2.23	1.67	19.70
MUR001_008	C	103.8	14.00	43.50	1.44	2.06	53.00
MUR001_009	A	8.4	60.94	79.30	0.88	1.12	18.70
	B	32.4	51.98	82.10	0.83	1.07	16.00
	C	102.4	12.69	84.60	0.47	0.93	14.00
MUR001_010	A	8.3	27.64	85.50	0.51	0.89	13.10
	B*	32.3	100.00	-	-	-	-
	C	102.3	25.20	98.80	0.63	0.57	0.00
MUR001_011	A	8.1	18.20	97.80	1.17	1.03	0.00
	B	15.1	18.39	86.80	1.00	1.40	10.80
	C	102.1	11.27	97.40	1.73	0.87	0.00
MUR001_012	A	8.1	25.17	88.80	1.17	1.13	8.90
	B	15.1	27.76	91.40	0.96	1.39	6.25
	C	102.1	12.40	97.40	1.83	0.77	0.00
MUR001_013	A	8.0	15.30	72.00	1.22	0.88	25.90
	B	15.0	35.06	83.40	1.33	1.17	14.10
	C	102.0	11.07	93.50	2.13	0.80	3.57
MUR001_014	A	8.0	56.55	97.60	1.49	0.77	0.14
	B	32.0	33.11	89.00	1.28	0.90	8.82
	C	102.1	17.52	39.70	1.14	0.86	58.30
MUR001_015	A	7.6	29.59	92.40	1.10	0.62	5.88
	B	31.6	36.55	97.70	1.30	1.00	0.00
	C	101.7	14.63	96.40	2.45	0.85	0.30

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)
MUR001_016	A	7.1	25.87	97.20	1.94	0.86	0.00
	B	31.1	51.44	97.30	1.92	0.78	0.00
	C	101.2	15.62	95.20	3.56	1.24	0.00
MUR001_017	A	7.1	10.06	92.70	1.38	0.90	5.02
	B*	14.1	95.44	-	-	-	-
	C	101.2	13.24	97.00	1.95	1.05	0.00
MUR001_018	A	7.0	23.29	92.90	0.96	1.44	4.70
	B	31.0	27.98	97.60	1.30	1.10	0.00
	C	101.1	12.61	97.90	1.28	0.82	0.00
MUR001_019	A	6.8	33.18	59.70	0.78	0.42	39.10
	B	30.8	55.22	85.60	1.31	0.69	12.40
	C	100.9	18.66	58.50	1.17	0.93	39.40
MUR001_020	A	6.7	87.70	97.20	1.55	1.25	0.00
	B	13.7	9.62	78.90	0.77	1.13	19.20
	C*	100.8	99.89	-	-	-	-
MUR001_021	A	6.7	17.81	89.60	0.96	0.67	8.77
	C	27.6	7.54	87.40	0.87	1.13	10.60
	D	27.7	64.01	97.90	1.55	0.55	0.00
	E	27.7	65.35	97.70	1.71	0.59	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.

1 Introduction

Murdoch 1 is located within the Surat Basin, approximately 79km south-west of Milmerran. The well was spudded on 31st March 2013 and drilled to a Total Depth of 853.860 m, which was reached on 16th April 2013. Well location and drilling information is summarised in Table 1.

Table 1: Well Information

Well Name and Number	Murdoch 1
Basin	Surat
MGA Easting (m E):	268824.000
Northing (m N):	6902160.000
Zone:	56
Elevation G.L.(m):	352.000
Permit	ATP965P
Drilling Contractor	Spaulding Drillers
Date Drilling Commenced	31/03/2013
Date Drilling Completed	16/04/2013
Total Depth (m)	853.860
Core Diameter (mm)	61.5
Desorption Temperature (ºC)	38.0, 42.0 and 45.5
Status	Plugged & Abandoned

Gas desorption properties were measured on twenty-one (21) core samples, varying in size from 0.300 m to 0.810 m, collected from the Upper Juandah, Lower Juandah and Taroom Coal Measures. Additional analyses were performed on the core samples once the desorption measurements were completed.

2 Procedures

An outline of the desorption testing procedures and analysis is shown in Figure 1.

2.1 Field

Earth Data Pty Ltd was engaged by QGC Pty Limited to provide onsite geological supervision and desorption testing. Core samples recovered were lithologically logged and described.

All coal samples in excess of 0.300 m in thickness from between the depths of 622.440 m and 808.790 m were collected for desorption testing.

Desorption samples were sealed in airtight canisters soon after the core reached the surface; the canisters were then purged with helium and placed on test. For samples with thicknesses less than 0.700 m, void space fillers were placed in the desorption canister with the sample in order to reduce the headspace volume within the canister. While on test, gas content measurements were carried out, originally at 2 minute intervals and decreased in frequency over time. Table 2 shows the typical frequency at which desorption measurements are collected. Desorption samples were maintained at temperatures of approximately 38.0, 42.0 ºC or 45.5 ºC to replicate reservoir conditions.

One (1) gas composition sample was scheduled to be collected from each desorption sample 12-24 hours after the first desorption measurement. Additional gas composition samples were collected after the samples were transported to the laboratory facility.

At the conclusion of drilling Murdoch 1, the desorption samples were transported to Earth Data's laboratory facility for further analyses and testing.

Table 2: Standard Frequency of Field Desorption Measurements

Frequency of reads	Quantity of reads	Total time elapsed
2 minute	20	40 minutes
5 minute	12	100 minutes
15 minute	6	3 hours, 10 minutes
30 minute	6	6 hours, 10 minutes
1 hour	6	12 hours, 10 minutes
2 hour	6	24 hours, 10 minutes
6 hour	Until samples are sent to laboratory facility	

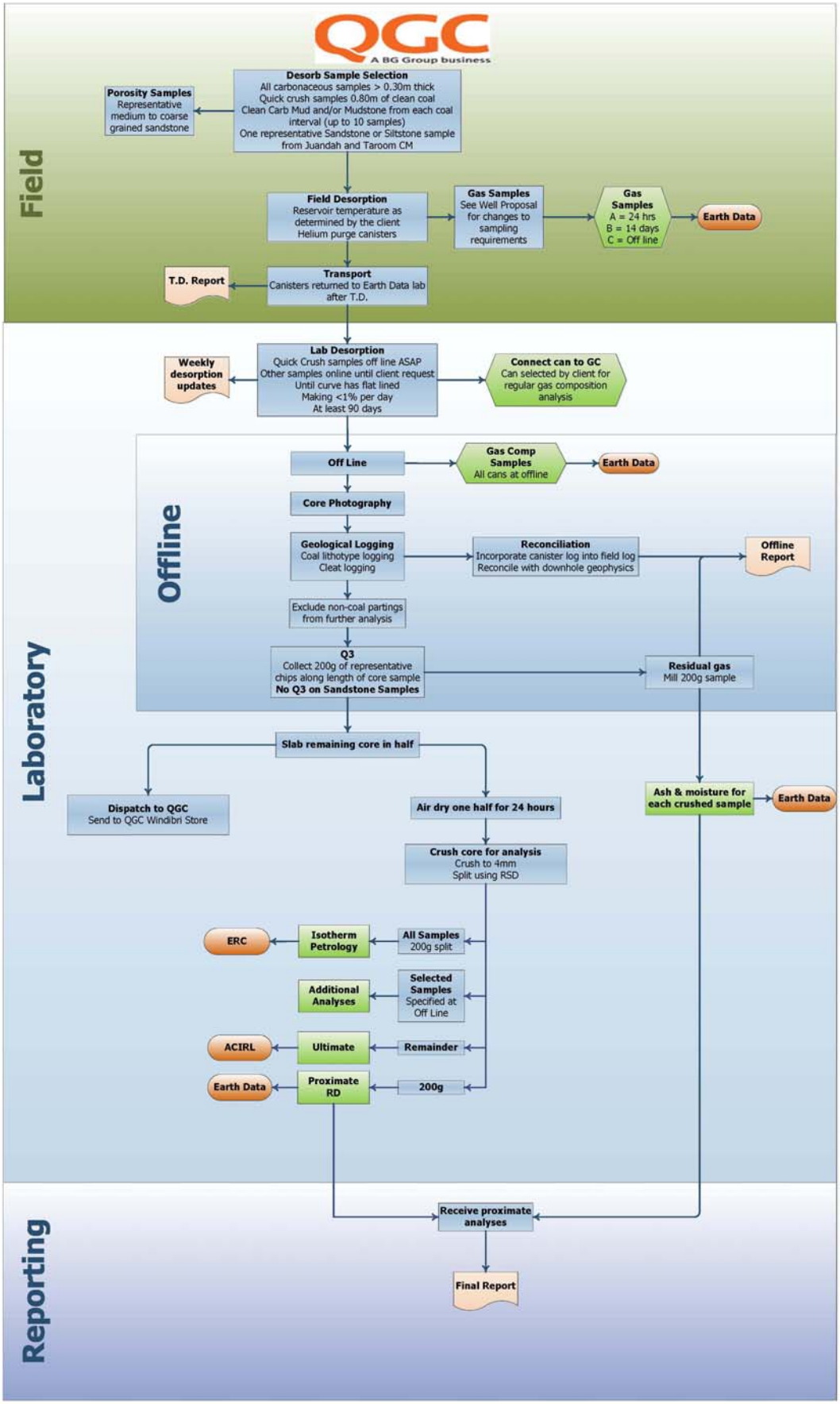


Figure 1: Flow Chart of Desorption Sample Processing and Analysis Procedures

2.2 Laboratory

Gas content measurements were continued at Earth Data's laboratory facility until instructed by QGC Pty Limited to take the samples off test. In general, measurements continued for between 102 and 105 days. Two (2) samples, MUR001_003 and MUR001_021, were selected for Express Desorption and remained online for the shortest time possible. After the final gas content measurement, the void space of each canister was measured using a helium reference cell. The core samples were lithologically logged and photographed, the coal and non-coal portions of each sample were weighed, and representative subsamples were analysed for residual gas. All core was slabbed in half, with half used for analysis and the remaining half returned to QGC Pty Limited.

Table 3 details the processes undertaken for each sample. Table 4 lists the provider for each service and the standard methodology used.

2.2.1 Gas Volume Measurement

Measurement of desorbable gas volume was performed using inverted water-filled measuring cylinders[1]. Gas was introduced into the inverted cylinder above the water level and bleed valves on the canisters were closed between successive readings to reduce the possibility of carbon dioxide absorption by the water. Readings were made at a frequency sufficient to minimise pressure build-up in canisters between successive readings. All measured gas volumes were corrected to a standard temperature and pressure (293.15 K and 1 Atmosphere) using the method described in Australian Standard AS 3980-1999 with the exception that canister void space temperature was measured and not assumed equal to ambient temperature.

2.2.2 Lost Gas (Q1)

The modified USBM calculation[2] of Q1 using actual lost gas time has been used for the lost gas calculation of all samples. Time zero was calculated assuming a normal formation pressure gradient of 0.433 psi/ft, along with known mud weight and depth, to determine the depth at which formation pressure of the sample equalled hydrostatic pressure. The time that this depth was reached during the trip out was calculated by measuring the rate of wireline retrieval.

2.2.3 Desorbable Gas (Q2)

Successive, corrected gas volume measurements were added to determine the desorbable gas volume of each sample. Plots showing the relationship between elapsed time and both cumulative gas volume and cumulative gas content of each sample were created from the gas volume data.

2.2.4 Residual Gas (Q3)

For the extended desorption samples residual gas (Q3) was measured within one hour of removal of the desorption sample from the canister. Subsamples weighing 200 g were taken from each desorption sample and pulverised to liberate residual gas. The sample used to measure residual gas was then analysed by Earth Data for ash and moisture content to allow reporting of the residual gas content on a DAF basis.

For the express desorption samples, two (2) 200 g subsamples were taken from each sample and crushed to liberate residual gas. Both subsamples were then analysed by Earth Data for ash and moisture content. The weighted average of the two gas content measurements was used as the Q3 value, and the weighted average of the ash and moisture content was used to report the residual gas on a dry, ash-free basis.

In both cases, corrections were made to the liberated gas volume to allow for ambient air temperature and pressure changes and void space temperature changes during crushing[3].

---

[1] This method is described completely in Australian Standard AS3980-1999 - "Guide to the Determination of Gas Content of Coal - Direct Desorption Method".

[2] This calculation is described in Smith and Williams' paper – "Direct Method of Determining the Methane Content of Coal - A Modification"

[3] Not specified in the Australian Standard

2.2.5 Coal Analysis

For each desorption sample a 200 g subsample was collected for proximate analysis. Proximate analysis was carried out by Earth Data according to Australian Standard AS1038.3-2000. The remainder of each desorption sample was sent to ACIRL for ultimate analysis. Further 200 g subsamples were split off by ACIRL and sent to ERC for isotherm and petrographic analysis.

2.2.6 Total Gas Content (Q_m)

Corrected gas volumes for lost, desorbable and residual gas for all desorption samples were divided by their measured masses to produce as received (raw) gas content results in m^3/tonne. Proximate analysis results (ash and moisture) and relative density measurements were used to report the raw results on a DAF basis. The DAF corrected lost, desorbable and residual gas contents were summed to give total gas content for each sample. In cases where more than one desorption sample was taken from a seam, the DAF mass percent of each desorption sample was used in calculating the weighted average DAF total gas content for the seam.

2.2.7 Gas Composition

Three (3) gas composition samples were scheduled for collection from each extended desorption sample at 12-24 hours after the first desorption measurement (A), 14 days after the first desorption measurement (B), and at the time of the final desorption measurement (C). Not all desorption samples were sampled for gas composition as scheduled due to insufficient volumes of gas produced at the scheduled times.

Five (5) gas composition samples were scheduled for collection from the express desorption samples MUR001_003 and MUR001_021; one (1) approximately 1 day after the first desorption measurement (A), one (1) approximately 14 days after the first desorption measurement (B), one (1) at the time of the final desorption measurement (C) and a further two (2) when the core samples were crushed to liberate residual gas (D and E). Not all samples were collected due to insufficient volumes of gas produced at the scheduled times.

Air content is determined based on measured O_2+Ar and proportionate amounts of N_2 (N_2:O_2+Ar ratio of 3.57) and CO_2 (CO_2:O_2+Ar ratio of 0.001435) typically associated with air. The raw gas composition analysis results are subsequently reported on an air-free basis. The total amounts of N_2 and CO_2 measured in the sample less the amounts associated with air are assumed to have desorbed from the core sample.

Table 3: Analyses Performed on Desorption Samples

Sample ID	Depth From (mMD)	Depth To (mMD)	Formation	Express Desorption	Extended Desorption	Gas Composition Sample Count	Canister Connected To GC	Slabbing	Proximate Analysis	Ultimate Analysis	Petrographic Analysis	Isotherm Analysis	Isotope Analysis	Gamma Scanner	Core Scanner
MUR001_001	622.440	623.190	Upper Juandah CM			2									
MUR001_002	623.460	624.100	Upper Juandah CM			1									
MUR001_003	624.340	624.690	Upper Juandah CM			3									
MUR001_004	624.740	625.240	Upper Juandah CM			2									
MUR001_005	639.490	640.200	Upper Juandah CM			2									
MUR001_006	640.200	641.010	Upper Juandah CM			2									
MUR001_007	642.750	643.350	Upper Juandah CM			2									
MUR001_008	643.580	644.120	Upper Juandah CM			1									
MUR001_009	682.840	683.140	Lower Juandah CM			3									
MUR001_010	696.650	697.440	Lower Juandah CM			3									
MUR001_011	708.340	709.060	Lower Juandah CM			3									
MUR001_012	709.060	709.720	Lower Juandah CM			3									
MUR001_013	709.720	710.290	Lower Juandah CM			3									
MUR001_014	712.970	713.320	Lower Juandah CM			3									

Sample ID	Depth From (mMD)	Depth To (mMD)	Formation	Express Desorption	Extended Desorption	Gas Composition Sample Count	Canister Connected To GC	Slabbing	Proximate Analysis	Ultimate Analysis	Petrographic Analysis	Isotherm Analysis	Isotope Analysis	Gamma Scanner	Core Scanner
MUR001_015	744.660	744.980	Lower Juandah CM			3									
MUR001_016	777.810	778.150	Taroom CM			3									
MUR001_017	782.060	782.860	Taroom CM			3									
MUR001_018	787.900	788.540	Taroom CM			3									
MUR001_019	803.370	803.670	Taroom CM			3									
MUR001_020	807.290	808.090	Taroom CM			3									
MUR001_021	808.090	808.790	Taroom CM			4									

Legend: Not Performed Performed

Table 4: Service Providers and Methodologies

Procedure	Provider	Methodology
Gas Content Measurement	Earth Data	AS3980-1999
Gas Composition Analysis	Earth Data	Method: ASTM D1945-03 Calculations: ISO6976-1995
Relative Density Analysis	Earth Data	NATA Accredited In-House Method (RD-01) using Helium Pycnometer
Proximate Analysis	Earth Data	AS1038.3-2000
Ultimate Analysis	ACIRL	AS1038.6.1-1997
Petrographic Analysis	ERC	AS2856, ISO7404, ICCP Guide Lines
Isotherm Analysis	ERC	No Australian Standard Available
Isotope Analysis	N/A	No Australian Standard Available

3 Results

Lost and desorbable gas readings and curves for individual desorption samples are presented in Appendix I.

3.1 Sample Geology

Geological descriptions and core photographs for all desorption samples are available in Appendix IV.

3.2 Gas Content

Gas content data is also presented in Appendix I.

3.2.1 Lost Gas (Q1)

The interval of lost gas (time zero to sample sealing time) for samples in Murdoch 1 ranged from 26 minutes to 40 minutes (excluding desorption samples MUR001_002, MUR001_003 and MUR001_004). The Q1 values ranged from 0.04 m^3/tonne to 0.90 m^3/tonne, representing between 3% and 52% of the total gas content, on a DAF basis, for all samples. Q1 data is summarised in Table 5.

The inner tube containing desorption samples MUR001_002, MUR001_003 and MUR001_004 became stuck in the core barrel resulting in the drill crew having to pull out of the hole in order to retrieve the core. This resulted in a lost gas time of approx 4 hours for these samples and subsequently high lost gas values.

3.2.2 Desorbable Gas (Q2)

Q2 values ranged from 0.60 m^3/tonne to 2.95 m^3/tonne, representing between 35% and 95% of the total gas content, on a DAF basis, for all samples. Q2 data is summarised in Table 5.

The cumulative lost and desorbed DAF gas values are plotted against elapsed time in Figures 2.

3.2.3 Residual Gas (Q3)

Q3 values ranged from 0.00 m^3/tonne to 1.14 m^3/tonne, representing 0% to 51% of the total gas content, on a DAF basis, for all samples. Q3 data is summarised in Table 5 and is presented in full in Appendix II.

3.2.4 Total Gas Content (Q_m)

The Q_m (DAF) values ranged from 0.70 m^3/tonne to 3.42 m^3/tonne. Raw and DAF total gas content results are summarised in Table 5 and presented in Appendix I. Weighted average DAF total gas contents were calculated for samples in close proximity (maximum interburden thickness of 0.350m) and are presented in Table 5.

Q1, Q2 and Q3 values and proportions are presented in Figures 3 and 4.

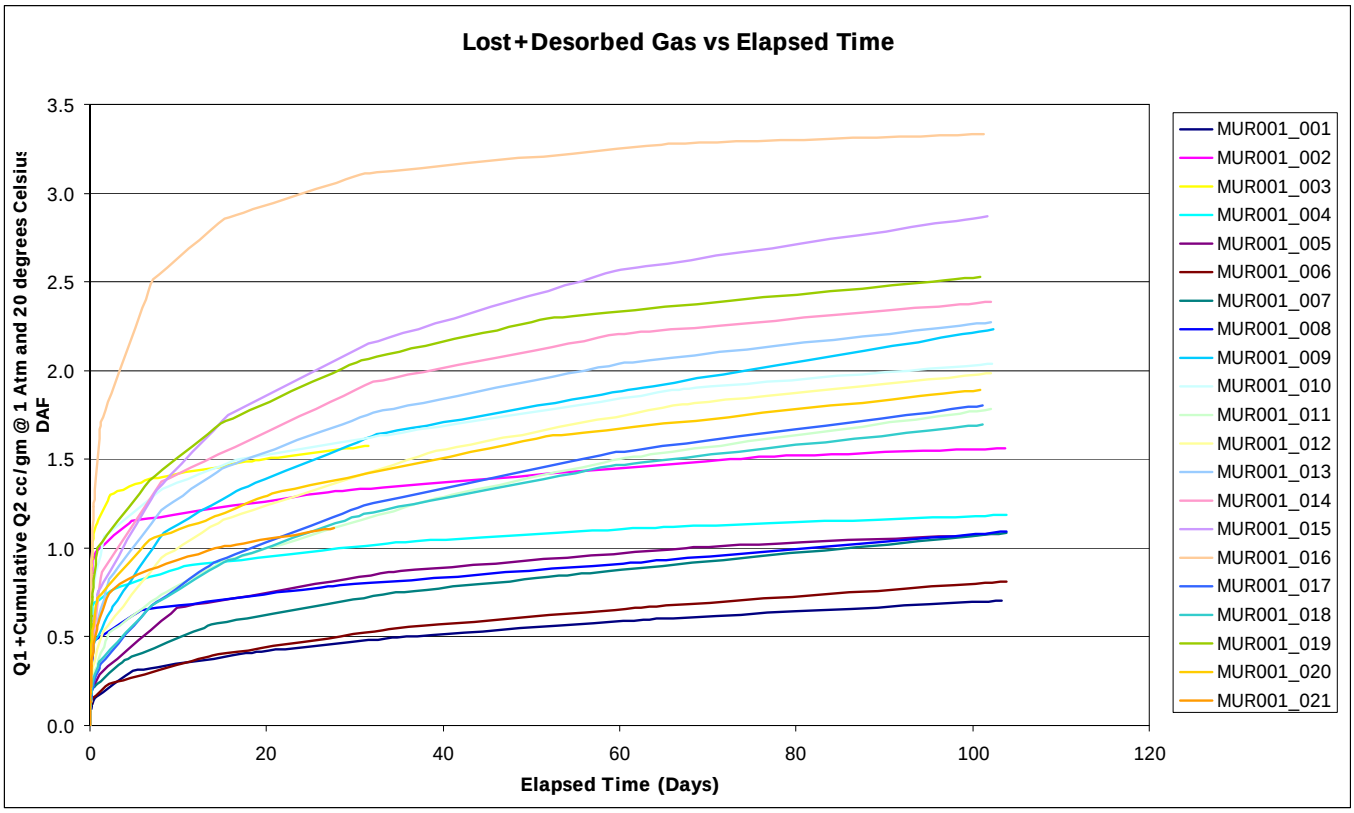


Figure 2: Combined Lost Gas and Desorbed Gas (Q1+Q2) vs. Elapsed Time (DAF)

Table 5: Gas Desorption Summary (Raw and DAF)

Sample ID	Depth Top (mMD)	Depth Base (mMD)	Thickness (m)	Q1 (m^3/tonne Raw)	Q1 (m^3/tonne DAF)	Q2 (m^3/tonne Raw)	Q2 (m^3/tonne DAF)	Q3 (m^3/tonne Raw)	Q3 (m^3/tonne DAF)	Total Gas Content (m^3/tonne Raw) #	Total Gas Content (m^3/tonne DAF)	Sorption Time (Days)^	Diffusivity (sec^{-1})
MUR001_001	622.440	623.190	0.750	0.03	0.04	0.45	0.66	0.00	0.00	0.48	0.70	18.84	1.18E-05
MUR001_002	623.460	624.100	0.640	0.33	0.82	0.30	0.75	0.00	0.00	0.64	1.57	0.82	9.48E-05
MUR001_003	624.340	624.690	0.350	0.77	0.90	0.58	0.68	0.30	0.36	1.65	1.94	1.60	7.35E-05
MUR001_004	624.740	625.240	0.500	0.41	0.59	0.41	0.60	0.00	0.00	0.83	1.19	1.60	8.58E-05
Wgt Avg	622.440	625.240	2.800								1.26		
MUR001_005	639.490	640.200	0.710	0.06	0.11	0.50	0.97	0.00	0.00	0.56	1.08	9.90	2.07E-05
MUR001_006	640.200	641.010	0.810	0.05	0.07	0.53	0.74	0.04	0.06	0.63	0.87	33.90	1.40E-05
Wgt Avg	639.490	641.010	1.520								0.97		
MUR001_007	642.750	643.350	0.600	0.03	0.07	0.43	1.02	0.00	0.01	0.47	1.10	23.84	1.64E-05
MUR001_008	643.580	644.120	0.540	0.11	0.14	0.77	0.96	0.09	0.10	0.97	1.20	17.97	3.16E-05
Wgt Avg	642.750	644.120	1.370								1.14		
MUR001_009	682.840	683.140	0.300	0.15	0.16	1.86	2.07	0.21	0.25	2.20	2.48	25.46	1.31E-05
MUR001_010	696.650	697.440	0.790	0.19	0.24	1.40	1.80	0.12	0.16	1.71	2.20	8.29	2.89E-05
MUR001_011	708.340	709.060	0.720	0.05	0.07	1.39	1.72	0.18	0.32	1.67	2.11	39.27	3.10E-06
MUR001_012	709.060	709.720	0.660	0.07	0.09	1.62	1.90	0.22	0.26	1.91	2.25	25.13	5.70E-06
MUR001_013	709.720	710.290	0.570	0.11	0.14	1.66	2.13	0.11	0.14	1.88	2.41	16.14	8.31E-06
Wgt Avg	708.340	710.290	1.950								2.24		
MUR001_014	712.970	713.320	0.350	0.09	0.18	1.08	2.20	0.00	0.00	1.15	2.38	8.03	1.22E-05
MUR001_015	744.660	744.980	0.320	0.14	0.24	1.59	2.64	0.07	0.11	1.81	2.99	15.67	1.49E-05
MUR001_016	777.810	778.150	0.340	0.16	0.38	1.23	2.95	0.04	0.09	1.43	3.42	3.04	3.07E-05
MUR001_017	782.060	782.860	0.800	0.05	0.08	0.98	1.73	0.11	0.25	1.15	2.06	31.08	4.00E-06

Sample ID	Depth Top (mMD)	Depth Base (mMD)	Thickness (m)	Q1 (m^3/tonne Raw)	Q1 (m^3/tonne DAF)	Q2 (m^3/tonne Raw)	Q2 (m^3/tonne DAF)	Q3 (m^3/tonne Raw)	Q3 (m^3/tonne DAF)	Total Gas Content (m^3/tonne Raw) #	Total Gas Content (m^3/tonne DAF)	Sorption Time (Days) ^	Diffusivity (sec^{-1})
MUR001_018	787.900	788.540	0.640	0.05	0.09	0.87	1.60	0.17	0.36	1.11	2.05	38.15	5.65E-06
MUR001_019	803.370	803.670	0.300	0.13	0.30	0.94	2.23	0.00	0.00	1.03	2.53	10.70	3.98E-05
MUR001_020	807.290	808.090	0.800	0.09	0.18	0.86	1.71	0.00	0.00	0.94	1.89	13.67	1.74E-05
MUR001_021	808.090	808.790	0.700	0.10	0.14	0.74	0.98	0.91	1.14	1.72	2.26	NR	7.54E-06
Wgt Avg	807.290	808.790	1.500								2.04		

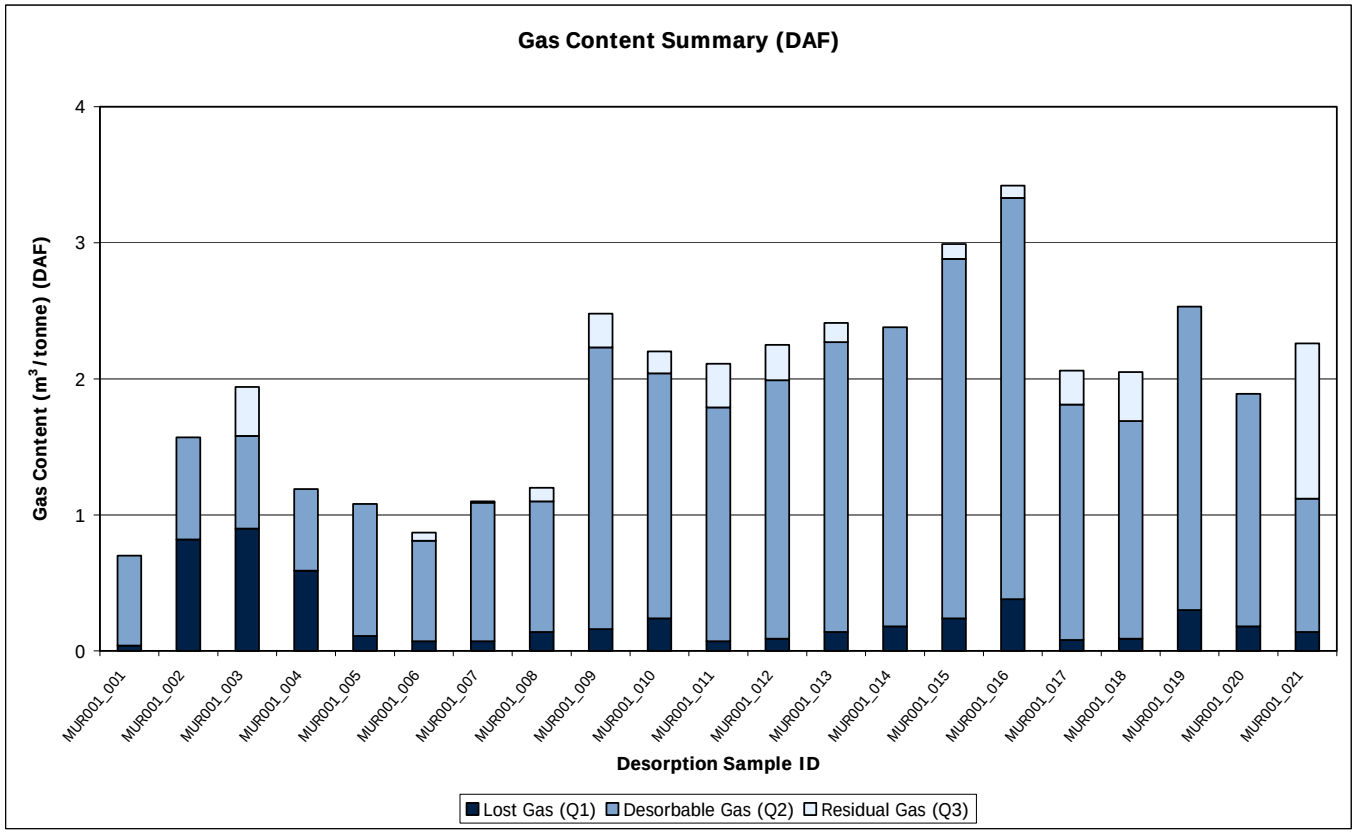


Figure 3: Lost, Desorbed and Residual Gas Content Summary (DAF)

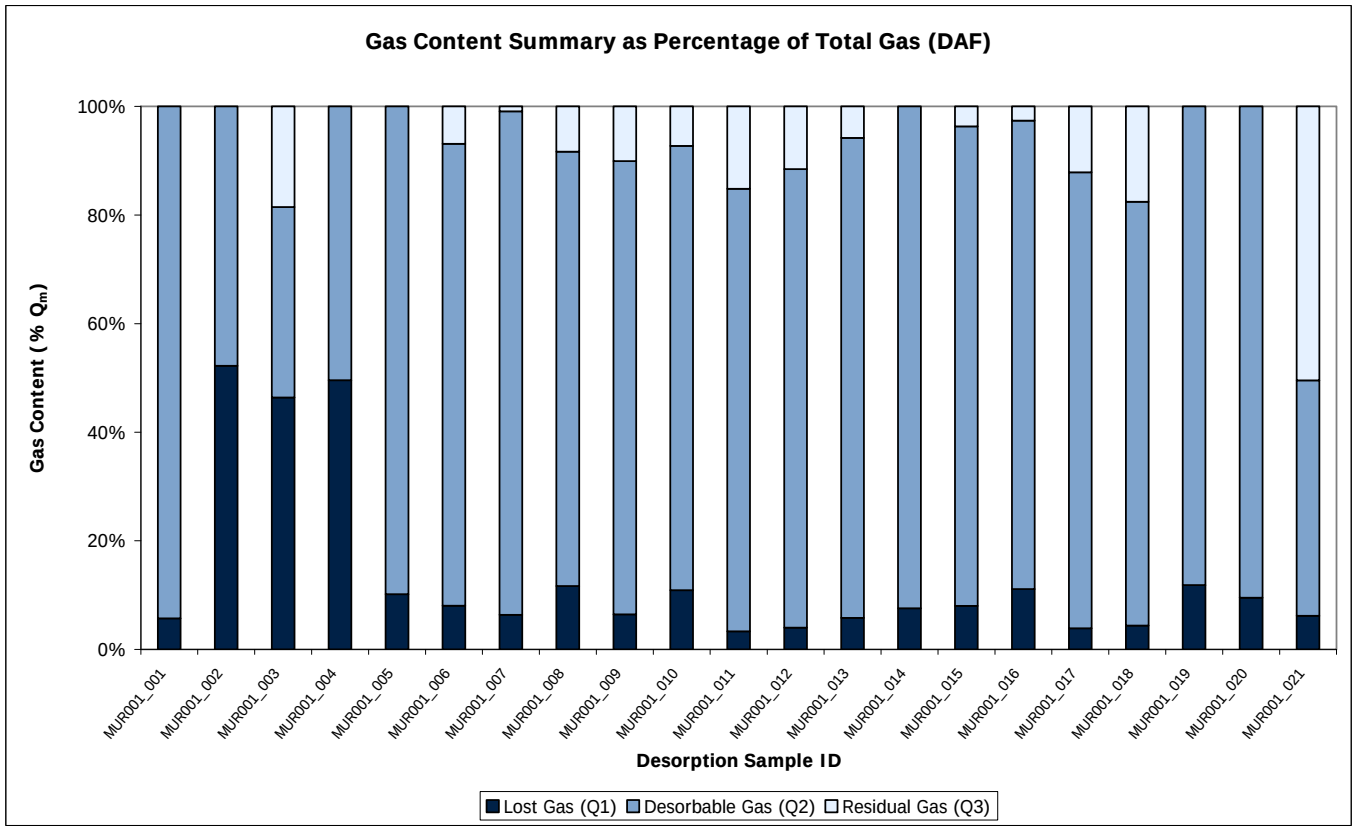


Figure 4: Lost, Desorbed and Residual Gas Content Summary as Percentage of Total Gas (DAF)

3.3 Gas Composition

Methane concentrations are between 39.70 mol% and 99.60 mol% on an air-free basis. Air-free methane concentrations are presented in Figures 5 and 6. Full gas composition results are included in Appendix III.

The confidence in the results for cases where the air contents exceed 40 mol% is considered low as defined in Table A in Appendix VI.

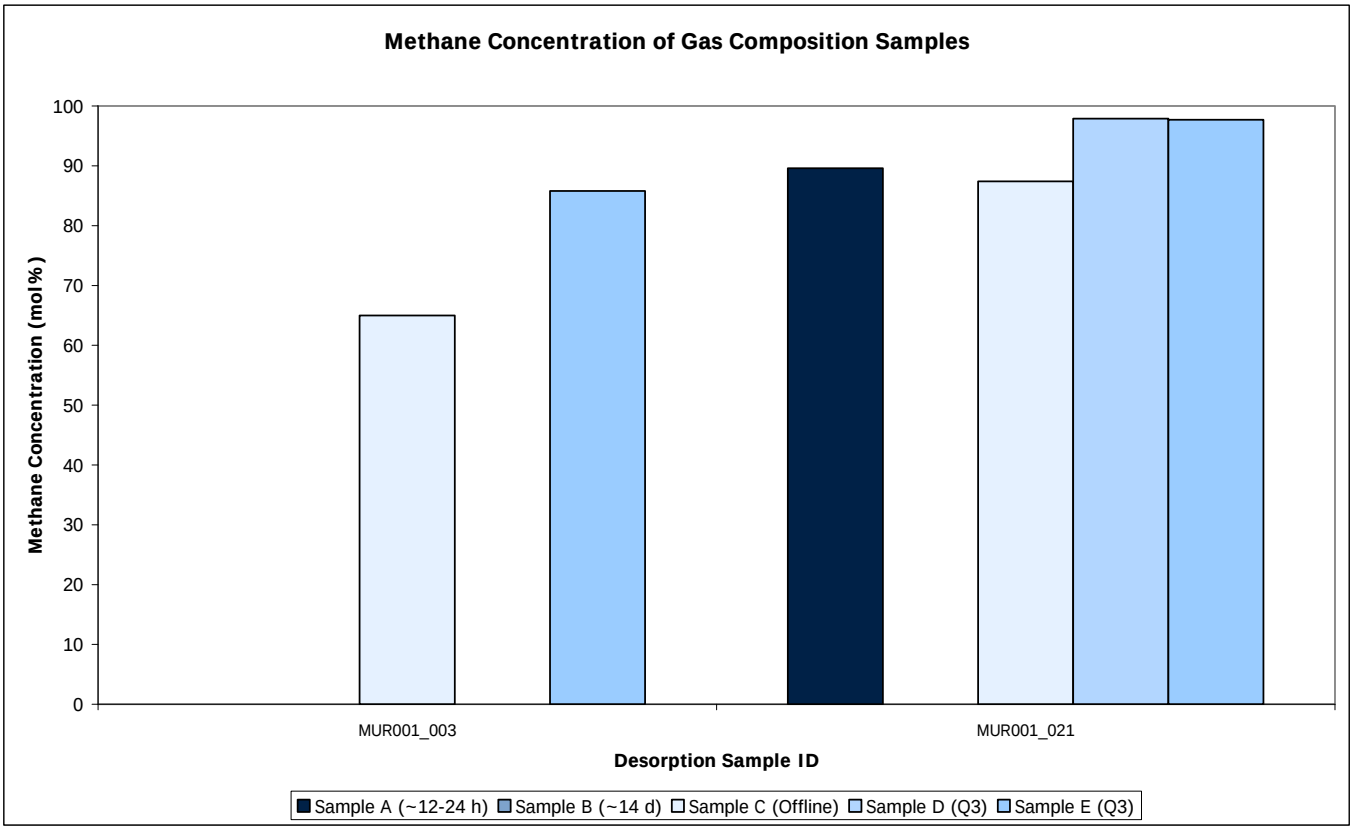


Figure 5: Gas Composition Methane Concentrations (Express Desorption Sample)

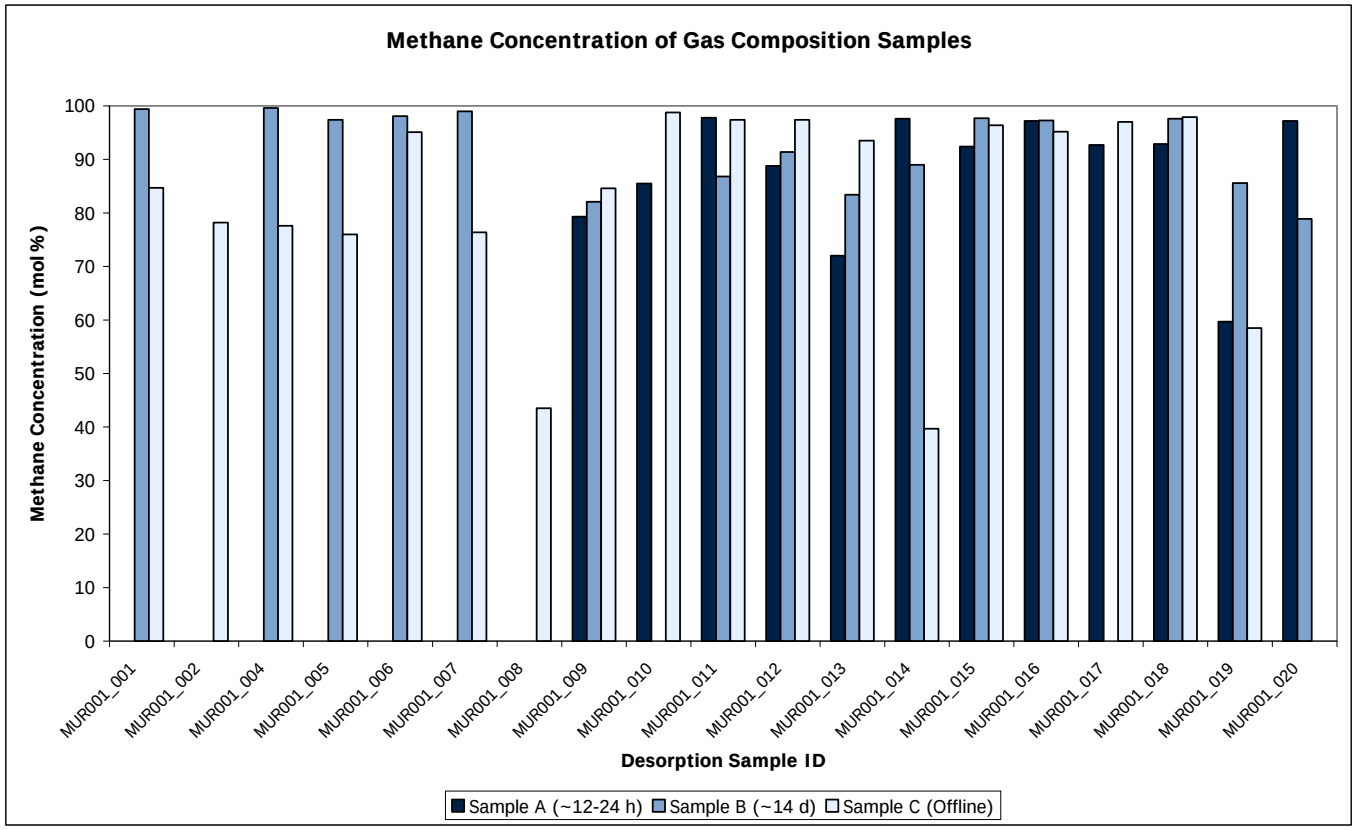


Figure 6: Gas Composition Methane Concentrations (Extended Desorption Samples)

4 QAQC

4.1 Initial Desorption Rate (IDR30)

The initial desorption rate (IDR30) is defined as the quantity of gas (m^3/tonne) obtained in the initial 30 minutes of desorption. This can be related to Q_m (Raw) as shown in Figure 7. The intention of this plot is to identify samples whose desorption measurement may have been affected by leaking canisters or measuring apparatus. Any points lying within the region of abnormally high desorption or potential leakage indicated in Figure 7 represent potentially affected samples that require investigation.

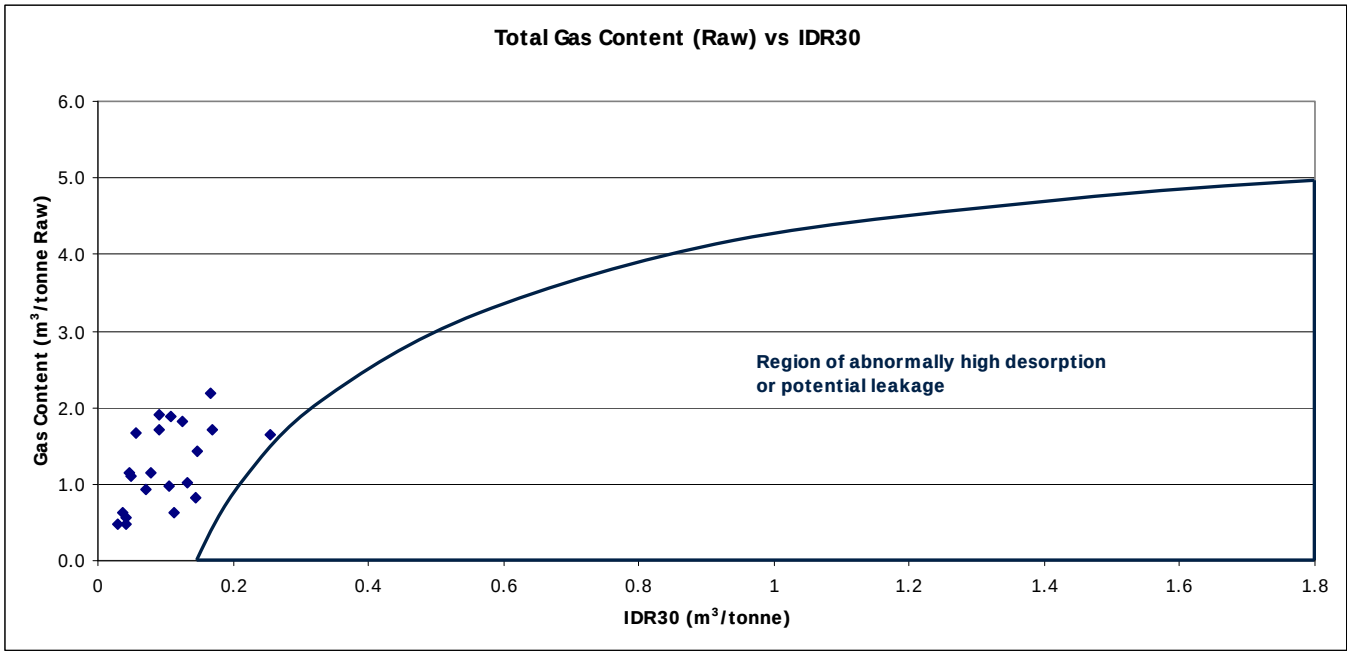


Figure 7: Gas Content (Raw) vs. Initial Desorption Rate (IDR30)

4.2 Lost Gas (DAF) vs. Diffusivity

A higher diffusivity tends to result in a larger amount of gas being lost prior to sealing a desorption sample in a canister. The lost gas content (Q1), as a percentage of the total gas content (Q_m), for the desorption samples increases with diffusivity as expected (Figure 8). The purpose of this plot is to validate Q1 interpretation.

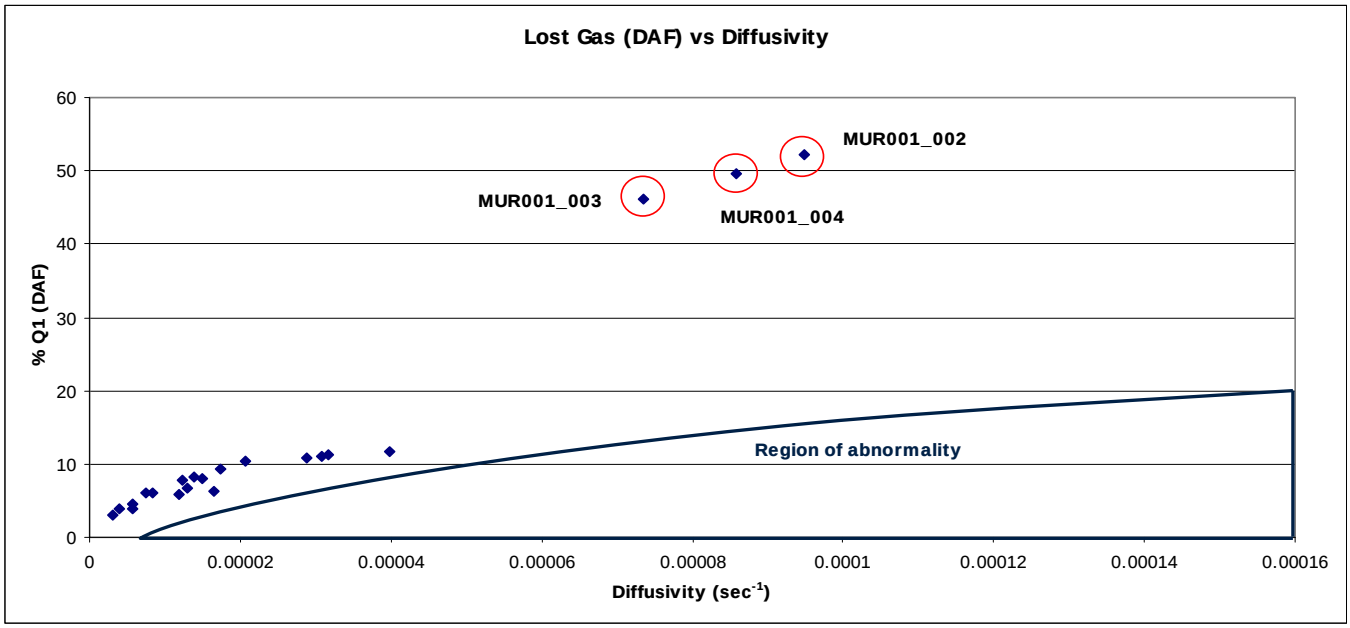


Figure 8: Lost Gas (DAF) vs. Diffusivity

Desorption samples MUR001_002, MUR001_003 and MUR001_004 have high lost gas values due to a delay of approximately 4 hours in placing them on test as explained in 3.2.1.

4.3 Ash and Moisture Content

The correlation between the combined ash and moisture content (determined from proximate analysis) and the sample density, is demonstrated in Figure 9. The correlation between the Q2 ash content and Q3 ash content demonstrated in Figure 10. These plots evaluate the accuracy of our sampling techniques when collecting samples for proximate analysis and residual gas measurement. A strong correlation on each plot indicates a high level of sample representivity.

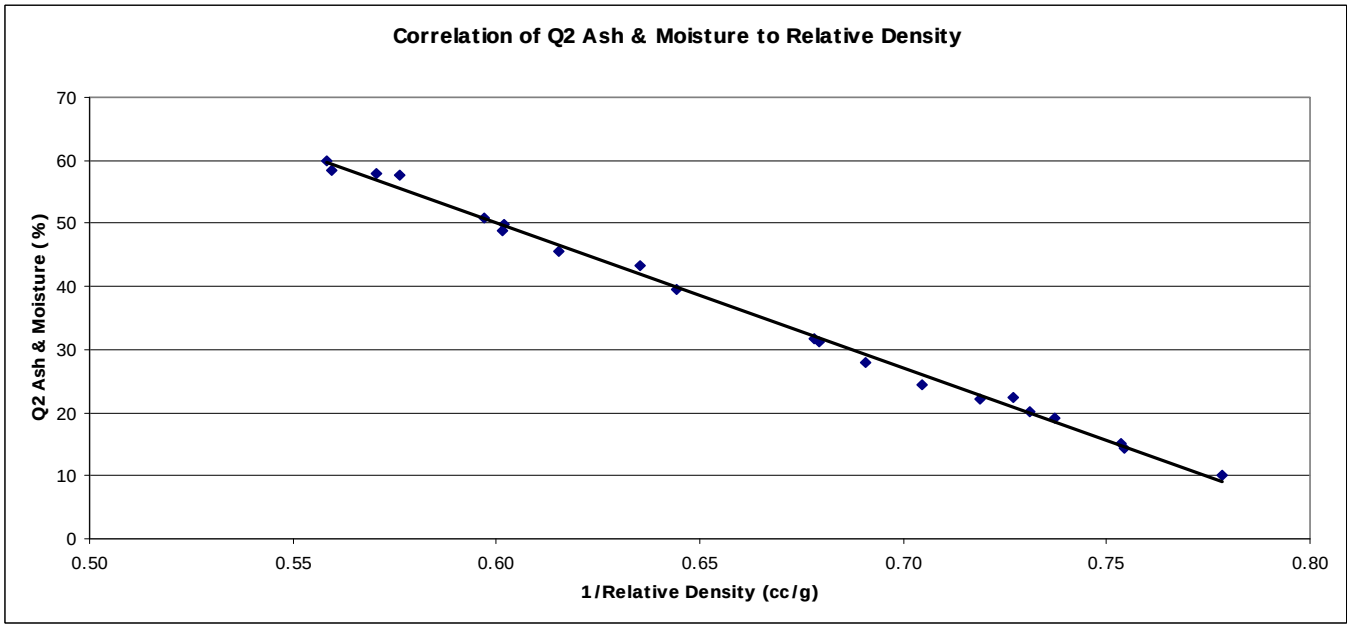


Figure 9: Correlation of Ash and Moisture Content to Relative Density

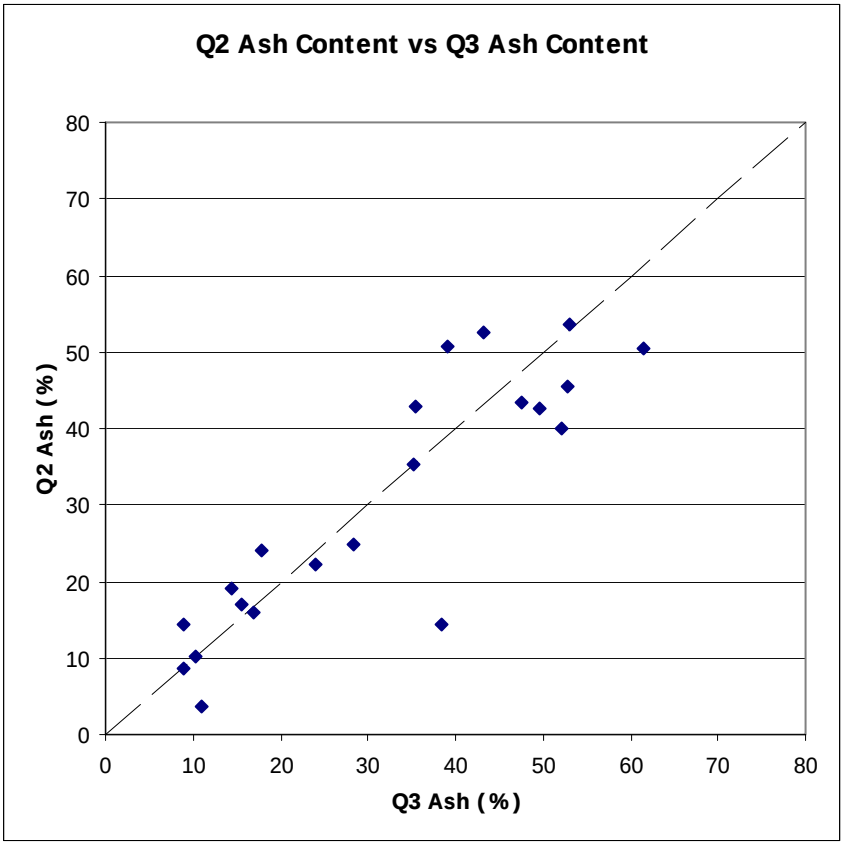


Figure 10: Correlation of Q2 Ash Content to Q3 Ash Content

5 Earth Data Desorption Glossary

Adsorption - adherence through chemical or physical bonding of gas molecules to the surface of solids, for example methane on coal surfaces. Adsorbed molecules are at metastable equilibrium which is strongly affected by changes pressure and temperature – changes in pressure and temperature results in detachment or desorption of the adsorbed molecules.

Adsorption Isotherm Analysis - analysis to determine the quantity of gas a sample can theoretically contain at its reservoir conditions, used to determine the gas saturation level of a sample.

As Received – a reporting basis that includes total moisture, including surface moisture.

Ash – inorganic, non combustible components of coal.

Basis – normalization of analytical results by excluding the percentages of certain components, for example, ash and moisture.

Calculated Raw Gas Content – back-calculated from the Total DAF Gas Content using moisture and ash values from both the desorption sample and the sub sample used to measure residual gas. This is not equal to the sum of Q1 (Raw), Q2 (Raw) and Q3 (Raw).

Canister – an air-tight, cylindrical container used to contain coal for the purpose of measuring gas desorbed from the coal.

Cleat – a regular, generally hand specimen scale fracture system in a coal seam.

Desorbed Gas – commonly referred to as Q2 or measured gas, is the amount of gas that desorbs from a coal sample while it's sealed in a canister.

Desorption – physical detachment of gas molecules attached or adsorbed on coal surfaces.

Diffusion - the process whereby particles of liquids or gases move from a region of higher to lower concentration, independent of the pressure gradient.

Diffusivity - the ratio of the diffusion coefficient to the square of a typical diffusion distance.

Dry, Ash-Free - a reporting basis that excludes inherent moisture and ash.

Fixed Carbon – solid, combustible part of coal.

Gas Content – the gas content of coal is generally reported as volume of gas per unit of coal mass. Common units include cubic metres of gas per tonne of coal (m^3/tonne), which is equivalent to cubic centimetres of gas per gram of coal (cc/gm), and Standard Cubic Feet of gas per US Ton of coal (scf/ton) (1 cc/gm = 32.0369 scf/ton).

Inherent Moisture Content - moisture that exists as an integral part of the coal seam in its natural state, including water in pores but not that present in macroscopically visible fractures.

Lost Gas – commonly referred to as Q1, is the gas that desorbs from a desorption sample before the coal can be sealed in a canister.

Lost Gas Time - the time between when the sample gas pressure falls below the reservoir pressure during sample recovery (time zero) and the time when the sample is sealed in a desorption canister.

Petrographic Analysis – identifies the rank and maceral components of coal.

Proximate Analysis – performed on coal samples to determine the relative percentages for Moisture, Ash, Volatile Matter (by laboratory tests) and of Fixed Carbon (by calculation) in a sample.

Raw Basis - a basis for gas content calculation whereby the gas volume is divided by the actual sample weight, regardless of the moisture content or the presence of non-coal in the canister sample.

Relative Density – the ratio of the density (mass per unit volume) of a sample to the density of a given reference material (usually water).

Remaining Gas – commonly interchanged with Residual Gas, is the gas that remains in the coal after canister desorption measurement has been ceased (as opposed to actual cessation of desorption).

Residual Gas – commonly referred to as Q3, is the gas that will not desorb from the coal matrix at normal pressures.

Sorption Time - the time required for 63.2 percent of the total sorbed gas (including residual gas) to be released. It is reported in either hours or days (since time zero) depending on the relative rate at which gas is released from a desorption sample.

Time Zero – the time gas begins desorbing from a coal sample.

Ultimate Analysis – performed on coal samples to determine the composition of the organic fraction of a coal sample. Determines relative percentages of carbon, hydrogen, nitrogen and sulfur (by laboratory test) and oxygen (by calculation).

USBM - a method for representing desorption of gas from coal or other materials where gas storage due to adsorption is significant. It mathematically presumes constant temperature diffusion from a sphere initially at uniform gas concentration. The solution of the basic equation adopted suggests that the measured desorbed gas volume is proportional to the square root of time since the start of desorption (time zero). The Direct Method is the most widely used method for estimating lost gas volume.

Volatile Matter – gases or vapours given off when coal is heated to a specific temperature in a specific atmosphere.

Void Space – amount of free space inside a desorption canister.

6 References

Australian Standard AS3980-1999 - “Guide to the Determination of Gas Content of Coal - Direct Desorption Method”, Standards Australia, p. 33

McLennan, J. D., Schafer, P. S., and Pratt, T. J., 1995, “A Guide to Determining Coalbed Gas Content”, Gas Research Institute Report GRI-94/0396, p. 182

Smith, D. M. and Williams, F. L., 1981, “Direct Method of Determining the Methane Content of Coal - A Modification”, Fuel, Vol. 63, pp. 425-427

Ward, C. R. (Editor), 1984, “Coal Geology and Coal Technology”, Blackwell Scientific Publications.

Williams, R., 2002, “Gas Content Testing for Outburst Management Compliance”, Underground Coal Operators Conference, Paper 191, p. 50

Appendix I

Lost and Desorbable Gas Readings and Curves

QGC Pty Limited Murdoch 1 - Sample MUR001_001 - 622.440 to 623.190 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_001	Sample Type	Core	Sample Top (m)	622.440	Sample Base (m)	623.190	Core Diameter (cm)	6.15
Sample Volume (cc)	2228	Mass (g)	2858	RD (g/cc)	1.47	Moisture (%ad)	7	Ash (%ad)	24.8
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	8	Q3 Ash (%ad)	28.3
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1168		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	36.7
Sample Penetrated	11/04/2013	16:00		Formation Pressure (Mpa) @ 0.433 psi/ft	6.10			Surface Time Ratio	0.528
Sample Off Bottom	11/04/2013	17:18		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.015
Sample at Surface	11/04/2013	17:35		Depth HSP=Formation Pressure (m)	621.68			USBM Q1 - Surface Time Correction	1.15
Sample Sealed	11/04/2013	17:54		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000
Time Zero	11/04/2013	17:18		Standard Temperature (°C)	20.00	Comments:			
Last Entry	24/07/2013	1:00		Standard Pressure (hPa)	1013				

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3
m^3	0.000	0.000	0.000	0.001	0.000	0.000	0.000	
m^3/tonne (raw)	0.02	0.03	0.00	0.45	0.00	0.470	0.480	
SCF/T (raw)	1	1	0	14	0	15.250	15.370	
m^3/tonne (daf)	0.04	0.04	0.00	0.66	0.00	0.70	**0.70**	0.66
SCF/T (daf)	1	1	0	21	0	22	**23**	21
Percent of daf total	5.16%	5.94%	0.00%	94.53%	Sorption Time (days)	18.84	Diffusivity (sec^{-1})	1.18235E-05

Can Void Calculation: ○ Volumetric ◉ He Reference

Time Zero Calculation: ◉ Auto ○ Manual ○ Cut Time

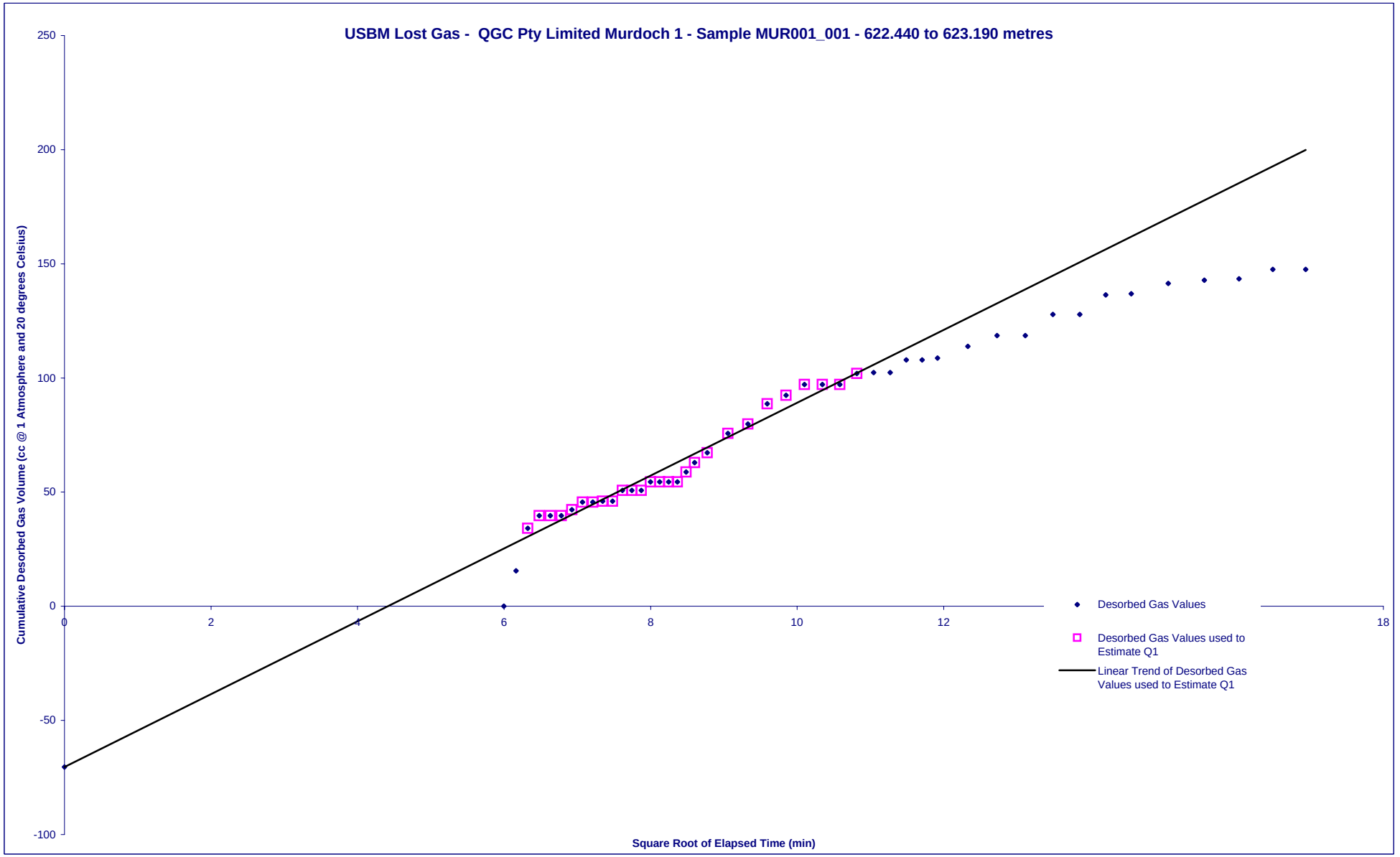
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
11/04/2013	17:54:00	26.2	25.5	24.8	978.4	100	100	2	0
11/04/2013	17:56:00	28.7	25.5	24.7	978.4	100	190	2	16
11/04/2013	17:58:00	31.5	25.5	24.7	978.8	190	220	2	34
11/04/2013	18:00:00	32.6	25.5	24.6	978.8	220	230	2	40
11/04/2013	18:02:00	34.0	25.4	24.5	979.0	230	235	2	40
11/04/2013	18:04:00	35.5	25.2	24.4	979.0	235	240	2	40
11/04/2013	18:06:00	36.1	25.1	24.3	979.0	240	245	2	42
11/04/2013	18:08:00	36.5	25.1	24.3	979.0	245	250	2	46
11/04/2013	18:10:00	37.1	24.9	24.2	978.8	250	250	2	46
11/04/2013	18:12:00	37.1	24.8	24.2	979.2	250	250	2	46
11/04/2013	18:14:00	37.5	24.8	24.1	979.2	250	250	2	46
11/04/2013	18:16:00	37.5	24.6	24.1	979.2	250	255	2	51
11/04/2013	18:18:00	37.8	24.4	24.0	979.2	255	255	2	51
11/04/2013	18:20:00	38.0	24.3	23.9	979.2	255	255	2	51
11/04/2013	18:22:00	38.3	24.2	23.8	979.2	255	260	2	54
11/04/2013	18:24:00	38.4	24.1	23.8	979.4	260	260	2	54
11/04/2013	18:26:00	38.6	24.0	23.7	979.4	260	260	2	54
11/04/2013	18:28:00	38.8	23.8	23.5	979.4	260	260	2	54
11/04/2013	18:30:00	38.9	23.8	23.5	979.4	260	265	2	59
11/04/2013	18:32:00	39.1	23.6	23.4	979.4	265	270	2	63
11/04/2013	18:35:00	39.2	23.5	23.3	979.4	270	275	2	67
11/04/2013	18:40:00	39.5	23.4	23.1	979.4	275	285	2	76
11/04/2013	18:45:00	39.7	23.4	23.0	979.4	285	290	2	80
11/04/2013	18:50:00	40.0	23.3	22.9	979.8	290	300	2	89
11/04/2013	18:55:00	40.3	23.2	22.8	979.8	300	305	2	92
11/04/2013	19:00:00	40.3	23.2	22.7	979.8	305	310	2	97
11/04/2013	19:05:00	40.5	23.1	22.5	979.9	310	310	2	97
11/04/2013	19:10:00	40.5	23.0	22.5	979.9	310	310	2	97
11/04/2013	19:15:00	40.5	22.9	22.3	979.9	310	315	2	102
11/04/2013	19:20:00	40.5	22.8	22.2	980.3	315	315	2	102
11/04/2013	19:25:00	40.5	22.5	22.1	980.1	315	315	2	102
11/04/2013	19:30:00	40.3	22.3	22.0	980.1	315	320	2	108

QGC Pty Limited Murdoch 1 - Sample MUR001_001 - 622.440 to 623.190 metres

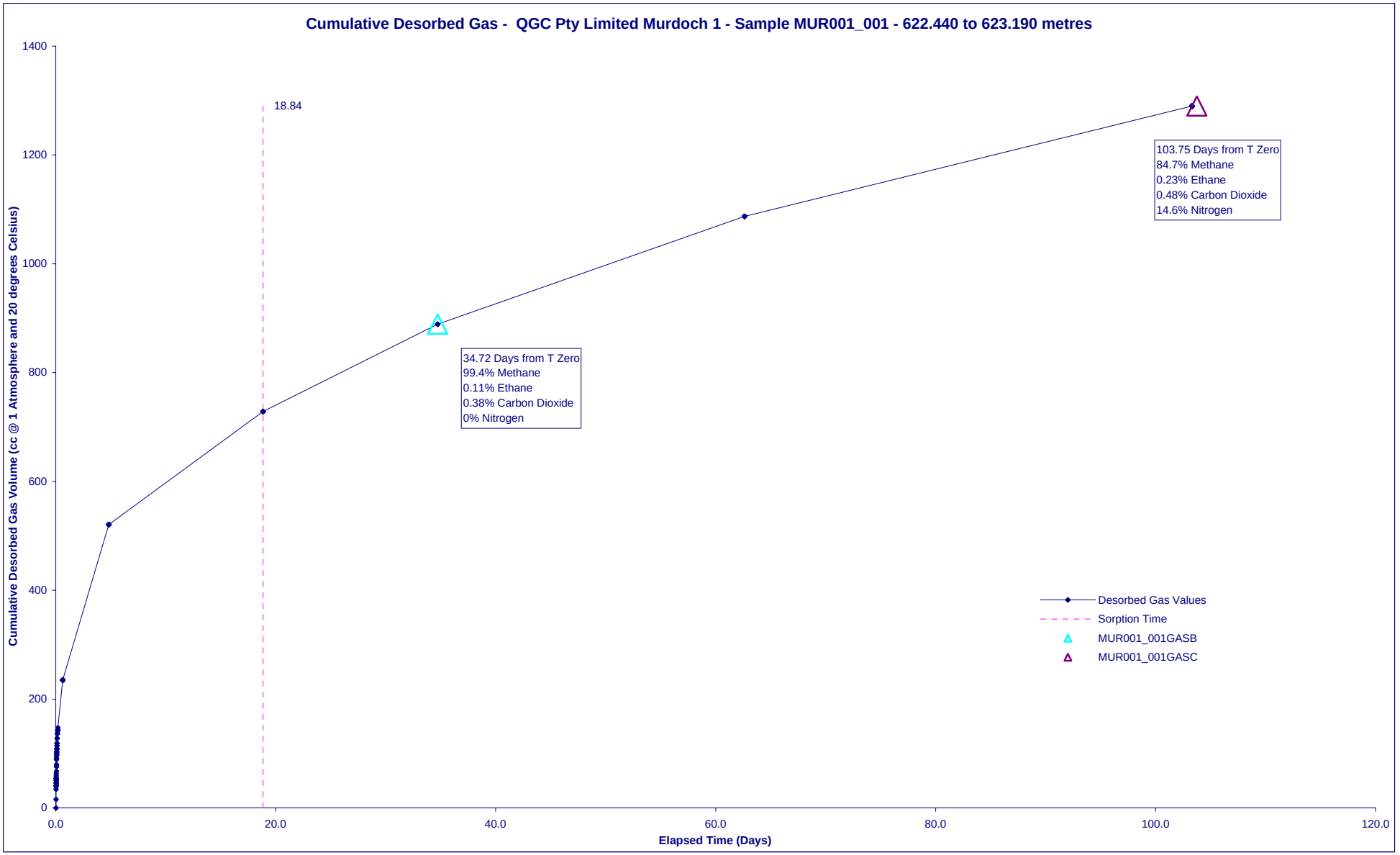
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
11/04/2013	19:35:00	40.3	22.2	21.9	979.9	320	320	2	108
11/04/2013	19:40:00	40.2	22.1	21.8	980.3	320	320	2	109
11/04/2013	19:50:00	40.1	22.2	21.6	980.3	320	325	2	114
11/04/2013	20:00:00	40.1	22.2	21.6	980.3	325	330	2	119
11/04/2013	20:10:00	40.2	22.3	21.6	980.5	330	330	2	119
11/04/2013	20:20:00	40.3	22.3	21.6	980.5	330	340	2	128
11/04/2013	20:30:00	40.5	22.3	21.6	980.5	340	340	2	128
11/04/2013	20:40:00	40.7	22.7	21.7	980.3	340	350	2	136
11/04/2013	20:50:00	40.7	22.8	21.8	980.7	350	350	2	137
11/04/2013	21:05:00	40.7	22.7	21.8	980.5	350	355	2	141
11/04/2013	21:20:00	40.3	22.3	21.7	980.5	355	355	2	143
11/04/2013	21:35:00	40.0	22.2	21.7	980.1	355	355	2	143
11/04/2013	21:50:00	40.2	22.1	21.5	980.1	355	360	2	148
11/04/2013	22:05:00	40.4	21.9	21.5	980.1	360	360	2	148
11/04/2013	22:20:00	40.6	21.7	21.3	980.3	360	370	2	157
11/04/2013	22:50:00	40.9	21.2	21.1	980.3	370	375	2	160
11/04/2013	23:20:00	40.0	20.9	20.6	980.3	375	375	2	164
11/04/2013	23:50:00	40.2	20.8	20.3	980.1	375	380	2	167
12/04/2013	0:20:00	40.7	20.5	20.2	980.1	380	390	2	175
12/04/2013	0:50:00	40.9	20.2	19.9	979.6	390	400	2	184
12/04/2013	1:20:00	40.6	19.6	19.5	979.6	400	400	2	185
12/04/2013	2:00:00	40.3	19.1	19.7	979.8	400	410	2	196
12/04/2013	3:00:00	41.3	18.8	19.1	979.8	410	420	2	202
12/04/2013	4:00:00	40.3	18.3	18.8	979.2	420	420	2	205
12/04/2013	5:00:00	40.7	17.2	17.9	980.3	420	430	2	214
12/04/2013	6:00:00	41.3	17.1	17.5	980.5	430	440	2	222
12/04/2013	7:00:00	40.3	17.6	17.5	981.7	440	440	2	227
12/04/2013	8:12:00	40.7	20.7	19.2	981.3	440	450	2	235
12/04/2013	14:30:00	39.7	29.4	26.9	976.9	450	480	2	261
12/04/2013	20:30:00	40.8	22.8	23.2	979.4	480	500	2	280
13/04/2013	3:00:00	40.5	17.2	18.7	976.7	500	520	2	297
13/04/2013	9:12:00	40.3	23.1	20.3	978.6	520	530	2	309
13/04/2013	15:00:00	40.0	25.9	24.2	974.0	530	560	2	333
13/04/2013	21:00:00	41.1	19.2	20.8	975.7	560	570	2	341
14/04/2013	3:20:00	42.0	16.5	17.3	974.8	570	580	2	347
14/04/2013	10:09:00	40.7	28.7	22.5	974.2	600	600	2	351
14/04/2013	16:15:00	35.9	28.8	26.8	970.9	610	570	2	351
15/04/2013	16:49:00	40.4	31.9	28.5	967.7	600	730	2	454
16/04/2013	13:04:00	43.1	32.8	27.8	970.3	710	790	2	521
18/04/2013	9:15:00	39.0	26.4	25.6	1014.8	200	170	2	535
22/04/2013	10:50:00	38.7	26.1	24.0	1014.4	50	140	2	618
26/04/2013	9:26:00	38.3	25.9	24.4	1023.0	50	100	2	675
29/04/2013	10:34:00	38.8	26.9	25.1	1023.6	50	90	2	711
30/04/2013	13:31:00	38.5	27.7	25.4	1021.5	200	215	2	729
6/05/2013	10:19:00	38.4	25.1	23.4	1023.6	200	270	2	800
9/05/2013	12:06:00	38.7	26.8	24.8	1027.2	200	230	2	830
16/05/2013	10:39:00	38.4	23.9	22.9	1015.9	50	130	2	889
23/05/2013	15:08:00	38.8	25.6	22.1	1008.3	200	275	2	954
31/05/2013	9:12:00	39.5	22.4	21.2	1029.1	200	225	2	998
3/06/2013	10:11:00	37.1	24.7	24.1	1017.3	200	235	2	1027
6/06/2013	10:21:00	39.0	23.2	22.0	1027.4	200	220	2	1050
13/06/2013	8:32:00	38.7	24.6	23.2	1012.7	200	255	2	1087

QGC Pty Limited Murdoch 1 - Sample MUR001_001 - 622.440 to 623.190 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
20/06/2013	9:25:00	41.8	21.9	21.2	1022.8	200	260	2	1145
27/06/2013	9:28:00	40.7	22.6	21.6	1020.3	200	260	2	1204
4/07/2013	9:50:00	40.5	25.1	24.6	1012.6	200	210	2	1204
10/07/2013	9:08:00	40.9	21.6	20.8	1032.9	200	210	2	1236
18/07/2013	10:49:00	40.9	23.4	22.4	1025.3	200	240	2	1266
24/07/2013	1:00:00	40.3	22.7	18.3	1024.5	50	80	2	1290


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_001 - 622.440 to 623.190 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
250
200
150
100
50
0
-50
-100
0
2
4
6
8
10
12
18
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_001 - 622.440 to 623.190 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
1400
1200
1000
800
600
400
200
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
18.84
34.72 Days from T Zero
99.4% Methane
0.11% Ethane
0.38% Carbon Dioxide
0% Nitrogen
103.75 Days from T Zero
84.7% Methane
0.23% Ethane
0.48% Carbon Dioxide
14.6% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_001GASB
MUR001_001GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_002 - 623.460 to 624.100 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_002	Sample Type	Core	Sample Top (m)	623.460	Sample Base (m)	624.100	Core Diameter (cm)	6.15
Sample Volume (cc)	1901	Mass (g)	2834	RD (g/cc)	1.79	Moisture (%ad)	7.5	Ash (%ad)	52.5
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	8.4	Q3 Ash (%ad)	43.2
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1354		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	2.6	Minimum Q1 Point
Sample Penetrated	11/04/2013	18:18		Formation Pressure (Mpa) @ 0.433 psi/ft	6.11			Surface Time Ratio	0.100	2
Sample Off Bottom	11/04/2013	18:52		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.213	Maximum Q1 Point
Sample at Surface	11/04/2013	22:55		Depth HSP=Formation Pressure (m)	622.70			USBM Q1 - Surface Time Correction	0.97	20
Sample Sealed	11/04/2013	23:22		Formation Temperature (^oC)				Smith & Williams Q1 - Q2 Multiplier	1.120	Q1 Points Plotted
Time Zero	11/04/2013	18:52		Standard Temperature (^oC)	20.00	Comments:				34
Last Entry	24/07/2013	11:38		Standard Pressure (hPa)	1013					-956

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.001	0.001	0.000	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.34	0.33	0.04	0.30	0.00	0.640	0.630		Time Zero Calculation
SCF/T (raw)	11	10	1	10	0	20.360	20.030		
m^3/tonne (daf)	0.84	0.82	0.09	0.75	0.00	1.59	**1.57**	0.84	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	27	26	3	24	0	51	**50**	27	
Percent of daf total	53.03%	52.10%	10.65%	47.49%	Sorption Time (days)	0.82	Diffusivity (sec^{-1})	9.48339E-05	

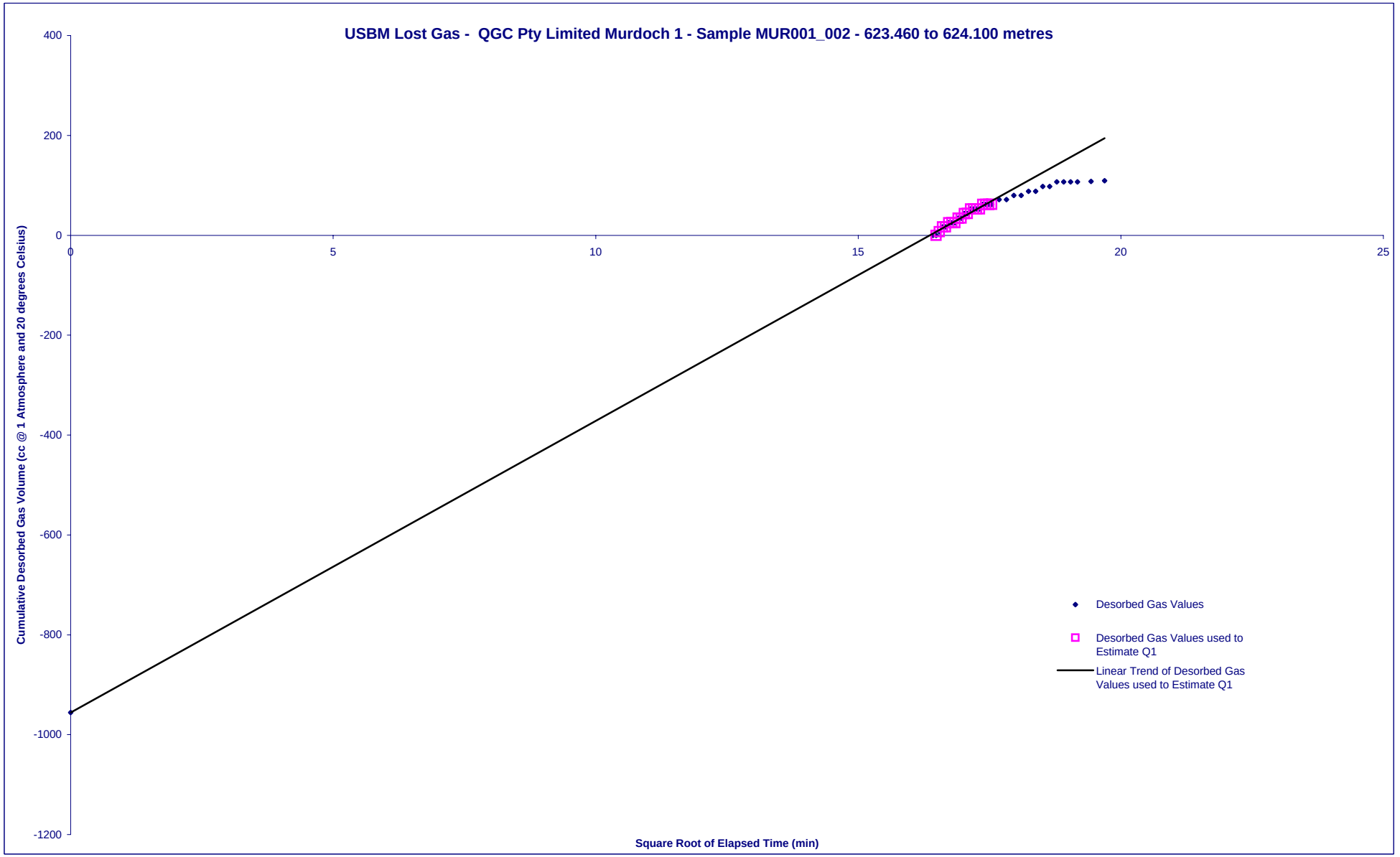
Date	Time	Temperature (^oC)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
11/04/2013	23:22:00	33.1	20.9	20.6	980.3	100	100	2	0
11/04/2013	23:24:00	34.9	20.8	20.6	980.1	100	130	2	0
11/04/2013	23:26:00	35.5	20.8	20.6	980.1	130	140	2	7
11/04/2013	23:28:00	35.5	20.8	20.6	980.1	140	150	2	17
11/04/2013	23:30:00	35.8	20.8	20.6	980.1	150	150	2	17
11/04/2013	23:32:00	36.1	20.8	20.6	980.1	150	160	2	25
11/04/2013	23:34:00	36.4	20.9	20.5	980.1	160	160	2	25
11/04/2013	23:36:00	36.7	20.9	20.5	979.9	160	160	2	25
11/04/2013	23:38:00	36.9	20.9	20.5	980.1	160	170	2	34
11/04/2013	23:40:00	37.0	20.9	20.4	980.1	170	170	2	34
11/04/2013	23:42:00	37.1	20.9	20.4	980.1	170	180	2	43
11/04/2013	23:44:00	37.2	20.8	20.3	980.1	180	180	2	43
11/04/2013	23:46:00	37.3	20.8	20.4	980.1	180	190	2	53
11/04/2013	23:48:00	37.4	20.8	20.4	979.9	190	190	2	53
11/04/2013	23:50:00	37.5	20.8	20.3	980.1	190	190	2	53
11/04/2013	23:52:00	37.6	20.8	20.3	980.1	190	190	2	53
11/04/2013	23:54:00	37.7	20.8	20.3	980.1	190	200	2	62
11/04/2013	23:56:00	37.8	20.8	20.3	980.1	200	200	2	62
11/04/2013	23:58:00	37.8	20.7	20.3	980.1	200	200	2	62
12/04/2013	0:00:00	37.9	20.6	20.3	980.1	200	200	2	62
12/04/2013	0:05:00	37.9	20.5	20.2	980.1	200	210	2	71
12/04/2013	0:10:00	37.9	20.5	20.2	980.1	210	210	2	71
12/04/2013	0:15:00	38.2	20.5	20.2	980.1	210	220	2	80
12/04/2013	0:20:00	38.3	20.5	20.2	980.1	220	220	2	80
12/04/2013	0:25:00	38.6	20.5	20.1	980.1	220	230	2	88
12/04/2013	0:30:00	38.6	20.5	20.1	980.1	230	230	2	88
12/04/2013	0:35:00	38.6	20.3	20.1	980.1	230	240	2	98
12/04/2013	0:40:00	38.6	20.3	20.0	980.1	240	240	2	98
12/04/2013	0:45:00	38.7	20.3	20.0	980.1	240	250	2	107
12/04/2013	0:50:00	38.7	20.2	19.9	979.6	250	250	2	107
12/04/2013	0:55:00	38.7	20.1	19.9	979.6	250	250	2	107
12/04/2013	1:00:00	38.7	19.9	19.7	979.6	250	250	2	107

QGC Pty Limited Murdoch 1 - Sample MUR001_002 - 623.460 to 624.100 metres

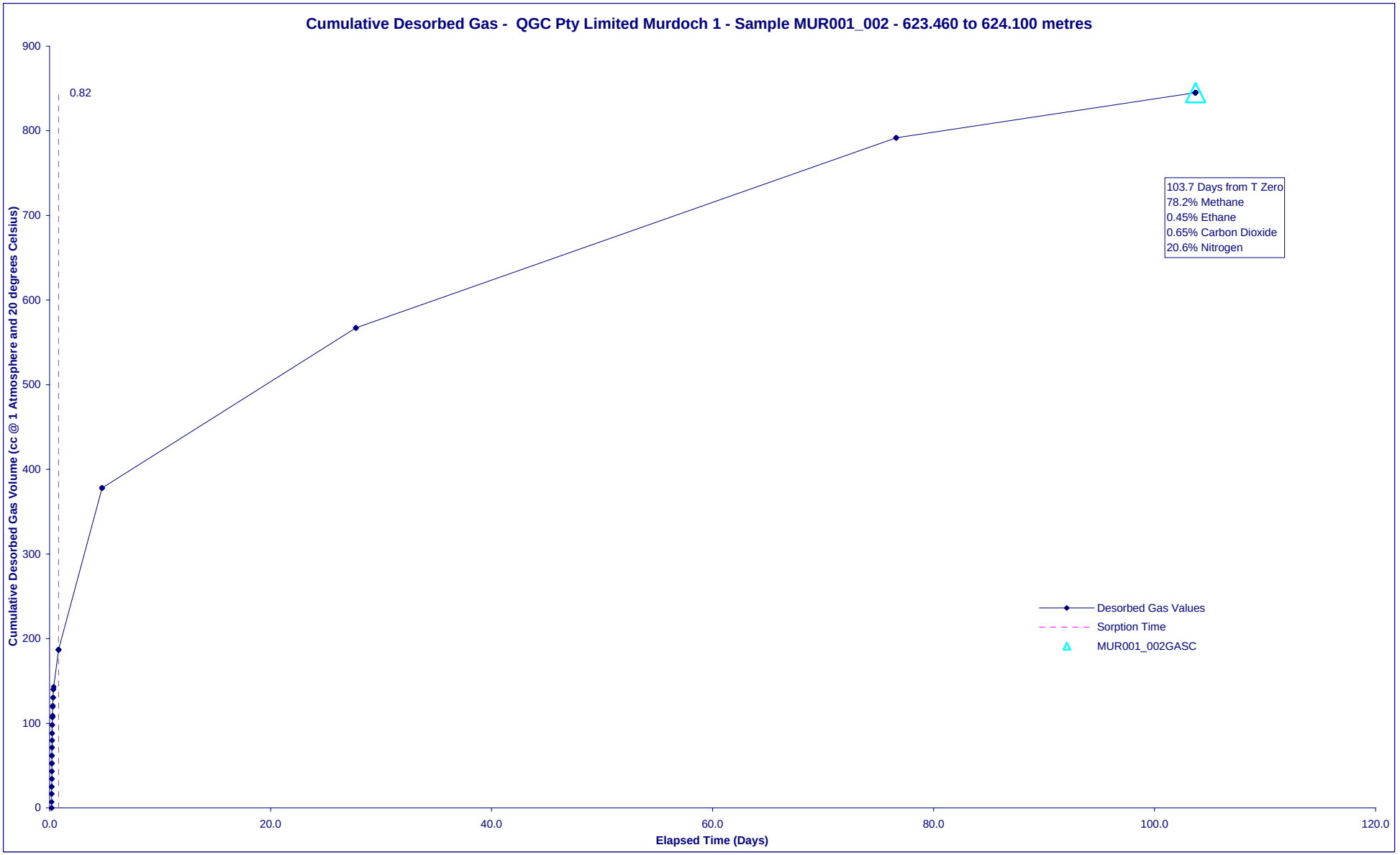
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	1:10:00	38.5	19.8	19.7	979.6	250	250	2	108
12/04/2013	1:20:00	38.2	19.6	19.5	979.6	250	250	2	109
12/04/2013	1:30:00	38.0	19.6	19.5	979.6	250	260	2	120
12/04/2013	1:40:00	38.0	19.4	19.3	979.6	260	260	2	120
12/04/2013	1:50:00	38.1	19.2	19.7	979.6	260	260	2	120
12/04/2013	2:00:00	37.9	19.1	19.7	979.8	260	260	2	121
12/04/2013	2:15:00	37.9	18.8	19.4	979.8	260	270	2	130
12/04/2013	2:30:00	38.0	19.0	19.3	979.8	270	270	2	130
12/04/2013	2:45:00	38.3	19.1	19.3	979.8	270	270	2	130
12/04/2013	3:00:00	38.4	18.8	19.1	979.8	270	280	2	140
12/04/2013	3:15:00	38.3	18.9	19.1	979.8	280	280	2	140
12/04/2013	3:30:00	37.9	18.8	19.0	978.8	280	280	2	140
12/04/2013	4:00:00	37.4	18.3	18.8	979.2	280	280	2	143
12/04/2013	4:30:00	37.6	17.2	18.1	980.1	280	290	2	153
12/04/2013	5:00:00	37.7	17.2	17.9	980.3	290	290	2	153
12/04/2013	5:30:00	38.2	17.0	17.5	980.1	290	300	2	161
12/04/2013	6:00:00	39.1	17.1	17.5	980.5	300	310	2	167
12/04/2013	6:34:00	38.3	17.1	17.2	981.5	310	300	2	167
12/04/2013	7:00:00	38.6	17.7	17.5	981.3	300	300	2	167
12/04/2013	8:12:00	38.9	20.6	19.2	981.3	300	310	2	176
12/04/2013	9:00:00	38.7	24.0	21.2	981.3	310	310	2	177
12/04/2013	10:15:00	39.6	29.0	24.2	980.5	310	320	2	181
12/04/2013	11:00:00	39.1	30.5	25.6	974.2	320	320	2	181
12/04/2013	12:00:00	39.1	32.3	23.6	978.6	320	320	2	187
12/04/2013	13:00:00	39.1	31.8	25.8	977.6	320	320	2	187
12/04/2013	14:30:00	39.1	29.4	26.9	976.9	320	320	2	187
12/04/2013	20:30:00	39.8	22.8	23.2	979.4	320	330	2	197
13/04/2013	3:00:00	39.3	17.2	18.7	976.7	330	350	2	215
13/04/2013	9:12:00	38.9	23.1	20.3	978.6	350	360	2	229
13/04/2013	15:00:00	38.7	25.9	24.2	974.0	360	360	2	229
13/04/2013	21:00:00	40.0	19.2	20.8	975.7	380	380	2	229
14/04/2013	3:20:00	40.7	16.5	17.3	974.8	380	400	2	244
14/04/2013	10:09:00	39.6	28.7	22.5	974.2	400	410	2	257
14/04/2013	16:15:00	35.1	28.8	26.8	970.9	410	360	2	257
15/04/2013	16:49:00	39.6	31.9	28.5	967.7	350	450	2	327
16/04/2013	13:04:00	41.5	32.8	27.8	970.3	440	500	2	378
18/04/2013	9:15:00	37.9	26.4	25.6	1014.8	200	130	2	378
22/04/2013	10:50:00	37.5	26.1	24.0	1014.4	50	110	2	434
26/04/2013	9:26:00	36.9	25.9	24.4	1023.0	50	80	2	475
29/04/2013	10:34:00	37.6	26.9	25.1	1023.6	50	80	2	501
30/04/2013	13:31:00	37.1	27.7	25.4	1021.5	200	205	2	510
6/05/2013	10:19:00	37.1	25.1	23.4	1023.6	200	240	2	553
9/05/2013	12:06:00	37.9	26.8	24.8	1027.2	200	215	2	567
16/05/2013	10:39:00	36.9	23.9	22.9	1015.9	50	70	2	569
23/05/2013	15:08:00	37.1	25.6	22.1	1008.3	200	215	2	578
31/05/2013	9:12:00	38.2	22.4	21.2	1029.1	200	175	2	578
3/06/2013	10:11:00	38.0	24.7	24.1	1017.3	200	230	2	594
6/06/2013	10:21:00	37.4	23.2	22.0	1027.4	200	210	2	618
13/06/2013	8:32:00	37.1	24.6	23.2	1012.7	200	220	2	619
20/06/2013	9:25:00	40.8	21.9	21.2	1022.8	200	240	2	656
27/06/2013	9:28:00	39.5	22.6	21.6	1020.3	200	335	2	792
4/07/2013	9:50:00	38.3	25.1	24.6	1012.6	200	210	2	792

QGC Pty Limited Murdoch 1 - Sample MUR001_002 - 623.460 to 624.100 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
10/07/2013	9:08:00	39.6	21.6	20.8	1032.9	200	205	2	818
18/07/2013	10:49:00	39.4	23.4	22.4	1025.3	200	230	2	839
24/07/2013	11:38:00	37.9	22.9	18.3	1023.9	50	60	2	845


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_002 - 623.460 to 624.100 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
400
200
0
-200
-400
-600
-800
-1000
-1200
0
5
10
15
20
25
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_002 - 623.460 to 624.100 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
0.82
103.7 Days from T Zero
78.2% Methane
0.45% Ethane
0.65% Carbon Dioxide
20.6% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_002GASC
0
100
200
300
400
500
600
700
800
900
0.0
20.0
40.0
60.0
80.0
100.0
120.0

EARTH DATA

QGC Pty Limited Murdoch 1 Express - Sample MUR001_003 - 624.340 to 624.690 metres

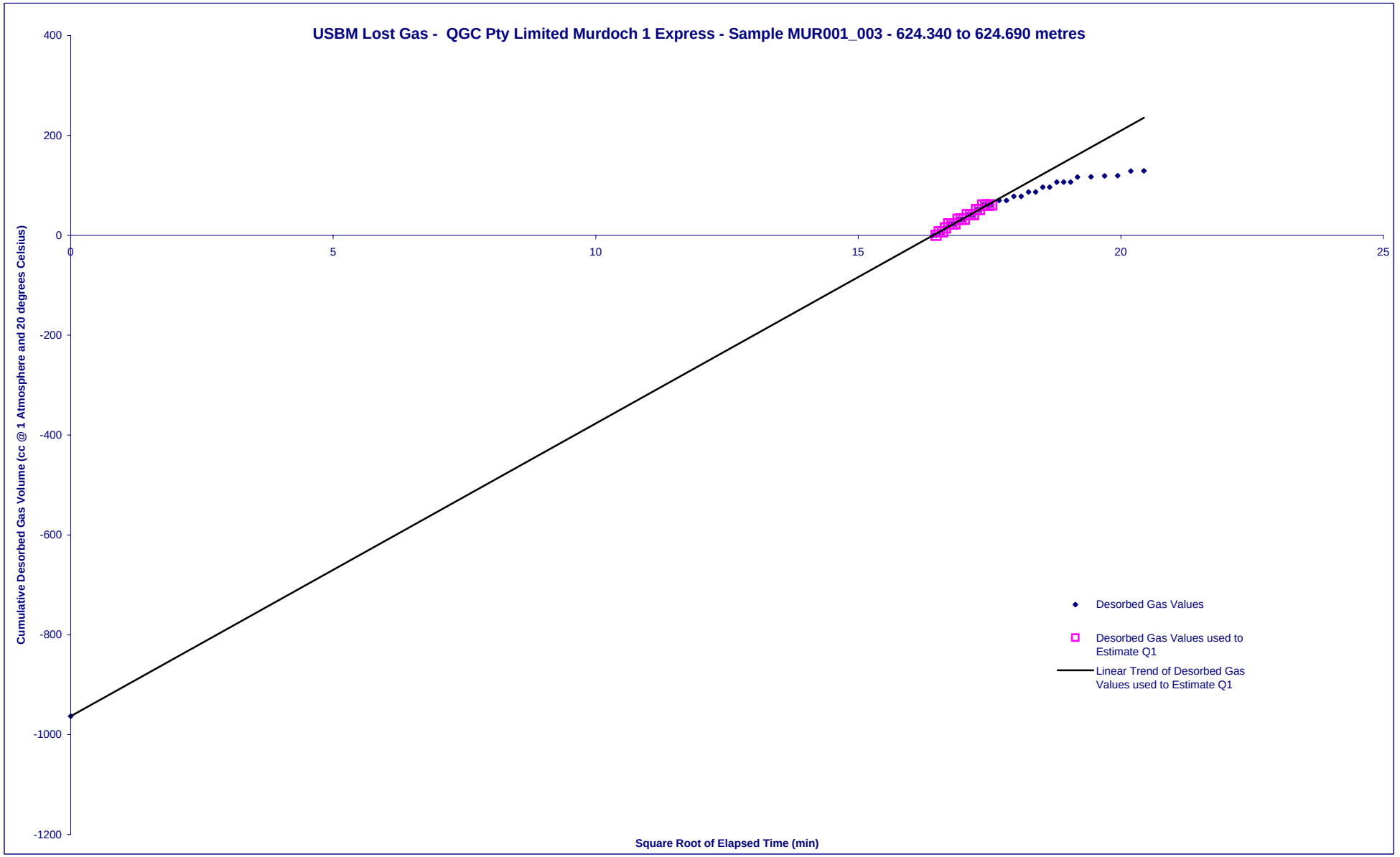
Hole Name	Murdoch 1 Express		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_003	Sample Type	Core	Sample Top (m)	624.340	Sample Base (m)	624.690	Core Diameter (cm)	6.15
Sample Volume (cc)	1040	Mass (g)	1218	RD (g/cc)	1.33	Moisture (%ad)	5.8	Ash (%ad)	8.6
Q3 Volume (cc@STP)	60.15	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	7.3	Q3 Ash (%ad)	8.9
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1260		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	2.6	Minimum Q1 Point
Sample Penetrated	11/04/2013	18:28	Formation Pressure (Mpa) @ 0.433 psi/ft		6.12			Surface Time Ratio	0.100	2
Sample Off Bottom	11/04/2013	18:52	Formation Pressure Gradient (psi/ft)		0.433			Lost Time Ratio	0.798	Maximum Q1 Point
Sample at Surface	11/04/2013	22:55	Depth HSP=Formation Pressure (m)		623.58			USBM Q1 - Surface Time Correction	0.97	20
Sample Sealed	11/04/2013	23:22	Formation Temperature (°C)					Smith & Williams Q1 - Q2 Multiplier	1.980	Q1 Points Plotted
Time Zero	11/04/2013	18:52	Standard Temperature (°C)		20.00	Comments:				37
Last Entry	13/05/2013	9:20	Standard Pressure (hPa)		1013					-963

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.001	0.001	0.001	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.79	0.77	0.57	0.58	0.30	1.670	1.650		Time Zero Calculation
SCF/T (raw)	25	25	18	19	10	53.700	52.940		
m^3/tonne (daf)	0.92	0.90	0.67	0.68	0.36	1.96	**1.94**	1.71	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	30	29	21	22	11	63	**62**	55	
Percent of daf total	47.14%	46.19%	39.13%	35.19%	Sorption Time (days)	1.60	Diffusivity (sec^{-1})	7.35189E-05	

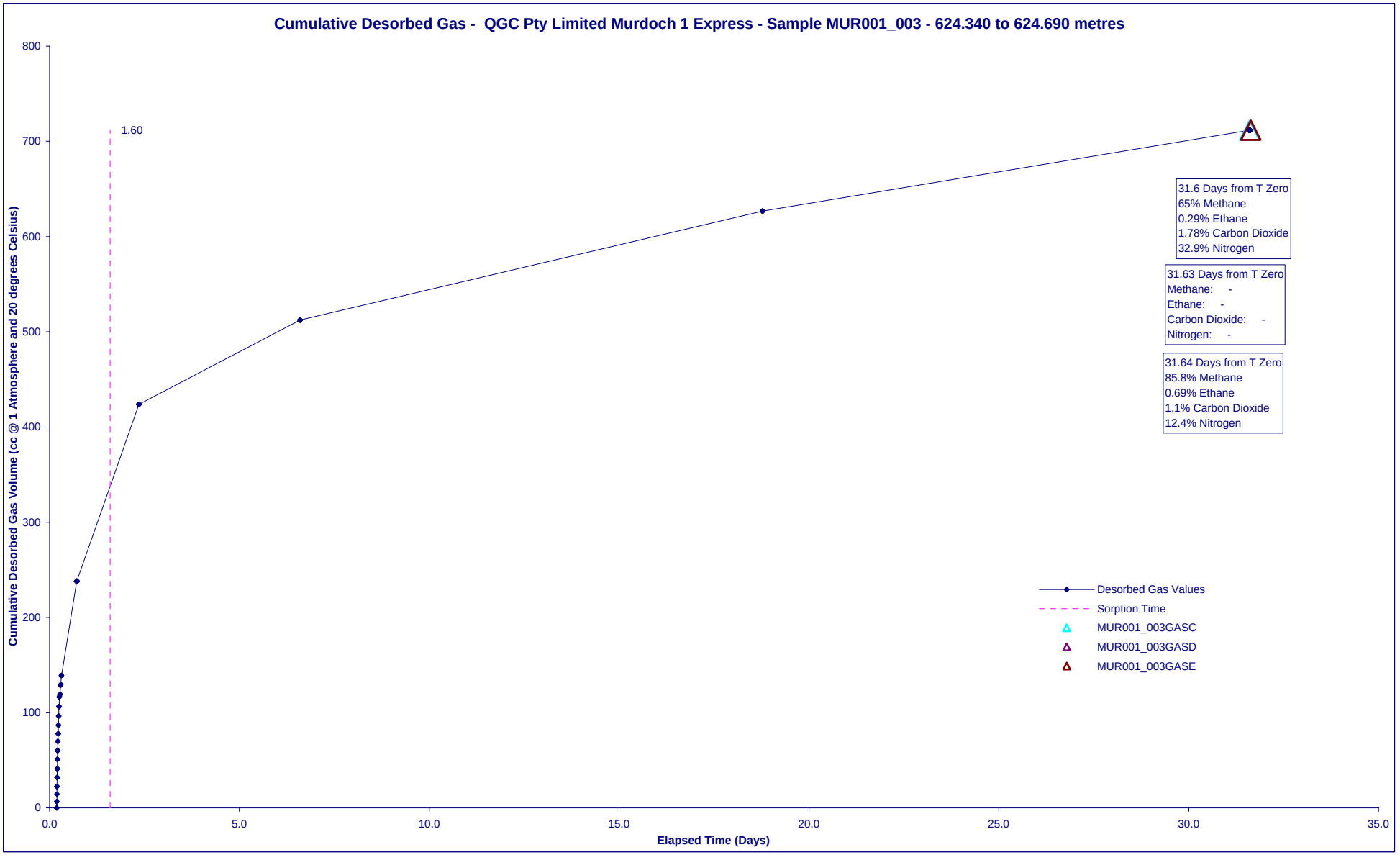
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
11/04/2013	23:22:00	32.4	20.9	20.6	980.3	100	100	2	0
11/04/2013	23:24:00	34.7	20.8	20.6	980.1	100	120	2	0
11/04/2013	23:26:00	35.5	20.8	20.6	980.1	120	130	2	6
11/04/2013	23:28:00	35.7	20.8	20.6	980.1	130	130	2	6
11/04/2013	23:30:00	36.1	20.8	20.6	980.1	130	140	2	15
11/04/2013	23:32:00	36.5	20.8	20.6	980.1	140	150	2	23
11/04/2013	23:34:00	36.7	20.9	20.5	980.1	150	150	2	23
11/04/2013	23:36:00	37.0	20.9	20.5	979.9	150	150	2	23
11/04/2013	23:38:00	37.1	20.9	20.5	980.1	150	160	2	32
11/04/2013	23:40:00	37.2	20.9	20.4	980.1	160	160	2	32
11/04/2013	23:42:00	37.3	20.9	20.4	980.1	160	160	2	32
11/04/2013	23:44:00	37.4	20.8	20.3	980.1	160	170	2	41
11/04/2013	23:46:00	37.5	20.8	20.4	980.1	170	170	2	41
11/04/2013	23:48:00	37.5	20.8	20.4	979.9	170	170	2	41
11/04/2013	23:50:00	37.5	20.8	20.3	980.1	170	180	2	51
11/04/2013	23:52:00	37.6	20.8	20.3	980.1	180	180	2	51
11/04/2013	23:54:00	37.7	20.8	20.3	980.1	180	190	2	60
11/04/2013	23:56:00	37.8	20.8	20.3	980.1	190	190	2	60
11/04/2013	23:58:00	37.8	20.7	20.3	980.1	190	190	2	60
12/04/2013	0:00:00	37.9	20.6	20.3	980.1	190	190	2	60
12/04/2013	0:05:00	37.9	20.5	20.2	980.1	190	200	2	70
12/04/2013	0:10:00	37.9	20.5	20.2	980.1	200	200	2	70
12/04/2013	0:15:00	38.3	20.5	20.2	980.1	200	210	2	78
12/04/2013	0:20:00	38.3	20.5	20.2	980.1	210	210	2	78
12/04/2013	0:25:00	38.5	20.5	20.1	980.1	210	220	2	87
12/04/2013	0:30:00	38.5	20.5	20.1	980.1	220	220	2	87
12/04/2013	0:35:00	38.5	20.3	20.1	980.1	220	230	2	96
12/04/2013	0:40:00	38.8	20.3	20.0	980.1	230	230	2	96
12/04/2013	0:45:00	38.7	20.3	20.0	980.1	230	240	2	106
12/04/2013	0:50:00	38.7	20.2	19.9	979.6	240	240	2	106
12/04/2013	0:55:00	38.8	20.1	19.9	979.6	240	240	2	106
12/04/2013	1:00:00	38.7	19.9	19.7	979.6	240	250	2	116

QGC Pty Limited Murdoch 1 Express - Sample MUR001_003 - 624.340 to 624.690 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	1:10:00	38.5	19.8	19.7	979.6	250	250	2	117
12/04/2013	1:20:00	38.1	19.6	19.5	979.6	250	250	2	119
12/04/2013	1:30:00	37.9	19.6	19.5	979.6	250	250	2	119
12/04/2013	1:40:00	38.0	19.4	19.3	979.6	250	260	2	129
12/04/2013	1:50:00	37.9	19.2	19.7	979.6	260	260	2	129
12/04/2013	2:00:00	37.8	19.1	19.7	979.8	260	260	2	130
12/04/2013	2:15:00	37.9	18.8	19.4	979.8	260	270	2	139
12/04/2013	2:30:00	38.0	19.0	19.3	979.8	270	270	2	139
12/04/2013	2:45:00	38.8	19.1	19.3	979.8	270	270	2	139
12/04/2013	3:00:00	38.3	18.8	19.1	979.8	270	270	2	141
12/04/2013	3:15:00	38.2	18.9	19.1	979.8	270	270	2	141
12/04/2013	3:30:00	37.8	18.8	19.0	978.8	270	280	2	151
12/04/2013	4:00:00	36.9	18.3	18.8	979.2	280	290	2	165
12/04/2013	4:30:00	38.5	17.2	18.1	980.1	290	300	2	170
12/04/2013	5:00:00	37.6	17.2	17.9	980.3	300	300	2	173
12/04/2013	5:30:00	37.7	17.0	17.5	980.1	300	310	2	182
12/04/2013	6:00:00	38.1	17.1	17.5	980.5	310	320	2	191
12/04/2013	6:34:00	37.3	17.1	17.2	981.5	320	330	2	205
12/04/2013	7:00:00	37.7	17.7	17.5	981.3	330	330	2	205
12/04/2013	8:12:00	37.9	20.6	19.2	981.3	330	340	2	214
12/04/2013	9:00:00	37.9	24.0	21.2	981.3	340	340	2	214
12/04/2013	10:15:00	38.7	29.0	24.2	980.5	340	350	2	220
12/04/2013	11:00:00	38.3	30.5	25.6	974.2	350	360	2	223
12/04/2013	12:00:00	38.1	32.3	23.6	978.6	360	370	2	238
12/04/2013	13:00:00	38.1	31.8	25.8	977.6	370	380	2	246
12/04/2013	14:30:00	38.1	29.4	26.9	976.9	380	380	2	246
12/04/2013	20:30:00	38.9	22.8	23.2	979.4	380	420	2	285
13/04/2013	3:00:00	37.8	17.2	18.7	976.7	420	460	2	324
13/04/2013	9:12:00	37.8	23.1	20.3	978.6	480	480	2	328
13/04/2013	15:00:00	37.8	25.9	24.2	974.0	480	530	2	369
13/04/2013	21:00:00	39.1	19.2	20.8	975.7	530	560	2	396
14/04/2013	3:20:00	39.1	16.5	17.3	974.8	560	590	2	424
14/04/2013	10:09:00	38.5	28.7	22.5	974.2	630	630	2	427
14/04/2013	16:15:00	33.9	28.8	26.8	970.9	650	610	2	427
15/04/2013	16:49:00	38.6	31.9	28.5	967.7	710	770	2	465
16/04/2013	13:04:00	39.9	32.8	27.8	970.3	820	870	2	512
18/04/2013	9:15:00	37.0	26.4	25.6	1014.8	200	140	2	512
22/04/2013	10:50:00	36.5	26.1	24.0	1014.4	50	80	2	539
26/04/2013	9:26:00	36.2	25.9	24.4	1023.0	50	85	2	584
29/04/2013	10:34:00	37.0	26.9	25.1	1023.6	50	80	2	610
30/04/2013	13:31:00	35.7	27.7	25.4	1021.5	200	210	2	627
6/05/2013	10:19:00	36.3	25.1	23.4	1023.6	200	235	2	661
9/05/2013	12:06:00	36.9	26.8	24.8	1027.2	200	220	2	682
13/05/2013	9:20:00	36.7	24.8	22.6	1020.9	50	95	2	712


USBM Lost Gas - QGC Pty Limited Murdoch 1 Express - Sample MUR001_003 - 624.340 to 624.690 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
400
200
0
-200
-400
-600
-800
-1000
-1200
0
5
10
15
20
25
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 Express - Sample MUR001_003 - 624.340 to 624.690 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
800
700
600
500
400
300
200
100
0
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
1.60
31.6 Days from T Zero
65% Methane
0.29% Ethane
1.78% Carbon Dioxide
32.9% Nitrogen
31.63 Days from T Zero
Methane: -
Ethane: -
Carbon Dioxide: -
Nitrogen: -
31.64 Days from T Zero
85.8% Methane
0.69% Ethane
1.1% Carbon Dioxide
12.4% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_003GASC
MUR001_003GASD
MUR001_003GASE

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_004 - 624.740 to 625.240 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_004	Sample Type	Core	Sample Top (m)	624.740	Sample Base (m)	625.240	Core Diameter (cm)	6.15
Sample Volume (cc)	1485	Mass (g)	1932	RD (g/cc)	1.47	Moisture (%ad)	7.1	Ash (%ad)	24.1
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	7.4	Q3 Ash (%ad)	17.9
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1260		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	2.6	Minimum Q1 Point
Sample Penetrated	11/04/2013	18:33		Formation Pressure (Mpa) @ 0.433 psi/ft	6.12			Surface Time Ratio	0.100	2
Sample Off Bottom	11/04/2013	18:52		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.163	Maximum Q1 Point
Sample at Surface	11/04/2013	22:55		Depth HSP=Formation Pressure (m)	623.98			USBM Q1 - Surface Time Correction	0.97	20
Sample Sealed	11/04/2013	23:22		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.080	Q1 Points Plotted
Time Zero	11/04/2013	18:52		Standard Temperature (°C)	20.00	Comments:				34
Last Entry	24/07/2013	13:46		Standard Pressure (hPa)	1013					-809

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.001	0.001	0.000	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.42	0.41	0.03	0.41	0.00	0.830	0.820		Time Zero Calculation
SCF/T (raw)	13	13	1	13	0	26.570	26.170		
m^3/tonne (daf)	0.61	0.59	0.05	0.60	0.00	1.21	**1.19**	0.65	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	19	19	2	19	0	39	**38**	21	
Percent of daf total	50.29%	49.60%	7.35%	50.19%	Sorption Time (days)	1.60	Diffusivity (sec^{-1})	8.57717E-05	

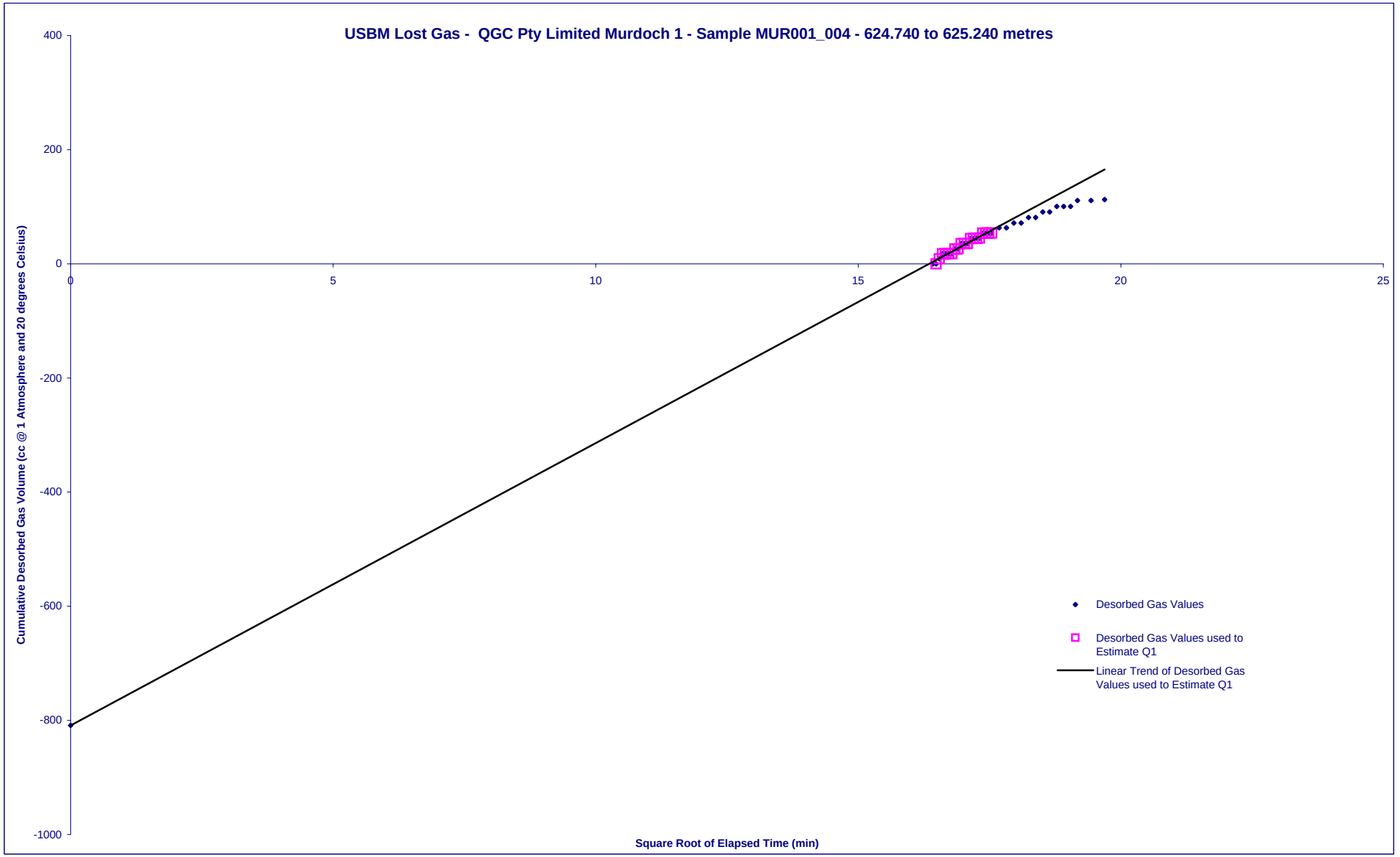
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
11/04/2013	23:22:00	34.3	20.9	20.6	980.3	100	100	2	0
11/04/2013	23:24:00	35.5	20.8	20.6	980.1	100	130	2	0
11/04/2013	23:26:00	35.7	20.8	20.6	980.1	130	140	2	9
11/04/2013	23:28:00	35.9	20.8	20.6	980.1	140	150	2	18
11/04/2013	23:30:00	36.2	20.8	20.6	980.1	150	150	2	18
11/04/2013	23:32:00	36.6	20.8	20.6	980.1	150	150	2	18
11/04/2013	23:34:00	36.7	20.9	20.5	980.1	150	150	2	18
11/04/2013	23:36:00	36.9	20.9	20.5	979.9	150	160	2	26
11/04/2013	23:38:00	37.1	20.9	20.5	980.1	160	160	2	26
11/04/2013	23:40:00	37.2	20.9	20.4	980.1	160	170	2	35
11/04/2013	23:42:00	37.4	20.9	20.4	980.1	170	170	2	35
11/04/2013	23:44:00	37.5	20.8	20.3	980.1	170	170	2	35
11/04/2013	23:46:00	37.7	20.8	20.4	980.1	170	180	2	44
11/04/2013	23:48:00	37.9	20.8	20.4	979.9	180	180	2	44
11/04/2013	23:50:00	37.8	20.8	20.3	980.1	180	180	2	45
11/04/2013	23:52:00	37.9	20.8	20.3	980.1	180	180	2	45
11/04/2013	23:54:00	38.0	20.8	20.3	980.1	180	190	2	54
11/04/2013	23:56:00	38.0	20.8	20.3	980.1	190	190	2	54
11/04/2013	23:58:00	38.1	20.7	20.3	980.1	190	190	2	54
12/04/2013	0:00:00	38.2	20.6	20.3	980.1	190	190	2	54
12/04/2013	0:05:00	38.3	20.5	20.2	980.1	190	200	2	63
12/04/2013	0:10:00	38.3	20.5	20.2	980.1	200	200	2	63
12/04/2013	0:15:00	38.6	20.5	20.2	980.1	200	210	2	72
12/04/2013	0:20:00	38.7	20.5	20.2	980.1	210	210	2	72
12/04/2013	0:25:00	38.7	20.5	20.1	980.1	210	220	2	81
12/04/2013	0:30:00	38.7	20.5	20.1	980.1	220	220	2	81
12/04/2013	0:35:00	38.7	20.3	20.1	980.1	220	230	2	91
12/04/2013	0:40:00	38.8	20.3	20.0	980.1	230	230	2	91
12/04/2013	0:45:00	38.8	20.3	20.0	980.1	230	240	2	101
12/04/2013	0:50:00	38.9	20.2	19.9	979.6	240	240	2	101
12/04/2013	0:55:00	38.9	20.1	19.9	979.6	240	240	2	101
12/04/2013	1:00:00	38.7	19.9	19.7	979.6	240	250	2	111

QGC Pty Limited Murdoch 1 - Sample MUR001_004 - 624.740 to 625.240 metres

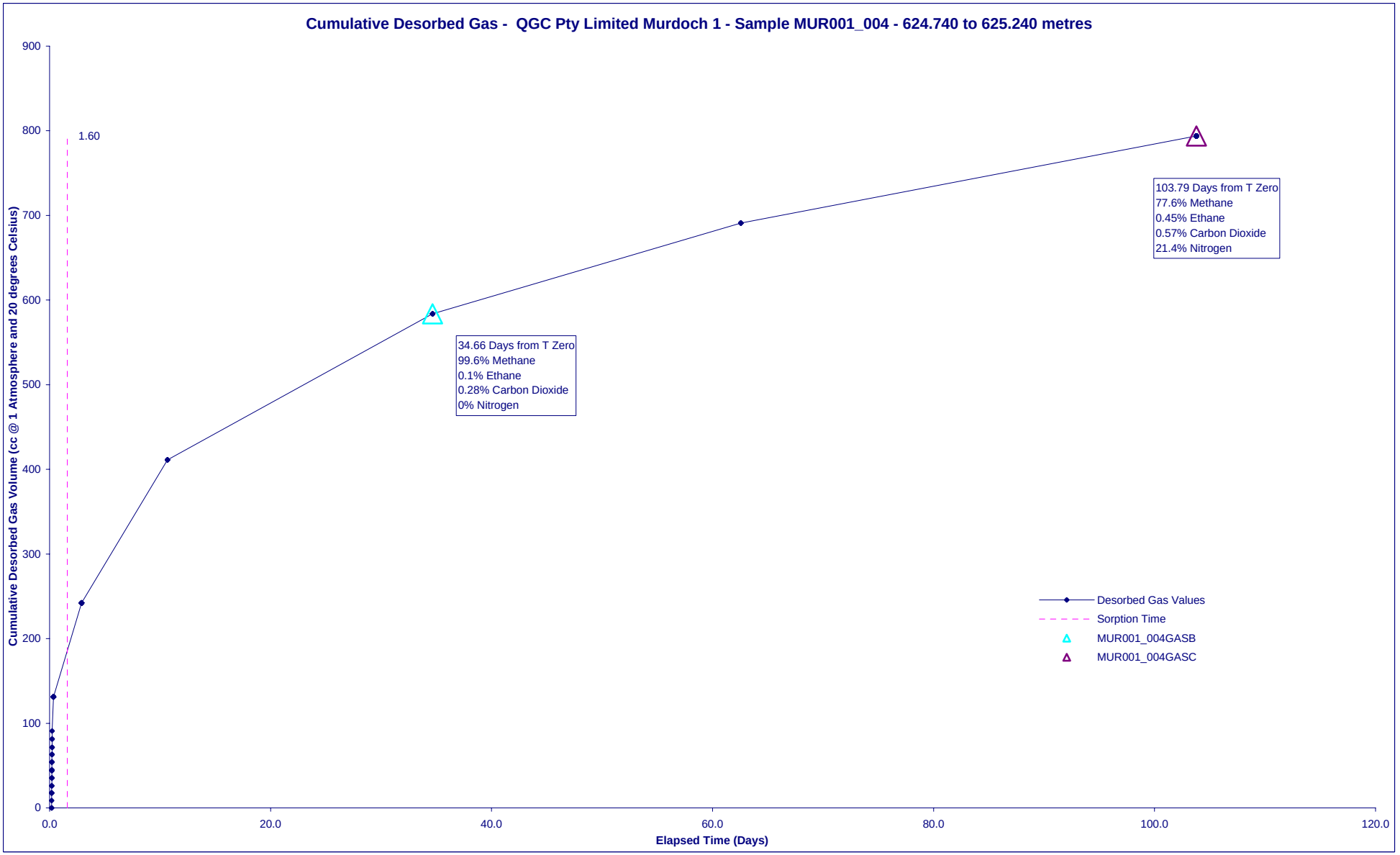
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	1:10:00	38.7	19.8	19.7	979.6	250	250	2	111
12/04/2013	1:20:00	38.3	19.6	19.5	979.6	250	250	2	112
12/04/2013	1:30:00	38.2	19.6	19.5	979.6	250	250	2	113
12/04/2013	1:40:00	38.3	19.4	19.3	979.6	250	250	2	113
12/04/2013	1:50:00	38.3	19.2	19.7	979.6	250	250	2	113
12/04/2013	2:00:00	38.2	19.1	19.7	979.8	250	250	2	113
12/04/2013	2:15:00	38.4	18.8	19.4	979.8	250	260	2	122
12/04/2013	2:30:00	38.4	19.0	19.3	979.8	260	260	2	122
12/04/2013	2:45:00	38.8	19.1	19.3	979.8	260	270	2	131
12/04/2013	3:00:00	38.7	18.8	19.1	979.8	270	270	2	131
12/04/2013	3:15:00	38.6	18.9	19.1	979.8	270	270	2	131
12/04/2013	3:30:00	38.3	18.8	19.0	978.8	270	270	2	131
12/04/2013	4:00:00	37.9	18.3	18.8	979.2	270	270	2	133
12/04/2013	4:30:00	38.3	17.2	18.1	980.1	270	280	2	143
12/04/2013	5:00:00	38.3	17.2	17.9	980.3	280	280	2	143
12/04/2013	5:30:00	38.3	17.0	17.5	980.1	280	280	2	143
12/04/2013	6:00:00	38.7	17.1	17.5	980.5	280	290	2	152
12/04/2013	6:34:00	37.9	17.1	17.2	981.5	290	280	2	152
12/04/2013	7:00:00	38.0	17.7	17.5	981.3	280	280	2	152
12/04/2013	8:12:00	38.3	20.6	19.2	981.3	280	290	2	160
12/04/2013	9:00:00	38.5	24.0	21.2	981.3	290	290	2	160
12/04/2013	10:15:00	39.3	29.0	24.2	980.5	290	300	2	166
12/04/2013	11:00:00	39.0	30.5	25.6	974.2	300	300	2	166
12/04/2013	12:00:00	39.0	32.3	23.6	978.6	300	300	2	171
12/04/2013	13:00:00	39.0	31.8	25.8	977.6	300	300	2	171
12/04/2013	14:30:00	39.0	29.4	26.9	976.9	300	300	2	171
12/04/2013	20:30:00	39.8	22.8	23.2	979.4	300	320	2	190
13/04/2013	3:00:00	39.4	17.2	18.7	976.7	320	330	2	198
13/04/2013	9:12:00	38.7	23.1	20.3	978.6	330	340	2	213
13/04/2013	15:00:00	38.7	25.9	24.2	974.0	340	350	2	216
13/04/2013	21:00:00	40.0	19.2	20.8	975.7	350	360	2	223
14/04/2013	3:20:00	40.9	16.5	17.3	974.8	360	380	2	238
14/04/2013	10:09:00	39.5	28.7	22.5	974.2	380	380	2	242
14/04/2013	16:15:00	39.9	28.8	26.8	970.9	380	340	2	242
15/04/2013	16:49:00	39.7	31.9	28.5	967.7	340	410	2	303
16/04/2013	13:04:00	41.8	32.8	27.8	970.3	400	460	2	354
18/04/2013	9:15:00	37.8	26.4	25.6	1014.8	200	120	2	354
22/04/2013	10:50:00	37.2	26.1	24.0	1014.4	50	110	2	411
26/04/2013	9:26:00	37.1	25.9	24.4	1023.0	50	75	2	444
29/04/2013	10:34:00	37.5	26.9	25.1	1023.6	50	85	2	477
30/04/2013	13:31:00	36.7	27.7	25.4	1021.5	200	210	2	492
6/05/2013	10:19:00	37.1	25.1	23.4	1023.6	200	240	2	532
9/05/2013	12:06:00	37.4	26.8	24.8	1027.2	200	220	2	553
16/05/2013	10:39:00	36.7	23.9	22.9	1015.9	50	100	2	584
23/05/2013	15:08:00	37.1	25.6	22.1	1008.3	200	250	2	625
31/05/2013	9:12:00	38.6	22.4	21.2	1029.1	200	200	2	644
3/06/2013	10:11:00	37.6	24.7	24.1	1017.3	200	225	2	658
6/06/2013	10:21:00	37.7	23.2	22.0	1027.4	200	210	2	679
13/06/2013	8:32:00	37.3	24.6	23.2	1012.7	200	230	2	691
20/06/2013	9:25:00	40.3	21.9	21.2	1022.8	200	240	2	731
27/06/2013	9:28:00	39.4	22.6	21.6	1020.3	200	230	2	759
4/07/2013	9:50:00	37.7	25.1	24.6	1012.6	200	190	2	759

QGC Pty Limited Murdoch 1 - Sample MUR001_004 - 624.740 to 625.240 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
10/07/2013	9:08:00	39.5	21.6	20.8	1032.9	200	180	2	759
18/07/2013	10:49:00	39.4	23.4	22.4	1025.3	200	220	2	771
24/07/2013	13:46:00	38.1	24.4	18.4	1021.8	50	80	2	794


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_004 - 624.740 to 625.240 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
400
200
0
-200
-400
-600
-800
-1000
0
5
10
15
20
25
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_004 - 624.740 to 625.240 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
900
800
700
600
500
400
300
200
100
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
1.60
103.79 Days from T Zero
77.6% Methane
0.45% Ethane
0.57% Carbon Dioxide
21.4% Nitrogen
34.66 Days from T Zero
99.6% Methane
0.1% Ethane
0.28% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_004GASB
MUR001_004GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_005 - 639.490 to 640.200 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_005	Sample Type	Core	Sample Top (m)	639.490	Sample Base (m)	640.200	Core Diameter (cm)	6.15
Sample Volume (cc)	2109	Mass (g)	2906	RD (g/cc)	1.66	Moisture (%ad)	6	Ash (%ad)	42.8
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	6.1	Q3 Ash (%ad)	35.4
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1452		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	49.2	Minimum Q1 Point
Sample Penetrated	12/04/2013	12:13		Formation Pressure (Mpa) @ 0.433 psi/ft	6.26			Surface Time Ratio	0.606	2
Sample Off Bottom	12/04/2013	13:13		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.011	Maximum Q1 Point
Sample at Surface	12/04/2013	13:26		Depth HSP=Formation Pressure (m)	638.71			USBM Q1 - Surface Time Correction	1.2	20
Sample Sealed	12/04/2013	13:46		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	12/04/2013	13:13		Standard Temperature (°C)	20.00	Comments:				33
Last Entry	24/07/2013	14:30		Standard Pressure (hPa)	1013					-138

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.05	0.06	0.00	0.50	0.00	0.550	0.560		Time Zero Calculation
SCF/T (raw)	2	2	0	16	0	17.460	17.760		
m^3/tonne (daf)	0.09	0.11	0.00	0.97	0.00	1.06	**1.08**	0.97	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	3	4	0	31	0	34	**35**	31	
Percent of daf total	8.77%	10.33%	0.00%	89.93%	Sorption Time (days)	9.90	Diffusivity (sec^{-1})	2.06994E-05	

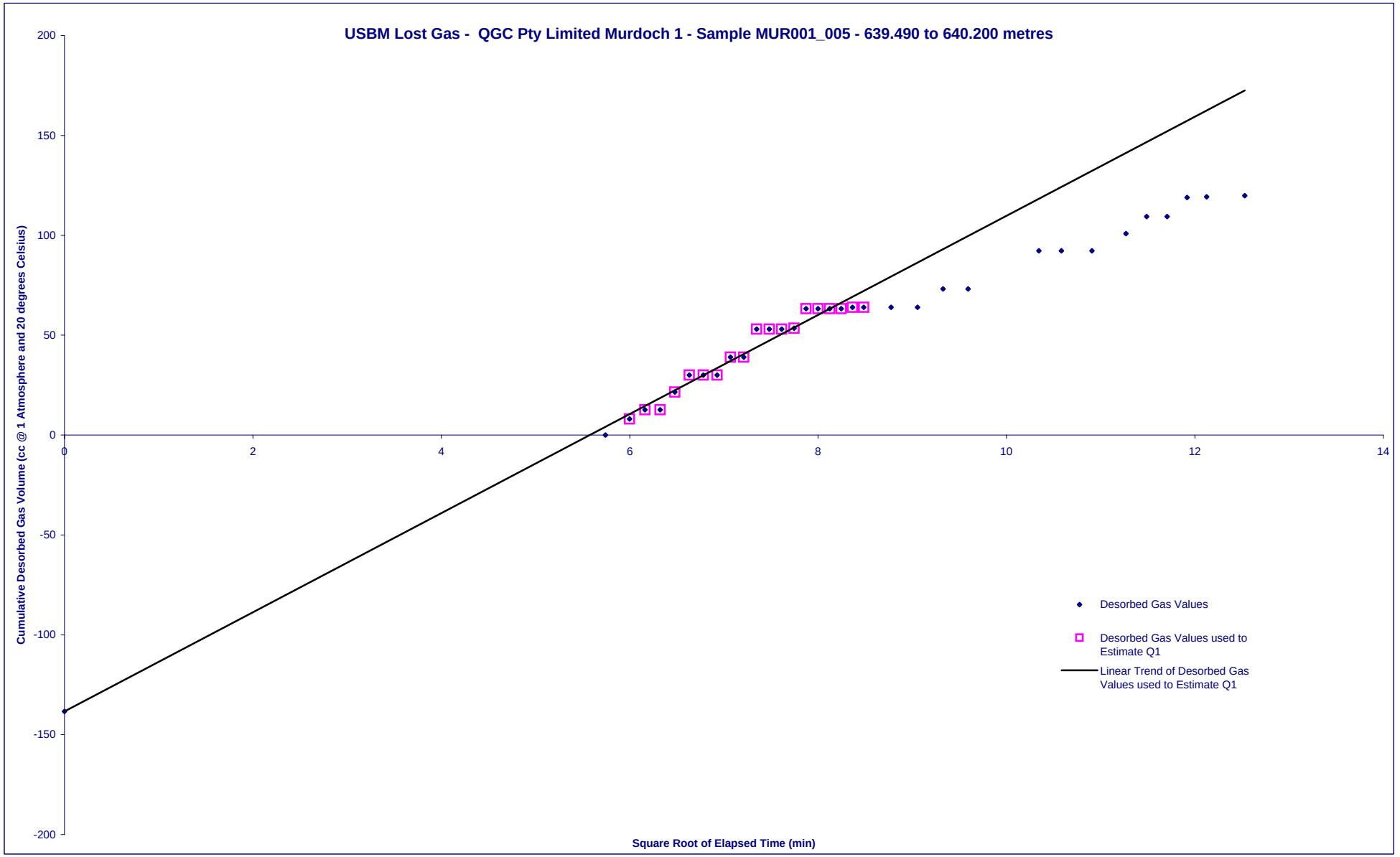
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	13:46:00	35.5	31.7	26.6	976.9	100	100	2	0
12/04/2013	13:49:00	36.3	31.8	26.6	977.1	100	190	2	8
12/04/2013	13:51:00	37.4	31.9	26.9	977.1	190	200	2	13
12/04/2013	13:53:00	37.8	32.1	27.2	977.1	200	200	2	13
12/04/2013	13:55:00	37.9	32.2	27.2	977.1	200	210	2	22
12/04/2013	13:57:00	38.1	32.3	27.2	977.1	210	220	2	30
12/04/2013	13:59:00	38.2	32.1	27.2	977.3	220	220	2	30
12/04/2013	14:01:00	38.3	31.9	27.2	977.1	220	220	2	30
12/04/2013	14:03:00	38.3	31.7	27.1	976.9	220	230	2	39
12/04/2013	14:05:00	38.3	31.4	27.1	976.9	230	230	2	39
12/04/2013	14:07:00	38.3	31.2	27.1	986.9	230	230	2	53
12/04/2013	14:09:00	38.3	31.0	27.1	976.9	230	240	2	53
12/04/2013	14:11:00	38.3	30.8	27.1	976.9	240	240	2	53
12/04/2013	14:13:00	38.2	30.4	27.1	976.9	240	240	2	53
12/04/2013	14:15:00	38.1	30.2	27.1	976.9	240	250	2	63
12/04/2013	14:17:00	38.1	29.9	27.0	976.9	250	250	2	63
12/04/2013	14:19:00	38.1	29.8	27.0	976.9	250	250	2	63
12/04/2013	14:21:00	38.1	29.6	27.0	976.9	250	250	2	63
12/04/2013	14:23:00	38.0	29.5	26.9	977.1	250	250	2	64
12/04/2013	14:25:00	38.0	29.5	26.9	976.9	250	250	2	64
12/04/2013	14:30:00	38.0	29.4	26.9	976.9	250	250	2	64
12/04/2013	14:35:00	38.2	29.5	26.9	976.5	250	250	2	64
12/04/2013	14:40:00	38.3	29.8	26.9	976.7	250	260	2	73
12/04/2013	14:45:00	38.5	30.1	26.9	976.5	260	260	2	73
12/04/2013	15:00:00	38.5	29.5	26.8	976.7	260	280	2	92
12/04/2013	15:05:00	38.9	29.2	26.7	976.7	280	280	2	92
12/04/2013	15:12:00	39.1	29.3	26.6	976.9	280	280	2	92
12/04/2013	15:20:00	39.2	29.4	26.6	976.7	280	290	2	101
12/04/2013	15:25:00	39.4	29.5	26.7	976.7	290	300	2	109
12/04/2013	15:30:00	39.5	29.9	26.7	976.9	300	300	2	109
12/04/2013	15:35:00	39.4	30.3	26.8	976.7	300	310	2	119
12/04/2013	15:40:00	39.3	30.2	26.8	976.7	310	310	2	119

QGC Pty Limited Murdoch 1 - Sample MUR001_005 - 639.490 to 640.200 metres

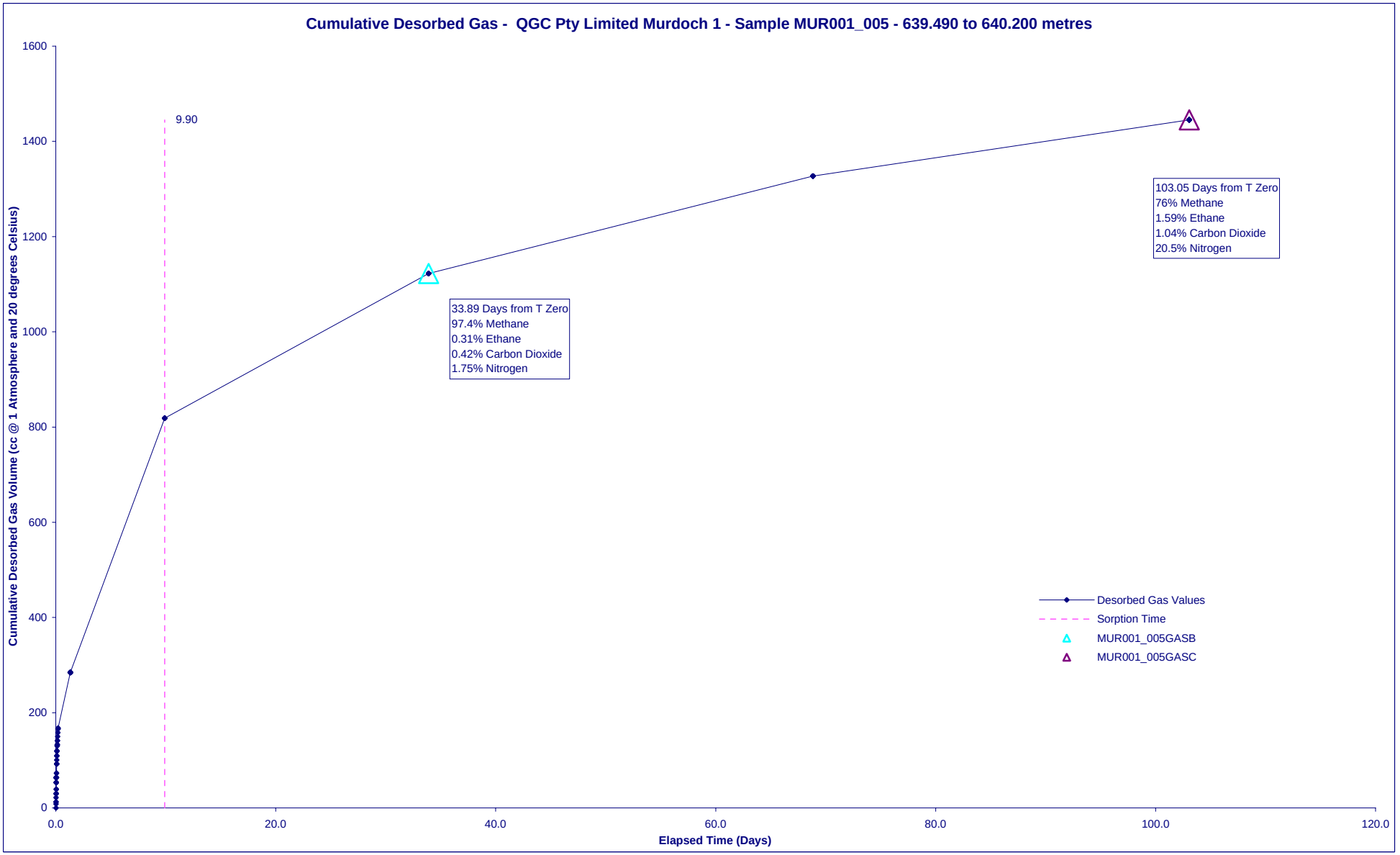
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	15:50:00	39.1	30.1	26.8	976.5	310	310	2	120
12/04/2013	16:00:00	38.9	29.8	26.8	976.5	310	320	2	130
12/04/2013	16:10:00	38.7	28.5	26.5	976.7	320	320	2	131
12/04/2013	16:20:00	38.4	28.0	26.4	976.7	320	320	2	132
12/04/2013	16:30:00	38.3	27.6	26.2	976.7	320	320	2	133
12/04/2013	16:40:00	38.6	27.5	26.1	976.9	320	330	2	141
12/04/2013	16:55:00	38.8	27.1	25.9	977.3	330	330	2	141
12/04/2013	17:14:00	39.1	26.4	25.5	977.5	330	340	2	150
12/04/2013	17:38:00	39.6	25.9	25.2	978.2	340	350	2	158
12/04/2013	17:55:00	37.9	25.3	24.9	978.4	350	350	2	166
12/04/2013	18:10:00	39.8	25.1	24.8	978.4	350	350	2	166
12/04/2013	18:25:00	39.4	24.5	24.5	978.6	350	350	2	168
12/04/2013	19:00:00	38.9	23.9	23.9	979.0	350	350	2	171
12/04/2013	19:30:00	39.4	23.5	23.6	979.2	350	360	2	178
12/04/2013	20:00:00	39.4	23.3	23.5	979.4	360	360	2	179
12/04/2013	20:30:00	38.5	22.8	23.2	979.4	360	360	2	182
12/04/2013	21:00:00	37.7	22.2	23.0	979.2	360	360	2	186
12/04/2013	21:30:00	38.2	21.5	22.5	979.6	360	360	2	186
12/04/2013	22:00:00	38.5	21.3	22.3	979.6	360	370	2	194
12/04/2013	23:00:00	37.7	20.4	21.5	978.2	370	380	2	205
13/04/2013	0:00:00	38.3	20.1	21.1	978.2	380	390	2	212
13/04/2013	1:00:00	37.4	18.2	20.1	977.6	390	390	2	215
13/04/2013	2:00:00	37.6	17.9	19.3	977.8	390	400	2	225
13/04/2013	3:00:00	37.4	17.2	18.7	976.7	400	400	2	225
13/04/2013	4:00:00	37.6	17.1	18.3	977.3	400	400	2	225
13/04/2013	5:00:00	37.3	17.2	18.0	978.2	400	400	2	227
13/04/2013	9:12:00	37.5	23.1	20.3	978.6	400	420	2	246
13/04/2013	15:00:00	37.6	25.9	24.2	974.0	420	450	2	268
13/04/2013	21:00:00	38.8	19.2	20.8	975.7	450	470	2	284
14/04/2013	3:20:00	38.8	16.5	17.3	974.8	470	490	2	303
14/04/2013	10:09:00	38.4	28.7	22.5	974.2	490	500	2	313
14/04/2013	16:15:00	33.9	28.8	26.8	970.9	510	470	2	313
15/04/2013	16:49:00	38.6	31.9	28.5	967.7	470	590	2	400
16/04/2013	13:04:00	40.8	32.8	27.8	970.3	560	650	2	477
18/04/2013	9:15:00	36.9	26.4	25.6	1014.8	200	390	2	724
22/04/2013	10:50:00	36.1	26.1	24.0	1014.4	50	160	2	819
26/04/2013	9:26:00	36.1	25.9	24.4	1023.0	50	110	2	885
29/04/2013	10:34:00	35.8	26.9	25.1	1023.6	50	105	2	939
30/04/2013	13:31:00	35.5	27.7	25.4	1021.5	200	210	2	951
6/05/2013	10:19:00	35.9	25.1	23.4	1023.6	200	280	2	1032
9/05/2013	12:06:00	36.4	26.8	24.8	1027.2	200	240	2	1070
16/05/2013	10:39:00	35.7	23.9	22.9	1015.9	50	125	2	1122
23/05/2013	15:08:00	35.7	25.6	22.1	1008.3	200	260	2	1174
31/05/2013	9:12:00	37.0	22.4	21.2	1029.1	200	200	2	1195
3/06/2013	10:11:00	37.1	24.7	24.1	1017.3	200	240	2	1217
6/06/2013	10:21:00	36.5	23.2	22.0	1027.4	200	220	2	1253
13/06/2013	8:32:00	36.9	24.6	23.2	1012.7	200	245	2	1273
20/06/2013	9:25:00	38.9	21.9	21.2	1022.8	200	250	2	1327
27/06/2013	9:28:00	38.8	22.6	21.6	1020.3	200	250	2	1371
4/07/2013	9:50:00	37.1	25.1	24.6	1012.6	200	220	2	1385
10/07/2013	9:08:00	37.9	21.6	20.8	1032.9	200	200	2	1410
18/07/2013	10:49:00	38.3	23.4	22.4	1025.3	200	230	2	1427

QGC Pty Limited Murdoch 1 - Sample MUR001_005 - 639.490 to 640.200 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
24/07/2013	14:30:00	38.1	24.6	18.6	1022.2	50	80	2	1445


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_005 - 639.490 to 640.200 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
200
150
100
50
0
-50
-100
-150
-200
0
2
4
6
8
10
12
14
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_005 - 639.490 to 640.200 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
1600
1400
1200
1000
800
600
400
200
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
9.90
33.89 Days from T Zero
97.4% Methane
0.31% Ethane
0.42% Carbon Dioxide
1.75% Nitrogen
103.05 Days from T Zero
76% Methane
1.59% Ethane
1.04% Carbon Dioxide
20.5% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_005GASB
MUR001_005GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_006 - 640.200 to 641.010 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_006	Sample Type	Core	Sample Top (m)	640.200	Sample Base (m)	641.010	Core Diameter (cm)	6.15
Sample Volume (cc)	2406	Mass (g)	3306	RD (g/cc)	1.45	Moisture (%ad)	5.7	Ash (%ad)	22.2
Q3 Volume (cc@STP)	8.78	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	6.5	Q3 Ash (%ad)	24
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	909		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454		Trip Rate (m/min)	49.3	Minimum Q1 Point
Sample Penetrated	12/04/2013	12:28		Formation Pressure (Mpa) @ 0.433 psi/ft	6.27		Surface Time Ratio	0.606	2
Sample Off Bottom	12/04/2013	13:13		Formation Pressure Gradient (psi/ft)	0.433		Lost Time Ratio	0.011	Maximum Q1 Point
Sample at Surface	12/04/2013	13:26		Depth HSP=Formation Pressure (m)	639.42		USBM Q1 - Surface Time Correction	1.2	20
Sample Sealed	12/04/2013	13:46		Formation Temperature (°C)			Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	12/04/2013	13:13		Standard Temperature (°C)	20.00	Comments:			34
Last Entry	25/07/2013	8:21		Standard Pressure (hPa)	1013				-143

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.002	0.000	0.000	0.000		
m^3/tonne (raw)	0.04	0.05	0.00	0.53	0.04	0.610	0.620		Time Zero Calculation
SCF/T (raw)	1	2	0	17	1	19.860	20.130		
m^3/tonne (daf)	0.06	0.07	0.00	0.74	0.06	0.86	**0.87**	0.80	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	2	2	0	24	2	28	**28**	26	
Percent of daf total	6.98%	8.27%	0.00%	84.92%	Sorption Time (days)	33.90	Diffusivity (sec^{-1})	1.39620E-05	

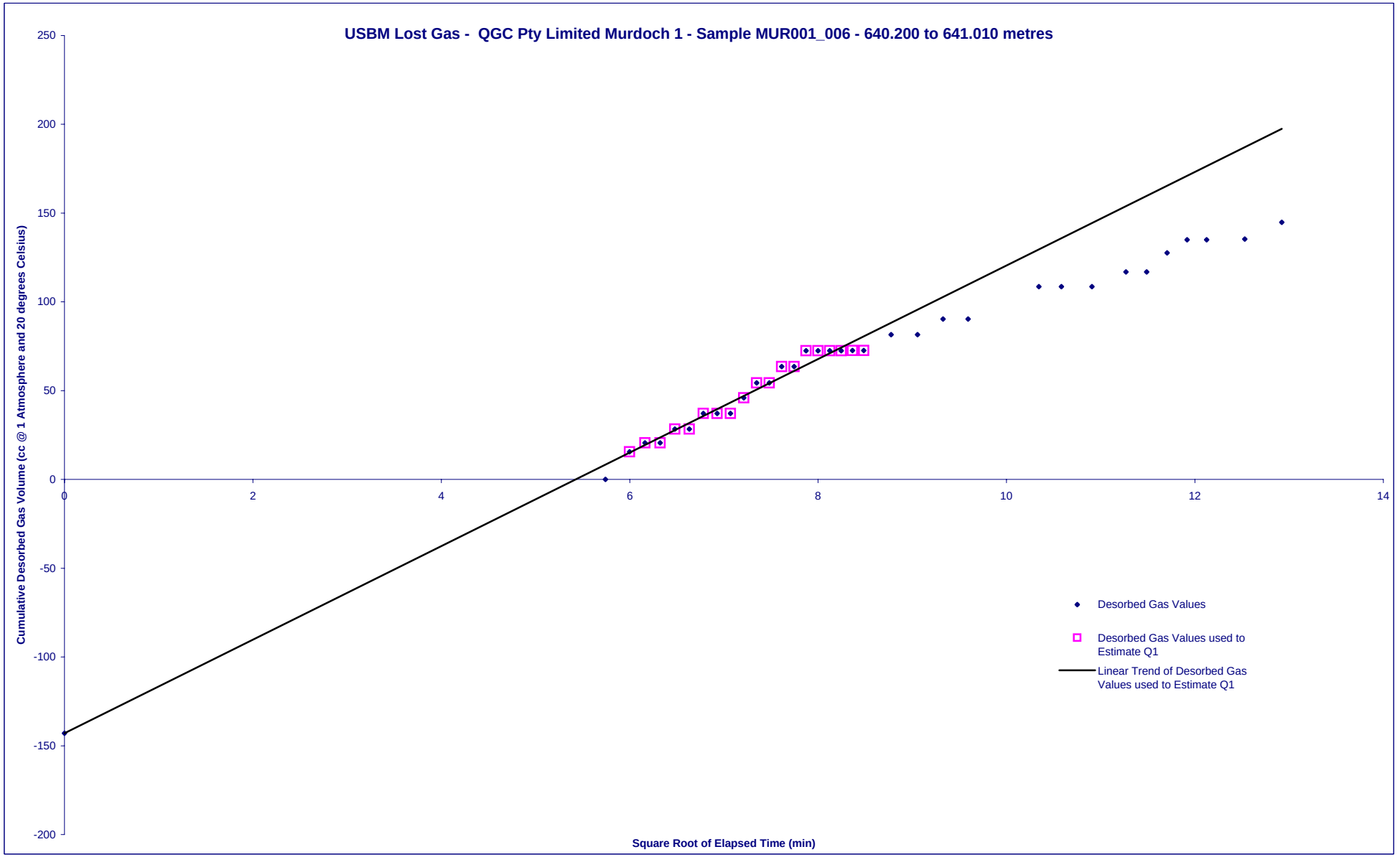
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	13:46:00	33.1	31.7	26.6	976.9	100	100	2	0
12/04/2013	13:49:00	34.0	31.8	26.6	977.1	100	170	2	16
12/04/2013	13:51:00	35.5	31.9	26.9	977.1	170	180	2	21
12/04/2013	13:53:00	36.0	32.1	27.2	977.1	180	180	2	21
12/04/2013	13:55:00	36.5	32.2	27.2	977.1	180	190	2	28
12/04/2013	13:57:00	36.9	32.3	27.2	977.1	190	190	2	28
12/04/2013	13:59:00	37.1	32.1	27.2	977.3	190	200	2	37
12/04/2013	14:01:00	37.1	31.9	27.2	977.1	200	200	2	37
12/04/2013	14:03:00	37.3	31.7	27.1	976.9	200	200	2	37
12/04/2013	14:05:00	37.4	31.4	27.1	976.9	200	210	2	46
12/04/2013	14:07:00	37.6	31.2	27.1	986.9	210	210	2	54
12/04/2013	14:09:00	37.7	31.0	27.1	976.9	210	210	2	54
12/04/2013	14:11:00	37.7	30.8	27.1	976.9	210	220	2	64
12/04/2013	14:13:00	37.7	30.4	27.1	976.9	220	220	2	64
12/04/2013	14:15:00	37.8	30.2	27.1	976.9	220	230	2	72
12/04/2013	14:17:00	37.9	29.9	27.0	976.9	230	230	2	72
12/04/2013	14:19:00	38.0	29.8	27.0	976.9	230	230	2	72
12/04/2013	14:21:00	38.0	29.6	27.0	976.9	230	230	2	72
12/04/2013	14:23:00	38.0	29.5	26.9	977.1	230	230	2	73
12/04/2013	14:25:00	38.0	29.5	26.9	976.9	230	230	2	73
12/04/2013	14:30:00	38.1	29.4	26.9	976.9	230	240	2	82
12/04/2013	14:35:00	38.3	29.5	26.9	976.5	240	240	2	82
12/04/2013	14:40:00	38.5	29.8	26.9	976.7	240	250	2	90
12/04/2013	14:45:00	38.7	30.1	26.9	976.5	250	250	2	90
12/04/2013	15:00:00	38.8	29.5	26.8	976.7	250	270	2	109
12/04/2013	15:05:00	39.2	29.2	26.7	976.7	270	270	2	109
12/04/2013	15:12:00	39.4	29.3	26.6	976.9	270	270	2	109
12/04/2013	15:20:00	39.7	29.4	26.6	976.7	270	280	2	117
12/04/2013	15:25:00	39.8	29.5	26.7	976.7	280	280	2	117
12/04/2013	15:30:00	39.3	29.9	26.7	976.9	280	290	2	128
12/04/2013	15:35:00	39.9	30.3	26.8	976.7	290	300	2	135
12/04/2013	15:40:00	39.9	30.2	26.8	976.7	300	300	2	135

QGC Pty Limited Murdoch 1 - Sample MUR001_006 - 640.200 to 641.010 metres

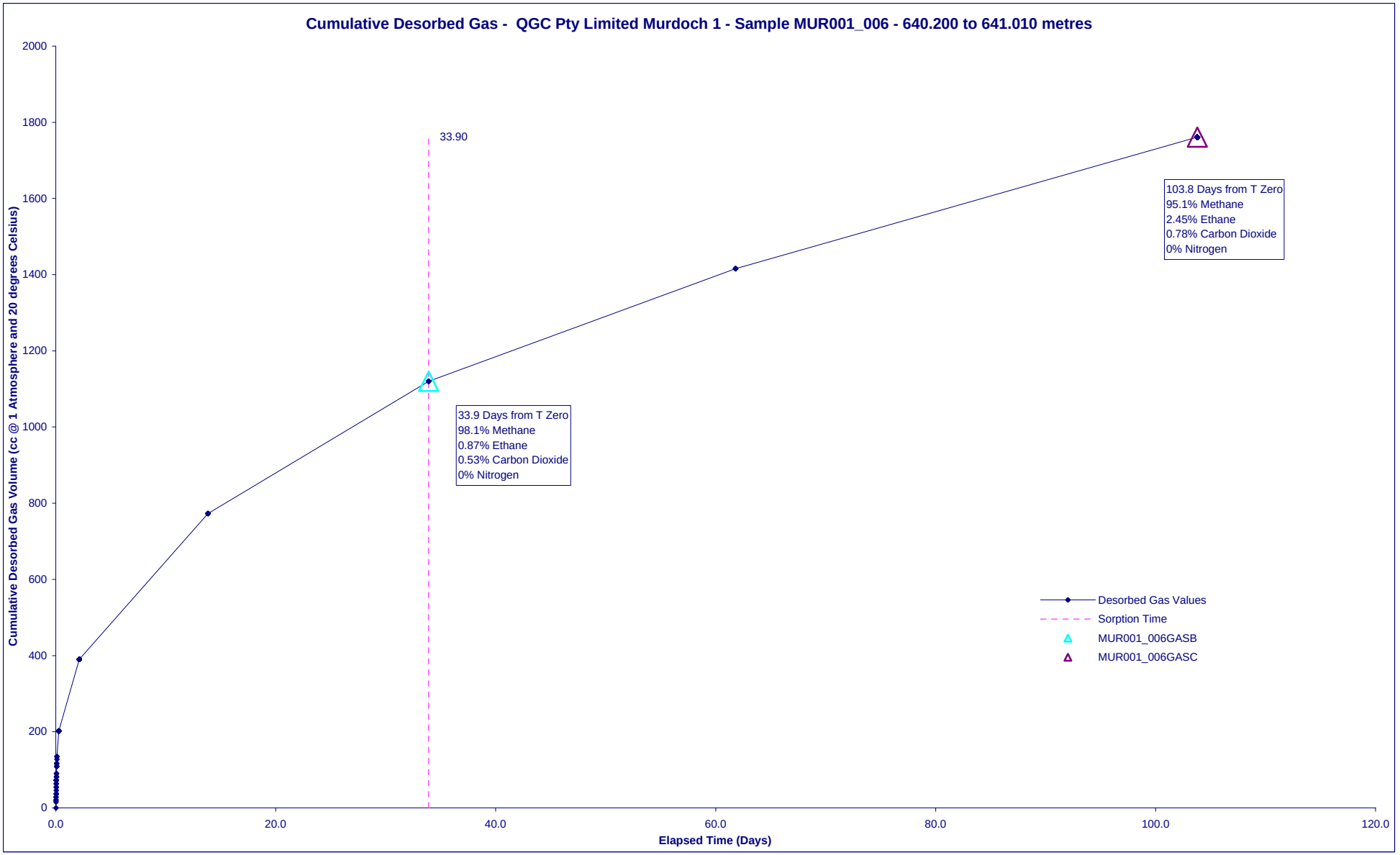
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	15:50:00	39.7	30.1	26.8	976.5	300	300	2	135
12/04/2013	16:00:00	39.6	29.8	26.8	976.5	300	310	2	145
12/04/2013	16:10:00	39.4	28.5	26.5	976.7	310	310	2	145
12/04/2013	16:20:00	39.3	28.0	26.4	976.7	310	310	2	146
12/04/2013	16:30:00	39.2	27.6	26.2	976.7	310	310	2	146
12/04/2013	16:40:00	39.4	27.5	26.1	976.9	310	320	2	155
12/04/2013	16:55:00	39.6	27.1	25.9	977.3	320	320	2	155
12/04/2013	17:14:00	39.9	26.4	25.5	977.5	320	330	2	164
12/04/2013	17:38:00	40.3	25.9	25.2	978.2	330	350	2	182
12/04/2013	17:55:00	40.5	25.3	24.9	978.4	350	350	2	182
12/04/2013	18:10:00	40.4	25.1	24.8	978.4	350	350	2	182
12/04/2013	18:25:00	40.2	24.5	24.5	978.6	350	360	2	192
12/04/2013	19:00:00	39.9	23.9	23.9	979.0	360	360	2	193
12/04/2013	19:30:00	40.2	23.5	23.6	979.2	360	370	2	202
12/04/2013	20:00:00	40.4	23.3	23.5	979.4	370	380	2	211
12/04/2013	20:30:00	39.9	22.8	23.2	979.4	380	380	2	213
12/04/2013	21:00:00	39.3	22.2	23.0	979.2	380	380	2	214
12/04/2013	21:30:00	39.6	21.5	22.5	979.6	380	390	2	223
12/04/2013	22:00:00	40.0	21.3	22.3	979.6	390	400	2	232
12/04/2013	23:00:00	39.5	20.4	21.5	978.2	400	410	2	241
13/04/2013	0:00:00	40.1	20.1	21.1	978.2	410	420	2	249
13/04/2013	1:00:00	39.4	18.2	20.1	977.6	420	420	2	251
13/04/2013	2:00:00	39.7	17.9	19.3	977.8	420	430	2	260
13/04/2013	3:00:00	39.3	17.2	18.7	976.7	430	440	2	269
13/04/2013	4:00:00	39.5	17.1	18.3	977.3	440	450	2	279
13/04/2013	5:00:00	39.1	17.2	18.0	978.2	450	450	2	281
13/04/2013	9:12:00	38.9	23.1	20.3	978.6	450	470	2	301
13/04/2013	15:00:00	38.7	25.9	24.2	974.0	470	510	2	335
13/04/2013	21:00:00	40.0	19.2	20.8	975.7	510	530	2	352
14/04/2013	3:20:00	40.8	16.5	17.3	974.8	530	560	2	378
14/04/2013	10:09:00	39.6	28.7	22.5	974.2	570	580	2	390
14/04/2013	16:15:00	35.0	28.8	26.8	970.9	580	560	2	390
15/04/2013	16:49:00	39.6	31.9	28.5	967.7	560	670	2	475
16/04/2013	13:04:00	41.1	32.8	27.8	970.3	650	740	2	556
18/04/2013	9:17:00	38.1	26.4	25.6	1015.5	200	180	2	570
22/04/2013	10:52:00	38.4	26.2	24.1	1014.4	50	170	2	679
26/04/2013	9:28:00	37.7	25.9	24.4	1023.0	50	140	2	773
29/04/2013	10:35:00	38.4	27.1	25.1	1023.4	50	125	2	841
30/04/2013	13:35:00	37.9	27.5	25.2	1021.5	200	220	2	862
6/05/2013	10:21:00	37.9	25.2	23.4	1023.4	200	305	2	966
9/05/2013	12:09:00	38.3	26.8	24.9	1027.2	200	255	2	1019
16/05/2013	10:43:00	38.1	23.6	22.9	1015.9	50	170	2	1120
23/05/2013	15:09:00	38.4	25.7	22.2	1008.3	200	310	2	1219
31/05/2013	9:14:00	39.0	22.5	21.3	1021.1	200	255	2	1280
3/06/2013	10:14:00	38.5	24.4	24.1	1017.3	200	250	2	1325
6/06/2013	10:23:00	38.2	23.2	22.1	1027.0	200	230	2	1363
13/06/2013	8:33:00	38.5	24.4	23.1	1012.7	200	270	2	1416
20/06/2013	9:26:00	42.1	21.9	21.2	1022.8	200	280	2	1492
27/06/2013	9:30:00	40.7	22.6	21.6	1020.1	200	285	2	1574
4/07/2013	9:52:00	40.0	25.2	24.6	1022.4	200	250	2	1625
10/07/2013	9:09:00	41.0	21.6	20.8	1032.9	200	220	2	1650
18/07/2013	10:52:00	39.8	23.5	22.4	1025.1	200	250	2	1695

QGC Pty Limited Murdoch 1 - Sample MUR001_006 - 640.200 to 641.010 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
25/07/2013	8:21:00	39.9	21.9	18.8	1028.5	50	120	2	1761


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_006 - 640.200 to 641.010 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
250
200
150
100
50
0
-50
-100
-150
-200
0
2
4
6
8
10
12
14
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_006 - 640.200 to 641.010 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
33.90
33.9 Days from T Zero
98.1% Methane
0.87% Ethane
0.53% Carbon Dioxide
0% Nitrogen
103.8 Days from T Zero
95.1% Methane
2.45% Ethane
0.78% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_006GASB
MUR001_006GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_007 - 642.750 to 643.350 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_007	Sample Type	Core	Sample Top (m)	642.750	Sample Base (m)	643.350	Core Diameter (cm)	6.15
Sample Volume (cc)	1782	Mass (g)	2802	RD (g/cc)	1.75	Moisture (%ad)	7.1	Ash (%ad)	50.8
Q3 Volume (cc@STP)	0.62	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	6.5	Q3 Ash (%ad)	39
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454		Trip Rate (m/min)	33.9	Minimum Q1 Point
Sample Penetrated	12/04/2013	13:57		Formation Pressure (Mpa) @ 0.433 psi/ft	6.30		Surface Time Ratio	0.525	2
Sample Off Bottom	12/04/2013	14:16		Formation Pressure Gradient (psi/ft)	0.433		Lost Time Ratio	0.009	Maximum Q1 Point
Sample at Surface	12/04/2013	14:35		Depth HSP=Formation Pressure (m)	641.97		USBM Q1 - Surface Time Correction	1.15	22
Sample Sealed	12/04/2013	14:56		Formation Temperature (°C)			Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	12/04/2013	14:16		Standard Temperature (°C)	20.00	Comments:			40
Last Entry	25/07/2013	8:45		Standard Pressure (hPa)	1013				-70

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.03	0.03	0.00	0.43	0.00	0.460	0.460		Time Zero Calculation
SCF/T (raw)	1	1	0	14	0	14.670	14.790		
m^3/tonne (daf)	0.06	0.07	0.00	1.02	0.01	1.09	**1.10**	1.03	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	2	2	0	33	0	35	**35**	33	
Percent of daf total	5.45%	6.21%	0.00%	92.81%	Sorption Time (days)	23.84	Diffusivity (sec^{-1})	1.64434E-05	

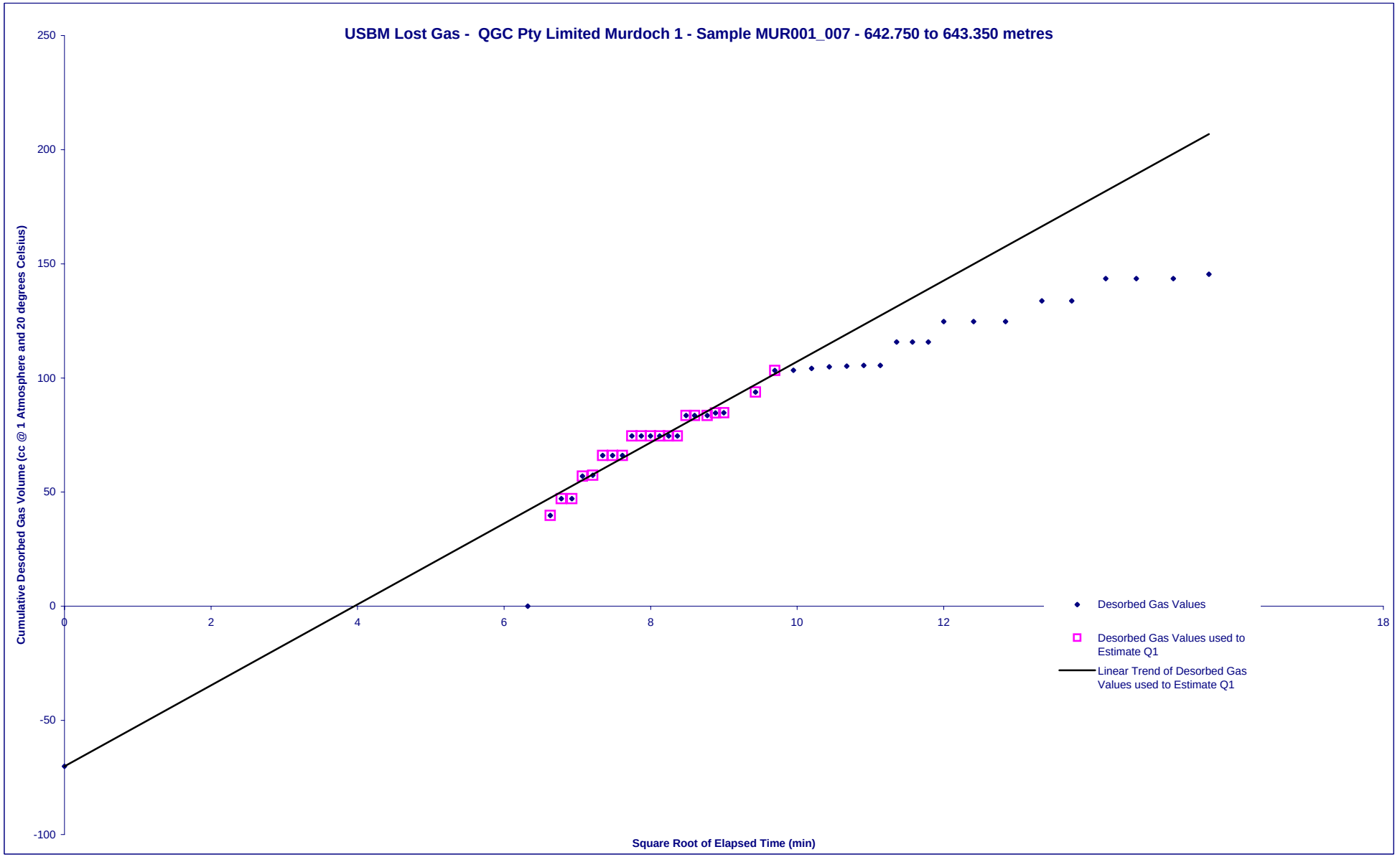
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	14:56:00	35.7	29.4	26.7	976.7	100	100	2	0
12/04/2013	15:00:00	37.9	29.3	26.8	976.7	100	210	2	40
12/04/2013	15:02:00	38.5	29.3	26.8	976.7	210	220	2	47
12/04/2013	15:04:00	39.1	29.3	26.7	976.7	220	220	2	47
12/04/2013	15:06:00	38.9	29.2	26.7	976.7	220	230	2	57
12/04/2013	15:08:00	38.7	29.2	26.7	976.5	230	230	2	57
12/04/2013	15:10:00	38.9	29.2	26.6	976.5	230	240	2	66
12/04/2013	15:12:00	39.2	29.3	26.7	976.9	240	240	2	66
12/04/2013	15:14:00	39.5	29.3	26.6	976.7	240	240	2	66
12/04/2013	15:16:00	39.7	29.3	26.6	976.7	240	250	2	75
12/04/2013	15:18:00	39.9	29.3	26.6	976.7	250	250	2	75
12/04/2013	15:20:00	40.1	29.4	26.6	976.9	250	250	2	75
12/04/2013	15:22:00	40.2	29.5	26.6	976.9	250	250	2	75
12/04/2013	15:24:00	40.3	29.5	26.7	976.9	250	250	2	75
12/04/2013	15:26:00	40.4	29.6	26.7	976.9	250	250	2	75
12/04/2013	15:28:00	40.5	29.8	26.7	976.9	250	260	2	84
12/04/2013	15:30:00	40.5	29.9	26.7	976.9	260	260	2	84
12/04/2013	15:33:00	40.6	30.1	26.8	976.5	260	260	2	84
12/04/2013	15:35:00	40.4	30.3	26.8	976.9	260	260	2	85
12/04/2013	15:37:00	40.3	30.3	26.8	976.7	260	260	2	85
12/04/2013	15:45:00	40.2	29.7	26.8	976.3	260	270	2	94
12/04/2013	15:50:00	40.2	30.1	26.8	976.5	270	280	2	103
12/04/2013	15:55:00	40.1	30.2	26.9	976.3	280	280	2	103
12/04/2013	16:00:00	39.9	29.8	26.8	976.5	280	280	2	104
12/04/2013	16:05:00	39.7	28.9	26.6	976.5	280	280	2	105
12/04/2013	16:10:00	39.6	28.5	26.5	976.5	280	280	2	105
12/04/2013	16:15:00	39.5	28.2	26.5	976.5	280	280	2	105
12/04/2013	16:20:00	39.4	28.0	26.3	976.1	280	280	2	105
12/04/2013	16:25:00	39.3	27.8	26.3	976.7	280	290	2	116
12/04/2013	16:30:00	39.5	27.6	26.2	976.7	290	290	2	116
12/04/2013	16:35:00	39.6	27.6	26.2	976.9	290	290	2	116
12/04/2013	16:40:00	39.7	27.5	26.1	976.9	290	300	2	125

QGC Pty Limited Murdoch 1 - Sample MUR001_007 - 642.750 to 643.350 metres

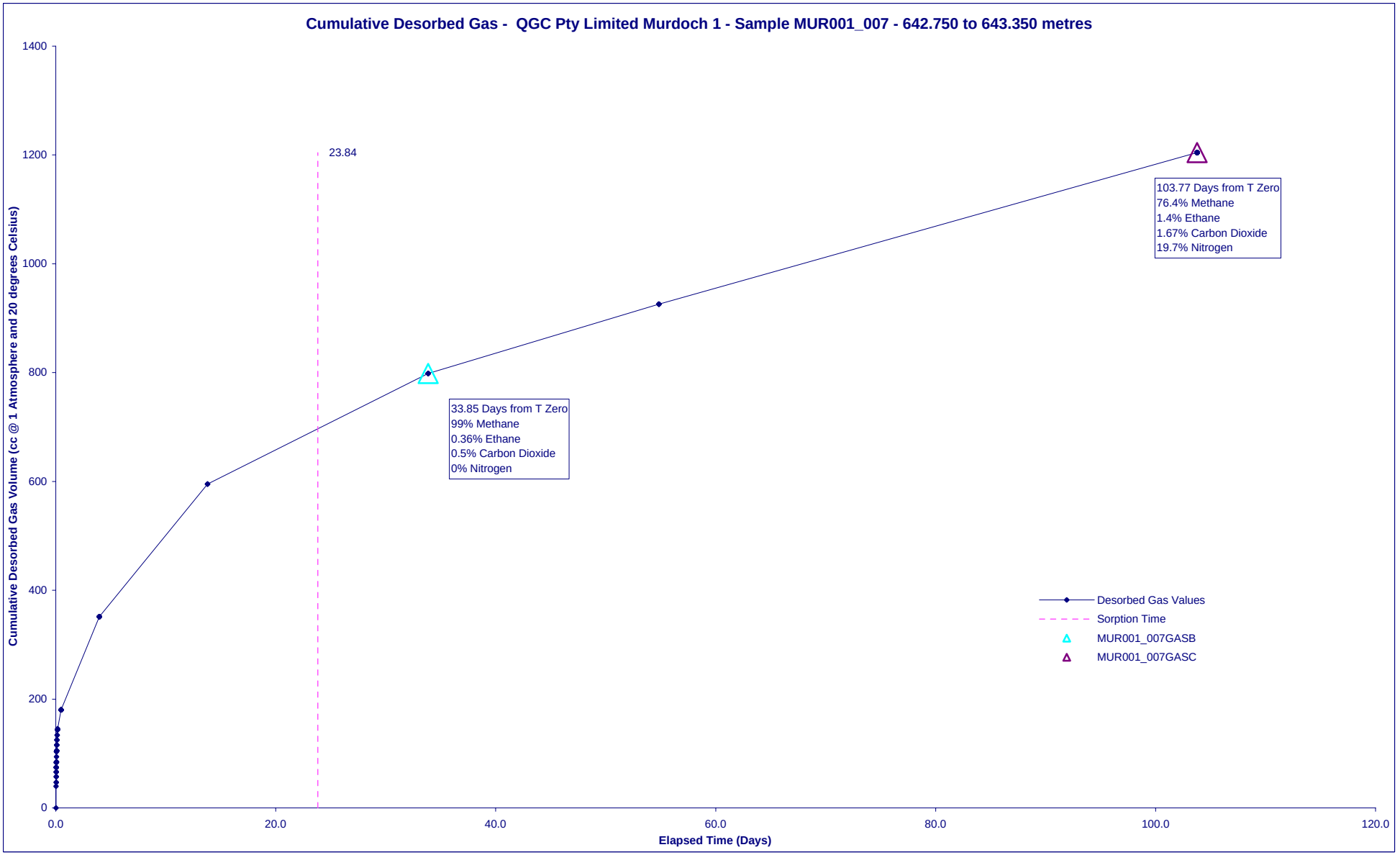
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	16:50:00	39.9	27.3	26.0	976.7	300	300	2	125
12/04/2013	17:01:00	40.2	26.9	25.8	976.9	300	300	2	125
12/04/2013	17:14:00	40.5	26.4	25.5	977.5	300	310	2	134
12/04/2013	17:25:00	40.6	26.1	25.4	977.3	310	310	2	134
12/04/2013	17:38:00	40.8	25.9	25.2	978.2	310	320	2	144
12/04/2013	17:50:00	41.1	25.4	25.1	978.2	320	320	2	144
12/04/2013	18:05:00	41.1	25.2	24.9	978.2	320	320	2	144
12/04/2013	18:20:00	40.5	24.5	24.5	978.2	320	320	2	145
12/04/2013	18:35:00	40.1	24.2	24.3	978.2	320	320	2	147
12/04/2013	18:50:00	39.9	23.9	24.1	978.4	320	320	2	148
12/04/2013	19:05:00	40.2	23.9	23.9	979.0	320	320	2	148
12/04/2013	19:20:00	40.5	23.6	23.8	979.2	320	320	2	148
12/04/2013	19:35:00	40.7	23.5	23.6	979.4	320	330	2	157
12/04/2013	20:00:00	40.7	23.3	23.5	979.4	330	330	2	157
12/04/2013	20:30:00	39.8	22.8	23.2	979.4	330	330	2	160
12/04/2013	21:00:00	39.2	22.2	23.0	979.2	330	330	2	161
12/04/2013	21:30:00	39.9	21.5	22.5	979.6	330	330	2	161
12/04/2013	22:00:00	40.3	21.3	22.3	979.6	330	340	2	170
12/04/2013	22:30:00	40.0	20.9	21.9	979.6	340	340	2	171
12/04/2013	23:00:00	39.5	20.4	21.5	978.2	340	340	2	171
13/04/2013	0:00:00	40.3	20.1	21.1	978.2	340	350	2	178
13/04/2013	1:00:00	39.2	18.2	20.1	977.6	350	350	2	181
13/04/2013	2:00:00	39.6	17.9	19.3	977.8	350	350	2	181
13/04/2013	3:00:00	39.0	17.2	18.7	976.7	350	360	2	191
13/04/2013	4:00:00	39.3	17.1	18.3	977.3	360	360	2	191
13/04/2013	5:00:00	38.7	17.2	18.0	978.2	360	360	2	194
13/04/2013	9:12:00	38.8	23.1	20.3	978.6	360	360	2	194
13/04/2013	15:00:00	38.9	25.9	24.2	974.0	360	390	2	217
13/04/2013	21:00:00	40.3	19.2	20.8	975.7	390	390	2	217
14/04/2013	3:20:00	40.7	16.5	17.3	974.8	390	410	2	234
14/04/2013	10:09:00	39.7	28.7	22.5	974.2	420	420	2	237
14/04/2013	16:15:00	35.1	28.8	26.8	970.9	420	370	2	237
15/04/2013	16:49:00	39.8	31.9	28.5	967.7	370	460	2	301
16/04/2013	13:04:00	42.0	32.8	27.8	970.3	450	510	2	351
18/04/2013	9:17:00	37.8	26.4	25.6	1015.5	200	270	2	470
22/04/2013	10:52:00	37.8	26.2	24.1	1014.4	50	120	2	529
26/04/2013	9:28:00	37.5	25.9	24.4	1023.0	50	110	2	595
29/04/2013	10:35:00	37.5	27.1	25.1	1023.4	50	100	2	642
30/04/2013	13:35:00	37.5	27.5	25.2	1021.5	200	210	2	653
6/05/2013	10:21:00	37.5	25.2	23.4	1023.4	200	265	2	719
9/05/2013	12:09:00	38.3	26.8	24.9	1027.2	200	230	2	747
16/05/2013	10:43:00	38.0	23.6	22.9	1015.9	50	120	2	798
23/05/2013	15:09:00	37.9	25.7	22.2	1008.3	200	255	2	846
31/05/2013	9:14:00	39.2	22.5	21.3	1021.1	200	210	2	864
3/06/2013	10:14:00	38.8	24.4	24.1	1017.3	200	240	2	900
6/06/2013	10:23:00	38.2	23.2	22.1	1027.0	200	215	2	926
13/06/2013	8:33:00	37.9	24.4	23.1	1012.7	200	250	2	960
20/06/2013	9:26:00	42.3	21.9	21.2	1022.8	200	260	2	1014
27/06/2013	9:30:00	40.2	22.6	21.6	1020.1	200	250	2	1065
4/07/2013	9:52:00	39.3	25.2	24.6	1022.4	200	230	2	1098
10/07/2013	9:09:00	41.0	21.6	20.8	1032.9	200	215	2	1118
18/07/2013	10:52:00	40.1	23.5	22.4	1025.1	200	240	2	1151

QGC Pty Limited Murdoch 1 - Sample MUR001_007 - 642.750 to 643.350 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
25/07/2013	8:45:00	38.8	22.2	18.3	1028.5	100	150	2	1204


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_007 - 642.750 to 643.350 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
250
200
150
100
50
0
-50
-100
0
2
4
6
8
10
12
18
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_007 - 642.750 to 643.350 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
1400
1200
1000
800
600
400
200
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
23.84
33.85 Days from T Zero
99% Methane
0.36% Ethane
0.5% Carbon Dioxide
0% Nitrogen
103.77 Days from T Zero
76.4% Methane
1.4% Ethane
1.67% Carbon Dioxide
19.7% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_007GASB
MUR001_007GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_008 - 643.580 to 644.120 metres

Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_008	Sample Type	Core	Sample Top (m)	643.580	Sample Base (m)	644.120	Core Diameter (cm)	6.15
Sample Volume (cc)	1604	Mass (g)	1940	RD (g/cc)	1.37	Moisture (%ad)	5.6	Ash (%ad)	14.5
Q3 Volume (cc@STP)	17.32	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	5.9	Q3 Ash (%ad)	8.9
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	33.9	Minimum Q1 Point
Sample Penetrated	12/04/2013	14:05		Formation Pressure (Mpa) @ 0.433 psi/ft	6.30			Surface Time Ratio	0.525	2
Sample Off Bottom	12/04/2013	14:16		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.143	Maximum Q1 Point
Sample at Surface	12/04/2013	14:35		Depth HSP=Formation Pressure (m)	642.80			USBM Q1 - Surface Time Correction	1.15	24
Sample Sealed	12/04/2013	14:56		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.090	Q1 Points Plotted
Time Zero	12/04/2013	14:16		Standard Temperature (°C)	20.00	Comments:				39
Last Entry	25/07/2013	9:16		Standard Pressure (hPa)	1013					-182

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.09	0.11	0.07	0.77	0.09	0.950	0.970		Time Zero Calculation
SCF/T (raw)	3	3	2	25	3	30.370	30.820		
m^3/tonne (daf)	0.12	0.14	0.09	0.96	0.10	1.18	**1.20**	1.15	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	4	4	3	31	3	38	**38**	37	
Percent of daf total	9.96%	11.26%	7.52%	80.06%	Sorption Time (days)	17.97	Diffusivity (sec^{-1})	3.16361E-05	

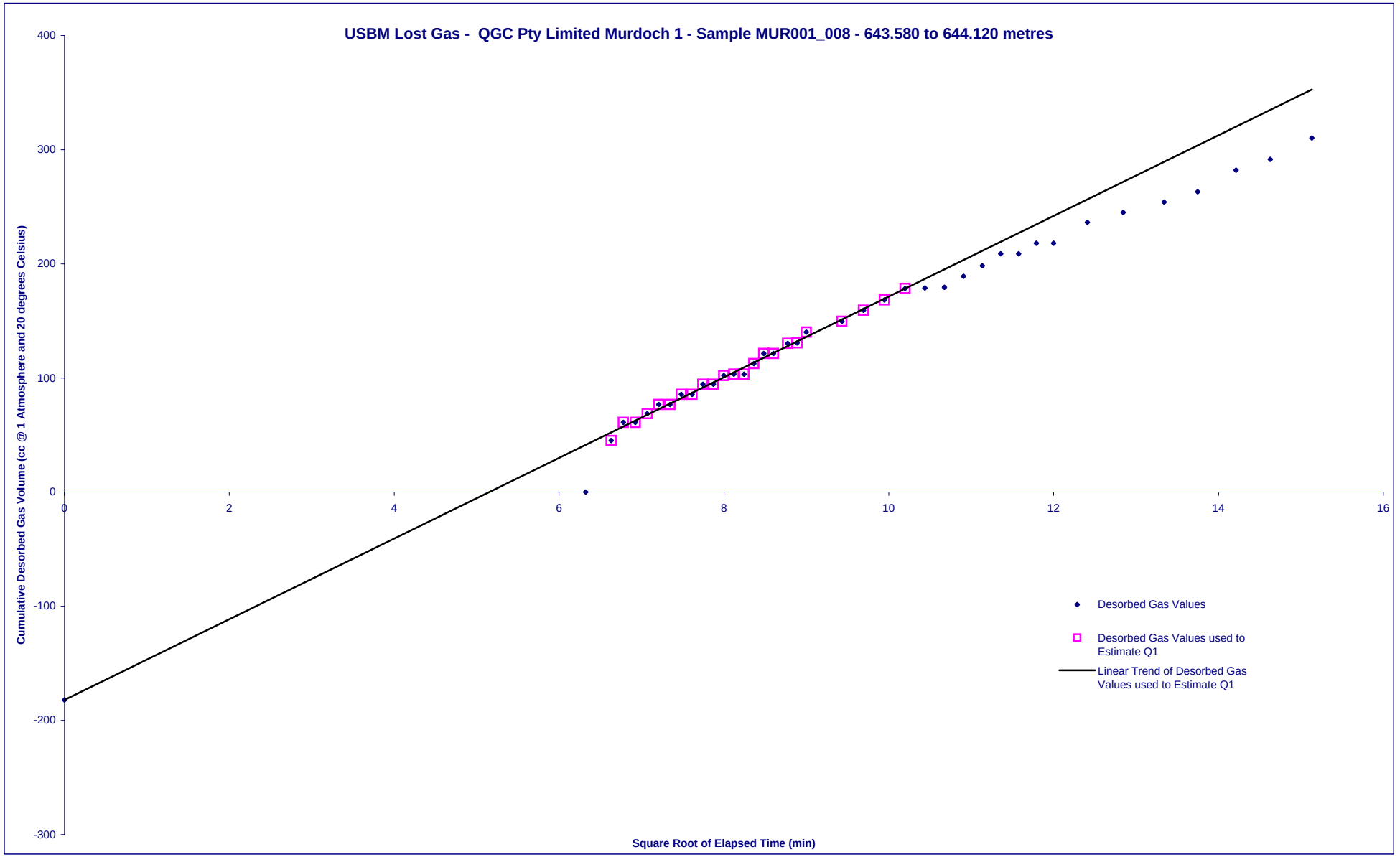
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	14:56:00	35.7	29.4	26.7	976.7	100	100	2	0
12/04/2013	15:00:00	36.3	29.3	26.8	976.7	100	210	2	45
12/04/2013	15:02:00	37.1	29.3	26.8	976.7	210	230	2	61
12/04/2013	15:04:00	37.8	29.3	26.7	976.7	230	230	2	61
12/04/2013	15:06:00	38.3	29.2	26.7	976.7	230	240	2	69
12/04/2013	15:08:00	38.6	29.2	26.7	976.5	240	250	2	77
12/04/2013	15:10:00	38.7	29.2	26.6	976.5	250	250	2	77
12/04/2013	15:12:00	39.0	29.3	26.7	976.9	250	260	2	86
12/04/2013	15:14:00	39.1	29.3	26.6	976.7	260	260	2	86
12/04/2013	15:16:00	39.2	29.3	26.6	976.7	260	270	2	94
12/04/2013	15:18:00	39.3	29.3	26.6	976.7	270	270	2	94
12/04/2013	15:20:00	39.9	29.4	26.6	976.9	270	280	2	102
12/04/2013	15:22:00	39.5	29.5	26.6	976.9	280	280	2	103
12/04/2013	15:24:00	39.6	29.5	26.7	976.9	280	280	2	103
12/04/2013	15:26:00	39.6	29.6	26.7	976.9	280	290	2	113
12/04/2013	15:28:00	39.7	29.8	26.7	976.9	290	300	2	122
12/04/2013	15:30:00	39.7	29.9	26.7	976.9	300	300	2	122
12/04/2013	15:33:00	39.7	30.1	26.8	976.5	300	310	2	130
12/04/2013	15:35:00	39.7	30.3	26.8	976.9	310	310	2	131
12/04/2013	15:37:00	39.6	30.3	26.8	976.7	310	320	2	140
12/04/2013	15:45:00	39.4	29.7	26.8	976.3	320	330	2	150
12/04/2013	15:50:00	39.3	30.1	26.8	976.5	330	340	2	159
12/04/2013	15:55:00	39.3	30.2	26.9	976.3	340	350	2	168
12/04/2013	16:00:00	39.1	29.8	26.8	976.5	350	360	2	178
12/04/2013	16:05:00	39.0	28.9	26.6	976.5	360	360	2	179
12/04/2013	16:10:00	38.8	28.5	26.5	976.5	360	360	2	179
12/04/2013	16:15:00	38.7	28.2	26.5	976.5	360	370	2	189
12/04/2013	16:20:00	38.6	28.0	26.3	976.1	370	380	2	198
12/04/2013	16:25:00	38.4	27.8	26.3	976.7	380	390	2	209
12/04/2013	16:30:00	38.6	27.6	26.2	976.7	390	390	2	209
12/04/2013	16:35:00	38.7	27.6	26.2	976.9	390	400	2	218
12/04/2013	16:40:00	38.7	27.5	26.1	976.9	400	400	2	218

QGC Pty Limited Murdoch 1 - Sample MUR001_008 - 643.580 to 644.120 metres

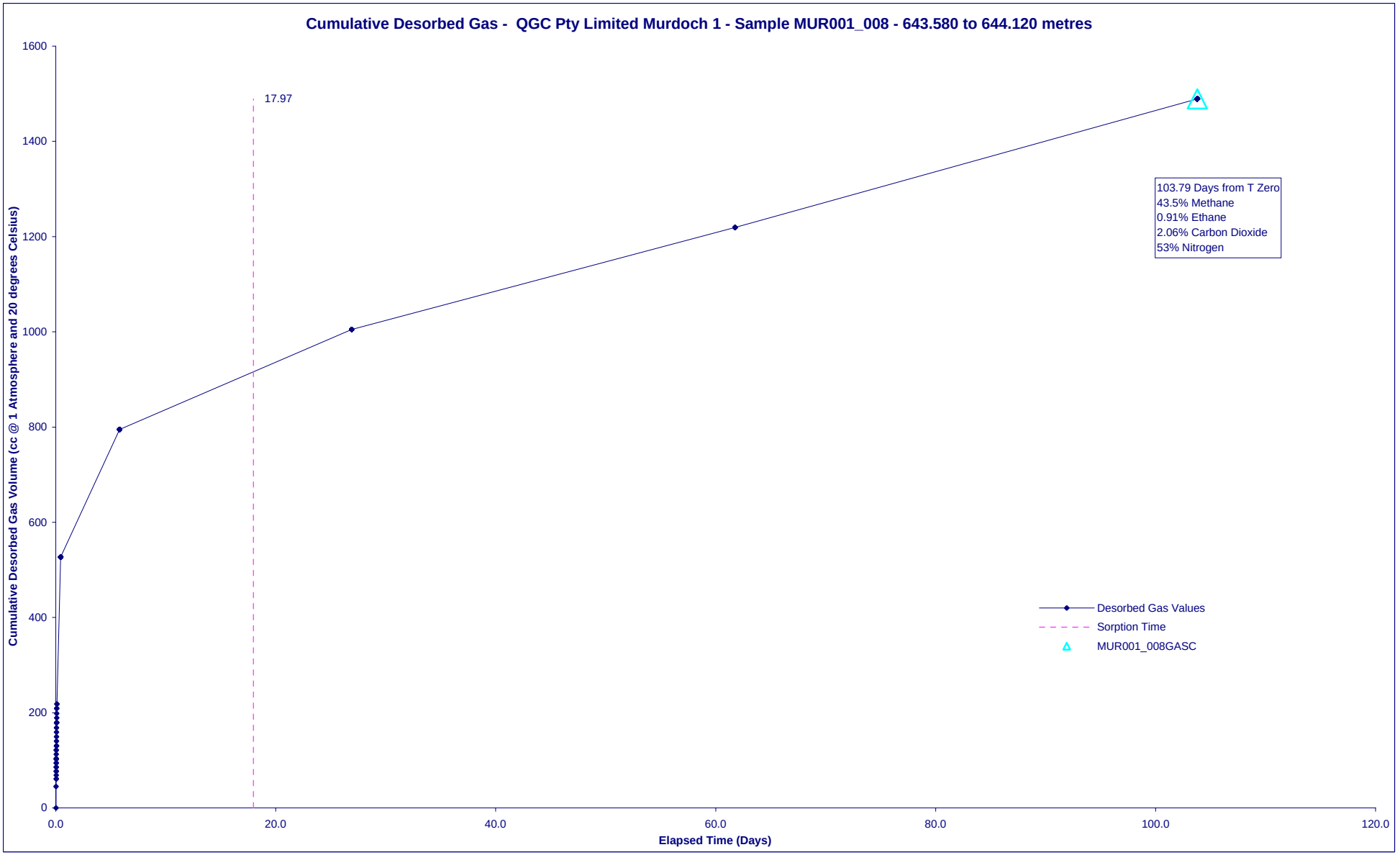
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
12/04/2013	16:50:00	38.8	27.3	26.0	976.7	400	420	2	236
12/04/2013	17:01:00	39.1	26.9	25.8	976.9	420	430	2	245
12/04/2013	17:14:00	39.4	26.4	25.5	977.5	430	440	2	254
12/04/2013	17:25:00	39.4	26.1	25.4	977.3	440	450	2	263
12/04/2013	17:38:00	39.7	25.9	25.2	978.2	450	470	2	282
12/04/2013	17:50:00	39.7	25.4	25.1	978.2	470	480	2	292
12/04/2013	18:05:00	39.8	25.2	24.9	978.2	480	500	2	310
12/04/2013	18:20:00	39.1	24.5	24.5	978.2	500	510	2	322
12/04/2013	18:35:00	38.7	24.2	24.3	978.2	510	510	2	323
12/04/2013	18:50:00	38.5	23.9	24.1	978.4	510	520	2	334
12/04/2013	19:05:00	38.7	23.9	23.9	979.0	520	540	2	353
12/04/2013	19:20:00	38.9	23.6	23.8	979.2	540	550	2	362
12/04/2013	19:35:00	39.2	23.5	23.6	979.4	550	560	2	371
12/04/2013	20:00:00	39.5	23.3	23.5	979.4	560	580	2	389
12/04/2013	20:30:00	38.8	22.8	23.2	979.4	580	590	2	401
12/04/2013	21:00:00	38.3	22.2	23.0	979.2	590	600	2	412
12/04/2013	21:30:00	38.7	21.5	22.5	979.6	600	620	2	430
12/04/2013	22:00:00	39.0	21.3	22.3	979.6	620	650	2	458
12/04/2013	22:30:00	38.7	20.9	21.9	979.6	650	660	2	469
12/04/2013	23:00:00	38.3	20.4	21.5	978.2	660	680	2	488
13/04/2013	0:00:00	39.0	20.1	21.1	978.2	680	700	2	505
13/04/2013	1:00:00	38.1	18.2	20.1	977.6	700	720	2	527
13/04/2013	2:00:00	38.4	17.9	19.3	977.8	720	750	2	555
13/04/2013	3:00:00	37.9	17.2	18.7	976.7	750	770	2	575
13/04/2013	4:00:00	38.3	17.1	18.3	977.3	770	790	2	594
13/04/2013	5:00:00	37.9	17.2	18.0	978.2	790	800	2	607
13/04/2013	9:12:00	38.3	23.1	20.3	978.6	820	860	2	645
13/04/2013	15:00:00	38.6	25.9	24.2	974.0	860	880	2	658
13/04/2013	21:00:00	38.7	19.2	20.8	975.7	880	840	2	658
14/04/2013	3:20:00	39.0	16.5	17.3	974.8	890	900	2	668
14/04/2013	10:09:00	39.0	28.7	22.5	974.2	940	950	2	678
14/04/2013	16:15:00	39.7	28.8	26.8	970.9	960	980	2	691
15/04/2013	16:49:00	39.7	31.9	28.5	967.7	980	1000	2	707
16/04/2013	13:04:00	41.9	32.8	27.8	970.3	980	1000	2	720
18/04/2013	9:17:00	37.1	26.4	25.6	1015.5	200	240	2	795
22/04/2013	10:52:00	37.5	26.2	24.1	1014.4	50	50	2	795
26/04/2013	9:28:00	36.7	25.9	24.4	1023.0	50	90	2	846
29/04/2013	10:35:00	36.7	27.1	25.1	1023.4	50	95	2	889
30/04/2013	13:35:00	36.7	27.5	25.2	1021.5	200	235	2	924
6/05/2013	10:21:00	36.7	25.2	23.4	1023.4	200	240	2	964
9/05/2013	12:09:00	37.1	26.8	24.9	1027.2	200	240	2	1005
16/05/2013	10:43:00	36.2	23.6	22.9	1015.9	50	90	2	1028
23/05/2013	15:09:00	36.9	25.7	22.2	1008.3	200	230	2	1050
31/05/2013	9:14:00	38.3	22.5	21.3	1021.1	200	255	2	1113
3/06/2013	10:14:00	37.6	24.4	24.1	1017.3	200	240	2	1148
6/06/2013	10:23:00	36.9	23.2	22.1	1027.0	200	250	2	1209
13/06/2013	8:33:00	37.5	24.4	23.1	1012.7	200	230	2	1219
20/06/2013	9:26:00	41.5	21.9	21.2	1022.8	200	240	2	1256
27/06/2013	9:30:00	39.1	22.6	21.6	1020.1	200	250	2	1309
4/07/2013	9:52:00	38.3	25.2	24.6	1022.4	200	240	2	1351
10/07/2013	9:09:00	40.4	21.6	20.8	1032.9	200	225	2	1379
18/07/2013	10:52:00	38.8	23.5	22.4	1025.1	200	250	2	1425

QGC Pty Limited Murdoch 1 - Sample MUR001_008 - 643.580 to 644.120 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
25/07/2013	9:16:00	31.2	22.6	18.1	1028.9	100	140	2	1489


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_008 - 643.580 to 644.120 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
400
300
200
100
0
-100
-200
-300
0
2
4
6
8
10
12
14
16
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_008 - 643.580 to 644.120 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
17.97
103.79 Days from T Zero
43.5% Methane
0.91% Ethane
2.06% Carbon Dioxide
53% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_008GASC
0
200
400
600
800
1000
1200
1400
1600
0.0
20.0
40.0
60.0
80.0
100.0
120.0

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_009 - 682.840 to 683.140 metres

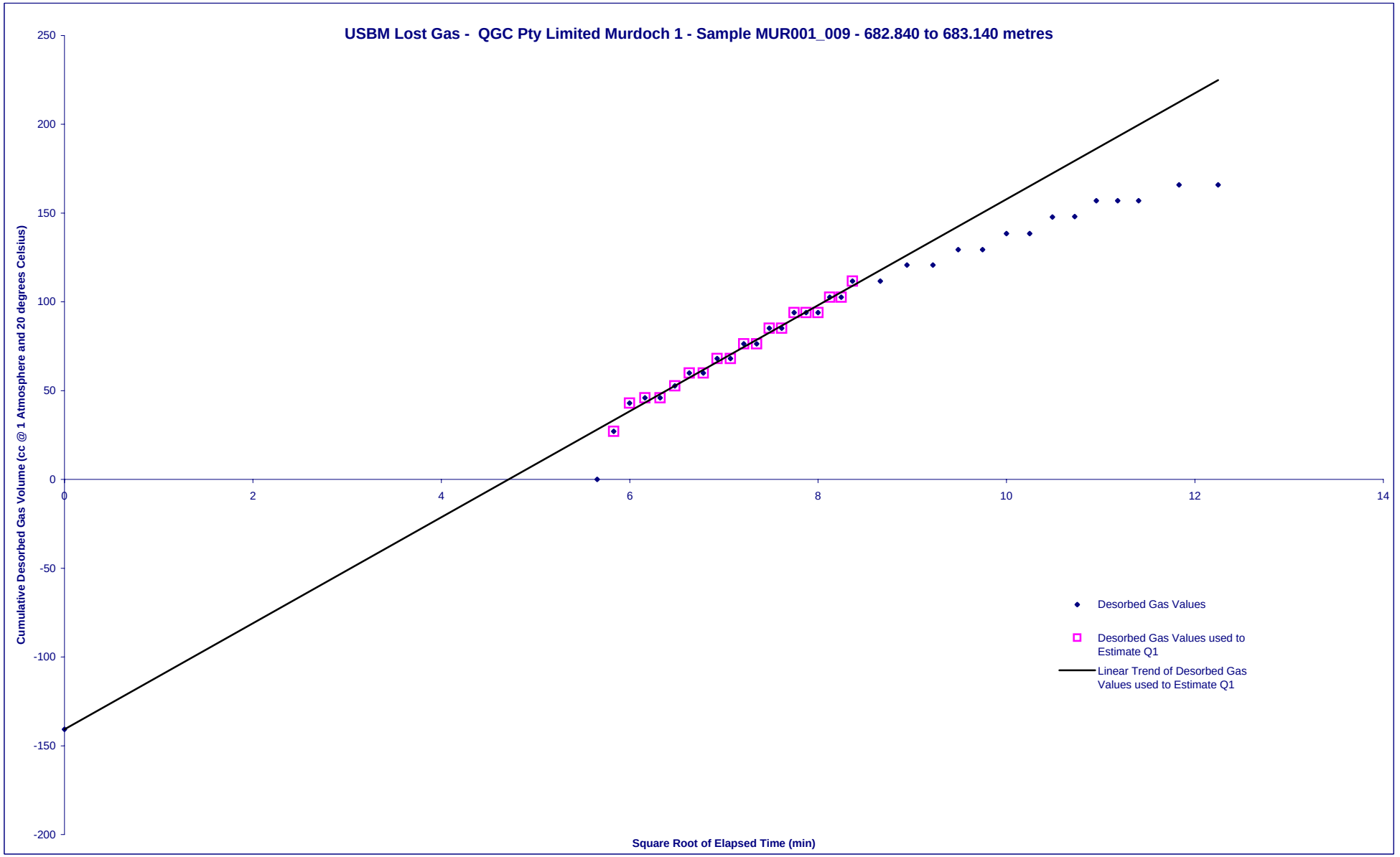
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_009	Sample Type	Core	Sample Top (m)	682.840	Sample Base (m)	683.140	Core Diameter (cm)	6.15
Sample Volume (cc)	891	Mass (g)	1092	RD (g/cc)	1.28	Moisture (%ad)	6.3	Ash (%ad)	3.7
Q3 Volume (cc@STP)	41.21	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	6.5	Q3 Ash (%ad)	10.9
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	909		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	45.5	Minimum Q1 Point
Sample Penetrated	14/04/2013	0:12		Formation Pressure (Mpa) @ 0.433 psi/ft	6.69			Surface Time Ratio	0.532	2
Sample Off Bottom	14/04/2013	0:50		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.009	Maximum Q1 Point
Sample at Surface	14/04/2013	1:05		Depth HSP=Formation Pressure (m)	682.01			USBM Q1 - Surface Time Correction	1.15	20
Sample Sealed	14/04/2013	1:22		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	14/04/2013	0:50		Standard Temperature (°C)	20.00	Comments:				34
Last Entry	25/07/2013	9:40		Standard Pressure (hPa)	1013					-141

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.002	0.000	0.000	0.000		
m^3/tonne (raw)	0.13	0.15	0.00	1.86	0.21	2.200	2.220		Time Zero Calculation
SCF/T (raw)	4	5	0	60	7	70.310	70.930		
m^3/tonne (daf)	0.14	0.16	0.00	2.07	0.25	2.46	**2.48**	2.32	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	5	5	0	66	8	79	**79**	74	
Percent of daf total	5.82%	6.64%	0.00%	83.32%	Sorption Time (days)	25.46	Diffusivity (sec^{-1})	1.30932E-05	

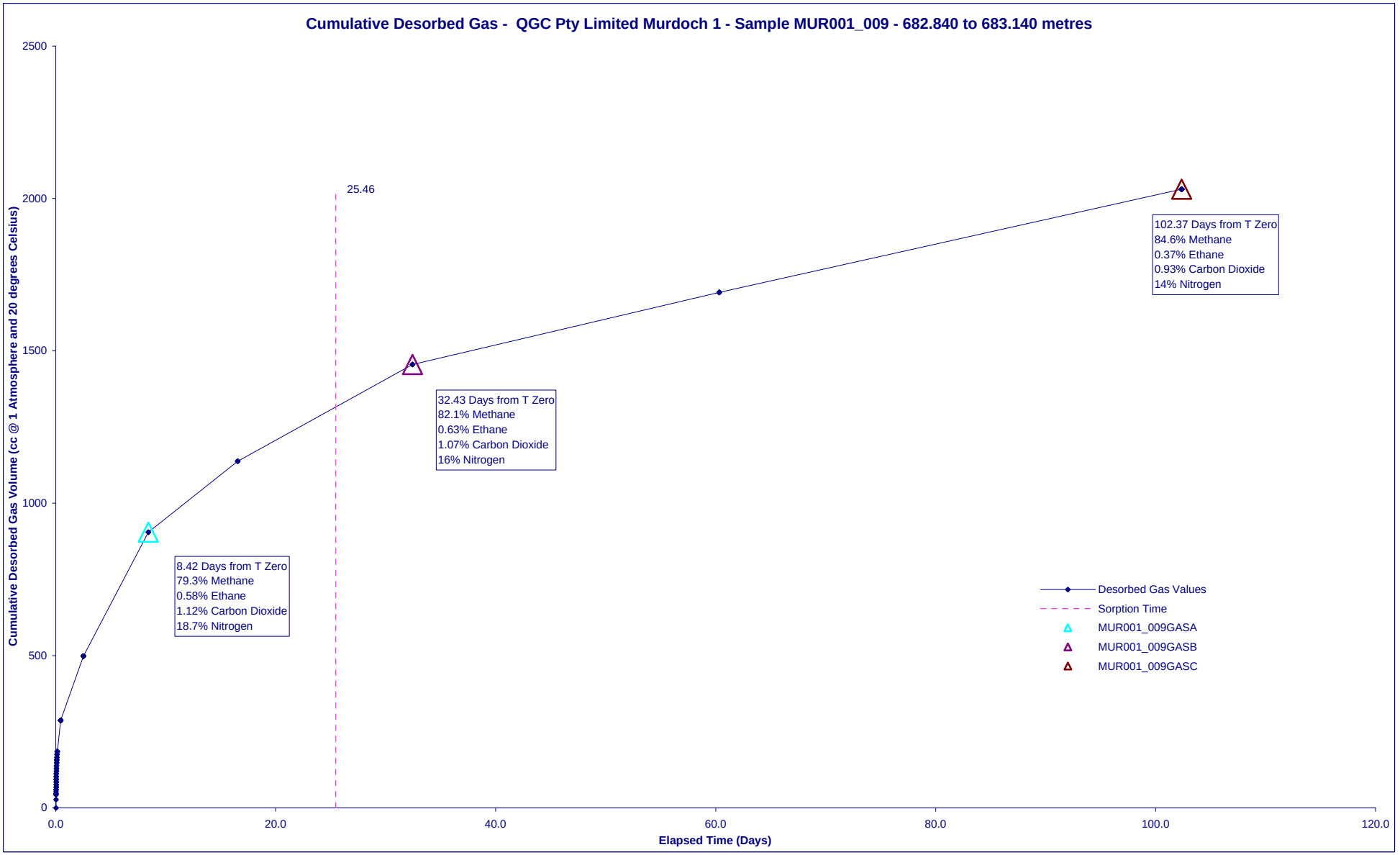
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	1:22:00	30.4	17.0	18.6	975.1	100	100	2	0
14/04/2013	1:24:00	30.8	17.1	18.7	975.1	100	180	2	27
14/04/2013	1:26:00	31.9	17.2	18.9	975.1	180	200	2	43
14/04/2013	1:28:00	34.3	17.0	19.1	975.3	200	210	2	46
14/04/2013	1:30:00	35.5	17.3	19.1	975.3	210	210	2	46
14/04/2013	1:32:00	36.5	17.3	19.1	975.3	210	220	2	53
14/04/2013	1:34:00	37.3	17.3	19.1	975.3	220	230	2	60
14/04/2013	1:36:00	38.0	17.4	19.1	975.3	230	230	2	60
14/04/2013	1:38:00	38.5	17.4	19.1	975.3	230	240	2	68
14/04/2013	1:40:00	39.0	17.5	19.0	975.5	240	240	2	68
14/04/2013	1:42:00	39.4	17.4	19.1	975.3	240	250	2	76
14/04/2013	1:44:00	39.7	17.4	19.1	975.3	250	250	2	76
14/04/2013	1:46:00	40.0	17.4	19.1	975.3	250	260	2	85
14/04/2013	1:48:00	40.3	17.4	19.0	975.5	260	260	2	85
14/04/2013	1:50:00	40.5	17.4	19.1	975.3	260	270	2	94
14/04/2013	1:52:00	40.7	17.4	19.1	975.3	270	270	2	94
14/04/2013	1:54:00	40.8	17.3	18.9	975.3	270	270	2	94
14/04/2013	1:56:00	41.1	17.3	18.9	975.3	270	280	2	103
14/04/2013	1:58:00	41.2	17.4	18.9	975.3	280	280	2	103
14/04/2013	2:00:00	41.4	17.4	18.9	975.3	280	290	2	112
14/04/2013	2:05:00	41.7	17.3	18.7	975.1	290	290	2	112
14/04/2013	2:10:00	41.9	17.3	18.9	975.1	290	300	2	121
14/04/2013	2:15:00	42.1	17.2	18.7	975.1	300	300	2	121
14/04/2013	2:20:00	42.4	17.2	18.6	975.1	300	310	2	129
14/04/2013	2:25:00	42.5	17.2	18.6	975.1	310	310	2	129
14/04/2013	2:30:00	42.7	17.1	18.6	975.1	310	320	2	139
14/04/2013	2:35:00	42.9	17.1	18.6	974.8	320	320	2	139
14/04/2013	2:40:00	43.0	17.1	18.5	974.8	320	330	2	148
14/04/2013	2:45:00	42.9	17.1	18.5	974.8	330	330	2	148
14/04/2013	2:50:00	43.1	17.1	18.5	974.6	330	340	2	157
14/04/2013	2:55:00	43.2	17.1	18.5	974.6	340	340	2	157
14/04/2013	3:00:00	43.3	17.1	18.4	974.8	340	340	2	157

QGC Pty Limited Murdoch 1 - Sample MUR001_009 - 682.840 to 683.140 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	3:10:00	43.4	17.1	18.4	974.4	340	350	2	166
14/04/2013	3:20:00	43.4	17.1	18.3	974.4	350	350	2	166
14/04/2013	3:30:00	43.4	17.1	18.3	974.4	350	360	2	175
14/04/2013	3:40:00	43.3	17.0	18.2	974.6	360	360	2	176
14/04/2013	3:50:00	43.4	17.1	18.3	974.8	360	370	2	185
14/04/2013	4:00:00	43.5	17.1	18.3	974.8	370	370	2	185
14/04/2013	4:15:00	43.5	17.1	18.3	974.8	370	370	2	185
14/04/2013	4:30:00	43.5	16.8	18.2	975.2	370	380	2	195
14/04/2013	4:45:00	43.5	16.7	18.1	975.2	380	380	2	195
14/04/2013	5:00:00	43.5	16.6	18.1	975.3	380	390	2	205
14/04/2013	5:15:00	43.6	16.7	18.1	975.7	390	390	2	205
14/04/2013	5:30:00	43.6	16.7	18.0	975.7	390	400	2	215
14/04/2013	6:00:00	43.7	16.7	17.9	975.5	400	400	2	215
14/04/2013	6:10:00	43.7	16.7	17.8	975.9	400	400	2	215
14/04/2013	6:40:00	43.7	16.9	17.9	975.5	400	405	2	220
14/04/2013	7:10:00	43.8	17.7	18.1	976.1	405	415	2	230
14/04/2013	7:40:00	44.0	19.1	18.3	975.5	415	420	2	233
14/04/2013	8:10:00	44.1	21.2	18.7	976.1	420	430	2	243
14/04/2013	9:15:00	43.9	25.0	20.6	974.6	430	450	2	261
14/04/2013	10:15:00	44.0	27.9	21.5	974.2	450	450	2	261
14/04/2013	11:15:00	44.1	29.4	23.0	973.4	450	470	2	278
14/04/2013	11:30:00	44.1	29.2	23.5	973.2	470	480	2	287
14/04/2013	12:30:00	45.3	31.7	25.1	971.9	480	500	2	301
14/04/2013	13:30:00	45.7	31.6	26.2	971.5	500	510	2	309
14/04/2013	19:30:00	45.3	23.9	25.2	972.3	510	540	2	339
15/04/2013	1:30:00	44.8	21.3	22.2	972.7	540	570	2	370
15/04/2013	14:14:00	45.7	32.7	27.2	968.4	100	180	2	422
15/04/2013	20:21:00	43.4	24.6	25.1	970.9	180	190	2	439
16/04/2013	13:08:00	44.9	32.0	27.1	970.2	190	260	2	498
18/04/2013	9:22:00	44.5	26.4	25.6	1015.0	200	400	2	732
22/04/2013	10:56:00	42.5	26.2	24.0	1014.4	50	235	2	905
26/04/2013	9:31:00	42.4	26.1	24.4	1023.0	200	330	2	1039
29/04/2013	10:39:00	42.3	27.1	25.1	1023.4	50	130	2	1109
30/04/2013	13:38:00	42.2	28.1	25.3	1021.3	200	230	2	1138
6/05/2013	10:46:00	42.4	26.4	23.8	1023.0	200	340	2	1275
9/05/2013	11:49:00	43.2	26.5	24.7	1027.6	200	260	2	1331
16/05/2013	11:13:00	43.2	23.9	23.1	1016.1	50	195	2	1455
23/05/2013	15:00:00	43.5	25.4	22.0	1008.3	200	30	2	1455
31/05/2013	9:39:00	43.5	24.0	21.6	1028.7	200	280	2	1558
3/06/2013	9:20:00	42.6	23.9	24.2	1017.3	200	240	2	1587
6/06/2013	11:04:00	43.0	24.4	22.6	1026.6	200	225	2	1618
13/06/2013	8:44:00	42.9	24.1	23.2	1012.9	200	290	2	1692
20/06/2013	10:57:00	42.5	23.3	21.3	1021.3	200	255	2	1752
27/06/2013	10:25:00	43.1	23.6	21.9	1019.9	200	265	2	1811
4/07/2013	10:35:00	42.1	25.7	24.6	1022.0	200	210	2	1824
11/07/2013	10:24:00	42.5	23.8	21.6	1032.9	200	225	2	1857
18/07/2013	11:16:00	42.8	24.1	22.6	1024.4	200	245	2	1892
25/07/2013	9:40:00	43.4	23.2	18.2	1028.5	100	243	2	2031


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_009 - 682.840 to 683.140 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
250
200
150
100
50
0
-50
-100
-150
-200
0
2
4
6
8
10
12
14
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_009 - 682.840 to 683.140 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Elapsed Time (Days)
25.46
8.42 Days from T Zero
79.3% Methane
0.58% Ethane
1.12% Carbon Dioxide
18.7% Nitrogen
32.43 Days from T Zero
82.1% Methane
0.63% Ethane
1.07% Carbon Dioxide
16% Nitrogen
102.37 Days from T Zero
84.6% Methane
0.37% Ethane
0.93% Carbon Dioxide
14% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_009GASA
MUR001_009GASB
MUR001_009GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_010 - 696.650 to 697.440 metres

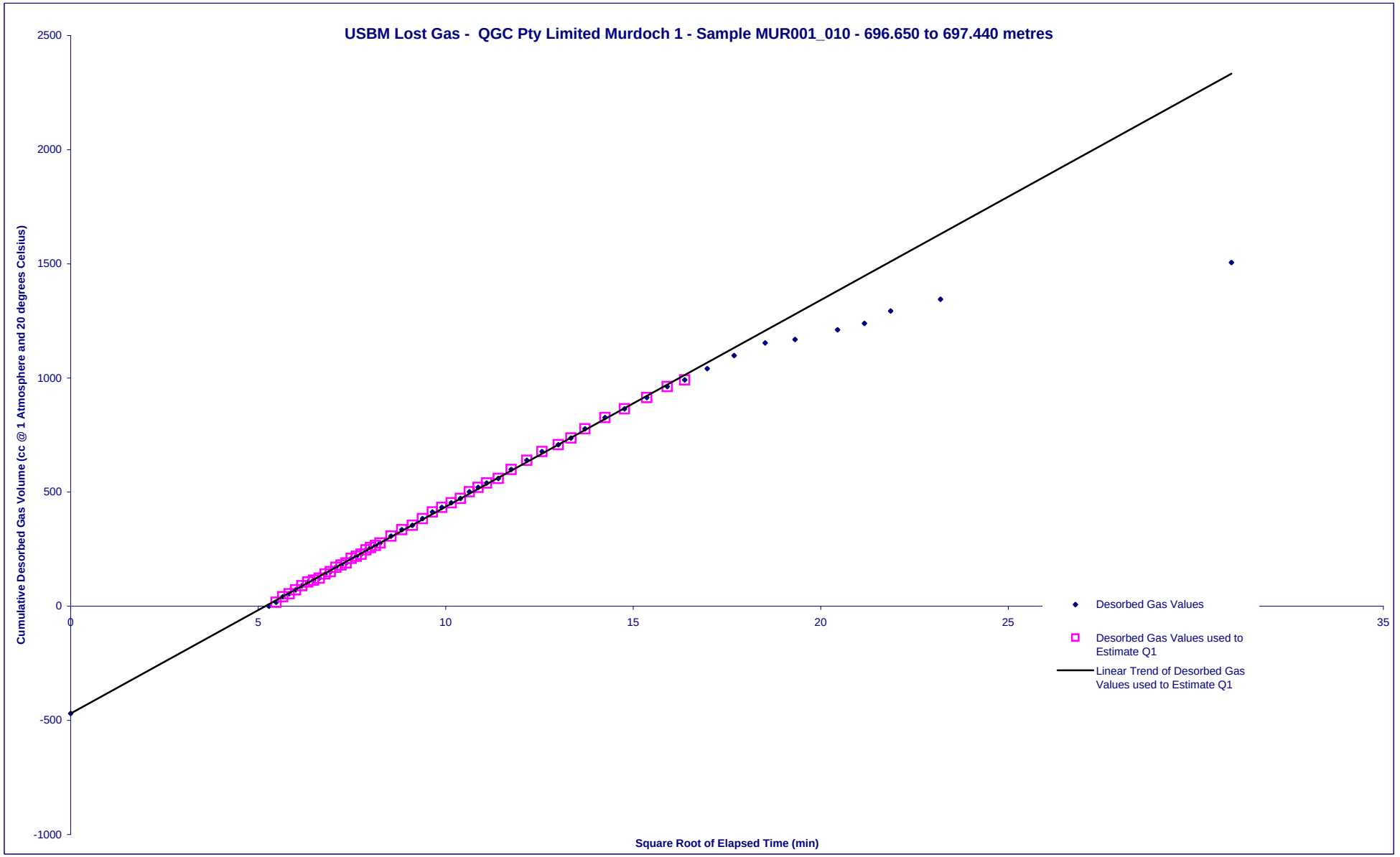
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_010	Sample Type	Core	Sample Top (m)	696.650	Sample Base (m)	697.440	Core Diameter (cm)	6.15
Sample Volume (cc)	2347	Mass (g)	2904	RD (g/cc)	1.38	Moisture (%ad)	6.3	Ash (%ad)	16
Q3 Volume (cc@STP)	24.99	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	6.9	Q3 Ash (%ad)	17
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	53.6	Minimum Q1 Point
Sample Penetrated	14/04/2013	3:41		Formation Pressure (Mpa) @ 0.433 psi/ft	6.82			Surface Time Ratio	0.536	2
Sample Off Bottom	14/04/2013	4:02		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.117	Maximum Q1 Point
Sample at Surface	14/04/2013	4:15		Depth HSP=Formation Pressure (m)	695.80			USBM Q1 - Surface Time Correction	1.15	44
Sample Sealed	14/04/2013	4:30		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.040	Q1 Points Plotted
Time Zero	14/04/2013	4:02		Standard Temperature (°C)	20.00	Comments:				53
Last Entry	25/07/2013	10:14		Standard Pressure (hPa)	1013					-469

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.001	0.000	0.004	0.000	0.000	0.000		
m^3/tonne (raw)	0.16	0.19	0.06	1.40	0.12	1.680	1.710		Time Zero Calculation
SCF/T (raw)	5	6	2	45	4	54.020	54.790		
m^3/tonne (daf)	0.21	0.24	0.07	1.80	0.16	2.17	**2.20**	2.03	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	7	8	2	58	5	70	**71**	65	
Percent of daf total	9.59%	10.87%	3.55%	81.88%	Sorption Time (days)	8.29	Diffusivity (sec^{-1})	2.89013E-05	

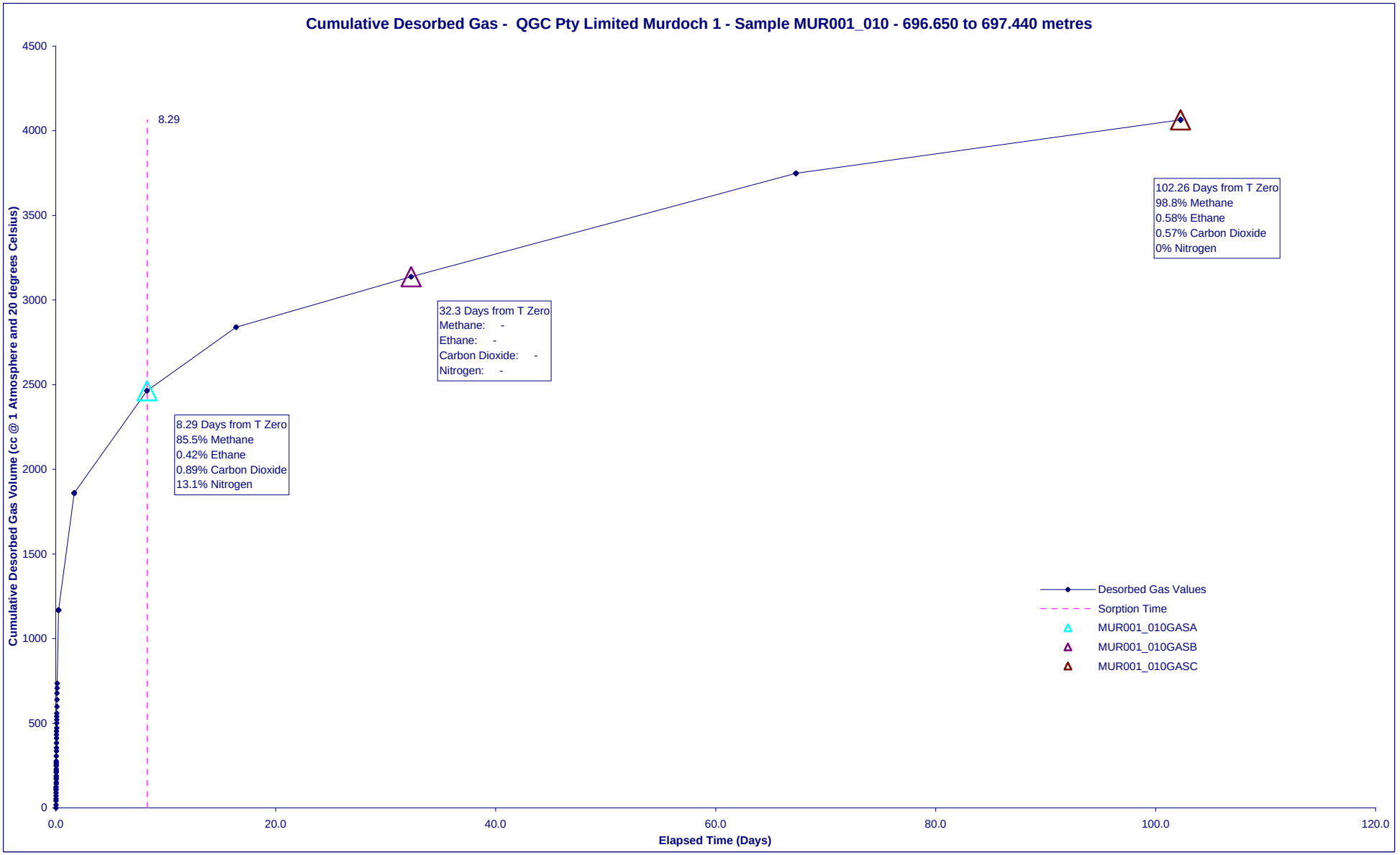
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	4:30:00	35.4	16.8	18.2	975.2	100	100	2	0
14/04/2013	4:32:00	36.2	16.8	18.2	975.2	100	180	2	17
14/04/2013	4:34:00	37.5	16.7	18.1	975.0	180	210	2	42
14/04/2013	4:36:00	39.5	16.7	18.1	975.0	210	230	2	54
14/04/2013	4:38:00	40.0	16.7	18.1	974.8	230	250	2	72
14/04/2013	4:40:00	40.5	16.7	18.1	975.0	250	270	2	90
14/04/2013	4:42:00	41.3	16.7	18.1	975.0	270	290	2	106
14/04/2013	4:44:00	41.9	16.7	18.1	975.0	290	300	2	114
14/04/2013	4:46:00	42.0	16.7	18.1	975.0	300	310	2	123
14/04/2013	4:48:00	42.2	16.6	18.1	974.8	310	330	2	142
14/04/2013	4:50:00	42.3	16.6	18.1	974.8	330	340	2	151
14/04/2013	4:52:00	42.3	16.6	18.1	974.8	340	360	2	170
14/04/2013	4:54:00	42.4	16.6	18.1	975.1	360	370	2	180
14/04/2013	4:56:00	42.4	16.6	18.1	975.1	370	380	2	190
14/04/2013	4:58:00	42.4	16.7	18.1	975.3	380	400	2	209
14/04/2013	5:00:00	42.4	16.6	18.1	975.3	400	410	2	219
14/04/2013	5:02:00	42.5	16.7	18.2	975.1	410	420	2	228
14/04/2013	5:04:00	42.6	16.7	18.1	975.1	420	440	2	247
14/04/2013	5:06:00	42.7	16.7	18.1	975.1	440	450	2	257
14/04/2013	5:08:00	42.7	16.7	18.1	975.1	450	460	2	266
14/04/2013	5:10:00	42.4	16.7	18.1	975.0	460	470	2	277
14/04/2013	5:15:00	42.4	16.7	18.1	975.7	470	500	2	307
14/04/2013	5:20:00	42.5	16.8	18.1	975.7	500	530	2	336
14/04/2013	5:25:00	42.6	16.8	18.0	975.7	530	550	2	355
14/04/2013	5:30:00	42.6	16.7	18.0	975.7	550	580	2	384
14/04/2013	5:35:00	42.7	16.7	18.1	975.7	580	610	2	413
14/04/2013	5:40:00	42.5	16.7	18.0	975.3	610	630	2	433
14/04/2013	5:45:00	42.3	16.8	17.9	975.5	630	650	2	453
14/04/2013	5:50:00	42.5	16.8	18.0	975.5	650	670	2	472
14/04/2013	5:55:00	42.5	16.7	17.9	975.5	670	700	2	501
14/04/2013	6:00:00	42.5	16.7	17.9	975.5	700	720	2	521
14/04/2013	6:05:00	42.6	16.7	17.9	975.5	720	740	2	540

QGC Pty Limited Murdoch 1 - Sample MUR001_010 - 696.650 to 697.440 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	6:12:00	42.6	16.7	17.8	975.5	740	760	2	560
14/04/2013	6:20:00	42.5	16.7	17.9	975.3	760	800	2	599
14/04/2013	6:30:00	42.3	16.7	17.8	975.7	800	840	2	640
14/04/2013	6:40:00	42.6	16.9	17.9	975.5	840	880	2	678
14/04/2013	6:51:00	42.6	17.2	17.9	975.9	880	910	2	708
14/04/2013	7:00:00	42.6	17.4	18.0	975.5	910	940	2	737
14/04/2013	7:10:00	42.4	17.7	18.1	976.1	940	980	2	777
14/04/2013	7:25:00	42.5	18.2	18.1	975.9	980	1030	2	826
14/04/2013	7:40:00	42.6	19.1	18.3	975.5	1030	1070	2	865
14/04/2013	7:58:00	42.6	20.2	18.5	976.1	1070	1120	2	914
14/04/2013	8:15:00	42.7	21.7	18.9	975.7	1120	1170	2	962
14/04/2013	8:30:00	42.6	22.4	19.2	975.3	1170	1200	2	992
14/04/2013	8:50:00	42.4	23.6	19.7	975.5	1200	1250	2	1041
14/04/2013	9:15:00	42.7	25.1	20.6	975.1	1250	1310	2	1098
14/04/2013	9:45:00	43.4	26.4	19.7	974.6	1310	1370	2	1153
14/04/2013	10:15:00	43.0	28.0	21.5	974.0	200	260	2	1168
14/04/2013	11:00:00	42.8	29.0	22.7	973.6	410	450	2	1211
14/04/2013	11:30:00	43.6	29.3	23.4	973.2	540	570	2	1239
14/04/2013	12:00:00	44.3	31.1	24.2	972.5	620	680	2	1294
14/04/2013	13:00:00	44.1	31.6	25.6	971.5	830	880	2	1345
14/04/2013	20:00:00	43.9	23.3	24.7	973.0	50	250	2	1506
14/04/2013	22:00:00	44.1	21.9	23.4	973.4	100	130	2	1528
14/04/2013	23:00:00	43.7	21.2	22.8	973.4	130	160	2	1558
15/04/2013	0:00:00	43.5	20.9	22.4	972.8	160	190	2	1586
15/04/2013	1:00:00	43.4	21.0	22.2	972.8	190	210	2	1605
15/04/2013	2:00:00	43.5	21.3	22.3	972.1	210	240	2	1633
15/04/2013	3:00:00	43.5	20.8	22.2	972.3	240	260	2	1652
15/04/2013	4:00:00	43.7	21.1	22.2	971.9	260	280	2	1670
15/04/2013	14:14:00	45.0	32.7	27.2	968.4	100	240	2	1783
15/04/2013	20:21:00	42.1	24.6	25.1	970.9	240	310	2	1860
16/04/2013	13:08:00	43.1	32.0	27.1	970.2	380	440	2	1914
18/04/2013	9:22:00	43.7	26.4	25.6	1015.0	200	480	2	2225
22/04/2013	10:56:00	41.5	26.2	24.0	1014.4	50	305	2	2464
26/04/2013	9:31:00	41.7	26.1	24.4	1023.0	200	395	2	2661
29/04/2013	10:39:00	41.0	27.1	25.1	1023.4	50	175	2	2774
30/04/2013	13:38:00	41.0	28.1	25.3	1021.3	200	270	2	2840
6/05/2013	10:46:00	41.1	26.4	23.8	1023.0	200	335	2	2972
9/05/2013	11:49:00	41.9	26.5	24.7	1027.6	200	295	2	3063
16/05/2013	11:13:00	42.1	23.9	23.1	1016.1	50	150	2	3139
23/05/2013	15:00:00	42.3	25.4	22.0	1008.3	200	290	2	3218
31/05/2013	9:39:00	42.7	24.0	21.6	1028.7	200	360	2	3395
3/06/2013	9:20:00	41.4	23.9	24.2	1017.3	200	300	2	3480
6/06/2013	11:04:00	41.7	24.4	22.6	1026.6	200	270	2	3555
13/06/2013	8:44:00	41.8	24.1	23.2	1012.9	200	310	2	3644
20/06/2013	10:57:00	41.8	23.3	21.3	1021.3	200	300	2	3749
27/06/2013	10:25:00	41.4	23.6	21.9	1019.9	200	280	2	3824
4/07/2013	10:35:00	41.0	25.7	24.6	1022.0	200	260	2	3883
11/07/2013	10:24:00	41.9	23.8	21.6	1032.9	200	270	2	3960
18/07/2013	11:16:00	41.7	24.1	22.6	1024.4	200	270	2	4018
25/07/2013	10:14:00	41.5	24.0	18.1	1028.5	50	100	2	4064


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_010 - 696.650 to 697.440 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
2500
2000
1500
1000
500
0
-500
-1000
0
5
10
15
20
25
35
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_010 - 696.650 to 697.440 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
8.29
8.29 Days from T Zero
85.5% Methane
0.42% Ethane
0.89% Carbon Dioxide
13.1% Nitrogen
32.3 Days from T Zero
Methane: -
Ethane: -
Carbon Dioxide: -
Nitrogen: -
102.26 Days from T Zero
98.8% Methane
0.58% Ethane
0.57% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_010GASA
MUR001_010GASB
MUR001_010GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_011 - 708.340 to 709.060 metres

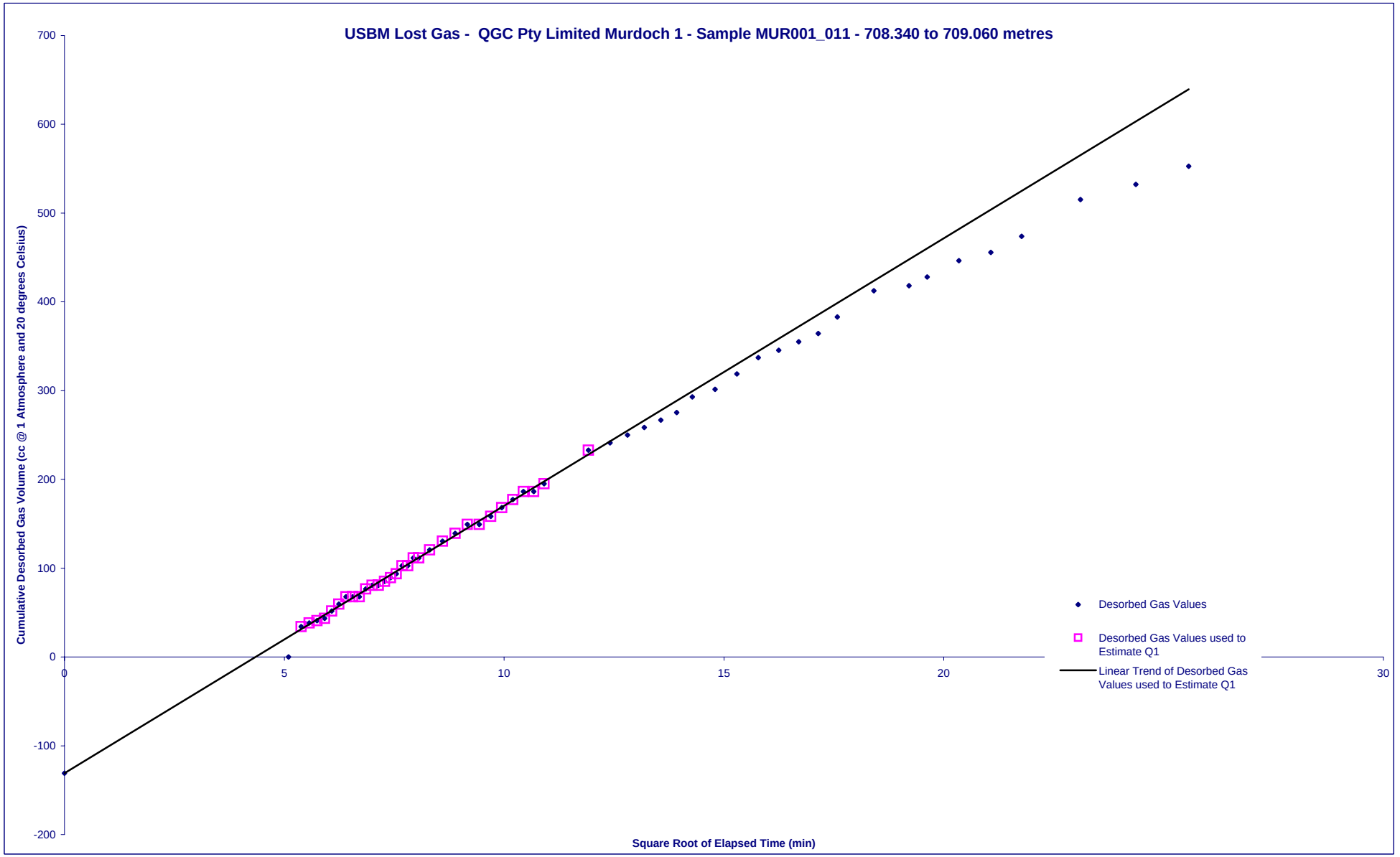
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_011	Sample Type	Core	Sample Top (m)	708.340	Sample Base (m)	709.060	Core Diameter (cm)	6.15
Sample Volume (cc)	2139	Mass (g)	2974	RD (g/cc)	1.36	Moisture (%ad)	4.6	Ash (%ad)	14.5
Q3 Volume (cc@STP)	36.38	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	4.5	Q3 Ash (%ad)	38.5
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	993		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	70.9	Minimum Q1 Point
Sample Penetrated	14/04/2013	7:59		Formation Pressure (Mpa) @ 0.433 psi/ft	6.94			Surface Time Ratio	0.616	2
Sample Off Bottom	14/04/2013	8:36		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.012	Maximum Q1 Point
Sample at Surface	14/04/2013	8:46		Depth HSP=Formation Pressure (m)	707.48			USBM Q1 - Surface Time Correction	1.2	32
Sample Sealed	14/04/2013	9:02		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	14/04/2013	8:36		Standard Temperature (°C)	20.00	Comments:				54
Last Entry	25/07/2013	10:39		Standard Pressure (hPa)	1013					-131

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.004	0.000	0.000	0.000		
m^3/tonne (raw)	0.04	0.05	0.00	1.39	0.18	1.610	1.620		Time Zero Calculation
SCF/T (raw)	1	2	0	45	6	51.760	52.040		
m^3/tonne (daf)	0.05	0.07	0.00	1.72	0.32	2.09	**2.11**	2.04	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	2	2	0	55	10	67	**67**	65	
Percent of daf total	2.60%	3.09%	0.00%	81.41%	Sorption Time (days)	39.27	Diffusivity (sec^{-1})	3.09594E-06	

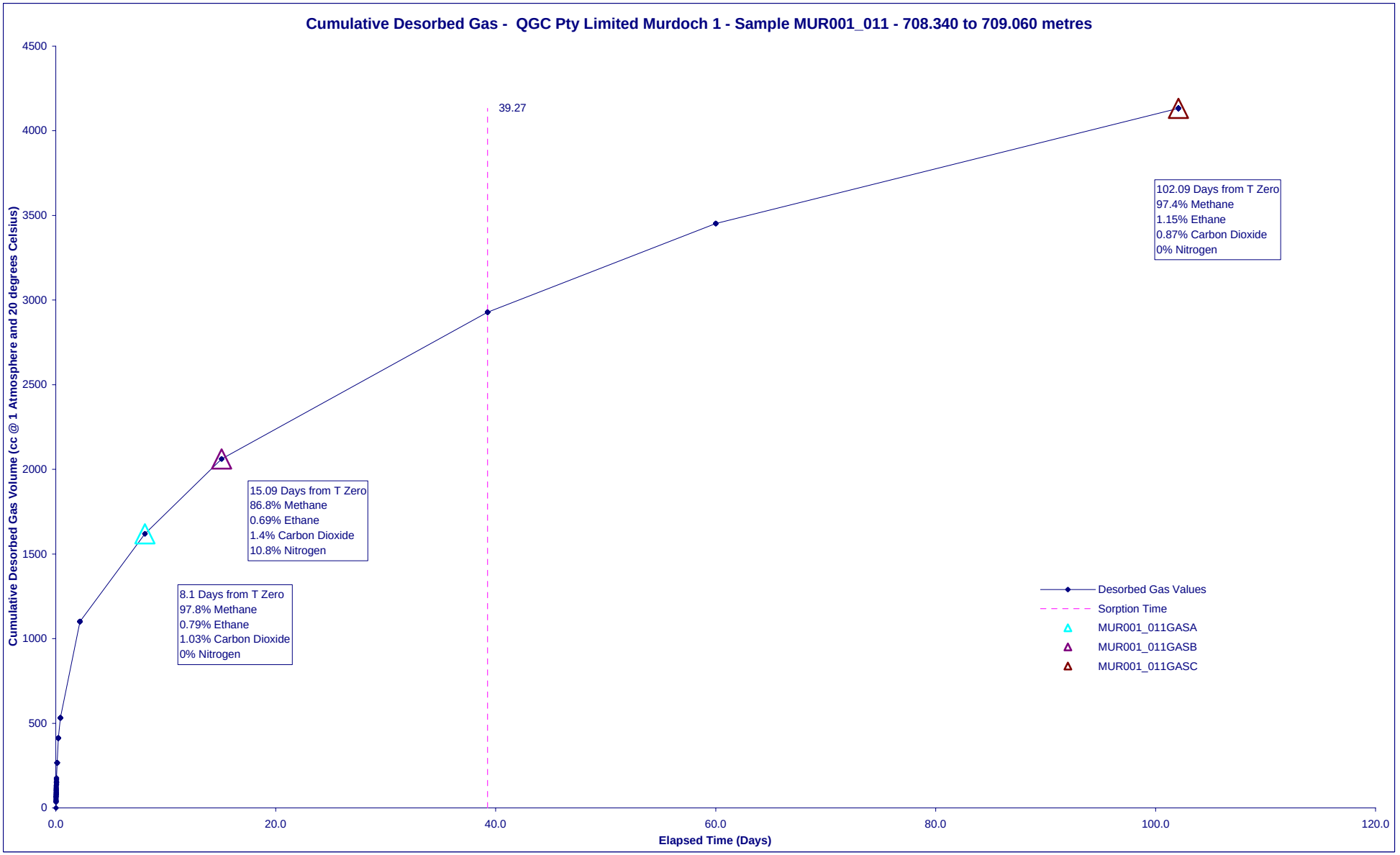
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	9:02:00	35.7	24.6	20.2	974.8	100	100	2	0
14/04/2013	9:05:00	38.3	24.6	20.2	974.8	100	200	2	34
14/04/2013	9:07:00	40.1	24.7	20.3	975.0	200	210	2	38
14/04/2013	9:09:00	40.9	24.8	20.4	975.1	210	215	2	41
14/04/2013	9:11:00	41.5	24.9	20.4	975.0	215	220	2	44
14/04/2013	9:13:00	41.9	24.9	20.5	975.0	220	230	2	52
14/04/2013	9:15:00	42.4	25.1	20.6	975.0	230	240	2	60
14/04/2013	9:17:00	42.7	25.0	20.6	974.8	240	250	2	68
14/04/2013	9:19:00	42.9	25.1	20.6	975.0	250	250	2	68
14/04/2013	9:21:00	43.0	25.1	20.7	975.0	250	250	2	68
14/04/2013	9:23:00	43.1	25.2	20.7	974.8	250	260	2	77
14/04/2013	9:25:00	43.3	25.2	20.8	974.8	260	265	2	81
14/04/2013	9:27:00	43.4	25.2	18.7	975.1	265	265	2	81
14/04/2013	9:29:00	43.5	25.3	17.8	975.0	265	270	2	85
14/04/2013	9:31:00	43.6	25.4	17.9	974.8	270	275	2	89
14/04/2013	9:33:00	43.7	25.5	18.2	974.8	275	280	2	94
14/04/2013	9:35:00	43.8	25.5	18.6	974.8	280	290	2	103
14/04/2013	9:37:00	43.8	25.9	18.9	974.8	290	290	2	103
14/04/2013	9:39:00	43.9	26.0	19.2	974.6	290	300	2	111
14/04/2013	9:41:00	43.9	26.1	19.4	974.6	300	300	2	111
14/04/2013	9:45:00	44.0	26.4	19.7	974.6	300	310	2	121
14/04/2013	9:50:00	43.9	26.8	20.2	974.9	310	320	2	130
14/04/2013	9:55:00	43.9	27.1	20.6	974.4	320	330	2	139
14/04/2013	10:00:00	43.8	27.4	20.9	974.9	330	340	2	149
14/04/2013	10:05:00	43.7	27.5	21.1	974.2	340	340	2	149
14/04/2013	10:10:00	43.6	27.7	21.3	973.8	340	350	2	158
14/04/2013	10:15:00	43.6	28.0	21.6	974.2	350	360	2	168
14/04/2013	10:20:00	43.6	28.1	21.6	974.0	360	370	2	177
14/04/2013	10:25:00	43.6	28.1	21.8	973.8	370	380	2	186
14/04/2013	10:30:00	43.7	28.4	21.9	973.8	380	380	2	186
14/04/2013	10:35:00	43.8	28.6	22.1	973.8	380	390	2	195
14/04/2013	10:58:00	43.5	28.9	22.6	973.6	390	430	2	233

QGC Pty Limited Murdoch 1 - Sample MUR001_011 - 708.340 to 709.060 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	11:10:00	43.8	29.4	22.9	973.6	430	440	2	241
14/04/2013	11:20:00	43.9	29.4	23.1	973.4	440	450	2	250
14/04/2013	11:30:00	44.1	29.4	23.5	973.2	450	460	2	259
14/04/2013	11:40:00	44.3	29.7	23.7	972.7	460	470	2	267
14/04/2013	11:50:00	44.5	30.5	23.9	972.7	470	480	2	275
14/04/2013	12:00:00	44.7	31.1	24.3	972.5	480	500	2	293
14/04/2013	12:15:00	44.9	31.5	24.6	972.3	500	510	2	301
14/04/2013	12:30:00	45.1	31.7	25.1	971.9	510	530	2	319
14/04/2013	12:45:00	45.2	31.5	25.4	972.1	530	550	2	337
14/04/2013	13:00:00	45.3	31.6	25.7	971.5	550	560	2	345
14/04/2013	13:15:00	45.2	31.9	26.0	971.5	560	570	2	355
14/04/2013	13:30:00	45.1	31.6	26.2	971.5	570	580	2	364
14/04/2013	13:45:00	45.2	31.6	26.6	971.9	580	600	2	383
14/04/2013	14:15:00	44.1	31.8	27.0	970.7	600	630	2	413
14/04/2013	14:45:00	45.3	30.8	26.8	970.5	630	640	2	418
14/04/2013	15:01:00	45.1	30.3	26.8	970.5	640	650	2	428
14/04/2013	15:30:00	45.1	30.5	26.8	970.5	650	670	2	446
14/04/2013	16:00:00	45.1	30.4	27.0	970.5	670	680	2	456
14/04/2013	16:30:00	45.3	29.8	26.9	970.5	680	700	2	474
14/04/2013	17:30:00	43.9	28.6	26.9	970.5	700	740	2	515
14/04/2013	18:30:00	44.5	25.4	26.2	970.5	740	760	2	532
14/04/2013	19:30:00	44.6	23.9	25.2	972.3	760	780	2	553
14/04/2013	20:30:00	44.4	23.1	24.4	973.2	780	810	2	583
14/04/2013	21:30:00	44.3	22.4	23.8	973.0	810	830	2	602
14/04/2013	22:30:00	44.1	21.4	22.9	973.2	830	850	2	622
15/04/2013	4:00:00	43.9	21.1	22.2	971.9	850	970	2	738
15/04/2013	14:14:00	45.4	32.7	27.2	968.4	100	330	2	911
15/04/2013	20:21:00	42.5	24.6	25.1	970.9	380	380	2	923
16/04/2013	13:08:00	44.4	32.0	27.1	970.2	380	580	2	1101
18/04/2013	9:22:00	44.3	26.4	25.6	1015.0	200	320	2	1249
22/04/2013	10:56:00	42.6	26.2	24.0	1014.4	50	435	2	1620
26/04/2013	9:31:00	42.6	26.1	24.4	1023.0	200	495	2	1911
29/04/2013	10:39:00	41.3	27.1	25.1	1023.4	50	215	2	2062
30/04/2013	13:38:00	41.8	28.1	25.3	1021.3	200	270	2	2125
6/05/2013	10:46:00	41.8	26.4	23.8	1023.0	200	450	2	2370
9/05/2013	11:49:00	42.5	26.5	24.7	1027.6	200	340	2	2502
16/05/2013	11:13:00	42.2	23.9	23.1	1016.1	200	440	2	2723
23/05/2013	15:00:00	43.1	25.4	22.0	1008.3	200	430	2	2928
31/05/2013	9:39:00	42.4	24.0	21.6	1028.7	200	395	2	3136
3/06/2013	9:20:00	41.6	23.9	24.2	1017.3	200	300	2	3219
6/06/2013	11:04:00	41.9	24.4	22.6	1026.6	200	275	2	3298
13/06/2013	8:44:00	42.1	24.1	23.2	1012.9	200	375	2	3452
20/06/2013	10:57:00	42.3	23.3	21.3	1021.3	200	385	2	3637
27/06/2013	10:25:00	40.1	23.6	21.9	1019.9	200	340	2	3775
4/07/2013	10:35:00	41.2	25.7	24.6	1022.0	200	290	2	3857
11/07/2013	10:24:00	41.7	23.8	21.6	1032.9	200	290	2	3953
18/07/2013	11:16:00	41.8	24.1	22.6	1024.4	200	305	2	4044
25/07/2013	10:39:00	40.5	24.1	18.2	1028.5	50	140	2	4133


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_011 - 708.340 to 709.060 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
700
600
500
400
300
200
100
0
-100
-200
0
5
10
15
20
30
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_011 - 708.340 to 709.060 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
39.27
102.09 Days from T Zero
97.4% Methane
1.15% Ethane
0.87% Carbon Dioxide
0% Nitrogen
15.09 Days from T Zero
86.8% Methane
0.69% Ethane
1.4% Carbon Dioxide
10.8% Nitrogen
8.1 Days from T Zero
97.8% Methane
0.79% Ethane
1.03% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_011GASA
MUR001_011GASB
MUR001_011GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_012 - 709.060 to 709.720 metres

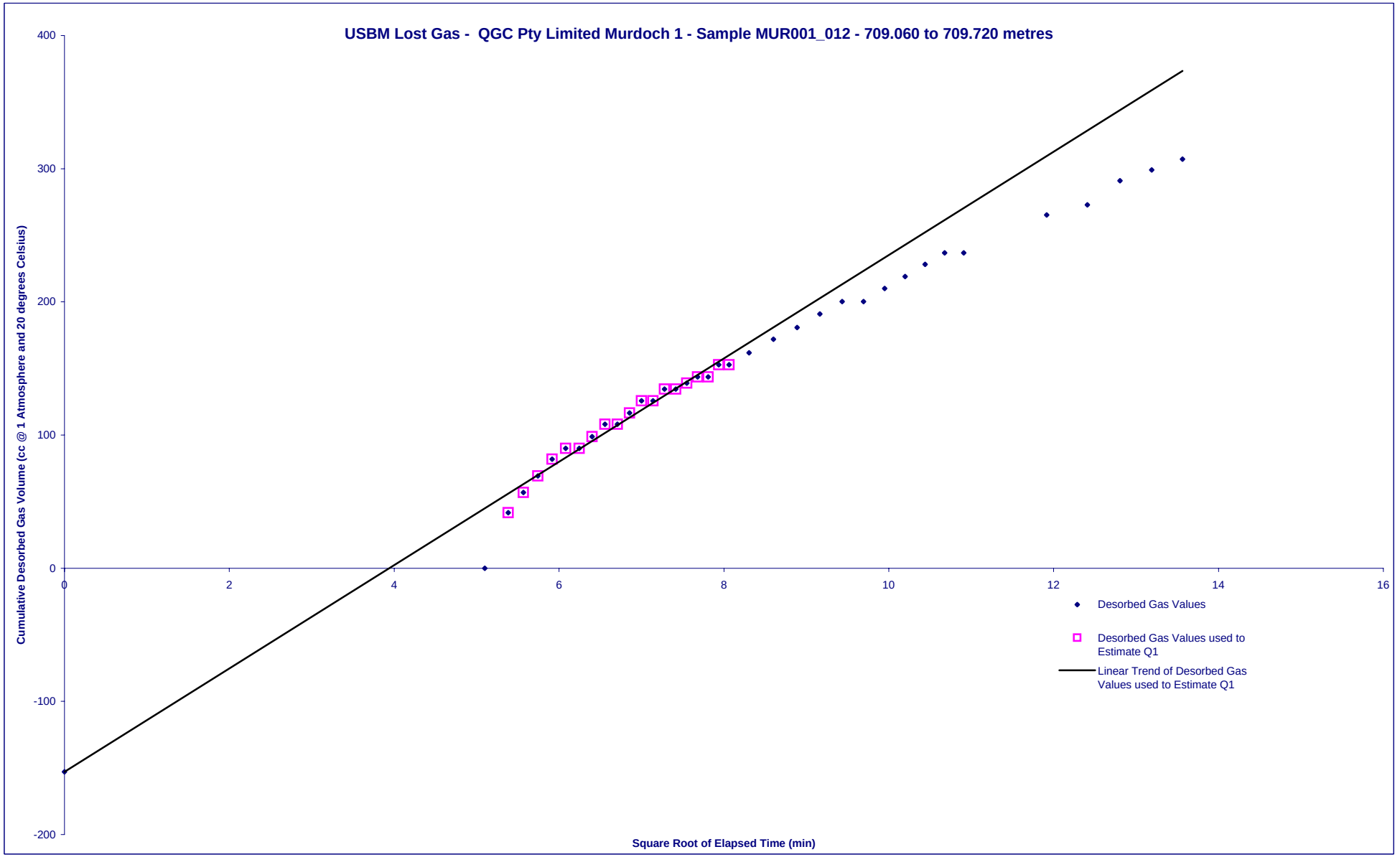
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_012	Sample Type	Core	Sample Top (m)	709.060	Sample Base (m)	709.720	Core Diameter (cm)	6.15
Sample Volume (cc)	1961	Mass (g)	2510	RD (g/cc)	1.33	Moisture (%ad)	4.8	Ash (%ad)	10.2
Q3 Volume (cc@STP)	44.68	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	5.2	Q3 Ash (%ad)	10.2
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1168		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	71.0	Minimum Q1 Point
Sample Penetrated	14/04/2013	8:09		Formation Pressure (Mpa) @ 0.433 psi/ft	6.95			Surface Time Ratio	0.616	2
Sample Off Bottom	14/04/2013	8:36		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.012	Maximum Q1 Point
Sample at Surface	14/04/2013	8:46		Depth HSP=Formation Pressure (m)	708.20			USBM Q1 - Surface Time Correction	1.2	20
Sample Sealed	14/04/2013	9:02		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	14/04/2013	8:36		Standard Temperature (°C)	20.00	Comments:				36
Last Entry	25/07/2013	10:59		Standard Pressure (hPa)	1013					-153

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.004	0.000	0.000	0.000		
m^3/tonne (raw)	0.06	0.07	0.00	1.62	0.22	1.900	1.910		Time Zero Calculation
SCF/T (raw)	2	2	0	52	7	60.850	61.240		
m^3/tonne (daf)	0.07	0.09	0.00	1.90	0.26	2.23	**2.25**	2.16	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	2	3	0	61	8	72	**72**	69	
Percent of daf total	3.21%	3.82%	0.00%	84.45%	Sorption Time (days)	25.13	Diffusivity (sec^{-1})	5.70088E-06	

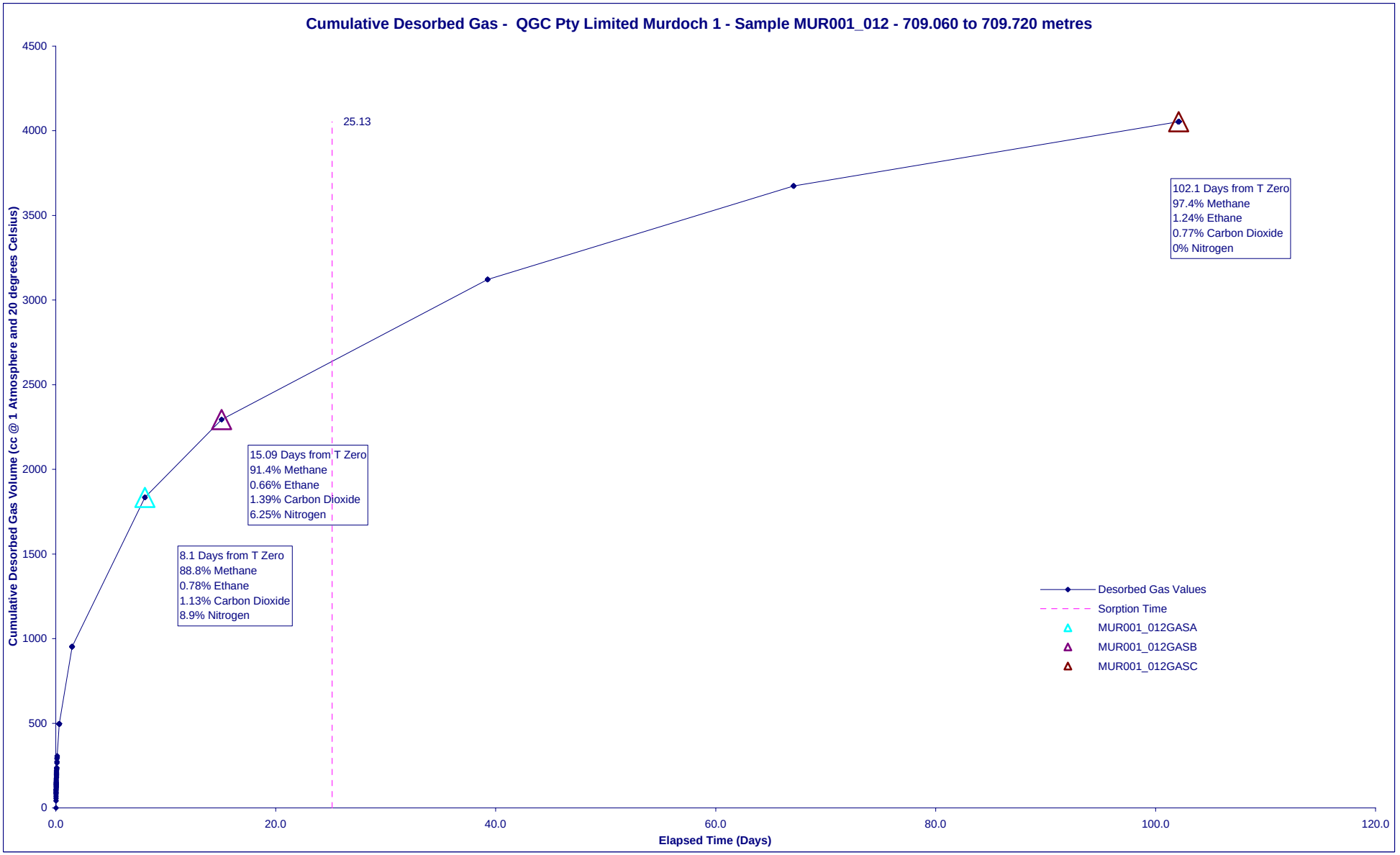
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	9:02:00	35.6	24.6	20.2	974.8	100	100	2	0
14/04/2013	9:05:00	38.7	24.6	20.2	974.8	100	220	2	42
14/04/2013	9:07:00	39.8	24.7	20.3	975.0	220	240	2	57
14/04/2013	9:09:00	40.3	24.8	20.4	975.1	240	255	2	69
14/04/2013	9:11:00	40.7	24.9	20.4	975.0	255	270	2	82
14/04/2013	9:13:00	41.1	24.9	20.5	975.0	270	280	2	90
14/04/2013	9:15:00	41.5	25.1	20.6	975.0	280	280	2	90
14/04/2013	9:17:00	41.6	25.0	20.6	974.8	280	290	2	99
14/04/2013	9:19:00	41.7	25.1	20.6	975.0	290	300	2	108
14/04/2013	9:21:00	41.8	25.1	20.7	975.0	300	300	2	108
14/04/2013	9:23:00	42.0	25.2	20.7	974.8	300	310	2	117
14/04/2013	9:25:00	42.1	25.2	20.8	974.8	310	320	2	126
14/04/2013	9:27:00	42.2	25.2	18.7	975.1	320	320	2	126
14/04/2013	9:29:00	42.3	25.3	17.8	975.0	320	330	2	135
14/04/2013	9:31:00	42.3	25.4	17.9	974.8	330	330	2	135
14/04/2013	9:33:00	42.4	25.5	18.2	974.8	330	335	2	139
14/04/2013	9:35:00	42.4	25.5	18.6	974.8	335	340	2	144
14/04/2013	9:37:00	42.5	25.9	18.9	974.8	340	340	2	144
14/04/2013	9:39:00	42.5	26.0	19.2	974.6	340	350	2	153
14/04/2013	9:41:00	42.5	26.1	19.4	974.6	350	350	2	153
14/04/2013	9:45:00	42.6	26.4	19.7	974.6	350	360	2	162
14/04/2013	9:50:00	42.5	26.8	20.2	974.9	360	370	2	172
14/04/2013	9:55:00	42.5	27.1	20.6	974.4	370	380	2	181
14/04/2013	10:00:00	42.4	27.4	20.9	974.9	380	390	2	191
14/04/2013	10:05:00	42.2	27.5	21.1	974.2	390	400	2	200
14/04/2013	10:10:00	42.1	27.7	21.3	973.8	400	400	2	200
14/04/2013	10:15:00	42.1	28.0	21.6	974.2	400	410	2	210
14/04/2013	10:20:00	42.1	28.1	21.6	974.0	410	420	2	219
14/04/2013	10:25:00	42.1	28.1	21.8	973.8	420	430	2	228
14/04/2013	10:30:00	42.3	28.4	21.9	973.8	430	440	2	237
14/04/2013	10:35:00	42.3	28.6	22.1	973.8	440	440	2	237
14/04/2013	10:58:00	42.1	28.9	22.6	973.6	440	470	2	265

QGC Pty Limited Murdoch 1 - Sample MUR001_012 - 709.060 to 709.720 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	11:10:00	42.6	29.4	22.9	973.6	470	480	2	273
14/04/2013	11:20:00	42.7	29.4	23.1	973.4	480	500	2	291
14/04/2013	11:30:00	43.0	29.4	23.5	973.2	500	510	2	299
14/04/2013	11:40:00	43.2	29.7	23.7	972.7	510	520	2	307
14/04/2013	11:50:00	43.5	30.5	23.9	972.7	520	540	2	325
14/04/2013	12:00:00	43.7	31.1	24.3	972.5	540	550	2	333
14/04/2013	12:15:00	43.8	31.5	24.6	972.3	550	565	2	346
14/04/2013	12:30:00	44.1	31.7	25.1	971.9	565	580	2	359
14/04/2013	12:45:00	44.2	31.5	25.4	972.1	580	600	2	377
14/04/2013	13:00:00	44.1	31.6	25.7	971.5	600	610	2	386
14/04/2013	13:15:00	43.9	31.9	26.0	971.5	610	620	2	396
14/04/2013	13:30:00	43.8	31.6	26.2	971.5	620	640	2	415
14/04/2013	13:45:00	43.9	31.6	26.6	971.9	640	650	2	424
14/04/2013	14:15:00	44.8	31.8	27.0	970.7	650	670	2	439
14/04/2013	14:45:00	43.9	30.8	26.8	970.5	670	680	2	451
14/04/2013	15:01:00	43.9	30.3	26.8	970.5	680	690	2	460
14/04/2013	15:30:00	43.9	30.5	26.8	970.5	690	715	2	483
14/04/2013	16:00:00	43.9	30.4	27.0	970.5	715	730	2	497
14/04/2013	16:30:00	44.1	29.8	26.9	970.5	730	750	2	515
14/04/2013	17:30:00	45.1	28.6	26.9	970.5	750	770	2	531
14/04/2013	18:30:00	43.5	25.4	26.2	970.5	770	790	2	555
14/04/2013	19:30:00	43.4	23.9	25.2	972.3	790	810	2	577
14/04/2013	20:30:00	43.1	23.1	24.4	973.2	810	840	2	608
14/04/2013	21:30:00	43.1	22.4	23.8	973.0	840	860	2	627
14/04/2013	22:30:00	42.5	21.4	22.9	973.2	860	870	2	639
15/04/2013	4:00:00	42.7	21.1	22.2	971.9	870	980	2	744
15/04/2013	14:14:00	44.1	32.7	27.2	968.4	100	310	2	893
15/04/2013	20:21:00	41.4	24.6	25.1	970.9	310	360	2	952
16/04/2013	13:08:00	43.4	32.0	27.1	970.2	360	560	2	1130
18/04/2013	9:22:00	43.0	26.4	25.6	1015.0	200	435	2	1399
22/04/2013	10:56:00	42.1	26.2	24.0	1014.4	50	505	2	1834
26/04/2013	9:31:00	41.8	26.1	24.4	1023.0	200	490	2	2120
29/04/2013	10:39:00	40.6	27.1	25.1	1023.4	50	240	2	2294
30/04/2013	13:38:00	40.9	28.1	25.3	1021.3	200	270	2	2357
6/05/2013	10:46:00	41.2	26.4	23.8	1023.0	200	425	2	2578
9/05/2013	11:49:00	41.8	26.5	24.7	1027.6	200	330	2	2701
16/05/2013	11:13:00	43.3	23.9	23.1	1016.1	200	450	2	2924
23/05/2013	15:00:00	41.5	25.4	22.0	1008.3	200	415	2	3122
31/05/2013	9:39:00	43.4	24.0	21.6	1028.7	200	395	2	3325
3/06/2013	9:20:00	42.4	23.9	24.2	1017.3	200	275	2	3382
6/06/2013	11:04:00	42.5	24.4	22.6	1026.6	200	260	2	3449
13/06/2013	8:44:00	42.2	24.1	23.2	1012.9	200	340	2	3569
20/06/2013	10:57:00	42.0	23.3	21.3	1021.3	200	300	2	3674
27/06/2013	10:25:00	41.7	23.6	21.9	1019.9	200	310	2	3778
4/07/2013	10:35:00	42.2	25.7	24.6	1022.0	200	270	2	3843
11/07/2013	10:24:00	43.3	23.8	21.6	1032.9	200	270	2	3919
18/07/2013	11:16:00	42.9	24.1	22.6	1024.4	200	280	2	3987
25/07/2013	10:59:00	42.4	25.7	18.3	1028.3	50	120	2	4054


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_012 - 709.060 to 709.720 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
400
300
200
100
0
-100
-200
0
2
4
6
8
10
12
14
16
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_012 - 709.060 to 709.720 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
25.13
102.1 Days from T Zero
97.4% Methane
1.24% Ethane
0.77% Carbon Dioxide
0% Nitrogen
15.09 Days from T Zero
91.4% Methane
0.66% Ethane
1.39% Carbon Dioxide
6.25% Nitrogen
8.1 Days from T Zero
88.8% Methane
0.78% Ethane
1.13% Carbon Dioxide
8.9% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_012GASA
MUR001_012GASB
MUR001_012GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_013 - 709.720 to 710.290 metres

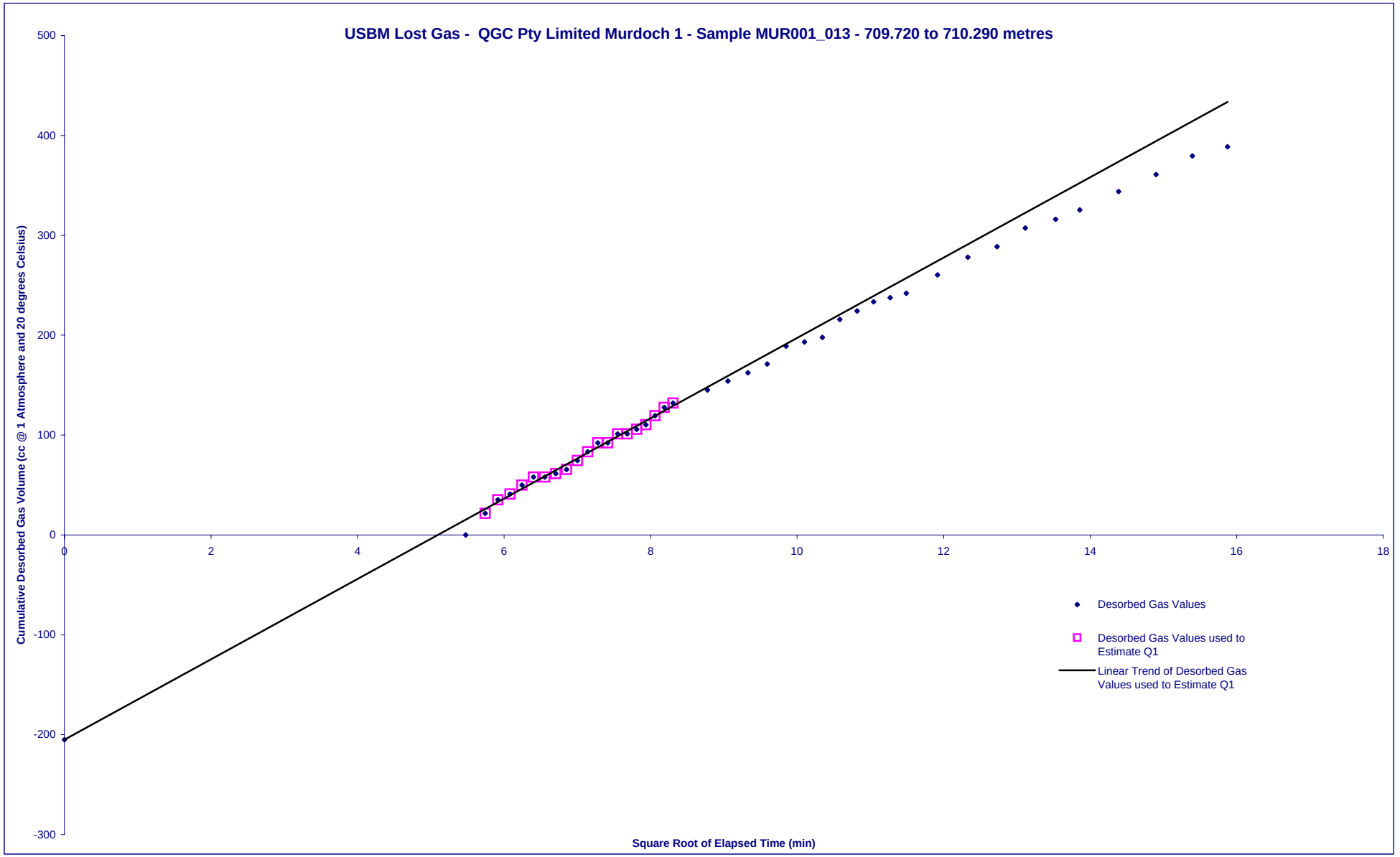
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_013	Sample Type	Core	Sample Top (m)	709.720	Sample Base (m)	710.290	Core Diameter (cm)	6.15
Sample Volume (cc)	1693	Mass (g)	2190	RD (g/cc)	1.39	Moisture (%ad)	5.1	Ash (%ad)	17
Q3 Volume (cc@STP)	22.78	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	5.3	Q3 Ash (%ad)	15.6
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	993		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454		Trip Rate (m/min)	64.6	Minimum Q1 Point
Sample Penetrated	14/04/2013	9:07		Formation Pressure (Mpa) @ 0.433 psi/ft	6.95		Surface Time Ratio	0.634	2
Sample Off Bottom	14/04/2013	10:23		Formation Pressure Gradient (psi/ft)	0.433		Lost Time Ratio	0.026	Maximum Q1 Point
Sample at Surface	14/04/2013	10:34		Depth HSP=Formation Pressure (m)	708.85		USBM Q1 - Surface Time Correction	1.2	20
Sample Sealed	14/04/2013	10:53		Formation Temperature (°C)			Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	14/04/2013	10:23		Standard Temperature (°C)	20.00	Comments:			42
Last Entry	25/07/2013	11:21		Standard Pressure (hPa)	1013				-205

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.004	0.000	0.000	0.000		
m^3/tonne (raw)	0.09	0.11	0.00	1.66	0.11	1.860	1.880		Time Zero Calculation
SCF/T (raw)	3	4	0	53	4	59.750	60.350		
m^3/tonne (daf)	0.12	0.14	0.00	2.13	0.14	2.39	**2.41**	2.27	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	4	5	0	68	5	77	**77**	73	
Percent of daf total	5.03%	5.98%	0.00%	88.29%	Sorption Time (days)	16.14	Diffusivity (sec^{-1})	8.31204E-06	

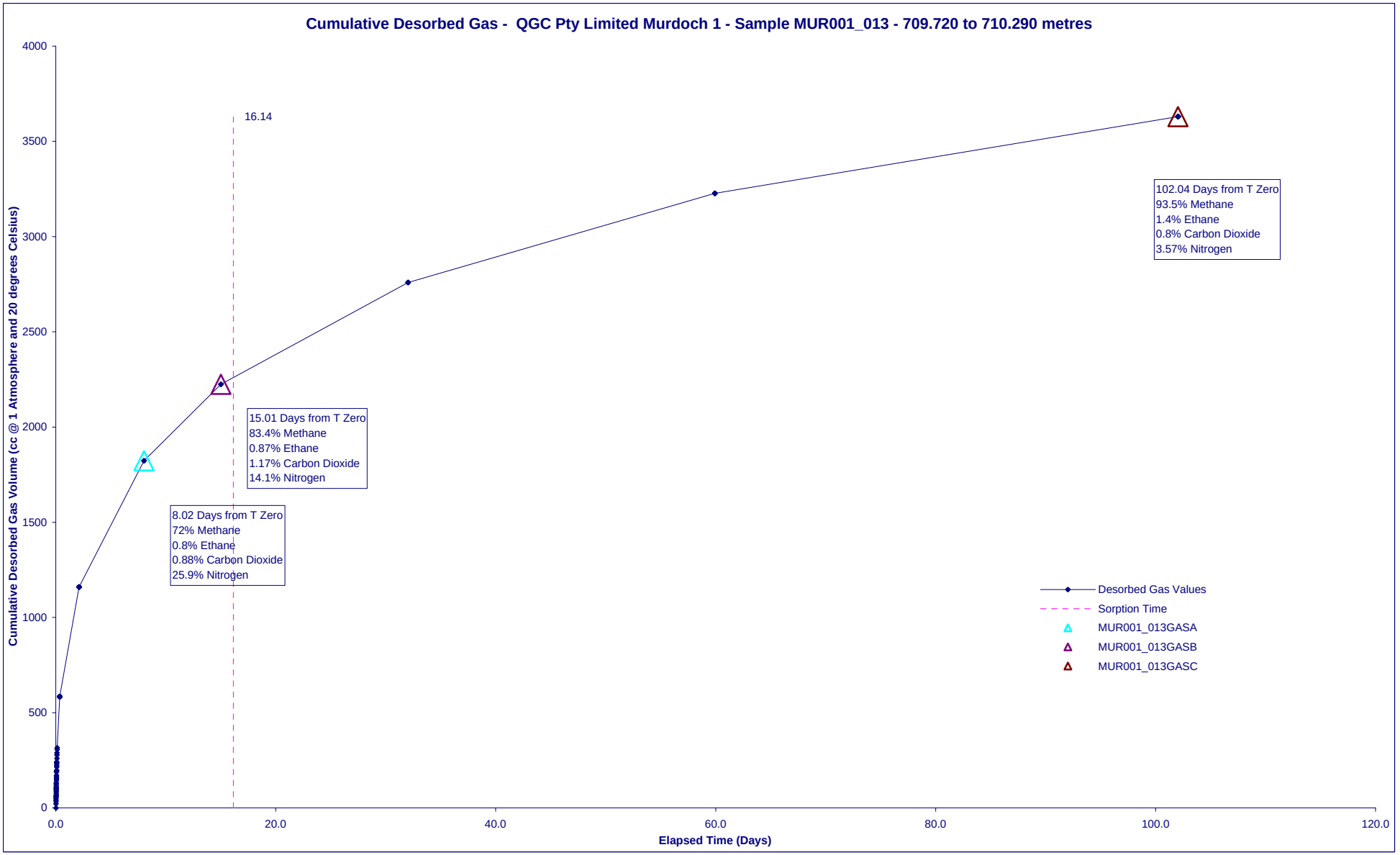
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	10:53:00	32.4	28.6	22.5	973.8	100	100	2	0
14/04/2013	10:56:00	38.8	28.8	22.5	973.8	100	200	2	22
14/04/2013	10:58:00	40.4	28.9	22.6	973.6	200	220	2	35
14/04/2013	11:00:00	41.6	29.0	22.7	973.6	220	230	2	41
14/04/2013	11:02:00	41.7	29.1	22.7	973.6	230	240	2	50
14/04/2013	11:04:00	42.0	29.2	22.8	973.4	240	250	2	58
14/04/2013	11:06:00	42.3	29.2	22.8	973.8	250	250	2	58
14/04/2013	11:08:00	42.6	29.4	22.9	973.6	250	255	2	61
14/04/2013	11:10:00	42.8	29.4	22.9	973.6	255	260	2	65
14/04/2013	11:12:00	42.9	29.4	23.0	973.6	260	270	2	74
14/04/2013	11:14:00	43.0	29.4	23.0	973.6	270	280	2	83
14/04/2013	11:16:00	43.1	29.4	23.1	973.6	280	290	2	92
14/04/2013	11:18:00	43.2	29.5	23.1	973.4	290	290	2	92
14/04/2013	11:20:00	43.3	29.4	23.1	973.4	290	300	2	101
14/04/2013	11:22:00	43.4	29.4	23.2	973.4	300	300	2	101
14/04/2013	11:24:00	43.4	29.3	23.3	973.4	300	305	2	106
14/04/2013	11:26:00	43.5	29.2	23.3	973.8	305	310	2	110
14/04/2013	11:28:00	43.5	29.2	23.4	973.4	310	320	2	119
14/04/2013	11:30:00	43.7	29.4	23.4	973.2	320	330	2	128
14/04/2013	11:32:00	43.8	29.4	23.4	973.2	330	335	2	132
14/04/2013	11:40:00	44.0	29.9	23.8	973.0	335	350	2	145
14/04/2013	11:45:00	44.0	30.1	23.8	972.8	350	360	2	154
14/04/2013	11:50:00	44.3	30.0	23.9	972.7	360	370	2	162
14/04/2013	11:55:00	44.3	30.8	24.1	972.3	370	380	2	171
14/04/2013	12:00:00	44.5	31.1	24.3	972.5	380	400	2	189
14/04/2013	12:05:00	44.6	31.4	24.4	972.3	400	405	2	193
14/04/2013	12:10:00	44.6	31.4	24.6	972.3	405	410	2	198
14/04/2013	12:15:00	44.7	31.5	24.6	972.3	410	430	2	216
14/04/2013	12:20:00	44.8	31.6	24.7	971.9	430	440	2	224
14/04/2013	12:25:00	44.9	31.7	24.9	972.1	440	450	2	233
14/04/2013	12:30:00	45.0	31.7	25.1	972.1	450	455	2	238
14/04/2013	12:35:00	45.0	31.6	25.1	971.9	455	460	2	242

QGC Pty Limited Murdoch 1 - Sample MUR001_013 - 709.720 to 710.290 metres

Date	Time	Temperature (^{o}C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	12:45:00	45.1	31.5	25.4	972.1	460	480	2	260
14/04/2013	12:55:00	45.0	31.4	25.6	971.1	480	500	2	278
14/04/2013	13:05:00	44.6	31.8	25.7	971.5	500	510	2	289
14/04/2013	13:15:00	44.5	31.9	26.0	971.5	510	530	2	307
14/04/2013	13:26:00	44.5	31.7	26.2	971.1	530	540	2	316
14/04/2013	13:35:00	44.5	31.6	26.2	971.3	540	550	2	325
14/04/2013	13:50:00	44.5	31.4	26.4	971.3	550	570	2	344
14/04/2013	14:05:00	44.8	31.9	26.7	970.7	570	590	2	361
14/04/2013	14:20:00	44.8	31.9	26.9	970.9	590	610	2	379
14/04/2013	14:35:00	44.7	31.4	27.0	970.7	610	620	2	389
14/04/2013	14:50:00	44.5	30.6	26.9	970.9	620	640	2	408
14/04/2013	15:05:00	44.5	30.3	26.8	970.9	640	650	2	417
14/04/2013	15:30:00	44.7	30.5	26.8	970.9	650	670	2	435
14/04/2013	16:00:00	44.7	30.3	27.0	970.7	670	700	2	463
14/04/2013	16:30:00	45.1	29.8	26.9	970.5	700	740	2	499
14/04/2013	17:02:00	44.7	29.8	26.8	970.5	740	750	2	509
14/04/2013	17:30:00	45.1	28.6	26.9	970.5	750	770	2	527
14/04/2013	18:00:00	45.2	26.8	26.7	970.5	770	800	2	555
14/04/2013	19:00:00	44.9	24.5	25.7	970.5	800	830	2	584
14/04/2013	20:00:00	44.9	23.4	24.8	970.5	830	860	2	613
14/04/2013	21:00:00	44.7	22.7	23.9	973.4	860	900	2	654
14/04/2013	22:00:00	44.7	21.9	23.4	973.4	900	930	2	683
14/04/2013	23:00:00	44.7	21.2	22.8	973.4	930	950	2	703
15/04/2013	0:00:00	44.5	20.9	22.4	972.8	950	970	2	722
15/04/2013	6:00:00	44.4	21.7	22.3	972.1	970	1080	2	828
15/04/2013	14:14:00	44.9	32.7	27.2	968.4	100	260	2	937
15/04/2013	20:21:00	43.2	24.6	25.1	970.9	260	320	2	1000
16/04/2013	13:08:00	44.5	32.0	27.1	970.2	320	500	2	1160
18/04/2013	9:22:00	43.0	26.4	25.6	1015.0	200	470	2	1462
22/04/2013	10:56:00	41.6	26.2	24.0	1014.4	50	430	2	1822
26/04/2013	9:31:00	41.9	26.1	24.4	1023.0	200	450	2	2068
29/04/2013	10:39:00	40.8	27.1	25.1	1023.4	50	220	2	2224
30/04/2013	13:38:00	41.5	28.1	25.3	1021.3	200	255	2	2273
6/05/2013	10:46:00	41.1	26.4	23.8	1023.0	200	415	2	2485
9/05/2013	11:49:00	42.3	26.5	24.7	1027.6	200	305	2	2582
16/05/2013	11:13:00	42.2	23.9	23.1	1016.1	200	395	2	2759
23/05/2013	15:00:00	41.9	25.4	22.0	1008.3	200	365	2	2905
31/05/2013	9:39:00	42.2	24.0	21.6	1028.7	200	315	2	3033
3/06/2013	9:20:00	41.5	23.9	24.2	1017.3	200	260	2	3079
6/06/2013	11:04:00	41.5	24.4	22.6	1026.6	200	240	2	3126
13/06/2013	8:44:00	41.9	24.1	23.2	1012.9	200	320	2	3227
20/06/2013	10:57:00	41.9	23.3	21.3	1021.3	200	270	2	3300
27/06/2013	10:25:00	41.3	23.6	21.9	1019.9	200	300	2	3396
4/07/2013	10:35:00	41.6	25.7	24.6	1022.0	200	250	2	3443
11/07/2013	10:24:00	42.4	23.8	21.6	1032.9	200	255	2	3505
18/07/2013	11:16:00	43.3	24.1	22.6	1024.4	200	270	2	3560
25/07/2013	11:21:00	41.9	25.5	18.5	1028.3	50	120	2	3630


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_013 - 709.720 to 710.290 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
500
400
300
200
100
0
-100
-200
-300
0
2
4
6
8
10
12
14
16
18
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_013 - 709.720 to 710.290 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
16.14
102.04 Days from T Zero
93.5% Methane
1.4% Ethane
0.8% Carbon Dioxide
3.57% Nitrogen
15.01 Days from T Zero
83.4% Methane
0.87% Ethane
1.17% Carbon Dioxide
14.1% Nitrogen
8.02 Days from T Zero
72% Methane
0.8% Ethane
0.88% Carbon Dioxide
25.9% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_013GASA
MUR001_013GASB
MUR001_013GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_014 - 712.970 to 713.320 metres

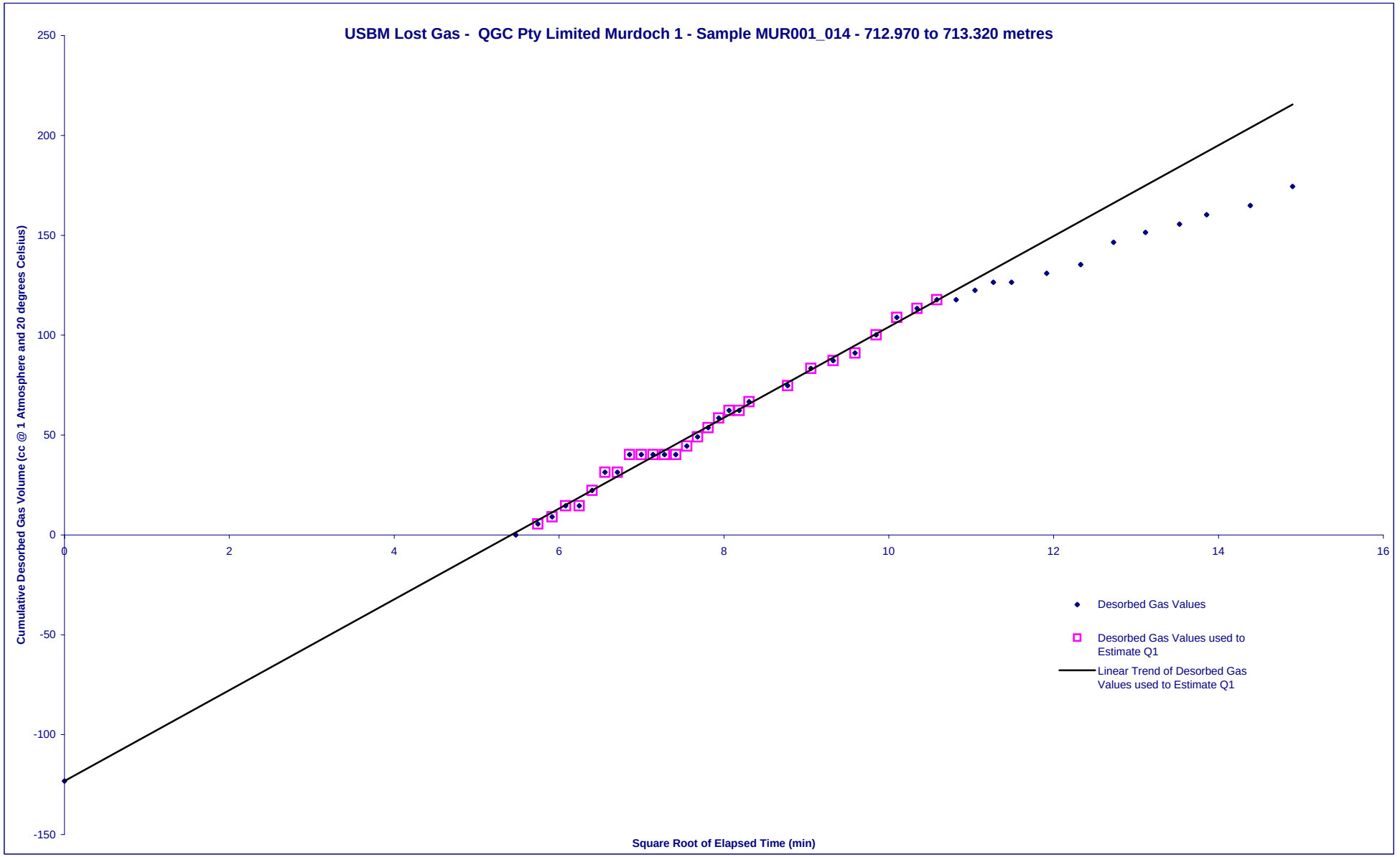
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_014	Sample Type	Core	Sample Top (m)	712.970	Sample Base (m)	713.320	Core Diameter (cm)	6.15
Sample Volume (cc)	1040	Mass (g)	1640	RD (g/cc)	1.68	Moisture (%ad)	5.3	Ash (%ad)	45.6
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	6	Q3 Ash (%ad)	52.7
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	64.8	Minimum Q1 Point
Sample Penetrated	14/04/2013	9:43		Formation Pressure (Mpa) @ 0.433 psi/ft	6.98			Surface Time Ratio	0.634	2
Sample Off Bottom	14/04/2013	10:23		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.026	Maximum Q1 Point
Sample at Surface	14/04/2013	10:34		Depth HSP=Formation Pressure (m)	712.10			USBM Q1 - Surface Time Correction	1.2	28
Sample Sealed	14/04/2013	10:53		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	14/04/2013	10:23		Standard Temperature (°C)	20.00	Comments:				40
Last Entry	25/07/2013	11:43		Standard Pressure (hPa)	1013					-123

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.002	0.000	0.000	0.000		
m^3/tonne (raw)	0.08	0.09	0.00	1.08	0.00	1.160	1.170		Time Zero Calculation
SCF/T (raw)	2	3	0	35	0	37.020	37.500		
m^3/tonne (daf)	0.15	0.18	0.00	2.20	0.00	2.35	**2.38**	2.20	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	5	6	0	70	0	75	**76**	71	
Percent of daf total	6.51%	7.72%	0.00%	92.46%	Sorption Time (days)	8.03	Diffusivity (sec^{-1})	1.22374E-05	

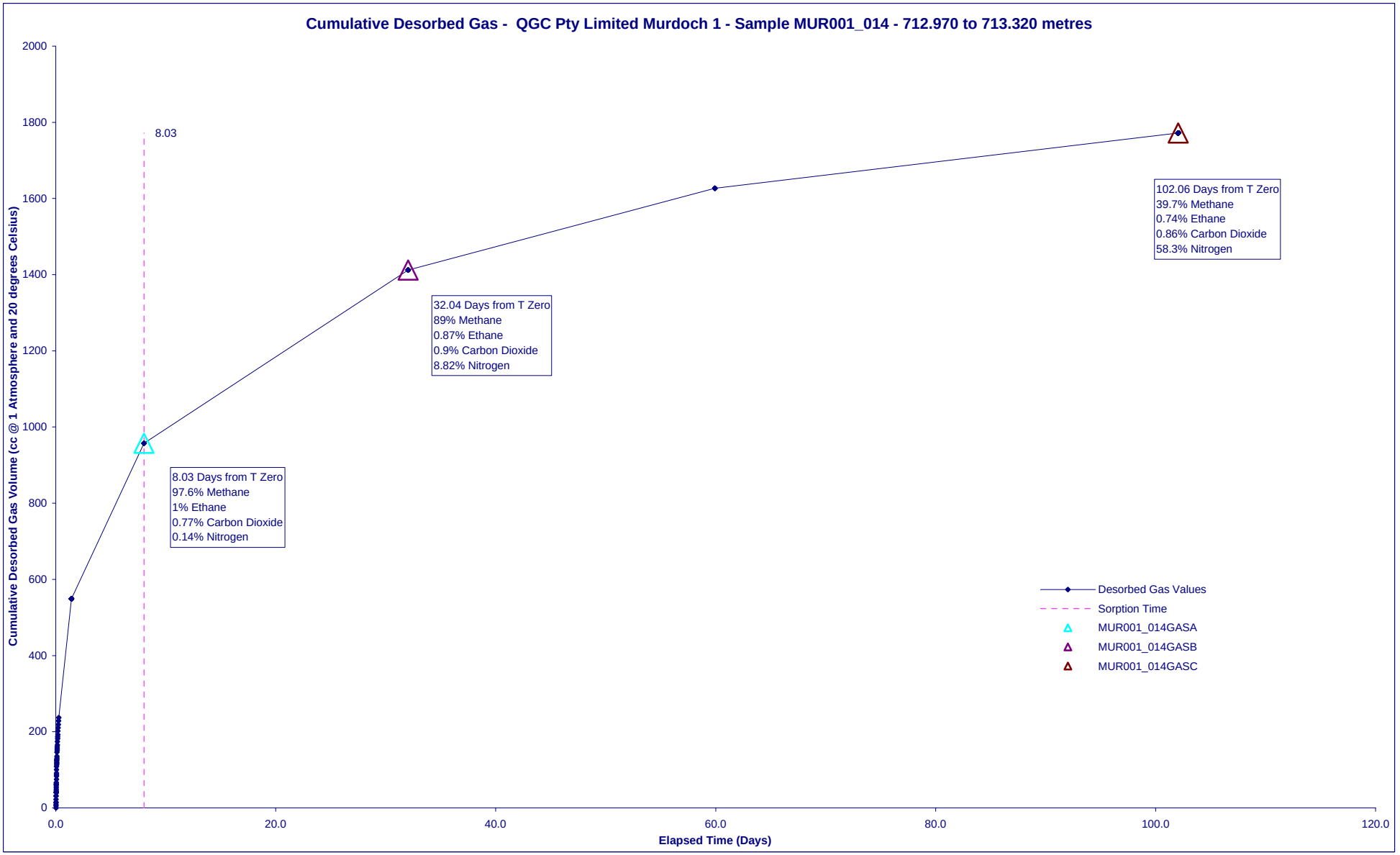
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	10:53:00	29.0	28.6	22.5	973.8	100	100	2	0
14/04/2013	10:56:00	38.4	28.8	22.5	973.8	100	200	2	5
14/04/2013	10:58:00	40.1	28.9	22.6	973.6	200	210	2	9
14/04/2013	11:00:00	41.3	29.0	22.7	973.6	210	220	2	15
14/04/2013	11:02:00	41.5	29.1	22.7	973.6	220	220	2	15
14/04/2013	11:04:00	41.9	29.2	22.8	973.4	220	230	2	22
14/04/2013	11:06:00	42.1	29.2	22.8	973.8	230	240	2	31
14/04/2013	11:08:00	42.3	29.4	22.9	973.6	240	240	2	31
14/04/2013	11:10:00	42.4	29.4	22.9	973.6	240	250	2	40
14/04/2013	11:12:00	42.5	29.4	23.0	973.6	250	250	2	40
14/04/2013	11:14:00	42.6	29.4	23.0	973.6	250	250	2	40
14/04/2013	11:16:00	42.7	29.4	23.1	973.6	250	250	2	40
14/04/2013	11:18:00	42.7	29.5	23.1	973.4	250	250	2	40
14/04/2013	11:20:00	42.8	29.4	23.1	973.4	250	255	2	45
14/04/2013	11:22:00	42.8	29.4	23.2	973.4	255	260	2	49
14/04/2013	11:24:00	42.8	29.3	23.3	973.4	260	265	2	54
14/04/2013	11:26:00	42.9	29.2	23.3	973.8	265	270	2	58
14/04/2013	11:28:00	43.0	29.2	23.4	973.4	270	275	2	62
14/04/2013	11:30:00	43.1	29.4	23.4	973.2	275	275	2	62
14/04/2013	11:32:00	43.2	29.4	23.4	973.2	275	280	2	67
14/04/2013	11:40:00	43.5	29.9	23.8	973.0	280	290	2	75
14/04/2013	11:45:00	43.6	30.1	23.8	972.8	290	300	2	83
14/04/2013	11:50:00	43.8	30.0	23.9	972.7	300	305	2	87
14/04/2013	11:55:00	43.9	30.8	24.1	972.3	305	310	2	91
14/04/2013	12:00:00	44.0	31.1	24.3	972.5	310	320	2	100
14/04/2013	12:05:00	44.1	31.4	24.4	972.3	320	330	2	109
14/04/2013	12:10:00	44.1	31.4	24.6	972.3	330	335	2	113
14/04/2013	12:15:00	44.2	31.5	24.6	972.3	335	340	2	118
14/04/2013	12:20:00	44.3	31.6	24.7	971.9	340	340	2	118
14/04/2013	12:25:00	44.3	31.7	24.9	972.1	340	345	2	122
14/04/2013	12:30:00	44.5	31.7	25.1	972.1	345	350	2	126
14/04/2013	12:35:00	44.5	31.6	25.1	971.9	350	350	2	126

QGC Pty Limited Murdoch 1 - Sample MUR001_014 - 712.970 to 713.320 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	12:45:00	44.6	31.5	25.4	972.1	350	355	2	131
14/04/2013	12:55:00	44.3	31.4	25.6	971.1	355	360	2	135
14/04/2013	13:05:00	43.8	31.8	25.7	971.5	360	370	2	147
14/04/2013	13:15:00	43.7	31.9	26.0	971.5	370	375	2	151
14/04/2013	13:26:00	43.7	31.7	26.2	971.1	375	380	2	156
14/04/2013	13:35:00	43.7	31.6	26.2	971.3	380	385	2	160
14/04/2013	13:50:00	43.7	31.4	26.4	971.3	385	390	2	165
14/04/2013	14:05:00	43.4	31.9	26.7	970.7	390	400	2	174
14/04/2013	14:20:00	44.0	31.9	26.9	970.9	400	410	2	182
14/04/2013	14:35:00	43.9	31.4	27.0	970.7	410	415	2	187
14/04/2013	14:50:00	43.7	30.6	26.9	970.9	415	420	2	192
14/04/2013	15:05:00	43.5	30.3	26.8	970.9	420	430	2	202
14/04/2013	15:30:00	43.7	30.5	26.8	970.9	430	440	2	210
14/04/2013	16:00:00	43.8	30.3	27.0	970.7	440	450	2	219
14/04/2013	16:30:00	43.7	29.8	26.9	970.5	450	460	2	228
14/04/2013	17:02:00	43.9	29.8	26.8	970.5	460	470	2	237
14/04/2013	17:30:00	44.1	28.6	26.9	970.5	470	480	2	246
14/04/2013	18:00:00	44.6	26.8	26.7	970.5	480	500	2	263
14/04/2013	19:00:00	44.5	24.5	25.7	970.5	500	520	2	282
14/04/2013	20:00:00	44.5	23.4	24.8	970.5	520	530	2	291
14/04/2013	21:00:00	44.3	22.7	23.9	973.4	530	550	2	314
14/04/2013	22:00:00	44.2	21.9	23.4	973.4	550	560	2	324
14/04/2013	23:00:00	44.2	21.2	22.8	973.4	560	580	2	343
15/04/2013	0:00:00	44.2	20.9	22.4	972.8	580	590	2	352
15/04/2013	6:00:00	44.3	21.7	22.3	972.1	590	670	2	428
15/04/2013	14:14:00	44.2	32.7	27.2	968.4	100	200	2	495
15/04/2013	20:21:00	42.6	24.6	25.1	970.9	200	250	2	549
16/04/2013	13:08:00	43.3	32.0	27.1	970.2	250	400	2	684
18/04/2013	9:24:00	44.7	26.7	25.6	1015.1	200	215	2	735
22/04/2013	11:03:00	42.9	26.5	24.1	1014.2	50	280	2	957
26/04/2013	9:33:00	43.7	26.2	24.4	1023.0	200	310	2	1069
29/04/2013	10:47:00	42.5	27.4	25.3	1023.4	50	115	2	1128
30/04/2013	13:39:00	42.3	28.1	25.3	1021.3	200	220	2	1148
6/05/2013	10:47:00	43.1	26.5	23.9	1022.8	200	320	2	1264
9/05/2013	11:51:00	43.9	26.7	24.6	1027.6	200	245	2	1307
16/05/2013	11:17:00	44.5	23.9	23.0	1015.9	50	180	2	1412
23/05/2013	15:03:00	43.8	25.6	22.1	1008.3	200	270	2	1475
31/05/2013	9:41:00	45.3	24.1	21.7	1028.7	200	250	2	1539
3/06/2013	9:29:00	42.6	24.4	24.2	1017.3	200	230	2	1563
6/06/2013	11:06:00	43.5	24.4	22.6	1026.8	200	210	2	1579
13/06/2013	8:45:00	43.7	24.2	23.1	1012.9	200	265	2	1627
20/06/2013	10:59:00	42.5	23.4	21.6	1021.1	200	180	2	1627
27/06/2013	10:26:00	42.0	23.6	21.9	1019.9	200	245	2	1672
4/07/2013	10:39:00	42.1	26.1	24.6	1022.0	200	175	2	1672
11/07/2013	10:25:00	42.6	23.8	21.6	1032.9	200	220	2	1703
18/07/2013	11:18:00	42.8	24.2	22.7	1024.1	200	240	2	1731
25/07/2013	11:43:00	42.8	25.7	18.7	1027.0	50	95	2	1772


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_014 - 712.970 to 713.320 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
250
200
150
100
50
0
-50
-100
-150
0
2
4
6
8
10
12
14
16
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_014 - 712.970 to 713.320 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
8.03
8.03 Days from T Zero
97.6% Methane
1% Ethane
0.77% Carbon Dioxide
0.14% Nitrogen
32.04 Days from T Zero
89% Methane
0.87% Ethane
0.9% Carbon Dioxide
8.82% Nitrogen
102.06 Days from T Zero
39.7% Methane
0.74% Ethane
0.86% Carbon Dioxide
58.3% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_014GASA
MUR001_014GASB
MUR001_014GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_015 - 744.660 to 744.980 metres

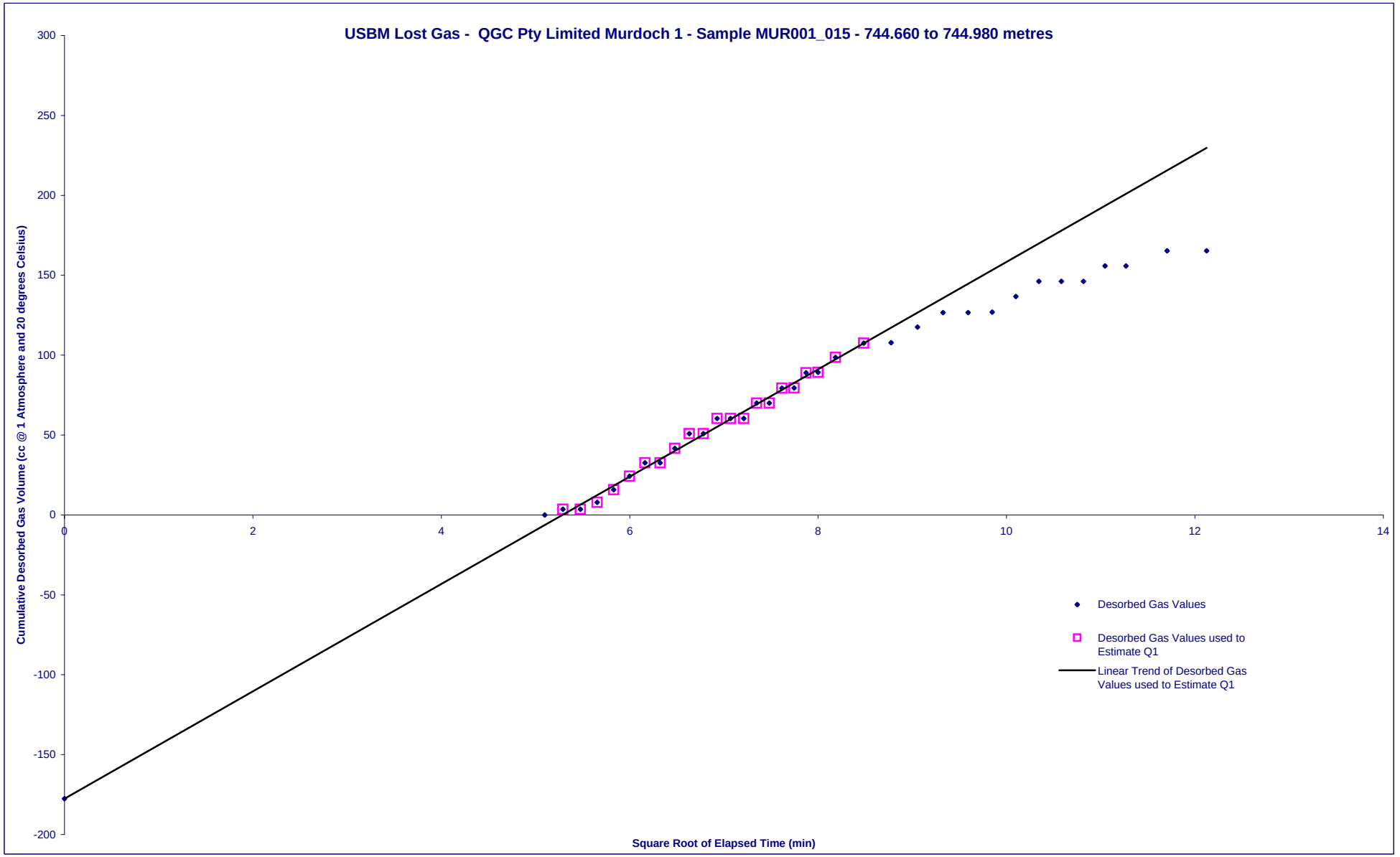
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_015	Sample Type	Core	Sample Top (m)	744.660	Sample Base (m)	744.980	Core Diameter (cm)	6.15
Sample Volume (cc)	951	Mass (g)	1422	RD (g/cc)	1.55	Moisture (%ad)	4.2	Ash (%ad)	35.3
Q3 Volume (cc@STP)	13.32	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	4.3	Q3 Ash (%ad)	35.2
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	993		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	62.1	Minimum Q1 Point
Sample Penetrated	14/04/2013	20:36		Formation Pressure (Mpa) @ 0.433 psi/ft	7.29			Surface Time Ratio	0.539	2
Sample Off Bottom	14/04/2013	21:28		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.011	Maximum Q1 Point
Sample at Surface	14/04/2013	21:40		Depth HSP=Formation Pressure (m)	743.75			USBM Q1 - Surface Time Correction	1.15	22
Sample Sealed	14/04/2013	21:54		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	14/04/2013	21:28		Standard Temperature (°C)	20.00	Comments:				35
Last Entry	25/07/2013	13:05		Standard Pressure (hPa)	1013					-178

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.002	0.000	0.000	0.000		
m^3/tonne (raw)	0.12	0.14	0.00	1.59	0.07	1.780	1.800		Time Zero Calculation
SCF/T (raw)	4	5	0	51	2	57.220	57.820		
m^3/tonne (daf)	0.21	0.24	0.00	2.64	0.11	2.96	**2.99**	2.75	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	7	8	0	84	4	95	**96**	88	
Percent of daf total	6.97%	7.94%	0.00%	88.15%	Sorption Time (days)	15.67	Diffusivity (sec^{-1})	1.49454E-05	

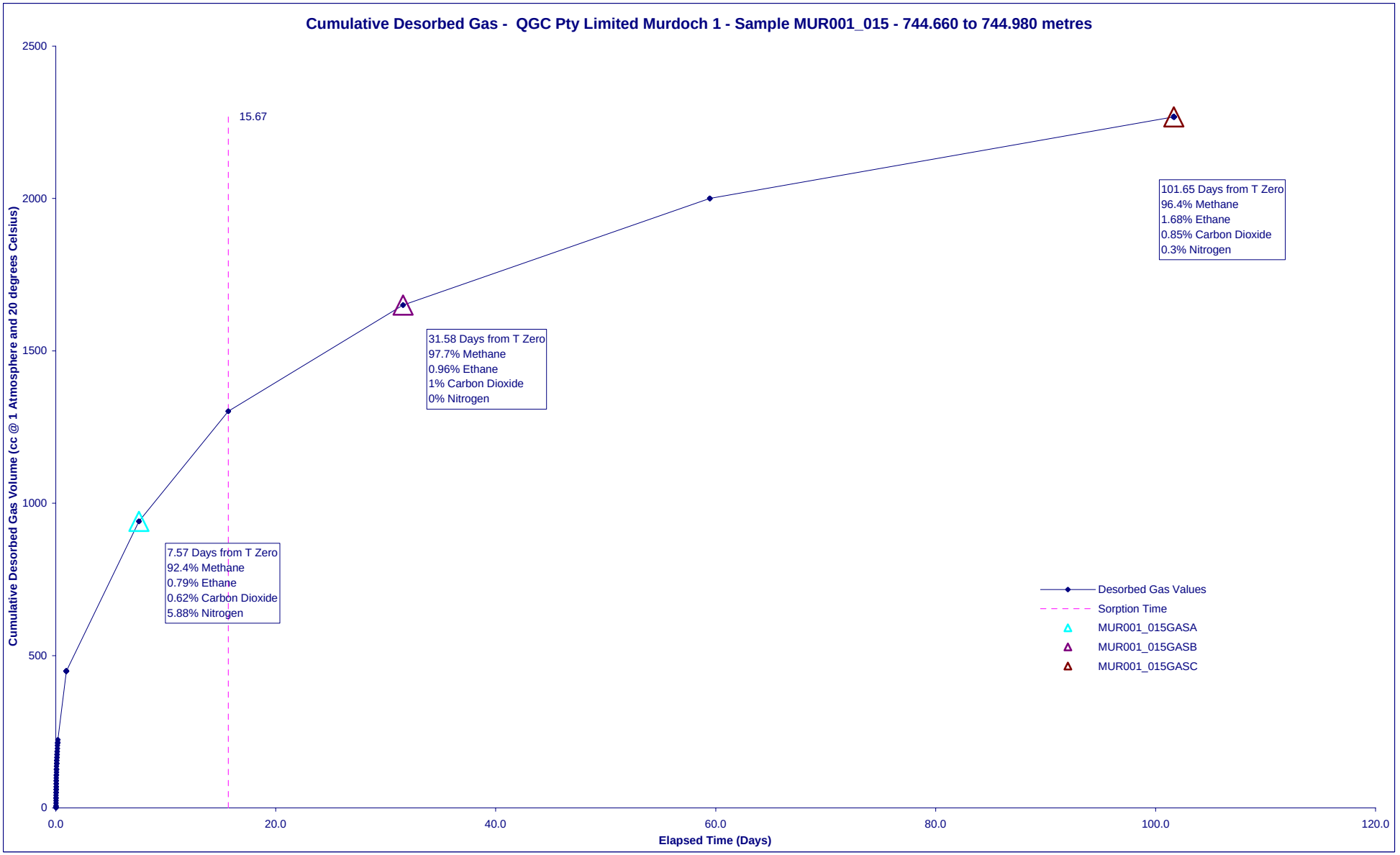
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	21:54:00	34.7	21.9	23.4	973.4	100	100	2	0
14/04/2013	21:56:00	38.1	21.9	23.4	973.4	100	170	2	4
14/04/2013	21:58:00	41.3	21.9	23.5	973.4	170	180	2	4
14/04/2013	22:00:00	43.0	21.9	23.4	973.4	180	190	2	8
14/04/2013	22:02:00	43.5	21.9	23.4	973.4	190	200	2	16
14/04/2013	22:04:00	43.9	21.8	23.4	973.6	200	210	2	24
14/04/2013	22:06:00	44.2	21.7	23.4	973.4	210	220	2	33
14/04/2013	22:08:00	44.4	21.8	23.3	973.6	220	220	2	33
14/04/2013	22:10:00	44.5	21.7	23.3	973.6	220	230	2	42
14/04/2013	22:12:00	44.6	21.7	23.4	973.6	230	240	2	51
14/04/2013	22:14:00	44.6	21.5	23.3	973.6	240	240	2	51
14/04/2013	22:16:00	44.6	21.6	23.2	973.6	240	250	2	60
14/04/2013	22:18:00	44.6	21.6	23.2	973.6	250	250	2	60
14/04/2013	22:20:00	44.6	21.6	23.2	973.2	250	250	2	60
14/04/2013	22:22:00	44.6	21.5	23.2	973.4	250	260	2	70
14/04/2013	22:24:00	44.6	21.5	22.9	973.4	260	260	2	70
14/04/2013	22:26:00	44.6	21.4	22.9	973.4	260	270	2	79
14/04/2013	22:28:00	44.5	21.4	22.9	973.2	270	270	2	79
14/04/2013	22:30:00	44.5	21.4	22.9	973.2	270	280	2	89
14/04/2013	22:32:00	44.4	21.4	22.9	973.2	280	280	2	89
14/04/2013	22:35:00	44.4	21.4	23.0	973.2	280	290	2	99
14/04/2013	22:40:00	44.6	21.3	23.0	973.2	290	300	2	108
14/04/2013	22:45:00	44.5	21.4	22.9	973.2	300	300	2	108
14/04/2013	22:50:00	44.4	21.3	22.9	973.2	300	310	2	118
14/04/2013	22:55:00	44.6	21.3	22.8	973.4	310	320	2	127
14/04/2013	23:00:00	44.7	21.2	22.8	973.4	320	320	2	127
14/04/2013	23:05:00	44.6	21.2	22.8	973.4	320	320	2	127
14/04/2013	23:10:00	44.5	21.2	22.8	973.4	320	330	2	137
14/04/2013	23:15:00	44.5	21.1	22.7	973.4	330	340	2	146
14/04/2013	23:20:00	44.5	21.2	22.6	973.4	340	340	2	146
14/04/2013	23:25:00	44.5	21.1	22.6	973.4	340	340	2	146
14/04/2013	23:30:00	44.5	21.0	22.4	973.6	340	350	2	156

QGC Pty Limited Murdoch 1 - Sample MUR001_015 - 744.660 to 744.980 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
14/04/2013	23:35:00	44.5	21.0	22.4	973.6	350	350	2	156
14/04/2013	23:45:00	44.5	20.9	22.4	973.6	350	360	2	165
14/04/2013	23:55:00	44.5	20.9	22.4	973.0	360	360	2	165
15/04/2013	0:05:00	44.2	20.9	22.3	973.0	360	370	2	176
15/04/2013	0:15:00	44.4	20.9	22.2	973.0	370	370	2	176
15/04/2013	0:25:00	44.5	21.0	22.3	973.2	370	380	2	185
15/04/2013	0:35:00	44.5	21.2	22.3	973.2	380	380	2	185
15/04/2013	0:50:00	44.4	21.2	22.3	973.2	380	390	2	195
15/04/2013	1:05:00	44.2	21.0	22.2	973.2	390	400	2	205
15/04/2013	1:20:00	44.5	21.1	22.2	973.2	400	410	2	214
15/04/2013	1:35:00	44.5	21.3	22.3	972.3	410	410	2	214
15/04/2013	1:50:00	44.3	21.4	22.2	972.5	410	410	2	214
15/04/2013	2:05:00	44.3	21.4	22.2	972.5	410	420	2	224
15/04/2013	2:20:00	44.5	21.2	22.3	972.5	420	430	2	233
15/04/2013	2:50:00	44.4	20.9	22.2	972.5	430	440	2	243
15/04/2013	3:20:00	44.3	20.9	22.2	972.5	440	450	2	252
15/04/2013	3:50:00	44.5	20.8	22.1	972.1	450	460	2	261
15/04/2013	4:20:00	44.8	21.2	22.2	972.5	460	460	2	261
15/04/2013	4:50:00	44.4	21.2	22.2	972.5	460	470	2	272
15/04/2013	5:20:00	44.6	21.5	22.2	972.5	470	480	2	280
15/04/2013	6:00:00	44.6	21.7	22.3	972.1	480	490	2	290
15/04/2013	7:00:00	44.8	21.9	22.5	975.1	490	505	2	306
15/04/2013	8:12:00	45.0	24.1	23.1	973.0	505	530	2	327
15/04/2013	9:05:00	45.8	27.5	23.9	972.3	530	550	2	343
15/04/2013	10:07:00	43.1	30.4	25.0	972.1	550	550	2	350
15/04/2013	11:12:00	44.0	32.7	26.3	971.3	550	565	2	361
15/04/2013	14:14:00	44.3	32.7	27.2	968.4	100	160	2	396
15/04/2013	20:21:00	43.0	24.6	25.1	970.9	160	210	2	449
16/04/2013	13:08:00	43.5	32.0	27.1	970.2	210	320	2	547
18/04/2013	9:24:00	44.6	26.7	25.6	1015.1	200	355	2	735
22/04/2013	11:03:00	43.4	26.5	24.1	1014.2	50	270	2	940
26/04/2013	9:33:00	43.3	26.2	24.4	1023.0	200	360	2	1104
29/04/2013	10:47:00	41.1	27.4	25.3	1023.4	50	230	2	1276
30/04/2013	13:39:00	41.1	28.1	25.3	1021.3	200	230	2	1302
6/05/2013	10:47:00	42.3	26.5	23.9	1022.8	200	365	2	1460
9/05/2013	11:51:00	42.8	26.7	24.6	1027.6	200	265	2	1522
16/05/2013	11:17:00	44.1	23.9	23.0	1015.9	50	205	2	1650
23/05/2013	15:03:00	43.5	25.6	22.1	1008.3	200	320	2	1760
31/05/2013	9:41:00	45.1	24.1	21.7	1028.7	200	290	2	1861
3/06/2013	9:29:00	42.4	24.4	24.2	1017.3	200	240	2	1894
6/06/2013	11:06:00	43.6	24.4	22.6	1026.8	200	235	2	1933
13/06/2013	8:45:00	43.8	24.2	23.1	1012.9	200	285	2	2000
20/06/2013	10:59:00	42.4	23.4	21.6	1021.1	200	250	2	2059
27/06/2013	10:26:00	41.3	23.6	21.9	1019.9	200	270	2	2128
4/07/2013	10:39:00	41.7	26.1	24.6	1022.0	200	225	2	2151
11/07/2013	10:25:00	42.7	23.8	21.6	1032.9	200	230	2	2188
18/07/2013	11:18:00	42.8	24.2	22.7	1024.1	200	250	2	2227
25/07/2013	13:05:00	42.5	26.2	19.2	1026.4	50	95	2	2268


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_015 - 744.660 to 744.980 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
300
250
200
150
100
50
0
-50
-100
-150
-200
0
2
4
6
8
10
12
14
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_015 - 744.660 to 744.980 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
15.67
7.57 Days from T Zero
92.4% Methane
0.79% Ethane
0.62% Carbon Dioxide
5.88% Nitrogen
31.58 Days from T Zero
97.7% Methane
0.96% Ethane
1% Carbon Dioxide
0% Nitrogen
101.65 Days from T Zero
96.4% Methane
1.68% Ethane
0.85% Carbon Dioxide
0.3% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_015GASA
MUR001_015GASB
MUR001_015GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_016 - 777.810 to 778.150 metres

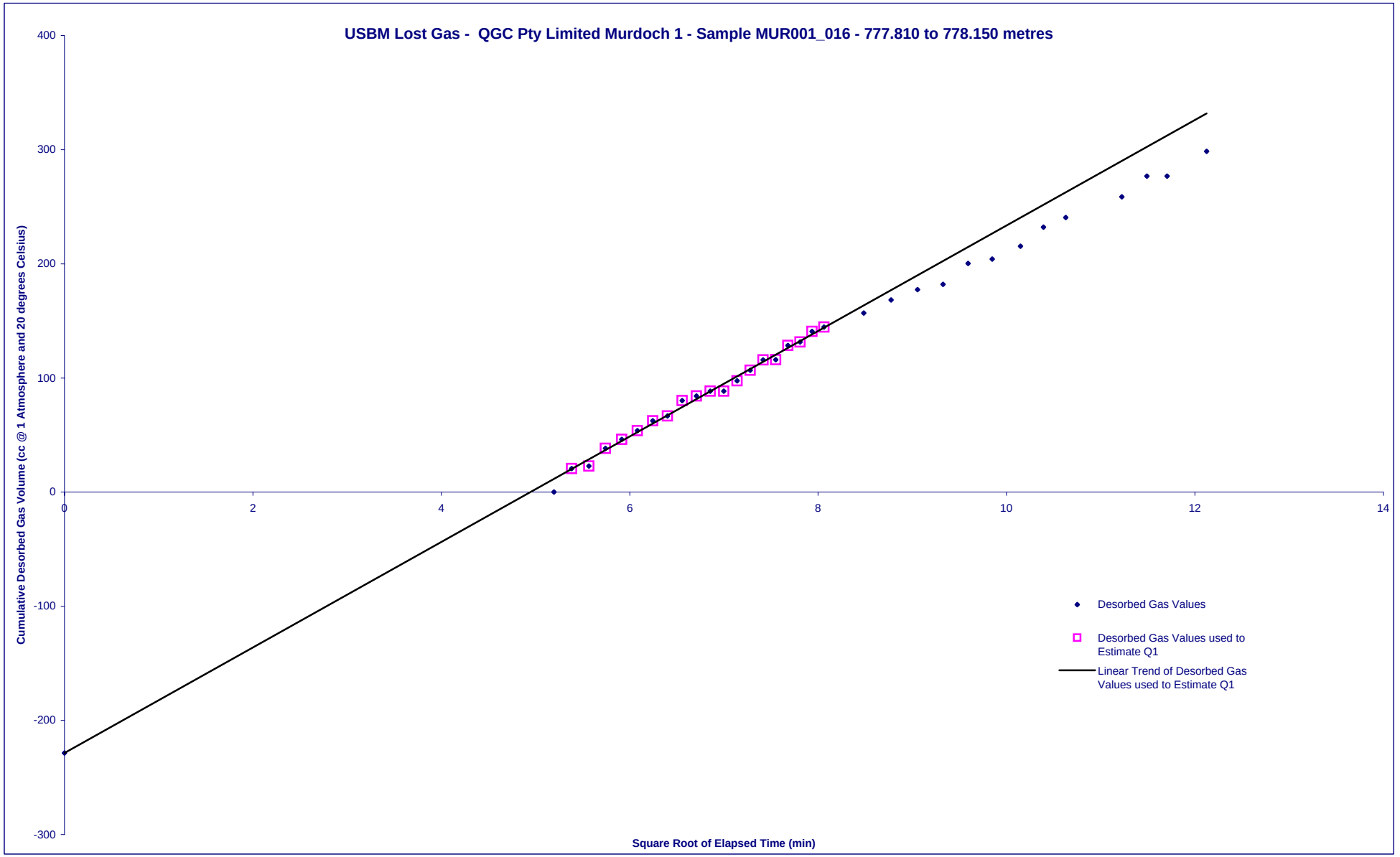
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_016	Sample Type	Core	Sample Top (m)	777.810	Sample Base (m)	778.150	Core Diameter (cm)	6.15
Sample Volume (cc)	1010	Mass (g)	1724	RD (g/cc)	1.79	Moisture (%ad)	4.6	Ash (%ad)	53.7
Q3 Volume (cc@STP)	7.82	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	4.6	Q3 Ash (%ad)	53.1
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	77.8	Minimum Q1 Point
Sample Penetrated	15/04/2013	7:45		Formation Pressure (Mpa) @ 0.433 psi/ft	7.62			Surface Time Ratio	0.630	2
Sample Off Bottom	15/04/2013	8:03		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.075	Maximum Q1 Point
Sample at Surface	15/04/2013	8:13		Depth HSP=Formation Pressure (m)	776.86			USBM Q1 - Surface Time Correction	1.2	20
Sample Sealed	15/04/2013	8:30		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.040	Q1 Points Plotted
Time Zero	15/04/2013	8:03		Standard Temperature (°C)	20.00	Comments:				33
Last Entry	25/07/2013	13:43		Standard Pressure (hPa)	1013					-228

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.002	0.000	0.000	0.000		
m^3/tonne (raw)	0.13	0.16	0.05	1.23	0.04	1.400	1.430		Time Zero Calculation
SCF/T (raw)	4	5	2	39	1	44.920	45.770		
m^3/tonne (daf)	0.32	0.38	0.12	2.95	0.09	3.36	**3.42**	3.16	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	10	12	4	95	3	108	**110**	101	
Percent of daf total	9.46%	11.15%	3.73%	86.27%	Sorption Time (days)	3.04	Diffusivity (sec^{-1})	3.07478E-05	

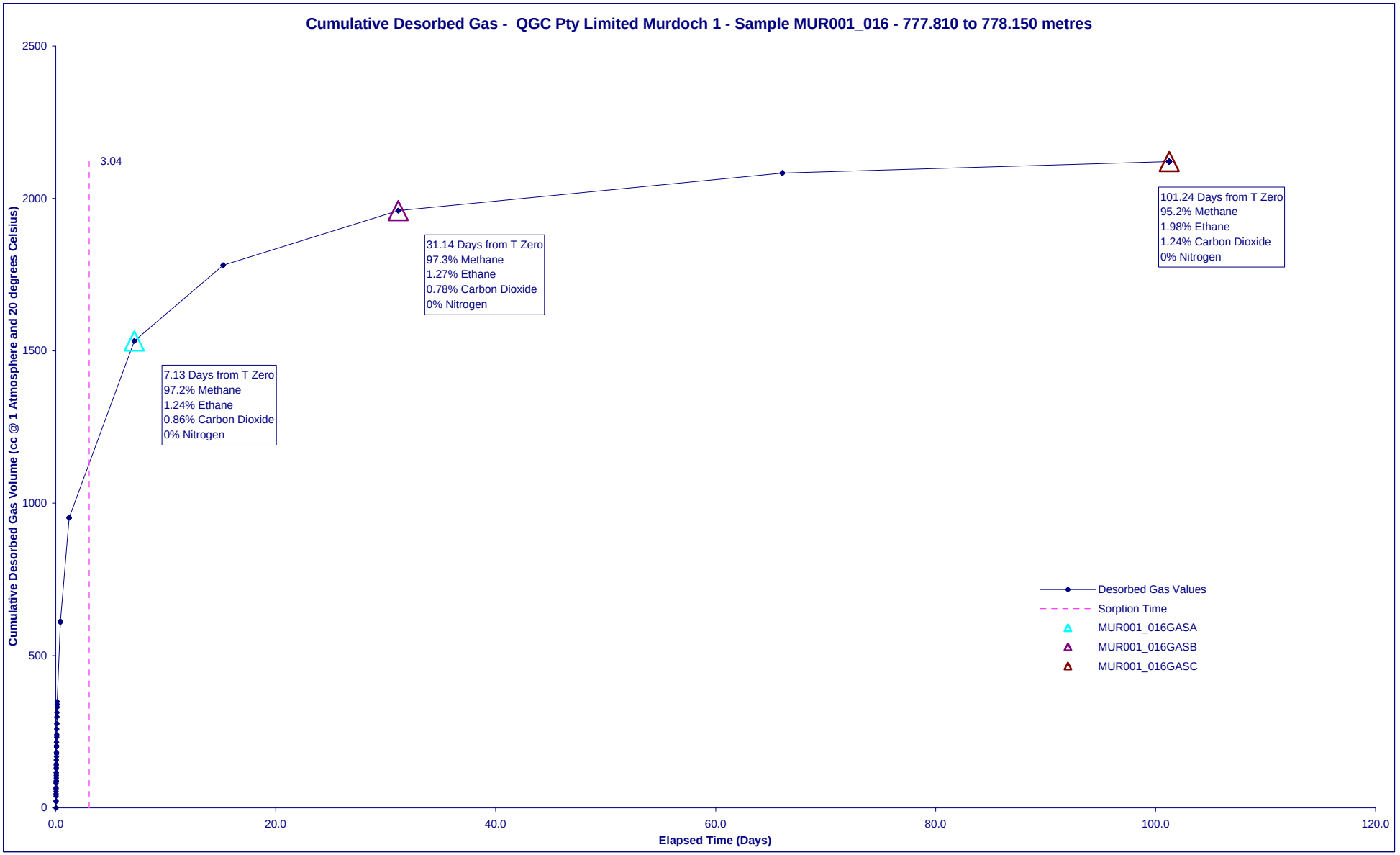
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	8:30:00	38.3	25.4	23.3	972.5	100	100	2	0
15/04/2013	8:32:00	40.7	25.6	23.2	972.5	100	190	2	21
15/04/2013	8:34:00	42.9	25.7	23.3	972.5	190	200	2	23
15/04/2013	8:36:00	43.9	25.9	23.4	972.5	200	220	2	38
15/04/2013	8:38:00	44.4	26.0	23.3	972.5	220	230	2	46
15/04/2013	8:40:00	44.9	26.2	23.4	972.5	230	240	2	54
15/04/2013	8:42:00	45.1	26.3	23.4	972.5	240	250	2	63
15/04/2013	8:44:00	45.2	26.6	23.3	972.3	250	255	2	67
15/04/2013	8:46:00	45.3	26.6	23.5	972.3	255	270	2	80
15/04/2013	8:48:00	45.5	26.8	23.5	972.3	270	275	2	84
15/04/2013	8:50:00	45.7	26.5	23.6	972.5	275	280	2	89
15/04/2013	8:52:00	45.8	27.1	23.6	972.3	280	280	2	89
15/04/2013	8:54:00	45.9	27.1	23.6	972.3	280	290	2	98
15/04/2013	8:56:00	45.9	27.2	23.7	972.3	290	300	2	107
15/04/2013	8:58:00	45.9	27.3	23.8	972.1	300	310	2	116
15/04/2013	9:00:00	45.9	27.3	23.8	972.3	310	310	2	116
15/04/2013	9:02:00	44.8	27.4	23.9	972.1	310	320	2	129
15/04/2013	9:04:00	43.9	27.5	23.9	972.3	320	320	2	132
15/04/2013	9:06:00	43.9	27.5	23.9	972.3	320	330	2	141
15/04/2013	9:08:00	44.1	27.6	24.1	972.1	330	335	2	145
15/04/2013	9:15:00	44.7	27.9	24.2	972.3	335	350	2	157
15/04/2013	9:20:00	45.1	28.1	24.2	971.1	350	365	2	168
15/04/2013	9:25:00	45.4	28.6	24.4	971.9	365	375	2	177
15/04/2013	9:30:00	45.4	28.9	24.5	971.9	375	380	2	182
15/04/2013	9:35:00	45.5	29.2	24.6	971.9	380	400	2	200
15/04/2013	9:40:00	44.3	29.7	24.7	972.1	400	400	2	204
15/04/2013	9:46:00	43.6	30.1	24.9	971.9	400	410	2	215
15/04/2013	9:51:00	44.3	29.7	24.2	972.3	410	430	2	232
15/04/2013	9:56:00	44.4	29.5	24.4	971.9	430	440	2	241
15/04/2013	10:09:00	44.6	29.3	24.9	972.1	440	460	2	259
15/04/2013	10:15:00	44.7	29.8	25.1	971.9	460	480	2	277
15/04/2013	10:20:00	44.9	29.8	25.2	971.7	480	480	2	277

QGC Pty Limited Murdoch 1 - Sample MUR001_016 - 777.810 to 778.150 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	10:30:00	43.8	31.0	25.6	971.7	480	500	2	299
15/04/2013	10:40:00	45.1	32.9	26.2	971.5	500	520	2	313
15/04/2013	10:50:00	45.3	34.1	26.8	971.3	520	540	2	330
15/04/2013	11:00:00	45.3	33.9	27.2	971.3	540	550	2	339
15/04/2013	11:10:00	45.3	33.1	27.5	971.1	550	560	2	348
15/04/2013	11:20:00	45.1	32.3	27.5	971.1	560	570	2	358
15/04/2013	11:35:00	44.7	30.3	27.4	970.9	570	580	2	368
15/04/2013	11:50:00	45.0	37.3	28.2	970.7	580	600	2	385
15/04/2013	12:05:00	45.2	39.5	28.8	970.2	600	630	2	411
15/04/2013	12:20:00	45.2	32.3	28.7	970.0	630	645	2	425
15/04/2013	12:35:00	44.9	33.0	28.4	969.8	645	650	2	430
15/04/2013	12:50:00	45.1	31.1	28.2	969.2	650	665	2	443
15/04/2013	13:05:00	45.1	34.6	28.5	969.4	665	680	2	457
15/04/2013	13:30:00	45.1	41.8	29.3	969.0	680	705	2	479
15/04/2013	14:00:00	45.1	43.4	30.6	968.6	705	740	2	510
15/04/2013	14:30:00	45.1	47.5	32.5	968.0	740	760	2	527
15/04/2013	15:00:00	45.2	43.1	33.4	968.2	760	780	2	544
15/04/2013	15:30:00	44.2	40.1	33.5	967.5	780	800	2	565
15/04/2013	16:00:00	44.1	37.5	32.7	967.9	800	810	2	574
15/04/2013	17:00:00	43.5	30.0	29.9	967.7	810	820	2	585
15/04/2013	18:00:00	42.3	24.3	25.7	969.8	820	840	2	611
15/04/2013	19:00:00	43.9	21.2	24.3	970.0	840	870	2	634
15/04/2013	20:00:00	43.7	19.0	21.9	970.3	870	890	2	655
15/04/2013	21:00:00	43.4	18.1	20.7	971.3	890	910	2	677
15/04/2013	22:00:00	43.2	17.5	20.0	971.3	910	930	2	697
16/04/2013	4:00:00	43.4	17.8	19.8	970.5	930	1050	2	813
16/04/2013	13:15:00	44.3	45.9	28.2	970.0	100	300	2	953
18/04/2013	9:01:00	44.1	26.4	25.6	1015.5	200	380	2	1174
22/04/2013	11:10:00	45.0	27.1	24.2	1013.8	50	435	2	1532
26/04/2013	9:36:00	44.1	26.3	24.5	1023.2	200	350	2	1684
29/04/2013	10:50:00	44.3	27.4	25.2	1023.2	50	150	2	1770
30/04/2013	13:22:00	44.0	27.8	25.4	1021.5	200	210	2	1781
6/05/2013	10:11:00	44.1	25.3	23.4	1023.4	200	280	2	1861
9/05/2013	12:14:00	44.1	26.8	24.9	1027.2	200	230	2	1892
16/05/2013	11:22:00	44.3	23.9	23.0	1015.7	50	140	2	1960
23/05/2013	14:52:00	43.8	25.5	21.8	1008.1	200	260	2	2014
31/05/2013	9:51:00	44.0	23.9	21.7	1028.7	200	195	2	2028
3/06/2013	10:04:00	44.1	24.9	24.1	1017.3	200	230	2	2045
6/06/2013	9:46:00	43.6	22.3	21.9	1027.8	200	205	2	2062
13/06/2013	8:27:00	43.7	24.2	23.1	1012.7	200	220	2	2065
20/06/2013	9:39:00	43.8	21.8	21.2	1022.0	200	210	2	2084
27/06/2013	9:46:00	43.3	23.0	21.7	1014.4	200	215	2	2092
4/07/2013	10:16:00	42.5	25.5	24.5	1022.2	200	190	2	2092
10/07/2013	9:23:00	44.5	22.3	20.9	1032.4	200	200	2	2097
18/07/2013	11:04:00	44.8	23.9	22.5	1024.4	200	220	2	2107
25/07/2013	13:43:00	44.9	26.7	19.9	1025.3	50	70	2	2121


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_016 - 777.810 to 778.150 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
400
300
200
100
0
-100
-200
-300
0
2
4
6
8
10
12
14
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_016 - 777.810 to 778.150 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
3.04
7.13 Days from T Zero
97.2% Methane
1.24% Ethane
0.86% Carbon Dioxide
0% Nitrogen
31.14 Days from T Zero
97.3% Methane
1.27% Ethane
0.78% Carbon Dioxide
0% Nitrogen
101.24 Days from T Zero
95.2% Methane
1.98% Ethane
1.24% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_016GASA
MUR001_016GASB
MUR001_016GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_017 - 782.060 to 782.860 metres

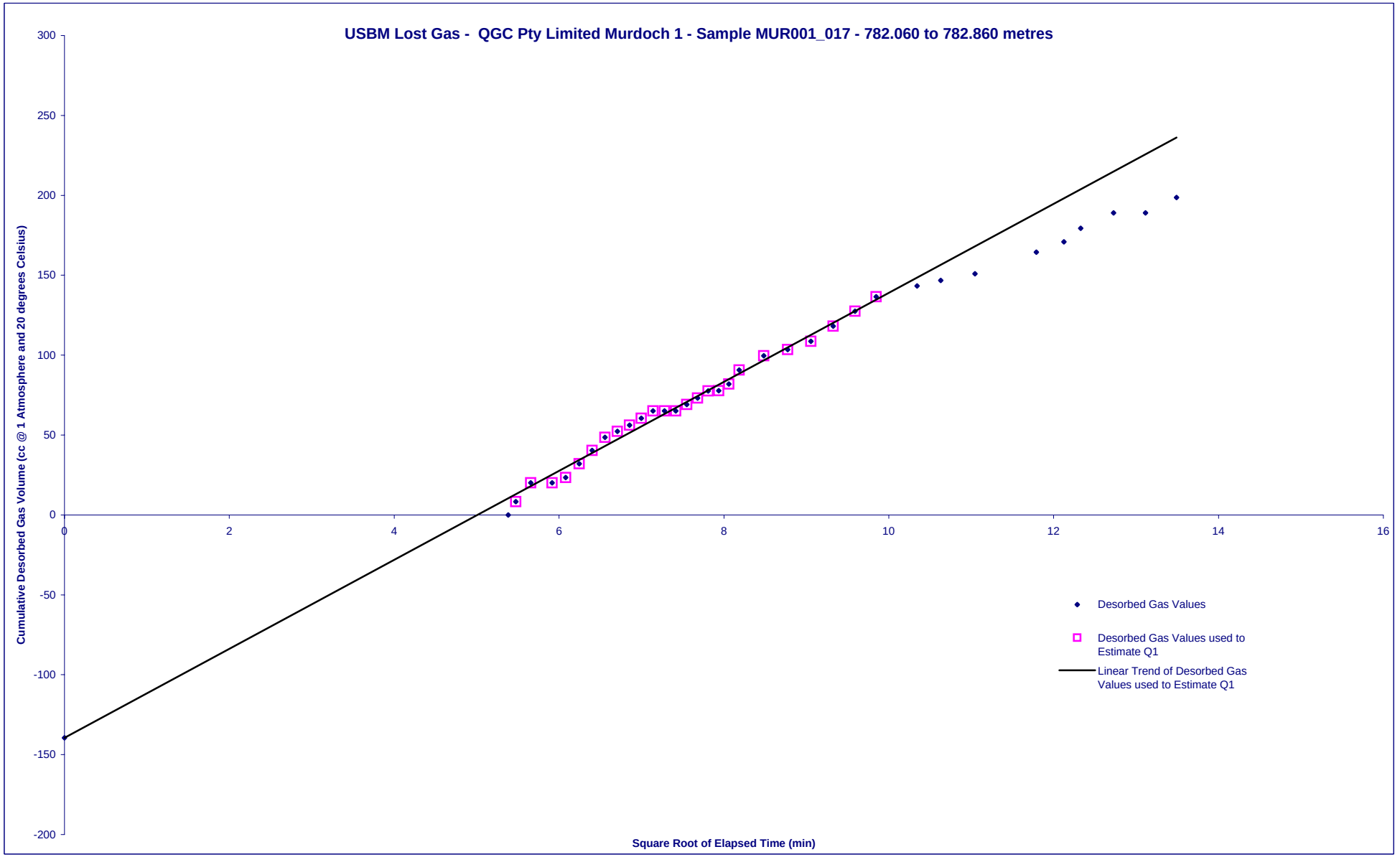
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_017	Sample Type	Core	Sample Top (m)	782.060	Sample Base (m)	782.860	Core Diameter (cm)	6.15
Sample Volume (cc)	2376	Mass (g)	3526	RD (g/cc)	1.57	Moisture (%ad)	3.3	Ash (%ad)	40
Q3 Volume (cc@STP)	22.37	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	3.4	Q3 Ash (%ad)	52
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	55.9	Minimum Q1 Point
Sample Penetrated	15/04/2013	9:01		Formation Pressure (Mpa) @ 0.433 psi/ft	7.66			Surface Time Ratio	0.518	2
Sample Off Bottom	15/04/2013	9:33		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.007	Maximum Q1 Point
Sample at Surface	15/04/2013	9:47		Depth HSP=Formation Pressure (m)	781.11			USBM Q1 - Surface Time Correction	1.15	26
Sample Sealed	15/04/2013	10:02		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	15/04/2013	9:33		Standard Temperature (°C)	20.00	Comments:				35
Last Entry	25/07/2013	14:01		Standard Pressure (hPa)	1013					-139

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.003	0.000	0.000	0.000		
m^3/tonne (raw)	0.04	0.05	0.00	0.98	0.11	1.130	1.140		Time Zero Calculation
SCF/T (raw)	1	1	0	31	4	36.210	36.400		
m^3/tonne (daf)	0.07	0.08	0.00	1.73	0.25	2.05	**2.06**	1.98	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	2	3	0	55	8	66	**66**	63	
Percent of daf total	3.40%	3.89%	0.00%	83.82%	Sorption Time (days)	31.08	Diffusivity (sec^{-1})	3.99866E-06	

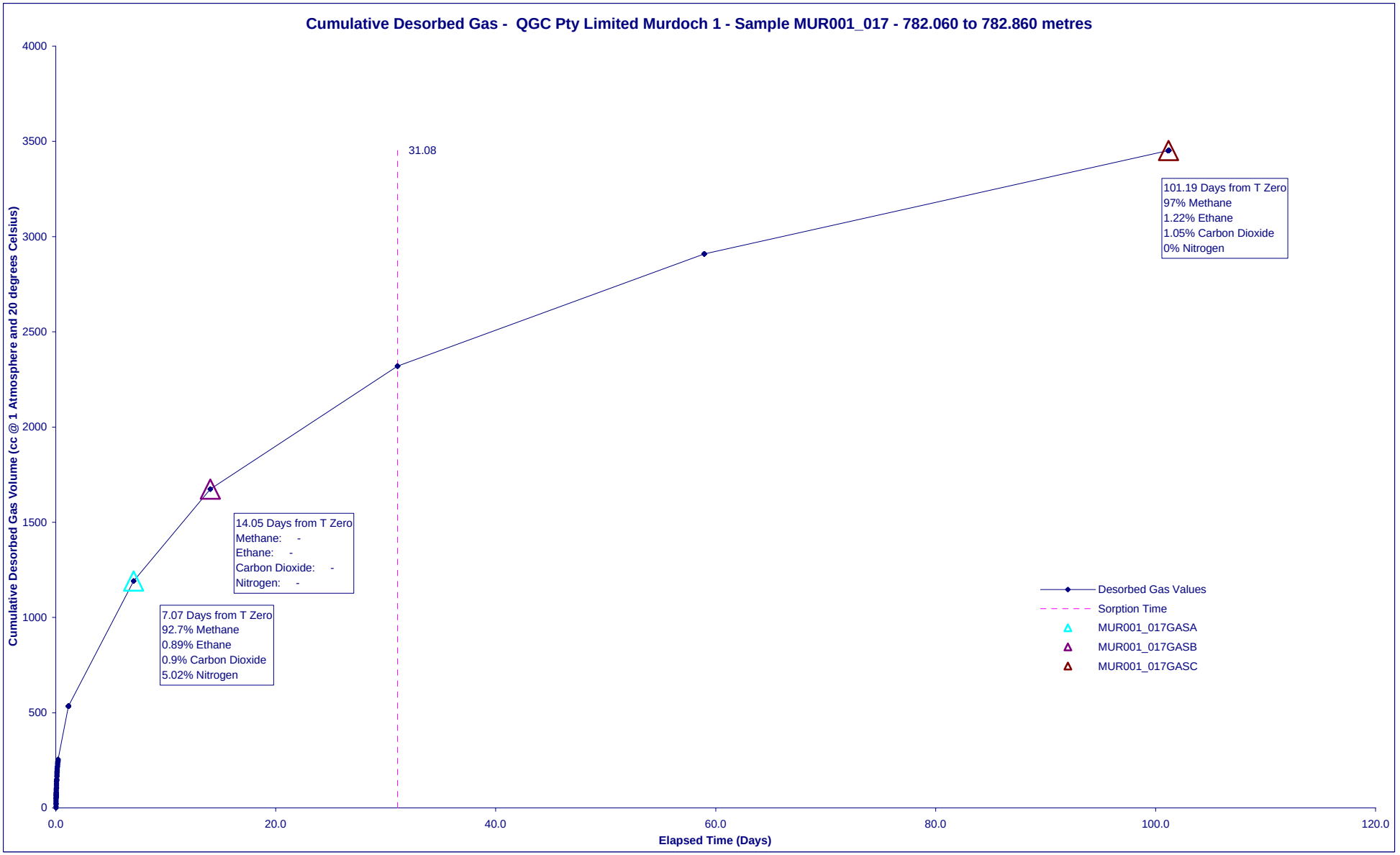
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	10:02:00	34.8	29.3	24.7	972.1	100	100	2	0
15/04/2013	10:03:00	38.0	29.2	24.8	972.1	100	180	2	8
15/04/2013	10:05:00	40.1	29.2	24.8	972.1	180	200	2	20
15/04/2013	10:08:00	41.9	29.2	24.9	971.9	200	205	2	20
15/04/2013	10:10:00	42.3	29.3	24.9	971.9	205	210	2	23
15/04/2013	10:12:00	42.5	29.3	25.0	971.9	210	220	2	32
15/04/2013	10:14:00	42.9	29.9	25.1	972.3	220	230	2	40
15/04/2013	10:16:00	43.1	29.7	25.1	971.9	230	240	2	48
15/04/2013	10:18:00	43.3	29.7	25.2	971.7	240	245	2	52
15/04/2013	10:20:00	43.5	29.8	25.2	971.7	245	250	2	56
15/04/2013	10:22:00	43.6	29.9	25.2	971.7	250	255	2	61
15/04/2013	10:24:00	43.6	29.8	25.3	971.7	255	260	2	65
15/04/2013	10:26:00	43.7	30.1	25.3	971.9	260	260	2	65
15/04/2013	10:28:00	43.7	30.6	25.5	971.7	260	260	2	65
15/04/2013	10:30:00	43.9	31.0	25.6	971.7	260	265	2	69
15/04/2013	10:32:00	44.0	31.8	25.8	971.5	265	270	2	73
15/04/2013	10:34:00	44.0	32.1	25.9	971.5	270	275	2	78
15/04/2013	10:36:00	44.1	32.3	26.0	971.9	275	275	2	78
15/04/2013	10:38:00	44.1	32.6	26.1	971.5	275	280	2	82
15/04/2013	10:40:00	44.2	32.9	26.2	971.5	280	290	2	91
15/04/2013	10:45:00	44.2	33.1	26.5	971.3	290	300	2	100
15/04/2013	10:50:00	44.3	33.9	26.8	970.9	300	305	2	103
15/04/2013	10:55:00	44.2	34.6	27.1	971.3	305	310	2	109
15/04/2013	11:00:00	44.0	33.9	27.2	971.1	310	320	2	118
15/04/2013	11:05:00	43.9	33.9	27.4	971.1	320	330	2	128
15/04/2013	11:10:00	44.0	33.1	27.5	971.3	330	340	2	137
15/04/2013	11:20:00	43.2	32.3	27.5	971.1	340	345	2	143
15/04/2013	11:26:00	43.6	31.1	27.5	971.1	345	350	2	147
15/04/2013	11:35:00	43.5	30.3	27.4	970.5	350	355	2	151
15/04/2013	11:52:00	43.5	37.8	28.2	970.5	355	370	2	164
15/04/2013	12:00:00	44.2	43.8	29.1	970.3	370	380	2	171
15/04/2013	12:05:00	44.3	40.9	28.8	970.2	380	390	2	179

QGC Pty Limited Murdoch 1 - Sample MUR001_017 - 782.060 to 782.860 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	12:15:00	44.1	33.4	28.8	970.0	390	400	2	189
15/04/2013	12:25:00	44.3	32.2	28.5	970.0	400	400	2	189
15/04/2013	12:35:00	44.1	33.0	28.3	970.0	400	410	2	199
15/04/2013	12:45:00	44.1	31.8	28.3	969.6	410	420	2	207
15/04/2013	12:55:00	44.1	30.8	28.0	969.4	420	430	2	216
15/04/2013	13:05:00	44.1	34.5	28.5	969.0	430	430	2	216
15/04/2013	13:20:00	43.9	35.9	29.1	969.0	430	440	2	226
15/04/2013	13:37:00	44.1	48.9	29.6	969.2	440	450	2	234
15/04/2013	13:55:00	43.5	38.0	30.0	968.8	450	455	2	240
15/04/2013	14:10:00	43.8	46.2	31.3	968.8	455	460	2	244
15/04/2013	14:25:00	45.0	47.2	32.2	968.2	460	470	2	248
15/04/2013	14:41:00	45.4	47.4	33.0	967.7	470	480	2	255
15/04/2013	15:00:00	45.1	43.0	33.4	968.2	480	485	2	261
15/04/2013	15:30:00	44.0	40.1	33.5	967.5	485	500	2	277
15/04/2013	16:30:00	42.4	34.0	31.3	967.5	500	505	2	287
15/04/2013	17:00:00	41.8	30.0	29.9	967.7	505	510	2	293
15/04/2013	17:32:00	41.1	26.8	27.6	968.8	510	520	2	306
15/04/2013	18:09:00	40.2	24.3	25.7	969.8	520	520	2	310
15/04/2013	19:00:00	41.9	21.2	24.3	970.0	520	550	2	333
15/04/2013	20:00:00	42.4	19.0	21.9	970.3	550	560	2	342
15/04/2013	21:00:00	41.8	18.1	20.7	971.3	560	580	2	364
15/04/2013	22:00:00	41.5	17.5	20.0	971.3	580	590	2	375
15/04/2013	23:00:00	41.2	16.7	19.1	971.9	590	600	2	386
16/04/2013	0:00:00	41.9	19.3	20.1	971.5	600	620	2	402
16/04/2013	6:00:00	41.9	18.2	19.9	971.7	620	690	2	471
16/04/2013	13:15:00	42.5	45.9	28.2	970.0	100	200	2	534
18/04/2013	9:01:00	42.9	26.4	25.6	1015.5	200	340	2	718
22/04/2013	11:10:00	43.9	27.1	24.2	1013.8	50	550	2	1191
26/04/2013	9:36:00	43.0	26.3	24.5	1023.2	200	500	2	1488
29/04/2013	10:50:00	43.9	27.4	25.2	1023.2	50	260	2	1674
30/04/2013	13:22:00	43.1	27.8	25.4	1021.5	200	255	2	1726
6/05/2013	10:11:00	43.8	25.3	23.4	1023.4	200	450	2	1971
9/05/2013	12:14:00	43.5	26.8	24.9	1027.2	200	315	2	2081
16/05/2013	11:22:00	43.5	23.9	23.0	1015.7	200	460	2	2320
23/05/2013	14:52:00	44.0	25.5	21.8	1008.1	200	410	2	2506
31/05/2013	9:51:00	43.0	23.9	21.7	1028.7	200	345	2	2668
3/06/2013	10:04:00	43.5	24.9	24.1	1017.3	200	295	2	2742
6/06/2013	9:46:00	42.8	22.3	21.9	1027.8	200	260	2	2812
13/06/2013	8:27:00	43.3	24.2	23.1	1012.7	200	320	2	2909
20/06/2013	9:39:00	43.3	21.8	21.2	1022.0	200	315	2	3029
27/06/2013	9:46:00	42.9	23.0	21.7	1014.4	200	360	2	3176
4/07/2013	10:16:00	43.8	25.5	24.5	1022.2	200	280	2	3254
10/07/2013	9:23:00	44.9	22.3	20.9	1032.4	200	300	2	3359
18/07/2013	11:04:00	44.2	23.9	22.5	1024.4	200	220	2	3369
25/07/2013	14:01:00	44.3	25.4	19.9	1025.3	50	140	2	3452


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_017 - 782.060 to 782.860 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
300
250
200
150
100
50
0
-50
-100
-150
-200
0
2
4
6
8
10
12
14
16
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_017 - 782.060 to 782.860 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
4000
3500
3000
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
31.08
101.19 Days from T Zero
97% Methane
1.22% Ethane
1.05% Carbon Dioxide
0% Nitrogen
14.05 Days from T Zero
Methane: -
Ethane: -
Carbon Dioxide: -
Nitrogen: -
7.07 Days from T Zero
92.7% Methane
0.89% Ethane
0.9% Carbon Dioxide
5.02% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_017GASA
MUR001_017GASB
MUR001_017GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_018 - 787.900 to 788.540 metres

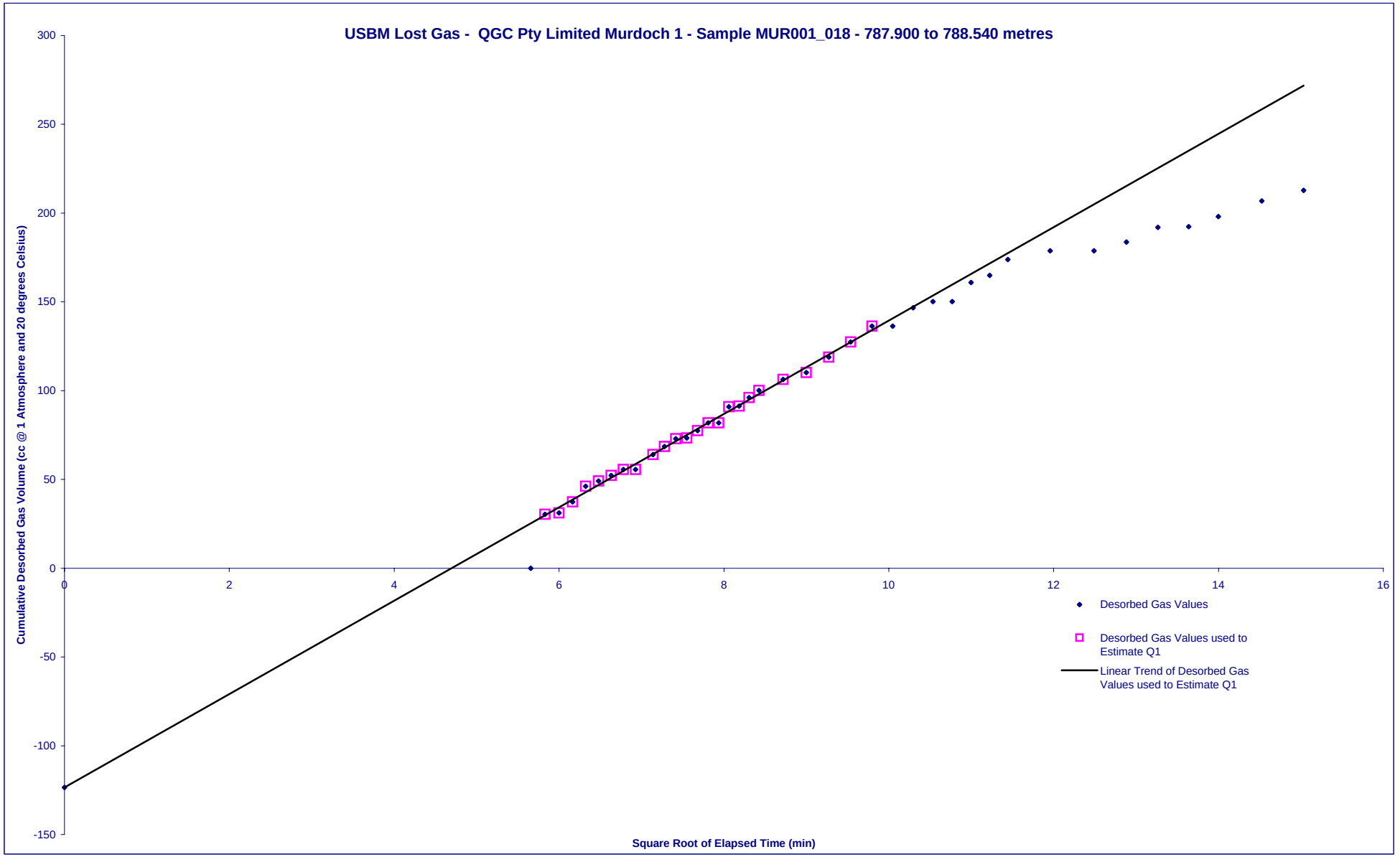
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_018	Sample Type	Core	Sample Top (m)	787.900	Sample Base (m)	788.540	Core Diameter (cm)	6.15
Sample Volume (cc)	1901	Mass (g)	2924	RD (g/cc)	1.63	Moisture (%ad)	3	Ash (%ad)	42.5
Q3 Volume (cc@STP)	33.57	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	3.3	Q3 Ash (%ad)	49.6
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1168		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	56.3	Minimum Q1 Point
Sample Penetrated	15/04/2013	10:37		Formation Pressure (Mpa) @ 0.433 psi/ft	7.72			Surface Time Ratio	0.563	2
Sample Off Bottom	15/04/2013	11:14		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.008	Maximum Q1 Point
Sample at Surface	15/04/2013	11:28		Depth HSP=Formation Pressure (m)	786.94			USBM Q1 - Surface Time Correction	1.18	25
Sample Sealed	15/04/2013	11:46		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	15/04/2013	11:14		Standard Temperature (°C)	20.00	Comments:				40
Last Entry	25/07/2013	14:20		Standard Pressure (hPa)	1013					-123

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.003	0.000	0.000	0.000		
m^3/tonne (raw)	0.04	0.05	0.00	0.87	0.17	1.080	1.090		Time Zero Calculation
SCF/T (raw)	1	2	0	28	5	34.710	34.960		
m^3/tonne (daf)	0.08	0.09	0.00	1.60	0.36	2.04	**2.05**	1.96	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	2	3	0	51	11	65	**66**	63	
Percent of daf total	3.80%	4.46%	0.00%	78.16%	Sorption Time (days)	38.15	Diffusivity (sec^{-1})	5.65474E-06	

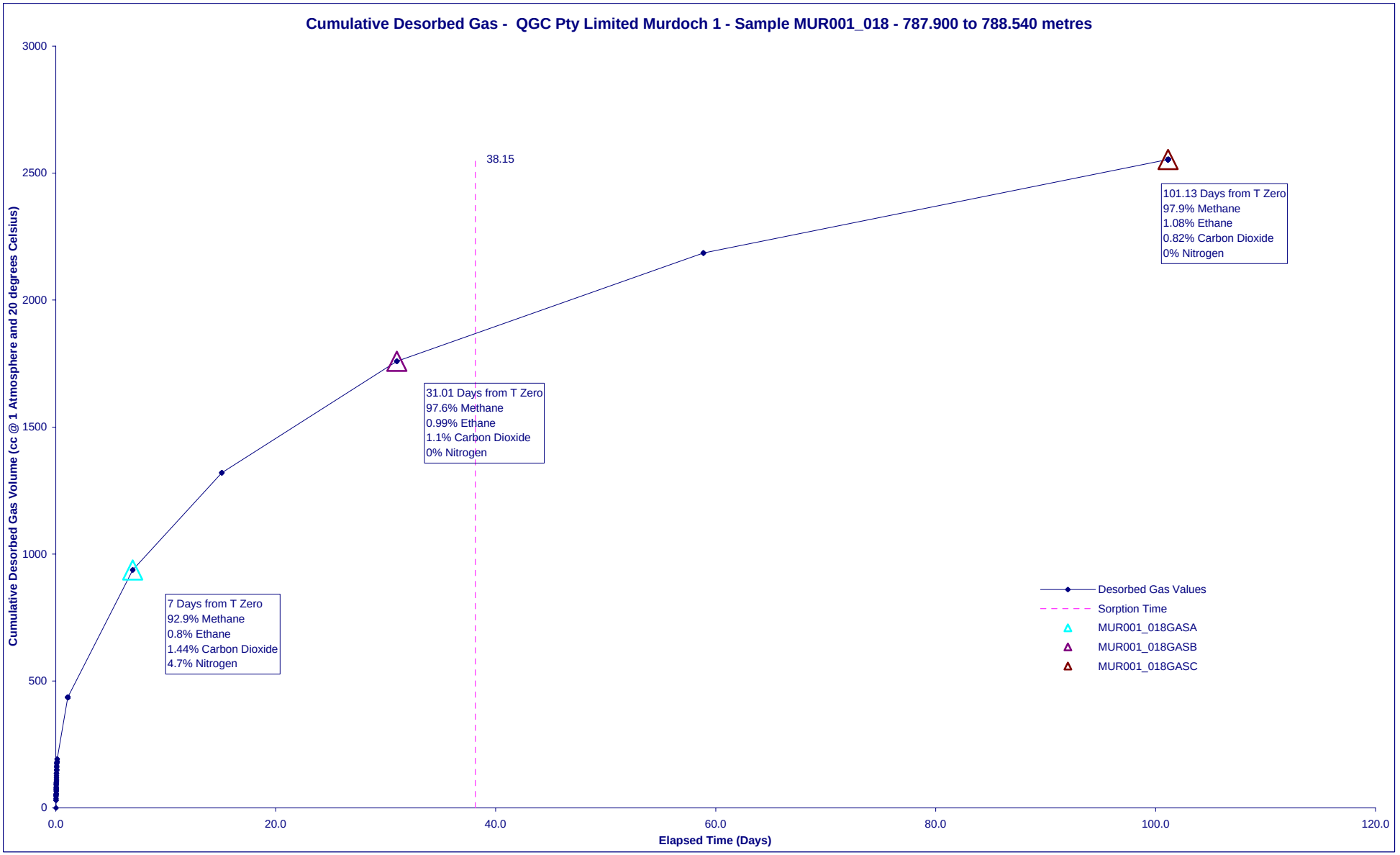
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	11:46:00	39.1	35.4	28.1	970.3	100	100	2	0
15/04/2013	11:48:00	39.7	36.8	28.1	970.3	100	200	2	30
15/04/2013	11:50:00	42.3	37.1	28.2	970.7	200	210	2	31
15/04/2013	11:52:00	43.1	37.5	28.2	970.5	210	220	2	37
15/04/2013	11:54:00	44.5	38.6	28.4	970.5	220	235	2	46
15/04/2013	11:56:00	44.9	40.0	28.7	970.3	235	240	2	49
15/04/2013	11:58:00	45.3	40.6	28.9	970.3	240	245	2	52
15/04/2013	12:00:00	45.6	43.2	29.1	970.2	245	250	2	56
15/04/2013	12:02:00	45.8	44.2	29.2	970.3	250	250	2	56
15/04/2013	12:05:00	45.9	42.7	28.9	970.2	250	260	2	64
15/04/2013	12:07:00	45.9	37.5	28.7	970.2	260	265	2	68
15/04/2013	12:09:00	45.9	36.1	28.7	970.2	265	270	2	73
15/04/2013	12:11:00	45.9	34.6	28.6	970.5	270	270	2	73
15/04/2013	12:13:00	45.9	34.3	28.5	970.2	270	275	2	78
15/04/2013	12:15:00	45.9	33.4	28.8	970.0	275	280	2	82
15/04/2013	12:17:00	45.9	33.0	28.8	970.0	280	280	2	82
15/04/2013	12:19:00	45.9	32.7	28.7	970.0	280	290	2	91
15/04/2013	12:21:00	45.8	32.3	28.6	970.0	290	290	2	91
15/04/2013	12:23:00	45.8	32.2	28.6	970.2	290	295	2	96
15/04/2013	12:25:00	45.9	32.2	28.5	970.0	295	300	2	100
15/04/2013	12:30:00	45.4	31.2	28.3	970.0	300	305	2	106
15/04/2013	12:35:00	45.6	32.9	28.4	970.0	305	310	2	110
15/04/2013	12:40:00	45.7	32.2	28.3	969.8	310	320	2	119
15/04/2013	12:45:00	45.8	31.8	28.3	969.6	320	330	2	127
15/04/2013	12:50:00	45.9	31.1	28.2	969.6	330	340	2	136
15/04/2013	12:55:00	45.9	30.8	28.0	964.4	340	340	2	136
15/04/2013	13:00:00	45.9	32.9	28.2	969.6	340	345	2	147
15/04/2013	13:05:00	46.1	34.5	28.5	969.2	345	350	2	150
15/04/2013	13:10:00	46.2	35.2	28.8	964.2	350	355	2	150
15/04/2013	13:15:00	46.1	35.0	28.8	969.4	355	360	2	161
15/04/2013	13:20:00	46.1	35.9	29.1	969.0	360	365	2	165
15/04/2013	13:25:00	46.1	40.7	29.4	969.0	365	375	2	174

QGC Pty Limited Murdoch 1 - Sample MUR001_018 - 787.900 to 788.540 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	13:37:00	46.0	45.9	29.6	969.2	375	380	2	179
15/04/2013	13:50:00	46.0	40.6	29.9	968.8	380	380	2	179
15/04/2013	14:00:00	45.7	43.0	30.5	968.4	380	385	2	184
15/04/2013	14:10:00	47.3	46.8	31.4	968.6	385	400	2	192
15/04/2013	14:20:00	47.1	46.8	31.9	968.4	400	400	2	192
15/04/2013	14:30:00	48.0	47.8	32.5	968.2	400	410	2	198
15/04/2013	14:45:00	47.9	46.2	33.1	967.9	410	420	2	207
15/04/2013	15:00:00	47.4	42.9	33.4	967.9	420	425	2	213
15/04/2013	15:15:00	47.2	42.9	33.6	968.2	425	430	2	218
15/04/2013	15:30:00	46.1	40.1	33.5	967.5	430	430	2	221
15/04/2013	15:45:00	45.9	37.8	33.1	967.3	430	435	2	226
15/04/2013	16:00:00	46.3	36.6	32.5	967.9	435	440	2	230
15/04/2013	16:15:00	44.1	31.2	31.1	968.0	440	440	2	237
15/04/2013	16:45:00	45.2	33.3	30.9	967.7	440	445	2	238
15/04/2013	17:24:00	42.8	27.3	28.0	968.2	445	445	2	246
15/04/2013	18:09:00	42.9	24.3	25.7	969.8	445	450	2	253
15/04/2013	18:30:00	42.9	22.5	25.2	969.8	450	460	2	262
15/04/2013	19:00:00	44.1	21.2	24.3	970.0	460	460	2	262
15/04/2013	19:30:00	44.3	20.0	21.9	970.3	460	470	2	271
15/04/2013	20:00:00	44.1	19.0	21.9	970.3	470	480	2	282
15/04/2013	21:00:00	43.7	18.1	20.7	971.3	480	490	2	294
15/04/2013	22:00:00	42.9	17.5	20.0	971.3	490	500	2	306
15/04/2013	23:00:00	43.8	16.7	19.1	971.9	500	510	2	314
16/04/2013	0:00:00	44.2	19.3	20.1	971.5	510	520	2	321
16/04/2013	1:00:00	44.6	19.8	20.9	971.3	520	540	2	339
16/04/2013	2:00:00	44.5	19.0	20.6	970.7	540	550	2	348
16/04/2013	3:00:00	43.1	18.1	19.9	970.3	550	560	2	362
16/04/2013	13:15:00	45.1	45.9	28.2	970.0	100	210	2	435
18/04/2013	9:01:00	43.7	26.4	25.6	1015.5	200	275	2	565
22/04/2013	11:10:00	44.7	27.1	24.2	1013.8	50	445	2	937
26/04/2013	9:36:00	44.2	26.3	24.5	1023.2	200	415	2	1152
29/04/2013	10:50:00	43.1	27.4	25.2	1023.2	50	205	2	1294
30/04/2013	13:22:00	43.4	27.8	25.4	1021.5	200	230	2	1320
6/05/2013	10:11:00	42.8	25.3	23.4	1023.4	200	390	2	1511
9/05/2013	12:14:00	43.6	26.8	24.9	1027.2	200	280	2	1584
16/05/2013	11:22:00	43.4	23.9	23.0	1015.7	50	250	2	1759
23/05/2013	14:52:00	44.3	25.5	21.8	1008.1	200	360	2	1901
31/05/2013	9:51:00	43.2	23.9	21.7	1028.7	200	290	2	2012
3/06/2013	10:04:00	43.5	24.9	24.1	1017.3	200	275	2	2068
6/06/2013	9:46:00	42.9	22.3	21.9	1027.8	200	240	2	2120
13/06/2013	8:27:00	43.9	24.2	23.1	1012.7	200	290	2	2185
20/06/2013	9:39:00	42.9	21.8	21.2	1022.0	200	285	2	2281
27/06/2013	9:46:00	43.3	23.0	21.7	1014.4	200	290	2	2356
4/07/2013	10:16:00	43.4	25.5	24.5	1022.2	200	250	2	2410
10/07/2013	9:23:00	45.4	22.3	20.9	1032.4	200	265	2	2478
18/07/2013	11:04:00	44.7	23.9	22.5	1024.4	200	220	2	2489
25/07/2013	14:20:00	44.4	24.9	19.9	1025.3	50	120	2	2553


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_018 - 787.900 to 788.540 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
300
250
200
150
100
50
0
-50
-100
-150
0
2
4
6
8
10
12
14
16
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_018 - 787.900 to 788.540 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
3000
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
38.15
7 Days from T Zero
92.9% Methane
0.8% Ethane
1.44% Carbon Dioxide
4.7% Nitrogen
31.01 Days from T Zero
97.6% Methane
0.99% Ethane
1.1% Carbon Dioxide
0% Nitrogen
101.13 Days from T Zero
97.9% Methane
1.08% Ethane
0.82% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_018GASA
MUR001_018GASB
MUR001_018GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_019 - 803.370 to 803.670 metres

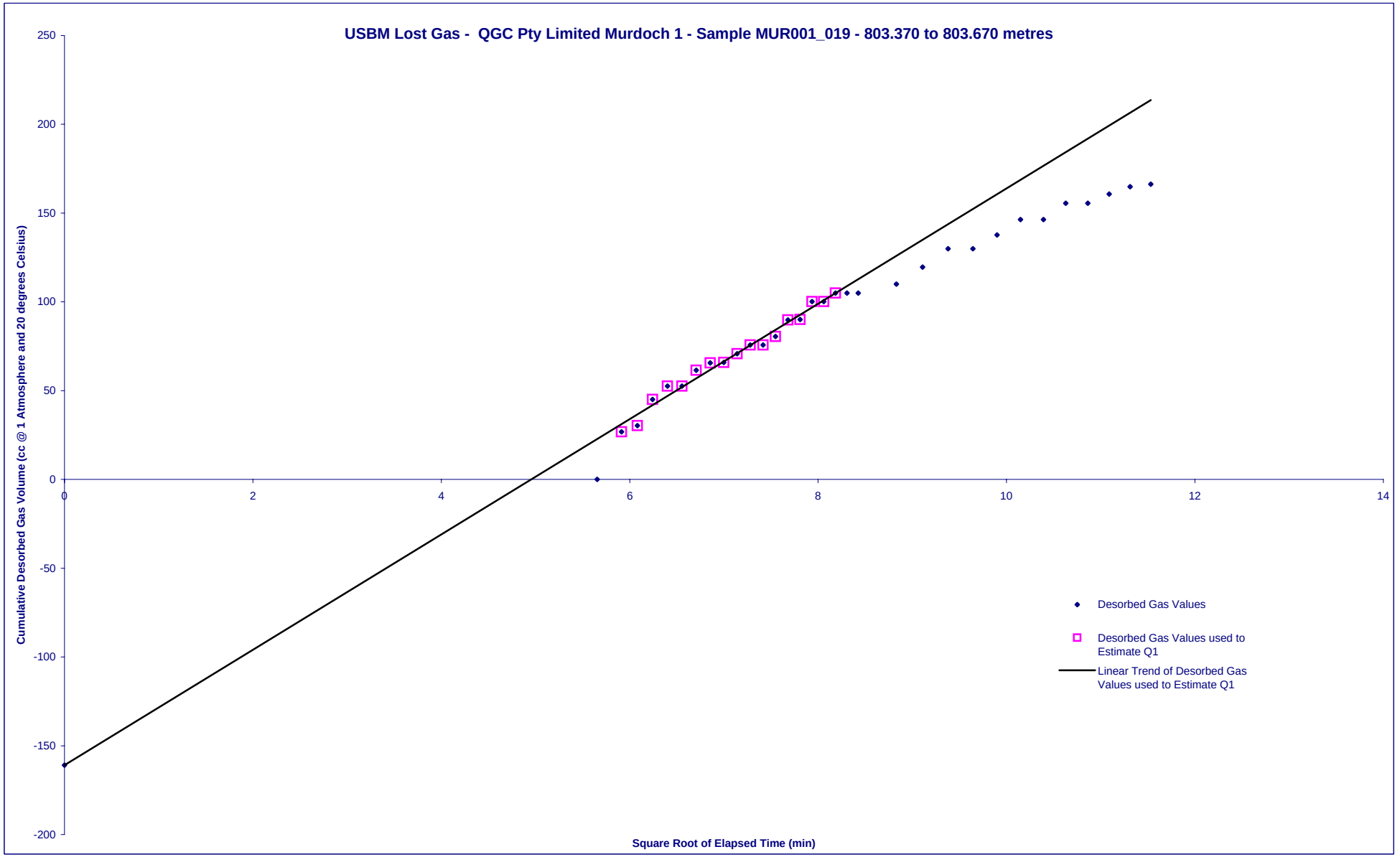
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_019	Sample Type	Core	Sample Top (m)	803.370	Sample Base (m)	803.670	Core Diameter (cm)	6.15
Sample Volume (cc)	891	Mass (g)	1424	RD (g/cc)	1.74	Moisture (%ad)	7.2	Ash (%ad)	50.5
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	8.3	Q3 Ash (%ad)	61.4
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1168		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	44.6	Minimum Q1 Point
Sample Penetrated	15/04/2013	16:02		Formation Pressure (Mpa) @ 0.433 psi/ft	7.87			Surface Time Ratio	0.438	2
Sample Off Bottom	15/04/2013	16:42		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.050	Maximum Q1 Point
Sample at Surface	15/04/2013	17:00		Depth HSP=Formation Pressure (m)	802.39			USBM Q1 - Surface Time Correction	1.11	18
Sample Sealed	15/04/2013	17:14		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	15/04/2013	16:42		Standard Temperature (°C)	20.00	Comments:				32
Last Entry	25/07/2013	14:39		Standard Pressure (hPa)	1013					-161

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.001	0.000	0.000	0.000		
m^3/tonne (raw)	0.11	0.13	0.00	0.94	0.00	1.050	1.070		Time Zero Calculation
SCF/T (raw)	4	4	0	30	0	33.830	34.230		
m^3/tonne (daf)	0.27	0.30	0.00	2.23	0.00	2.50	**2.53**	2.23	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	9	10	0	71	0	80	**81**	71	
Percent of daf total	10.69%	11.72%	0.00%	88.11%	Sorption Time (days)	10.70	Diffusivity (sec^{-1})	3.97870E-05	

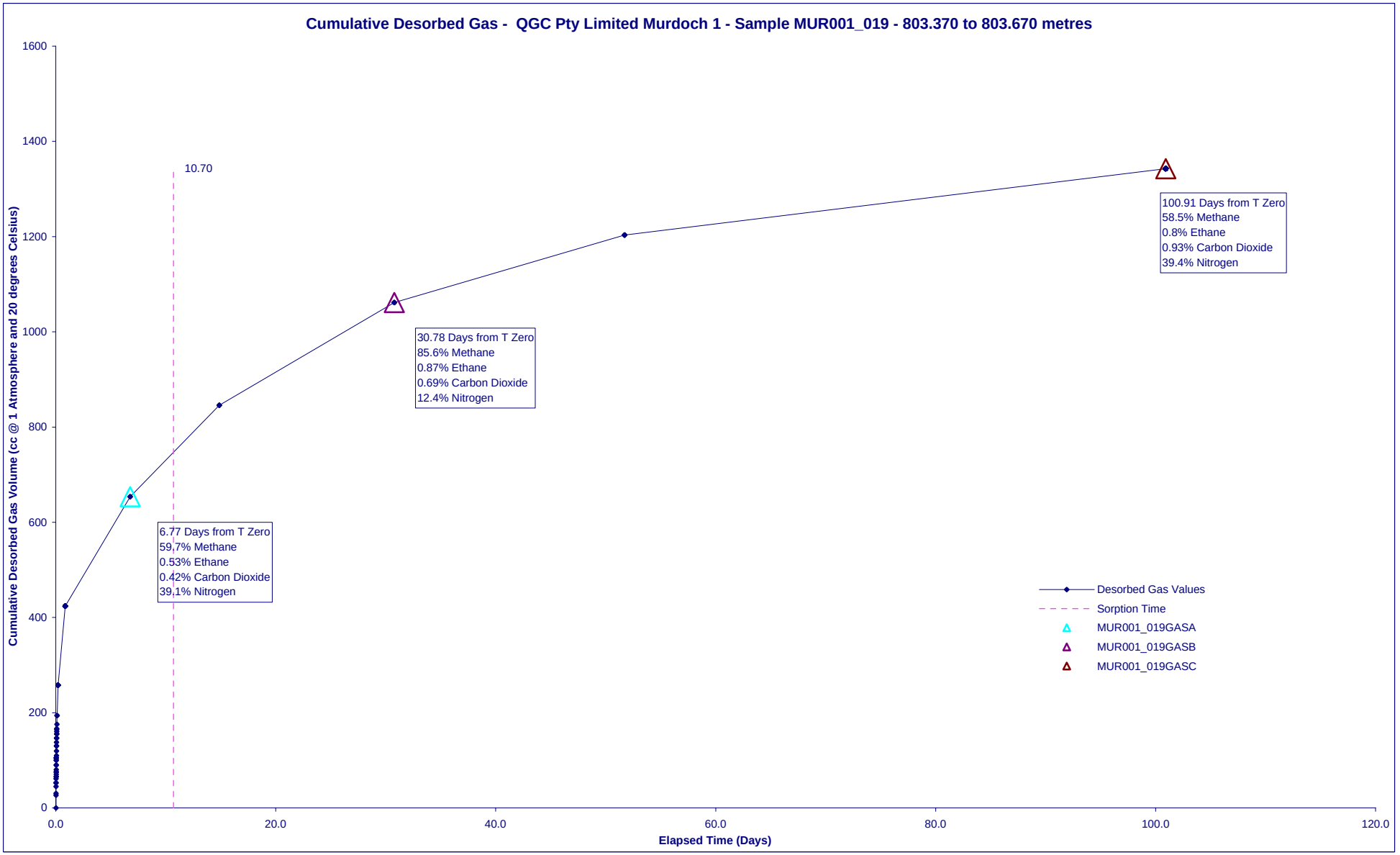
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	17:14:00	35.6	28.2	29.0	968.4	100	100	2	0
15/04/2013	17:17:00	40.0	28.0	28.7	968.6	100	210	2	27
15/04/2013	17:19:00	41.7	27.8	28.4	968.6	210	220	2	30
15/04/2013	17:21:00	42.8	27.5	28.2	968.6	220	240	2	45
15/04/2013	17:23:00	43.3	27.4	28.1	968.6	240	250	2	53
15/04/2013	17:25:00	43.7	27.3	27.9	968.8	250	250	2	53
15/04/2013	17:27:00	43.8	27.2	27.9	968.8	250	260	2	62
15/04/2013	17:29:00	43.9	27.1	27.8	968.6	260	265	2	66
15/04/2013	17:31:00	43.9	26.9	27.7	968.8	265	265	2	66
15/04/2013	17:33:00	43.8	26.7	27.5	968.8	265	270	2	71
15/04/2013	17:35:00	43.8	26.5	27.5	969.0	270	275	2	76
15/04/2013	17:37:00	43.8	26.3	27.3	969.0	275	275	2	76
15/04/2013	17:39:00	43.7	26.3	27.2	968.8	275	280	2	80
15/04/2013	17:41:00	43.7	26.1	27.1	968.8	280	290	2	90
15/04/2013	17:43:00	43.6	25.9	26.9	968.8	290	290	2	90
15/04/2013	17:45:00	43.5	25.8	26.9	969.2	290	300	2	100
15/04/2013	17:47:00	43.5	25.6	26.8	969.2	300	300	2	100
15/04/2013	17:49:00	43.5	25.5	26.7	969.2	300	305	2	105
15/04/2013	17:51:00	43.5	25.4	26.5	969.0	305	305	2	105
15/04/2013	17:53:00	43.5	25.3	26.5	969.0	305	305	2	105
15/04/2013	18:00:00	43.5	25.1	26.2	969.4	305	310	2	110
15/04/2013	18:05:00	43.4	24.8	26.0	969.2	310	320	2	120
15/04/2013	18:10:00	43.3	24.3	25.7	969.8	320	330	2	130
15/04/2013	18:15:00	43.8	23.9	25.5	969.6	330	330	2	130
15/04/2013	18:20:00	44.3	23.4	25.3	969.6	330	340	2	138
15/04/2013	18:25:00	44.5	22.5	25.2	969.6	340	350	2	146
15/04/2013	18:30:00	44.7	22.5	25.2	969.8	350	350	2	146
15/04/2013	18:35:00	44.8	22.3	25.1	969.8	350	360	2	156
15/04/2013	18:40:00	44.8	22.1	25.0	969.8	360	360	2	156
15/04/2013	18:45:00	44.8	21.8	24.6	970.2	360	365	2	161
15/04/2013	18:50:00	44.9	21.5	24.5	970.0	365	370	2	165
15/04/2013	18:55:00	44.5	21.2	24.3	970.0	370	370	2	166

QGC Pty Limited Murdoch 1 - Sample MUR001_019 - 803.370 to 803.670 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	19:00:00	44.6	21.2	24.3	970.0	370	380	2	175
15/04/2013	19:18:00	44.8	20.2	23.5	970.3	380	400	2	194
15/04/2013	19:30:00	45.1	20.0	21.9	970.3	400	400	2	194
15/04/2013	19:40:00	45.1	19.8	22.7	970.5	400	410	2	204
15/04/2013	19:50:00	44.9	19.3	22.2	970.7	410	410	2	205
15/04/2013	20:00:00	44.1	19.0	21.9	970.3	410	420	2	217
15/04/2013	20:10:00	45.0	18.8	21.6	970.9	420	420	2	217
15/04/2013	20:25:00	44.9	18.5	21.3	970.9	420	430	2	227
15/04/2013	20:40:00	44.8	18.1	20.9	971.1	430	430	2	227
15/04/2013	20:55:00	44.8	18.1	20.8	971.5	430	440	2	238
15/04/2013	21:10:00	44.7	17.9	20.5	971.3	440	450	2	247
15/04/2013	21:25:00	44.9	17.6	20.2	971.3	450	450	2	247
15/04/2013	21:45:00	44.7	17.5	20.1	971.5	450	460	2	258
15/04/2013	22:00:00	44.6	17.5	20.0	971.3	460	460	2	258
15/04/2013	22:30:00	44.8	16.9	19.6	971.7	460	470	2	267
15/04/2013	23:00:00	44.5	16.7	19.1	971.9	470	470	2	269
15/04/2013	23:30:00	44.6	18.9	19.8	970.9	470	480	2	277
16/04/2013	0:00:00	44.7	19.3	20.1	971.5	480	490	2	287
16/04/2013	0:30:00	45.0	19.8	20.4	971.1	490	500	2	295
16/04/2013	1:00:00	45.3	19.8	20.9	971.3	500	510	2	304
16/04/2013	2:00:00	44.8	19.0	20.6	970.7	510	520	2	314
16/04/2013	3:00:00	43.2	18.1	19.9	970.3	520	530	2	329
16/04/2013	4:00:00	44.3	17.8	19.8	970.5	530	540	2	335
16/04/2013	5:00:00	44.5	18.2	19.5	970.7	540	550	2	344
16/04/2013	6:00:00	44.3	18.3	19.9	971.5	550	560	2	356
16/04/2013	7:07:00	43.8	18.5	19.7	972.3	560	570	2	368
16/04/2013	13:15:00	44.9	45.9	28.2	970.0	100	190	2	424
18/04/2013	9:01:00	42.1	26.4	25.6	1015.5	200	220	2	506
22/04/2013	11:10:00	43.0	27.1	24.2	1013.8	50	215	2	654
26/04/2013	9:36:00	43.8	26.3	24.5	1023.2	200	290	2	750
29/04/2013	10:50:00	42.1	27.4	25.2	1023.2	50	135	2	830
30/04/2013	13:22:00	43.2	27.8	25.4	1021.5	200	220	2	846
6/05/2013	10:11:00	43.1	25.3	23.4	1023.4	200	310	2	956
9/05/2013	12:14:00	43.3	26.8	24.9	1027.2	200	230	2	985
16/05/2013	11:22:00	43.6	23.9	23.0	1015.7	50	150	2	1062
23/05/2013	14:52:00	44.3	25.5	21.8	1008.1	200	265	2	1115
31/05/2013	9:51:00	42.9	23.9	21.7	1028.7	200	215	2	1157
3/06/2013	10:04:00	43.1	24.9	24.1	1017.3	200	240	2	1181
6/06/2013	9:46:00	42.8	22.3	21.9	1027.8	200	210	2	1203
13/06/2013	8:27:00	43.4	24.2	23.1	1012.7	200	235	2	1217
20/06/2013	9:39:00	43.3	21.8	21.2	1022.0	200	220	2	1247
27/06/2013	9:46:00	43.4	23.0	21.7	1014.4	200	235	2	1271
4/07/2013	10:16:00	43.3	25.5	24.5	1022.2	200	200	2	1279
10/07/2013	9:23:00	44.8	22.3	20.9	1032.4	200	220	2	1306
18/07/2013	11:04:00	44.6	23.9	22.5	1024.4	200	220	2	1316
25/07/2013	14:39:00	42.6	24.9	20.1	1025.3	50	75	2	1343


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_019 - 803.370 to 803.670 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
250
200
150
100
50
0
-50
-100
-150
-200
0
2
4
6
8
10
12
14
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_019 - 803.370 to 803.670 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
1600
1400
1200
1000
800
600
400
200
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
10.70
6.77 Days from T Zero
59,7% Methane
0.53% Ethane
0.42% Carbon Dioxide
39,1% Nitrogen
30.78 Days from T Zero
85.6% Methane
0.87% Ethane
0.69% Carbon Dioxide
12.4% Nitrogen
100.91 Days from T Zero
58.5% Methane
0.8% Ethane
0.93% Carbon Dioxide
39.4% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_019GASA
MUR001_019GASB
MUR001_019GASC

EARTH DATA

QGC Pty Limited Murdoch 1 - Sample MUR001_020 - 807.290 to 808.090 metres

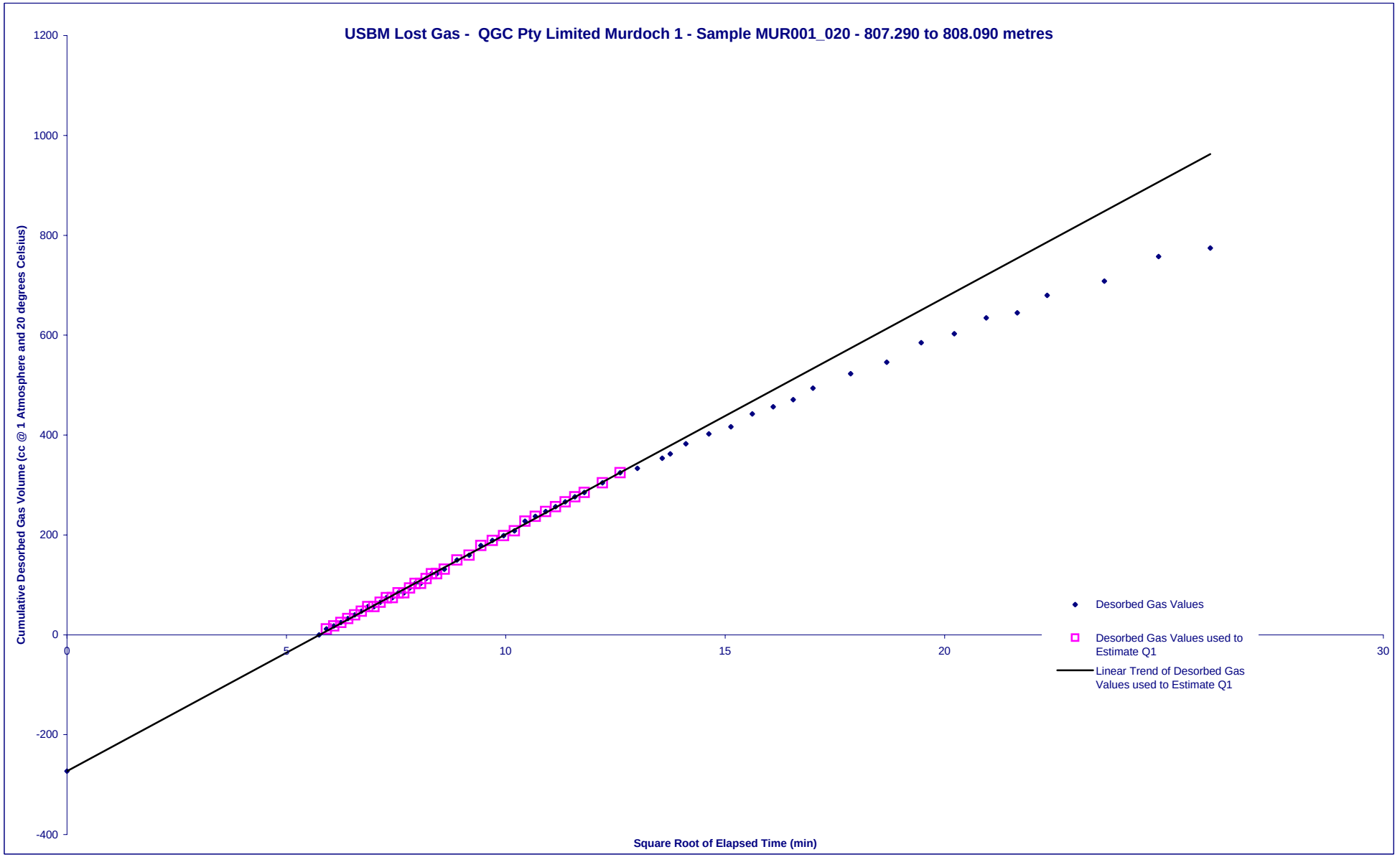
Hole Name	Murdoch 1		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_020	Sample Type	Core	Sample Top (m)	807.290	Sample Base (m)	808.090	Core Diameter (cm)	6.15
Sample Volume (cc)	2376	Mass (g)	3548	RD (g/cc)	1.66	Moisture (%ad)	6.4	Ash (%ad)	43.5
Q3 Volume (cc@STP)	0.00	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	9.2	Q3 Ash (%ad)	47.6
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1079		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	50.5	Minimum Q1 Point
Sample Penetrated	15/04/2013	17:46		Formation Pressure (Mpa) @ 0.433 psi/ft	7.91			Surface Time Ratio	0.515	2
Sample Off Bottom	15/04/2013	18:41		Formation Pressure Gradient (psi/ft)	0.433			Lost Time Ratio	0.056	Maximum Q1 Point
Sample at Surface	15/04/2013	18:57		Depth HSP=Formation Pressure (m)	806.31			USBM Q1 - Surface Time Correction	1.15	36
Sample Sealed	15/04/2013	19:14		Formation Temperature (°C)				Smith & Williams Q1 - Q2 Multiplier	1.000	Q1 Points Plotted
Time Zero	15/04/2013	18:41		Standard Temperature (°C)	20.00	Comments:				56
Last Entry	25/07/2013	14:57		Standard Pressure (hPa)	1013					-273

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.003	0.000	0.000	0.000		
m^3/tonne (raw)	0.08	0.09	0.00	0.86	0.00	0.940	0.950		Time Zero Calculation
SCF/T (raw)	2	3	0	28	0	29.990	30.360		
m^3/tonne (daf)	0.15	0.18	0.00	1.71	0.00	1.86	**1.89**	1.71	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	5	6	0	55	0	60	**61**	55	
Percent of daf total	8.26%	9.35%	0.00%	90.71%	Sorption Time (days)	13.67	Diffusivity (sec^{-1})	1.73736E-05	

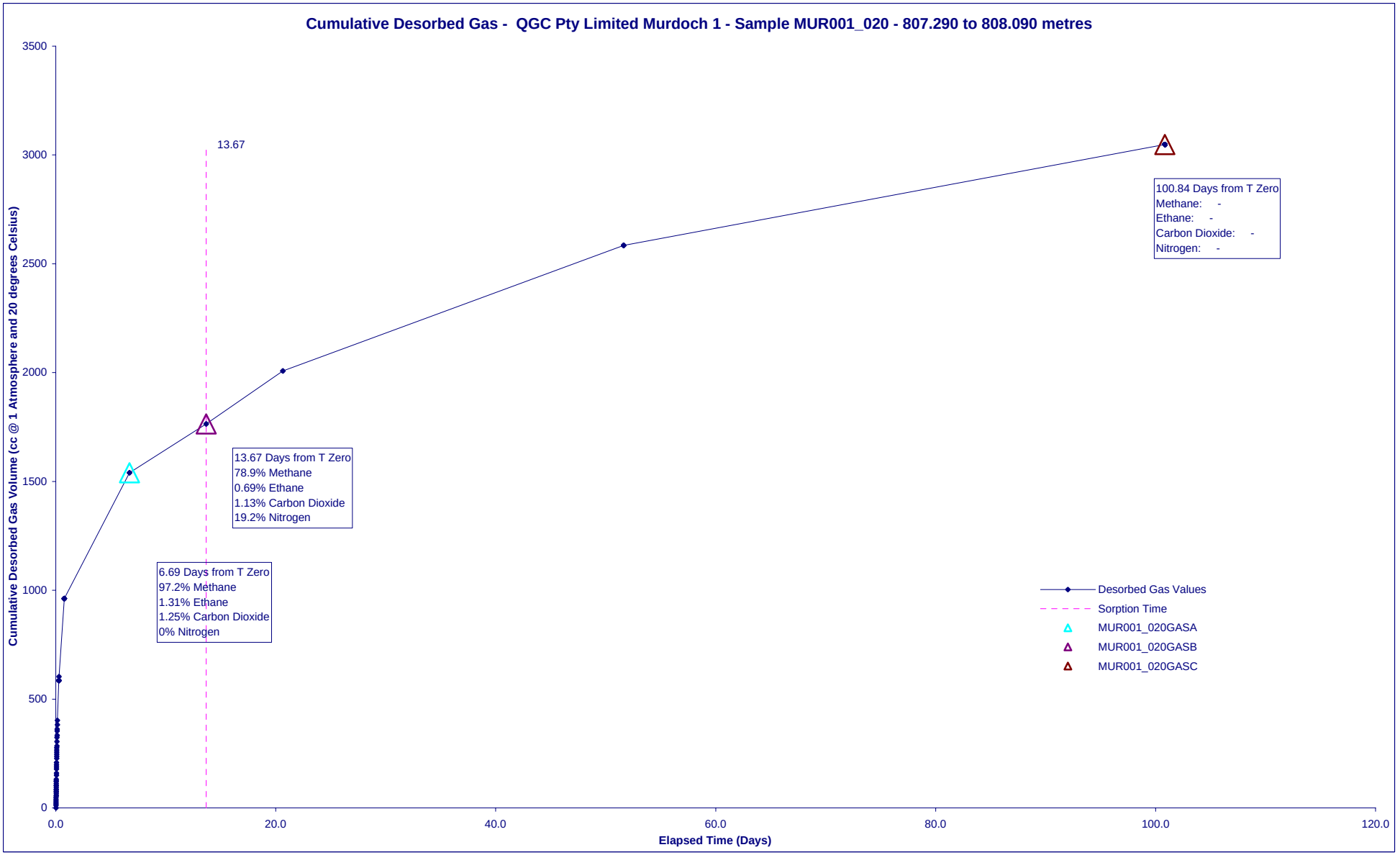
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	19:14:00	32.9	20.3	23.9	970.3	100	100	2	0
15/04/2013	19:16:00	37.8	20.3	23.9	970.3	100	190	2	12
15/04/2013	19:18:00	38.9	20.2	23.6	970.2	190	200	2	18
15/04/2013	19:20:00	39.8	20.2	23.4	970.3	200	210	2	24
15/04/2013	19:22:00	40.3	20.2	23.2	970.3	210	220	2	32
15/04/2013	19:24:00	40.9	20.1	23.1	970.2	220	230	2	40
15/04/2013	19:26:00	41.4	20.1	23.0	970.0	230	240	2	47
15/04/2013	19:28:00	41.6	20.0	22.9	970.3	240	250	2	56
15/04/2013	19:30:00	41.9	20.0	22.9	970.3	250	250	2	56
15/04/2013	19:32:00	42.1	19.9	22.6	970.3	250	260	2	65
15/04/2013	19:34:00	42.3	19.9	22.8	970.3	260	270	2	74
15/04/2013	19:36:00	42.4	19.9	22.7	970.3	270	270	2	74
15/04/2013	19:38:00	42.5	19.8	22.6	970.9	270	280	2	84
15/04/2013	19:40:00	42.7	19.8	22.7	970.5	280	280	2	84
15/04/2013	19:42:00	42.7	19.7	22.6	970.5	280	290	2	93
15/04/2013	19:44:00	42.7	19.5	22.6	970.5	290	300	2	103
15/04/2013	19:46:00	42.8	19.5	22.6	970.5	300	300	2	103
15/04/2013	19:48:00	42.8	19.3	22.3	970.5	300	310	2	113
15/04/2013	19:50:00	42.8	19.3	22.2	970.7	310	320	2	122
15/04/2013	19:52:00	42.8	19.2	22.1	970.7	320	320	2	122
15/04/2013	19:55:00	42.9	19.2	22.0	970.7	320	330	2	131
15/04/2013	20:00:00	43.0	19.0	21.9	970.3	330	350	2	150
15/04/2013	20:05:00	43.1	18.9	21.8	970.7	350	360	2	159
15/04/2013	20:10:00	43.1	18.8	21.6	970.9	360	380	2	179
15/04/2013	20:15:00	43.0	18.7	21.5	970.9	380	390	2	189
15/04/2013	20:20:00	43.0	18.5	21.3	970.9	390	400	2	198
15/04/2013	20:25:00	42.9	18.5	21.3	970.9	400	410	2	208
15/04/2013	20:30:00	42.9	18.3	21.2	970.9	410	430	2	227
15/04/2013	20:35:00	42.9	18.2	21.1	970.9	430	440	2	237
15/04/2013	20:40:00	42.9	18.1	20.9	971.1	440	450	2	247
15/04/2013	20:45:00	42.9	18.0	20.8	971.1	450	460	2	256
15/04/2013	20:50:00	42.9	18.1	20.8	971.1	460	470	2	266

QGC Pty Limited Murdoch 1 - Sample MUR001_020 - 807.290 to 808.090 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	20:55:00	42.9	18.1	20.8	971.5	470	480	2	276
15/04/2013	21:00:00	43.1	18.1	20.7	971.3	480	490	2	285
15/04/2013	21:10:00	43.0	17.9	20.5	971.3	490	510	2	304
15/04/2013	21:20:00	42.9	17.5	20.2	971.5	510	530	2	324
15/04/2013	21:30:00	43.0	17.7	20.2	971.3	530	540	2	333
15/04/2013	21:45:00	42.9	17.5	20.1	971.5	540	560	2	353
15/04/2013	21:50:00	43.0	17.5	20.1	971.3	560	570	2	362
15/04/2013	22:00:00	42.8	17.5	20.0	971.3	570	590	2	382
15/04/2013	22:15:00	42.8	17.1	19.7	971.5	590	610	2	402
15/04/2013	22:30:00	41.4	16.9	19.6	971.7	610	620	2	417
15/04/2013	22:45:00	42.4	16.9	19.2	971.5	620	650	2	442
15/04/2013	23:00:00	41.2	16.7	19.1	971.9	650	660	2	456
15/04/2013	23:15:00	42.5	18.4	19.5	971.5	660	680	2	471
15/04/2013	23:30:00	41.3	18.9	19.8	970.9	680	700	2	494
16/04/2013	0:00:00	41.4	19.3	20.1	971.5	700	730	2	523
16/04/2013	0:30:00	43.1	19.8	20.4	971.1	730	760	2	546
16/04/2013	1:00:00	43.0	19.8	20.9	971.3	760	800	2	585
16/04/2013	1:30:00	43.5	20.4	21.2	971.3	800	820	2	603
16/04/2013	2:00:00	42.5	19.0	20.6	970.7	820	850	2	635
16/04/2013	2:30:00	42.5	18.5	20.3	971.1	850	860	2	645
16/04/2013	3:00:00	40.5	18.1	19.9	970.3	860	890	2	680
16/04/2013	4:00:00	40.8	17.8	19.8	970.5	890	920	2	708
16/04/2013	5:00:00	40.7	18.2	19.5	970.7	920	970	2	758
16/04/2013	6:00:00	41.9	18.3	19.9	971.9	970	990	2	775
16/04/2013	7:07:00	41.9	18.6	19.7	972.3	990	1030	2	814
16/04/2013	8:04:00	41.2	22.0	20.9	972.5	1030	1060	2	846
16/04/2013	9:14:00	40.8	25.1	23.2	972.7	1060	1110	2	895
16/04/2013	13:15:00	43.4	45.9	28.2	970.0	50	180	2	963
18/04/2013	9:04:00	41.8	26.3	25.6	1015.3	200	550	2	1360
22/04/2013	11:16:00	43.1	26.9	24.2	1013.8	50	260	2	1540
26/04/2013	9:37:00	42.9	26.3	24.4	1023.0	200	370	2	1715
29/04/2013	10:51:00	42.1	27.4	25.3	1021.5	200	255	2	1764
30/04/2013	13:24:00	42.1	27.6	25.3	1026.5	200	255	2	1821
6/05/2013	10:12:00	42.3	25.3	23.4	1023.4	200	395	2	2008
9/05/2013	12:15:00	42.3	26.8	24.8	1027.2	200	310	2	2113
16/05/2013	11:22:00	42.3	23.9	23.0	1015.7	200	380	2	2274
23/05/2013	14:54:00	42.7	25.4	22.0	1008.3	200	330	2	2384
31/05/2013	9:52:00	42.1	23.7	21.7	1028.9	200	270	2	2473
3/06/2013	10:07:00	42.1	24.7	24.1	1017.3	200	270	2	2527
6/06/2013	9:46:00	42.5	22.3	21.9	1027.8	200	250	2	2584
13/06/2013	8:27:00	42.3	24.2	23.1	1012.7	200	285	2	2650
20/06/2013	9:39:00	41.9	21.8	21.2	1022.6	200	275	2	2733
27/06/2013	9:46:00	42.3	23.0	21.7	1014.4	200	280	2	2799
4/07/2013	10:16:00	42.4	25.5	24.5	1022.2	200	250	2	2853
10/07/2013	9:23:00	44.1	22.3	20.9	1032.4	200	260	2	2917
18/07/2013	11:06:00	43.4	23.8	22.5	1024.4	200	270	2	2978
25/07/2013	14:57:00	42.5	25.1	20.1	1025.3	50	125	2	3048


USBM Lost Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_020 - 807.290 to 808.090 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
1200
1000
800
600
400
200
0
-200
-400
0
5
10
15
20
30
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 - Sample MUR001_020 - 807.290 to 808.090 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
3500
3000
2500
2000
1500
1000
500
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
13.67
100.84 Days from T Zero
Methane: -
Ethane: -
Carbon Dioxide: -
Nitrogen: -
13.67 Days from T Zero
78.9% Methane
0.69% Ethane
1.13% Carbon Dioxide
19.2% Nitrogen
6.69 Days from T Zero
97.2% Methane
1.31% Ethane
1.25% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_020GASA
MUR001_020GASB
MUR001_020GASC

EARTH DATA

QGC Pty Limited Murdoch 1 Express - Sample MUR001_021 - 808.090 to 808.790 metres

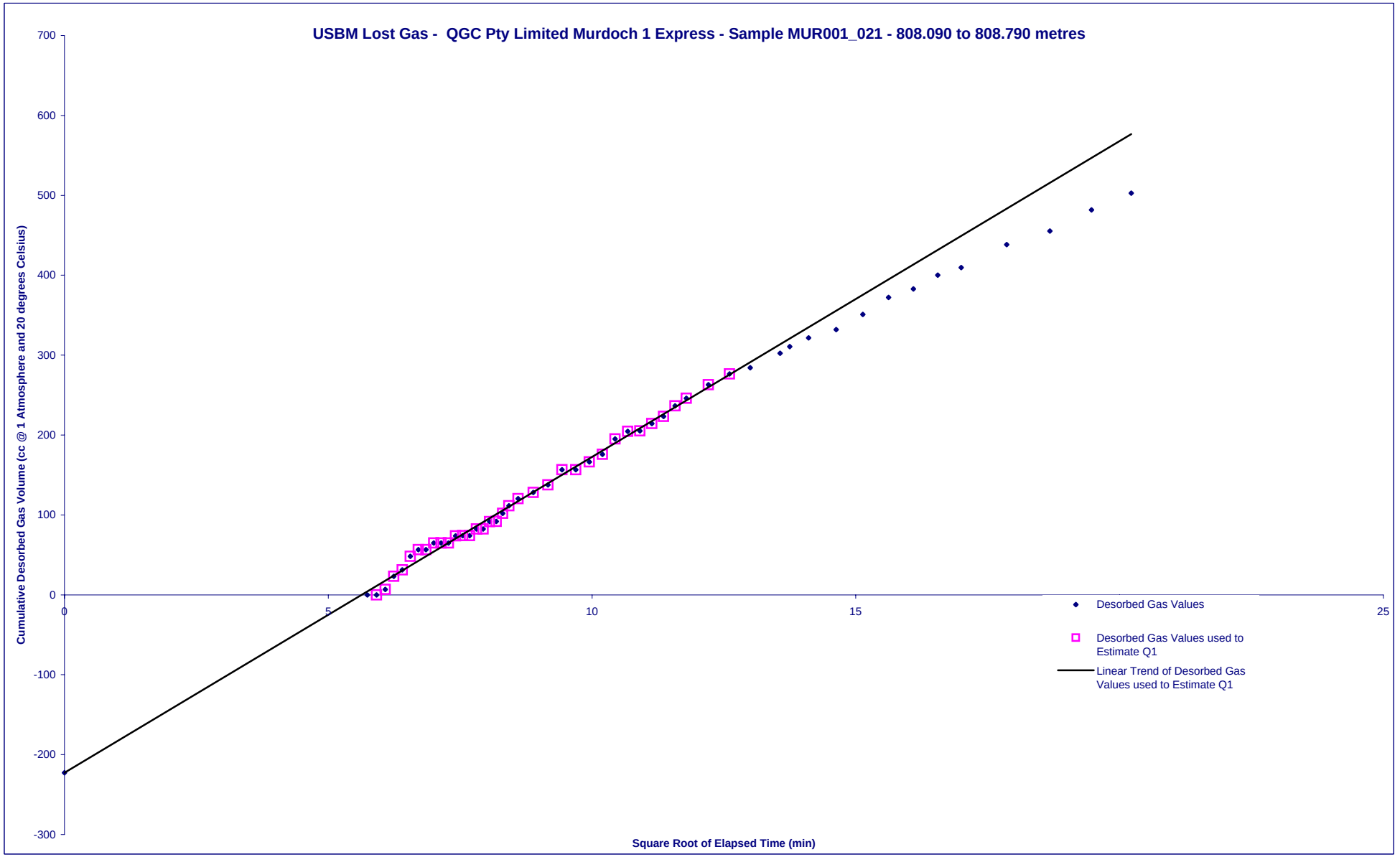
Hole Name	Murdoch 1 Express		Operator	QGC Pty Limited		Basin	Surat	State	QLD
Sample ID	MUR001_021	Sample Type	Core	Sample Top (m)	808.090	Sample Base (m)	808.790	Core Diameter (cm)	6.15
Sample Volume (cc)	2079	Mass (g)	2490	RD (g/cc)	1.42	Moisture (%ad)	5.2	Ash (%ad)	19.1
Q3 Volume (cc@STP)	182.29	Q3 Mass (g)	200.00	Q3 <212 μm (%)	100	Q3 Moisture (%ad)	5.6	Q3 Ash (%ad)	14.4
Can Length (cm)	87	Can Diameter (cm)	8	Can Volume (cc)	4373	Can Void (cc)	1260		
Date and Time	DD/MM/YY	HH:MM		Mud Weight (ppg)	8.3454			Trip Rate (m/min)	50.5	Minimum Q1 Point
Sample Penetrated	15/04/2013	17:55	Formation Pressure (Mpa) @ 0.433 psi/ft		7.91			Surface Time Ratio	0.515	2
Sample Off Bottom	15/04/2013	18:41	Formation Pressure Gradient (psi/ft)		0.433			Lost Time Ratio	0.104	Maximum Q1 Point
Sample at Surface	15/04/2013	18:57	Depth HSP=Formation Pressure (m)		807.10			USBM Q1 - Surface Time Correction	1.15	36
Sample Sealed	15/04/2013	19:14	Formation Temperature (°C)					Smith & Williams Q1 - Q2 Multiplier	1.040	Q1 Points Plotted
Time Zero	15/04/2013	18:41	Standard Temperature (°C)		20.00	Comments:				50
Last Entry	13/05/2013	9:45	Standard Pressure (hPa)		1013					-223

Network	Uncorrected USBM Q1	Corrected USBM Q1	Smith & Williams Q1	Q2	Q3	Uncorrected USBM Q1+Q2+Q3	Corrected USBM Q1+Q2+Q3	Smith and Williams Q1+Q2+Q3	Can Void Calculation: ○ Volumetric ◉ He Reference
m^3	0.000	0.000	0.000	0.002	0.000	0.000	0.000		
m^3/tonne (raw)	0.09	0.10	0.03	0.74	0.91	1.740	1.750		Time Zero Calculation
SCF/T (raw)	3	3	1	24	29	55.820	56.250		
m^3/tonne (daf)	0.12	0.14	0.04	0.98	1.14	2.24	**2.26**	2.16	◉ Auto ○ Manual ○ Cut Time
SCF/T (daf)	4	4	1	31	37	72	**72**	69	
Percent of daf total	5.27%	6.01%	1.81%	43.35%	Sorption Time (days)	Not Reached	Diffusivity (sec^{-1})	7.54485E-06	

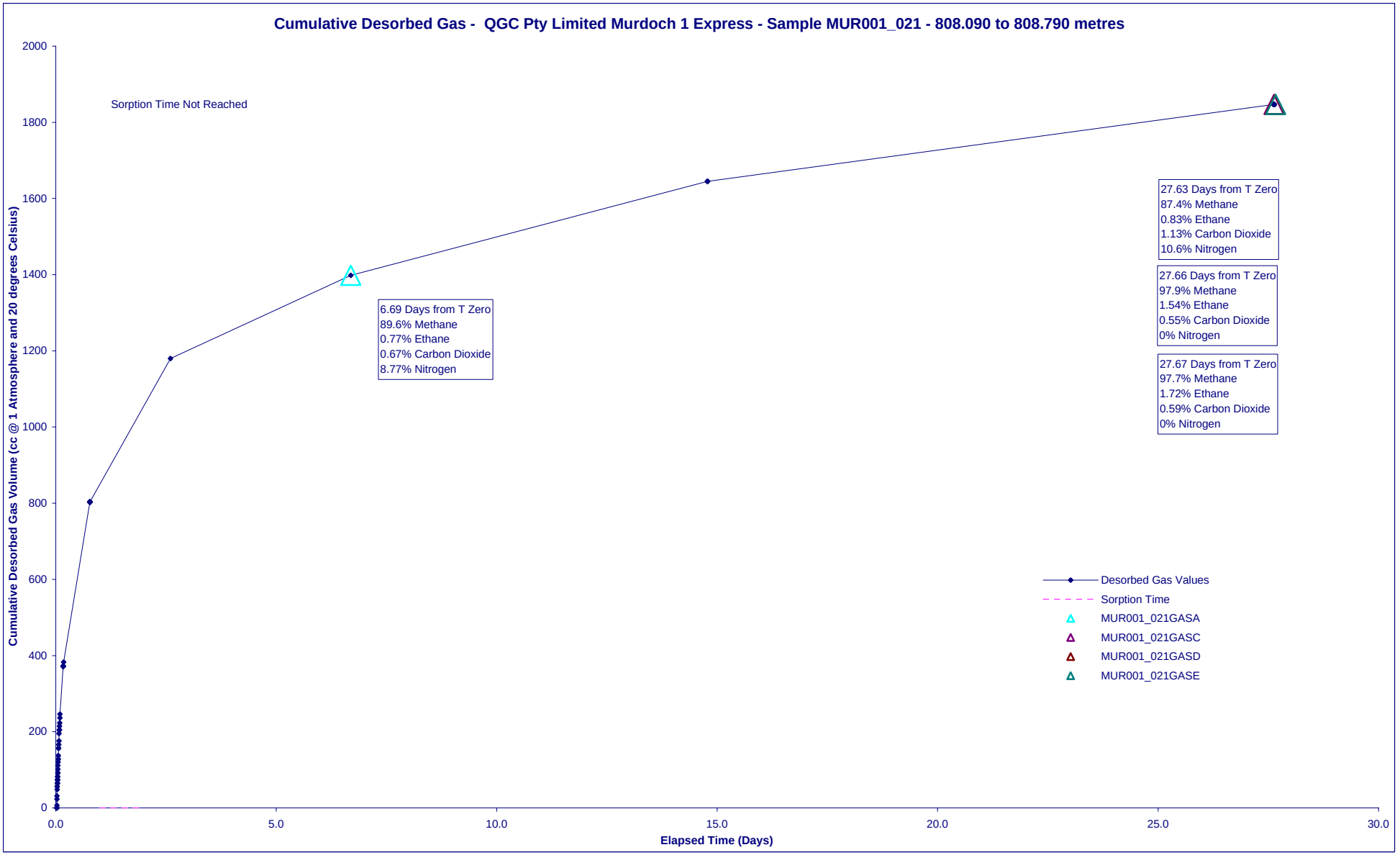
Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	19:14:00	32.6	20.3	23.9	970.3	100	100	2	0
15/04/2013	19:16:00	37.0	20.3	23.9	970.3	100	170	2	0
15/04/2013	19:18:00	37.7	20.2	23.6	970.2	170	180	2	7
15/04/2013	19:20:00	38.4	20.2	23.4	970.3	180	200	2	23
15/04/2013	19:22:00	38.8	20.2	23.2	970.3	200	210	2	31
15/04/2013	19:24:00	39.3	20.1	23.1	970.2	210	230	2	48
15/04/2013	19:26:00	39.6	20.1	23.0	970.0	230	240	2	56
15/04/2013	19:28:00	39.7	20.0	22.9	970.3	240	240	2	56
15/04/2013	19:30:00	40.0	20.0	22.9	970.3	240	250	2	65
15/04/2013	19:32:00	40.2	19.9	22.6	970.3	250	250	2	65
15/04/2013	19:34:00	40.4	19.9	22.8	970.3	250	250	2	65
15/04/2013	19:36:00	40.6	19.9	22.7	970.3	250	260	2	74
15/04/2013	19:38:00	40.7	19.8	22.6	970.9	260	260	2	74
15/04/2013	19:40:00	40.8	19.8	22.7	970.5	260	260	2	74
15/04/2013	19:42:00	41.1	19.7	22.6	970.5	260	270	2	82
15/04/2013	19:44:00	41.1	19.5	22.6	970.5	270	270	2	82
15/04/2013	19:46:00	41.2	19.5	22.6	970.5	270	280	2	92
15/04/2013	19:48:00	41.1	19.3	22.3	970.5	280	280	2	92
15/04/2013	19:50:00	41.1	19.3	22.2	970.7	280	290	2	102
15/04/2013	19:52:00	41.1	19.2	22.1	970.7	290	300	2	111
15/04/2013	19:55:00	41.3	19.2	22.0	970.7	300	310	2	120
15/04/2013	20:00:00	41.6	19.0	21.9	970.3	310	320	2	128
15/04/2013	20:05:00	41.8	18.9	21.8	970.7	320	330	2	138
15/04/2013	20:10:00	41.9	18.8	21.6	970.9	330	350	2	157
15/04/2013	20:15:00	41.9	18.7	21.5	970.9	350	350	2	157
15/04/2013	20:20:00	41.9	18.5	21.3	970.9	350	360	2	166
15/04/2013	20:25:00	41.9	18.5	21.3	970.9	360	370	2	176
15/04/2013	20:30:00	41.9	18.3	21.2	970.9	370	390	2	195
15/04/2013	20:35:00	42.0	18.2	21.1	970.9	390	400	2	204
15/04/2013	20:40:00	41.9	18.1	20.9	971.1	400	400	2	205
15/04/2013	20:45:00	42.0	18.0	20.8	971.1	400	410	2	214
15/04/2013	20:50:00	42.2	18.1	20.8	971.1	410	420	2	223

QGC Pty Limited Murdoch 1 Express - Sample MUR001_021 - 808.090 to 808.790 metres

Date	Time	Temperature (°C)			Abs. Air Pressure	Measurement Device			Cumulative Q2
DD/MM/YY	HH:MM	Canister	Air	H_20	(hPa)	Start (cc)	Finish (cc)	Size	(cc at STP)
15/04/2013	20:55:00	41.4	18.1	20.8	971.5	420	430	2	237
15/04/2013	21:00:00	41.4	18.1	20.7	971.3	430	440	2	246
15/04/2013	21:10:00	42.0	17.9	20.5	971.3	440	460	2	263
15/04/2013	21:20:00	41.1	17.5	20.2	971.5	460	470	2	276
15/04/2013	21:30:00	41.5	17.7	20.2	971.3	470	480	2	284
15/04/2013	21:45:00	41.9	17.5	20.1	971.5	480	500	2	302
15/04/2013	21:50:00	42.2	17.5	20.1	971.3	500	510	2	311
15/04/2013	22:00:00	41.9	17.5	20.0	971.3	510	520	2	322
15/04/2013	22:15:00	41.8	17.1	19.7	971.5	520	530	2	332
15/04/2013	22:30:00	42.0	16.9	19.6	971.7	530	550	2	351
15/04/2013	22:45:00	41.5	16.9	19.2	971.5	550	570	2	372
15/04/2013	23:00:00	41.4	16.7	19.1	971.9	570	580	2	383
15/04/2013	23:15:00	41.8	18.4	19.5	971.5	580	600	2	400
15/04/2013	23:30:00	41.7	18.9	19.8	970.9	600	610	2	410
16/04/2013	0:00:00	42.0	19.3	20.1	971.5	610	640	2	438
16/04/2013	0:30:00	42.5	19.8	20.4	971.1	640	660	2	455
16/04/2013	1:00:00	43.2	19.8	20.9	971.3	660	690	2	482
16/04/2013	1:30:00	42.8	20.4	21.2	971.3	690	710	2	503
16/04/2013	2:00:00	41.9	19.0	20.6	970.7	710	730	2	525
16/04/2013	2:30:00	41.8	18.5	20.3	971.1	730	740	2	536
16/04/2013	3:00:00	41.1	18.1	19.9	970.3	740	760	2	557
16/04/2013	4:00:00	41.1	17.8	19.8	970.5	760	790	2	586
16/04/2013	5:00:00	41.2	18.2	19.5	970.7	790	820	2	616
16/04/2013	6:00:00	41.4	18.3	19.9	971.9	820	850	2	646
16/04/2013	7:07:00	40.3	18.6	19.7	972.3	850	880	2	680
16/04/2013	8:04:00	40.4	22.0	20.9	972.5	880	910	2	709
16/04/2013	9:14:00	41.2	25.1	23.2	972.7	910	950	2	745
16/04/2013	13:15:00	44.9	45.9	28.2	970.0	50	175	2	803
18/04/2013	9:04:00	42.3	26.3	25.6	1015.3	200	515	2	1180
22/04/2013	11:16:00	43.6	26.9	24.2	1013.8	50	300	2	1398
26/04/2013	9:37:00	42.7	26.3	24.4	1023.0	200	345	2	1552
29/04/2013	10:51:00	43.1	27.4	25.3	1021.5	200	250	2	1592
30/04/2013	13:24:00	43.1	27.6	25.3	1026.5	200	250	2	1645
6/05/2013	10:12:00	42.7	25.3	23.4	1023.4	200	275	2	1715
9/05/2013	12:15:00	43.1	26.8	24.8	1027.2	200	270	2	1784
13/05/2013	9:45:00	42.9	24.9	22.7	1021.1	50	130	2	1847


USBM Lost Gas - QGC Pty Limited Murdoch 1 Express - Sample MUR001_021 - 808.090 to 808.790 metres
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
700
600
500
400
300
200
100
0
-100
-200
-300
0
5
10
15
25
Square Root of Elapsed Time (min)
Desorbed Gas Values
Desorbed Gas Values used to Estimate Q1
Linear Trend of Desorbed Gas Values used to Estimate Q1

EARTH DATA


Cumulative Desorbed Gas - QGC Pty Limited Murdoch 1 Express - Sample MUR001_021 - 808.090 to 808.790 metres
Sorption Time Not Reached
6.69 Days from T Zero
89.6% Methane
0.77% Ethane
0.67% Carbon Dioxide
8.77% Nitrogen
27.63 Days from T Zero
87.4% Methane
0.83% Ethane
1.13% Carbon Dioxide
10.6% Nitrogen
27.66 Days from T Zero
97.9% Methane
1.54% Ethane
0.55% Carbon Dioxide
0% Nitrogen
27.67 Days from T Zero
97.7% Methane
1.72% Ethane
0.59% Carbon Dioxide
0% Nitrogen
Desorbed Gas Values
Sorption Time
MUR001_021GASA
MUR001_021GASC
MUR001_021GASD
MUR001_021GASE
Cumulative Desorbed Gas Volume (cc @ 1 Atmosphere and 20 degrees Celsius)
Elapsed Time (Days)
0
200
400
600
800
1000
1200
1400
1600
1800
2000
0.0
5.0
10.0
15.0
20.0
25.0
30.0

EARTH DATA

Appendix II

Residual Gas Calculation

QGC Pty Limited Murdoch 1 Residual Gas Calculation

Sample ID	Sample Mass (g)	Absolute Ambient Air Pressure at Sealing (hPa)	Ambient Air Temperature at Sealing (°C)	Internal Mill Temperature at Sealing (°C)	Milling Duration (seconds)	Measured Gas Volume (cc)	Height of Water in Measuring Cylinder Above Reservoir Level (mm)	Absolute Ambient Air Pressure at Bleeding (hPa)	Ambient Air Temperature at Bleeding (°C)	Internal Mill Temperature at Bleeding (°C)	Head Space Correction (cc)	Raw Residual Gas Volume @ 1 Atm and 20 deg C (cc)	Head Space Corrected Raw Residual Gas Volume @ 1 Atm and 20 deg C (cc)	Percentage of Sample <212 μm	ADB Ash Percentage of <212 μm Fraction	ADB Moisture Percentage of <212 μm Fraction	Raw Residual Gas Content @ 1 Atm and 20 deg C (cc/gm)	Dry Ash Free Residual Gas Content @ 1 Atm and 20 deg C (cc/gm)	Comment
MUR001_001	200	1023.4	20.1	15.0	90	20	263	1023.3	21.1	25.6	37.1	19.6	0.0	100.0	28.3	8.0	Not Measureable		
MUR001_002	200	1023.1	21.1	20.6	90	20	264	1022.9	21.4	29.1	32.5	19.6	0.0	100.0	43.2	8.4	Not Measureable		
MUR001_004	200	1022.1	21.0	18.6	90	30	261	1021.9	20.5	26.0	30.2	29.5	0.0	100.0	17.9	7.4	Not Measureable		
MUR001_005	200	1021.9	21.1	19.9	90	10	265	1021.7	21.1	25.6	26.9	9.8	0.0	100.0	35.4	6.1	Not Measureable		
MUR001_006	200	1027.7	20.3	18.6	90	40	260	1027.7	20.3	26.4	30.8	39.5	8.8	100.0	24.0	6.5	0.04	0.06	
MUR001_007	200	1027.9	21.4	20.3	90	35	261	1027.9	20.3	29.7	34.0	34.6	0.6	100.0	39.0	6.5	0.00	0.01	
MUR001_008	200	1028.3	21.3	20.9	90	55	257	1028.1	21.5	31.8	36.9	54.2	17.3	100.0	8.9	5.9	0.09	0.10	
MUR001_009	200	1028.3	21.4	21.4	90	80	252	1028.1	21.1	32.9	37.7	78.9	41.2	100.0	10.9	6.5	0.21	0.25	
MUR001_010	200	1028.1	21.4	21.5	90	60	256	1027.9	21.4	31.1	34.1	59.1	25.0	100.0	17.0	6.9	0.12	0.16	
MUR001_011	200	1027.7	21.4	22.9	90	70	254	1027.5	21.7	31.8	32.5	68.9	36.4	100.0	38.5	4.5	0.18	0.32	
MUR001_012	200	1027.3	21.4	25.5	90	80	252	1027.1	21.7	35.3	34.0	78.7	44.7	100.0	10.2	5.2	0.22	0.26	
MUR001_013	200	1026.7	20.3	23.4	90	60	256	1026.5	20.5	34.2	36.4	59.2	22.8	100.0	15.6	5.3	0.11	0.14	
MUR001_014	200	1026.3	21.8	26.0	90	20	262	1026.1	21.1	35.7	34.4	19.7	0.0	100.0	52.7	6.0	Not Measureable		
MUR001_015	200	1025.4	20.6	19.1	90	40	260	1025.4	20.7	24.6	26.1	39.4	13.3	100.0	35.2	4.3	0.07	0.11	
MUR001_016	200	1025.2	20.2	23.5	90	30	262	1025.4	21.1	26.9	21.7	29.5	7.8	100.0	53.1	4.6	0.04	0.09	
MUR001_017	200	1025.4	20.9	24.5	90	50	258	1025.6	19.9	30.7	27.0	49.4	22.4	100.0	52.0	3.4	0.11	0.25	
MUR001_018	200	1025.6	20.1	23.1	90	70	255	1025.4	19.8	33.5	35.6	69.2	33.6	100.0	49.6	3.3	0.17	0.36	
MUR001_019	200	1025.7	19.5	26.8	90	20	263	1025.7	19.3	35.7	32.7	19.8	0.0	100.0	61.4	8.3	Not Measureable		
MUR001_020	200	1025.7	21.1	25.8	90	10	264	1025.6	21.4	36.8	37.1	9.8	0.0	100.0	47.6	9.2	Not Measureable		

QGC Pty Limited Murdoch 1 Express Residual Gas Calculation

Sample ID	Sample Mass (g)	Absolute Ambient Air Pressure at Sealing (hPa)	Ambient Air Temperature at Sealing (^{o}C)	Internal Mill Temperature at Sealing (^{o}C)	Milling Duration (seconds)	Measured Gas Volume (cc)	Height of Water in Measuring Cylinder Above Reservoir Level (mm)	Absolute Ambient Air Pressure at Bleeding (hPa)	Ambient Air Temperature at Bleeding (^{o}C)	Internal Mill Temperature at Bleeding (^{o}C)	Head Space Correction (cc)	Raw Residual Gas Volume @ 1 Atm and 20 deg C (cc)	Head Space Corrected Raw Residual Gas Volume @ 1 Atm and 20 deg C (cc)	Percentage of Sample <212 µm	ADB Ash Percentage of <212 µm Fraction	ADB Moisture Percentage of <212 µm Fraction	Raw Residual Gas Content @ 1 Atm and 20 deg C (cc/gm)	Dry Ash Free Residual Gas Content @ 1 Atm and 20 deg C (cc/gm)	Comment
MUR001_003A	200	1020.7	21.4	18.9	90	90	294	1020.5	21.0	24.7	28.9	87.8	58.9	100.0	9.3	7.4	0.29	0.35	
MUR001_003B	200	1020.9	20.4	21.6	90	90	294	1020.7	20.4	26.3	26.6	88.0	61.4	100.0	8.5	7.2	0.31	0.36	
MUR001_003	200												60.2	100.0	8.9	7.3	0.30	0.36	Weighted average
MUR001_021A	200	1020.9	21.5	23.3	90	215	272	1020.9	21.9	28.3	25.7	209.7	184.0	100.0	13.5	5.7	0.92	1.14	
MUR001_021B	200	1020.5	20.7	24.5	90	210	273	1020.5	20.7	29.1	24.9	205.5	180.6	100.0	15.3	5.5	0.90	1.14	
MUR001_021	200												182.3	100.0	14.4	5.6	0.91	1.14	Weighted average

Appendix III

Gas Composition Analysis

Gas Composition Analysis Report

Accreditation Number 18571
Accredited for compliance with ISO/IEC 17025

NATA
WORLD RECOGNISED ACCREDITATION

Report Date: 07/08/2013
Analysis Batch: 2013/1341
GC Calibration Date: 8/05/2013
Client: QGC Pty Limited

Earth Data Pty Ltd
9A Huntingdale Drive
Thornton 2322

Sample ID	Date Sampled	Time Sampled	Analysis Date	Depth From (m)	Depth To (m)	Air Included														Air Corrected									
						Oxygen+Argon (mol %)	Nitrogen (mol %)	Carbon Dioxide (mol %)	Methane (mol %)	Ethane (mol %)	Propane (mol %)	i-Butane (mol %)	n-Butane (mol %)	i-Pentane (mol %)	n-Pentane (mol %)	Hexane (mol %)	Purge Gas (mol %)	Total (mol %)	Air Content (mol %)	Nitrogen (mol %)	Carbon Dioxide (mol %)	Methane (mol %)	Ethane (mol %)	Propane (mol %)	i-Butane (mol %)	n-Butane (mol %)	i-Pentane (mol %)	n-Pentane (mol %)	Hexane (mol %)	Total (mol %)
MUR001_001GASB	16/05/2013	10:39	22/05/2013	622.440	623.190	9.77	27.5	0.24	58.2	0.06	0.02	0.03	<0.01	0.01	<0.01	<0.01	4.17	100.0	44.67	0.00	0.38	99.4	0.11	0.03	0.06	<0.01	0.01	<0.01	<0.01	100.0
MUR001_001GASC	24/07/2013	11:15	06/08/2013	622.440	623.190	4.33	25.5	0.34	58.1	0.16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	11.57	100.0	19.80	14.6	0.48	84.7	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_002GASC	24/07/2013	11:38	06/08/2013	623.460	624.100	4.77	31.7	0.47	55.6	0.32	<0.01	0.01	<0.01	0.01	<0.01	<0.01	7.12	100.0	21.80	20.6	0.65	78.2	0.45	<0.01	0.01	<0.01	0.02	<0.01	<0.01	100.0
MUR001_003GASC_1	13/05/2013	9:20	21/05/2013	624.340	624.690	2.00	25.8	1.01	36.9	0.16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	34.12	100.0	9.16	32.9	1.78	65.0	0.29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_003GASC_2	13/05/2013	9:20	21/05/2013	624.340	624.690	2.01	25.9	1.02	36.9	0.16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	34.01	100.0	9.18	32.9	1.78	65.0	0.29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_003GASD*	13/05/2013	10:00	21/05/2013	624.340	624.690	21.8	77.7	0.07	0.04	<0.01	ND	ND	ND	ND	ND	<0.01	0.39	100.0	99.76	-	-	-	-	-	-	-	-	-	-
MUR001_003GASE	13/05/2013	10:14	21/05/2013	624.340	624.690	20.3	73.3	0.11	6.27	0.05	ND	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	100.0	93.53	12.4	1.10	85.8	0.69	ND	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_004GASB	16/05/2013	10:39	22/05/2013	624.740	625.240	8.46	20.5	0.20	67.9	0.07	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	2.86	100.0	38.68	0.00	0.28	99.6	0.10	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_004GASC	24/07/2013	13:46	06/08/2013	624.740	625.240	5.30	33.2	0.39	51.7	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	9.11	100.0	24.24	21.4	0.57	77.6	0.45	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_005GASB	16/05/2013	10:39	22/05/2013	639.490	640.200	7.72	28.6	0.27	59.6	0.19	0.06	0.01	<0.01	<0.01	<0.01	<0.01	3.55	100.0	35.27	1.75	0.42	97.4	0.31	0.10	0.02	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_005GASC	24/07/2013	14:30	06/08/2013	639.490	640.200	3.68	28.1	0.77	55.4	1.16	0.46	0.12	0.03	0.03	0.01	<0.01	10.24	100.0	16.81	20.5	1.04	76.0	1.59	0.63	0.17	0.04	0.04	0.01	<0.01	100.0
MUR001_006GASB	16/05/2013	10:43	22/05/2013	640.200	641.010	10.7	36.6	0.28	48.0	0.43	0.16	0.05	0.01	0.01	<0.01	<0.01	3.76	100.0	48.91	0.00	0.53	98.1	0.87	0.32	0.10	0.02	0.02	<0.01	<0.01	100.0
MUR001_006GASC	25/07/2013	8:21	06/08/2013	640.200	641.010	15.4	50.9	0.26	28.6	0.74	0.34	0.10	0.02	0.02	0.01	<0.01	3.61	100.0	70.24	0.00	0.78	95.1	2.45	1.14	0.34	0.07	0.07	0.02	<0.01	100.0
MUR001_007GASB	16/05/2013	10:43	22/05/2013	642.750	643.350	9.95	32.0	0.29	53.8	0.20	0.06	0.02	<0.01	<0.01	<0.01	<0.01	3.68	100.0	45.45	0.00	0.50	99.0	0.36	0.10	0.03	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_007GASC	25/07/2013	8:45	06/08/2013	642.750	643.350	3.26	25.2	1.15	52.4	0.96	0.38	0.11	0.02	0.02	0.01	<0.01	16.49	100.0	14.90	19.7	1.67	76.4	1.40	0.56	0.16	0.04	0.03	0.01	<0.01	100.0
MUR001_008GASC_1	25/07/2013	9:16	06/08/2013	643.580	644.120	3.06	54.6	1.70	35.8	0.75	0.31	0.09	0.02	0.02	<0.01	<0.01	3.65	100.0	14.00	53.0	2.06	43.5	0.91	0.38	0.11	0.02	0.02	<0.01	<0.01	100.0
MUR001_008GASC_2	25/07/2013	9:16	06/08/2013	643.580	644.120	3.07	54.6	1.70	35.8	0.75	0.31	0.09	0.02	0.02	<0.01	<0.01	3.64	100.0	14.01	53.0	2.06	43.5	0.91	0.38	0.11	0.02	0.02	<0.01	<0.01	100.0
MUR001_009GASA	22/04/2013	10:56	30/04/2013	682.840	683.140	13.3	53.8	0.39	26.3	0.19	0.05	0.01	<0.01	<0.01	<0.01	<0.01	5.95	100.0	60.94	18.7	1.12	79.3	0.58	0.14	0.05	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_009GASB_1	16/05/2013	11:13	22/05/2013	682.840	683.140	11.4	47.5	0.47	35.1	0.27	0.07	0.03	0.01	0.01	<0.01	<0.01	5.24	100.0	51.98	16.0	1.07	82.0	0.63	0.17	0.06	0.01	0.01	<0.01	<0.01	100.0
MUR001_009GASB_2	16/05/2013	11:13	22/05/2013	682.840	683.140	11.4	47.4	0.47	35.1	0.27	0.07	0.03	0.01	0.01	<0.01	<0.01	5.24	100.0	51.91	16.0	1.07	82.1	0.63	0.16	0.06	0.01	0.01	<0.01	<0.01	100.0
MUR001_009GASC_1	25/07/2013	9:40	06/08/2013	682.840	683.140	2.78	20.7	0.73	65.4	0.29	0.02	0.02	<0.01	<0.01	<0.01	<0.01	9.96	100.0	12.69	14.0	0.93	84.6	0.37	0.03	0.03	<0.01	<0.01	<0.01	<0.01	100.0

EARTH DATA

Report Date: 07/08/2013
Analysis Batch: 2013/1341
GC Calibration Date: 6/08/2013
Client: QGC Pty Limited

Earth Data Pty Ltd
9A Huntingdale Drive
Thornton 2322

Sample ID	Date Sampled	Time Sampled	Analysis Date	Depth From (m)	Depth To (m)	Air Included: Oxygen+Argon (mol %)	Nitrogen (mol %)	Carbon Dioxide (mol %)	Methane (mol %)	Ethane (mol %)	Propane (mol %)	i-Butane (mol %)	n-Butane (mol %)	i-Pentane (mol %)	n-Pentane (mol %)	Hexane (mol %)	Purge Gas (mol %)	Total (mol %)	Air Content (mol %)	Air Corrected: Nitrogen (mol %)	Carbon Dioxide (mol %)	Methane (mol %)	Ethane (mol %)	Propane (mol %)	i-Butane (mol %)	n-Butane (mol %)	i-Pentane (mol %)	n-Pentane (mol %)	Hexane (mol %)	Total (mol %)
MUR001_009GASC_2	25/07/2013	9:40	06/08/2013	682.840	683.140	2.77	20.7	0.73	65.5	0.29	0.02	0.02	ND	<0.01	<0.01	<0.01	9.97	100.0	12.65	14.0	0.93	84.6	0.37	0.03	0.03	ND	<0.01	<0.01	<0.01	100.0
MUR001_010GASA	22/04/2013	10:56	30/04/2013	696.650	697.440	6.05	30.4	0.61	57.1	0.28	0.03	0.01	<0.01	<0.01	<0.01	<0.01	5.52	100.0	27.64	13.1	0.89	85.5	0.42	0.04	0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_010GASB*	16/05/2013	11:13	22/05/2013	696.650	697.440	21.9	78.0	0.04	0.03	<0.01	ND	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	100.0	100.00	-	-	-	-	-	-	-	-	-	-	-
MUR001_010GASC	25/07/2013	10:14	06/08/2013	696.650	697.440	5.52	18.7	0.42	71.4	0.42	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	3.54	100.0	25.20	0.00	0.57	98.8	0.58	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_011GASA	22/04/2013	10:56	30/04/2013	708.340	709.060	3.98	14.1	0.77	72.2	0.59	0.20	0.06	0.01	0.01	<0.01	<0.01	8.08	100.0	18.20	0.00	1.03	97.8	0.79	0.28	0.08	0.02	0.02	<0.01	<0.01	100.0
MUR001_011GASB	29/04/2013	10:39	01/05/2013	708.340	709.060	4.02	21.8	0.97	59.8	0.48	0.17	0.05	0.01	0.01	<0.01	<0.01	12.69	100.0	18.39	10.8	1.40	86.8	0.69	0.24	0.07	0.01	0.01	<0.01	<0.01	100.0
MUR001_011GASC	25/07/2013	10:39	06/08/2013	708.340	709.060	2.47	8.59	0.72	79.5	0.94	0.33	0.11	0.02	0.02	<0.01	<0.01	7.30	100.0	11.27	0.00	0.87	97.4	1.15	0.41	0.13	0.03	0.03	<0.01	<0.01	100.0
MUR001_012GASA_1	22/04/2013	10:56	30/04/2013	709.060	709.720	5.51	25.5	0.75	58.2	0.51	0.19	0.05	0.01	0.01	<0.01	<0.01	9.27	100.0	25.17	8.91	1.13	88.8	0.78	0.28	0.07	0.02	0.02	<0.01	<0.01	100.0
MUR001_012GASA_2	22/04/2013	10:56	30/04/2013	709.060	709.720	5.51	25.5	0.75	58.2	0.51	0.19	0.05	0.01	0.01	<0.01	<0.01	9.28	100.0	25.16	8.90	1.13	88.8	0.78	0.28	0.07	0.02	0.02	<0.01	<0.01	100.0
MUR001_012GASB	29/04/2013	10:39	01/05/2013	709.060	709.720	6.07	25.2	0.80	51.8	0.38	0.14	0.03	0.01	0.01	<0.01	<0.01	15.56	100.0	27.76	6.25	1.39	91.4	0.66	0.24	0.06	0.02	0.01	<0.01	<0.01	100.0
MUR001_012GASC	25/07/2013	10:59	06/08/2013	709.060	709.720	2.71	8.61	0.67	84.1	1.07	0.39	0.11	0.02	0.02	<0.01	<0.01	2.30	100.0	12.40	0.00	0.77	97.4	1.24	0.45	0.13	0.03	0.02	<0.01	<0.01	100.0
MUR001_013GASA	22/04/2013	10:56	30/04/2013	709.720	710.290	3.35	31.7	0.68	55.0	0.61	0.23	0.05	0.01	0.01	<0.01	<0.01	8.36	100.0	15.30	25.9	0.88	72.0	0.80	0.30	0.07	0.02	0.02	<0.01	<0.01	100.0
MUR001_013GASB	29/04/2013	10:39	01/05/2013	709.720	710.290	7.67	34.8	0.63	44.0	0.46	0.19	0.04	0.01	0.01	<0.01	<0.01	12.19	100.0	35.06	14.1	1.17	83.4	0.87	0.35	0.08	0.02	0.02	<0.01	<0.01	100.0
MUR001_013GASC	25/07/2013	11:21	06/08/2013	709.720	710.290	2.42	11.7	0.68	79.0	1.18	0.47	0.14	0.03	0.03	0.01	<0.01	4.35	100.0	11.07	3.57	0.80	93.5	1.40	0.55	0.16	0.03	0.03	0.01	<0.01	100.0
MUR001_014GASA	22/04/2013	11:03	30/04/2013	712.970	713.320	12.4	44.2	0.31	36.6	0.38	0.14	0.04	0.01	0.01	<0.01	<0.01	5.91	100.0	56.55	0.14	0.77	97.6	1.00	0.37	0.10	0.02	0.02	<0.01	<0.01	100.0
MUR001_014GASB	16/05/2013	11:17	22/05/2013	712.970	713.320	7.25	31.4	0.58	55.6	0.54	0.17	0.05	0.01	0.01	<0.01	<0.01	4.41	100.0	33.11	8.82	0.90	89.0	0.87	0.27	0.09	0.02	0.02	<0.01	<0.01	100.0
MUR001_014GASC	25/07/2013	11:43	06/08/2013	712.970	713.320	3.83	59.9	0.69	31.5	0.59	0.24	0.07	0.01	0.02	<0.01	<0.01	3.15	100.0	17.52	58.3	0.86	39.7	0.74	0.30	0.09	0.02	0.02	<0.01	<0.01	100.0
MUR001_015GASA	22/04/2013	11:03	30/04/2013	744.660	744.980	6.47	27.0	0.42	60.8	0.52	0.14	0.04	0.01	0.01	<0.01	<0.01	4.59	100.0	29.59	5.88	0.62	92.4	0.79	0.21	0.06	0.01	0.01	<0.01	<0.01	100.0
MUR001_015GASB_1	16/05/2013	11:17	22/05/2013	744.660	744.980	8.01	28.0	0.59	57.0	0.56	0.14	0.05	0.01	0.01	<0.01	<0.01	5.64	100.0	36.55	0.00	1.00	97.7	0.96	0.25	0.08	0.02	0.01	<0.01	<0.01	100.0
MUR001_015GASB_2	16/05/2013	11:17	22/05/2013	744.660	744.980	8.03	28.1	0.59	57.0	0.56	0.14	0.05	0.01	0.01	<0.01	<0.01	5.51	100.0	36.69	0.00	1.00	97.7	0.96	0.25	0.08	0.02	0.02	<0.01	<0.01	100.0
MUR001_015GASC	25/07/2013	13:05	06/08/2013	744.660	744.980	3.20	11.7	0.67	75.3	1.31	0.42	0.15	0.03	0.02	0.01	<0.01	7.19	100.0	14.63	0.30	0.85	96.4	1.68	0.53	0.19	0.04	0.03	0.01	<0.01	100.0
MUR001_016GASA	22/04/2013	11:10	30/04/2013	777.810	778.150	5.66	17.4	0.60	66.8	0.85	0.25	0.18	0.03	0.03	0.01	<0.01	8.19	100.0	25.87	0.00	0.86	97.2	1.24	0.36	0.26	0.04	0.05	0.01	<0.01	100.0
MUR001_016GASB	16/05/2013	11:22	22/05/2013	777.810	778.150	11.3	37.7	0.39	46.4	0.61	0.19	0.10	0.01	0.02	<0.01	<0.01	3.38	100.0	51.44	0.00	0.78	97.3	1.27	0.41	0.21	0.03	0.04	<0.01	<0.01	100.0
MUR001_016GASC	25/07/2013	13:43	06/08/2013	777.810	778.150	3.42	11.6	1.01	76.9	1.60	0.52	0.56	0.06	0.08	0.01	0.01	4.23	100.0	15.62	0.00	1.24	95.2	1.98	0.64	0.70	0.07	0.10	0.01	0.01	100.0
MUR001_017GASA	22/04/2013	11:10	30/04/2013	782.060	782.860	2.20	11.7	0.69	70.4	0.68	0.15	0.14	0.02	0.03	0.01	<0.01	13.98	100.0	10.06	5.02	0.90	92.7	0.89	0.20	0.18	0.03	0.05	0.01	<0.01	100.0
MUR001_017GASB*	29/04/2013	10:50	01/05/2013	782.060	782.860	20.9	74.3	0.15	4.50	0.10	0.03	0.03	<0.01	0.01	<0.01	<0.01	0.00	100.0	95.44	-	-	-	-	-	-	-	-	-	-	-

Report Date: 07/08/2013
Analysis Batch: 2013/1341
GC Calibration Date: 6/08/2013
Client: QGC Pty Limited

Earth Data Pty Ltd
9A Huntingdale Drive
Thornton 2322

Sample ID	Date Sampled	Time Sampled	Analysis Date	Depth From (m)	Depth To (m)	Air Included: Oxygen+Argon (mol %)	Nitrogen (mol %)	Carbon Dioxide (mol %)	Methane (mol %)	Ethane (mol %)	Propane (mol %)	i-Butane (mol %)	n-Butane (mol %)	i-Pentane (mol %)	n-Pentane (mol %)	Hexane (mol %)	Purge Gas (mol %)	Total (mol %)	Air Content (mol %)	Air Corrected: Nitrogen (mol %)	Carbon Dioxide (mol %)	Methane (mol %)	Ethane (mol %)	Propane (mol %)	i-Butane (mol %)	n-Butane (mol %)	i-Pentane (mol %)	n-Pentane (mol %)	Hexane (mol %)	Total (mol %)
MUR001_017GASC	25/07/2013	14:01	06/08/2013	782.060	782.860	2.89	7.51	0.91	83.7	1.05	0.23	0.26	0.04	0.06	0.01	<0.01	3.33	100.0	13.24	0.00	1.05	97.0	1.22	0.27	0.30	0.04	0.07	0.01	<0.01	100.0
MUR001_018GASA_1	22/04/2013	11:10	30/04/2013	787.900	788.540	5.10	21.4	0.98	62.6	0.54	0.06	0.04	0.01	0.01	<0.01	<0.01	9.26	100.0	23.29	4.70	1.44	92.9	0.80	0.10	0.06	0.01	0.02	<0.01	<0.01	100.0
MUR001_018GASA_2	22/04/2013	11:10	30/04/2013	787.900	788.540	5.10	21.4	0.98	62.6	0.54	0.06	0.04	0.01	0.01	<0.01	<0.01	9.26	100.0	23.29	4.70	1.44	92.9	0.80	0.10	0.06	0.01	0.02	<0.01	<0.01	100.0
MUR001_018GASB	16/05/2013	11:22	22/05/2013	787.900	788.540	6.12	20.9	0.74	65.3	0.66	0.11	0.05	0.01	0.02	<0.01	<0.01	6.09	100.0	27.98	0.00	1.10	97.6	0.99	0.16	0.08	0.01	0.02	<0.01	<0.01	100.0
MUR001_018GASC	25/07/2013	14:20	06/08/2013	787.900	788.540	2.76	8.48	0.71	84.5	0.94	0.04	0.06	0.01	0.03	<0.01	<0.01	2.47	100.0	12.61	0.00	0.82	97.9	1.08	0.05	0.07	0.01	0.03	<0.01	<0.01	100.0
MUR001_019GASA	22/04/2013	11:10	30/04/2013	803.370	803.670	7.26	50.5	0.27	37.5	0.33	0.09	0.04	0.01	0.01	<0.01	<0.01	3.99	100.0	33.18	39.1	0.42	59.7	0.53	0.14	0.07	0.01	0.02	<0.01	<0.01	100.0
MUR001_019GASB	16/05/2013	11:22	22/05/2013	803.370	803.670	12.1	48.3	0.30	35.3	0.36	0.10	0.05	0.01	0.01	<0.01	<0.01	3.57	100.0	55.22	12.4	0.69	85.6	0.87	0.23	0.11	0.02	0.03	<0.01	<0.01	100.0
MUR001_019GASC	25/07/2013	14:39	06/08/2013	803.370	803.670	4.08	45.3	0.73	45.6	0.62	0.09	0.14	0.02	0.04	0.01	0.01	3.36	100.0	18.66	39.4	0.93	58.5	0.80	0.12	0.18	0.03	0.05	0.01	0.01	100.0
MUR001_020GASA	22/04/2013	11:16	30/04/2013	807.290	808.090	19.2	64.0	0.16	10.0	0.14	0.01	0.01	<0.01	<0.01	<0.01	<0.01	6.48	100.0	87.70	0.00	1.25	97.2	1.31	0.12	0.10	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_020GASB_1	29/04/2013	10:51	01/05/2013	807.290	808.090	2.11	23.1	0.92	64.0	0.56	0.05	0.03	0.01	0.01	<0.01	<0.01	9.21	100.0	9.62	19.2	1.13	78.9	0.69	0.06	0.04	0.01	0.01	<0.01	<0.01	100.0
MUR001_020GASB_2	29/04/2013	10:51	01/05/2013	807.290	808.090	2.11	23.1	0.92	64.1	0.56	0.05	0.03	0.01	0.01	<0.01	<0.01	9.11	100.0	9.63	19.2	1.13	78.9	0.69	0.06	0.04	0.01	0.01	<0.01	<0.01	100.0
MUR001_020GASC*	25/07/2013	14:57	06/08/2013	807.290	808.090	21.9	78.0	0.04	0.05	<0.01	ND	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	100.0	99.89	-	-	-	-	-	-	-	-	-	-	-
MUR001_021GASA	22/04/2013	11:16	30/04/2013	808.090	808.790	3.90	20.6	0.52	68.9	0.59	0.08	0.02	<0.01	<0.01	<0.01	<0.01	5.39	100.0	17.81	8.77	0.67	89.6	0.77	0.10	0.02	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_021GASC	13/05/2013	9:45	21/05/2013	808.090	808.790	1.65	15.1	0.99	76.2	0.73	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5.33	100.0	7.54	10.6	1.13	87.4	0.83	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_021GASD	13/05/2013	10:27	21/05/2013	808.090	808.790	14.0	39.7	0.23	37.9	0.60	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	7.57	100.0	64.01	0.00	0.55	97.9	1.54	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
MUR001_021GASE	13/05/2013	10:40	21/05/2013	808.090	808.790	14.3	39.4	0.26	39.2	0.69	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6.15	100.0	65.35	0.00	0.59	97.7	1.72	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100.0
Standard E1_1			30/04/2013			0.04	39.6	9.66	39.9	9.59	0.21	0.20	0.20	0.20	0.19	0.19	0.00	100.0	0.17	39.6	9.67	40.0	9.61	0.21	0.20	0.20	0.20	0.20	0.19	100.0
Standard E1_2			30/04/2013			0.03	39.6	9.66	39.9	9.59	0.21	0.20	0.20	0.20	0.20	0.19	0.00	100.0	0.15	39.6	9.67	40.0	9.60	0.21	0.20	0.20	0.20	0.20	0.19	100.0
Standard G1_1			01/05/2013			0.04	98.2	0.18	0.17	0.20	0.21	0.20	0.20	0.20	0.20	0.20	0.00	100.0	0.17	98.2	0.18	0.17	0.20	0.21	0.20	0.20	0.20	0.20	0.20	100.0
Standard G1_2			01/05/2013			0.04	98.2	0.18	0.17	0.20	0.21	0.20	0.20	0.20	0.20	0.20	0.00	100.0	0.17	98.3	0.18	0.17	0.20	0.21	0.20	0.20	0.20	0.20	0.20	100.0
Standard E2_1			21/05/2013			0.03	39.6	9.68	39.9	9.60	0.21	0.20	0.20	0.20	0.20	0.19	0.00	100.0	0.14	39.5	9.69	40.0	9.61	0.21	0.20	0.20	0.20	0.20	0.20	100.0
Standard E2_2			21/05/2013			0.03	39.6	9.68	39.9	9.60	0.21	0.20	0.20	0.20	0.20	0.20	0.00	100.0	0.13	39.5	9.69	40.0	9.61	0.21	0.20	0.20	0.20	0.20	0.20	100.0
Standard G2_1			22/05/2013			0.03	98.1	0.21	0.23	0.22	0.21	0.20	0.20	0.20	0.20	0.20	0.00	100.0	0.12	98.1	0.21	0.23	0.23	0.21	0.20	0.20	0.20	0.20	0.20	100.0
Standard G2_2			22/05/2013			0.03	98.1	0.21	0.23	0.22	0.21	0.20	0.20	0.20	0.20	0.20	0.00	100.0	0.12	98.1	0.21	0.23	0.22	0.21	0.20	0.20	0.20	0.20	0.20	100.0
Standard A1_1			06/08/2013			0.01	0.10	0.02	97.7	1.07	1.03	0.02	0.02	0.02	0.02	0.02	0.00	100.0	0.05	0.07	0.02	97.7	1.07	1.03	0.02	0.02	0.02	0.02	0.02	100.0
Standard A1_2			06/08/2013			0.01	0.10	0.02	97.7	1.07	1.03	0.02	0.02	0.02	0.02	0.02	0.00	100.0	0.05	0.06	0.02	97.7	1.07	1.03	0.02	0.02	0.02	0.02	0.02	100.0

Air Included Parameters: The above results are calculated assuming only the measured constituents are present. Oxygen+Argon is quantified from an Air Standard. Purge gas is calculated by difference.

Air Corrected Parameters: The above results are calculated on an air free basis assuming only the measured constituents are present.

The following are the concentrations for the NATA accredited standards used as part of Earth Data's QAQC procedures.
NB: * Denotes sample contains <5% of measured components after air and purge gas corrections.
Unless indicated otherwise, the tests were performed on the samples as recieved. Analysis completed in accordance with Earth Data in house method GC-01.

Standard ID	Nitrogen	Methane	Carbon Dioxide	Ethane	Propane	Isobutane	N-butane	Isopentane	N-pentane	Hexane
Standard A	0.10	97.68	0.02	1.07	1.03	0.02	0.02	0.02	0.02	0.02
Standard C	19.93	72.60	0.08	4.96	2.07	0.08	0.08	0.04	0.08	0.08
Standard D	0.31	57.56	39.73	0.20	0.20	0.40	0.41	0.40	0.40	0.40
Standard E	39.69	39.86	9.67	9.59	0.21	0.20	0.20	0.20	0.20	0.20
Standard G	98.19	0.20	0.20	0.21	0.21	0.20	0.20	0.20	0.20	0.20

	Oxygen + Argon	Nitrogen	Methane	Carbon Dioxide	Ethane	Propane	Isobutane	N-butane	Isopentane	N-pentane	Hexane
Measurement Uncertainty (% Relative)	2.23	2.24	2.69	1.68	3.43	3.43	3.41	3.41	3.41	3.41	3.42

The quoted measurement uncertainty is the expanded uncertainty at the 95% confidence interval, with a coverage factor (k) of 2.

Approved By:
Matthew Crotty - Chemist

Robert Raymond - Laboratory Manager

Gas Analysis Report

Accreditation Number 18571
Accredited for compliance with ISO/IEC17025

NATA
WORLD RECOGNISED ACCREDITATION

Analysis Batch: 2013/1341
Report Date: 07/08/2013
Client: QGC Pty Limited

Earth Data Pty Ltd
9A Huntingdale Drive
Thornton 2322

Sample ID	Date Sampled	Time Sampled	Analysis Date	Depth From (m)	Depth To (m)	Average Molecular Weight	Ideal Inferior Calorific Value (MJ/m3)	Real Inferior Calorific Value (MJ/m3)	Ideal Superior Calorific Value (MJ/m3)	Real Superior Calorific Value (MJ/m3)	Ideal Relative Density	Real Relative Density	Ideal Density (kg/m3)	Real Density (kg/m3)	Ideal Wobbe Index (MJ/m3)	Real Wobbe Index (MJ/m3)
MUR001_001GASB	16/05/2013	10:39	22/05/2013	622.440	623.190	16.21	33.93	35.53	37.68	39.46	0.56	0.59	0.69	0.72	50.37	51.56
MUR001_001GASC	24/07/2013	11:15	6/08/2013	622.440	623.190	17.96	28.88	30.11	32.08	33.44	0.62	0.65	0.76	0.79	40.73	41.60
MUR001_002GASC	24/07/2013	11:38	6/08/2013	623.460	624.100	18.78	26.88	27.98	29.85	31.08	0.65	0.67	0.79	0.83	37.07	37.83
MUR001_003GASC_1^	13/05/2013	9:20	21/05/2013	624.340	624.690	20.53	22.25	23.09	24.71	25.64	0.71	0.74	0.87	0.90	29.35	29.91
MUR001_003GASC_2^	13/05/2013	9:20	21/05/2013	624.340	624.690	20.53	22.24	23.08	24.70	25.63	0.71	0.74	0.87	0.90	29.34	29.89
MUR001_003GASD*	13/05/2013	10:00	21/05/2013	624.340	624.690	-	-	-	-	-	-	-	-	-	-	-
MUR001_003GASE	13/05/2013	10:14	21/05/2013	624.340	624.690	17.93	29.56	30.86	32.83	34.27	0.62	0.65	0.76	0.79	41.72	42.64
MUR001_004GASB	16/05/2013	10:39	22/05/2013	624.740	625.240	16.14	33.89	35.48	37.64	39.41	0.56	0.58	0.68	0.71	50.42	51.61
MUR001_004GASC	24/07/2013	13:46	6/08/2013	624.740	625.240	18.83	26.63	27.72	29.57	30.78	0.65	0.68	0.80	0.83	36.67	37.42
MUR001_005GASB	16/05/2013	10:39	22/05/2013	639.490	640.200	16.46	33.38	34.94	37.07	38.80	0.57	0.59	0.70	0.73	49.17	50.32
MUR001_005GASC	24/07/2013	14:30	6/08/2013	639.490	640.200	19.30	27.61	28.79	30.63	31.94	0.67	0.69	0.82	0.85	37.52	38.32
MUR001_006GASB	16/05/2013	10:43	22/05/2013	640.200	641.010	16.47	34.29	35.94	38.07	39.90	0.57	0.60	0.70	0.73	50.48	51.68
MUR001_006GASC	25/07/2013	8:21	6/08/2013	640.200	641.010	17.15	35.35	37.13	39.20	41.18	0.59	0.62	0.73	0.76	50.94	52.22
MUR001_007GASB	16/05/2013	10:43	22/05/2013	642.750	643.350	16.28	33.97	35.57	37.72	39.50	0.56	0.59	0.69	0.72	50.31	51.49
MUR001_007GASC	25/07/2013	8:45	6/08/2013	642.750	643.350	19.33	27.56	28.74	30.57	31.89	0.67	0.70	0.82	0.85	37.42	38.22
MUR001_008GASC_1^	25/07/2013	9:16	6/08/2013	643.580	644.120	23.27	15.82	16.34	17.55	18.13	0.80	0.83	0.98	1.02	19.58	19.91
MUR001_008GASC_2^	25/07/2013	9:16	6/08/2013	643.580	644.120	23.27	15.82	16.34	17.55	18.12	0.80	0.83	0.98	1.02	19.58	19.90
MUR001_009GASA	22/04/2013	10:56	30/04/2013	682.840	683.140	18.75	27.49	28.65	30.53	31.81	0.65	0.67	0.79	0.83	37.94	38.73
MUR001_009GASB_1	16/05/2013	11:13	22/05/2013	682.840	683.140	18.43	28.48	29.70	31.62	32.98	0.64	0.66	0.78	0.81	39.63	40.48
MUR001_009GASB_2	16/05/2013	11:13	22/05/2013	682.840	683.140	18.43	28.49	29.72	31.64	33.00	0.64	0.66	0.78	0.81	39.66	40.51
MUR001_009GASC_1	25/07/2013	9:40	6/08/2013	682.840	683.140	18.06	29.03	30.28	32.23	33.63	0.62	0.65	0.76	0.80	40.82	41.70
MUR001_009GASC_2	25/07/2013	9:40	6/08/2013	682.840	683.140	18.06	29.01	30.26	32.22	33.61	0.62	0.65	0.76	0.80	40.79	41.67
MUR001_010GASA	22/04/2013	10:56	30/04/2013	696.650	697.440	17.95	29.33	30.60	32.57	33.98	0.62	0.65	0.76	0.79	41.38	42.27

EARTH DATA

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MUR001_010GASB*	16/05/2013	11:13	22/05/2013	696.650	697.440	-	-	-	-	-	-	-	-	-	-	-
MUR001_010GASC	25/07/2013	10:14	6/08/2013	696.650	697.440	16.29	33.92	35.52	37.67	39.45	0.56	0.59	0.69	0.72	50.23	51.41
MUR001_011GASA	22/04/2013	10:56	30/04/2013	708.340	709.060	16.58	34.06	35.69	37.81	39.63	0.57	0.60	0.70	0.73	49.98	51.17
MUR001_011GASB	29/04/2013	10:39	1/05/2013	708.340	709.060	17.94	30.21	31.56	33.54	35.04	0.62	0.65	0.76	0.79	42.62	43.57
MUR001_011GASC	25/07/2013	10:39	6/08/2013	708.340	709.060	16.65	34.33	35.99	38.10	39.95	0.57	0.60	0.70	0.74	50.26	51.47
MUR001_012GASA_1	22/04/2013	10:56	30/04/2013	709.060	709.720	17.66	30.99	32.39	34.40	35.96	0.61	0.64	0.75	0.78	44.05	45.05
MUR001_012GASA_2	22/04/2013	10:56	30/04/2013	709.060	709.720	17.66	30.99	32.40	34.40	35.96	0.61	0.64	0.75	0.78	44.06	45.05
MUR001_012GASB	29/04/2013	10:39	1/05/2013	709.060	709.720	17.38	31.74	33.20	35.24	36.86	0.60	0.63	0.74	0.77	45.48	46.53
MUR001_012GASC	25/07/2013	10:59	6/08/2013	709.060	709.720	16.64	34.40	36.07	38.18	40.03	0.57	0.60	0.70	0.74	50.38	51.59
MUR001_013GASA	22/04/2013	10:56	30/04/2013	709.720	710.290	19.64	25.32	26.34	28.10	29.23	0.68	0.70	0.83	0.86	34.13	34.82
MUR001_013GASB	29/04/2013	10:39	1/05/2013	709.720	710.290	18.34	29.28	30.56	32.50	33.93	0.63	0.66	0.78	0.81	40.84	41.74
MUR001_013GASC	25/07/2013	11:21	6/08/2013	709.720	710.290	17.15	33.32	34.90	36.97	38.73	0.59	0.62	0.73	0.76	48.05	49.19
MUR001_014GASA	22/04/2013	11:03	30/04/2013	712.970	713.320	16.59	34.23	35.88	37.99	39.82	0.57	0.60	0.70	0.74	50.20	51.41
MUR001_014GASB	16/05/2013	11:17	22/05/2013	712.970	713.320	17.61	31.12	32.54	34.55	36.12	0.61	0.64	0.74	0.78	44.32	45.32
MUR001_014GASC^	25/07/2013	11:43	6/08/2013	712.970	713.320	23.51	14.35	14.79	15.92	16.41	0.81	0.84	0.99	1.02	17.67	17.94
MUR001_015GASA	22/04/2013	11:03	30/04/2013	744.660	744.980	17.13	32.14	33.62	35.68	37.32	0.59	0.62	0.72	0.76	46.40	47.46
MUR001_015GASB_1	16/05/2013	11:17	22/05/2013	744.660	744.980	16.58	34.09	35.73	37.84	39.66	0.57	0.60	0.70	0.73	50.02	51.22
MUR001_015GASB_2	16/05/2013	11:17	22/05/2013	744.660	744.980	16.58	34.09	35.73	37.84	39.66	0.57	0.60	0.70	0.73	50.02	51.22
MUR001_015GASC	25/07/2013	13:05	6/08/2013	744.660	744.980	16.82	34.50	36.19	38.29	40.16	0.58	0.61	0.71	0.75	50.24	51.46
MUR001_016GASA	22/04/2013	11:10	30/04/2013	777.810	778.150	16.71	34.47	36.14	38.25	40.11	0.58	0.60	0.71	0.74	50.35	51.57
MUR001_016GASB	16/05/2013	11:22	22/05/2013	777.810	778.150	16.68	34.47	36.15	38.26	40.12	0.58	0.60	0.71	0.74	50.41	51.63
MUR001_016GASC	25/07/2013	13:43	6/08/2013	777.810	778.150	17.24	35.12	36.89	38.94	40.90	0.60	0.62	0.73	0.77	50.48	51.74
MUR001_017GASA	22/04/2013	11:10	30/04/2013	782.060	782.860	17.20	32.50	34.02	36.08	37.76	0.59	0.62	0.73	0.76	46.82	47.91
MUR001_017GASB*	29/04/2013	10:50	1/05/2013	782.060	782.860	-	-	-	-	-	-	-	-	-	-	-
MUR001_017GASC	25/07/2013	14:01	6/08/2013	782.060	782.860	16.78	34.42	36.10	38.20	40.06	0.58	0.61	0.71	0.74	50.18	51.40
MUR001_018GASA_1	22/04/2013	11:10	30/04/2013	787.900	788.540	17.19	32.21	33.70	35.76	37.42	0.59	0.62	0.73	0.76	46.41	47.49
MUR001_018GASA_2	22/04/2013	11:10	30/04/2013	787.900	788.540	17.19	32.21	33.70	35.76	37.42	0.59	0.62	0.73	0.76	46.41	47.49
MUR001_018GASB	16/05/2013	11:22	22/05/2013	787.900	788.540	16.59	34.03	35.66	37.78	39.59	0.57	0.60	0.70	0.74	49.91	51.11
MUR001_018GASC	25/07/2013	14:20	6/08/2013	787.900	788.540	16.49	34.08	35.71	37.84	39.65	0.57	0.60	0.70	0.73	50.14	51.34

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MUR001_019GASA^	22/04/2013	11:10	30/04/2013	803.370	803.670	21.01	20.83	21.58	23.12	23.95	0.73	0.75	0.89	0.92	27.15	27.64
MUR001_019GASB	16/05/2013	11:22	22/05/2013	803.370	803.670	17.99	29.98	31.31	33.28	34.76	0.62	0.65	0.76	0.79	42.23	43.16
MUR001_019GASC^	25/07/2013	14:39	6/08/2013	803.370	803.670	21.29	20.76	21.51	23.03	23.87	0.74	0.76	0.90	0.93	26.86	27.35
MUR001_020GASA	22/04/2013	11:16	30/04/2013	807.290	808.090	16.68	34.07	35.71	37.82	39.64	0.58	0.60	0.71	0.74	49.83	51.03
MUR001_020GASB_1	29/04/2013	10:51	1/05/2013	807.290	808.090	18.79	27.32	28.47	30.33	31.61	0.65	0.68	0.79	0.83	37.66	38.45
MUR001_020GASB_2	29/04/2013	10:51	1/05/2013	807.290	808.090	18.79	27.32	28.47	30.34	31.61	0.65	0.68	0.79	0.83	37.66	38.45
MUR001_020GASC*	25/07/2013	14:57	6/08/2013	807.290	808.090	-	-	-	-	-	-	-	-	-	-	-
MUR001_021GASA	22/04/2013	11:16	30/04/2013	808.090	808.790	17.43	31.03	32.43	34.46	36.01	0.60	0.63	0.74	0.77	44.41	45.41
MUR001_021GASC	13/05/2013	9:45	21/05/2013	808.090	808.790	17.75	30.18	31.53	33.52	35.01	0.61	0.64	0.75	0.78	42.82	43.77
MUR001_021GASD	13/05/2013	10:27	21/05/2013	808.090	808.790	16.41	34.17	35.81	37.94	39.75	0.57	0.59	0.69	0.73	50.40	51.60
MUR001_021GASE	13/05/2013	10:40	21/05/2013	808.090	808.790	16.45	34.20	35.84	37.97	39.79	0.57	0.60	0.70	0.73	50.38	51.59
Standard E1_1			30/04/2013			25.41	20.86	21.80	23.03	24.07	0.88	0.92	1.07	1.12	24.58	25.14
Standard E1_2			30/04/2013			25.41	20.86	21.80	23.02	24.06	0.88	0.92	1.07	1.12	24.58	25.13
Standard G1_1			1/05/2013			28.47	1.68	1.72	1.83	1.86	0.98	1.00	1.20	1.23	1.84	1.86
Standard G1_2			1/05/2013			28.47	1.68	1.72	1.83	1.86	0.98	1.00	1.20	1.23	1.84	1.86
Standard E2_1			21/05/2013			25.42	20.87	21.82	23.04	24.08	0.88	0.92	1.07	1.12	24.59	25.15
Standard E2_2			21/05/2013			25.42	20.87	21.82	23.04	24.08	0.88	0.92	1.07	1.12	24.59	25.15
Standard G2_1			22/05/2013			28.47	1.73	1.76	1.87	1.91	0.98	1.00	1.20	1.23	1.89	1.91
Standard G2_2			22/05/2013			28.47	1.73	1.76	1.87	1.91	0.98	1.00	1.20	1.23	1.89	1.91
Standard A1_1			6/08/2013			16.55	34.84	36.53	38.66	40.54	0.57	0.60	0.70	0.73	51.15	52.39
Standard A1_2			6/08/2013			16.55	34.84	36.53	38.66	40.54	0.57	0.60	0.70	0.73	51.15	52.39

The above parameters are calculated from the corresponding air free gas compositon analysis results at a standard temperature of 15 degrees Celsius and standard pressure of 101.325 kPa.

^ Denotes reported values are not covered by the Australian Standard due to compositional component falling outside the required range for calculations to be applicable.

* Denotes sample contained <5% measured components after air and purge gas correction, thus these values were not used to calculate the above fields.

Approved By:
Matthew Crotty - Chemist

Robert Raymond - Laboratory Manager

Appendix IV

Geological Information

QGC Pty Limited Murdoch 1

Hole Summary

	Easting	Northing	Zone
MGA:	268824.000	6902160.000	56
RL Ground (AHD):	352.000	**RL RKB (AHD):**	353.000
Accuracy:	Pre-Spud Survey	**Survey Source:**	Well Proposal
Start Date:	31-Mar-13	**Finish Date:**	16-Apr-13
Base of Alluvials (m):		**Weathered Depth (m):**	
SWL(m):		**Deviation at TD:**	
Total Depth (m):	853.860	**Hole Status:**	Plugged & Abandoned

Non Cored From (m)	Non Cored To (m)	Non Cored Size	Cored From (m)	Cored To (m)	Cored Size
0.000	10.000	14" Auger			
10.000	72.000	8 1/2" PDC			
72.000	565.150	6 1/8" PDC	565.150	853.860	3 7/8" HQ

Casing:	Depth (m)	Size	Material	Type	Recovered
CSG String 1:	10.000	9 5/8"	Steel	Conductor	No
CSG String 2:	71.750	7"	Steel	Surface	No
CSG String 3:	563.950	4 1/2"	Steel	Intermediate	No

Geophysical Logs:	From (m)	To(m)	Logging Tool
Log Run 1:	5.000	853.860	Gamma, Density, Neutron, Sonic, Induction Resistivity
Log Run 2:	563.950	853.860	CMI

Geology:	Earth Data Pty Ltd	**Geologist:**	Danielle Higgins, Janelle Hurrell
Drilling Contractor:	Spaulding Drilling	**Driller:**	
Geophysics:	Weatherford Precision Wireline Services	**Laboratory:**	Earth Data Pty Ltd, ACIRL, ERC
Total Core Trays:	66	**Core Photos:**	YES
Formation at TD:	Eurombah Formation		

Comments:

EARTH DATA

QGC Pty Limited - Murdoch 1 Formation Depths

Formation	Top (m)	Base (m)
Westbourne Formation	127.660	421.140
Norwood Mudstone	421.140	550.620
Springbok Sandstone	550.620	601.270
Upper Juandah Coal Measures	601.270	671.310
Lower Juandah Coal Measures	671.310	745.960
Tangalooma Sandstone	745.960	759.170
Taroom Coal Measures	759.170	823.110
Eurombah Formation	823.110	TD

QGC Pty Limited - Murdoch 1

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
0.000	565.150	565.150	NO SAMPLE			Non-cored section.
565.150	566.480	1.330	NO SAMPLE			Top of cored section. Cement recovered only.
566.480	569.200	2.720	SANDSTONE	Light grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, thinly bedded, minor carbonaceous wisps throughout common towards base, carbonaceous laminae in localised bands within unit, medium to high strength, 4 fractures, spin marks on one break.		MB 569.20 D 4.05 R 2.72
569.200	573.940	4.740	SANDSTONE	Light grey to grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, thinly bedded, upper half of unit us abundant in carbonaceous laminae and wisps, medium to high strength, core broken in middle of unit, 7 fractures.		
573.940	574.600	0.660	CORE LOSS			MB 574.60 D 5.40 R 4.74
574.600	580.510	5.910	SANDSTONE	Light grey to grey brown, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, thickly bedded, fining up sequences, minor localised carbonaceous laminae in middle of unit, muddy brown content in middle of unit, with coaly , medium to high strength, core ground in middle of unit, 6 fractures.		
580.510	580.600	0.090	CORE LOSS			MB 580.60 D 6.00 R 5.91
580.600	583.290	2.690	SANDSTONE	Light grey to grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, massive, minor carbonaceous laminae, medium to high strength, odd drilling cut in middle of unit, erosional basal contact.		
583.290	583.560	0.270	SILTSTONE	Brown to grey, thinly laminated, medium to high strength, erosional basal contact.		
583.560	583.670	0.110	SANDSTONE	Light grey to grey, fine to very coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, quartz to quartzlithic, argillaceous cement, moderate visible porosity, medium to high strength, sharp irregular basal		

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
				contact.		
583.670	583.710	0.040	SILTSTONE	Dark grey, thinly laminated, sharp irregular basal contact.		
583.710	586.450	2.740	SANDSTONE	Grey, medium to coarse grained, sub angular to sub rounded sub spherical, quartz lithic, calcareous cement, moderate visible porosity, rare carbonaceous laminae throughout unit.		
586.450	586.680	0.230	CORE LOSS			MB 586.60 D 6.00 R 5.85
586.680	590.760	4.080	SANDSTONE	Grey, medium to coarse grained, sub angular to sub rounded sub spherical, moderate sorting, quartz to quartz lithic, localised common carbonaceous laminae at top and middle of unit, tends to a muddy brown cement with coarser grains in lower unit, high strength, erosional basal contact.		
590.760	590.850	0.090	SIDERITE	Brown, medium grained, sub rounded sub spherical, lithic, argillaceous cement, minor carbonaceous laminae towards base, medium to high strength, gradational basal contact.		
590.850	592.210	1.360	SANDSTONE	Grey, fine to medium grained, sub angular sub spherical, moderate sorting, quartz to quartz lithic, argillaceous cement, sideritic clasts in a 0.10m thick band at 0.41m from top of unit, erosional basal contact.		
592.210	592.250	0.040	SIDERITE	Tan brown, very high strength, erosional basal contact.		
592.250	592.440	0.190	SANDSTONE	Grey, fine to medium grained, sub rounded sub spherical, moderate sorting, quartz lithic, argillaceous cement, carbonaceous laminae common throughout unit.		
592.440	592.680	0.240	CORE LOSS			MB 592.60 D 6.00 R 5.76
592.680	594.950	2.270	SANDSTONE	Grey, fine to medium grained, sub rounded sub spherical, moderate sorting, quartz lithic, argillaceous cement, carbonaceous laminae common in localised bands in middle of unit, siltstone band at 0.52m from top of unit with minor siltstone clasts above and below, low to medium strength, gradational basal contact.		
594.950	595.340	0.390	SANDSTONE	Light brown grey, fine to coarse grained, sub rounded sub spherical, moderate sorting, quartz minor lithic, argillaceous cement, carbonaceous laminae and coal laminae abundant throughout unit, broken in part, sharp		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					basal contact.		
595.340	595.530	0.190	SILTSTONE		Light brown grey, carbonaceous laminae common at top of unit, minor sandy laminae towards base, medium strength, 2 fractures, gradational basal contact.		
595.530	598.110	2.580	SANDSTONE		Grey, fine to coarse grained, sub angular to sub rounded, sub spherical moderate sorting, quartz to quartz lithic, argillaceous to calcareous cement in part, common carbonaceous wisps and laminae throughout, minor siltstone beds at top of unit.		
598.110	598.680	0.570	CORE LOSS				MB 598.60 D 6.00 R 5.43
598.680	598.840	0.160	SANDSTONE		Grey, fine to coarse grained, sub angular to sub rounded, sub spherical moderate sorting, quartz to quartz lithic, argillaceous to calcareous cement in part, common carbonaceous wisps throughout, sharp basal contact.		
598.840	598.940	0.100	SILTSTONE		Brown, minor carbonaceous wisps, sharp irregular basal contact.		
598.940	600.120	1.180	SANDSTONE		Grey, medium to very coarse grained, sub angular to sub rounded, sub spherical, poorly to moderate sorting, quartzose to minor quartz lithic, argillaceous cement, common localised carbonaceous laminae and wisps at top of unit, greenish matrix towards base of unit.		
600.120	600.310	0.190	CONGLOMERATE		Mottled, pebble sized, lithic, brown to greenish matrix, coaly clasts, core ground and friable, gradational basal contact.		
600.310	601.270	0.960	SANDSTONE		Grey to greenish, medium to very coarse grained, sub angular to sub rounded, sub spherical, poorly to moderate sorting, quartzose to minor quartz lithic, argillaceous cement, lithic pebbles abundant in band at base of unit, minor carbonaceous laminae throughout, brown to green matrix, low to medium strength, sharp irregular basal contact.		Base of Springbok Sandstone
601.270	602.850	1.580	SANDSTONE	60%	Grey green, fine to medium grained, sub rounded sub spherical, well sorted, quartz lithic, argillaceous cement.		
			SILTSTONE	40%	Grey. In general, sandy at top of unit, thinly interlaminated towards middle of unit, silty at base of unit, medium strength, sharp basal contact.		Top of Upper Juandah Coal Measures
602.850	603.710	0.860	SANDSTONE		Light grey, medium to coarse grained, sub rounded sub spherical, well sorted,		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					quartzose to quartz minor lithic, argillaceous cement, rare carbonaceous wisps, very low strength, core ground and friable.		
603.710	604.180	0.470	CORE LOSS				MB 604.10 D 5.50 R 5.03
604.180	604.360	0.180	SANDSTONE		Light grey, fine grained, sub rounded, sub spherical, moderate sorting, poorly cemented, moderate visible porosity, thinly to thickly laminated, low strength, gradational basal contact.		
604.360	607.490	3.130	SANDSTONE		Light grey, course grained, quartz lithic, sub angular to sub rounded, sub spherical, well sorted, poorly cemented, moderate visible porosity, , massive, low to medium strength.		
607.490	607.680	0.190	CORE LOSS				MB 607.60 D 3.50 R 3.31
607.680	607.810	0.130	SANDSTONE		Dark grey, coarse grained, quartz lithic, sub angular to sub rounded, sub spherical, well sorted, poorly cemented, moderate visible porosity, , thickly laminated, low to medium strength, gradational basal contact.		
607.810	608.150	0.340	SILTSTONE		Dark grey, thinly laminated, occasional sandy laminae at middle of unit, low strength, core ground at middle of unit.		
608.150	610.180	2.030	CORE LOSS				MB 610.10 D 2.50 R 0.47
610.180	610.300	0.120	SILTSTONE		Grey, occasional sandy laminae at base of unit, low to medium strength.		
610.300	611.380	1.080	CORE LOSS				MB 611.30 D 1.20 R 0.12
611.380	613.460	2.080	CORE LOSS				MB 613.60 D 2.30 R 0.00
613.460	615.060	1.600	SANDSTONE		Light grey, fine to coarse grained, angular to sub angular, sub elongate to sub spherical, moderate sorting, moderately cemented, moderate visible porosity, thinly to thickly laminated, carbonaceous laminae at top of unit, low to medium strength, over drill at top of unit.		MB 614.80 D 1.20 R 1.60
615.060	619.860	4.800	SANDSTONE	85%	Light grey, medium grained, sub angular to sub rounded, sub spherical, well sorted, moderately cemented, moderate visible porosity.		
			SILTSTONE	15%	Dark grey brown. In general, thinly laminated to very thinly bedded, occasional carbonaceous laminae throughout, fissile at middle, high carbon content at base of unit, low to medium strength.		MB 619.60 D 4.80 R 6.07

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
619.860	621.860	2.000	SANDSTONE	Light grey, medium grained, sub angular to sub rounded, sub spherical, well sorted, poor to moderately cemented, high visible porosity, thinly laminated to thinly bedded, occasional carbonaceous laminae throughout, fining upwards, low to medium strength, badly broken at base of unit.		MB 621.60 D 2.00 R 2.50
621.860	622.210	0.350	SILTSTONE	Dark grey, thinly laminated, common carbonaceous wisps throughout unit, low strength, over drilled, sharp basal contact.		
622.210	622.320	0.110	COAL Dull	Mudstone laminae near top of unit, core ground at top of unit, sharp basal contact, face cleat, average spacing 10mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 15mm, penetrating 10% of unit, no visible mineralisation, dips 80 degrees with azimuth 80 degrees to face cleat.		
622.320	622.410	0.090	CARBONACEOUS MUDSTONE	Light brown, thinly to thickly laminated, common carbonaceous wisps throughout, common carbonaceous laminae at base of unit, low strength, sharp basal contact.		
622.410	622.440	0.030	COAL Dull	Face cleat, average spacing 15mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 70% of unit, no visible mineralisation, dips 90 degrees with azimuth 45 degrees to face cleat, fracture set 1, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
622.440	622.590	0.150	COAL Dull minor bright	Tending to carbonaceous mudstone in part, 1 fracture, gradational basal contact, face cleat, average spacing 10mm, penetrating 5% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 7mm, penetrating 5% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		Top of MUR001_001
622.590	622.690	0.100	CARBONACEOUS MUDSTONE	Dark brown, coaly in part, 1 fracture, gradational basal contact.		
622.690	623.190	0.500	COAL Dull	Tuff lenses and laminae rare, coaly in part, 2 fractures, no visible cleat or fractures.		Base of MUR001_001
623.190	623.280	0.090	COAL Stony	Core ground at top of unit, gradational basal contact, no visible cleat or fractures.		

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
623.280	623.460	0.180	CARBONACEOUS MUDSTONE	Dark brown black, common carbonaceous laminae throughout, tending to stony coal at parts, low strength.		MB 623.20 D 1.60 R 1.77
623.460	623.530	0.070	TUFF	Cream, badly broken, low strength, basal parting.		Top of MUR001_002
623.530	623.610	0.080	COAL Stony	Tuffaceous laminae common, gradational basal contact, no visible cleat or fractures.		
623.610	623.640	0.030	TUFF	Light grey, coaly wisps rare, sharp basal contact.		
623.640	623.650	0.010	COAL Stony	Tuff laminae common, sharp basal contact, no visible cleat or fractures.		
623.650	623.670	0.020	TUFF	Light grey, coaly wisps rare, sharp basal contact.		
623.670	623.710	0.040	COAL Stony	Tuff laminae common at top, basal parting, no visible cleat or fractures.		
623.710	623.745	0.035	TUFF	Cream, coaly wisps abundant in part, sharp basal contact.		
623.745	623.860	0.115	COAL Dull minor bright	1 fracture, sharp basal contact, face cleat, average spacing 5mm, penetrating 2% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
623.860	623.870	0.010	TUFF	Coaly lenses and laminae common, sharp basal contact.		
623.870	624.020	0.150	COAL Dull minor bright	Tuff laminae rare, 2 fractures, basal parting, face cleat, average spacing 10mm, penetrating 2% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
624.020	624.100	0.080	TUFF	Brown, carbonaceous, broken in part, sharp basal contact.		Base of MUR001_002
624.100	624.340	0.240	CARBONACEOUS MUDSTONE	Dark grey black, thinly laminated, tending to stony coal throughout, medium strength, core ground at top of unit, sharp basal contact.		
624.340	624.555	0.215	COAL Dull and bright	Low strength, 2 fractures, sharp basal contact, face cleat, average spacing 4mm, penetrating 10% of unit, 90% clay filled, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 10% of unit, 90% clay filled, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 30mm, penetrating 90% of unit, 50% carbonate filled, dips 90 degrees.		Top of MUR001_003
624.555	624.565	0.010	CARBONACEOUS MUDSTONE	Dark brown, coaly, medium strength, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
624.565	624.585	0.020	COAL Dull minor bright	Medium strength, sharp basal contact, no visible cleat or fractures.		
624.585	624.625	0.040	COAL Dull	Medium strength, sharp basal contact, face cleat, average spacing 15mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
624.625	624.690	0.065	COAL Dull banded	Medium strength, basal parting, face cleat, average spacing 6mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 15mm, penetrating 60% of unit, no visible mineralisation, dips 90 degrees, secondary butt cleat, average spacing 30mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		Base of MUR001_003
624.690	624.740	0.050	CORE LOSS			
624.740	624.840	0.100	COAL Dull	Gradational basal contact, no visible cleat or fractures.		Top of MUR001_004
624.840	624.935	0.095	COAL Dull banded	Sharp basal contact, face cleat, average spacing 10mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 5mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
624.935	624.970	0.035	TUFF	White, coaly wisps rare, basal parting.		
624.970	625.210	0.240	COAL Dull minor bright	Broken in part, gradational basal contact, no visible cleat or fractures.		
625.210	625.240	0.030	CARBONACEOUS MUDSTONE	Dark brown, badly broken, sharp basal contact.		Base of MUR001_004, MB 625.20 D 2.00 R 1.73
625.240	625.270	0.030	COAL Stony	Gradational basal contact, no visible cleat or fractures.		
625.270	625.380	0.110	MUDSTONE	Brown, tending carbonaceous mud in part, core is undersized, with spin marks at the base .		
625.380	625.420	0.040	SILTSTONE	Dark grey brown, minor carbonaceous wisps, gradational basal contact.		
625.420	625.840	0.420	SIDERITE	Dark brown, very high strength, erosional basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
625.840	626.270	0.430	SANDSTONE	30%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement.		
			SILTSTONE	70%	Dark brown grey. In general, thinly interlaminated with some larger silty beds, common carbonaceous laminae throughout, slickensided fracture at base, medium to high strength.		
626.270	626.660	0.390	CORE LOSS				MB 631.30 D 6.10 R 1.03
626.660	629.200	2.540	SANDSTONE	30%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement.		
			SILTSTONE	70%	Dark grey. In general, thinly interlaminated to thickly interbedded, carbonaceous laminae common throughout, major silty bed at 0.40m from top of unit, , medium to high strength, core broken and partially redrilled, 5 fractures, spin marks on upper core, sharp irregular basal contact.		
629.200	631.430	2.230	SANDSTONE		Light grey to grey, medium to coarse grained, quartz to quartz lithic, sub rounded sub spherical, moderate sorting calcareous cement, abundant carbonaceous laminae in localised bands at top of unit, becoming common to minor towards base.		MB 631.60 D 0.30 R 4.77
631.430	632.120	0.690	SANDSTONE		Light grey, medium to coarse grained, quartz to quartz lithic, sub rounded sub spherical, moderate sorting calcareous cement, abundant carbonaceous laminae towards base, sharp basal contact.		
632.120	632.190	0.070	CORE LOSS				
632.190	632.270	0.080	COAL Stony		Sharp irregular basal contact, face cleat, average spacing 10mm, penetrating 20% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 25% of unit, 15% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		
632.270	632.520	0.250	SANDSTONE		Light grey, medium to coarse grained, quartz to quartz lithic, sub rounded sub spherical, moderate sorting calcareous cement, minor siltstone bands abundant carbonaceous wisps and coal lenses towards base, medium to high strength, erosional basal contact.		
632.520	632.610	0.090	COAL Stony		Gradational basal contact, no visible cleat or fractures.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
632.610	632.680	0.070	COAL Dull minor bright		Erosional basal contact, face cleat, average spacing 30mm, penetrating 50% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 30% of unit, 20% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		
632.680	633.260	0.580	SANDSTONE	40%	Grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement.		
			SILTSTONE	60%	Dark grey. In general, thinly to thickly interbedded, carbonaceous wisps minor throughout, , 2 slickensided fractures at 0.39m and 0.49m from top of unit, erosional basal contact.		
633.260	633.620	0.360	SIDERITE		Dark brown and mottled, calcite veins at top of unit, very high strength, gradational basal contact.		
633.620	634.430	0.810	SANDSTONE	50%	Grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement.		
			SILTSTONE	50%	Dark grey. In general, thinly to thickly bedded, sandy at top silty towards base, carbonaceous laminae throughout, sideritic clasts a top of unit, medium strength, sharp basal contact.		
634.430	634.480	0.050	CARBONACEOUS MUDSTONE		Dark brown, coaly laminae, medium strength, sharp basal contact.		
634.480	634.540	0.060	COAL Dull banded		Sharp basal contact, face cleat, average spacing 60mm, penetrating 100% of unit, 20% carbonate filled, dips 90 degrees, butt cleat, average spacing 15mm, penetrating 80% of unit, 20% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		
634.540	635.100	0.560	SANDSTONE	40%	Grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement.		
			SILTSTONE	60%	Dark grey. In general, thinly interbedded at top of unit, silt towards base, minor carbonaceous wisps throughout, sharp basal contact.		
635.100	635.220	0.120	CORE LOSS				
635.220	635.240	0.020	CARBONACEOUS MUDSTONE		Dark brown, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
635.240	635.530	0.290	SILTSTONE		Dark grey brown, medium strength, gradational basal contact.		
635.530	635.610	0.080	CARBONACEOUS MUDSTONE		Dark grey brown, carbonaceous laminae.		
635.610	635.940	0.330	SILTSTONE		Dark grey brownish, increasing carbonaceous content towards base, coal flares at base of unit, minor slickensided fracture at 0.27m from top of unit, erosional basal contact.		
635.940	636.030	0.090	COAL Stony		Gradational basal contact, no visible cleat or fractures.		
636.030	636.070	0.040	COAL Bright		Sharp basal contact, face cleat, average spacing 10mm, penetrating 100% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 5mm, penetrating 80% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		
636.070	636.140	0.070	CORE LOSS				
636.140	636.870	0.730	SANDSTONE	40%	Grey, fine to medium grained, lithic, sub rounded sub spherical, well sorted, argillaceous cement.		
			SILTSTONE	60%	Dark grey. In general, thinly to thickly interbedded, minor cross bedding towards base, carbonaceous laminae throughout, sharp basal contact.		
636.870	636.920	0.050	CARBONACEOUS MUDSTONE		Dark brown, carbonaceous laminae throughout.		
636.920	637.020	0.100	CORE LOSS				MB 637.60 D 6.00 R 5.23
637.020	637.090	0.070	COAL Stony		Sharp basal contact, no visible cleat or fractures.		
637.090	637.250	0.160	CARBONACEOUS MUDSTONE		Dark brown, carbonaceous laminae and wisps throughout, gradational basal contact.		
637.250	639.490	2.240	SANDSTONE	50%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted argillaceous cement.		
			SILTSTONE	50%	Dark grey. In general, thinly interlaminated to thickly interbedded, silty at top of unit, sandier towards base of unit, minor cross bedding throughout.		
639.490	639.650	0.160	CARBONACEOUS		Dark brown, tuffaceous in part, sharp basal contact.		Top of MUR001_005

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
			MUDSTONE			
639.650	639.720	0.070	COAL Dull	1 fracture, sharp basal contact, no visible cleat or fractures.		
639.720	639.760	0.040	TUFF	Cream, coaly lenses abundant, 1 fracture, sharp basal contact.		
639.760	639.840	0.080	COAL Dull	1 fracture, sharp basal contact, no visible cleat or fractures.		
639.840	639.860	0.020	TUFF	Grey, coaly laminae common, sharp basal contact.		
639.860	639.960	0.100	COAL Dull	Tuff laminae occasional, basal parting, no visible cleat or fractures.		
639.960	639.980	0.020	TUFF	Light grey, coaly wisps rare, sharp basal contact.		
639.980	640.200	0.220	COAL Dull	Badly broken, no visible cleat or fractures.		Base of MUR001_005
640.200	640.920	0.720	CARBONACEOUS MUDSTONE	Dark brown, bright flecks occasional, coaly, subvertical calcite veining rare, gradational basal contact.		Top of MUR001_006
640.920	640.980	0.060	TUFF	Cream, coaly wisps occasional, sharp basal contact.		
640.980	641.010	0.030	COAL Stony	No visible cleat or fractures.		Base of MUR001_006
641.010	641.050	0.040	CARBONACEOUS MUDSTONE	Dark brown, tuffaceous in part, coaly towards base, medium strength, gradational basal contact.		
641.050	641.110	0.060	COAL Stony	Face cleat, average spacing 60mm, penetrating 70% of unit, 30% carbonate filled, dips 90 degrees, no visible butt cleat.		
641.110	641.160	0.050	TUFF	Cream, carbonaceous wisps minor throughout unit, erosional basal contact.		
641.160	641.230	0.070	COAL Stony	Face cleat, average spacing 60mm, penetrating 60% of unit, 10% carbonate filled, dips 90 degrees, no visible butt cleat.		
641.230	641.260	0.030	CARBONACEOUS MUDSTONE	Dark brown, carbonaceous content throughout unit, no visible cleat or fractures.		
641.260	641.380	0.120	COAL Stony	Face cleat, average spacing 30mm, penetrating 40% of unit, 15% carbonate filled, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 10% of unit, 5% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
641.380	641.420	0.040	CORE LOSS				
641.420	641.590	0.170	SILTSTONE		Dark grey, carbonaceous wisps throughout, sharp basal contact.		
641.590	641.770	0.180	CARBONACEOUS MUDSTONE		Dark brown grey, coaly lenses and laminae abundant throughout, minor silty bands, sharp basal contact.		
641.770	641.880	0.110	COAL Dull		Face cleat, average spacing 60mm, penetrating 90% of unit, 20% carbonate filled, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 100% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		MB 642.90 D 5.30 R 4.85
641.880	642.750	0.870	SILTSTONE	70%	Dark grey.		
			SANDSTONE	30%	Grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting argillaceous cement. In general, coaly at top of unit, coal lenses and laminae abundant at top of unit, thinly interlaminated tending , sharp basal contact.		
642.750	643.060	0.310	CARBONACEOUS MUDSTONE		Dark brown, coaly at top of unit, sharp basal contact.		Top of MUR001_007
643.060	643.230	0.170	TUFF		Cream, sandy, coaly wisps occasional, 1 fracture, basal parting.		
643.230	643.350	0.120	COAL Dull		Stony in part, sharp basal contact, no visible cleat or fractures.		Base of MUR001_007
643.350	643.390	0.040	CORE LOSS				
643.390	643.580	0.190	SILTSTONE		Dark grey, tuffaceous at top of unit.		
643.580	644.120	0.540	COAL Stony		Rare, bright flecks throughout, tending to carbonaceous mudstone in part, subvertical calcite veining occasional, 3 fractures, no visible cleat or fractures.		MUR001_008, MB 644.00 D 1.10 R 2.20
644.120	646.880	2.760	SANDSTONE	40%	Light grey, fine to medium grained, quartz lithic sub rounded sub spherical, well sorted, argillaceous cement.		
			SILTSTONE	60%	Dark grey. In general, thinly interlaminated with a larger bed of siltstone at the top of the unit, and minor disturbed bedding throughout, larger beds of sandstone towards the base of the unit, medium to high strength, erosional basal contact.		
646.880	647.170	0.290	MUDSTONE		Dark brown, tends carbonaceous mudstone throughout unit, 2 bedding plane		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					factures, medium strength, slickensided fractures occur at 0.09m and 0.19m, gradational basal contact.		
647.170	647.260	0.090	CORE LOSS				
647.260	648.820	1.560	SANDSTONE	60%	Light grey, fine to medium grained, quartz lithic sub rounded sub spherical, well sorted, argillaceous cement.		
			SILTSTONE	40%	Dark grey. In general, sandy at top of unit, with thinly interlaminated and thinly interbedded throughout rest of unit, medium strength, slickensided fracture at base of unit, erosional basal contact.		
648.820	648.950	0.130	MUDSTONE		Dark brown to dark grey, carbonaceous wisps throughout unit with increasing carbonaceous content towards base of unit,.		MB 649.60 D 5.60 R 4.74
648.950	653.890	4.940	SANDSTONE	50%	Grey, fine grained, sub rounded. spherical, well sorted, quartz lithic, argillaceous cement, well cemented, poor visible porosity.		
			SILTSTONE	30%	Grey.		
			MUDSTONE	20%	Dark grey, carbonaceous at parts. In general, thinly to thickly laminated, common fossiliferous rootlets at top and base, medium to high strength, 3 fractures.		MB 653.60 D 4.00 R 5.03
653.890	654.180	0.290	TUFF		Beige grey, common carbonaceous wisps throughout unit, medium strength, over drilled throughout, sharp basal contact.		
654.180	654.230	0.050	COAL Dull		Core ground at middle, broken at base, sharp basal contact, face cleat, average spacing 30mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
654.230	654.660	0.430	SANDSTONE	60%	Grey, fine grained, rounded, spherical, well sorted, argillaceous cement, well cemented, poor visible porosity.		
			MUDSTONE	40%	Dark grey. In general, thinly laminated, occasional carbonaceous laminae throughout, common carbonaceous wisps at top, low strength, core ground at top, 1 fracture, gradational basal contact.		
654.660	655.610	0.950	MUDSTONE		Dark grey, carbonaceous at parts, occasional sandy laminae at base, occasional carbonaceous wisps throughout unit, low strength, 2 fractures, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
655.610	655.680	0.070	COAL Dull minor bright		Core ground at middle, broken at base, sharp basal contact, face cleat, average spacing 8mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 4mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
655.680	655.820	0.140	CORE LOSS				
655.820	656.030	0.210	SANDSTONE		Light grey, fine grained, sub rounded, rounded, well sorted, well cemented, poor visible porosity, common carbonaceous wisps at top of unit, medium strength, gradational basal contact.		
656.030	657.120	1.090	MUDSTONE		Dark grey brown, thinly laminated, tending to carbonaceous mudstone at parts, low strength, 3 fractures, 45 degree slickensided fracture at 1.02m from top of unit, gradational basal contact.		
657.120	657.250	0.130	COAL Stony		Tending to carbonaceous mudstone at parts, sharp basal contact, no visible cleat or fractures.		
657.250	657.310	0.060	COAL Dull minor bright		Face cleat, average spacing 30mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
657.310	657.530	0.220	CORE LOSS				MB 658.60 D 5.00 R 3.27
657.530	660.550	3.020	SANDSTONE	65%	Light grey, fine grained. rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic.		
			MUDSTONE	35%	Dark grey. In general, thinly laminated to very thinly bedded, common fossiliferous rootlets at top and middle, rare dewatering structures at base of unit, low to medium strength, core ground at top of unit, 5 fractures, 45 degree slickensided fracture at 2.39m from top of unit, gradational basal contact.		
660.550	660.660	0.110	MUDSTONE		Dark grey, abundant secondary calcite infill throughout unit, high strength, gradational basal contact.		
660.660	660.880	0.220	SIDERITE		Beige grey, high strength, gradational basal contact.		
660.880	661.180	0.300	MUDSTONE		Dark grey, abundant secondary calcite infill throughout unit, high strength,		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					gradational basal contact.		
661.180	662.310	1.130	SANDSTONE	10%	Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic.		
			MUDSTONE	90%	Grey. In general, thinly to thickly laminated, medium strength, gradational basal contact.		
662.310	663.540	1.230	SANDSTONE	90%	Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic.		
			SILTSTONE	10%	Grey. In general, thinly to thickly laminated, occasional cross bedding at top of unit, medium to high strength.		MB 663.60 D 5.00 R 6.01
663.540	667.540	4.000	SANDSTONE	90%	Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic.		
			SILTSTONE	10%	Grey. In general, sandstone with minor siltstone laminae and beds, carbonaceous laminae common throughout becoming rare at the base of the unit.		MB 667.60 D 4.00 R 4.10
667.540	671.190	3.650	SANDSTONE		Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity, quartz lithic, rare silty laminae towards base, abundant carbonaceous laminae and coaly laminae in lower half of the unit, medium strength, erosional basal contact.		
671.190	671.310	0.120	MUDSTONE		Brown , tends carbonaceous mudstone in part, spin marks and core undersize, gradational basal contact.		Base of Upper Juandah Coal Measures
671.310	673.360	2.050	SANDSTONE	60%	Grey, fine grained, sub rounded sub spherical, well sorted argillaceous cement.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated to thinly interbedded, minor carbonaceous wisps and laminae throughout increasing towards base.		Top of Lower Juandah Coal Measures
673.360	673.540	0.180	CORE LOSS				MB 673.60 D 6.00 R 5.82
673.540	678.210	4.670	SANDSTONE	50%	Light grey, fine grained, sub rounded sub spherical, well sorted argillaceous cement.		
			SILTSTONE	45%	Dark grey.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			MUDSTONE	5%	Brown. In general, thinly interlaminated to thinly interbedded, carbonaceous laminae throughout, mudstone beds in middle of unit, medium strength, badly broken due to core retrieval.		
678.210	679.870	1.660	CORE LOSS				MB 679.60 D 6.00 R 4.67
679.870	680.410	0.540	MUDSTONE		Dark grey brown, thinly laminae, carbonaceous laminae throughout, tending carbonaceous mudstone in part.		MB 680.10 D 0.50 R 0.54
680.410	681.510	1.100	MUDSTONE		Dark grey brown, thinly laminated, rare convoluted laminae near middle, occasional tuffaceous laminae throughout, low strength, core ground at top and middle of unit, 4 fractures.		MB 681.20 D 1.10 R 1.24
681.510	682.100	0.590	MUDSTONE		Dark grey black, thinly laminated, common tuffaceous laminae throughout, low strength, sharp basal contact.		
682.100	682.330	0.230	SANDSTONE		Light grey, medium grained, rounded, sub elongate, moderate sorting, argillaceous cement, well cemented, poor visible porosity, quartz lithic, occasional carbonaceous laminae throughout unit, medium strength, irregular sharp basal contact.		
682.330	682.360	0.030	COAL Stony		Tending to carbonaceous mudstone, sharp basal contact, no visible cleat or fractures.		
682.360	682.840	0.480	SANDSTONE	50%	Grey, fine grained, sub rounded, sub spherical, well sorted, argillaceous cement, poor visible porosity. quartz lithic.		
			MUDSTONE	50%	Dark grey. In general, thinly to thickly laminated, occasional carbonaceous wisps throughout, rare coal lens at base of unit, low strength, sharp basal contact.		
682.840	683.140	0.300	COAL Dull		Tending to carbonaceous mudstone rarely, bright flecks occasional, no visible cleat or fractures.		MUR001_009
683.140	683.180	0.040	CARBONACEOUS MUDSTONE		Dark grey black, low strength, sharp basal contact.		
683.180	683.200	0.020	TUFF		Beige, medium strength, sharp basal contact.		
683.200	685.670	2.470	SANDSTONE	30%	Light grey, fine grained, rounded, spherical, well sorted, argillaceous cement, well cemented, poor visible porosity.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			SILTSTONE	50%	Grey.		
			MUDSTONE	20%	Dark grey. In general, thinly to thickly laminated, common disturbed laminae throughout, occasional carbonaceous wisps at top, , low to medium strength.		MB 685.60 D 4.40 R 4.16
685.670	687.380	1.710	SANDSTONE		Light grey, medium grained, subrounded, sun spherical, well sorted, argillaceous cement, well cemented, poor visible porosity, rare silty laminae at middle of unit, common carbonaceous laminae at base, common coal fragments at base of unit, medium strength, 2 fractures, sharp basal contact.		
687.380	688.070	0.690	MUDSTONE		Dark grey black, occasional, sandy laminae at top, occasional clay nodules at middle and base of unit, low strength, 1 fracture, 20 degree slickensided fracture at 0.58m from top of unit, gradational basal contact.		
688.070	688.390	0.320	CARBONACEOUS MUDSTONE		Dark grey brown, thinly laminated, tending to stony coal at base of unit, low strength, gradational basal contact.		
688.390	691.780	3.390	SANDSTONE	30%	Grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	60%	Grey.		
			MUDSTONE	10%	Dark grey. In general, thinly to thickly laminated, common carbonaceous laminae at base, medium strength, ridged throughout.		MB 691.60 D 6.00 R 6.16
691.780	694.560	2.780	SANDSTONE		Light grey, medium grained subrounded, sub spherical, well sorted, well cemented, quartz lithic, poor visible porosity, thinly to thickly laminated, occasional carbonaceous laminae at top, slight sideritic alteration at middle, rare clay modules near base of unit, medium strength, 2 fractures, gradational basal contact.		
694.560	694.660	0.100	SIDERITE		Beige, occasional calcite veins at middle of unit, high strength, sharp basal contact.		
694.660	696.130	1.470	SANDSTONE		Light grey, medium grained subrounded, sub spherical, well sorted, well cemented, quartz lithic, poor visible porosity, common carbonaceous laminae at top, rare clay clast near base of unit, medium strength, 1 fracture, sharp basal contact.		
696.130	696.200	0.070	COAL Dull minor bright		Sharp basal contact, face cleat, average spacing 8mm, penetrating 10% of		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
696.200	696.600	0.400	MUDSTONE		Dark grey black, abundant carbonaceous wisps throughout, common coal lenses at middle and base of unit, low strength, gradational basal contact.		
696.600	696.650	0.050	CARBONACEOUS MUDSTONE		Dark grey brown, common carbonaceous wisps throughout unit, low strength, sharp basal contact.		
696.650	696.860	0.210	COAL Dull		Subvertical, calcite veining occasional, broken in part, 2 fractures, sharp basal contact, no visible cleat or fractures.		Top of MUR001_010
696.860	696.930	0.070	TUFF		Light brown, coaly wisps rare.		
696.930	697.440	0.510	COAL Dull minor bright		Badly broken in part, tuffaceous nodules rare, no visible cleat or fractures.		Base of MUR001_010
697.440	697.540	0.100	MUDSTONE		Dark grey, common carbonaceous wisps throughout unit, low strength, sharp basal contact.		
697.540	697.640	0.100	CORE LOSS				
697.640	697.710	0.070	COAL Dull		No visible cleat or fractures.		
697.710	697.740	0.030	CORE LOSS				MB 697.60 D 6.00 R 5.83
697.740	699.180	1.440	SANDSTONE	20%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	80%	Dark grey. In general, silty with minor sandy beds, carbonaceous wisps common throughout, sideritic nodules within unit and a coal lens towards the base, gradational basal contact.		
699.180	699.300	0.120	MUDSTONE		Dark grey brown, tends carbonaceous mudstone throughout.		
699.300	703.720	4.420	SANDSTONE	30%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	70%	Dark grey. In general, thinly interlaminated to thinly interbedded silty at top of unit, minor mudstone bands throughout, tends sideritic in middle of unit with calcite rich sandstone beds .		MB 703.60 D 6.00 R 6.04
703.720	705.070	1.350	SANDSTONE	40%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			SILTSTONE	60%	Dark grey. In general, thinly interlaminated to thinly interbedded, sandy at top of unit, siltier at base of unit, carbonaceous laminae throughout, gradational basal contact.		
705.070	705.310	0.240	CARBONACEOUS MUDSTONE		Dark brown, mudstone laminae with carbonaceous laminae throughout, gradational basal contact.		
705.310	707.890	2.580	SANDSTONE	40%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	60%	Dark grey. In general, thinly interlaminated to thinly interbedded mudstone laminae common throughout with sideritic nodules towards base of unit, carbonaceous laminae throughout, gradational basal contact.		
707.890	708.120	0.230	MUDSTONE		Brown, carbonaceous wisps minor, tending carbonaceous mudstone in part, erosional basal contact.		
708.120	708.340	0.220	SILTSTONE		Dark grey.		
708.340	708.500	0.160	CARBONACEOUS MUDSTONE		Dark brown, tending to stony coal at base, gradational basal contact.		Top of MUR001_011
708.500	709.060	0.560	COAL Stony		Tending to carbonaceous mudstone in part, 3 fractures, no visible cleat or fractures.		Base of MUR001_011
709.060	709.720	0.660	COAL Stony		Tending to carbonaceous mudstone in part, badly broken at base, bright lenses and flecks occasional, 70 degree calcite veining rare, 3 fractures, no visible cleat or fractures.		MUR001_012, MB 709.60 D 6.00 R 6.01
709.720	710.290	0.570	CARBONACEOUS MUDSTONE		Dark brown, coaly in part, tuffaceous lenses occasional, 2 fractures, closed, subvertical fracture in upper 0.30m.		MUR001_013
710.290	711.180	0.890	SANDSTONE	60%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	40%	Dark grey. In general, thinly interbedded with fining up sequences, carbonaceous wisps towards base of unit and at top.		
711.180	711.250	0.070	MUDSTONE		Dark grey, carbonaceous wisps throughout.		
711.250	711.290	0.040	CARBONACEOUS MUDSTONE		Dark brown grey.		

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
711.290	711.330	0.040	COAL Dull	Face cleat, average spacing 60mm, penetrating 80% of unit, 10% carbonate filled, dips 90 degrees, butt cleat, average spacing 45mm, penetrating 40% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		
711.330	711.390	0.060	CARBONACEOUS MUDSTONE	Dark brown, tending mudstone at the base minor coal laminae.		
711.390	711.460	0.070	MUDSTONE	Grey, carbonaceous wisps throughout.		
711.460	711.500	0.040	COAL Dull	No visible cleat or fractures.		
711.500	711.610	0.110	COAL Dull minor bright	Face cleat, average spacing 60mm, penetrating 80% of unit, 15% carbonate filled, dips 90 degrees, no visible butt cleat.		
711.610	711.680	0.070	COAL Stony	Tending carbonaceous mudstone in part, no visible cleat or fractures.		
711.680	711.700	0.020	TUFF	Cream, carbonaceous wisps throughout.		
711.700	711.770	0.070	COAL Stony	No visible cleat or fractures.		
711.770	712.080	0.310	SILTSTONE	Light grey, carbonaceous wisps throughout, erosional basal contact.		
712.080	712.140	0.060	TUFF	Cream, carbonaceous wisps throughout, erosional basal contact.		
712.140	712.400	0.260	SILTSTONE	Light grey, tending carbonaceous towards base.		
712.400	712.460	0.060	MUDSTONE	Dark grey, tending carbonaceous mudstone in part.		
712.460	712.530	0.070	COAL Dull	Face cleat, average spacing 60mm, penetrating 90% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
712.530	712.550	0.020	COAL Dull banded	Face cleat, average spacing 45mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
712.550	712.640	0.090	COAL Dull	Face cleat, average spacing 60mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
712.640	712.720	0.080	COAL Dull minor bright	Face cleat, average spacing 30mm, penetrating 30% of unit, 20% carbonate filled, dips 90 degrees, no visible butt cleat.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
712.720	712.970	0.250	SILTSTONE		Grey, carbonaceous laminae throughout.		
712.970	713.320	0.350	CARBONACEOUS MUDSTONE		Dark brown, coaly lenses rare, 3 fractures.		MUR001_014
713.320	713.750	0.430	SILTSTONE		Grey, carbonaceous wisps and coaly lenses throughout.		
713.750	713.770	0.020	COAL Dull		No visible cleat or fractures.		
713.770	714.430	0.660	SANDSTONE	50%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	50%	Grey. In general, thinly interlaminated to thinly interbedded carbonaceous laminae carbonaceous wisps throughout, unit tends to carbonaceous mudstone at base.		
714.430	714.760	0.330	SIDERITE		Tan grey, calcite cement.		
714.760	715.450	0.690	SANDSTONE	40%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	60%	Dark grey. In general, thinly interlaminated to thinly interbedded carbonaceous wisps throughout sideritic nodules throughout.		
715.450	715.500	0.050	COAL Dull		Face cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
715.500	715.570	0.070	SILTSTONE		Grey, carbonaceous wisps minor throughout.		
715.570	715.590	0.020	COAL Dull		No visible cleat or fractures.		
715.590	715.710	0.120	SILTSTONE		Grey, carbonaceous wisps and laminae throughout.		MB 715.60 D 6.00 R 6.00
715.710	715.760	0.050	SILTSTONE		Grey, carbonaceous laminae throughout.		
715.760	715.780	0.020	COAL Stony		No visible cleat or fractures.		
715.780	715.860	0.080	MUDSTONE		Dark grey, carbonaceous laminae and wisps throughout.		
715.860	715.940	0.080	CARBONACEOUS MUDSTONE		Brown, coal wisps and lenses.		
715.940	716.800	0.860	SILTSTONE		Grey, minor sandy beds throughout, carbonaceous laminae throughout with carbonaceous wisps at top and base of unit.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
716.800	716.830	0.030	COAL Dull		No visible cleat or fractures.		
716.830	717.530	0.700	SILTSTONE		Dark grey, minor sandy laminae, sideritic nodules at top of unit.		
717.530	717.980	0.450	SILTSTONE	50%	Dark grey.		
			SIDERITE	50%	Tan brown. In general, sideritic nodules and alteration throughout siltstone, minor sandy laminae.		
717.980	718.170	0.190	SILTSTONE		Dark grey, carbonaceous laminae common.		
718.170	718.850	0.680	SILTSTONE	50%	Grey.		
			MUDSTONE	50%	Light brown. In general, thinly interlaminated to thickly interbedded, carbonaceous wisps abundant at top and base of unit.		
718.850	718.880	0.030	CARBONACEOUS MUDSTONE		Dark brown, coaly lenses and laminae abundant.		
718.880	718.970	0.090	COAL Dull		Face cleat, average spacing 30mm, penetrating 100% of unit, 40% carbonate filled, dips 90 degrees, no visible butt cleat.		
718.970	720.010	1.040	SILTSTONE	50%	Dark grey.		
			SANDSTONE	50%	Grey, fine grained, quartz lithic, sub rounded sub spherical, well sorted. In general, thinly interlaminated to thinly interbedded sandier in middle of unit, carbonaceous wisps and laminae throughout, complex slickensided fractures at 1.00m from top of unit.		
720.010	720.140	0.130	CARBONACEOUS MUDSTONE		Dark brown, coal laminae, wisp and lenses abundant throughout.		
720.140	721.690	1.550	SANDSTONE	70%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical well sorted.		
			SILTSTONE	30%	Dark grey. In general, thickly interbedded to thinly interlaminated, minor disturbed bedding, minor coal lenses in middle of unit, carbonaceous wisps throughout.		MB 721.60 D 6.00 R 6.04
721.690	721.910	0.220	MUDSTONE		Dark brown, tending carbonaceous mudstone in part, carbonaceous laminae and wisps throughout, erosional basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
721.910	726.170	4.260	SANDSTONE	60%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated to thickly interbedded, carbonaceous wisps throughout, minor mudstone beds in middle of unit, sharp irregular basal contact.		
726.170	727.920	1.750	SANDSTONE	90%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement, .		
			SILTSTONE	10%	Grey. In general, thinly interlaminated to thinly interbedded carbonaceous wisps common at top of unit, coal lenses abundant from 0.4 to 0.5m and common til 0.6m from top of unit.		MB 727.60 D 6.00 R 6.16
727.920	728.310	0.390	SANDSTONE	90%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting, calcareous cement.		
			SILTSTONE	10%	Dark grey. In general, thinly interlaminated to thinly interbedded minor carbonaceous laminae.		
728.310	728.470	0.160	COAL Dull		30 degree fracture at 0.06m from top of unit, no visible cleat or fractures.		
728.470	728.530	0.060	CARBONACEOUS MUDSTONE		Light brown, common carbonaceous wisps.		
728.530	729.720	1.190	SANDSTONE	20%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	60%	Dark grey.		
			MUDSTONE	20%	Brown. In general, thinly interlaminated to thinly interbedded minor carbonaceous laminae throughout coaly wisps in middle of unit, slickensided fracture at 0.90m from top of unit, and complex fractures at 1.00m to 1.20m from top of unit, sharp irregular basal contact.		
729.720	729.770	0.050	CARBONACEOUS MUDSTONE		Dark brown, common coal lenses and wisps , sharp irregular basal contact.		
729.770	729.830	0.060	COAL Dull		No visible cleat or fractures.		
729.830	729.990	0.160	CARBONACEOUS		Dark brown, coaly laminae and wisps, carbonaceous laminae throughout,		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			MUDSTONE		sharp irregular basal contact.		
729.990	730.150	0.160	SILTSTONE		Dark grey, carbonaceous wisps and carbonaceous laminae throughout, slickensided fracture at 0.04m from top of unit, sharp basal contact.		
730.150	730.320	0.170	CARBONACEOUS MUDSTONE		Dark brown, minor bright coal laminae.		
730.320	730.390	0.070	COAL Stony		No visible cleat or fractures.		
730.390	730.530	0.140	CARBONACEOUS MUDSTONE		Dark brown, carbonaceous wisps and carbonaceous laminae, sharp irregular basal contact.		
730.530	731.740	1.210	SILTSTONE	60%	Grey.		
			SANDSTONE	40%	Light grey, fine to medium grained, quartz lithic sub rounded sub spherical moderate sorting. In general, thinly interlaminated to thinly interbedded minor disturbed bedding, calcareous cement in part.		
731.740	731.900	0.160	SILTSTONE	40%	Dark grey.		
			SIDERITE	60%	Tan brown. In general, sideritic siltstone with sideritic clasts throughout.		
731.900	732.300	0.400	SILTSTONE		Grey, carbonaceous wisps and coaly wisps common throughout.		
732.300	732.340	0.040	COAL Dull		No visible cleat or fractures.		
732.340	732.390	0.050	CARBONACEOUS MUDSTONE		Dark brown, carbonaceous laminae and wisps.		
732.390	732.410	0.020	SILTSTONE		Grey, minor carbonaceous wisps.		
732.410	732.450	0.040	COAL Stony		Minor bright coal laminae, no visible cleat or fractures.		
732.450	732.680	0.230	SILTSTONE		Grey, carbonaceous wisps.		
732.680	732.710	0.030	CARBONACEOUS MUDSTONE		Brown, coal lenses, tending mudstone in part.		
732.710	733.390	0.680	SILTSTONE	40%	Dark grey.		
			SANDSTONE	60%	Grey, fine to medium grained, quartz lithic sub rounded sub spherical		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					moderate sorting. In general, thinly interlaminated to thinly interbedded, minor disturbed bedding and carbonaceous wisps.		
733.390	733.510	0.120	CARBONACEOUS MUDSTONE		Dark brown, carbonaceous laminae and wisps throughout.		
733.510	733.900	0.390	SANDSTONE	60%	Grey, fine to medium grained, quartz lithic sub rounded sub spherical moderate sorting.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated to thinly interbedded, carbonaceous wisps and laminae, minor disturbed bedding.		MB 733.60 D 6.00 R 6.01
733.900	736.440	2.540	SANDSTONE	30%	Grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	70%	Grey. In general, thinly to thickly laminated, occasional erosional contacts between laminae, common carbonaceous wisps throughout, common coal fragments in localised area, low to medium strength, 4 fractures, irregular slickensided fracture at 0.47m, 0.57m and 1.44m from top of unit, gradational basal contact.		
736.440	736.660	0.220	SILTSTONE		Light grey white, 90% secondary calcite infill throughout unit, high strength, gradational basal contact.		
736.660	736.790	0.130	SIDERITE		Beige, high strength.		MB 736.60 D 3.00 R 2.91
736.790	738.330	1.540	SILTSTONE		Dark grey, tending to mudstone at parts, thinly laminated, occasional clay nodules at top, common coaly wisps throughout unit, low strength, 5 fractures, 45 degree slickensided fracture at 0.52m , sharp basal contact.		
738.330	738.490	0.160	COAL Dull minor bright		Face cleat, average spacing 4mm, penetrating 20% of unit, 10% carbonate filled, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 20% of unit, 10% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 30mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, secondary butt cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
738.490	738.710	0.220	MUDSTONE		Dark grey, thinly laminated, common carbonaceous wisps throughout unit, low strength, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
738.710	738.800	0.090	COAL Stony		No visible cleat or fractures.		
738.800	742.740	3.940	SANDSTONE	35%	Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	50%	Grey.		
			MUDSTONE	15%	Dark grey. In general, thinly to thickly laminated, common fossiliferous rootlets at top, common coal lenses at top, medium strength.		MB 742.60 D 6.00 R 5.98
742.740	743.350	0.610	MUDSTONE		Dark grey, thinly laminated, common bioturbation throughout, low strength, 1 fracture, 60 degree slickensided fracture at 0.56m from top of unit, gradational basal contact.		
743.350	743.490	0.140	TUFF		Beige, thinly laminated, low strength, sharp basal contact.		
743.490	743.590	0.100	COAL Dull minor bright		Face cleat, average spacing 30mm, penetrating 30% of unit, 15% carbonate filled, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 25% of unit, 15% carbonate filled, dips 90 degrees with azimuth 45 degrees to face cleat.		
743.590	744.390	0.800	MUDSTONE		Dark grey, thinly laminated, occasional sideritic alteration throughout unit, low strength, 3 fractures, 60 degree slickensided fracture at 0.78m from top of unit, gradational basal contact.		
744.390	744.660	0.270	TUFF		Beige grey, thinly laminated, occasional coal fragments throughout, low strength, sharp basal contact.		
744.660	744.735	0.075	CARBONACEOUS MUDSTONE		Dark brown, coaly lenses occasional, 1 fracture, gradational basal contact.		Top of MUR001_015
744.735	744.755	0.020	TUFF		Cream, coaly wisps rare, sharp basal contact.		
744.755	744.875	0.120	COAL Stony		Bright flecks common, broken in part, sharp basal contact, no visible cleat or fractures.		
744.875	744.980	0.105	CARBONACEOUS MUDSTONE		Dark brown, coaly lenses rare.		Base of MUR001_015
744.980	745.050	0.070	CARBONACEOUS MUDSTONE		Dark grey black, common carbonaceous wisps throughout unit, low strength, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
745.050	745.780	0.730	SILTSTONE	40%	Grey.		
			MUDSTONE	60%	Dark grey. In general, , thinly laminated, rare fossiliferous rootlets at middle of unit, low strength, 1 fracture, sharp basal contact.		
745.780	745.850	0.070	CARBONACEOUS MUDSTONE		Dark grey brown, tending to stony coal , medium strength, sharp basal contact.		
745.850	745.960	0.110	COAL Dull		Tending to stony coal at parts, occasional tuffaceous laminae and nodules at base, face cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 30 degrees to face cleat.		Base of Lower Juandah Coal Measures
745.960	746.640	0.680	SANDSTONE		Beige grey, very fine grained, thickly laminated, occasional fossiliferous rootlets throughout unit, low to medium strength, gradational basal contact.		Top of Tangalooma Sandstone
746.640	747.520	0.880	SANDSTONE		Light grey, fine grained, sub angular to sub rounded, sub spherical, medium sorting, calcite cement, poor visible porosity, thinly to thickly laminated, common carbonaceous laminae at middle, occasional fossiliferous rootlets at top of unit, medium to high strength, gradational basal contact.		
747.520	747.910	0.390	MUDSTONE		Dark grey, thinly laminated, common carbonaceous wisps throughout unit, low strength, 1 fracture, irregular slickensided fracture at 0.32m from top of unit, gradational basal contact.		
747.910	747.960	0.050	SIDERITE		Beige, thinly laminated, high strength, sharp basal contact.		
747.960	748.310	0.350	MUDSTONE		Dark grey, thinly laminated, common carbonaceous wisps throughout, tending to carbonaceous mudstone at base of unit, low strength, 1 fracture, 45 degree slickensided fracture at 0.03m from top of unit, gradational basal contact.		
748.310	748.920	0.610	SILTSTONE		Dark grey, occasional sandy laminae at middle, common carbonaceous wisps and fossiliferous rootlets throughout unit, low strength.		MB 748.60 D 6.00 R 6.18
748.920	750.120	1.200	SANDSTONE	20%	Light grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	70%	Grey.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			MUDSTONE	10%	Dark grey. In general, thinly laminated, rare carbonaceous laminae at middle, occasional fossiliferous rootlets at middle, occasional sideritic alteration throughout, coarsening upwards, medium strength, 2 fractures, irregular basal contact.		
750.120	750.380	0.260	SIDERITE		Beige, rare calcite vein at middle of unit, high strength, irregular sharp basal contact.		
750.380	750.480	0.100	MUDSTONE		Dark grey, common sideritic alteration throughout, occasional coal fragments at base of unit, low strength, 2 fractures, irregular slickensided fracture at 0.08m from top of unit, sharp basal contact.		
750.480	750.520	0.040	COAL Dull banded		Face cleat, average spacing 5mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 5mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 30mm, penetrating 60% of unit, 20% carbonate filled, dips 90 degrees, secondary butt cleat, average spacing 30mm, penetrating 60% of unit, 20% carbonate filled, dips 90 degrees with azimuth 80 degrees to face cleat.		
750.520	750.640	0.120	MUDSTONE		Grey, tending to carbonaceous mudstone at base of unit, low strength, gradational basal contact.		
750.640	750.900	0.260	SILTSTONE		Grey, thinly laminated, common carbonaceous wisps at top of unit, low strength, gradational basal contact.		
750.900	751.510	0.610	SANDSTONE	40%	Grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	60%	Dark grey, thinly laminated, common carbonaceous laminae at middle of unit, rare fossiliferous rootlets and cross bedding at middle of unit. In general, thinly laminated, common carbonaceous laminae at middle of unit, rare fossiliferous rootlets and cross bedding at middle of unit, low strength, 2 fractures, gradational basal contact.		
751.510	751.960	0.450	SILTSTONE	60%	Grey.		
			MUDSTONE	40%	Dark grey. In general, thinly laminated, occasional sandy laminae throughout unit, occasional sideritic alteration at base of unit, low strength, gradational		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					basal contact.		
751.960	752.490	0.530	CARBONACEOUS MUDSTONE		Dark grey black, occasional coal lenses at top of unit, common carbonaceous wisps throughout unit, low strength, 5 fractures, gradational basal contact.		
752.490	752.780	0.290	MUDSTONE		Dark grey, common sideritic alteration throughout, common coal lenses throughout unit, low strength, 5 fractures, fracture zone at base of unit, irregular fractures in multiple orientations, irregular sharp basal contact.		
752.780	752.970	0.190	SIDERITE		Beige, rare coal fragments at top of unit, high strength, irregular basal contact.		
752.970	753.040	0.070	MUDSTONE		Dark grey, rare coal fragments throughout unit, low strength, 1 fracture, gradational basal contact.		
753.040	754.960	1.920	SANDSTONE	20%	Light grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	60%	Grey.		
			MUDSTONE	20%	Dark grey. In general, thinly laminated, common fossiliferous rootlets at top, tending to carbonaceous mudstone at parts, low to medium strength, 3 fractures.		MB 754.60 D 6.00 R 6.00
754.960	756.730	1.770	SANDSTONE	70%	Light grey, fine grained, rounded, sub spherical, quartz lithic, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	30%	Grey. In general, thinly to thickly laminated, common disturbed laminae throughout, common carbonaceous wisps throughout, occasional sideritic alteration at middle of unit, medium strength, 3 fractures, gradational basal contact.		
756.730	757.950	1.220	MUDSTONE		Dark grey, thinly laminated, occasional sandy laminae at top, common sideritic alteration throughout unit, low strength, 7 fractures, stepped slickensided fractures at 0.20m, 0.35m, 0.56m, 0.64m and 0.75m from top of unit, 60 degree slickensided fractures at 1.00m and 1.16m from top of unit, 40 degree slickensided fracture basal contact.		
757.950	758.080	0.130	SIDERITE		Beige, thinly laminated, high strength, 45 degree slickensided basal contact.		
758.080	759.170	1.090	MUDSTONE		Grey, thinly laminated, occasional sandy laminae at base of unit, low to medium strength, 2 fractures, 60 degree slickensided fracture at 0.64m from		Base of Tangalooma Sandstone

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					top of unit, gradational basal contact.		
759.170	759.280	0.110	COAL Dull		Tending to stony coal, face cleat, average spacing 30mm, penetrating 30% of unit, no visible mineralisation, dips 80 degrees, butt cleat, average spacing 30mm, penetrating 20% of unit, no visible mineralisation, dips 60 degrees with azimuth 80 degrees to face cleat.		Top of Taroom Coal Measures
759.280	759.410	0.130	CARBONACEOUS MUDSTONE		Black brown, thinly laminated, low strength, 1 fracture, gradational basal contact.		
759.410	760.930	1.520	SANDSTONE	40%	Grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	50%	Grey.		
			MUDSTONE	10%	Dark grey. In general, thinly to thickly laminated, common fossiliferous rootlets at top, low to medium strength, 2 fractures.		MB 760.60 D 6.00 R 6.03
760.930	761.810	0.880	SILTSTONE	40%	Grey.		
			MUDSTONE	60%	Dark grey. In general, common sideritic alteration throughout unit, low strength, 3 fractures, gradational basal contact.		
761.810	762.200	0.390	SANDSTONE		Grey, fine grained, rounded, spherical, well sorted, moderately cemented, moderate visible porosity, occasional carbonaceous laminae throughout, slight sideritic alteration throughout, medium strength, erosional basal contact.		
762.200	762.730	0.530	CARBONACEOUS MUDSTONE		Dark grey brown, common carbonaceous wisps and coal lenses throughout unit, low strength, 2 fractures, 20 degree slickensided fracture at 0.08m from top of unit, gradational basal contact.		
762.730	762.860	0.130	COAL Stony		Gradational basal contact, no visible cleat or fractures.		
762.860	762.930	0.070	CARBONACEOUS MUDSTONE		Dark brown, thinly laminated, common carbonaceous wisps throughout unit, low strength, erosional basal contact.		
762.930	763.070	0.140	TUFF		Grey beige, thinly laminated, low strength, gradational basal contact.		
763.070	763.240	0.170	CARBONACEOUS MUDSTONE		Dark brown black, thinly laminated, low strength, gradational basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
763.240	763.360	0.120	COAL Dull		No visible cleat or fractures.		
763.360	763.510	0.150	CARBONACEOUS MUDSTONE		Dark grey, medium strength, sharp basal contact.		
763.510	765.190	1.680	SANDSTONE	10%	Grey, very fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	50%	Grey.		
			MUDSTONE	40%	Dark grey. In general, thinly to thickly laminated, common fossiliferous rootlets at top of unit, low strength, 3 fractures, gradational basal contact.		
765.190	765.440	0.250	SIDERITE		Beige white, abundant calcite veins and cone in cone structures at base of unit, medium to high strength, irregular basal contact.		
765.440	766.870	1.430	SILTSTONE	50%	Grey.		
			MUDSTONE	50%	Dark grey. In general, thinly laminated, occasional sandy laminae at middle, occasional bioturbation at middle, abundant sideritic alteration throughout unit, low strength.		MB 766.60 D 6.00 R 5.89
766.870	770.340	3.470	SILTSTONE	50%	Dark grey.		
			SANDSTONE	10%	Grey, very fine grained, well rounded. sub spherical. well sorted.		
			MUDSTONE	40%	Grey brown. In general, thinly interlaminated with intermixed silt and mudstone at top of unit, sand laminae increasing towards base of unit, slickensided fracture at top of unit, gradational basal contact.		
770.340	771.720	1.380	SANDSTONE	60%	Grey, very fine grained to fine grained, sub rounded sub spherical, moderate sorting, quartz lithic.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated to thinly interbedded, calcareous cement in sand towards base of unit, common sideritic clasts throughout, common carbonaceous wisps with disturbed bedding.		
771.720	772.850	1.130	SANDSTONE	90%	Light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	10%	Dark grey. In general, thinly interlaminated, abundant carbonaceous laminae		MB 772.60 D 6.00 R 5.98

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					throughout, minor siltstone clasts towards base of unit, rare coal wisp.		
772.850	773.250	0.400	SANDSTONE	90%	Light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	10%	Dark grey. In general, thinly interlaminated, abundant carbonaceous laminae throughout, abundant coal lenses towards base of unit, erosional basal contact.		
773.250	775.710	2.460	SILTSTONE	70%	Dark grey.		
			SANDSTONE	30%	Grey, very fine to fine grained, quartz lithic, sub rounded sub spherical, moderate sorting. In general, thinly interlaminated to intermixed with angled bedding, carbonaceous laminae and wisps throughout, with minor mudstone laminae and minor sideritic nodules at base of unit.		
775.710	775.950	0.240	MUDSTONE	50%	Brown.		
			SILTSTONE	50%	Grey. In general, mottled intermixed unit, with very coarse grained sized coal fragments , slickensided fracture at 0.20m from top of unit, faulted basal contact.		
775.950	776.200	0.250	SILTSTONE		Grey, thinly laminated, minor carbonaceous wisps throughout, complex fractures throughout unit, faulted basal contact.		
776.200	776.460	0.260	MUDSTONE		Brown, common coal fragments at base, carbonaceous wisps throughout, faulted basal contact.		
776.460	776.700	0.240	SILTSTONE		Grey, minor sand beds, friable band at 0.10m from top of unit, minor carbonaceous wisps and disturbed bedding, complex slickensided fractures at base of unit, faulted basal contact.		
776.700	777.040	0.340	SANDSTONE	50%	Light grey, fine to medium grained, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	50%	Grey. In general, intermixed with disturbed bedding at base, sharp basal contact.		
777.040	777.700	0.660	SANDSTONE	75%	Light grey, fine to medium grained, sub rounded sub spherical, moderate sorting.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			SILTSTONE	25%	Grey. In general, thinly interlaminated to thinly interbedded, gradational basal contact.		
777.700	777.810	0.110	MUDSTONE		Dark grey, minor coaly laminae, complex slickensided fractures throughout, gradational basal contact.		
777.810	778.150	0.340	CARBONACEOUS MUDSTONE		Dark brown, tuffaceous in part, coaly lenses abundant in bottom 0.20m, sharp basal contact.		MUR001_016
778.150	778.820	0.670	SANDSTONE	70%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	30%	Dark grey. In general, silty at top, sandy at base, with interbedding in middle of unit, minor cross bedding in part.		MB 778.60 D 6.00 R 6.06
778.820	779.240	0.420	SANDSTONE	70%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	30%	Dark grey. In general, silty at top, sandy at base, with interbedding in middle of unit, minor cross bedding in part.		
779.240	780.640	1.400	SANDSTONE		Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, well sorted, common carbonaceous laminae at top and base of unit, large siltstone clasts throughout middle of unit.		
780.640	780.820	0.180	COAL Dull		Face cleat, average spacing 30mm, penetrating 100% of unit, 10% carbonate filled, dips 90 degrees, no visible butt cleat.		
780.820	782.060	1.240	SILTSTONE	70%	Dark grey.		
			SANDSTONE	30%	Light grey, fine grained, sub rounded sub spherical, moderate sorting. In general, thinly interlaminated to thinly interbedded, carbonaceous wisps at of unit, carbonaceous laminae in upper half of unit, silty in lower half of unit, sharp basal contact.		
782.060	782.250	0.190	COAL Dull		Tending to stony coal in part, no visible cleat or fractures.		Top of MUR001_017
782.250	782.590	0.340	CARBONACEOUS MUDSTONE		Dark brown, bright lenses rare, tuffaceous in part occasionally, coaly in part occasionally, 1 fracture, open, coarse 80 degree fracture at 0.75m from top.		MUR001_017
782.590	782.730	0.140	COAL Stony		No visible cleat or fractures.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
782.730	782.860	0.130	COAL Dull		No visible cleat or fractures.		Base of MUR001_017
782.860	784.160	1.300	SANDSTONE	60%	Light grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated to thinly interbedded common carbonaceous wisps throughout top half of unit, gradational basal contact.		
784.160	784.220	0.060	CARBONACEOUS MUDSTONE		Dark grey, coaly fragments throughout.		
784.220	784.370	0.150	MUDSTONE		Dark brown to brown, tending carbonaceous mudstone at top of unit, gradational basal contact.		
784.370	784.830	0.460	SILTSTONE	40%	Grey brown.		
			SANDSTONE	60%	Grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting. In general, silty at top of unit, sandy at base of unit, intermixed in middle of unit.		MB 784.60 D 6.00 R 5.97
784.830	785.710	0.880	SANDSTONE	60%	Light grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated to thinly interbedded, minor cross bedding in part, common carbonaceous laminae throughout.		
785.710	786.080	0.370	SILTSTONE		Dark grey, coal laminae at top of unit and common towards base of unit, becomes sandy at base of unit, complex fractures around coaly laminae at the top of the unit, slickensided fracture 0.14m from top of unit.		
786.080	786.090	0.010	COAL Bright		Face cleat, average spacing 10mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 15mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
786.090	787.900	1.810	SANDSTONE	80%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	20%	Grey. In general, sandstone with minor siltstone laminae and beds throughout, abundant carbonaceous laminae at base of unit, .		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
787.900	788.140	0.240	CARBONACEOUS MUDSTONE		Dark brown, coaly lenses common, 1 fracture, sharp basal contact.		Top of MUR001_018
788.140	788.155	0.015	TUFF		Brown, sandy, sharp basal contact.		
788.155	788.285	0.130	CARBONACEOUS MUDSTONE		Dark brown, tuffaceous in part, 1 fracture, sharp basal contact.		
788.285	788.320	0.035	TUFF		Brown, coaly wisps occasional, sharp basal contact.		
788.320	788.450	0.130	CARBONACEOUS MUDSTONE		Dark brown, tuffaceous in part, 1 fracture, gradational basal contact.		
788.450	788.540	0.090	TUFF		Light brown, sandy, coaly root structure occasional.		Base of MUR001_018
788.540	789.120	0.580	MUDSTONE		Brown, coal wisps and minor sideritic nodules.		
789.120	789.270	0.150	COAL Dull minor bright		Face cleat, average spacing 25mm, penetrating 100% of unit, 30% carbonate filled, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 40% of unit, 15% carbonate filled, dips 90 degrees with azimuth 90 degrees to face cleat.		
789.270	789.350	0.080	COAL Dull		Face cleat, average spacing 30mm, penetrating 100% of unit, 20% carbonate filled, dips 90 degrees, no visible butt cleat.		
789.350	789.390	0.040	CARBONACEOUS MUDSTONE		Dark brown, coal laminae and lenses throughout.		
789.390	790.100	0.710	MUDSTONE	50%	Brown.		
			SILTSTONE	50%	Grey. In general, carbonaceous wisps abundant at top of unit rare towards base, mudstone at top of unit, siltstone at base of unit, gradational basal contact.		
790.100	790.770	0.670	SILTSTONE	60%	Dark grey.		
			SANDSTONE	40%	Light grey, fine grained, quartz lithic, sub rounded sub spherical, moderate sorting. In general, thinly interlaminated minor cross bedding with carbonaceous laminae throughout.		MB 790.60 D 6.00 R 5.95
790.770	796.960	6.190	SANDSTONE	60%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical,		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					moderate sorting.		
			SILTSTONE	40%	Grey. In general, thinly interlaminated to thinly interbedded, minor mudstone laminae at top of unit, with carbonaceous laminae becoming common towards base of unit.		MB 796.60 D 6.00 R 6.18
796.960	798.500	1.540	SANDSTONE	60%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	40%	Dark grey. In general, thinly interlaminated, minor mudstone laminae, high angled bedding, abundant carbonaceous laminae throughout,, healed fault at 1.67m from top of unit, sharp angled basal contact.		
798.500	798.600	0.100	COAL Dull		Gradational basal contact, face cleat, average spacing 45mm, penetrating 80% of unit, 15% carbonate filled, dips 90 degrees, no visible butt cleat.		
798.600	798.640	0.040	CARBONACEOUS MUDSTONE		Brown, abundant carbonaceous laminae at top of unit.		
798.640	799.710	1.070	SANDSTONE	40%	Light grey, fine to medium grained, quartz lithic, sub rounded sub spherical, moderate sorting.		
			SILTSTONE	50%	Dark grey.		
			MUDSTONE	10%	Dark brown. In general, thinly interlaminated, minor carbonaceous laminae, minor disturbed bedding in part,, healed micro faults visible throughout, slickensided fractures at 0.20m, 0.35m and 1.00m from top of unit.		
799.710	799.790	0.080	CARBONACEOUS MUDSTONE		Dark brown, coaly fragments and laminae throughout.		
799.790	802.380	2.590	MUDSTONE	40%	Light brown.		
			SILTSTONE	50%	Light brown grey.		
			SANDSTONE	10%	Grey, fine grained, lithic. In general, minor carbonaceous laminae and wisps throughout, very pale when dry, possible alteration of formation, very high strength, gradational basal contact.		
802.380	802.620	0.240	SILTSTONE		Black, minor mudstone laminae at top of unit, possible alteration of unit, medium strength, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
802.620	802.810	0.190	SILTSTONE		Brown, complex slickensided fractures throughout.		
802.810	802.860	0.050	CARBONACEOUS MUDSTONE		Black.		
802.860	802.920	0.060	COAL Stony		Minor visible gas, no visible cleat or fractures.		MB 802.60 D 6.00 R 5.96
802.920	802.980	0.060	CARBONACEOUS MUDSTONE		Dark brown, tends stony coal in part.		
802.980	803.370	0.390	MUDSTONE	50%	Dark brown.		
			SILTSTONE	50%	Dark grey. In general, thinly interlaminated , fractured, complex slickensided fractures throughout unit, sharp basal contact.		
803.370	803.670	0.300	CARBONACEOUS MUDSTONE		Dark brown, tuffaceous lenses and laminae common in part, coaly in part, broken at top, 4 fractures.		MUR001_019
803.670	804.310	0.640	CARBONACEOUS MUDSTONE	60%	Dark brown.		
			MUDSTONE	40%	Brown. In general, thickly interbedded, with bioturbation of mudstone into carbonaceous mudstone beds, abundant carbonaceous laminae throughout, 3 fractures, 3 slickensided fractures at base of unit.		
804.310	804.870	0.560	SILTSTONE	20%	Grey.		
			MUDSTONE	40%	Brown.		
			CARBONACEOUS MUDSTONE	40%	Dark brown. In general, thickly interbedded, silty at top and base of unit, calcite rich dewatering structures at 0.5m from top of unit.		
804.870	804.880	0.010	COAL Bright		No visible cleat or fractures.		
804.880	804.900	0.020	CARBONACEOUS MUDSTONE		Dark brown, tends to stony coal .		
804.900	804.920	0.020	COAL Dull		Face cleat, average spacing 60mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
804.920	805.220	0.300	CARBONACEOUS	40%	Dark brown.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
			MUDSTONE				
			MUDSTONE	60%	Brown. In general, thinly interlaminated to thinly interbedded, carbonaceous laminae and wisps and minor coaly laminae, complex fractures throughout unit, slickensided basal contact.		
805.220	805.300	0.080	COAL Dull		Fractured basal contact, face cleat, average spacing 30mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, no visible butt cleat.		
805.300	805.830	0.530	SILTSTONE		Grey, common carbonaceous and coaly wisps throughout, tends mudstone at top and base of unit, slickensided fracture at 0.35m from top of unit.		
805.830	805.900	0.070	COAL Dull		Face cleat, average spacing 60mm, penetrating 100% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 45mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
805.900	805.970	0.070	CARBONACEOUS MUDSTONE		Brown.		
805.970	806.000	0.030	COAL Stony				MB 805.60 D 3.00 R 3.12
806.000	807.190	1.190	SANDSTONE		Grey, fine grained, rounded, sub spherical, well sorted, moderately cemented, moderate visible porosity, thinly to thickly laminated, common fossiliferous rootlets and bioturbation throughout, common carbonaceous laminae at base of unit, medium strength, 2 fractures, sharp basal contact.		
807.190	807.260	0.070	COAL Dull minor bright		Sharp basal contact, face cleat, average spacing 30mm, penetrating 80% of unit, 60% carbonate filled, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 30% of unit, 70% carbonate filled, dips 70 degrees with azimuth 60 degrees to face cleat.		
807.260	807.290	0.030	TUFF		Dark beige, common carbonaceous wisps throughout, low to medium strength, sharp basal contact.		
807.290	807.430	0.140	CARBONACEOUS MUDSTONE		Dark brown, broken in part, coaly, 2 fractures, sharp basal contact.		Top of MUR001_020
807.430	807.530	0.100	TUFF		Yellow, coaly wisps common, 1 fracture, sharp basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology	Geological Description	Seam	Comment
807.530	807.730	0.200	CARBONACEOUS MUDSTONE	Dark brown, coaly, 1 fracture, subvertical, calcite-filled fractures occasional, sharp basal contact.		
807.730	807.840	0.110	TUFF	Light brown, coaly lenses rare, coaly wisps common, sharp basal contact.		
807.840	808.010	0.170	COAL Dull	Broken in part, sharp basal contact, no visible cleat or fractures.		
808.010	808.090	0.080	CARBONACEOUS MUDSTONE	Dark brown, coaly wisps occasional, 1.		Base of MUR001_020
808.090	808.290	0.200	COAL Dull minor bright	Tuffaceous band at top, tuff clasts at top, medium strength, broken throughout, 4 fractures, sharp basal contact, face cleat, average spacing 10mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 12mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees.		Top of MUR001_021
808.290	808.320	0.030	COAL Stony	Black brown, tuffaceous bands throughout, medium strength, gradational basal contact, face cleat, average spacing 6mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 10mm, penetrating 15% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
808.320	808.345	0.025	TUFF	Brown, fine to medium grained, poorly sorted, coal wisps throughout, coaly at top, medium strength, irregular basal contact.		
808.345	808.385	0.040	COAL Dull banded	Medium strength, 1 fracture, sharp basal contact, face cleat, average spacing 5mm, penetrating 10% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 10mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees.		
808.385	808.525	0.140	COAL Dull minor bright	Medium strength, 4 fractures, sharp basal contact, face cleat, average spacing 20mm, penetrating 60% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 30mm, penetrating 40% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 15mm, penetrating 30% of unit, 80%		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					carbonate filled, dips 90 degrees.		
808.525	808.535	0.010	COAL Bright banded		Low strength, badly broken, basal parting, face cleat, average spacing 10mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 20mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees.		
808.535	808.790	0.255	COAL Dull and bright		Medium strength, badly broken throughout, basal parting, face cleat, average spacing 10mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 30% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat, secondary face cleat, average spacing 20mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees.		Base of MUR001_021
808.790	808.800	0.010	COAL Dull minor bright		Face cleat, average spacing 10mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 40% of unit, no visible mineralisation, dips 70 degrees with azimuth 60 degrees to face cleat.		
808.800	810.010	1.210	SANDSTONE	40%	Grey, fine grained, rounded, sub spherical, well sorted, moderately cemented, poor visible porosity.		
			MUDSTONE	60%	Dark grey. In general, thinly laminated to very thinly bedded, common carbonaceous wisps at top, common carbonaceous laminae throughout, low strength, 4 fractures, 45 degree slickensided fracture at 0.25m, irregular slickensided fracture at 0.57m from top of unit, gradational basal contact.		
810.010	810.330	0.320	MUDSTONE		Dark grey, thinly laminated, low strength, 2 fractures, irregular slickensided fracture at 0.08m from top of unit, gradational basal contact.		
810.330	810.690	0.360	CARBONACEOUS MUDSTONE		Dark grey brown, thinly laminated, occasional carbonaceous wisps at top of unit, low strength, badly broken at base of unit, 5 fractures, 60 degree slickensided fracture at 0.06m, 20 degree slickensided fractures throughout unit, gradational basal contact.		
810.690	810.930	0.240	COAL Dull		Tending to stony coal, slickensided fractures throughout, gradational basal contact, no visible cleat or fractures.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
810.930	811.170	0.240	MUDSTONE		Dark grey, low strength, badly broken.		MB 810.80 D 5.20 R 5.13
811.170	811.810	0.640	SANDSTONE	40%	Light grey, fine grained, rounded, sub spherical, well sorted, moderately cemented, moderate visible porosity, quartz lithic.		
			SILTSTONE	60%	Grey. In general, thinly to thickly laminated, common carbonaceous laminae at base of unit, medium strength, gradational basal contact.		
811.810	812.470	0.660	CARBONACEOUS MUDSTONE		Dark grey brown, thinly laminated, occasional sandy laminae at middle of unit, low strength, 3 fractures, 60 degree slickensided fracture at 0.31m from top of unit, gradational basal contact.		
812.470	813.300	0.830	SILTSTONE	30%	Grey.		
			MUDSTONE	70%	Dark grey. In general, thinly laminated, tending to carbonaceous mudstone at parts, low strength, 2 fractures, irregular slickensided fracture at 0.76m from top of unit, sharp basal contact.		
813.300	813.380	0.080	COAL Stony		No visible cleat or fractures.		
813.380	813.430	0.050	COAL Dull minor bright		Face cleat, average spacing 15mm, penetrating 80% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 20mm, penetrating 50% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
813.430	813.560	0.130	COAL Stony		No visible cleat or fractures.		
813.560	815.040	1.480	SILTSTONE	50%	Grey.		
			MUDSTONE	50%	Grey. In general, thinly laminated, common fossiliferous rootlets at top of unit, medium strength.		MB 814.60 D 3.80 R 3.85
815.040	815.660	0.620	SANDSTONE	70%	Light grey, fine grained, sub rounded, sub spherical, well sorted, moderately cemented, calcite cement at parts, poor to moderate visible porosity.		
			SILTSTONE	30%	Grey. In general, thinly to thickly laminated, 0.015m coal lens near base of unit, medium strength, gradational basal contact.		
815.660	816.040	0.380	CARBONACEOUS MUDSTONE		Dark grey brown, thinly to thickly laminated, 0.01m coal lens near top, common carbonaceous wisps throughout unit, low strength, 2 fractures, irregular slickensided fracture at 0.30m from top of unit, gradational basal		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					contact.		
816.040	817.000	0.960	SILTSTONE	50%	Grey.		
			MUDSTONE	50%	Grey. In general, thinly laminated, medium strength, gradational basal contact.		
817.000	817.190	0.190	SIDERITE		Beige, high strength, gradational basal contact.		
817.190	821.050	3.860	SANDSTONE		Light grey, medium grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, thinly laminated to medium bedded, occasional siltstone clasts near top, common carbonaceous laminae and carbonaceous wisps in localised areas near bottom of unit, medium to high strength, 1 fracture.		MB 820.60 D 6.00 R 6.01
821.050	823.030	1.980	SANDSTONE		Light grey, medium grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, common carbonaceous laminae at middle, occasional sideritic alteration at middle, medium to high strength, gradational basal contact.		
823.030	823.110	0.080	SILTSTONE		Grey, thinly laminated, common carbonaceous wisps throughout, occasional claystone clasts at base of unit, low strength, sharp basal contact.		Base of Taroom Coal Measures
823.110	823.640	0.530	SILTSTONE	10%	Grey.		
			SIDERITE	90%	Beige white. In general, significant sideritic alteration throughout unit, abundant coal lenses and carbonaceous wisps throughout unit, high strength, sharp basal contact.		Top of Eurombah Formation
823.640	824.050	0.410	SANDSTONE	10%	Grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	90%	Dark grey. In general, thinly to thickly laminated, rare convolute laminae at middle of unit, medium strength.		MB 823.60 D 3.00 R 3.11
824.050	824.820	0.770	SANDSTONE	70%	Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	30%	Grey. In general, thinly to thickly laminated, rare bioturbation at top, occasional dewatering structures at base, medium strength, gradational basal contact.		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
824.820	825.010	0.190	SANDSTONE		Light grey, very coarse grained, angular, sub elongate, poorly sorted, well cemented, poor visible porosity, abundant silt drop stones throughout, common carbonaceous wisps throughout unit, high strength, gradational basal contact.		
825.010	829.800	4.790	SANDSTONE		Light grey, fine to medium grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, abundant silt clasts, coal fragments and carbonaceous laminae in localised areas throughout unit, medium to high strength, 1 fracture.		
829.800	829.850	0.050	CORE LOSS				MB 829.60 D 6.00 R 5.75
829.850	829.910	0.060	SANDSTONE		Light grey, medium to coarse grained, sub angular to sub rounded, sub spherical, moderate sorting, well cemented, poor visible porosity, medium strength, 45 degree sharp basal contact.		
829.910	829.990	0.080	COAL Dull		Carbonaceous mudstone laminae at middle of unit, face cleat, average spacing 10mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees, butt cleat, average spacing 12mm, penetrating 20% of unit, no visible mineralisation, dips 90 degrees with azimuth 90 degrees to face cleat.		
829.990	830.360	0.370	SANDSTONE		Light grey, medium to very coarse grained, quartz lithic, poorly sorted, well cemented, poor visible porosity, rare coal lens at top of unit, high strength, sharp basal contact.		
830.360	835.760	5.400	SANDSTONE	10%	Light grey, fine grained, rounded, spherical, well sorted, well cemented, poor visible porosity.		
			SILTSTONE	70%	Grey.		
			MUDSTONE	20%	Grey. In general, thinly laminated to medium bedded, rare bioturbation at top, occasional carbonaceous wisps throughout unit, tending to carbonaceous mudstone at base of unit, low to medium strength, 3 fractures.		MB 835.50 D 5.90 R 5.91
835.760	841.270	5.510	SANDSTONE	50%	Light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	50%	Dark grey. In general, thinly interlaminated to thickly interbedded, silty at top of unit, minor carbonaceous wisps at top of unit, rare coal laminae at 4.89m		

From (m) MD	To (m) MD	Thickness (m)	Lithology		Geological Description	Seam	Comment
					from top of unit, medium strength, slickensided fractures at top and middle of unit within siltstone, gradational basal contact.		
841.270	841.570	0.300	MUDSTONE		Brown, medium strength.		
841.570	841.860	0.290	SANDSTONE	70%	Light grey, medium grained, quartz lithic, sub rounded sub spherical, well sorted.		
			SILTSTONE	30%	Dark grey. In general, thinly interlaminated to thickly interbedded, minor carbonaceous wisps, sandy at base.		MB 841.60 D 6.10 R 6.19
841.860	847.740	5.880	SANDSTONE		Light grey, medium to coarse grained, quartz lithic, sub rounded sub spherical, moderate sorting, minor siltstone laminae at top of unit, abundant coal fragments and laminae at top of unit with coarser sand, silt laminae common in middle of unit between, medium strength, fractured in middle of unit.		
847.740	847.800	0.060	CORE LOSS				MB 847.60 D 6.00 R 5.88
847.800	853.860	6.060	SANDSTONE		Light grey, medium to very coarse grained, quartz lithic, sub rounded sub spherical, moderate sorting, minor carbonaceous laminae in top half of unit with coal laminae, last 1.0m of core is very coarse grained sand.		MB 853.60 D 6.00 R 6.06, Total Depth

Definition of Geological Terms

Weathering	
Soil	Rock has been totally degraded to a soil in which no evidence of the original rock fabric is preserved.
Completely Weathered	Rock has been weathered to the point where it exhibits only soil properties (disintegrates in water or with light handling). Original fabric is mainly preserved. Coal has weathered to a powdery or clayey soot. Colour ranges from black to medium brown with further deterioration.
Highly Weathered	Rock strength and competence has been clearly reduced, such that pieces are either friable or able to be broken across the rock fabric. Discolouring is evident, usually by oxide staining. Coal shows some original fabric (cleats, bands, etc.) but is friable between fingers and dispenses in water.
Moderately Weathered	Rock has undergone prominent changes in colour, lustre, and strength. However, the material is not friable and cannot be broken by hand across the fabric. Coal may appear dustier or cause smudging to fingers when moist.
Slightly Weathered	Rock shows slight change of colour and lustre, but usually has little reduction in strength when compared with fresh material. Coal may show discolouration.
Fresh	Rock or coal shows no sign of decomposition.

Note: Rock is fresh unless stated otherwise.

Strength	
Extremely Low Strength	May be broken in hand with difficulty, Crumbles under firm blows with hammer.
Very Low Strength	May be peeled with pocketknife. Drill cuttings often destroyed by drilling.
Low Strength	Deep indentations made with pick. May be peeled with difficulty with pocketknife. Cuttings easily broken with fingers.
Medium Strength	Fractures with moderate blow of hammer. Cannot be peeled with pocketknife. Pick indents to 5mm. Cuttings require mild effort to break between fingers.
High Strength	Fractures with full blow of hammer. Cuttings require maximum effort to break between fingers.
Very High Strength	Requires several hammer blows to break. Cuttings not breakable with fingers.
Extremely High Strength	Maximum effort necessary to chip rock. Drill return likely to be fine grains or paste.

Grain Size				
Lithology	Description	Smallest (mm)	Largest (mm)	Comments
Conglomerate	Boulder	256		
	Cobble	64	256	
	Pebble	4	64	
	Granule	2	4	
Sandstone	Very Coarse	1	2	
	Coarse	0.5	1	
	Medium	0.25	0.5	
	Fine	0.125	0.25	
	Very Fine	0.0625	0.125	Particles visible
Siltstone		0.0039	0.0625	Particles not visible, distinguishable by scraping
Mudstone			0.0039	Impossible to feel particles when scraping

Bedding	
Very thickly bedded	>2.0m
Thickly bedded	0.60 - 2.0m
Medium bedded	0.20 - 0.60m
Thinly bedded	0.06 - 0.20m
Very thinly bedded	0.02 - 0.06m
Thickly laminated	6mm - 2cm
Thinly laminated	<6mm

Coal Brightness		
Coal lithotype	Abbreviation	% Bright Coal
Bright	B	>90
Bright banded	Bb	60 to 90
Dull and bright	DB	40 to 60
Dull banded	Db	10 to 40
Dull minor bright	Dmb	1 to 10
Dull	D	<1

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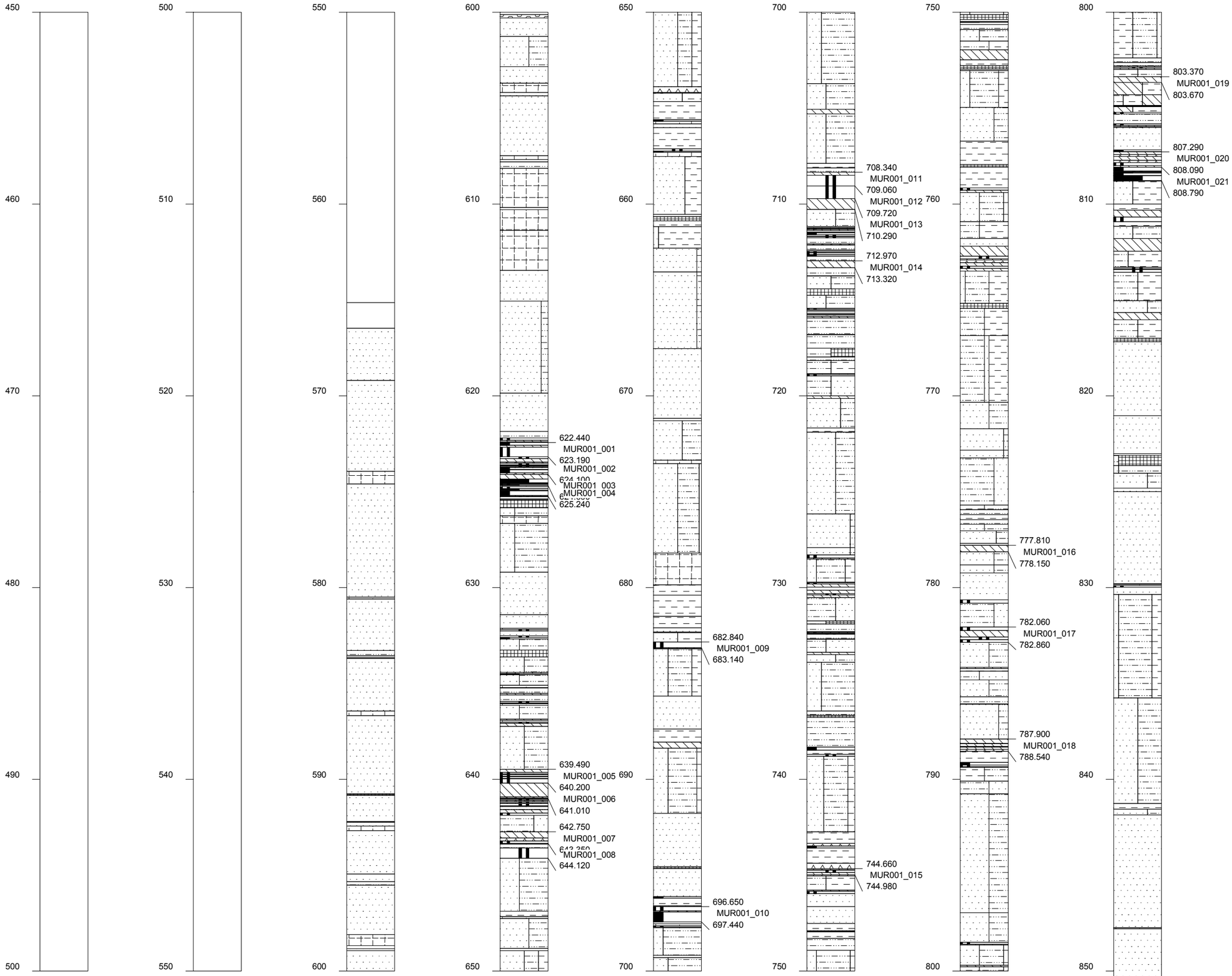

LEGEND

- NO SAMPLE
- SANDSTONE
- CORE LOSS
- SILTSTONE
- SIDERITE
- CONGLOMERATE
- COAL Dull
- CARBONACEOUS MUDSTONE
- COAL Dull minor bright
- COAL Stony
- TUFF
- COAL Dull and bright
- COAL Dull banded
- MUDSTONE
- COAL Bright
- COAL Bright banded

BOREHOLE NO:

PROJECT

QGC Pty Limited - Murdoch 1

DATE DRILLED April 2013

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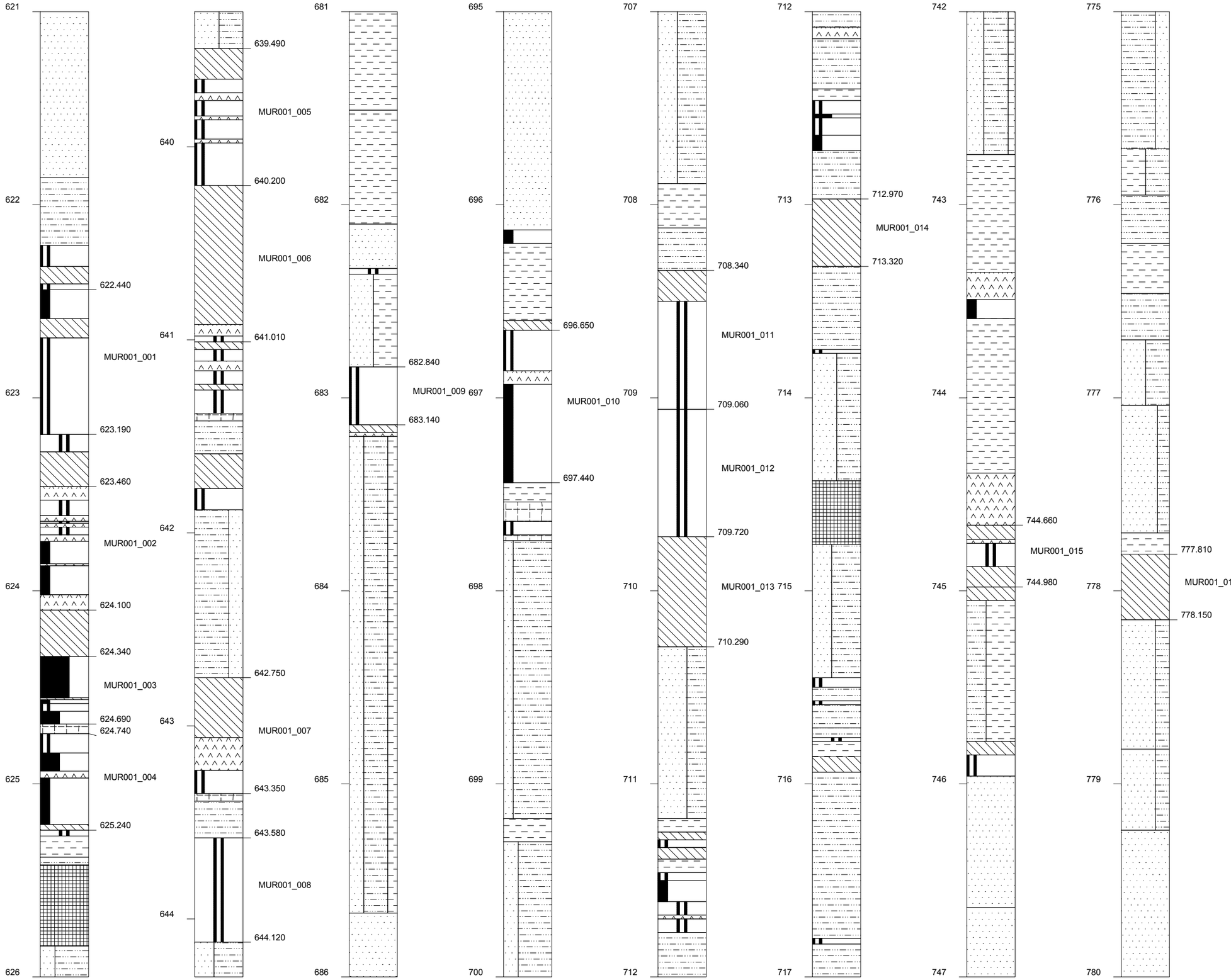

LEGEND

- SANDSTONE
- SILTSTONE
- COAL Dull
- CARBONACEOUS MUDSTONE
- COAL Dull minor bright
- COAL Stony
- TUFF
- COAL Dull and bright
- COAL Dull banded
- CORE LOSS
- MUDSTONE
- SIDERITE

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QGC Pty Limited - Murdoch 1

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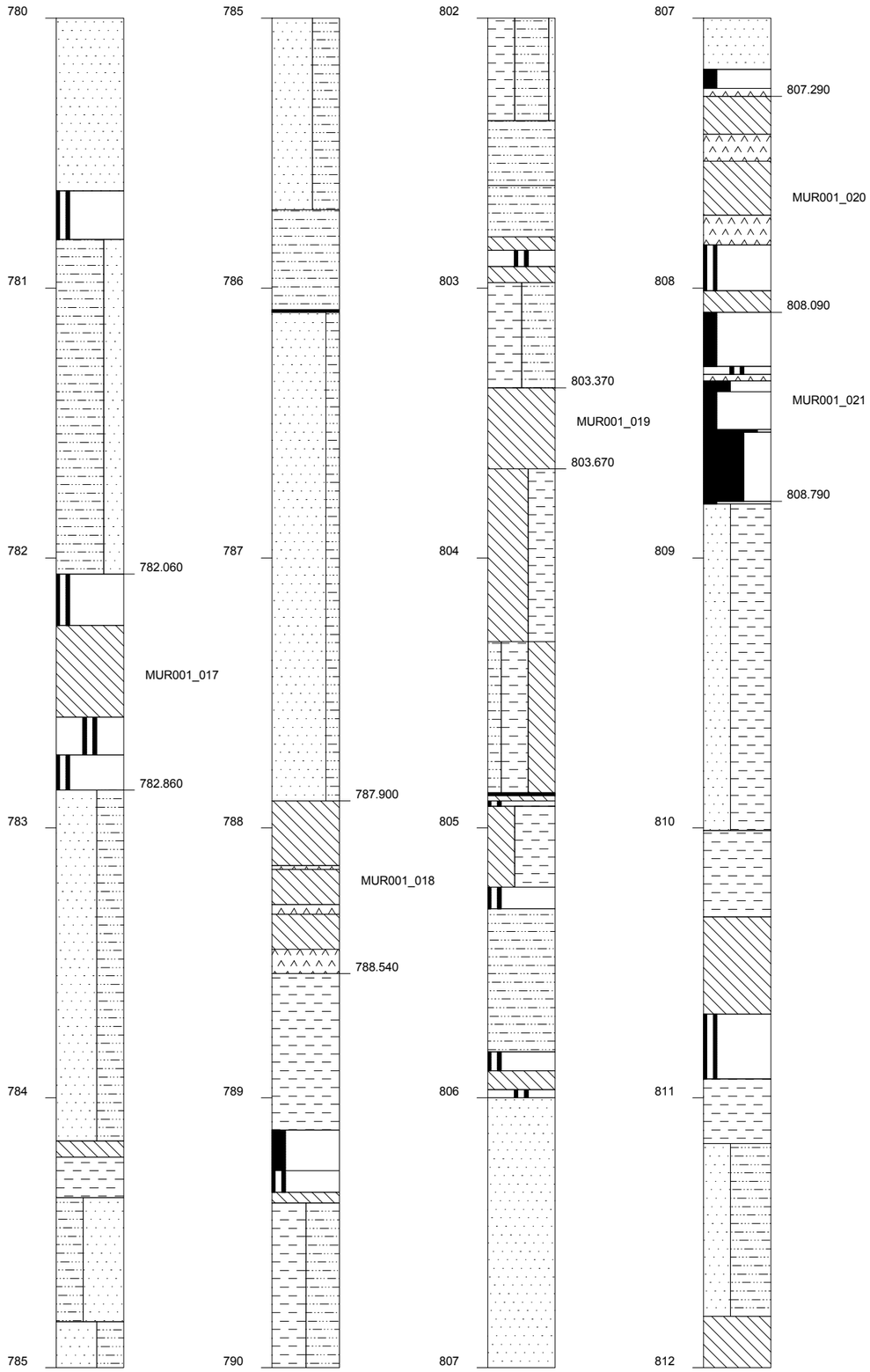

LEGEND

- SANDSTONE
- COAL Dull
- SILTSTONE
- CARBONACEOUS MUDSTONE
- COAL Stony
- MUDSTONE
- COAL Bright
- TUFF
- COAL Dull minor bright
- COAL Dull banded
- COAL Bright banded
- COAL Dull and bright

BOREHOLE NO:

PROJECT

QGC Pty Limited - Murdoch 1

DATE DRILLED April 2013

LOGGED BY: Earth Data

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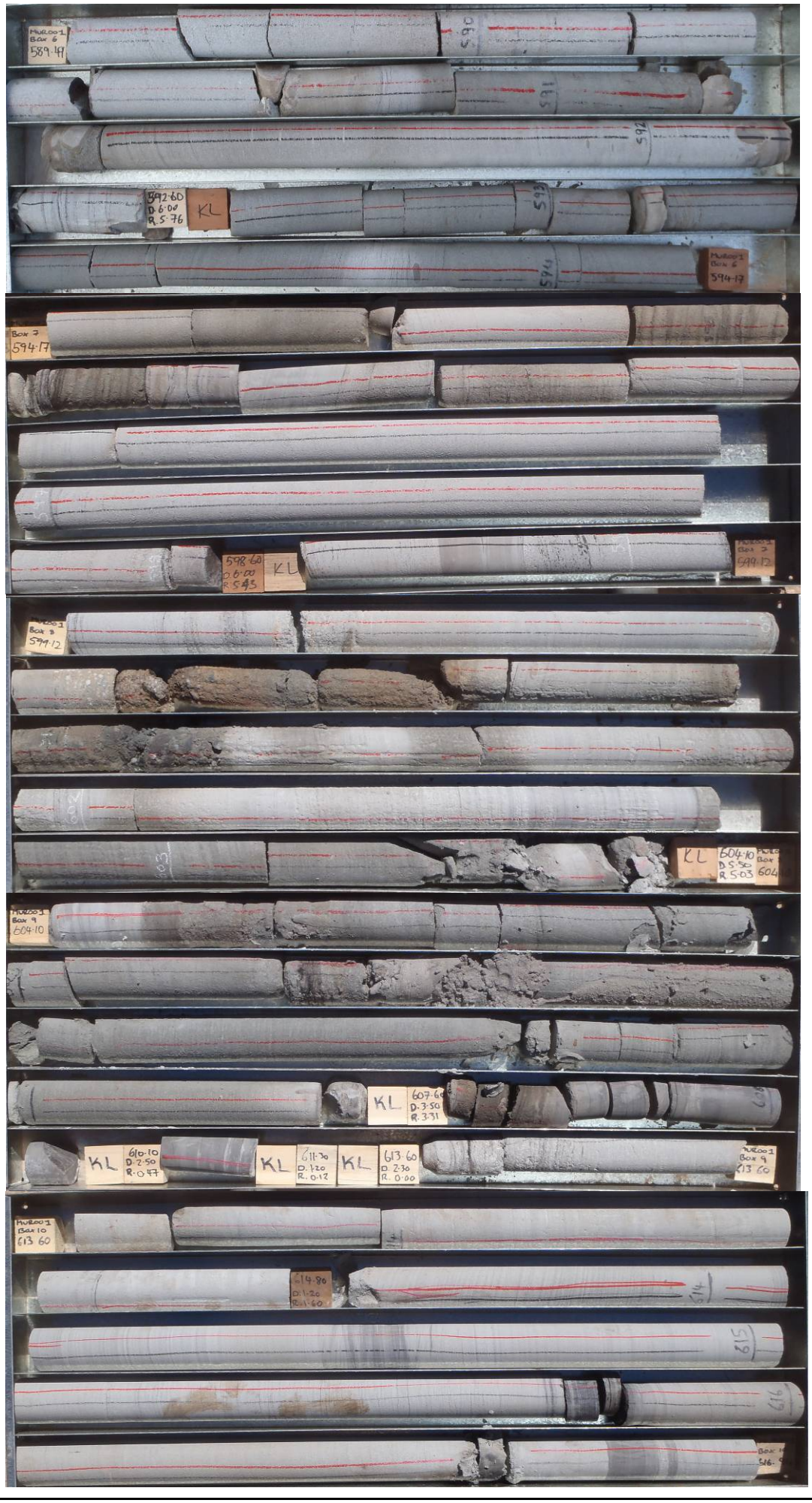
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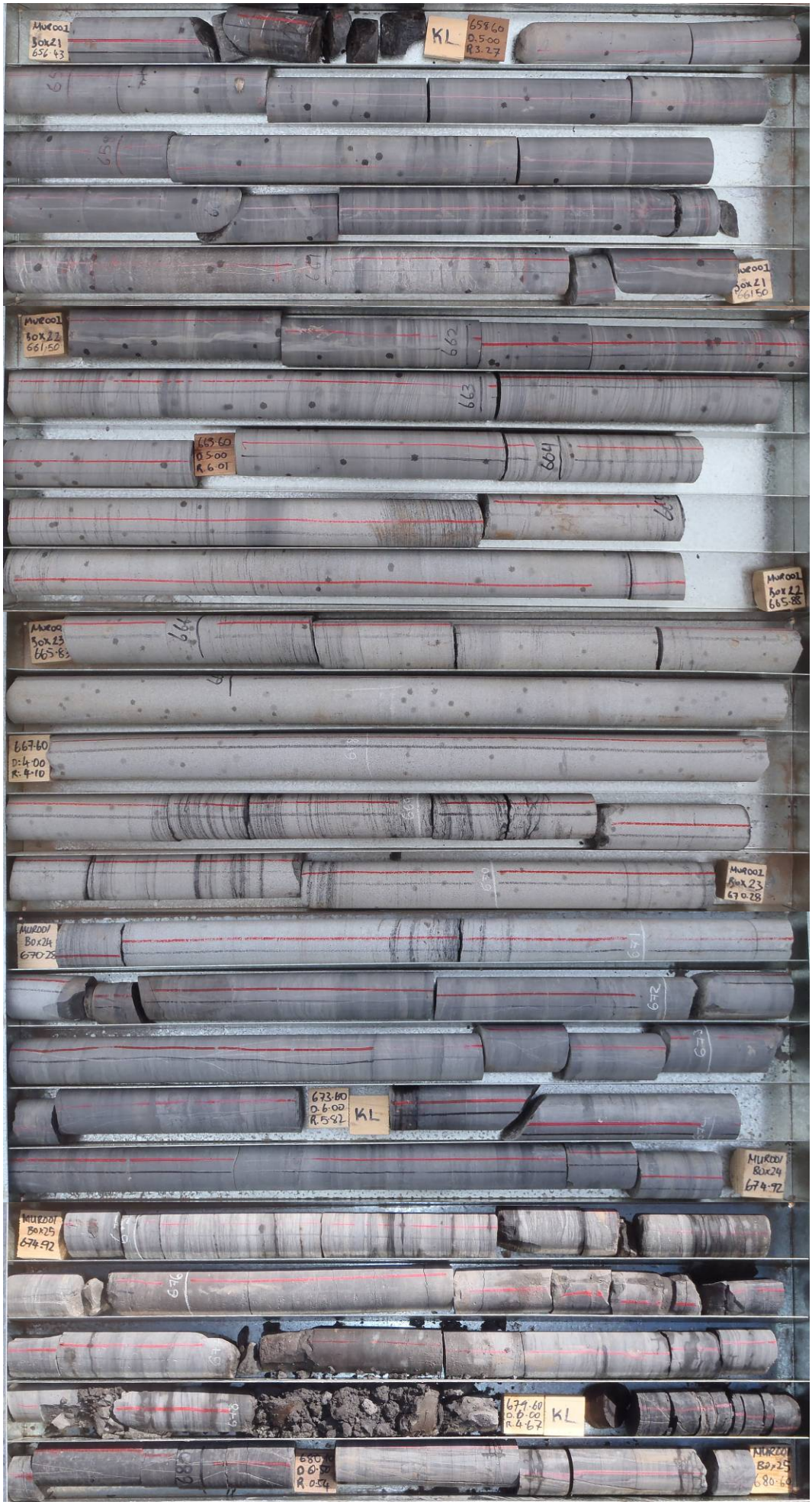
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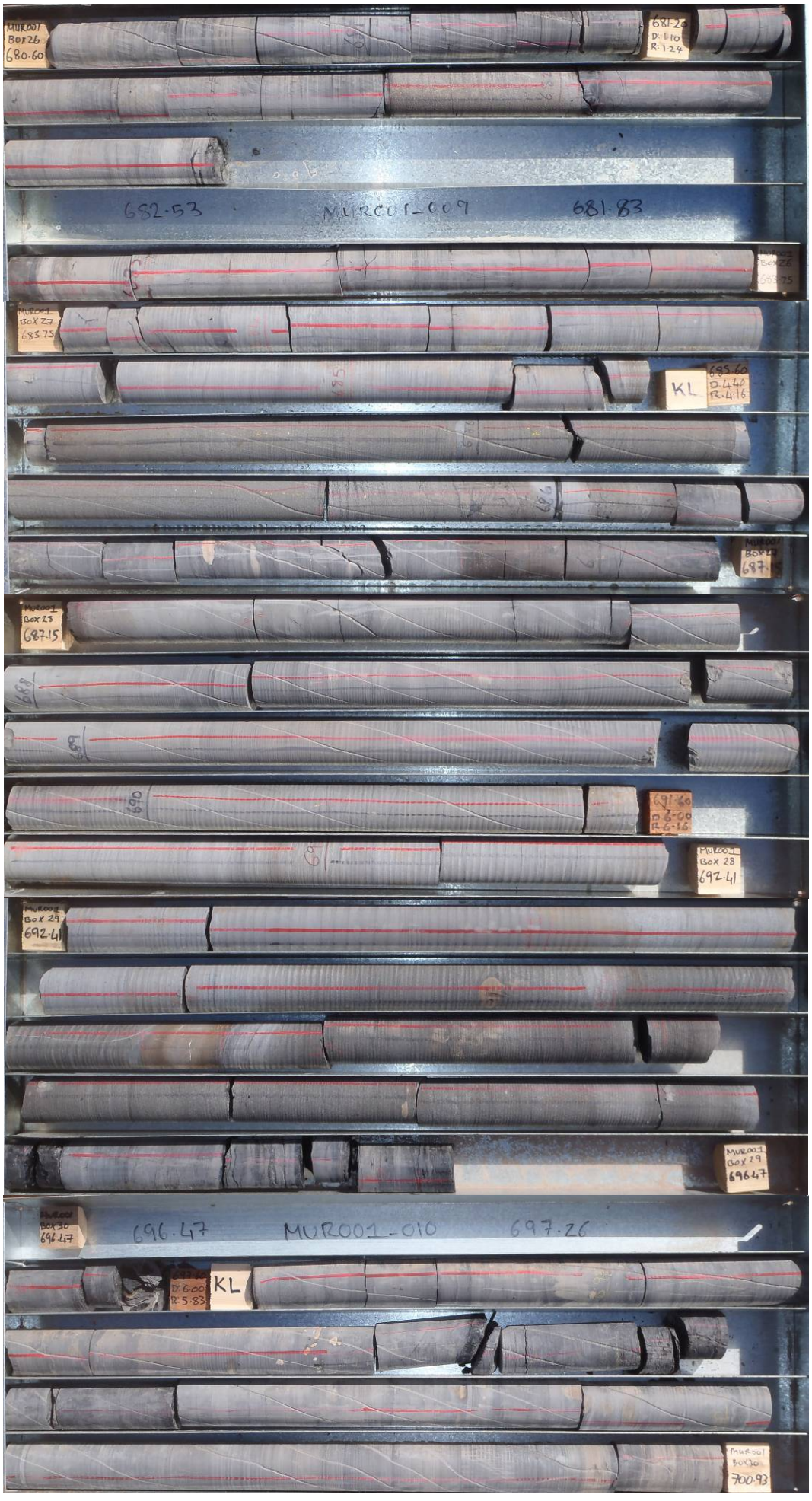
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EARTH DATA

Core Photos 8 of 14

QGC Pty Limited
Murdoch 1


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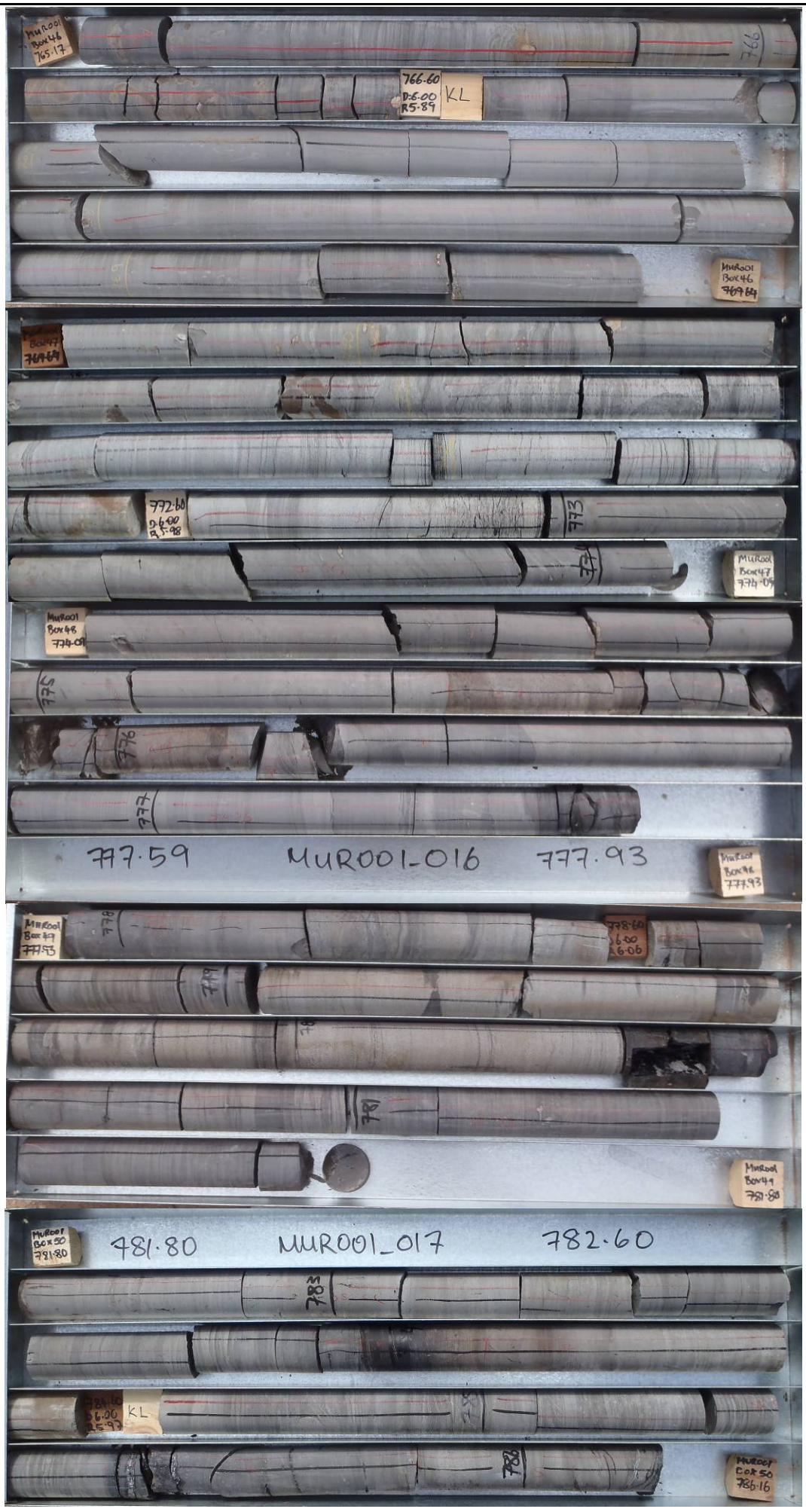
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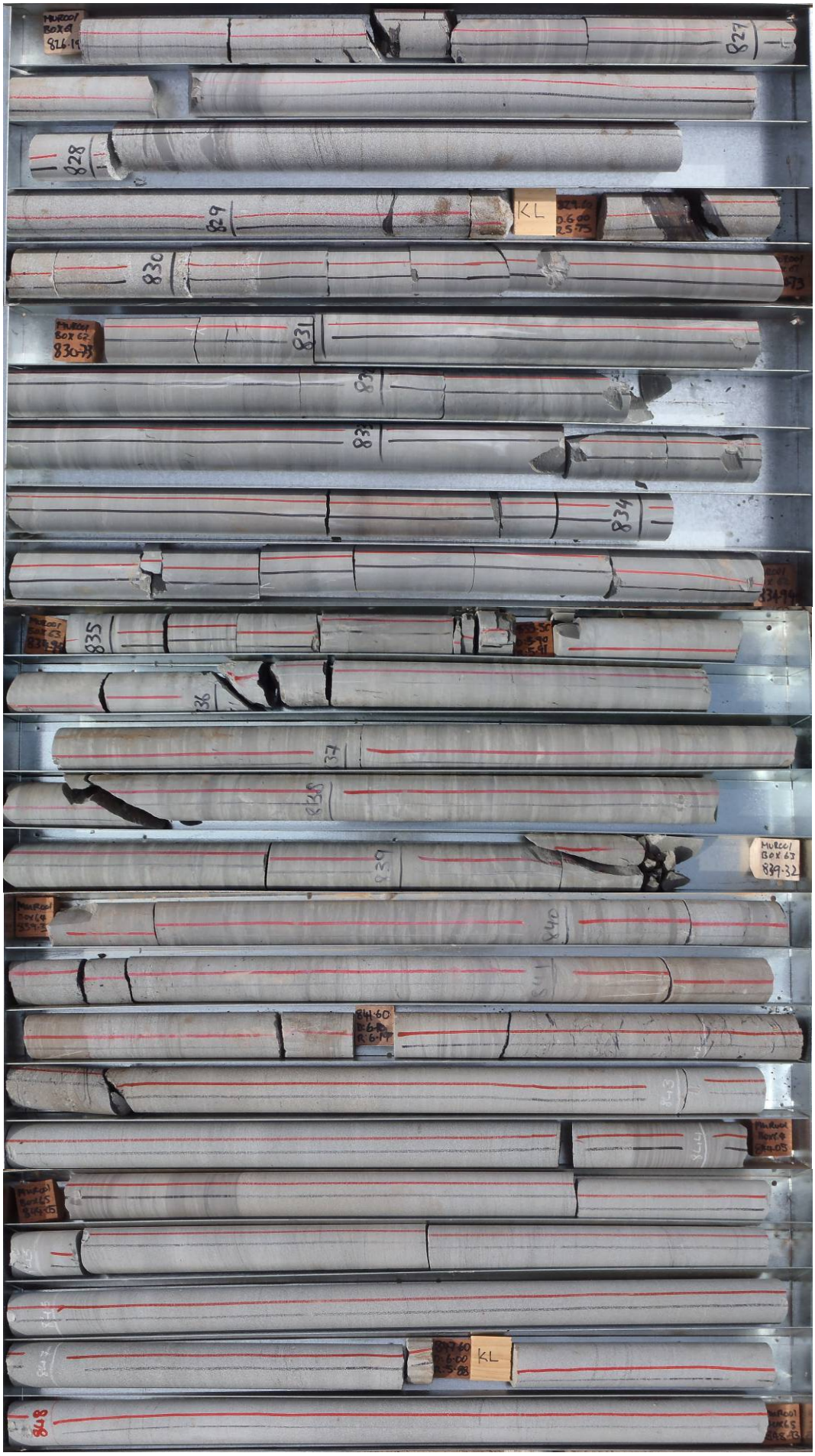
781.80
MUR001_017
782.60
783
788


787·65
MUR001_018
788·29
802·96
MUR001_019
803·26


806.87 MUR001_020 807.67
807.67 MUR001_021 808.37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MURDOCH
BOX 63
839-32
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843
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847
KL
848

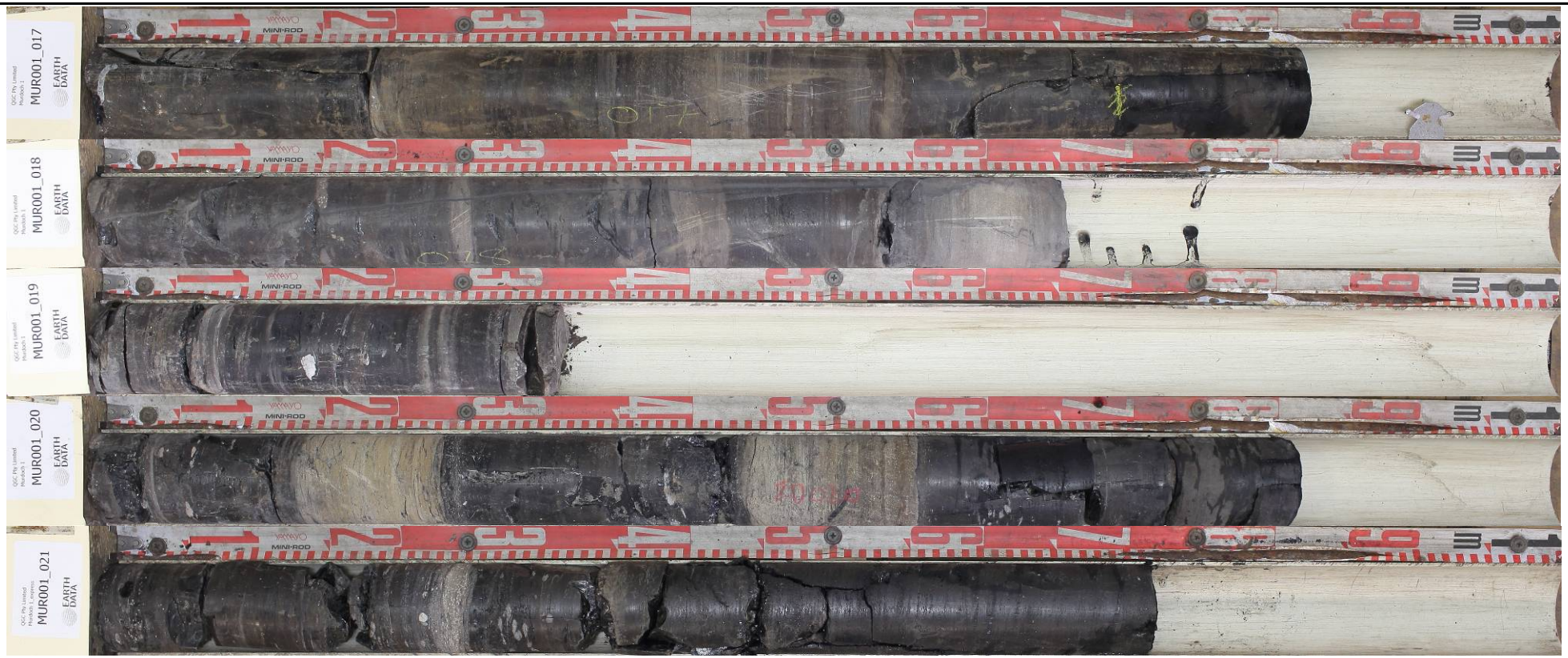

TD

EARTH DATA

Offline Sample Photos 1 of 3

QGC Pty Limited
Murdoch 1


MUR001_009
MUR001_010
MUR001_011
MUR001_012
MUR001_013
MUR001_014
MUR001_015
MUR001_016
EARTH DATA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MUR001_018
MUR001_019
MUR001_020
MUR001_021
EARTH DATA
MINI-ROD

Appendix V

Coal Analyses

EARTH DATA

Proximate Analysis Report - QGC MUR001

NATA
WORLD RECOGNISED ACCREDITATION

Accreditation Number 18571
Accredited for compliance with ISO/IEC 17025

QGC Pty Limited
Level 18, 69 Ann St
Brisbane QLD 4000

Job No: 2013082

Date Reported: 27/08/2013

All results reported to air dried basis unless noted

Client Description	Client Sample	From (m)	To (m)	Mass (kg)	Relative Density	Proximate Analysis			
						Moisture (%)	Ash (%)	Volatile (%)	Fixed Carbon (%)
QGC	MUR001_001	622.440	623.190	0.200	1.47	7.0	24.8	34.9	33.3
QGC	MUR001_002	623.460	624.100	0.200	1.79	7.5	52.5	21.3	18.7
QGC	MUR001_003	624.340	624.690	0.200	1.33	5.8	8.6	46.5	39.1
QGC	MUR001_004	624.740	625.240	0.200	1.47	7.1	24.1	36.0	32.8
QGC	MUR001_005	639.490	640.200	0.200	1.66	6.0	42.8	29.3	21.9
QGC	MUR001_006	640.200	641.010	0.200	1.45	5.7	22.2	40.1	32.0
QGC	MUR001_007	642.750	643.350	0.200	1.75	7.1	50.8	25.9	16.2
QGC	MUR001_008	643.580	644.120	0.200	1.37	5.6	14.5	43.6	36.3
QGC	MUR001_009	682.840	683.140	0.200	1.28	6.3	3.7	47.1	42.9
QGC	MUR001_010	696.650	697.440	0.200	1.38	6.3	16.0	42.6	35.1
QGC	MUR001_011	708.340	709.060	0.200	1.36	4.6	14.5	45.9	35.0
QGC	MUR001_012	709.060	709.720	0.200	1.33	4.8	10.2	47.2	37.8
QGC	MUR001_013	709.720	710.290	0.200	1.39	5.1	17.0	42.1	35.8
QGC	MUR001_014	712.970	713.320	0.200	1.68	5.3	45.6	29.3	19.8
QGC	MUR001_015	744.660	744.980	0.200	1.55	4.2	35.3	34.5	26.0
QGC	MUR001_016	777.810	778.150	0.200	1.79	4.6	53.7	22.3	19.4
QGC	MUR001_017	782.060	782.860	0.200	1.57	3.3	40.0	37.2	19.5
QGC	MUR001_018	787.900	788.540	0.200	1.63	3.0	42.5	35.3	19.2
QGC	MUR001_019	803.370	803.670	0.200	1.74	7.2	50.5	24.1	18.2

EARTH DATA

NATA
WORLD RECOGNISED ACCREDITATION

Accreditation Number 18571
Accredited for compliance with ISO/IEC 17025

Job No: 2013082

Date Reported: 27/08/2013

All results reported to air dried basis unless noted

Client Description	Client Sample	From (m)	To (m)	Mass (kg)	Relative Density	Proximate Analysis			
						Moisture (%)	Ash (%)	Volatile (%)	Fixed Carbon (%)
QGC	MUR001_020	807.290	808.090	0.200	1.66	6.4	43.5	28.3	21.8
QGC	MUR001_021	808.090	808.790	0.200	1.42	5.2	19.1	39.4	36.3
QGC	MUR001_001Q			0.200		8.0	28.3		
QGC	MUR001_002Q			0.200		8.4	43.2		
QGC	MUR001_003QA			0.200		7.4	9.3		
QGC	MUR001_003QB			0.200		7.2	8.5		
QGC	MUR001_004Q			0.200		7.4	17.9		
QGC	MUR001_005Q			0.200		6.1	35.4		
QGC	MUR001_006Q			0.200		6.5	24.0		
QGC	MUR001_007Q			0.200		6.5	39.0		
QGC	MUR001_008Q			0.200		5.9	8.9		
QGC	MUR001_009Q			0.200		6.5	10.9		
QGC	MUR001_010Q			0.200		6.9	17.0		
QGC	MUR001_011Q			0.200		4.5	38.5		
QGC	MUR001_012Q			0.200		5.2	10.2		
QGC	MUR001_013Q			0.200		5.3	15.6		
QGC	MUR001_014Q			0.200		6.0	52.7		
QGC	MUR001_015Q			0.200		4.3	35.2		
QGC	MUR001_016Q			0.200		4.6	53.1		
QGC	MUR001_017Q			0.200		3.4	52.0		
QGC	MUR001_018Q			0.200		3.3	49.6		
QGC	MUR001_019Q			0.200		8.3	61.4		
QGC	MUR001_020Q			0.200		9.2	47.6		
QGC	MUR001_021QA			0.200		5.7	13.5		
QGC	MUR001_021QB			0.200		5.5	15.3		

Moisture, ash and volatile matter analysis completed in accordance with Australian Standard AS1038.3-2000.
Relative density analysis completed in accordance with Earth Data in house method RD-01.

These results relate only to the items tested.

This report shall not be reproduced except in full and relates only to the items tested.

Analyte	Moisture <5%	Moisture >5%	Ash <10%	Ash 10 - 30%	Ash >30%	Volatile Matter <25%	Volatile Matter >25%	Relative Density
Measurement Uncertainty (% Relative)	3.72	3.74	0.57	1.86	1.29	3.89	4.26	0.46

The quoted measurement uncertainty is the expanded uncertainty at the 95% confidence interval, with a coverage factor (k) of 2.

Authorised By

Matthew Crotty Chemist

Robert Raymond Laboratory Manager

Appendix VI

Definition of Confidence Constraints

Data quality may be impacted by a number of different factors, which may in turn hold influence over the confidence in the analytical results. Each analysis component has been allocated a confidence constraint, as defined in Table A below, to help describe the results discussed in this report.

Table A: Definitions of Confidence Constraints for Analytical Results

High confidence	Little or no adverse factors have impacted on data quality, analytical results are considered to be representative.
Moderate confidence	Adverse factors have had an impact on data quality, rendering the analytical results as possibly unrepresentative, though possibly useful when regarded in conjunction comparative or more information.
Low confidence	Data quality has been significantly impacted by adverse factors, analytical results are considered unrepresentative.

APPENDIX 7

METHANE AND CARBON DIOXIDE ADSORPTION ISOTHERMS ANALYSIS REPORT

ANALYTICAL REPORT

ADSORPTION ISOTHERMS

MURDOCH 01

PREPARED FOR
QUEENSLAND GAS COMPANY LTD

NOVEMBER 2013

Energy Resources Consulting Pty Ltd
PO Box 54
Coorparoo, Qld 4151
Australia

ADSORPTION ISOTHERM ANALYSIS

INTRODUCTION

Twenty one samples were received (see table below) to be evaluated for adsorption isotherm properties, vitrinite reflectance (selected samples only) and maceral content. Adsorption isotherm data are reported herein.

Murdoch 01

Sample No.	From (m)	To (m)	Temp (°C)	Sample No.	From (m)	To (m)	Temp (°C)
MUR001_001	623.19	622.44	40.1	MUR001_012	709.06	709.72	43.4
MUR001_002	624.10	623.46	40.1	MUR001_013	709.72	710.29	43.5
MUR001_003	624.69	624.34	40.2	MUR001_014	712.97	713.32	43.5
MUR001_004	625.24	624.74	40.2	MUR001_015	744.66	744.98	44.8
MUR001_005	640.20	639.49	40.8	MUR001_016	777.81	778.15	46.1
MUR001_006	641.01	640.20	40.8	MUR001_017	782.06	782.86	46.1
MUR001_007	643.35	642.75	40.9	MUR001_018	787.90	788.54	46.7
MUR001_008	644.12	643.58	40.9	MUR001_019	803.37	803.67	46.7
MUR001_009	683.14	682.84	42.7	MUR001_020	807.29	808.09	47.2
MUR001_010	697.44	696.65	42.7	MUR001_021	808.09	808.79	47.2
MUR001_011	709.06	708.34	43.4				

ADSORPTION ISOTHERMS

Sample Preparation

Individual samples were as -6 mm coal which had been crushed elsewhere. Approximately 200 g of each sample was received, which was sub-sampled to obtain around 25 g for petrographic analysis. The remaining sample was then crushed to less than 0.212 mm and brought to an equilibrium moist state (AS 1038.17-1989) for methane adsorption isotherm analysis.

Where necessary, composites were prepared by pro-rataing on the basis of the coal mass. For each composite, individual samples were weighed and the total mass for the composited was calculated. A portion of each sample was then used for the composite by taking its proportion of the total composite mass and multiplying it by the desired final mass of the composite (in this case 150 g). For example, if two samples were received weighing 400 and 300 g respectively, a 150 g composite would be made up by (400/700*150) + (300/700*150). Since the initial masses are in the correct volume proportion, the final composite contains the individual samples in the correct volume proportions.

Moisture Content and Ash Yield

Equilibrium moisture content, ash yield and helium density (for evaluation of dead volume of the system) were determined prior to methane adsorption isotherm analysis.

Moisture content was determined by weighing approximately 0.5 to 1 g of coal in a 4 digit balance (i.e to 0.1 mg), heating it to 110 °C in a nitrogen atmosphere, and then re-weighing the dry sample. The method is similar to AS1038.3-1989 "Methods for the analysis and testing of

coal and coke. Part 3: Proximate analysis of higher rank coal."

Ash yield was determined on dry coal by weighing approximately 0.5 to 1 g of dry coal in a 4 digit balance (i.e. to 0.1 mg), heating it to 500 °C and holding it there for one hour and then raising the heat to 815 °C and maintaining this for a further one hour. The ash yield is then determined following re-weighing at room temperature. The method is similar to AS1038.3-1989 "Methods for the analysis and testing of coal and coke. Part 3: Proximate analysis of higher rank coal."

Adsorption Isotherm

Isotherm determination used at least nine pressure steps up to a maximum pressure of around 8 MPa (1160 psia) where the coals are at 800 m or shallower and additional pressure steps may be used for deeper coals. Analysis was performed as close as possible to formation temperature as advised. The procedure is detailed as follows:

1. adsorption isotherm cells are weighed
2. the equilibrium moist coal is placed in the cells and the cells weighed
3. the cells are evacuated and weighed
4. helium is introduced into the cells at pressures of approximately 2, 4, 6 and 8 MPa; this data is used to calculate the free volume of the cells and consequently the helium density of the coal
5. the cells are evacuated
6. a fixed volume of methane is introduced into the cell and the pressure monitored to the nearest 1 kPa until there is no change in pressure for a period of at least one hour
7. the adsorption is determined
8. steps 6 and 7 are repeated for each pressure step

RESULTS

Isotherm results are tabulated and presented graphically as follows. Absolute isotherms are calculated. Isotherm results are calculated to standardised conditions of 20°C and 1 atmosphere (101.3 kPa) pressure per gram of coal as well as in standard cubic feet (scf) at 60 °F and 1 atmosphere (14.7psia) per short ton (2000 lb) of coal.

Note, samples are retained by Energy Resources Consulting Pty Ltd for a period of 12 months following the reporting date. They may be discarded after this time.

Results: Methane (CH_4) Adsorption Isotherms

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_001] 622.44 - 623.19 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	113.96 [0.25124]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.433
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.1 [104.2]
Ash (%, at Equilibrium Moisture)	23.6	Analysis date	09-Oct-13
Equilibrium Moisture (%)	8.0	Test Gas	Methane

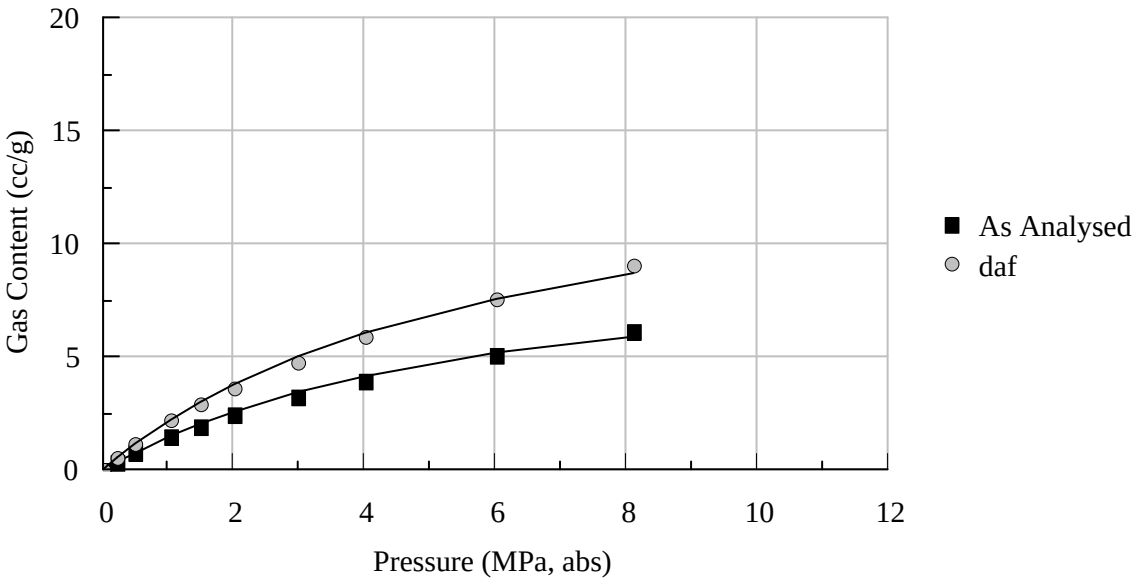
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.223	0.42	0.61	32	13	19
0.492	0.83	1.21	71	26	38
1.045	1.51	2.21	152	48	70
1.512	2.01	2.93	219	63	93
2.008	2.47	3.62	291	78	114
2.981	3.25	4.76	432	103	150
4.022	4.03	5.89	583	127	186
6.034	5.17	7.57	875	163	239
8.137	6.20	9.07	1180	196	286

Langmuir Isotherm Coefficients

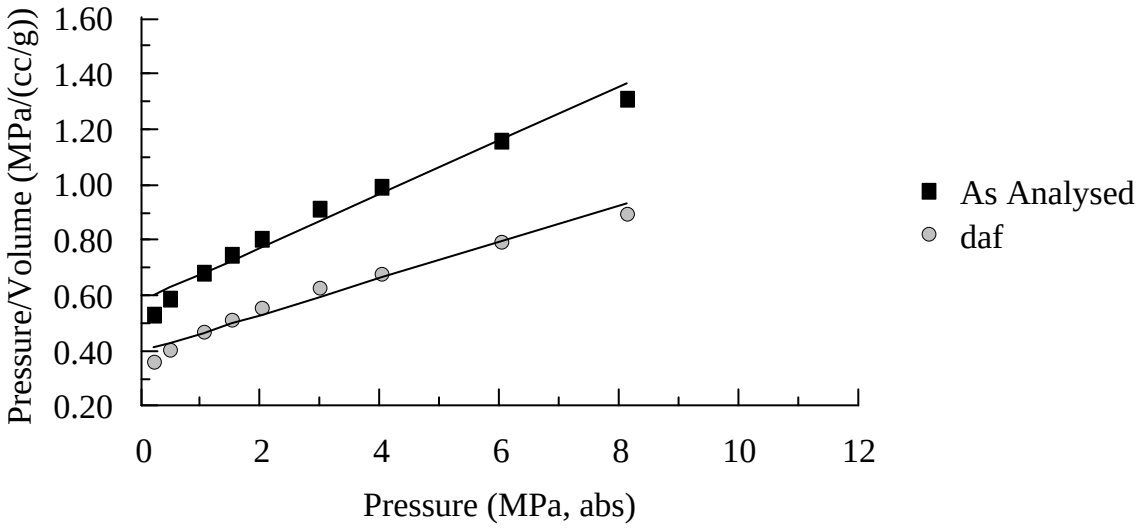
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.00	10.34	870	326
daf	6.00	15.13	870	477

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_001] 622.44 - 623.19 m
Analysis Temperature 40.1 °C



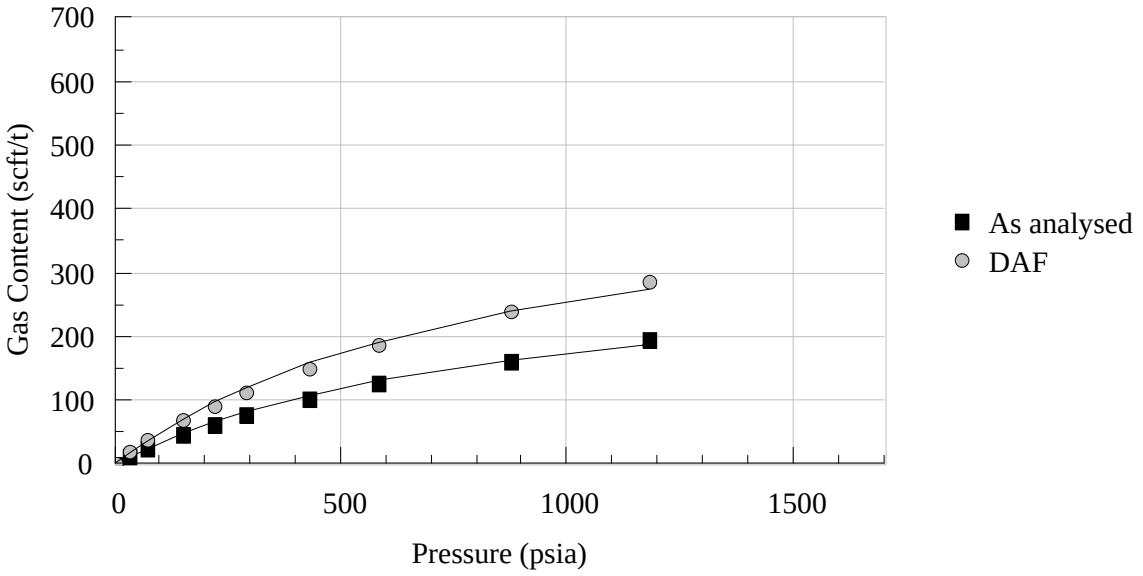
V = 10.34 P / (P + 6.00) (As analysed) V = 15.13 P / (P + 6.00) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_001] 622.44 - 623.19 m
Analysis Temperature 40.1 °C



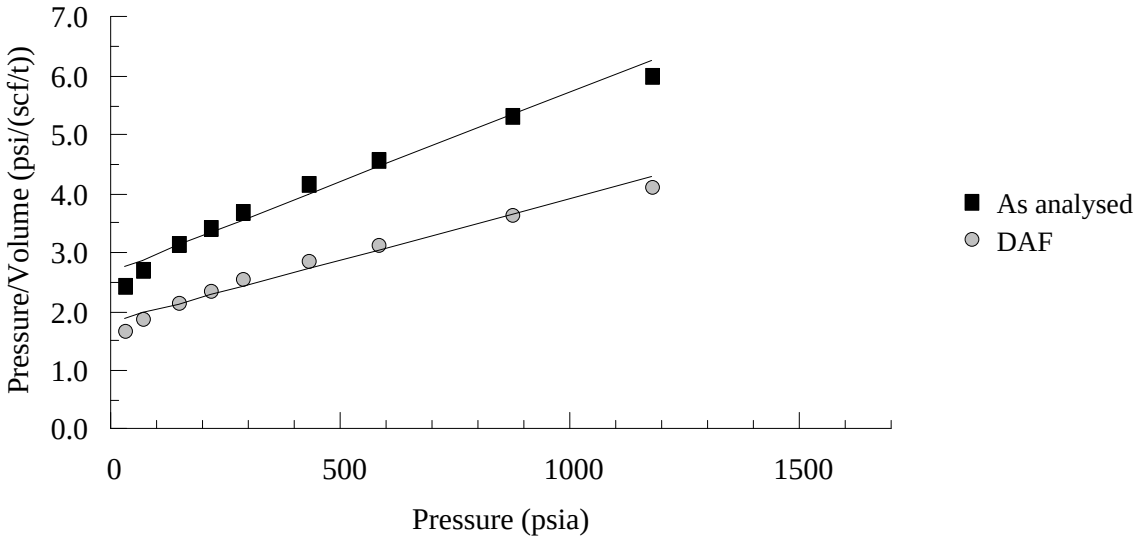
P/V = 0.097 P + 0.580; r^2 = 0.974 (As analysed)
P/V = 0.066 P + 0.397; r^2 = 0.974 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_001] 622.44 - 623.19 m
Analysis Temperature 104.2 °F



V = 326 P / (P + 870) (As analysed) V = 477 P / (P + 870) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_001] 622.44 - 623.19 m
Analysis Temperature 104.2 °F



P/V = 0.00306 P + 2.666; r^2 = 0.974 (As analysed)
P/V = 0.00209 P + 1.823; r^2 = 0.974 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_002] 623.46 - 624.10 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	125.61 [0.27692]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.735
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.1 [104.2]
Ash (%, at Equilibrium Moisture)	51.9	Analysis date	09-Oct-13
Equilibrium Moisture (%)	9.8	Test Gas	Methane

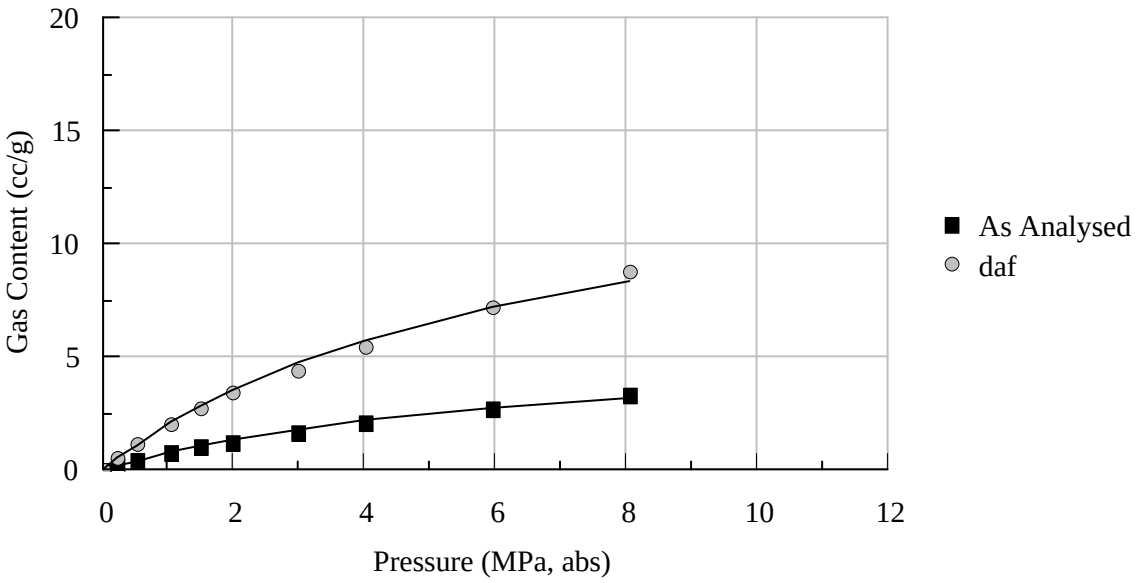
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.241	0.23	0.61	35	7	19
0.518	0.45	1.18	75	14	37
1.054	0.80	2.09	153	25	66
1.498	1.05	2.75	217	33	87
1.999	1.31	3.42	290	41	108
2.979	1.69	4.42	432	53	139
4.016	2.11	5.52	583	67	174
5.983	2.77	7.23	868	87	228
8.065	3.37	8.80	1170	106	278

Langmuir Isotherm Coefficients

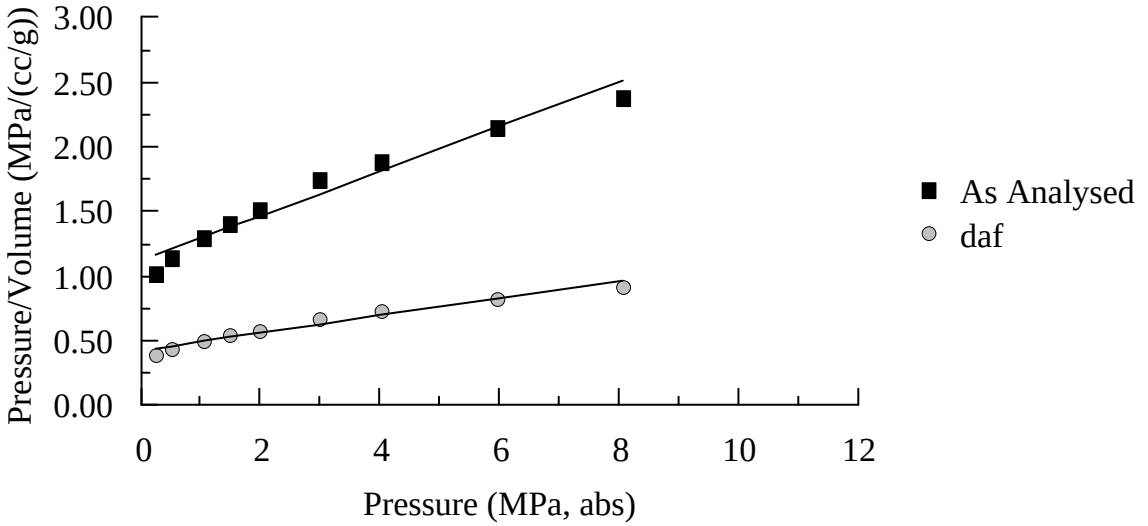
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.44	5.75	934	182
daf	6.44	15.02	934	474

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_002] 623.46 - 624.10 m
Analysis Temperature 40.1 °C



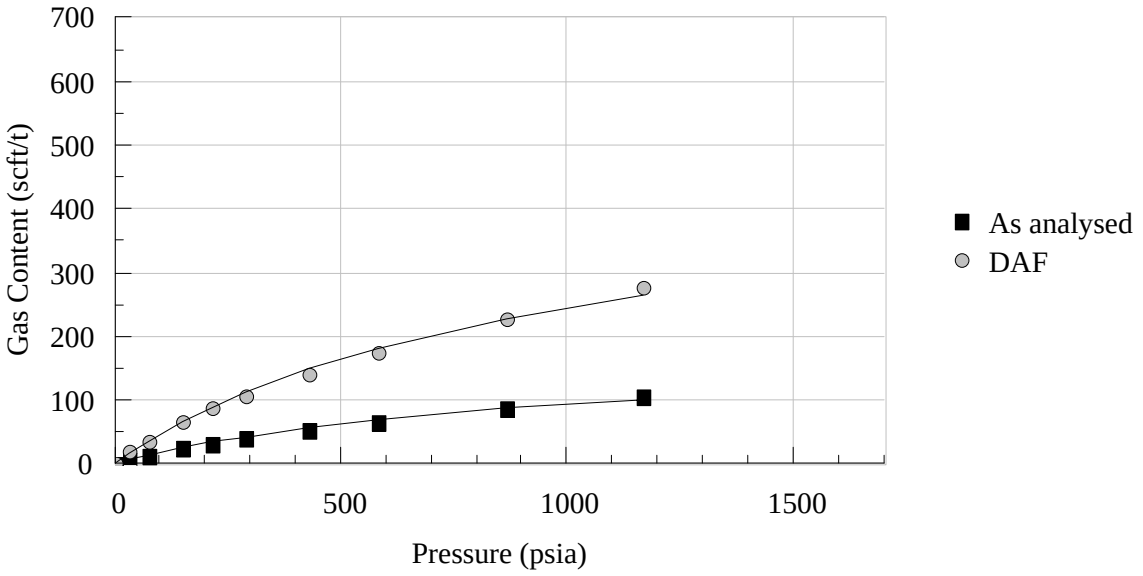
V = 5.75 P / (P + 6.44) (As analysed) V = 15.02 P / (P + 6.44) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_002] 623.46 - 624.10 m
Analysis Temperature 40.1 °C



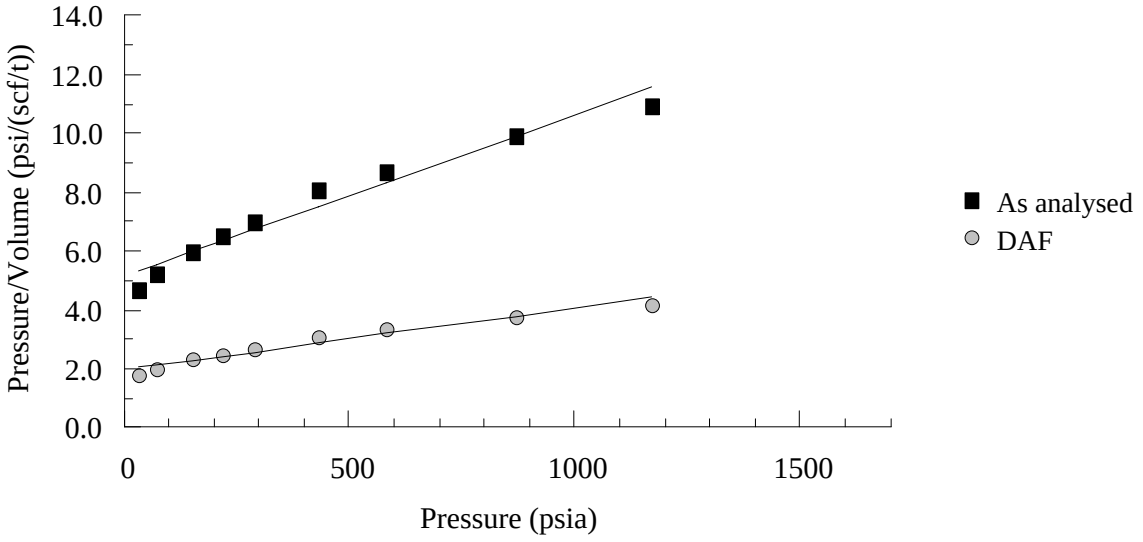
P/V = 0.174 P + 1.119; r^2 = 0.962 (As analysed)
P/V = 0.067 P + 0.429; r^2 = 0.962 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_002] 623.46 - 624.10 m
Analysis Temperature 104.2 °F



V = 182 P / (P + 934) (As analysed) V = 474 P / (P + 934) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_002] 623.46 - 624.10 m
Analysis Temperature 104.2 °F



P/V = 0.00551 P + 5.142; r^2 = 0.962 (As analysed)
P/V = 0.00211 P + 1.970; r^2 = 0.962 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_003] 624.34 - 624.69 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	112.52 [0.24806]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.293
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.2 [104.4]
Ash (%, Equilibrium Moisture ba	7.7	Analysis date	08-Oct-13
Moist. (%, Equilibrium Moisture	7.2	Test Gas	Methane

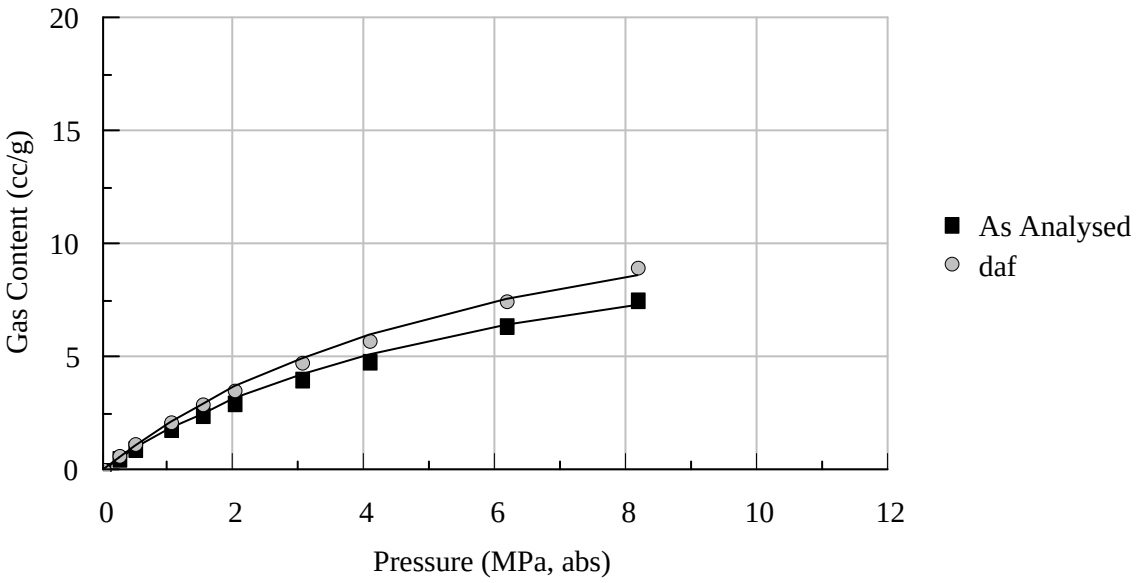
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.263	0.56	0.65	38	18	21
0.511	1.02	1.20	74	32	38
1.051	1.85	2.18	152	59	69
1.532	2.47	2.90	222	78	92
2.032	3.06	3.59	295	96	113
3.050	4.04	4.75	442	128	150
4.075	4.90	5.76	591	155	182
6.171	6.42	7.54	895	202	238
8.201	7.63	8.97	1189	241	283

Langmuir Isotherm Coefficients

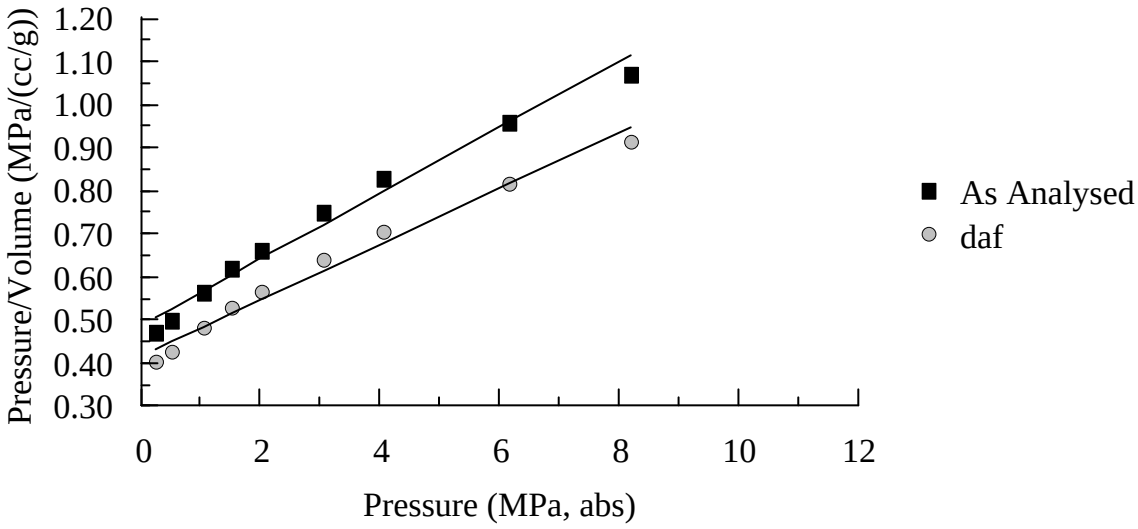
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.39	13.09	927	413
daf	6.39	15.38	927	485

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_003] 624.34 - 624.69 m
Analysis Temperature 40.2 °C



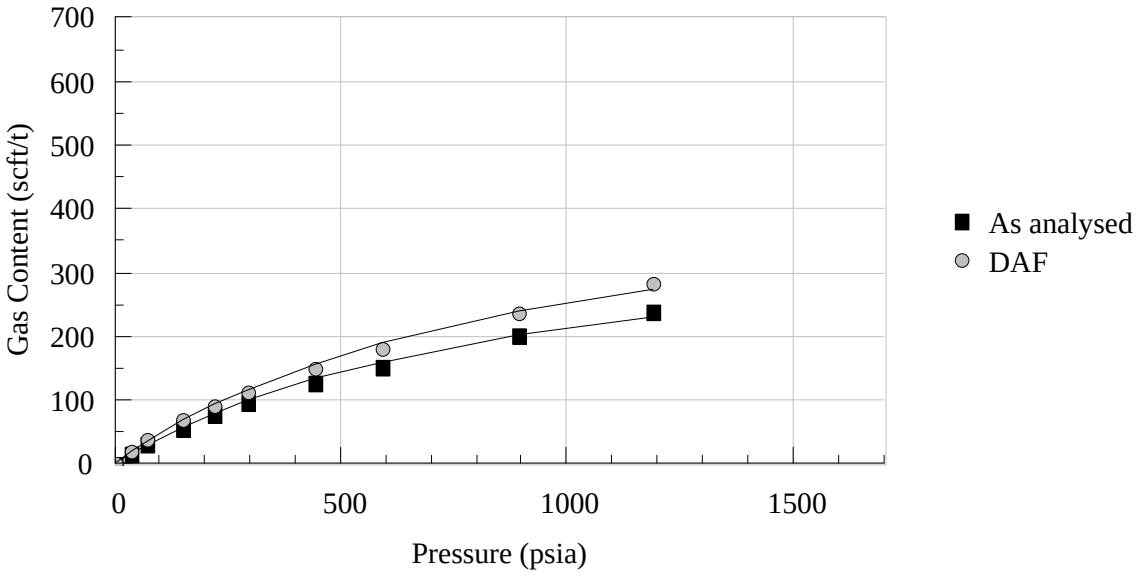
V = 13.09 P / (P + 6.39) (As analysed) V = 15.38 P / (P + 6.39) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_003] 624.34 - 624.69 m
Analysis Temperature 40.2 °C



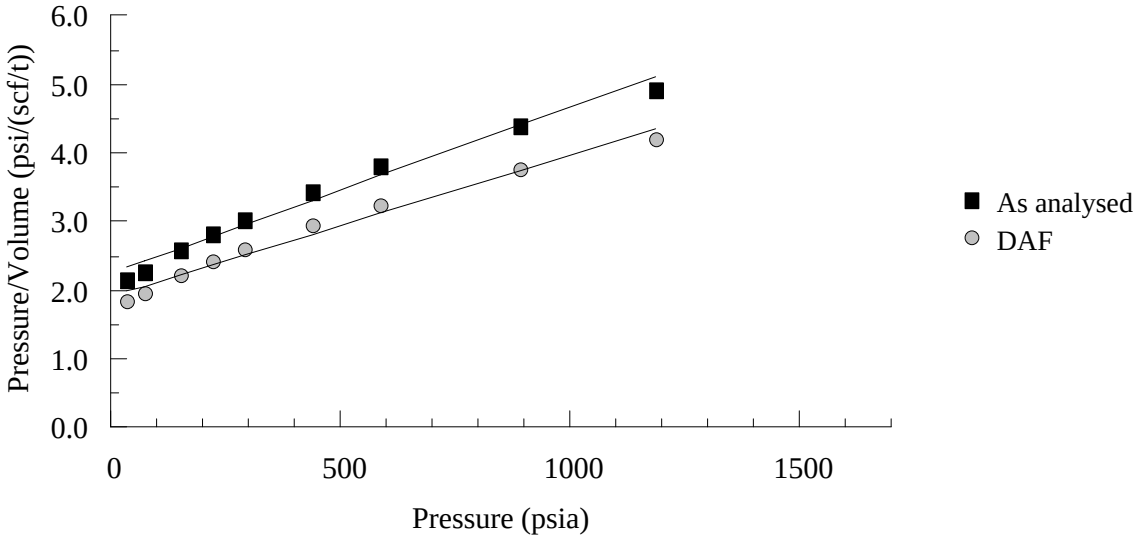
P/V = 0.076 P + 0.488; r^2 = 0.982 (As analysed)
P/V = 0.065 P + 0.415; r^2 = 0.982 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_003] 624.34 - 624.69 m
Analysis Temperature 104.4 °F



V = 413 P / (P + 927) (As analysed) V = 485 P / (P + 927) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_003] 624.34 - 624.69 m
Analysis Temperature 104.4 °F



P/V = 0.00242 P + 2.243; r^2 = 0.982 (As analysed)
P/V = 0.00206 P + 1.909; r^2 = 0.982 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_004] 624.74 - 625.24 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	111.29 [0.24535]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.427
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.2 [104.4]
Ash (%, Equilibrium Moisture ba	23.2	Analysis date	08-Oct-13
Moist. (%, Equilibrium Moisture	8.5	Test Gas	Methane

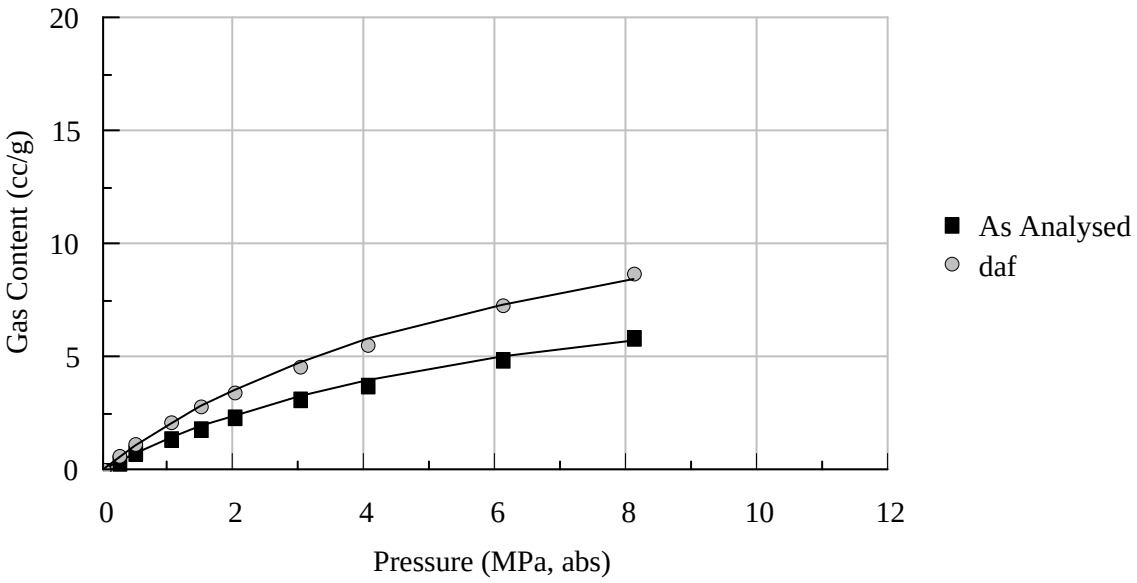
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.263	0.42	0.62	38	13	20
0.509	0.79	1.16	74	25	37
1.040	1.44	2.11	151	45	67
1.518	1.93	2.82	220	61	89
2.015	2.38	3.49	292	75	110
3.032	3.16	4.63	440	100	146
4.053	3.83	5.61	588	121	177
6.114	4.99	7.31	887	158	231
8.124	5.96	8.72	1178	188	275

Langmuir Isotherm Coefficients

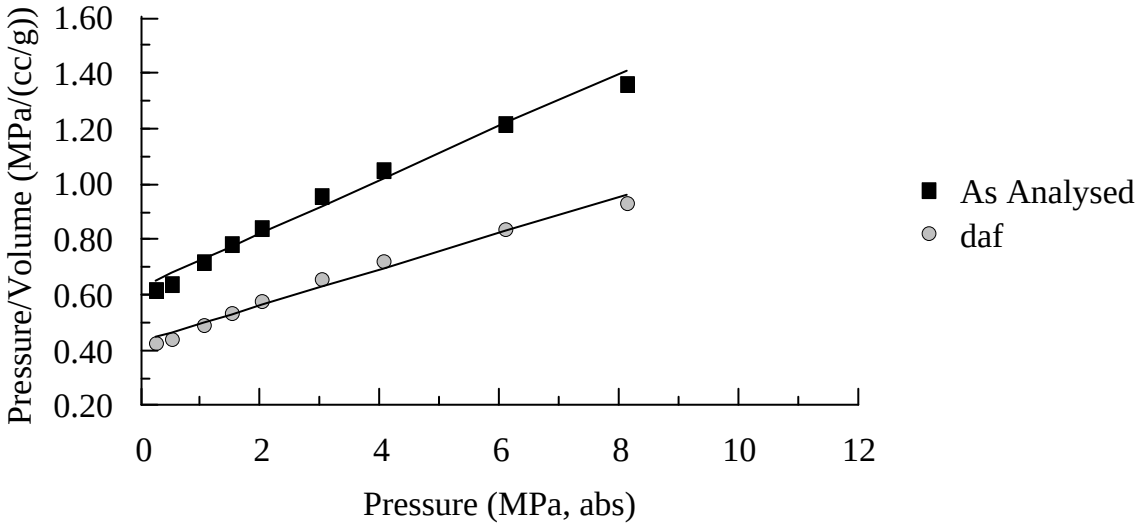
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.50	10.36	943	327
daf	6.50	15.16	943	479

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_004] 624.74 - 625.24 m
Analysis Temperature 40.2 °C



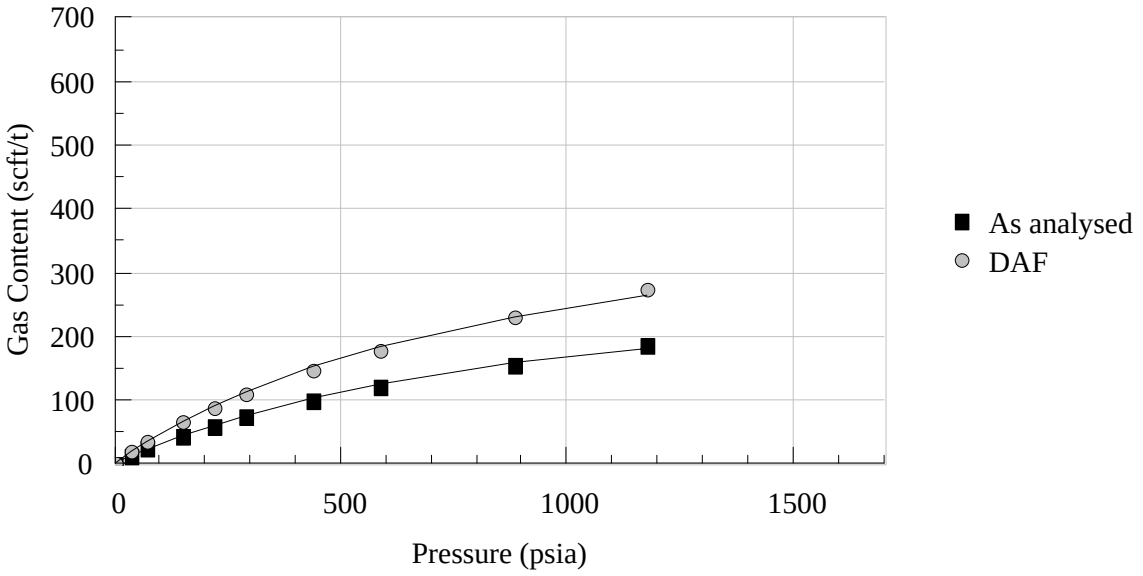
V = 10.36 P / (P + 6.50) (As analysed) V = 15.16 P / (P + 6.50) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_004] 624.74 - 625.24 m
Analysis Temperature 40.2 °C



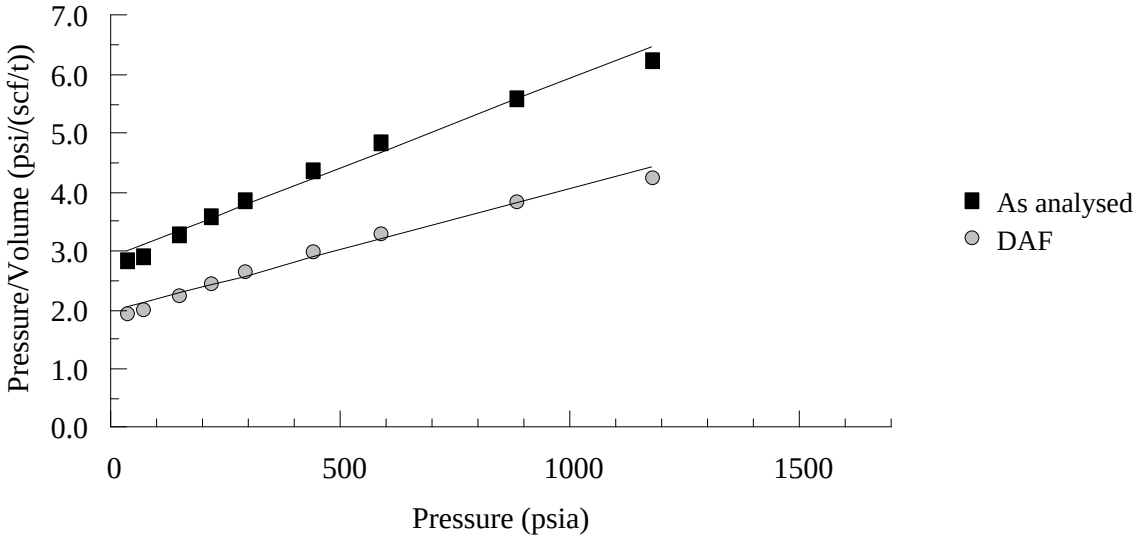
P/V = 0.097 P + 0.628; r^2 = 0.984 (As analysed)
P/V = 0.066 P + 0.429; r^2 = 0.984 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_004] 624.74 - 625.24 m
Analysis Temperature 104.4 °F



V = 327 P / (P + 943) (As analysed) V = 479 P / (P + 943) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_004] 624.74 - 625.24 m
Analysis Temperature 104.4 °F



P/V = 0.00306 P + 2.885; r^2 = 0.984 (As analysed)
P/V = 0.00209 P + 1.970; r^2 = 0.984 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_005] 639.49 - 640.20 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	119.03 [0.26242]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.608
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.8 [105.4]
Ash (%, Equilibrium Moisture ba	41.9	Analysis date	14-Oct-13
Moist. (%, Equilibrium Moisture	7.7	Test Gas	Methane

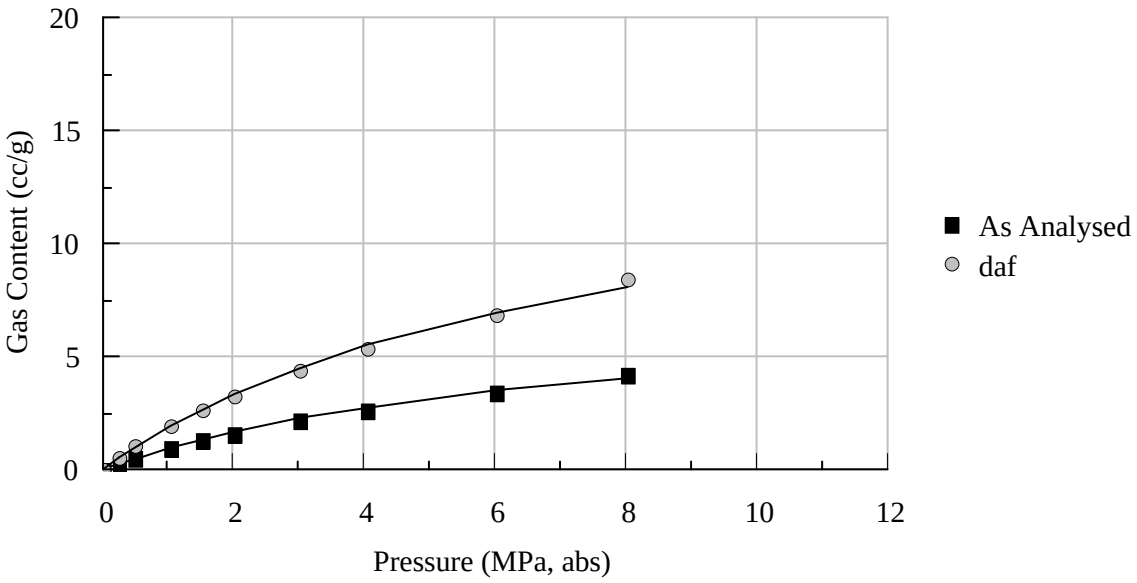
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.263	0.29	0.57	38	9	18
0.515	0.54	1.08	75	17	34
1.047	1.02	2.02	152	32	64
1.522	1.35	2.69	221	43	85
2.013	1.66	3.30	292	52	104
3.008	2.21	4.39	436	70	138
4.048	2.70	5.35	587	85	169
6.030	3.49	6.92	875	110	218
8.049	4.24	8.42	1167	134	266

Langmuir Isotherm Coefficients

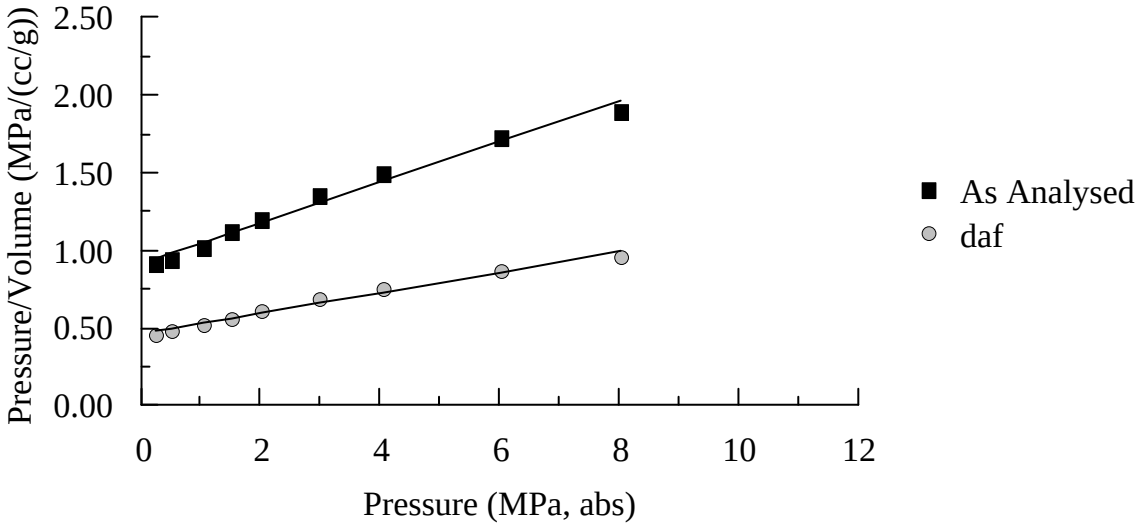
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	7.01	7.65	1017	241
daf	7.01	15.17	1017	479

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_005] 639.49 - 640.20 m
Analysis Temperature 40.8 °C



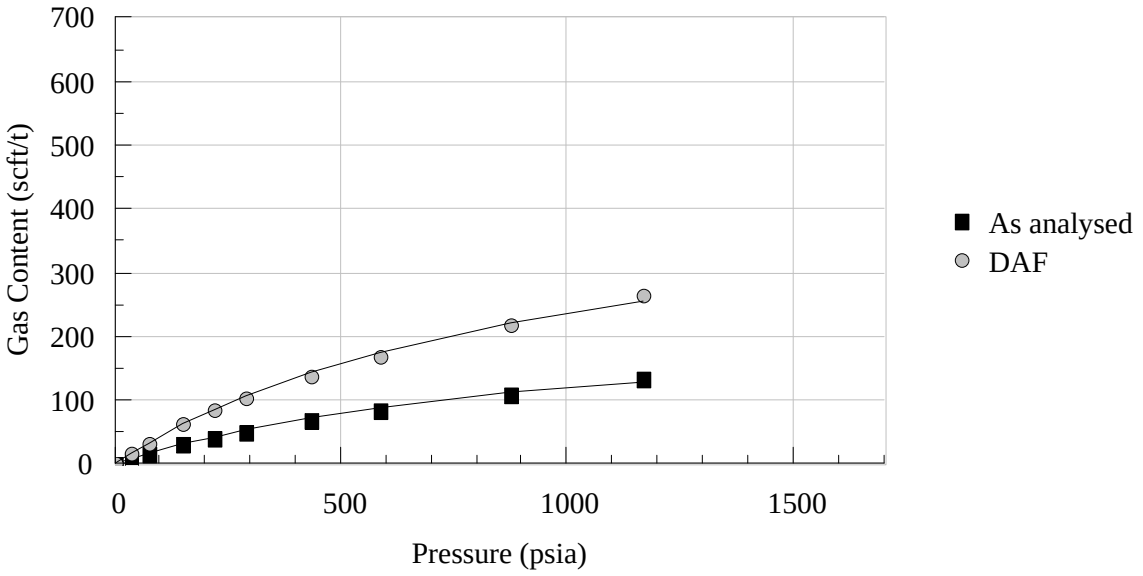
V = 7.65 P / (P + 7.01) (As analysed) V = 15.17 P / (P + 7.01) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_005] 639.49 - 640.20 m
Analysis Temperature 40.8 °C



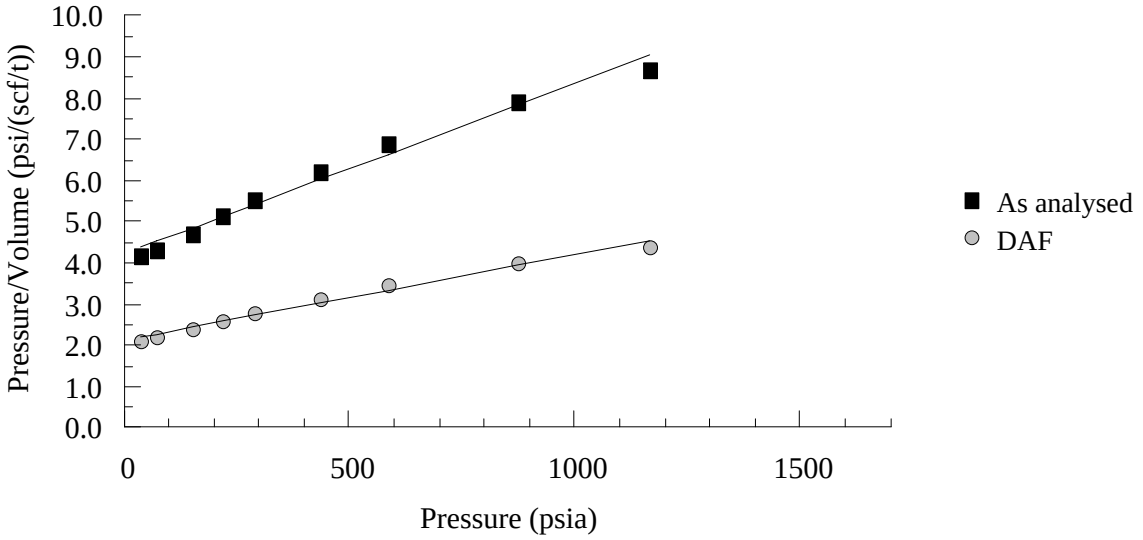
P/V = 0.131 P + 0.917; r^2 = 0.984 (As analysed)
P/V = 0.066 P + 0.462; r^2 = 0.984 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_005] 639.49 - 640.20 m
Analysis Temperature 105.4 °F



V = 241 P / (P + 1017) (As analysed) V = 479 P / (P + 1017) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_005] 639.49 - 640.20 m
Analysis Temperature 105.4 °F



P/V = 0.00414 P + 4.214; r^2 = 0.984 (As analysed)
P/V = 0.00209 P + 2.124; r^2 = 0.984 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_006] 640.20 - 641.01 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	104.31 [0.22996]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.397
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.8 [105.4]
Ash (%, Equilibrium Moisture ba	21.5	Analysis date	14-Oct-13
Moist. (%, Equilibrium Moisture	7.2	Test Gas	Methane

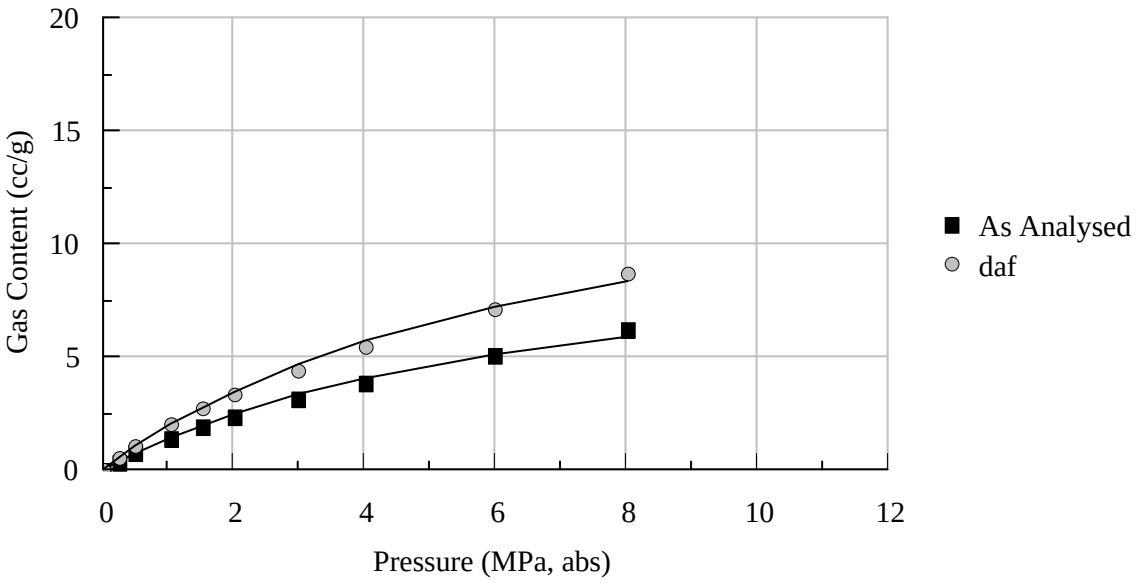
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.256	0.42	0.59	37	13	18
0.514	0.80	1.12	74	25	35
1.055	1.47	2.06	153	46	65
1.523	1.95	2.74	221	62	86
2.009	2.40	3.36	291	76	106
2.995	3.19	4.47	434	101	141
4.034	3.90	5.47	585	123	173
6.011	5.09	7.14	872	161	225
8.035	6.25	8.76	1165	197	277

Langmuir Isotherm Coefficients

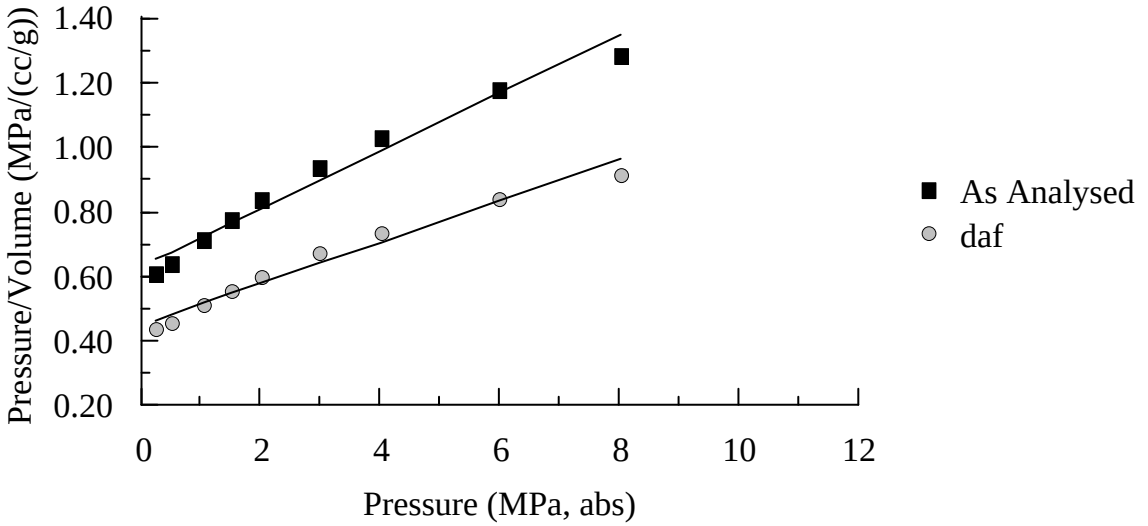
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	7.06	11.20	1024	354
daf	7.06	15.71	1024	496

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_006] 640.20 - 641.01 m
Analysis Temperature 40.8 °C



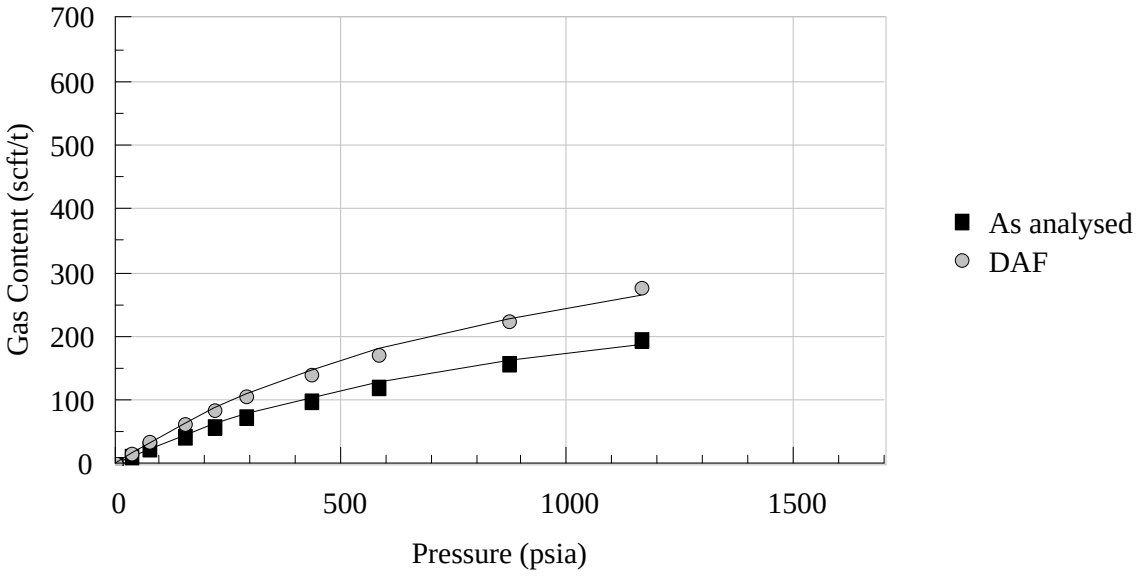
V = 11.20 P / (P + 7.06) (As analysed) V = 15.71 P / (P + 7.06) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_006] 640.20 - 641.01 m
Analysis Temperature 40.8 °C



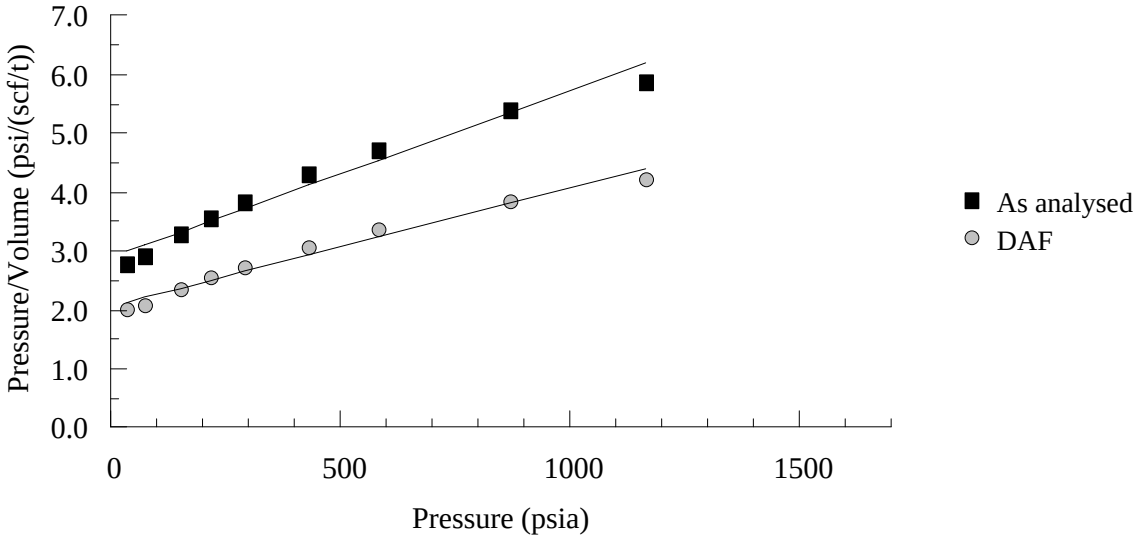
P/V = 0.089 P + 0.630; r^2 = 0.974 (As analysed)
P/V = 0.064 P + 0.449; r^2 = 0.974 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_006] 640.20 - 641.01 m
Analysis Temperature 105.4 °F



V = 354 P / (P + 1024) (As analysed) V = 496 P / (P + 1024) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_006] 640.20 - 641.01 m
Analysis Temperature 105.4 °F



P/V = 0.00283 P + 2.897; r^2 = 0.974 (As analysed)
P/V = 0.00202 P + 2.065; r^2 = 0.974 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_007] 642.75 - 643.35 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	113.37 [0.24994]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.692
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.9 [105.6]
Ash (%, Equilibrium Moisture ba	49.8	Analysis date	15-Oct-13
Moist. (%, Equilibrium Moisture	9.4	Test Gas	Methane

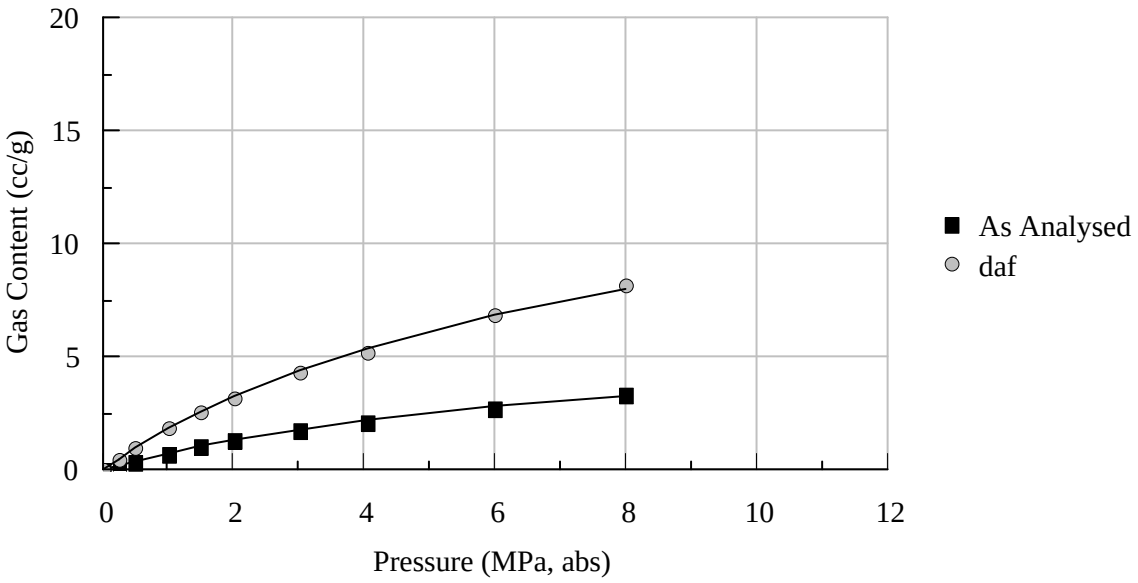
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.254	0.21	0.51	37	7	16
0.506	0.41	1.00	73	13	32
1.029	0.77	1.88	149	24	59
1.512	1.06	2.59	219	33	82
2.034	1.32	3.24	295	42	102
3.019	1.76	4.30	438	55	136
4.041	2.14	5.25	586	68	166
6.007	2.80	6.86	871	88	216
8.019	3.36	8.24	1163	106	260

Langmuir Isotherm Coefficients

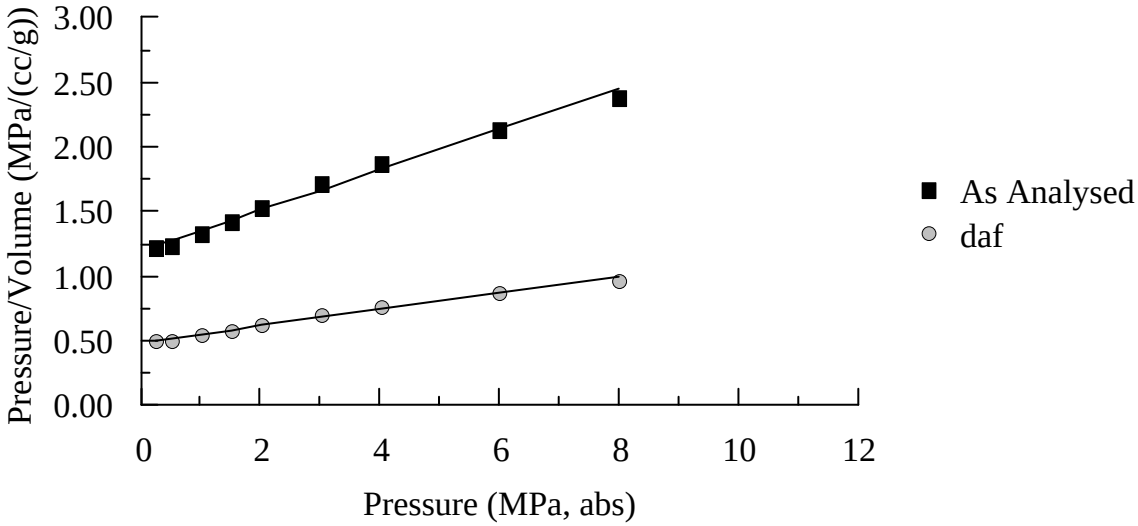
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	7.72	6.43	1120	203
daf	7.72	15.77	1120	498

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_007] 642.75 - 643.35 m
Analysis Temperature 40.9 °C



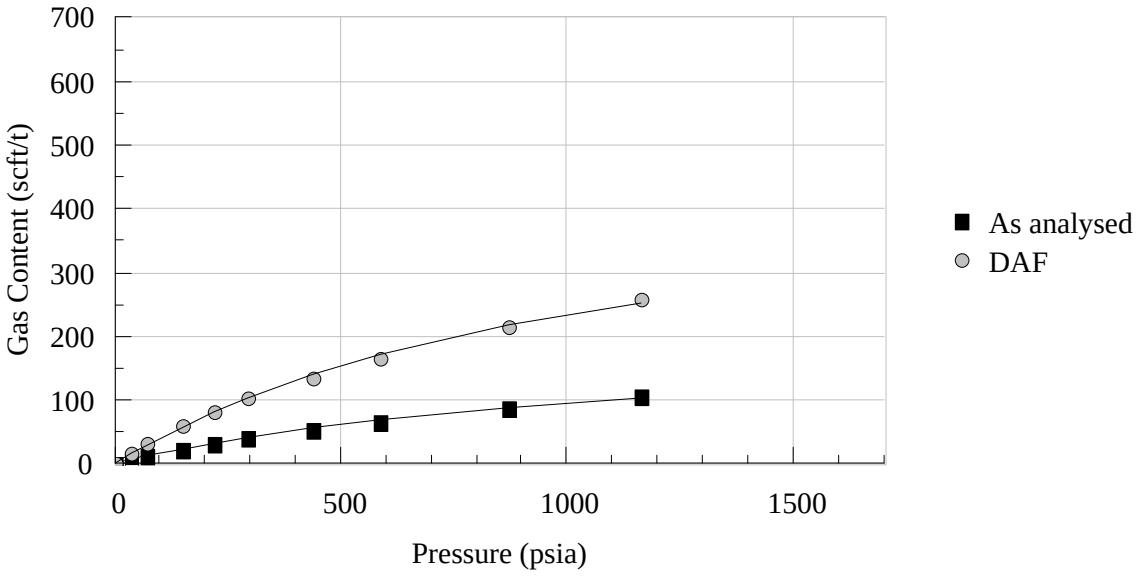
V = 6.43 P / (P + 7.72) (As analysed) V = 15.77 P / (P + 7.72) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_007] 642.75 - 643.35 m
Analysis Temperature 40.9 °C



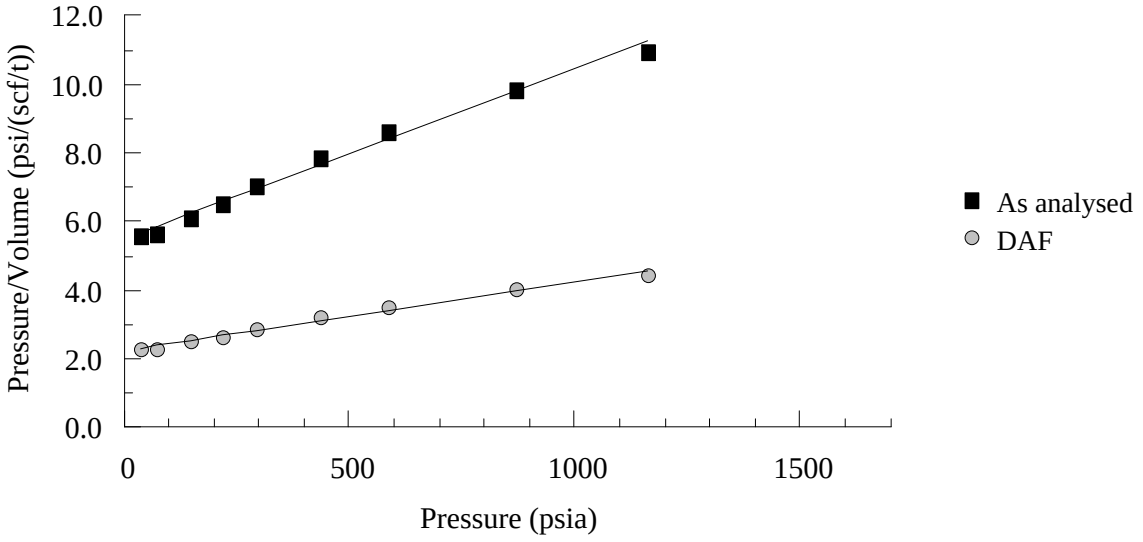
P/V = 0.155 P + 1.200; r^2 = 0.991 (As analysed)
P/V = 0.063 P + 0.490; r^2 = 0.991 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_007] 642.75 - 643.35 m
Analysis Temperature 105.6 °F



V = 203 P / (P + 1120) (As analysed) V = 498 P / (P + 1120) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_007] 642.75 - 643.35 m
Analysis Temperature 105.6 °F



P/V = 0.00492 P + 5.515; r^2 = 0.991 (As analysed)
P/V = 0.00201 P + 2.250; r^2 = 0.991 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_008] 643.58 - 644.12 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	93.53 [0.20620]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.344
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	40.9 [105.6]
Ash (%, Equilibrium Moisture ba	14.2	Analysis date	02-Nov-13
Moist. (%, Equilibrium Moisture	6.7	Test Gas	Methane

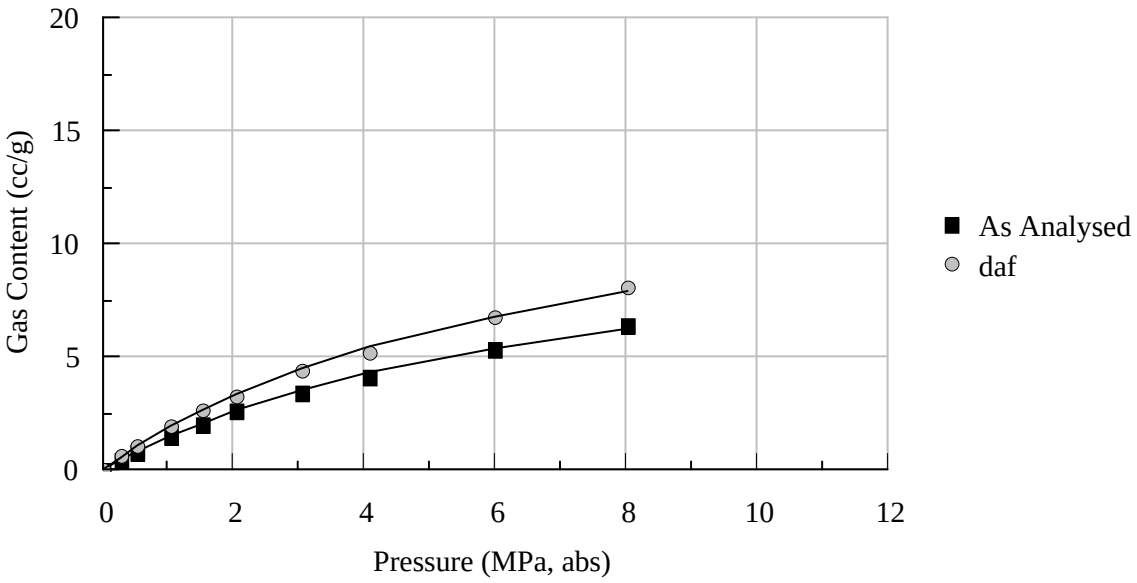
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.298	0.49	0.62	43	16	20
0.546	0.88	1.11	79	28	35
1.046	1.54	1.95	152	49	61
1.523	2.09	2.64	221	66	83
2.051	2.64	3.33	297	83	105
3.042	3.50	4.42	441	110	140
4.072	4.16	5.26	591	131	166
6.009	5.37	6.79	871	170	214
8.039	6.42	8.11	1166	202	256

Langmuir Isotherm Coefficients

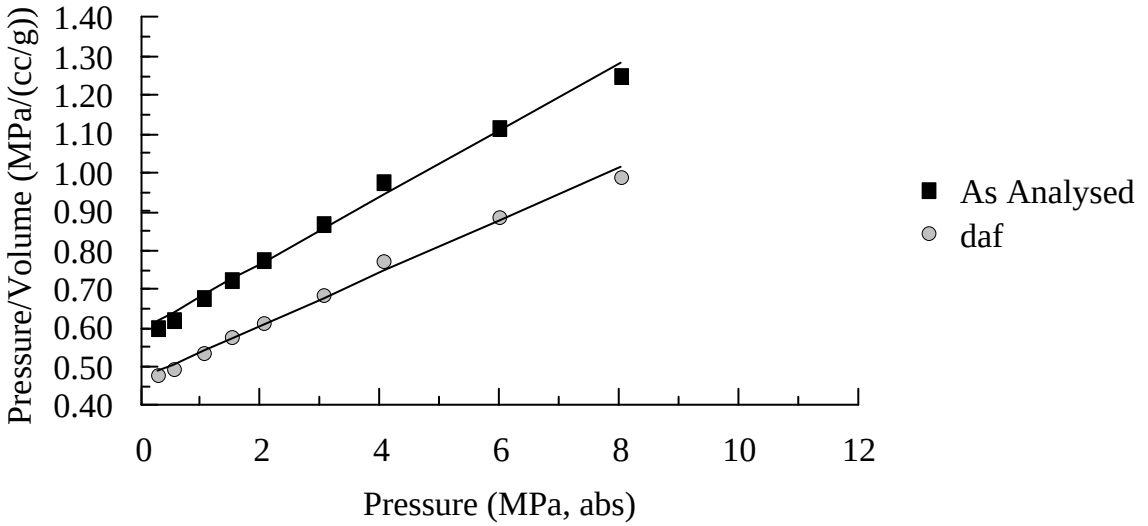
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.92	11.64	1003	367
daf	6.92	14.71	1003	464

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_008] 643.58 - 644.12 m
Analysis Temperature 40.9 °C



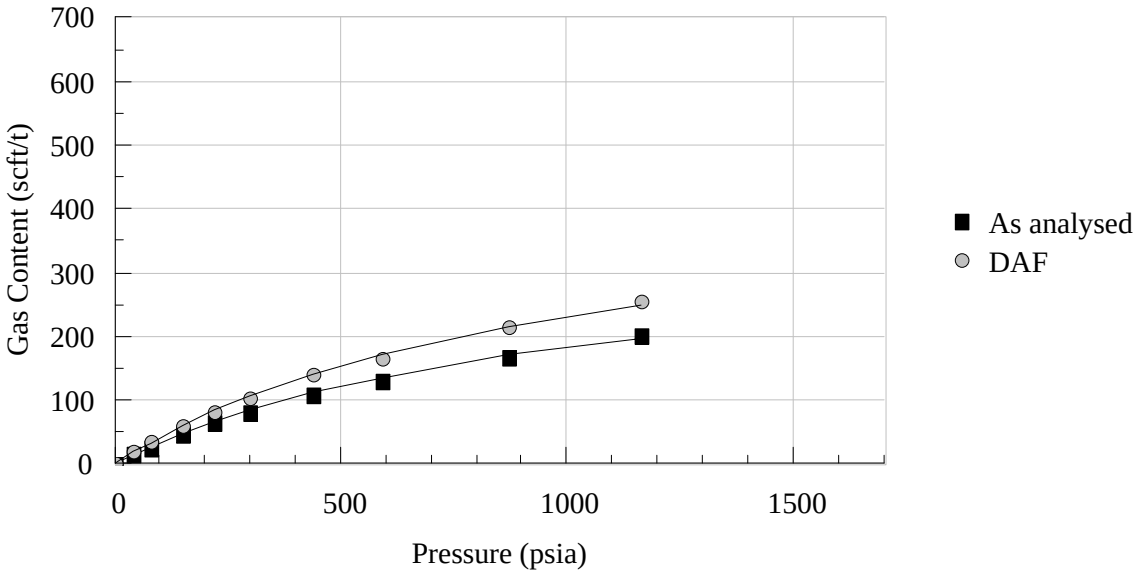
V = 11.64 P / (P + 6.92) (As analysed) V = 14.71 P / (P + 6.92) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_008] 643.58 - 644.12 m
Analysis Temperature 40.9 °C



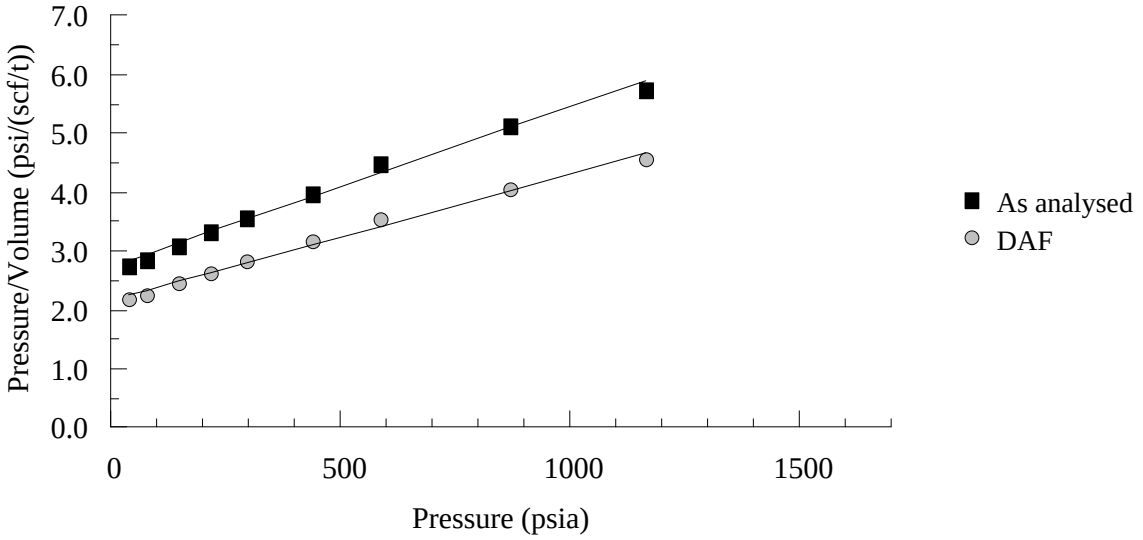
P/V = 0.086 P + 0.594; r^2 = 0.992 (As analysed)
P/V = 0.068 P + 0.470; r^2 = 0.992 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_008] 643.58 - 644.12 m
Analysis Temperature 105.6 °F



V = 367 P / (P + 1003) (As analysed) V = 464 P / (P + 1003) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_008] 643.58 - 644.12 m
Analysis Temperature 105.6 °F



P/V = 0.00272 P + 2.730; r^2 = 0.992 (As analysed)
P/V = 0.00215 P + 2.160; r^2 = 0.992 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_009] 682.84 - 683.14 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	102.17 [0.22525]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.269
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	42.7 [108.9]
Ash (%, Equilibrium Moisture ba	5.7	Analysis date	14-Oct-13
Moist. (%, Equilibrium Moisture	7.6	Test Gas	Methane

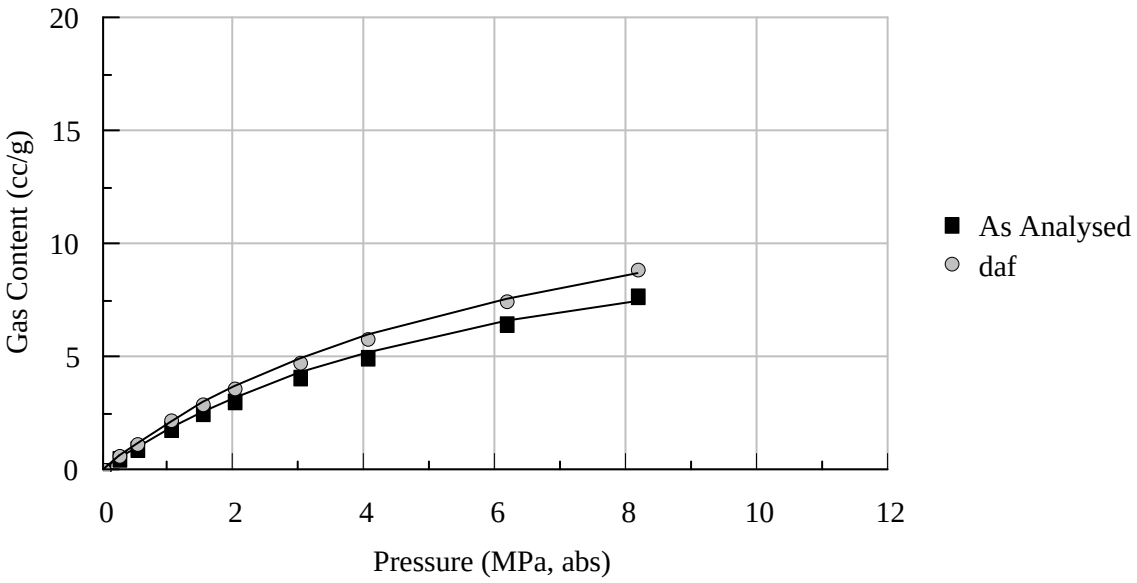
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.273	0.56	0.65	40	18	20
0.518	1.05	1.21	75	33	38
1.052	1.91	2.20	153	60	70
1.539	2.56	2.96	223	81	93
2.029	3.14	3.62	294	99	114
3.037	4.15	4.79	441	131	151
4.065	5.07	5.85	590	160	185
6.175	6.54	7.54	896	206	238
8.176	7.75	8.94	1186	245	282

Langmuir Isotherm Coefficients

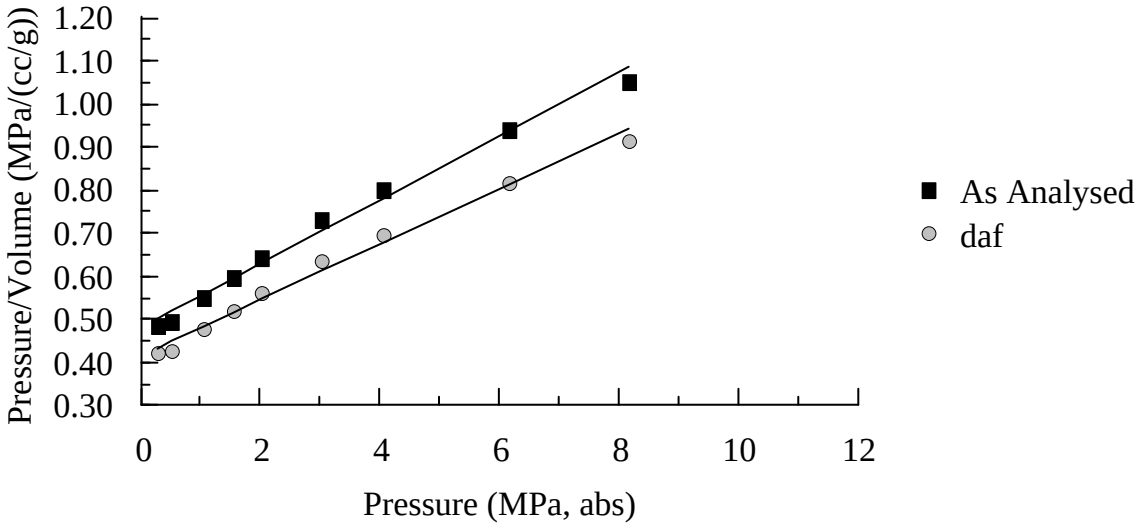
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.49	13.51	941	426
daf	6.49	15.58	941	492

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_009] 682.84 - 683.14 m
Analysis Temperature 42.7 °C



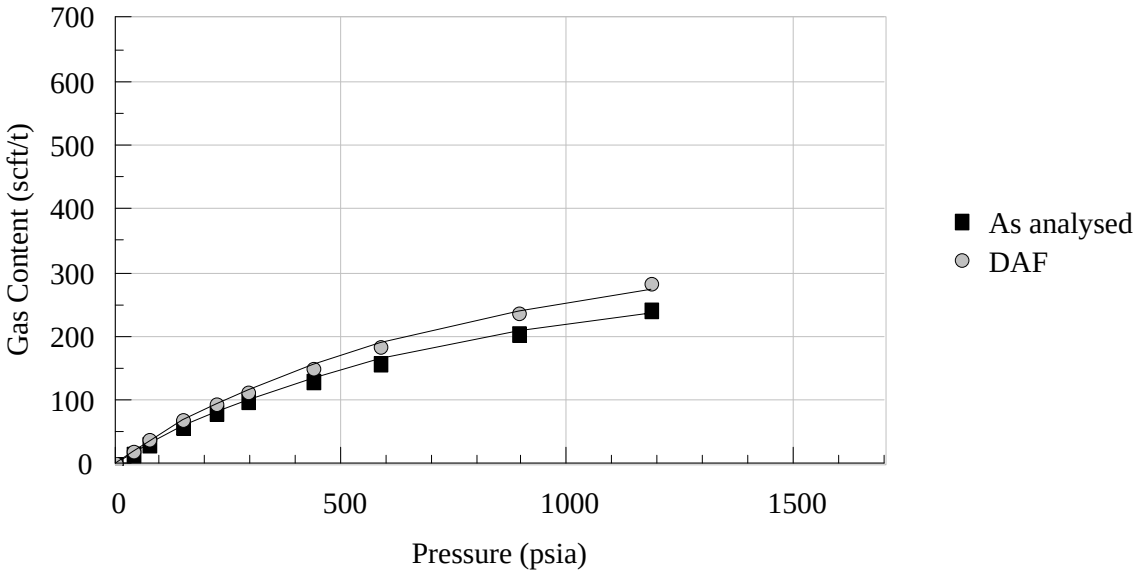
V = 13.51 P / (P + 6.49) (As analysed) V = 15.58 P / (P + 6.49) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_009] 682.84 - 683.14 m
Analysis Temperature 42.7 °C



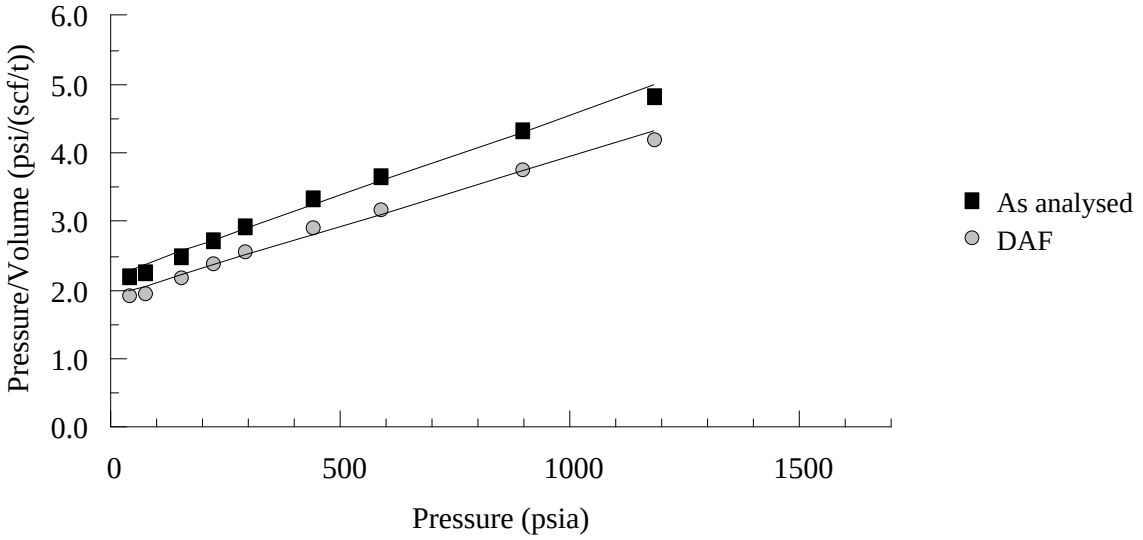
P/V = 0.074 P + 0.480; r^2 = 0.990 (As analysed)
P/V = 0.064 P + 0.416; r^2 = 0.990 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_009] 682.84 - 683.14 m
Analysis Temperature 108.9 °F



V = 426 P / (P + 941) (As analysed) V = 492 P / (P + 941) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_009] 682.84 - 683.14 m
Analysis Temperature 108.9 °F



P/V = 0.00235 P + 2.207; r^2 = 0.990 (As analysed)
P/V = 0.00203 P + 1.914; r^2 = 0.990 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_010] 696.65 - 697.44 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	114.89 [0.25329]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.347
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	42.7 [108.9]
Ash (%, Equilibrium Moisture ba	15.1	Analysis date	10-Oct-13
Moist. (%, Equilibrium Moisture	8.0	Test Gas	Methane

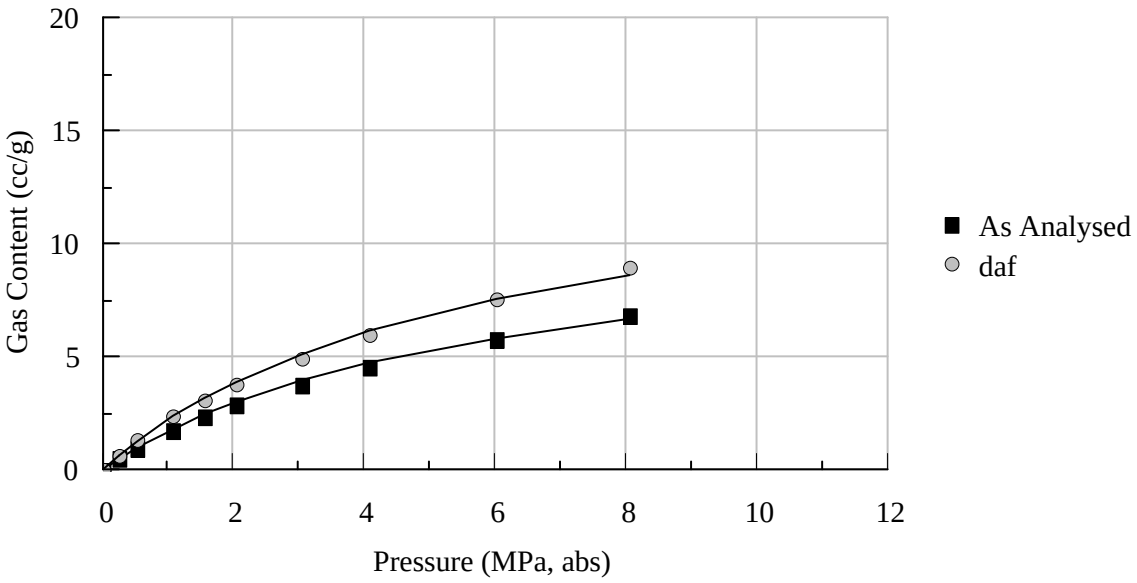
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.257	0.53	0.69	37	17	22
0.543	1.05	1.36	79	33	43
1.087	1.84	2.39	158	58	76
1.557	2.40	3.12	226	76	99
2.044	2.92	3.79	296	92	120
3.043	3.82	4.97	441	121	157
4.072	4.60	5.98	591	145	189
6.036	5.81	7.56	875	184	239
8.080	6.91	8.98	1172	218	283

Langmuir Isotherm Coefficients

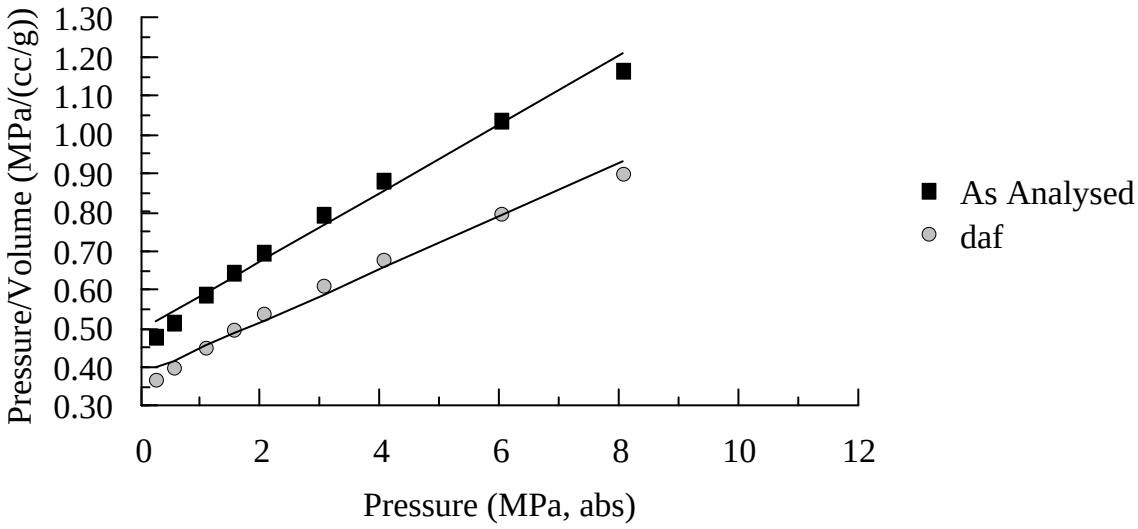
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	5.59	11.28	811	356
daf	5.59	14.67	811	463

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_010] 696.65 - 697.44 m
Analysis Temperature 42.7 °C



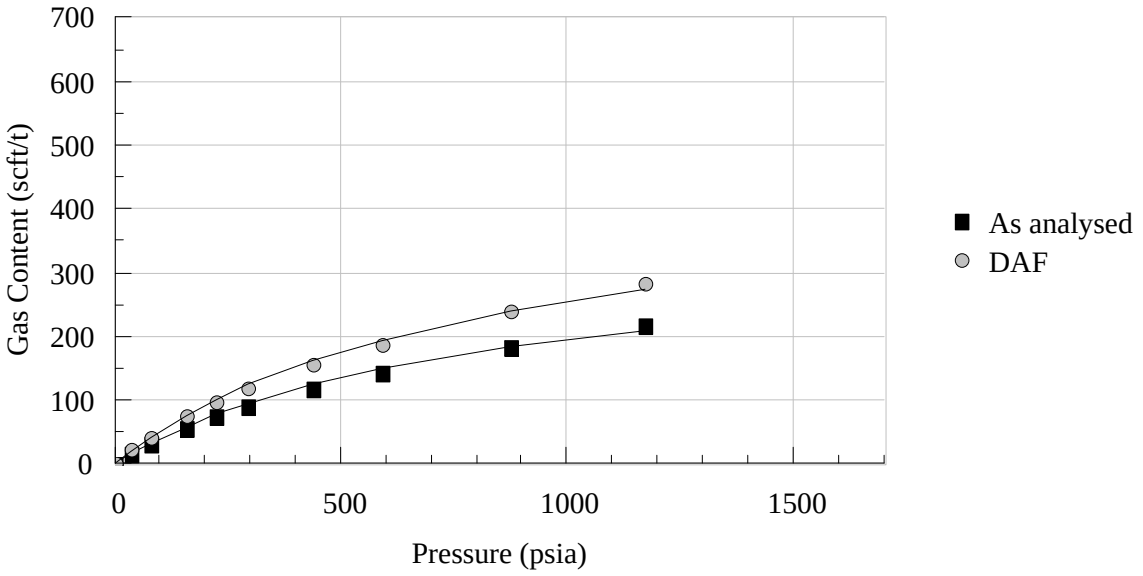
V = 11.28 P / (P + 5.59) (As analysed) V = 14.67 P / (P + 5.59) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_010] 696.65 - 697.44 m
Analysis Temperature 42.7 °C



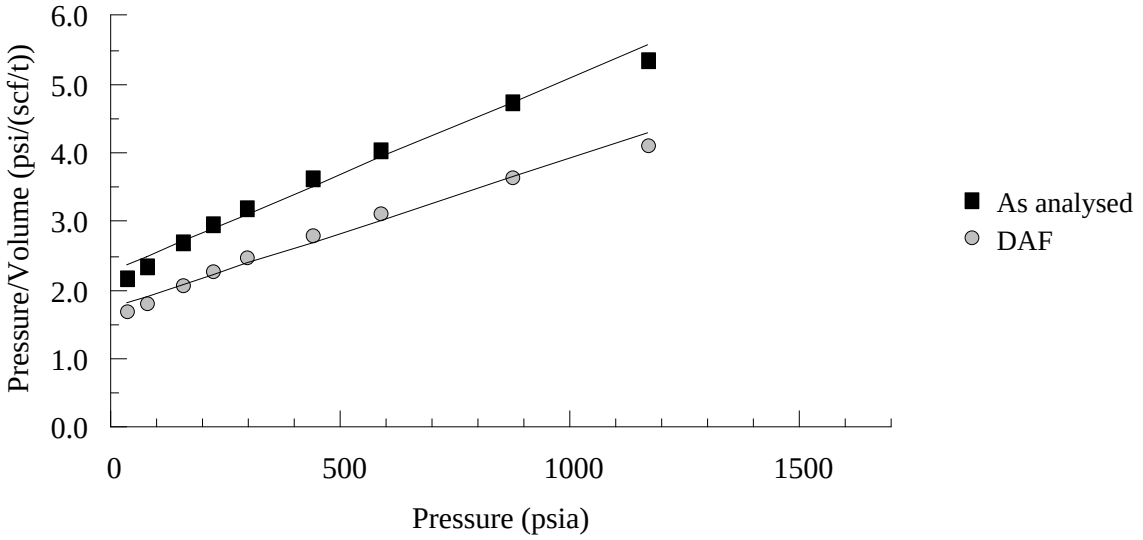
P/V = 0.089 P + 0.496; r^2 = 0.986 (As analysed)
P/V = 0.068 P + 0.381; r^2 = 0.986 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_010] 696.65 - 697.44 m
Analysis Temperature 108.9 °F



V = 356 P / (P + 811) (As analysed) V = 463 P / (P + 811) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_010] 696.65 - 697.44 m
Analysis Temperature 108.9 °F



P/V = 0.00281 P + 2.277; r^2 = 0.986 (As analysed)
P/V = 0.00216 P + 1.751; r^2 = 0.986 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_011] 708.34 - 709.06 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	103.84 [0.22893]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.322
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	43.4 [110.1]
Ash (%, Equilibrium Moisture ba	12.9	Analysis date	07-Oct-13
Moist. (%, Equilibrium Moisture	5.7	Test Gas	Methane

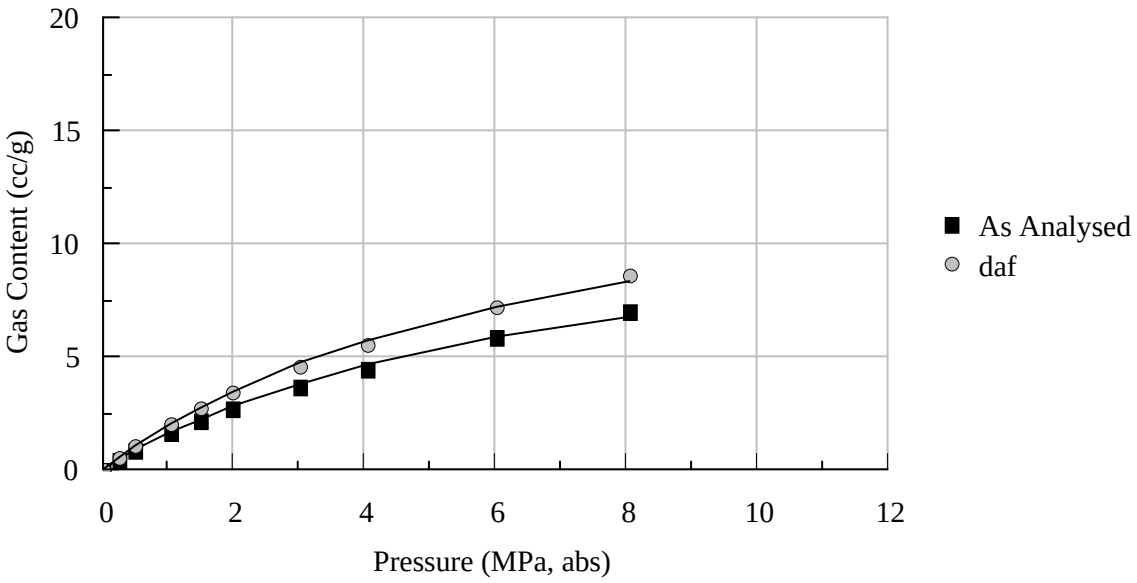
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.254	0.47	0.58	37	15	18
0.515	0.93	1.14	75	29	36
1.043	1.69	2.07	151	53	65
1.502	2.25	2.76	218	71	87
1.992	2.80	3.44	289	88	108
3.010	3.72	4.56	437	117	144
4.070	4.54	5.58	590	143	176
6.024	5.89	7.24	874	186	228
8.051	7.02	8.63	1168	222	272

Langmuir Isotherm Coefficients

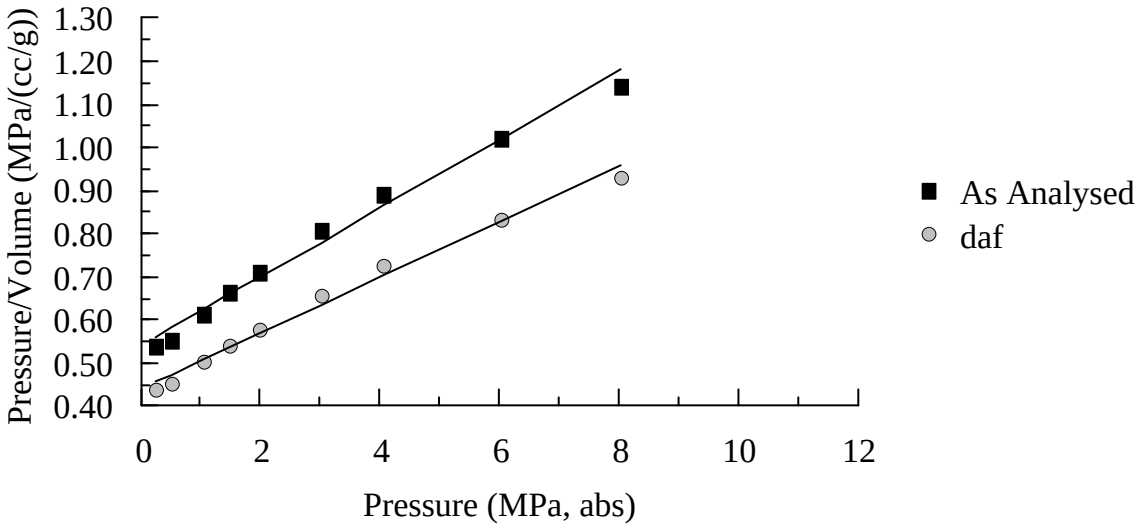
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.80	12.57	986	397
daf	6.80	15.45	986	488

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_011] 708.34 - 709.06 m
Analysis Temperature 43.4 °C



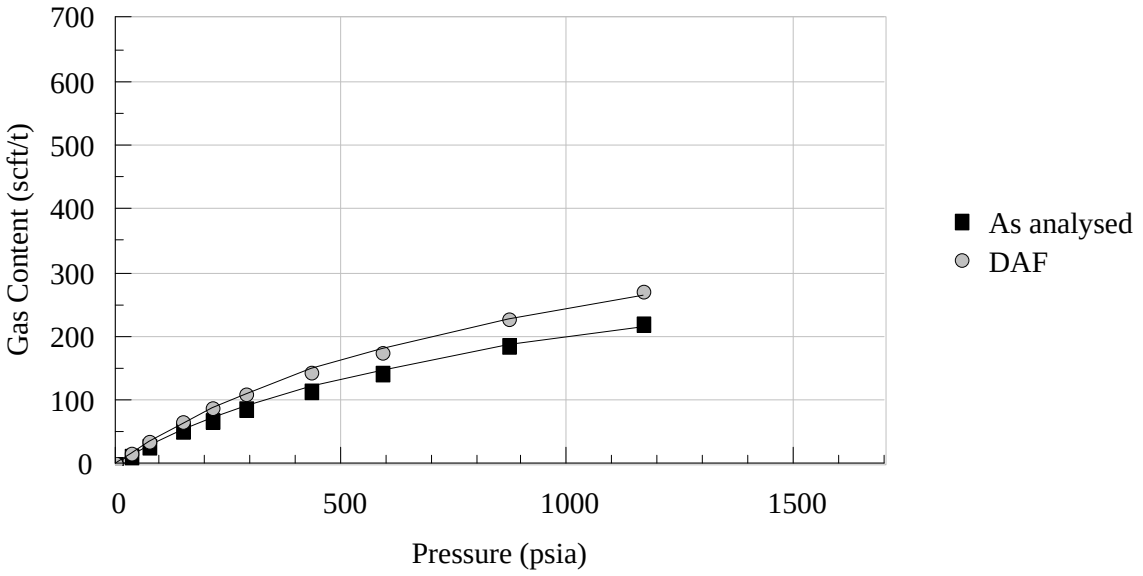
V = 12.57 P / (P + 6.80) (As analysed) V = 15.45 P / (P + 6.80) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_011] 708.34 - 709.06 m
Analysis Temperature 43.4 °C



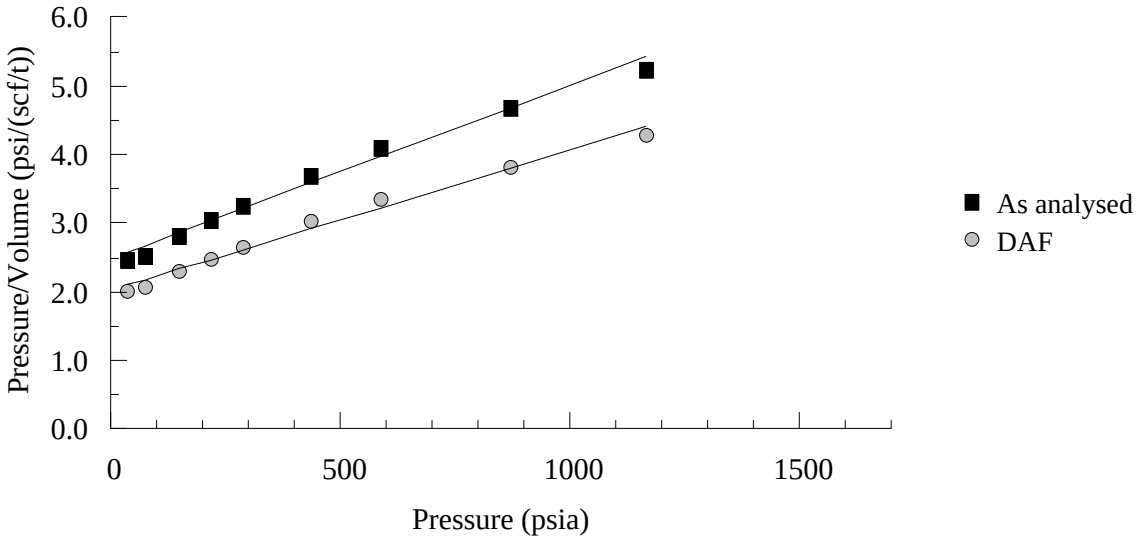
P/V = 0.080 P + 0.540; r^2 = 0.988 (As analysed)
P/V = 0.065 P + 0.440; r^2 = 0.988 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_011] 708.34 - 709.06 m
Analysis Temperature 110.1 °F



V = 397 P / (P + 986) (As analysed) V = 488 P / (P + 986) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_011] 708.34 - 709.06 m
Analysis Temperature 110.1 °F



P/V = 0.00252 P + 2.483; r^2 = 0.988 (As analysed)
P/V = 0.00205 P + 2.022; r^2 = 0.988 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_012] 709.06 - 709.72 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	106.89 [0.23565]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.307
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	43.4 [110.1]
Ash (%, Equilibrium Moisture ba	9.5	Analysis date	07-Oct-13
Moist. (%, Equilibrium Moisture	6.1	Test Gas	Methane

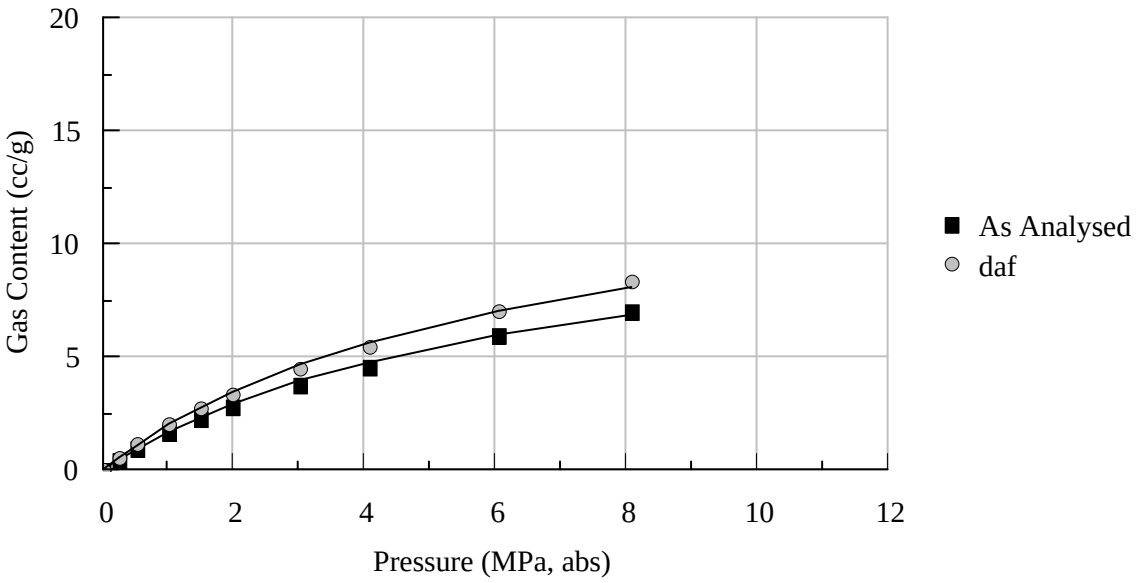
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.258	0.50	0.60	37	16	19
0.521	0.98	1.16	76	31	37
1.023	1.72	2.04	148	54	64
1.496	2.30	2.73	217	73	86
1.997	2.86	3.38	290	90	107
3.026	3.81	4.52	439	120	143
4.082	4.65	5.50	592	147	174
6.057	5.98	7.08	878	189	224
8.088	7.10	8.41	1173	224	265

Langmuir Isotherm Coefficients

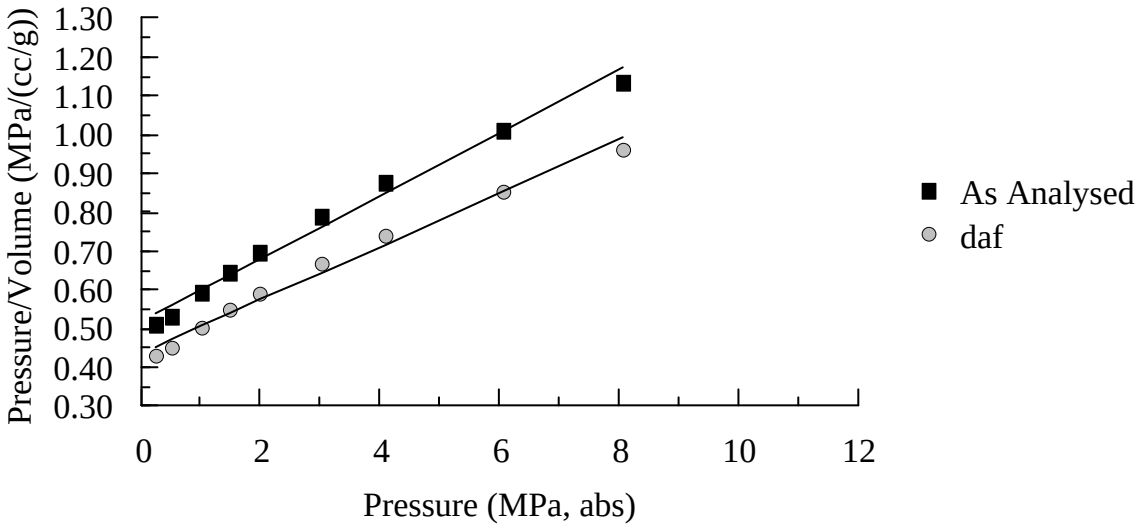
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.36	12.29	922	388
daf	6.36	14.56	922	460

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_012] 709.06 - 709.72 m
Analysis Temperature 43.4 °C



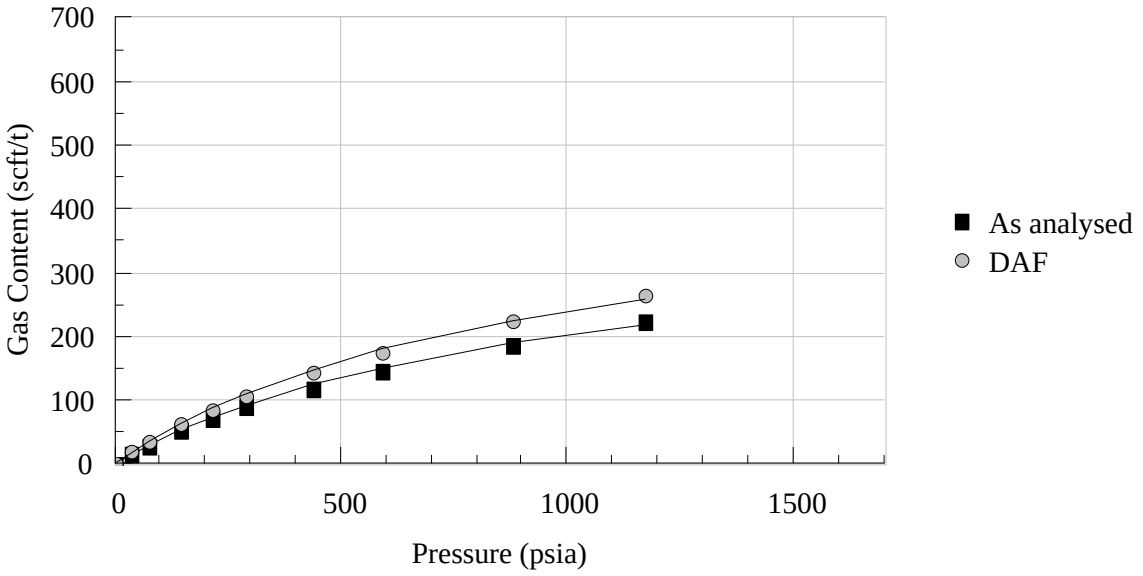
V = 12.29 P / (P + 6.36) (As analysed) V = 14.56 P / (P + 6.36) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_012] 709.06 - 709.72 m
Analysis Temperature 43.4 °C



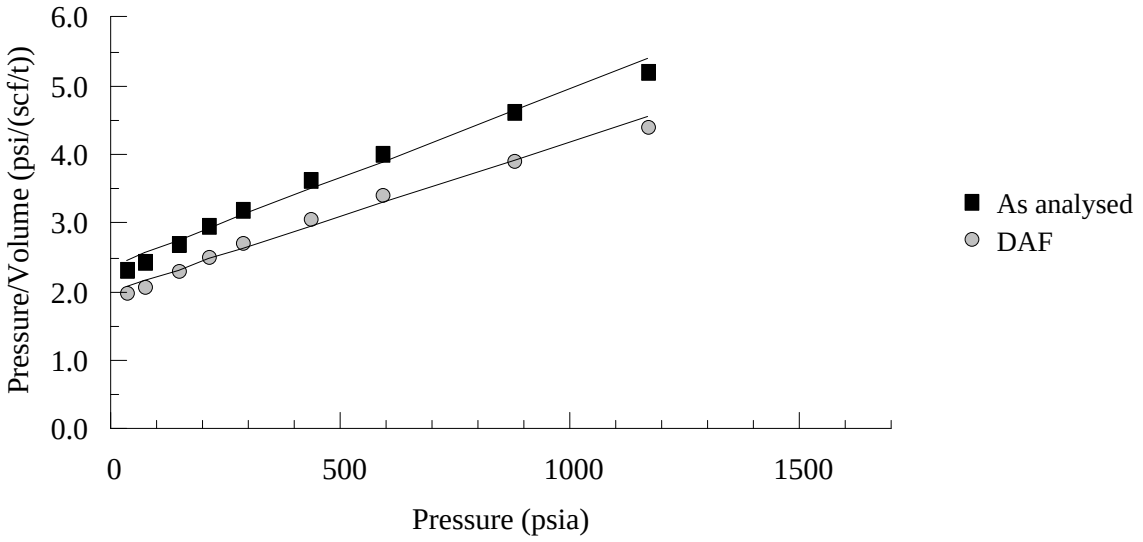
P/V = 0.081 P + 0.517; r^2 = 0.987 (As analysed)
P/V = 0.069 P + 0.436; r^2 = 0.987 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_012] 709.06 - 709.72 m
Analysis Temperature 110.1 °F



V = 388 P / (P + 922) (As analysed) V = 460 P / (P + 922) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_012] 709.06 - 709.72 m
Analysis Temperature 110.1 °F



P/V = 0.00258 P + 2.376; r^2 = 0.987 (As analysed)
P/V = 0.00218 P + 2.006; r^2 = 0.987 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_013] 709.72 - 710.29 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	103.85 [0.22895]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.355
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	43.5 [110.3]
Ash (%, Equilibrium Moisture ba	15.9	Analysis date	12-Oct-13
Moist. (%, Equilibrium Moisture	6.8	Test Gas	Methane

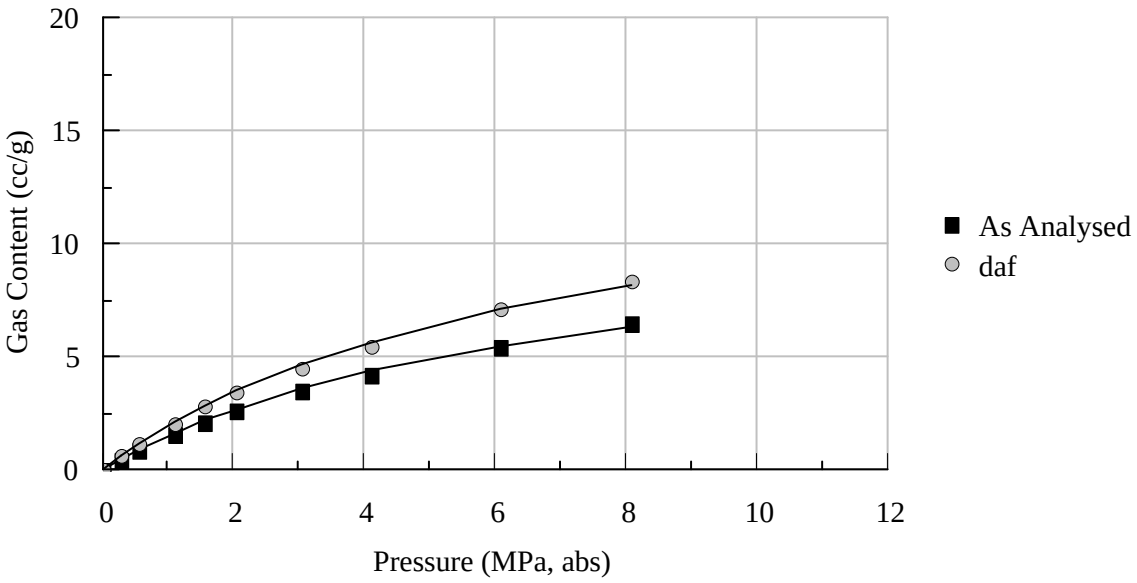
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.295	0.51	0.66	43	16	21
0.570	0.92	1.20	83	29	38
1.107	1.62	2.09	161	51	66
1.575	2.19	2.83	228	69	89
2.065	2.68	3.47	299	85	109
3.058	3.52	4.55	444	111	144
4.108	4.27	5.52	596	135	174
6.085	5.50	7.12	882	174	225
8.111	6.49	8.40	1176	205	265

Langmuir Isotherm Coefficients

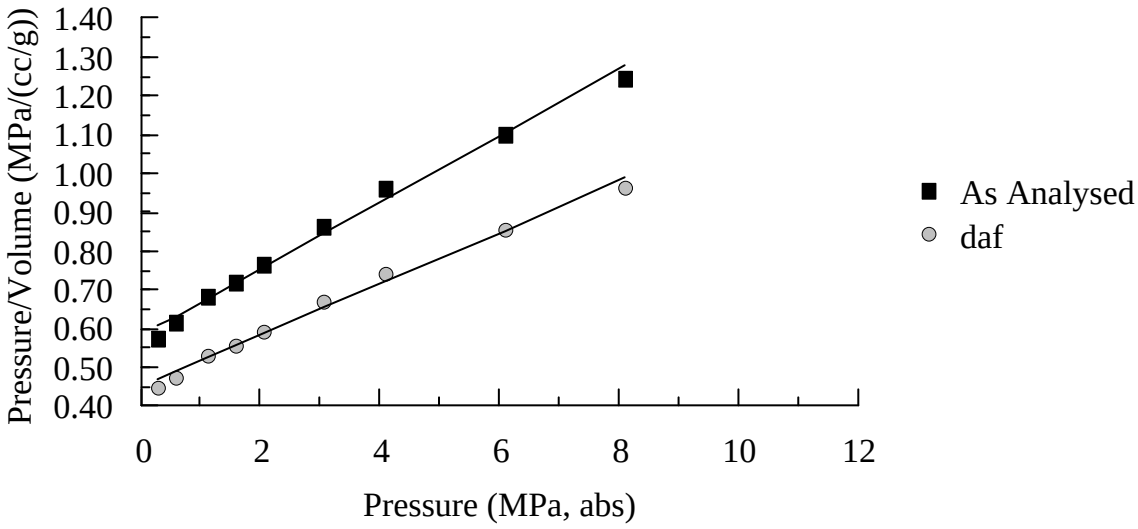
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.80	11.66	986	368
daf	6.80	15.09	986	476

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_013] 709.72 - 710.29 m
Analysis Temperature 43.5 °C



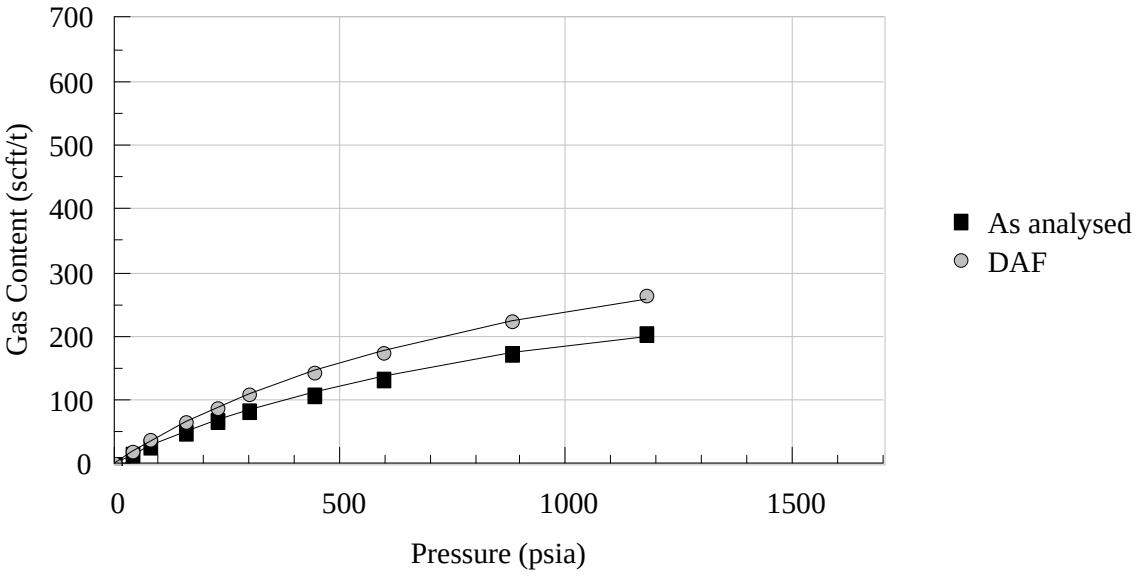
V = 11.66 P / (P + 6.80) (As analysed) V = 15.09 P / (P + 6.80) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_013] 709.72 - 710.29 m
Analysis Temperature 43.5 °C



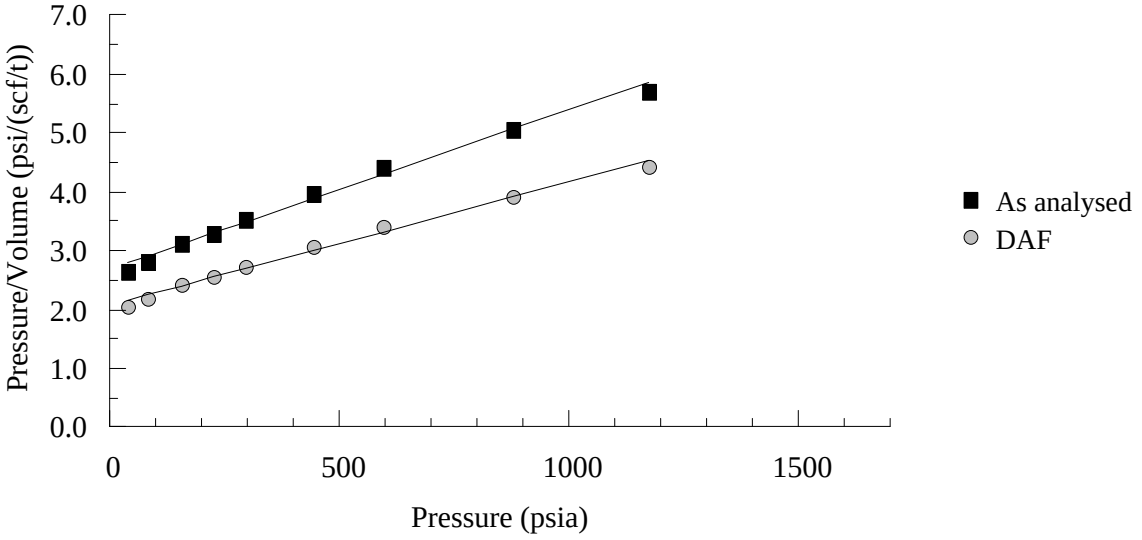
P/V = 0.086 P + 0.583; r^2 = 0.992 (As analysed)
P/V = 0.066 P + 0.450; r^2 = 0.992 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_013] 709.72 - 710.29 m
Analysis Temperature 110.3 °F



V = 368 P / (P + 986) (As analysed) V = 476 P / (P + 986) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_013] 709.72 - 710.29 m
Analysis Temperature 110.3 °F



P/V = 0.00272 P + 2.677; r^2 = 0.992 (As analysed)
P/V = 0.00210 P + 2.069; r^2 = 0.992 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_014] 712.97 - 713.32 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	127.58 [0.28127]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.590
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	43.5 [110.3]
Ash (%, Equilibrium Moisture ba	41.4	Analysis date	12-Oct-13
Moist. (%, Equilibrium Moisture	8.2	Test Gas	Methane

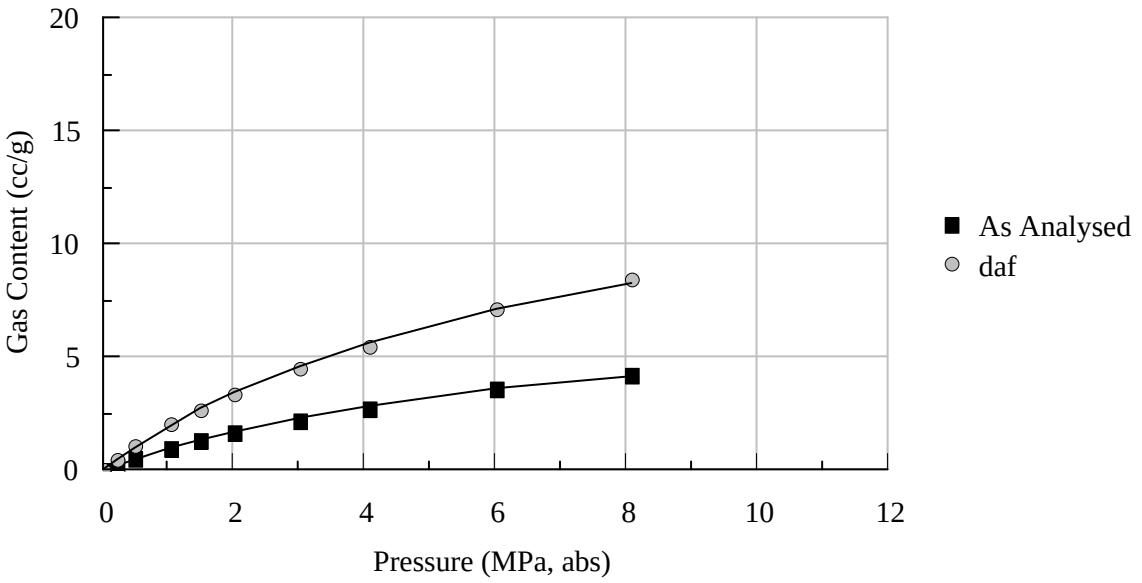
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.231	0.25	0.50	34	8	16
0.507	0.55	1.08	74	17	34
1.056	1.02	2.02	153	32	64
1.516	1.36	2.70	220	43	85
2.005	1.69	3.36	291	53	106
3.022	2.27	4.51	438	72	142
4.075	2.77	5.50	591	88	174
6.045	3.61	7.15	877	114	226
8.086	4.28	8.50	1173	135	268

Langmuir Isotherm Coefficients

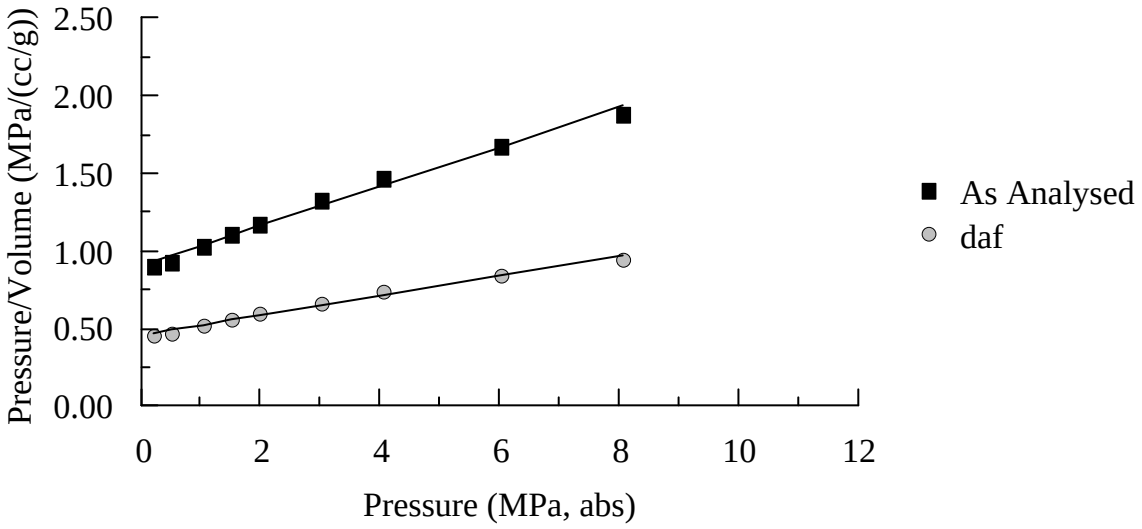
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	7.16	7.88	1038	249
daf	7.16	15.64	1038	494

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_014] 712.97 - 713.32 m
Analysis Temperature 43.5 °C



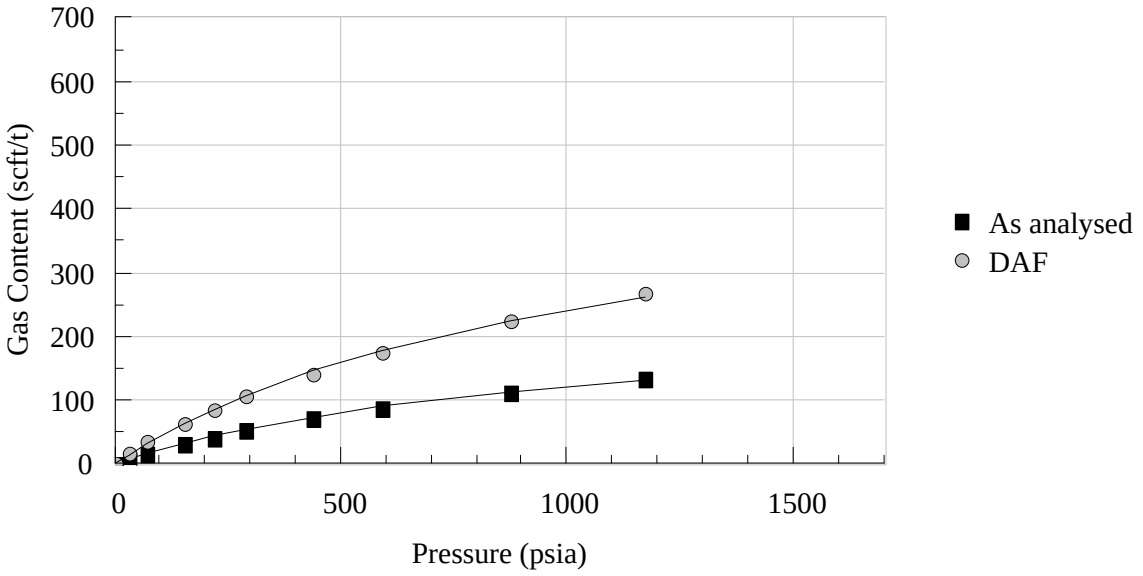
V = 7.88 P / (P + 7.16) (As analysed) V = 15.64 P / (P + 7.16) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_014] 712.97 - 713.32 m
Analysis Temperature 43.5 °C



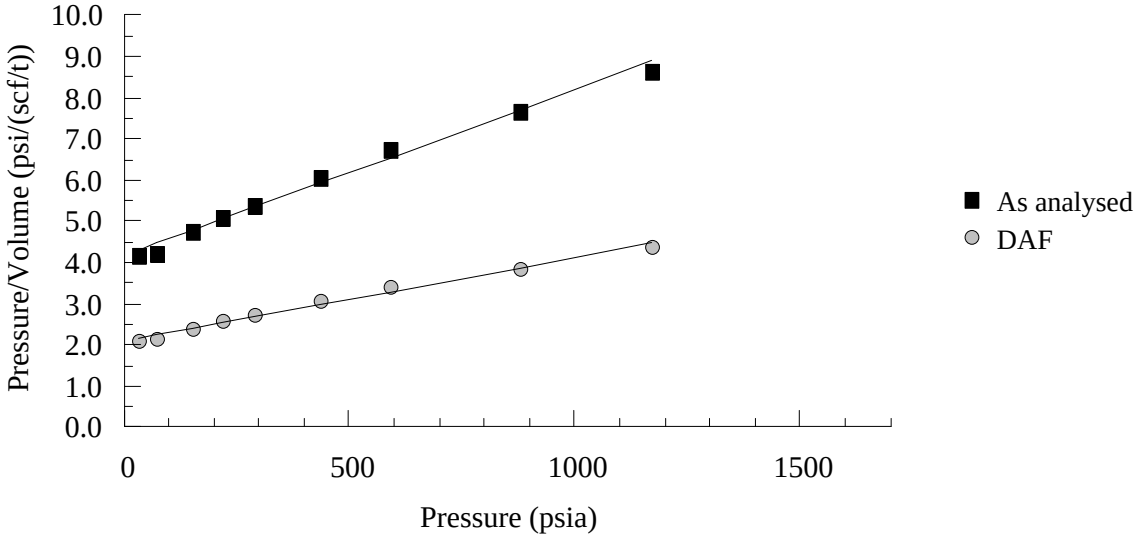
P/V = 0.127 P + 0.908; r^2 = 0.991 (As analysed)
P/V = 0.064 P + 0.458; r^2 = 0.991 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_014] 712.97 - 713.32 m
Analysis Temperature 110.3 °F



V = 249 P / (P + 1038) (As analysed) V = 494 P / (P + 1038) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_014] 712.97 - 713.32 m
Analysis Temperature 110.3 °F



P/V = 0.00402 P + 4.172; r^2 = 0.991 (As analysed)
P/V = 0.00203 P + 2.103; r^2 = 0.991 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_015] 744.66 - 744.98 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	116.61 [0.25708]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.513
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	44.8 [112.6]
Ash (%, at Equilibrium Moisture)	33.8	Analysis date	12-Oct-13
Equilibrium Moisture (%)	5.8	Test Gas	Methane

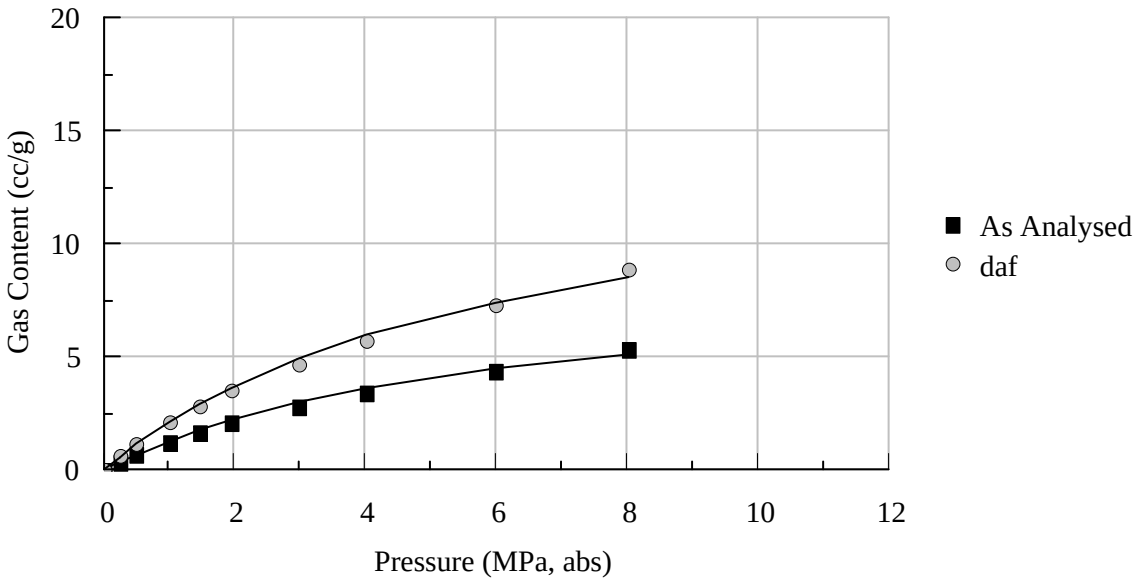
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.255	0.40	0.66	37	13	21
0.503	0.73	1.21	73	23	38
1.005	1.28	2.12	146	40	67
1.484	1.73	2.86	215	54	90
1.971	2.14	3.55	286	68	112
2.990	2.85	4.72	434	90	149
4.026	3.47	5.73	584	109	181
5.996	4.44	7.35	870	140	232
8.041	5.38	8.91	1166	170	281

Langmuir Isotherm Coefficients

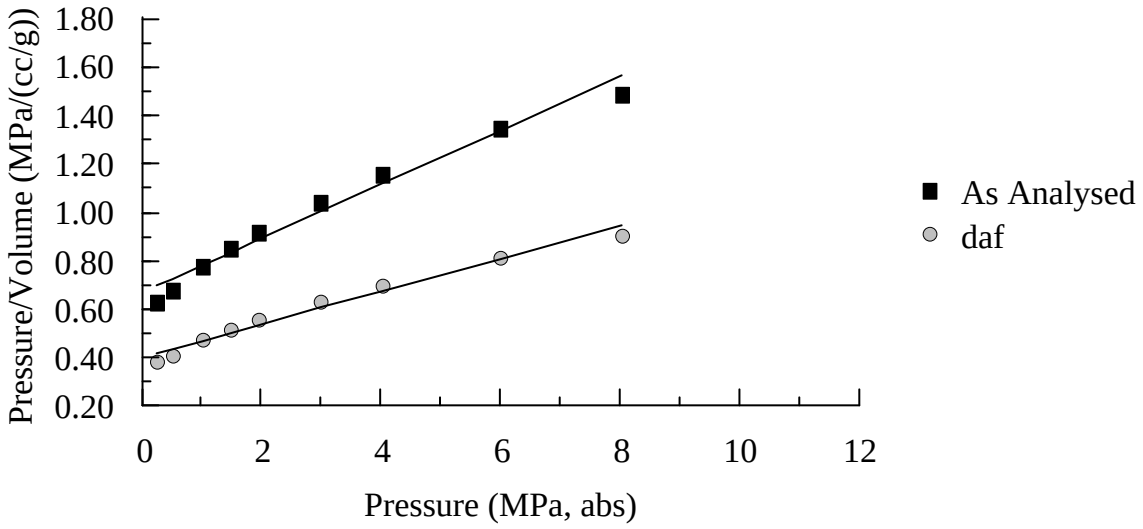
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.02	9.00	873	284
daf	6.02	14.88	873	470

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_015] 744.66 - 744.98 m
Analysis Temperature 44.8 °C



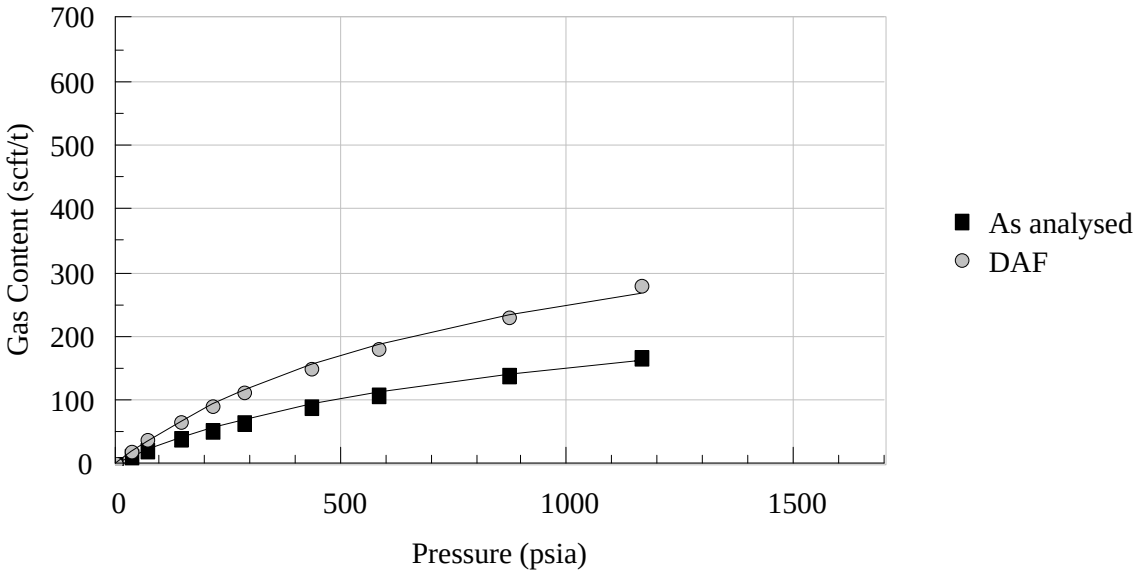
V = 9.00 P / (P + 6.02) (As analysed) V = 14.88 P / (P + 6.02) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_015] 744.66 - 744.98 m
Analysis Temperature 44.8 °C



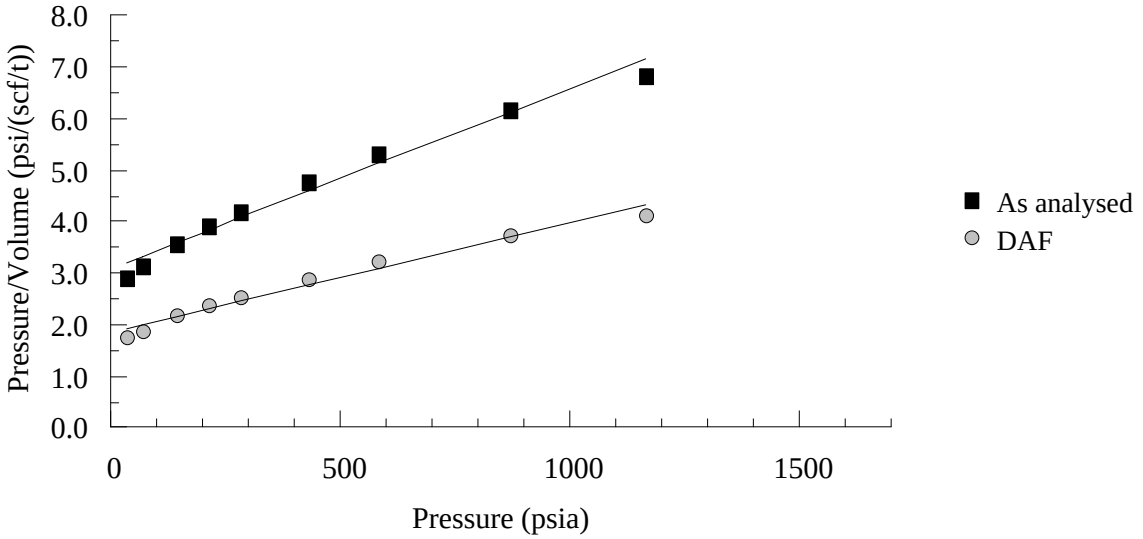
P/V = 0.111 P + 0.669; r^2 = 0.977 (As analysed)
P/V = 0.067 P + 0.404; r^2 = 0.977 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_015] 744.66 - 744.98 m
Analysis Temperature 112.6 °F



V = 284 P / (P + 873) (As analysed) V = 470 P / (P + 873) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_015] 744.66 - 744.98 m
Analysis Temperature 112.6 °F



P/V = 0.00352 P + 3.073; r^2 = 0.977 (As analysed)
P/V = 0.00213 P + 1.858; r^2 = 0.977 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_016] 777.81 - 778.15 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	127.14 [0.28030]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.722
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	46.1 [115.0]
Ash (%, Equilibrium Moisture ba	52.3	Analysis date	11-Oct-13
Moist. (%, Equilibrium Moisture	7.7	Test Gas	Methane

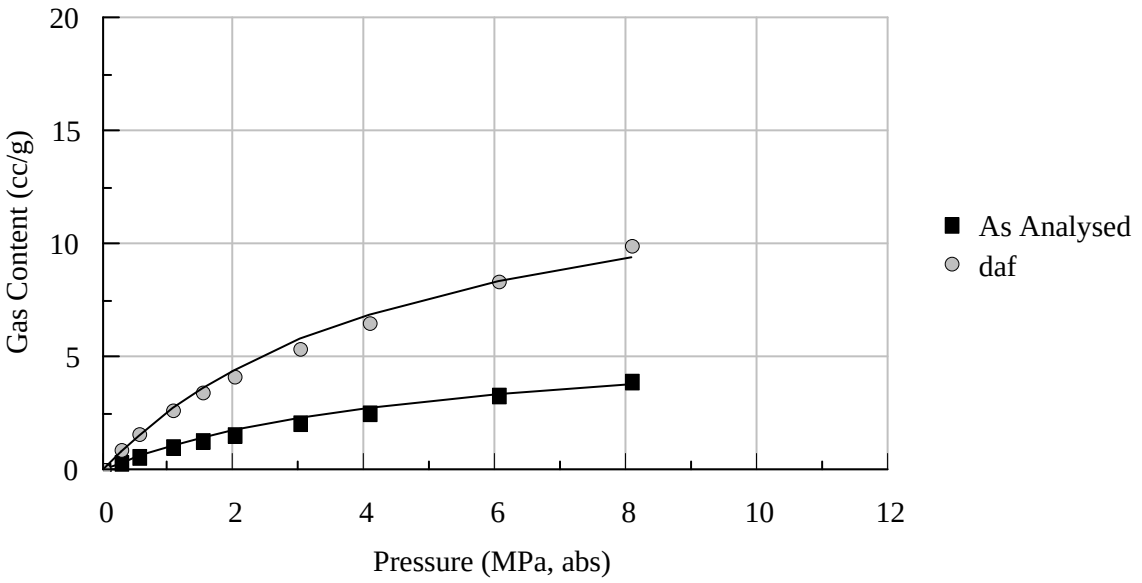
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.274	0.38	0.96	40	12	30
0.555	0.65	1.63	81	21	51
1.086	1.07	2.68	158	34	85
1.532	1.37	3.43	222	43	108
2.011	1.66	4.14	292	52	131
3.035	2.17	5.43	440	69	171
4.084	2.62	6.55	592	83	207
6.061	3.36	8.41	879	106	265
8.088	3.99	9.97	1173	126	315

Langmuir Isotherm Coefficients

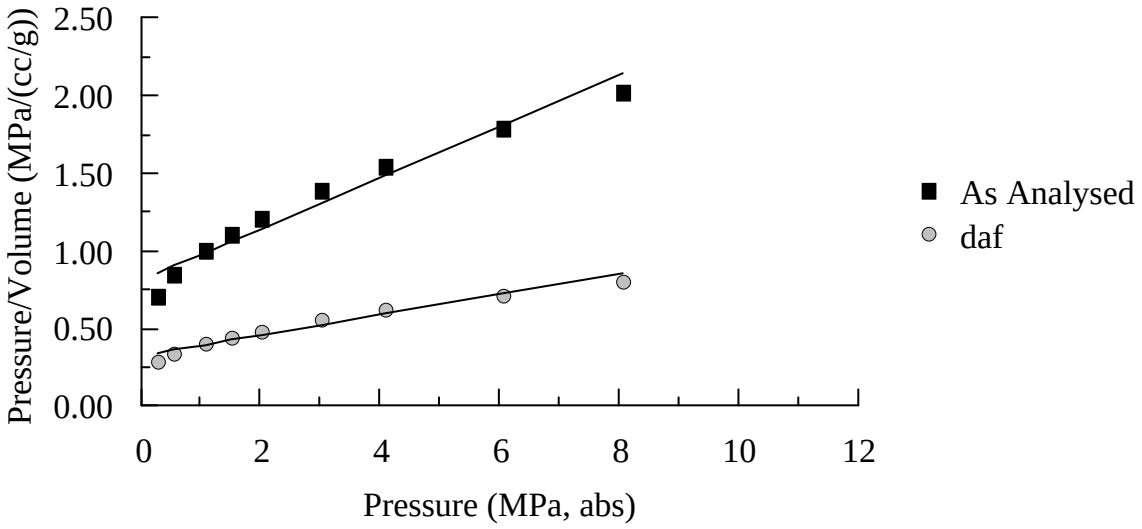
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	4.95	6.09	718	192
daf	4.95	15.24	718	481

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_016] 777.81 - 778.15 m
Analysis Temperature 46.1 °C



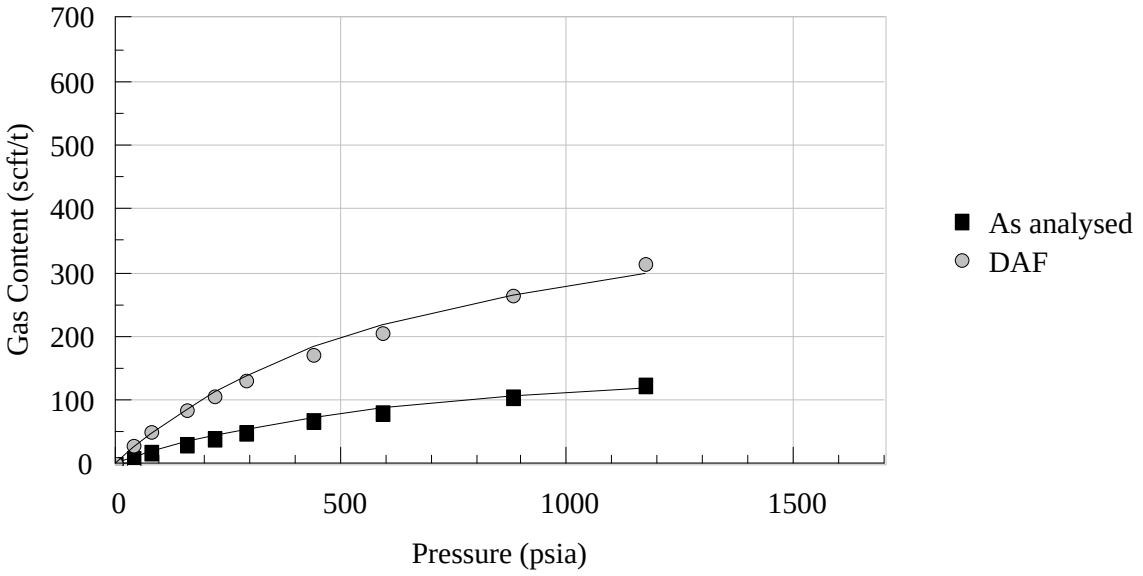
V = 6.09 P / (P + 4.95) (As analysed) V = 15.24 P / (P + 4.95) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_016] 777.81 - 778.15 m
Analysis Temperature 46.1 °C



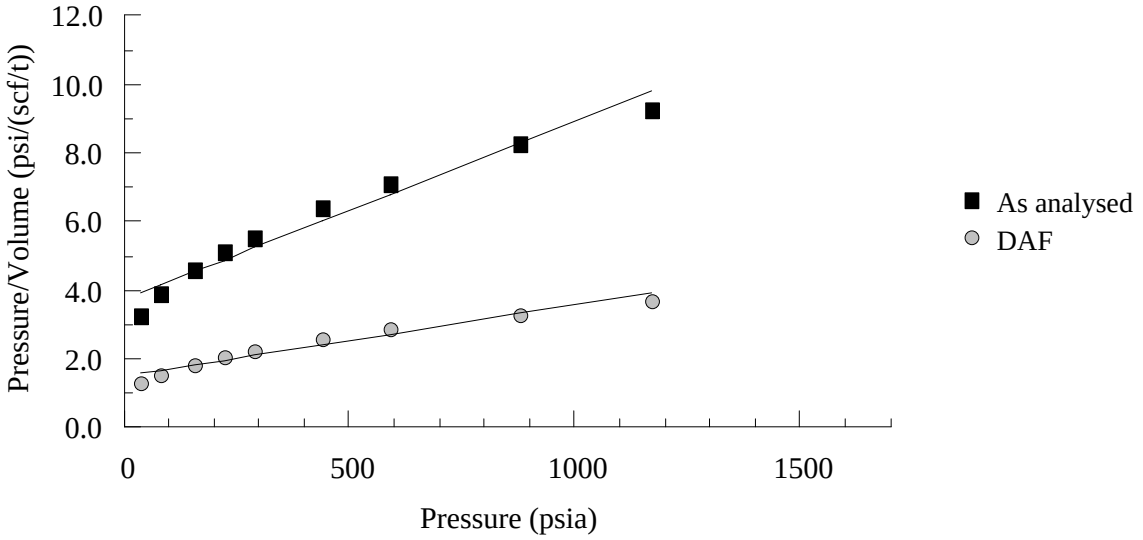
P/V = 0.164 P + 0.812; r^2 = 0.963 (As analysed)
P/V = 0.066 P + 0.325; r^2 = 0.963 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_016] 777.81 - 778.15 m
Analysis Temperature 115.0 °F



V = 192 P / (P + 718) (As analysed) V = 481 P / (P + 718) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_016] 777.81 - 778.15 m
Analysis Temperature 115.0 °F



P/V = 0.00520 P + 3.733; r^2 = 0.963 (As analysed)
P/V = 0.00208 P + 1.493; r^2 = 0.963 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_017] 782.06 - 782.86 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	127.05 [0.28010]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.526
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	46.1 [115.0]
Ash (%, Equilibrium Moisture ba	38.1	Analysis date	11-Oct-13
Moist. (%, Equilibrium Moisture	5.3	Test Gas	Methane

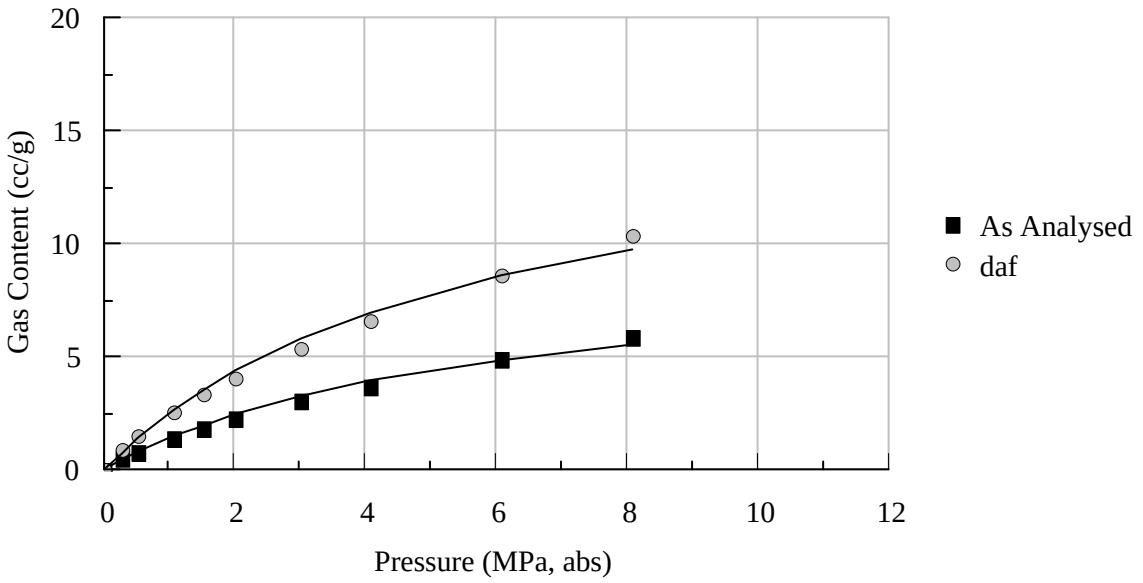
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.274	0.53	0.94	40	17	30
0.523	0.87	1.54	76	27	49
1.070	1.47	2.59	155	46	82
1.527	1.90	3.35	222	60	106
2.012	2.33	4.12	292	74	130
3.035	3.07	5.43	440	97	171
4.086	3.74	6.61	593	118	209
6.096	4.91	8.68	884	155	274
8.108	5.88	10.39	1176	186	328

Langmuir Isotherm Coefficients

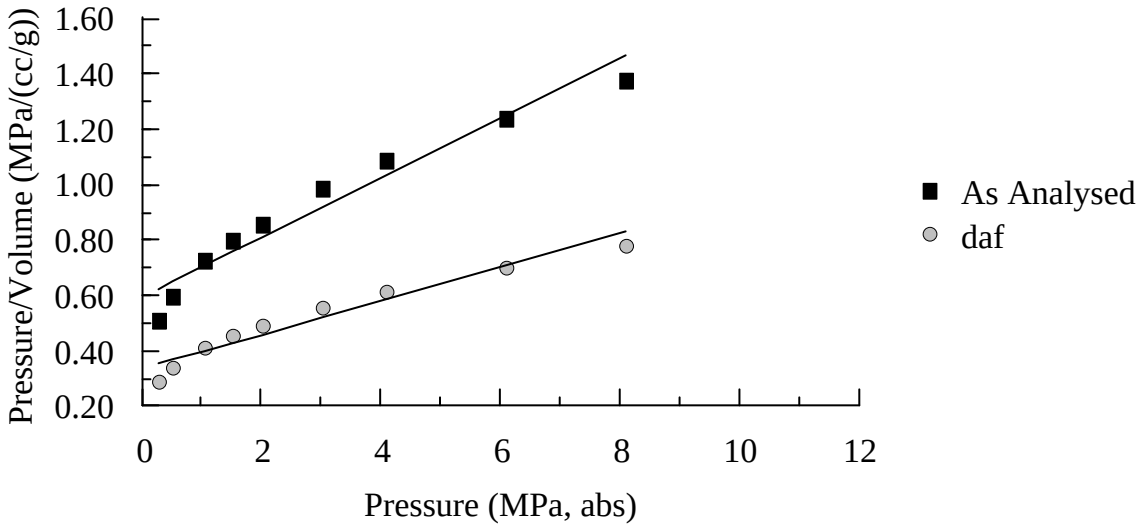
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	5.50	9.29	798	293
daf	5.50	16.40	798	518

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_017] 782.06 - 782.86 m
Analysis Temperature 46.1 °C



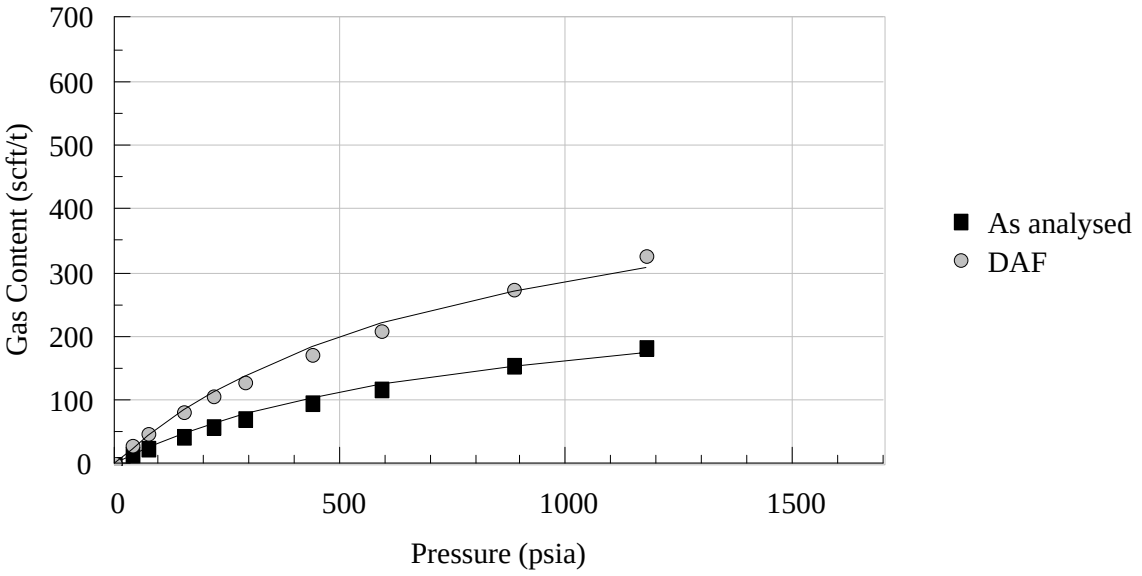
V = 9.29 P / (P + 5.50) (As analysed) V = 16.40 P / (P + 5.50) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_017] 782.06 - 782.86 m
Analysis Temperature 46.1 °C



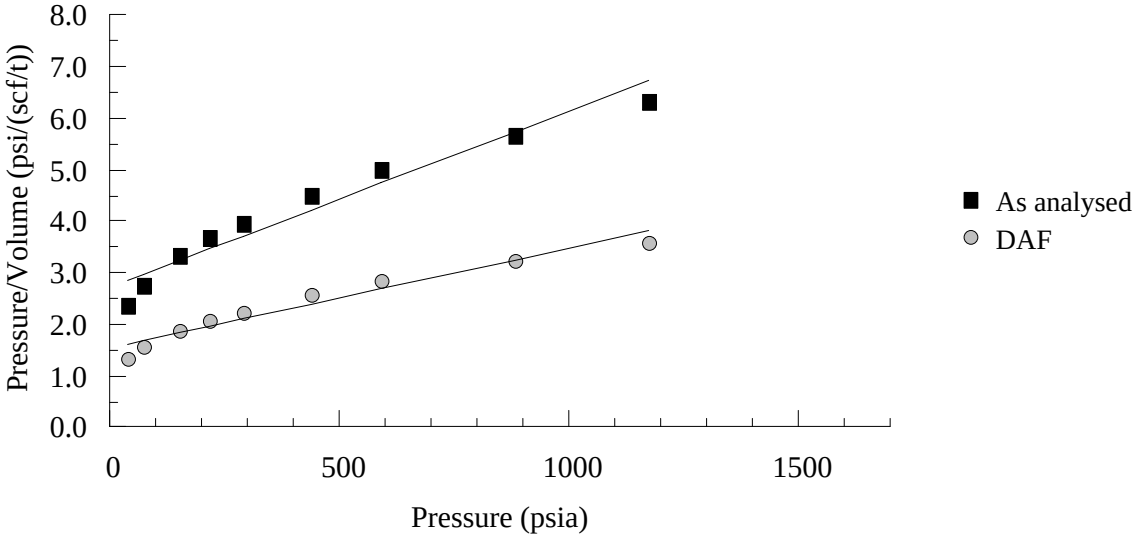
P/V = 0.108 P + 0.593; r^2 = 0.948 (As analysed)
P/V = 0.061 P + 0.336; r^2 = 0.948 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_017] 782.06 - 782.86 m
Analysis Temperature 115.0 °F



V = 293 P / (P + 798) (As analysed) V = 518 P / (P + 798) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_017] 782.06 - 782.86 m
Analysis Temperature 115.0 °F



P/V = 0.00341 P + 2.724; r^2 = 0.948 (As analysed)
P/V = 0.00193 P + 1.542; r^2 = 0.948 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_018] 787.90 - 788.54 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	115.08 [0.25371]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.572
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	46.7 [116.1]
Ash (%, Equilibrium Moisture ba	40.6	Analysis date	31-Oct-13
Moist. (%, Equilibrium Moisture	4.1	Test Gas	Methane

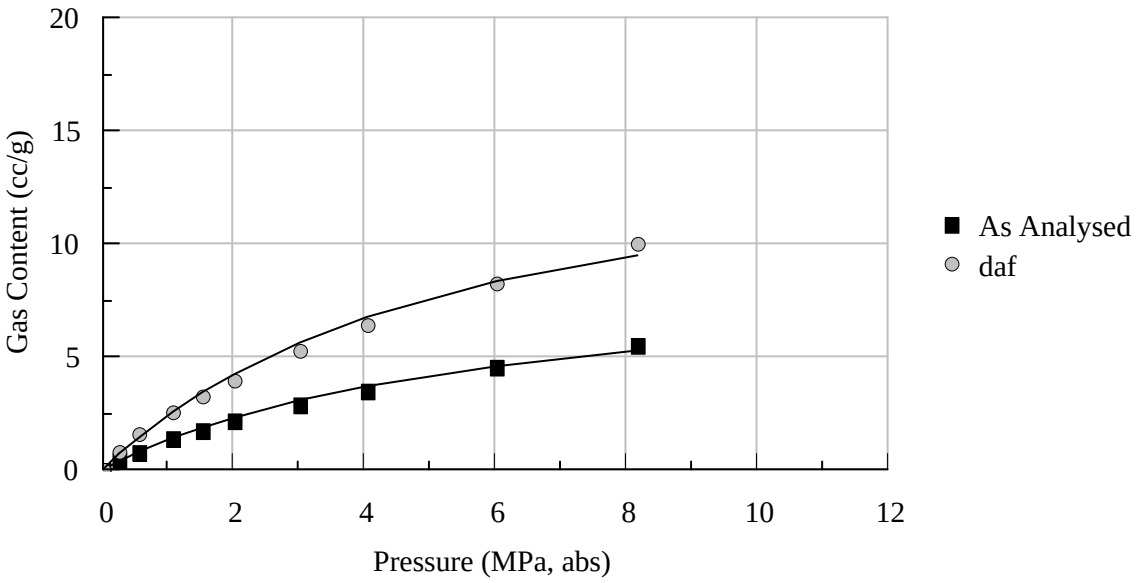
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.258	0.45	0.82	37	14	26
0.561	0.87	1.58	81	28	50
1.077	1.42	2.56	156	45	81
1.525	1.83	3.30	221	58	104
2.008	2.22	4.02	291	70	127
3.022	2.93	5.31	438	93	167
4.064	3.57	6.46	589	113	204
6.035	4.60	8.31	875	145	262
8.173	5.56	10.06	1185	176	317

Langmuir Isotherm Coefficients

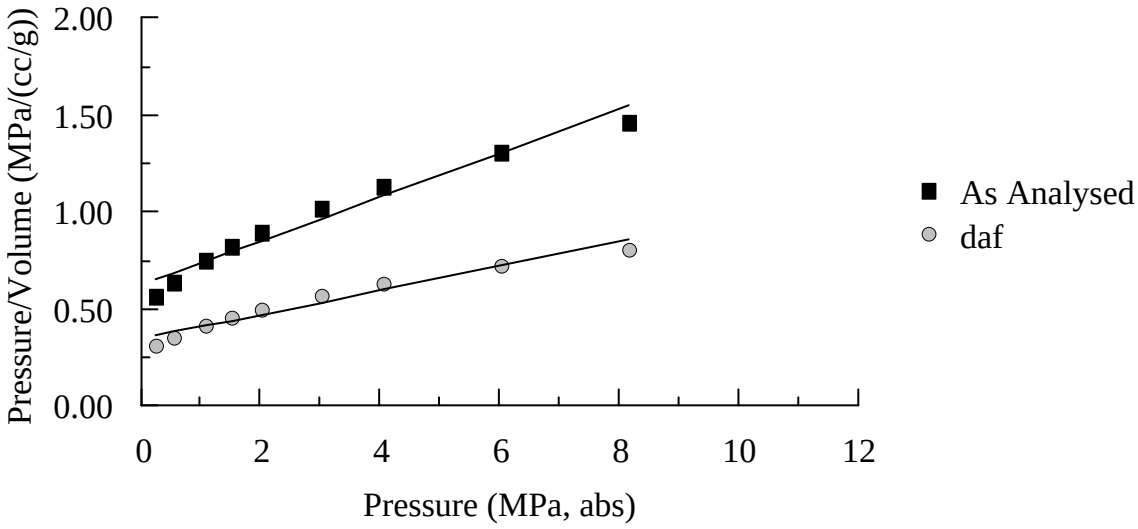
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	5.55	8.85	804	279
daf	5.55	16.00	804	505

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_018] 787.90 - 788.54 m
Analysis Temperature 46.7 °C



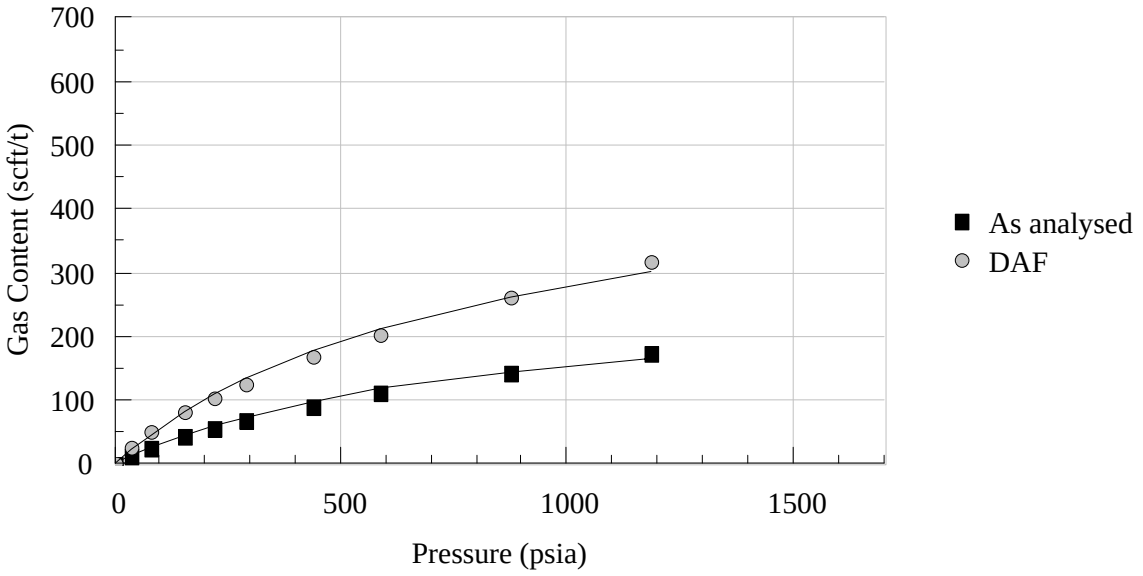
V = 8.85 P / (P + 5.55) (As analysed) V = 16.00 P / (P + 5.55) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_018] 787.90 - 788.54 m
Analysis Temperature 46.7 °C



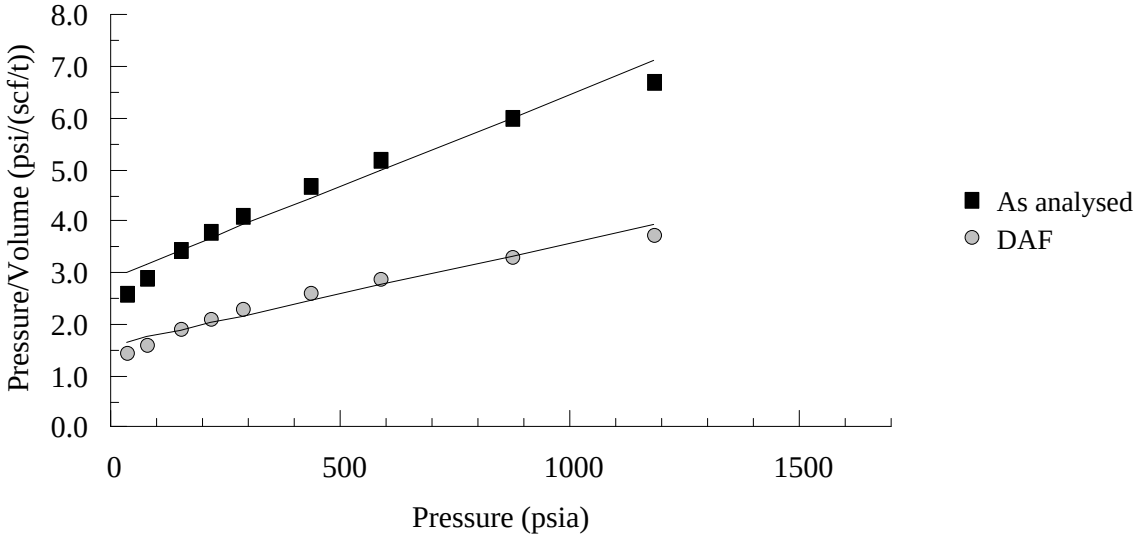
P/V = 0.113 P + 0.627; r^2 = 0.964 (As analysed)
P/V = 0.062 P + 0.347; r^2 = 0.964 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_018] 787.90 - 788.54 m
Analysis Temperature 116.1 °F



V = 279 P / (P + 804) (As analysed) V = 505 P / (P + 804) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_018] 787.90 - 788.54 m
Analysis Temperature 116.1 °F



P/V = 0.00358 P + 2.880; r^2 = 0.964 (As analysed)
P/V = 0.00198 P + 1.593; r^2 = 0.964 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_019] 803.37 - 803.67 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	101.52 [0.22381]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.650
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	46.7 [116.1]
Ash (%, Equilibrium Moisture ba	48.5	Analysis date	31-Oct-13
Moist. (%, Equilibrium Moisture	10.7	Test Gas	Methane

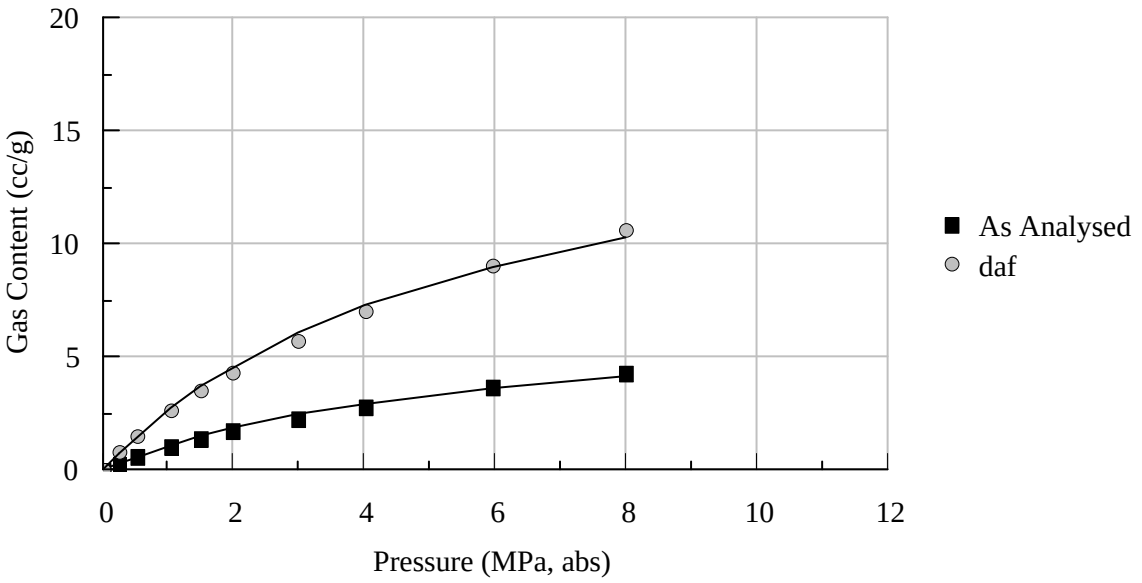
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.254	0.34	0.82	37	11	26
0.517	0.64	1.56	75	20	49
1.046	1.11	2.71	152	35	86
1.511	1.45	3.56	219	46	112
1.991	1.78	4.35	289	56	137
2.984	2.35	5.76	433	74	182
4.023	2.87	7.03	584	90	222
5.955	3.70	9.08	864	117	287
8.010	4.36	10.69	1162	138	337

Langmuir Isotherm Coefficients

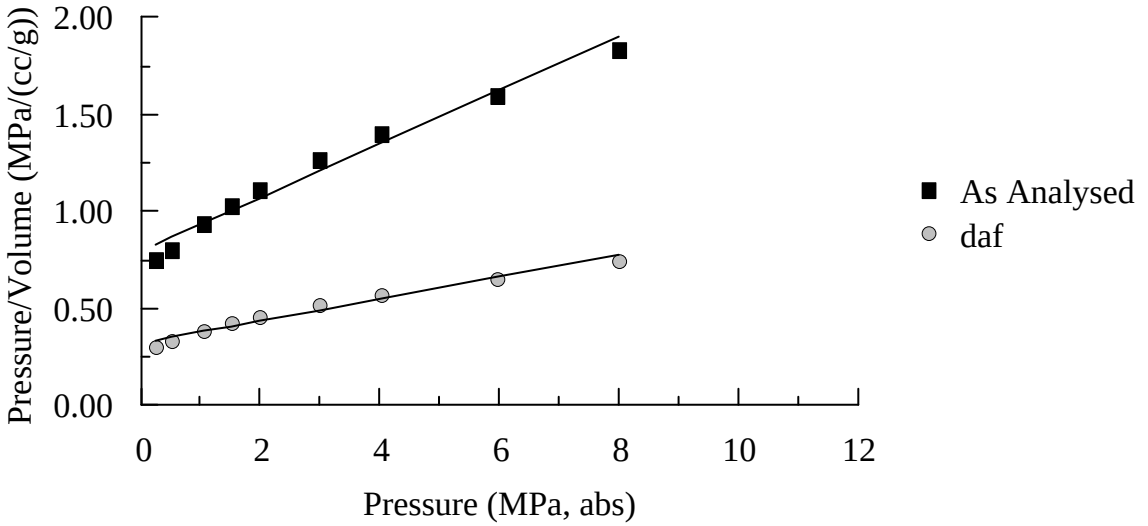
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	5.74	7.23	833	228
daf	5.74	17.71	833	559

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_019] 803.37 - 803.67 m
Analysis Temperature 46.7 °C



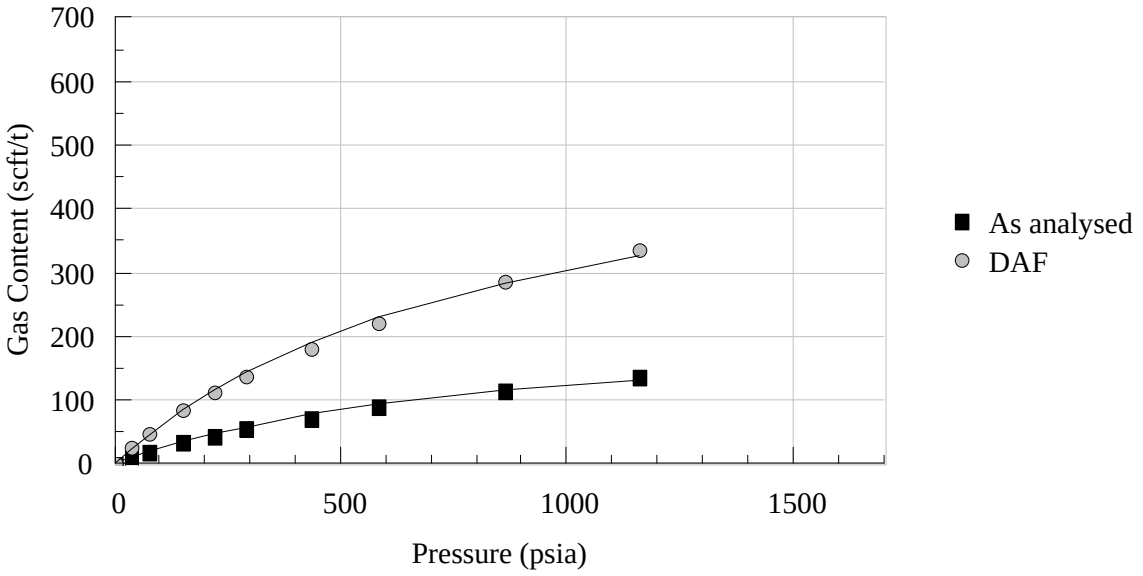
V = 7.23 P / (P + 5.74) (As analysed) V = 17.71 P / (P + 5.74) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_019] 803.37 - 803.67 m
Analysis Temperature 46.7 °C



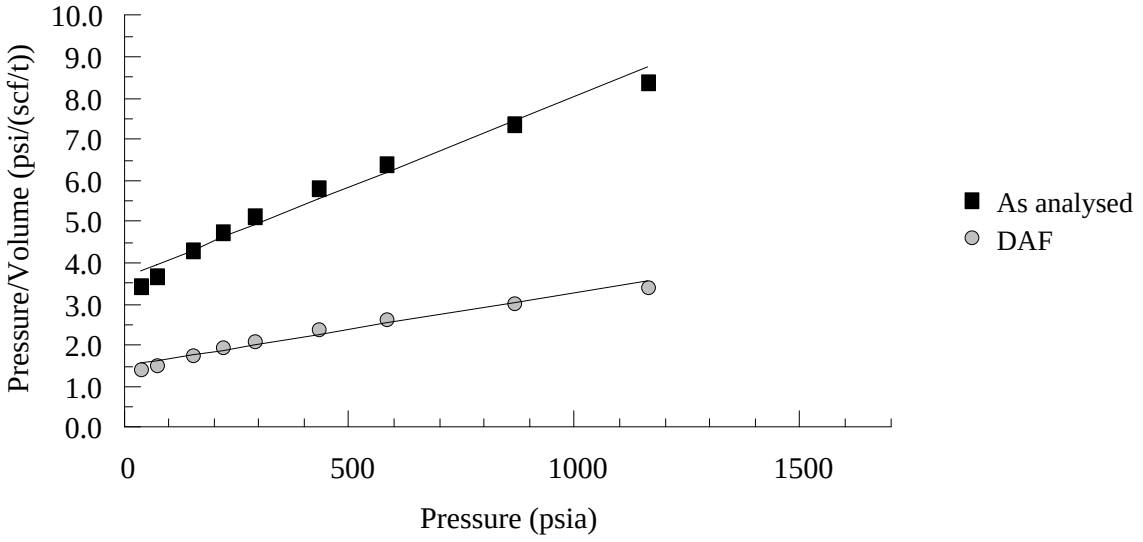
P/V = 0.138 P + 0.795; r^2 = 0.978 (As analysed)
P/V = 0.056 P + 0.324; r^2 = 0.978 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_019] 803.37 - 803.67 m
Analysis Temperature 116.1 °F



V = 228 P / (P + 833) (As analysed) V = 559 P / (P + 833) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_019] 803.37 - 803.67 m
Analysis Temperature 116.1 °F



P/V = 0.00438 P + 3.652; r^2 = 0.978 (As analysed)
P/V = 0.00179 P + 1.490; r^2 = 0.978 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_020] 807.29 - 808.09 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	127.39 [0.28085]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.613
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	47.2 [117.0]
Ash (%, Equilibrium Moisture ba	43.4	Analysis date	11-Oct-13
Moist. (%, Equilibrium Moisture	9.2	Test Gas	Methane

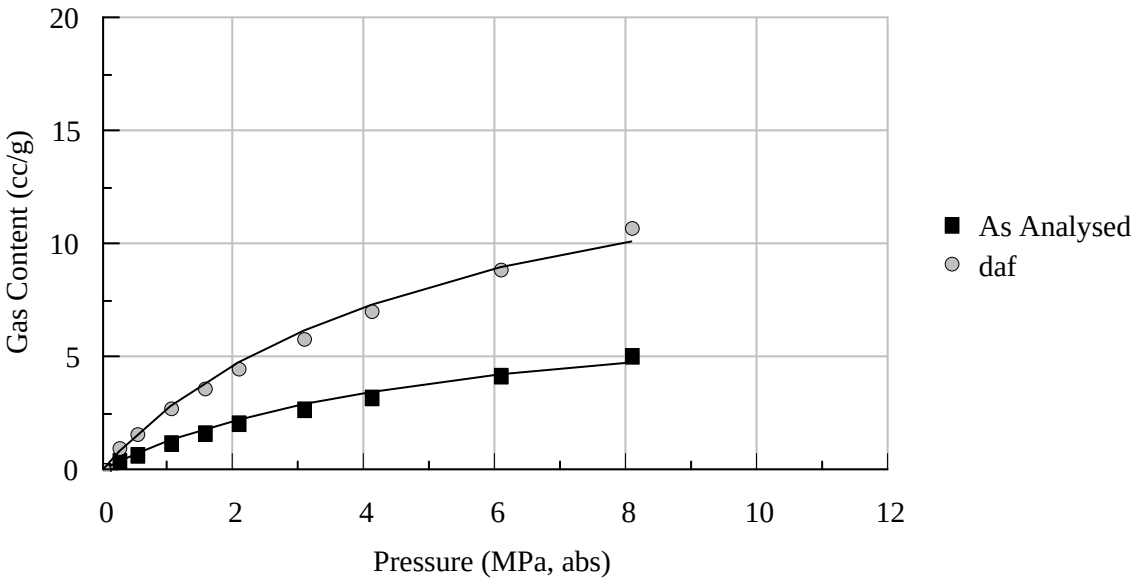
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.269	0.46	0.97	39	14	30
0.524	0.79	1.66	76	25	52
1.050	1.31	2.77	152	41	87
1.556	1.73	3.66	226	55	115
2.069	2.13	4.50	300	67	142
3.071	2.76	5.82	445	87	184
4.109	3.33	7.03	596	105	222
6.084	4.22	8.91	882	133	281
8.101	5.11	10.78	1175	161	340

Langmuir Isotherm Coefficients

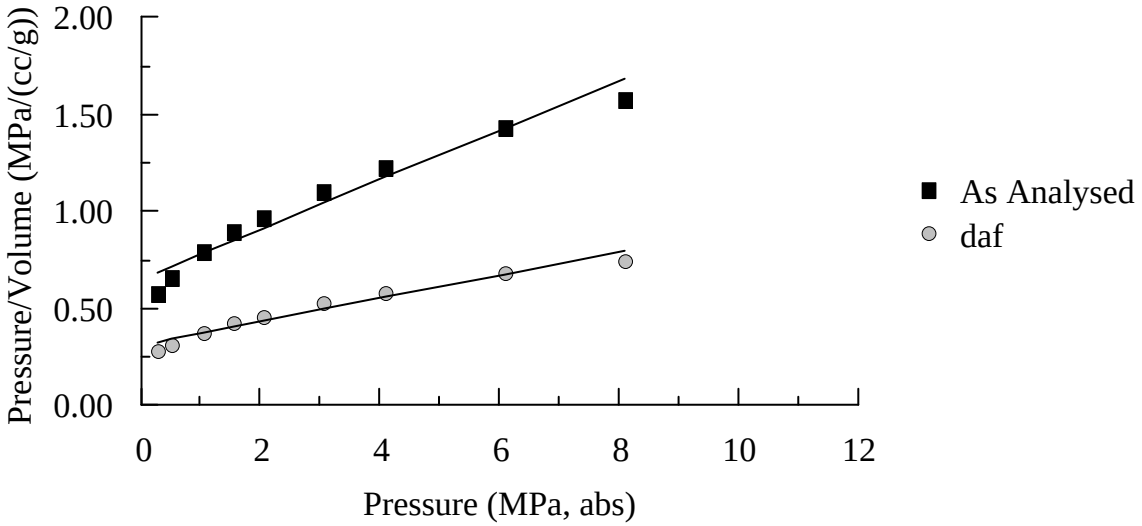
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	5.12	7.84	743	248
daf	5.12	16.55	743	522

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_020] 807.29 - 808.09 m
Analysis Temperature 47.2 °C



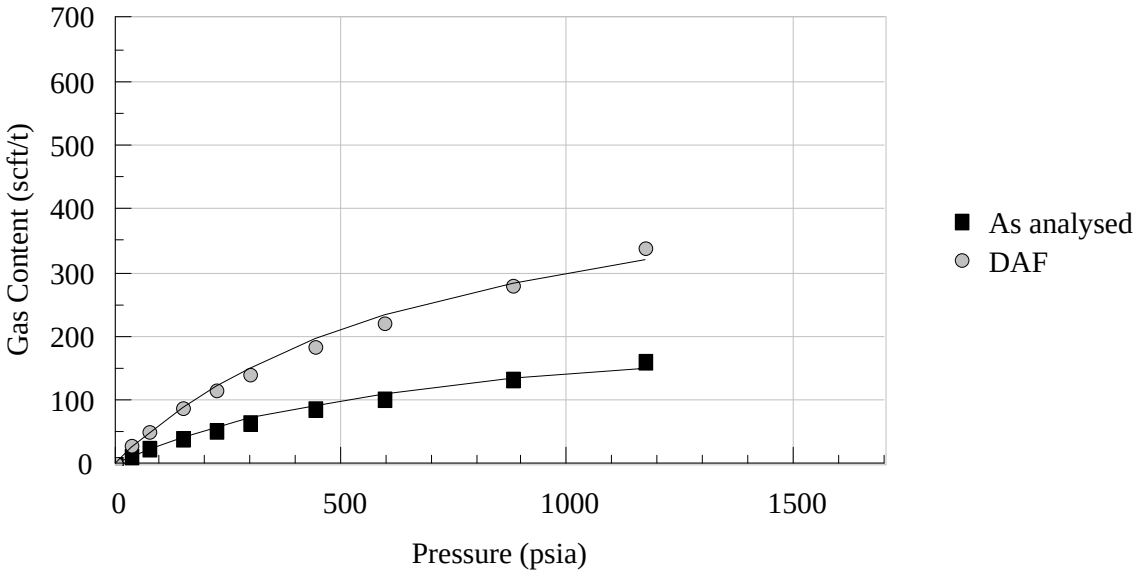
V = 7.84 P / (P + 5.12) (As analysed) V = 16.55 P / (P + 5.12) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_020] 807.29 - 808.09 m
Analysis Temperature 47.2 °C



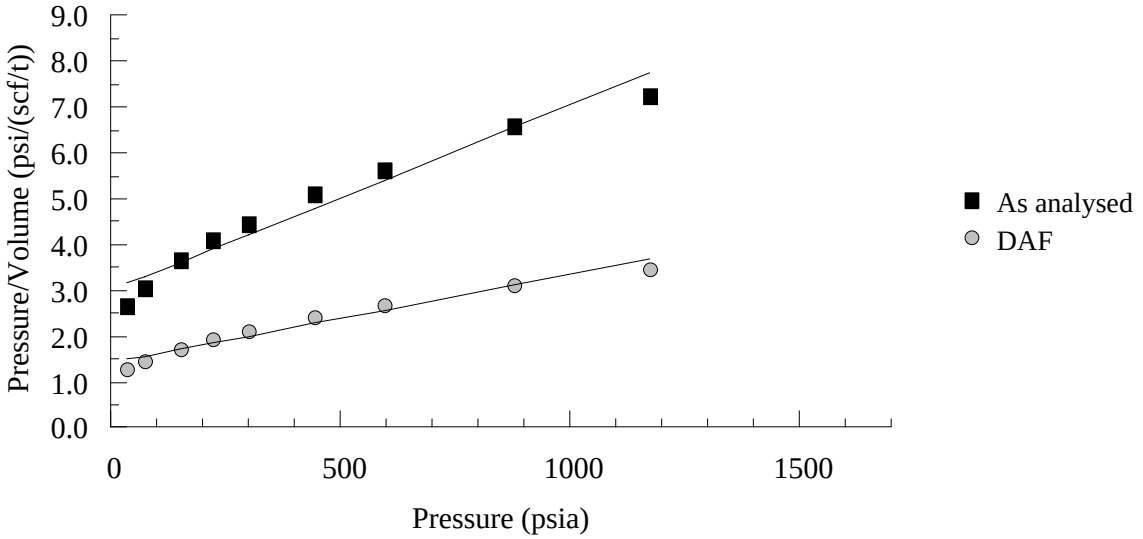
P/V = 0.127 P + 0.653; r^2 = 0.961 (As analysed)
P/V = 0.060 P + 0.309; r^2 = 0.961 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_020] 807.29 - 808.09 m
Analysis Temperature 117.0 °F



V = 248 P / (P + 743) (As analysed) V = 522 P / (P + 743) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_020] 807.29 - 808.09 m
Analysis Temperature 117.0 °F



P/V = 0.00404 P + 3.000; r^2 = 0.961 (As analysed)
P/V = 0.00191 P + 1.422; r^2 = 0.961 (daf)

Client	Queensland Gas Ltd
Sample Details	Murdoch 01 [MUR001_021] 808.09 - 808.79 m

Sample Properties

Inherent Moisture (%, ad)	n.d.	Isotherm Sample Mass (g) [lb]	106.25 [0.23424]
Ash (%, ad)	n.d.	Particle Size (mm) [US mesh]	-0.212 [70]
Volatile Matter (%, ad)	n.d.	Helium density (g/cc)	1.365
Fixed Carbon (%, ad)	n.d.	Test Temperature (°C) [°F]	47.2 [117.0]
Ash (%, Equilibrium Moisture ba	17.4	Analysis date	11-Oct-13
Moist. (%, Equilibrium Moisture	6.9	Test Gas	Methane

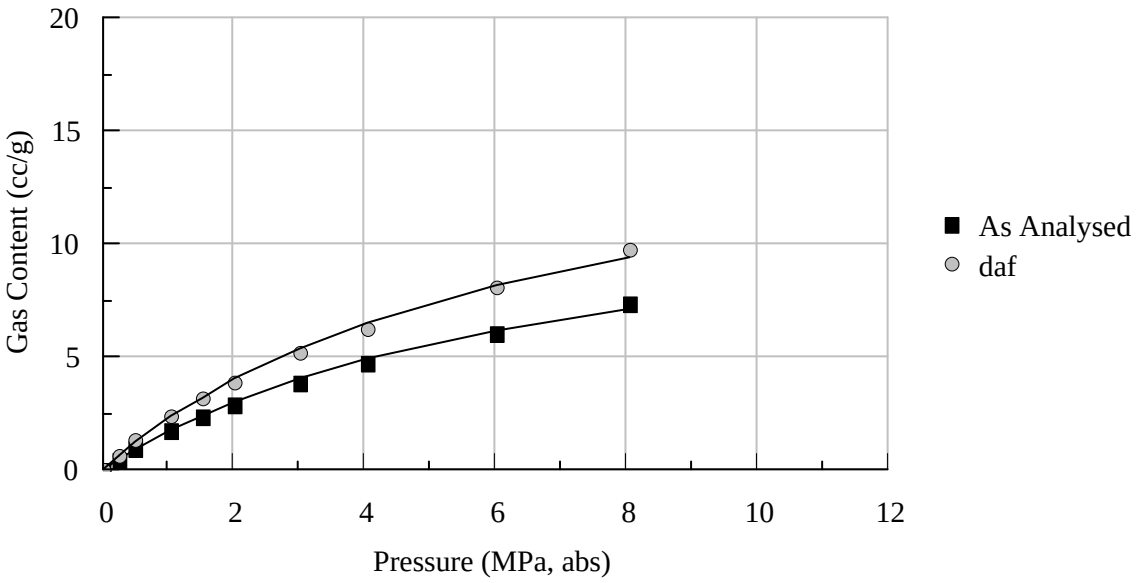
Methane Absolute Adsorption at Equilibrium Moisture Basis

at 20°C; 101.1kPa (1 atm)			at 60°F, 14.7 psia		
Pressure (MPa) (absolute)	Gas Content (cc/g) (as analysed)	Gas Content (cc/g) (daf)	Pressure (psia)	Gas Content (scf/t) (as analysed)	Gas Content (scf/t) (daf)
0.256	0.52	0.68	37	16	22
0.512	1.00	1.32	74	31	42
1.049	1.81	2.39	152	57	75
1.522	2.42	3.19	221	76	101
2.017	2.98	3.93	293	94	124
3.015	3.92	5.18	437	124	163
4.057	4.78	6.31	588	151	199
6.030	6.11	8.08	875	193	255
8.056	7.39	9.76	1168	233	308

Langmuir Isotherm Coefficients

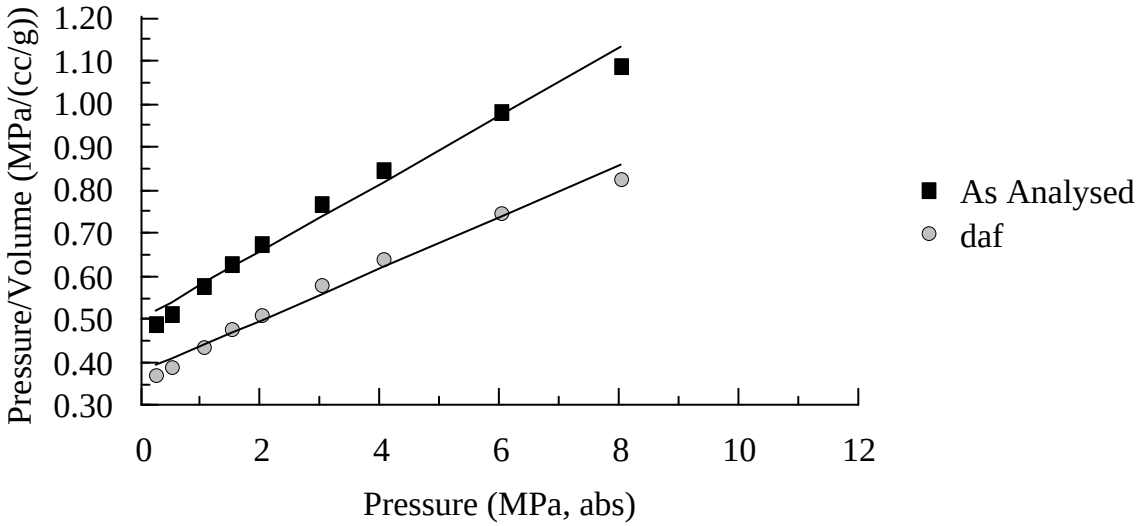
	P_L (MPa, abs)	V_L (cc/g)	P_L (psia)	V_L (scf/t)
As analysed	6.37	12.73	925	402
daf	6.37	16.82	925	531

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_021] 808.09 - 808.79 m
Analysis Temperature 47.2 °C



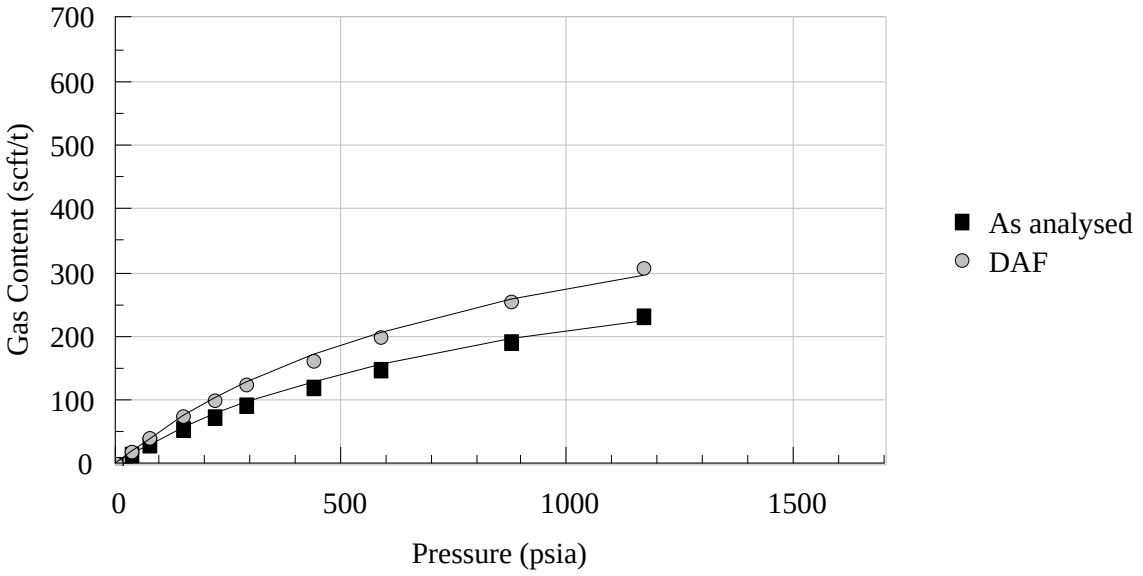
V = 12.73 P / (P + 6.37) (As analysed) V = 16.82 P / (P + 6.37) (daf)

Methane Absolute Adsorption Isotherm (20 °C, 101.3 kPa)
Murdoch 01 [MUR001_021] 808.09 - 808.79 m
Analysis Temperature 47.2 °C



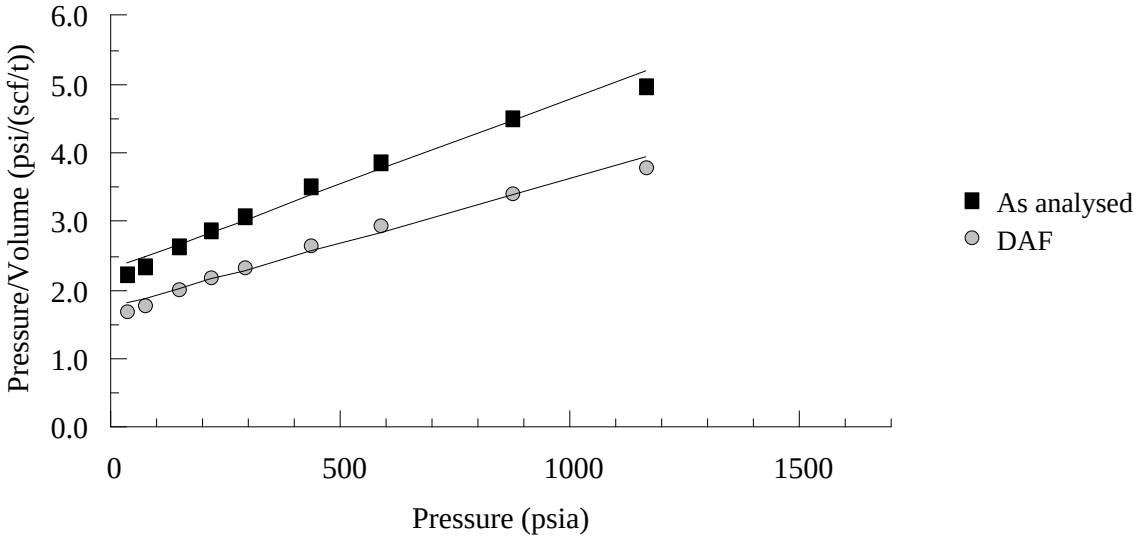
P/V = 0.079 P + 0.501; r^2 = 0.983 (As analysed)
P/V = 0.059 P + 0.379; r^2 = 0.983 (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_021] 808.09 - 808.79 m
Analysis Temperature 117.0 °F



V = 402 P / (P + 925) (As analysed) V = 531 P / (P + 925) (daf)

Methane Absolute Adsorption Isotherm (60 °F, 14.7 psia)
Murdoch 01 [MUR001_021] 808.09 - 808.79 m
Analysis Temperature 117.0 °F



P/V = 0.00249 P + 2.301; r^2 = 0.983 (As analysed)
P/V = 0.00188 P + 1.742; r^2 = 0.983 (daf)

Dr Peter Crosdale (MAIG)
Director, ERC
5th November, 2013

APPENDIX 8

REFLECTANCE ANALYSIS REPORT

ANALYTICAL REPORT

REFLECTANCE ANALYSIS

MURDOCH 01

PREPARED FOR
QUEENSLAND GAS COMPANY LTD

NOVEMBER 2013

Energy Resources Consulting Pty Ltd
PO Box 54
Coorparoo, Qld 4151
Australia

REFLECTANCE ANALYSIS

INTRODUCTION

Twenty one samples were received (see table below) to be evaluated for adsorption isotherm properties, vitrinite reflectance (selected samples only - highlighted) and maceral content (all samples). Vitrinite reflectance data are reported herein.

Murdoch 01

Sample No.	From (m)	To (m)	Temp (°C)	Sample No.	From (m)	To (m)	Temp (°C)
MUR001_001	623.19	622.44	40.1	***MUR001_012***	709.06	709.72	43.4
MUR001_002	624.10	623.46	40.1	MUR001_013	709.72	710.29	43.5
MUR001_003	624.69	624.34	40.2	MUR001_014	712.97	713.32	43.5
MUR001_004	625.24	624.74	40.2	***MUR001_015***	744.66	744.98	44.8
MUR001_005	640.20	639.49	40.8	MUR001_016	777.81	778.15	46.1
MUR001_006	641.01	640.20	40.8	***MUR001_017***	782.06	782.86	46.1
MUR001_007	643.35	642.75	40.9	MUR001_018	787.90	788.54	46.7
MUR001_008	644.12	643.58	40.9	MUR001_019	803.37	803.67	46.7
MUR001_009	683.14	682.84	42.7	MUR001_020	807.29	808.09	47.2
MUR001_010	697.44	696.65	42.7	***MUR001_021***	808.09	808.79	47.2
MUR001_011	709.06	708.34	43.4				

METHODS

Samples were supplied in a crushed to less than 6 mm state. The -6 mm coal was sub-sampled by evenly spreading the coal and taking between 10 to 30 scoops using 30 mm wide spatula, ensuring that the entire thickness of the spread coal was sampled. Approximately 25g of coal was taken. The -6 mm samples were stored at -10°C for adsorption isotherm analysis at a later date.

Where necessary, composites were prepared by pro-rataing on the basis of the coal mass. For each composite, individual samples were weighed and the total mass for the composited was calculated. A portion of each sample was then used for the composite by taking its proportion of the total composite mass and multiplying it by the desired final mass of the composite (in this case 150 g). For example, if two samples were received weighing 400 and 300 g respectively, a 150 g composite would be made up by (400/700*150) + (300/700*150). Since the initial masses are in the correct volume proportion, the final composite contains the individual samples in the correct volume proportions.

The maceral sub-sample was then gently crushed and sieved to pass through a 1 mm sieve, keeping fines to a minimum. The -1 mm coal was sub-sampled by evenly spreading the coal and taking between 10 to 15 scoops using 5 mm wide spatula, ensuring that the entire thickness of the spread coal was sampled, until about 10 g of coal was obtained. This sub-sample was mounted in epoxy resin and polished for microscopic examination in reflected light. The polished sample was desiccated for at least 12 hours prior to analysis.

Mean maximum reflectance of vitrinite in oil was determined by using a mechanical stage to traverse the sample at regular intervals. A minimum of 50 measurements were made using a

Leica MP4500P system with Hilgers DISKUS software. Reflectance was determined of a 20 μm^2 area at 546nm using a total magnification of 500X.

RESULTS

Results are tabulated as follows. Note that samples will be retained by ERC for 12 months after reporting but may be discarded after that date.

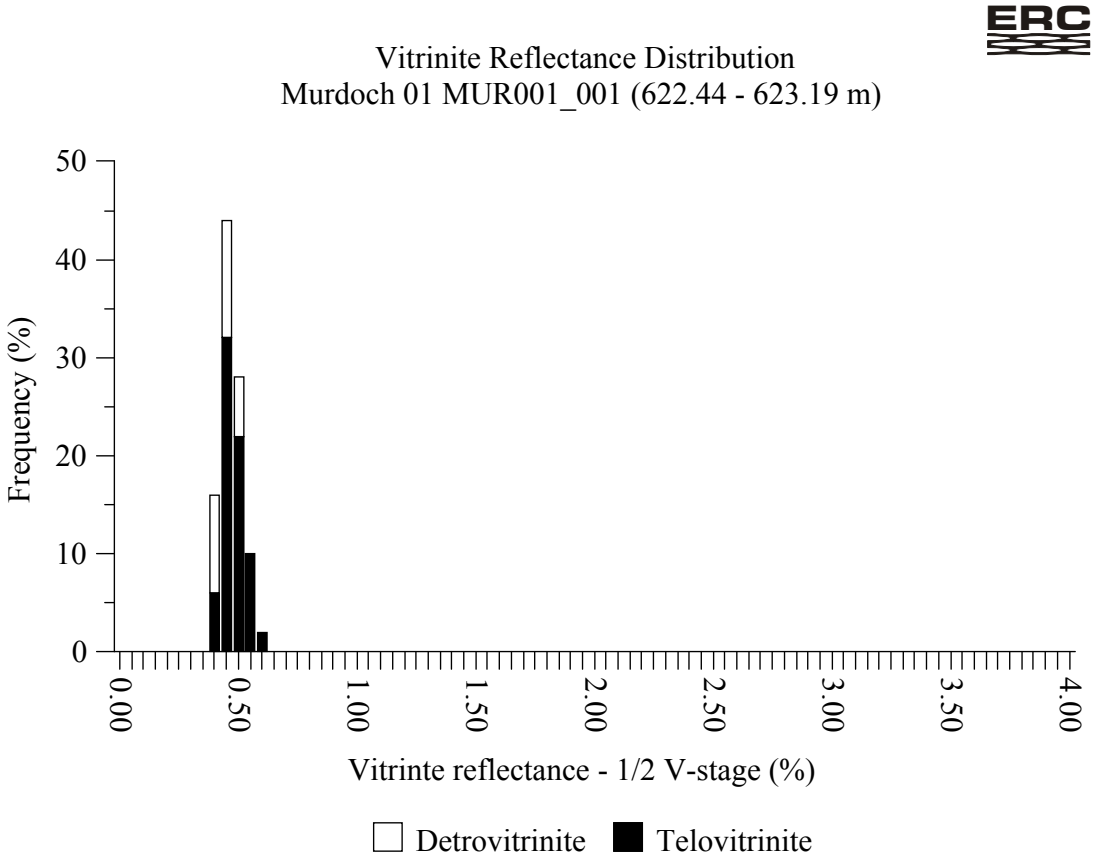
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_001 (622.44 - 623.19 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.50	0.43 - 0.60	36	0.041
Detrovitrinite	0.46	0.42 - 0.50	14	0.028
Total Vitrinite	0.49	0.42 - 0.60	50	0.043



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

Our ref : QGC 13-19c

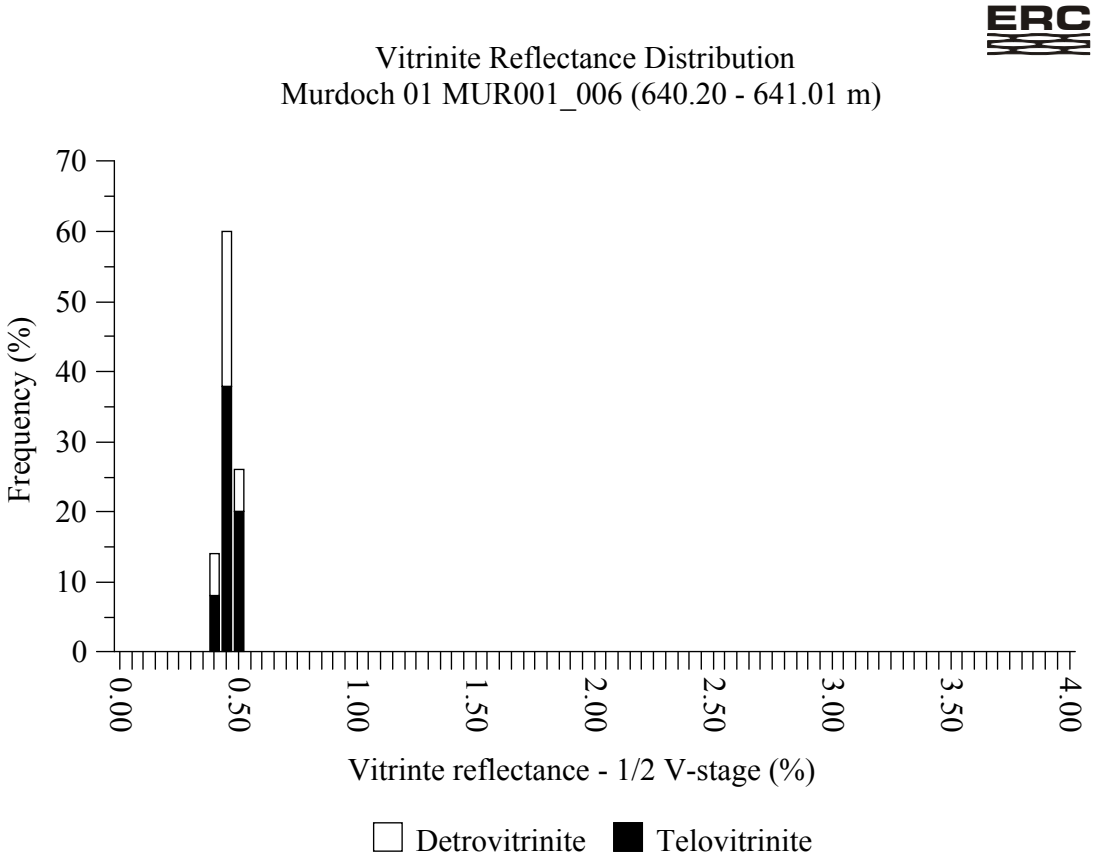
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_006 (640.20 - 641.01 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.48	0.42 - 0.53	33	0.026
Detrovitrinite	0.46	0.43 - 0.51	17	0.025
Total Vitrinite	0.47	0.42 - 0.53	50	0.027



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

Our ref : QGC 13-19c

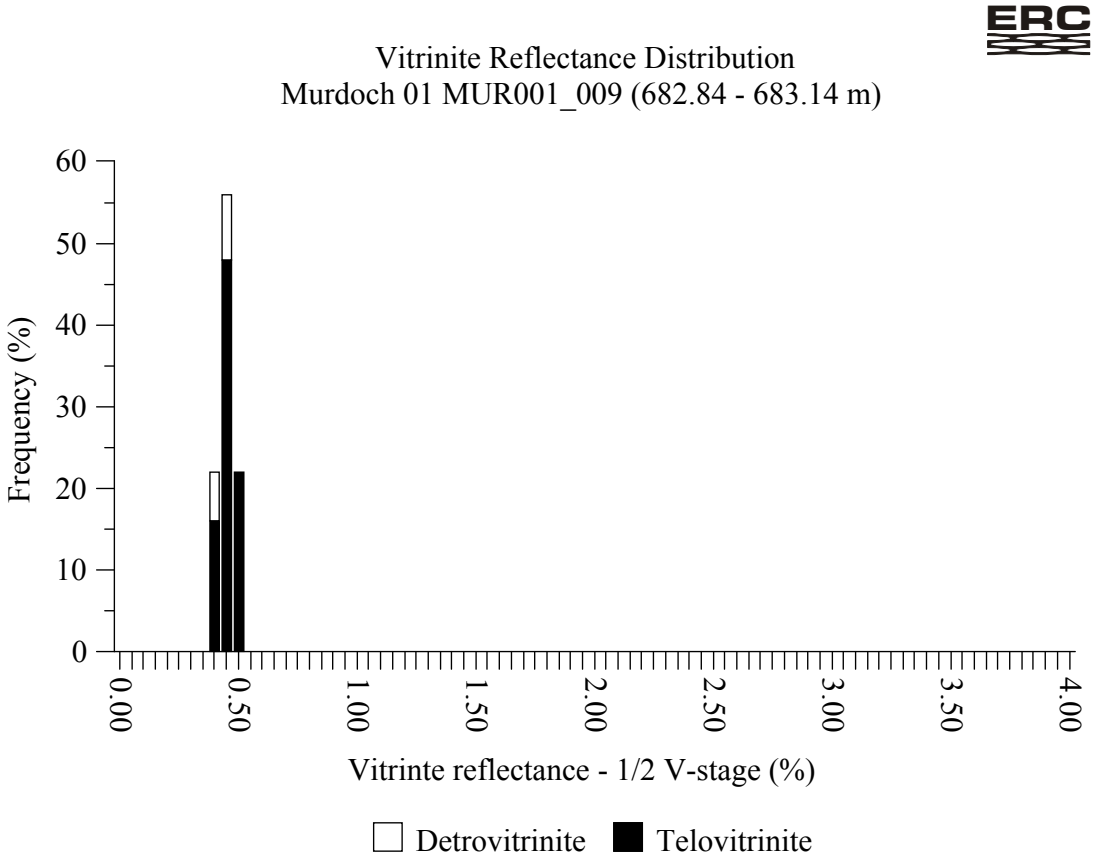
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_009 (682.84 - 683.14 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.47	0.42 - 0.52	43	0.025
Detrovitrinite	0.45	0.41 - 0.48	7	0.023
Total Vitrinite	0.47	0.41 - 0.52	50	0.026



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

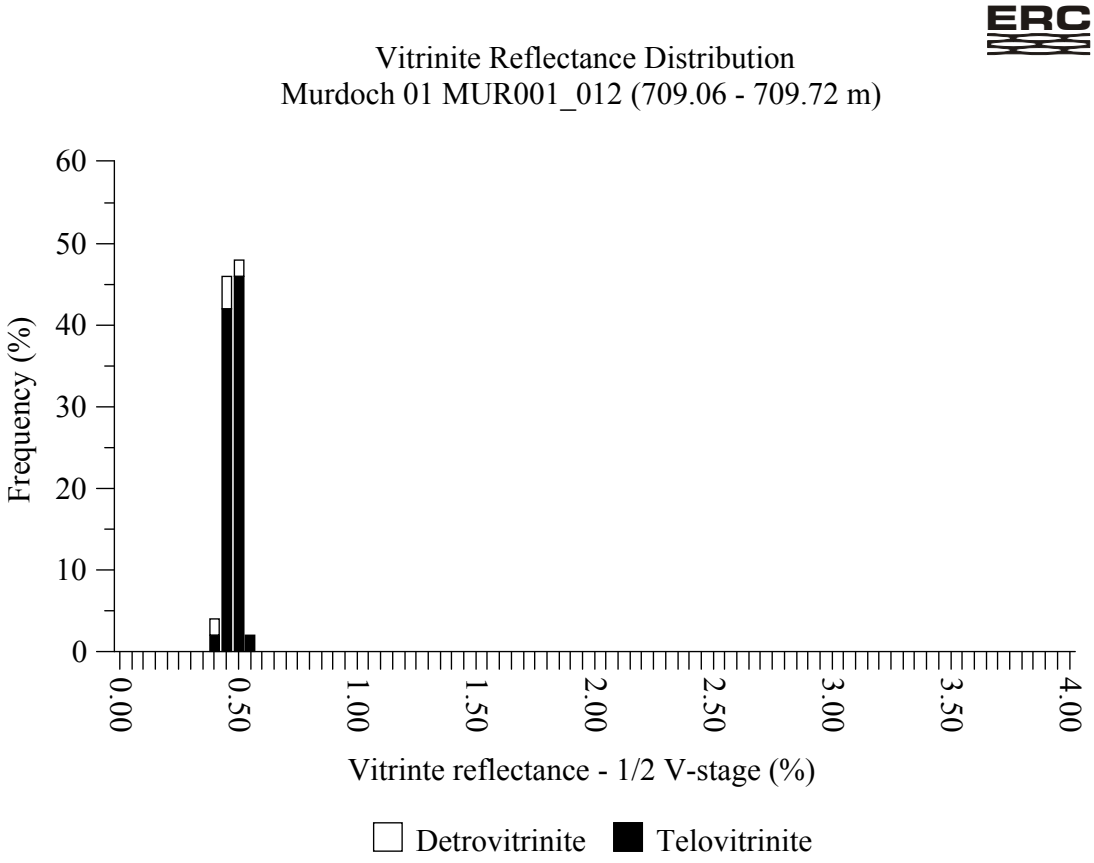
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_012 (709.06 - 709.72 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.49	0.44 - 0.54	46	0.026
Detrovitrinite	0.47	0.44 - 0.52	4	0.031
Total Vitrinite	0.49	0.44 - 0.54	50	0.028



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

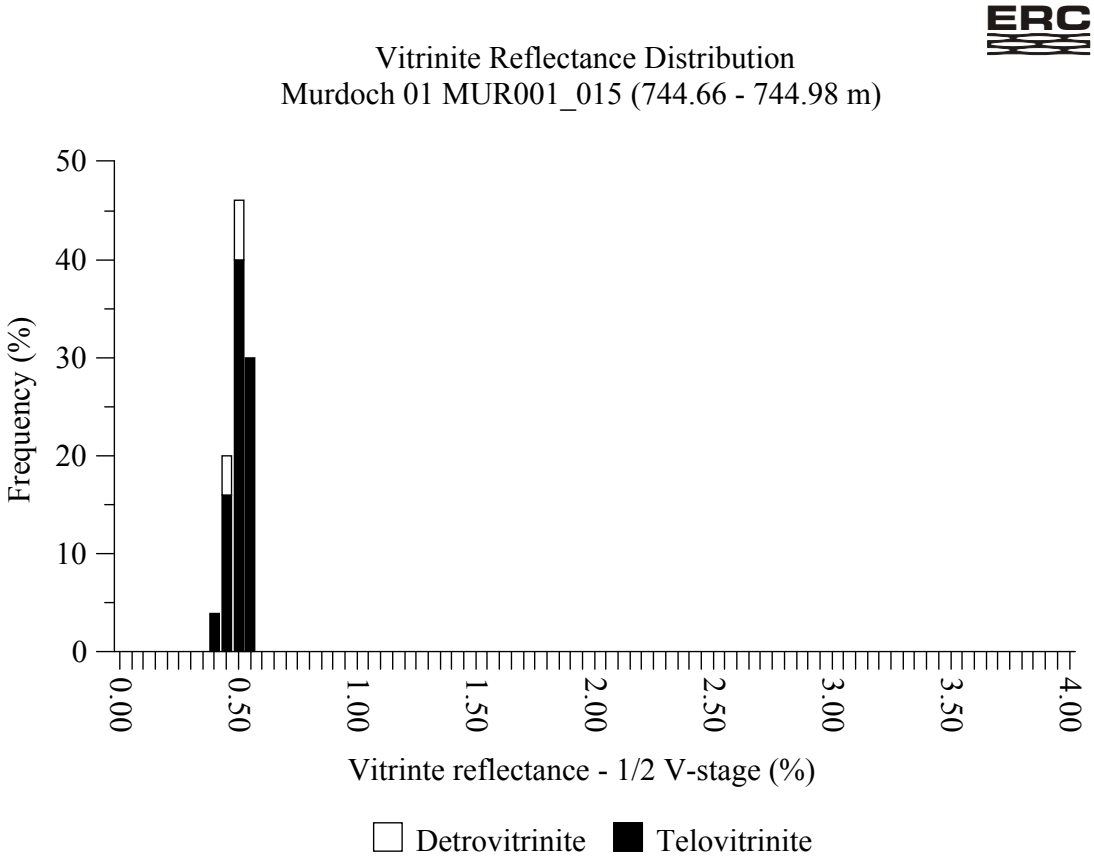
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_015 (744.66 - 744.98 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.52	0.42 - 0.58	45	0.036
Detrovitrinite	0.49	0.47 - 0.51	5	0.014
Total Vitrinite	0.51	0.42 - 0.58	50	0.035



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

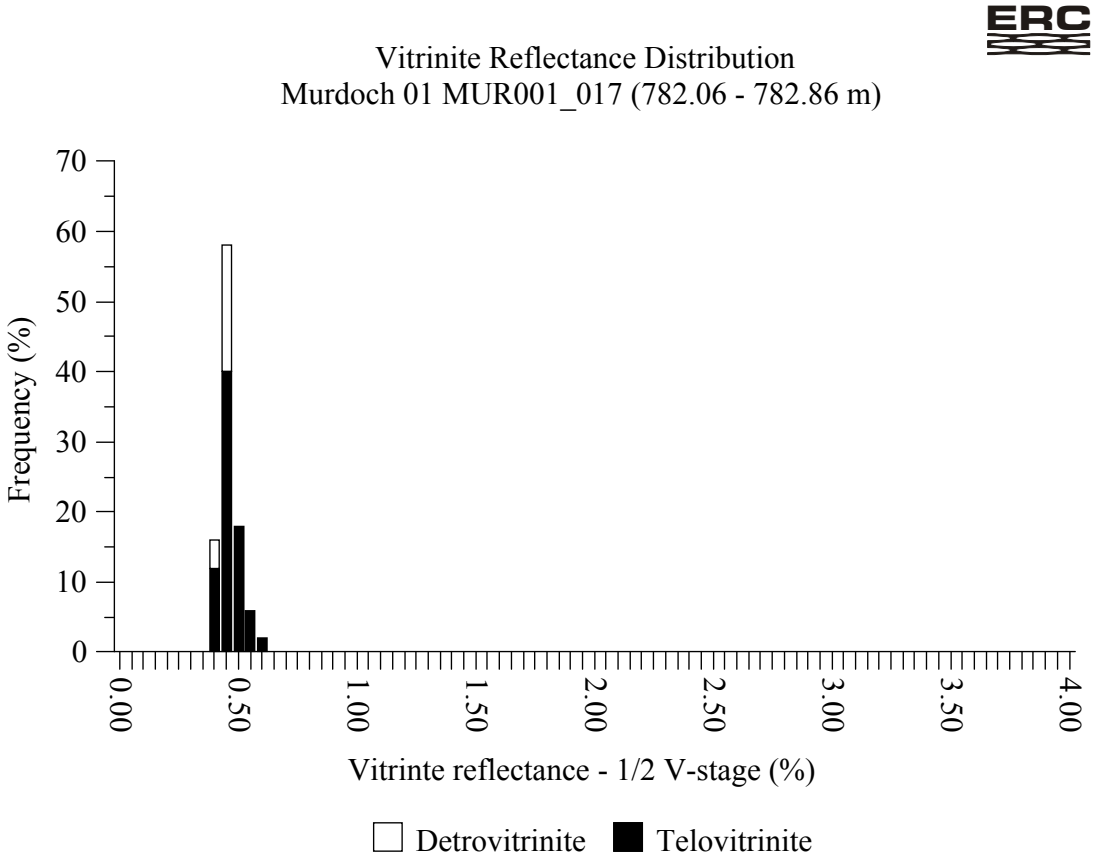
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_017 (782.06 - 782.86 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.48	0.43 - 0.62	39	0.042
Detrovitrinite	0.46	0.43 - 0.49	11	0.020
Total Vitrinite	0.48	0.43 - 0.62	50	0.040



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

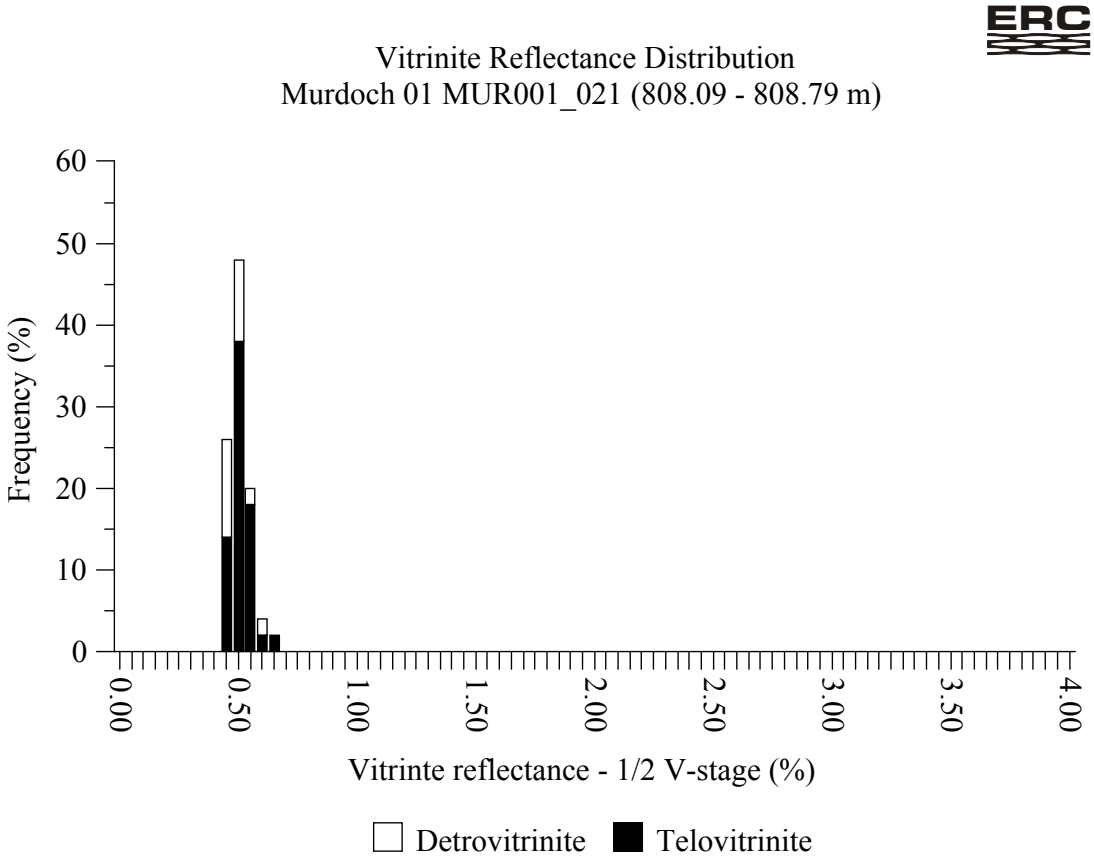
PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_021 (808.09 - 808.79 m)
Date

Vitrinite Reflectance

Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.52	0.46 - 0.64	37	0.040
Detrovitrinite	0.50	0.47 - 0.59	13	0.034
Total Vitrinite	0.52	0.46 - 0.64	50	0.039



Comments

Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

Dr Peter Crosdale (MAIG)
Director, ERC
24th November, 2013

APPENDIX 9

MACERAL ANALYSIS REPORT

ANALYTICAL REPORT

MACERAL ANALYSIS

MURDOCH 01

PREPARED FOR
QUEENSLAND GAS COMPANY LTD

NOVEMBER 2013

Energy Resources Consulting Pty Ltd
PO Box 54
Coorparoo, Qld 4151
Australia

MACERAL ANALYSIS

INTRODUCTION

Twenty one samples were received (see table below) to be evaluated for adsorption isotherm properties, vitrinite reflectance (selected samples only) and maceral content (all samples). Maceral content data are reported herein.

Murdoch 01

Sample No.	From (m)	To (m)	Temp (°C)	Sample No.	From (m)	To (m)	Temp (°C)
MUR001_001	623.19	622.44	40.1	MUR001_012	709.06	709.72	43.4
MUR001_002	624.10	623.46	40.1	MUR001_013	709.72	710.29	43.5
MUR001_003	624.69	624.34	40.2	MUR001_014	712.97	713.32	43.5
MUR001_004	625.24	624.74	40.2	MUR001_015	744.66	744.98	44.8
MUR001_005	640.20	639.49	40.8	MUR001_016	777.81	778.15	46.1
MUR001_006	641.01	640.20	40.8	MUR001_017	782.06	782.86	46.1
MUR001_007	643.35	642.75	40.9	MUR001_018	787.90	788.54	46.7
MUR001_008	644.12	643.58	40.9	MUR001_019	803.37	803.67	46.7
MUR001_009	683.14	682.84	42.7	MUR001_020	807.29	808.09	47.2
MUR001_010	697.44	696.65	42.7	MUR001_021	808.09	808.79	47.2
MUR001_011	709.06	708.34	43.4				

METHODS

Samples were supplied in a crushed to less than 6 mm state. The -6 mm coal was sub-sampled by evenly spreading the coal and taking between 10 to 30 scoops using 30 mm wide spatula, ensuring that the entire thickness of the spread coal was sampled. Approximately 25g of coal was taken. The -6 mm samples were stored at -10°C for adsorption isotherm analysis at a later date.

Where necessary, composites were prepared by pro-rataing on the basis of the coal mass. For each composite, individual samples were weighed and the total mass for the composited was calculated. A portion of each sample was then used for the composite by taking its proportion of the total composite mass and multiplying it by the desired final mass of the composite (in this case 150 g). For example, if two samples were received weighing 400 and 300 g respectively, a 150 g composite would be made up by (400/700*150) + (300/700*150). Since the initial masses are in the correct volume proportion, the final composite contains the individual samples in the correct volume proportions.

The maceral sub-sample was then gently crushed and sieved to pass through a 1 mm sieve, keeping fines to a minimum. The -1 mm coal was sub-sampled by evenly spreading the coal and taking between 10 to 15 scoops using 5 mm wide spatula, ensuring that the entire thickness of the spread coal was sampled, until about 10 g of coal was obtained. This sub-sample was mounted in epoxy resin and polished for microscopic examination in reflected light. The polished sample was desiccated for at least 12 hours prior to analysis.

Maceral composition was determined by point counting the polished block using 500X magnification and oil immersion. A minimum of 500 points were counted using a motorised stage and Hilgers DISKUS software. Maceral classification followed Australian Standard

AS2856-1986 except where noted.

RESULTS

Results are tabulated as follows. Note that samples will be retained by ERC for 12 months after reporting but may be discarded after that date.

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_001 (622.44 - 623.19 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	23.9	40.6	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	123	23.9	40.6
Vitrinite	29.9	50.8				Attrinite	0	0.0	0.0
			Detrovitrinite	4.1	6.9	Densinite	0	0.0	0.0
						Desmocollinite	21	4.1	6.9
						Corpogelinite	10	1.9	3.3
			Gelovitrinite	1.9	3.3	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	46	8.9	15.2
						Cutinite	5	1.0	1.7
						Resinite	0	0.0	0.0
						Liptodetrinite	0	0.0	0.0
Liptinite	21.0	35.7		21.0	35.7	Alginite	0	0.0	0.0
						Suberinite	57	11.1	18.8
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	15	2.9	5.0
			Telo-inertinite	4.7	8.0	Semifusinite	9	1.8	3.0
Inertinite	8.0	13.6				Sclerotinite	0	0.0	0.0
			Detro-inertinite	3.3	5.6	Inertodetrinite	17	3.3	5.6
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	41.1	n/a		41.1	n/a		211	41.1	n/a
Total	100.0	100.1		100.0	100.1		514	100.0	100.1

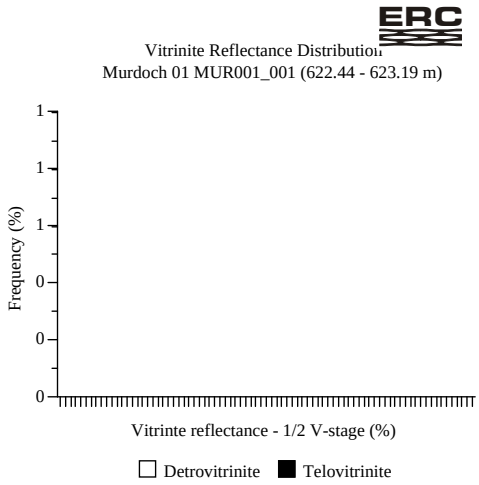
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_002 (623.46 - 624.10 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	23.8	57.4	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	120	23.8	57.4
Vitrinite	28.0	67.5				Attrinite	0	0.0	0.0
			Detrovitrinite	2.0	4.8	Densinite	0	0.0	0.0
						Desmocollinite	10	2.0	4.8
						Corpogelinite	11	2.2	5.3
			Gelovitrinite	2.2	5.3	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	12	2.4	5.7
						Cutinite	0	0.0	0.0
						Resinite	2	0.4	1.0
						Liptodetrinite	0	0.0	0.0
Liptinite	10.7	25.8		10.7	25.8	Alginite	0	0.0	0.0
						Suberinite	40	7.9	19.1
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	5	1.0	2.4
			Telo-inertinite	2.4	5.7	Semifusinite	7	1.4	3.3
Inertinite	2.8	6.7				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.4	1.0	Inertodetrinite	2	0.4	1.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	58.5	n/a		58.5	n/a		295	58.5	n/a
Total	100.0	100.0		100.0	100.0		504	100.0	100.0

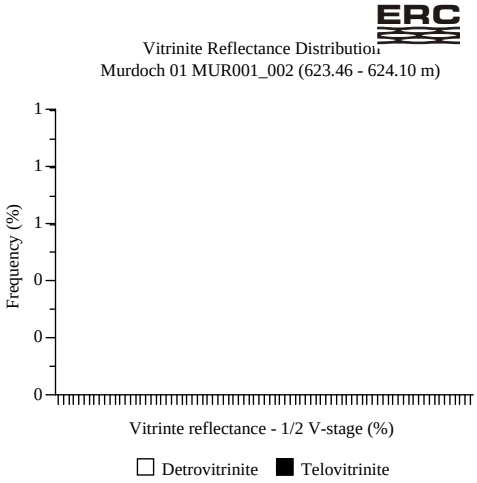
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Carbonate minerals in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_003 (624.34 - 624.69 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	36.8	42.4	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	189	36.8	42.4
Vitrinite	40.9	47.1				Attrinite	0	0.0	0.0
			Detrovitrinite	1.6	1.8	Densinite	0	0.0	0.0
						Desmocollinite	8	1.6	1.8
						Corpogelinite	13	2.5	2.9
			Gelovitrinite	2.5	2.9	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	47	9.2	10.5
						Cutinite	8	1.6	1.8
						Resinite	4	0.8	0.9
						Liptodetrinite	0	0.0	0.0
Liptinite	43.0	49.3		43.0	49.3	Alginite	0	0.0	0.0
						Suberinite	161	31.4	36.1
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	11	2.1	2.5
			Telo-inertinite	2.7	3.2	Semifusinite	3	0.6	0.7
Inertinite	3.1	3.6				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.4	0.4	Inertodetrinite	2	0.4	0.4
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	13.1	n/a		13.1	n/a		67	13.1	n/a
Total	100.1	100.0		100.1	100.0		513	100.1	100.0

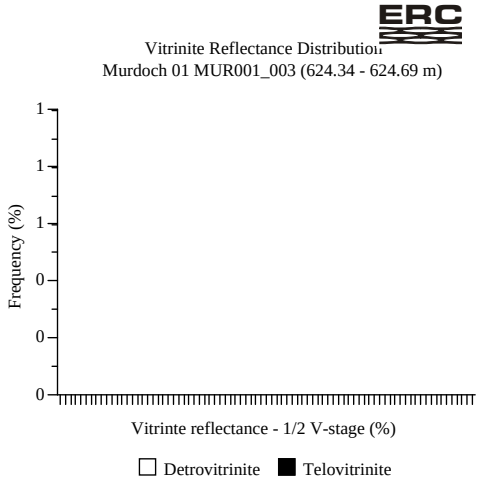
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Rare coarse calcite grains
Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_004 (624.74 - 625.24 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	33.9	54.0	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	174	33.9	54.0
Vitrinite	40.7	64.8				Attrinite	0	0.0	0.0
			Detrovitrinite	4.1	6.5	Densinite	0	0.0	0.0
						Desmocollinite	21	4.1	6.5
						Corpogelinite	14	2.7	4.3
			Gelovitrinite	2.7	4.3	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	25	4.9	7.8
						Cutinite	4	0.8	1.2
						Resinite	2	0.4	0.6
						Liptodetrinite	0	0.0	0.0
Liptinite	17.6	27.9		17.6	27.9	Alginite	0	0.0	0.0
						Suberinite	59	11.5	18.3
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	4	0.8	1.2
			Telo-inertinite	3.1	4.9	Semifusinite	12	2.3	3.7
Inertinite	4.5	7.1				Sclerotinite	0	0.0	0.0
			Detro-inertinite	1.4	2.2	Inertodetrinite	7	1.4	2.2
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	37.4	n/a		37.4	n/a		192	37.4	n/a
Total	100.2	99.8		100.2	99.8		514	100.2	99.8

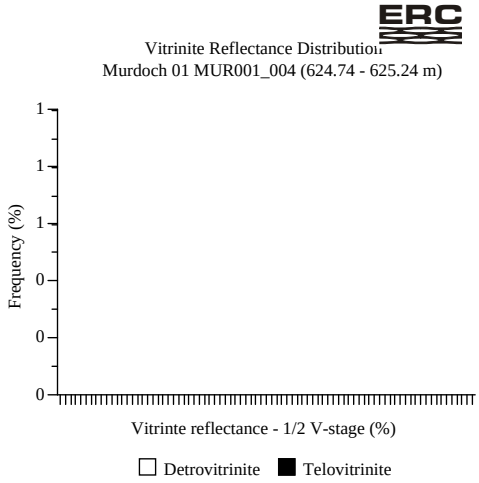
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare iron oxides minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_005 (639.49 - 640.20 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	17.5	43.0	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	89	17.5	43.0
Vitrinite	20.7	50.7				Attrinite	0	0.0	0.0
			Detrovitrinite	2.2	5.3	Densinite	0	0.0	0.0
						Desmocollinite	11	2.2	5.3
						Corpogelinite	5	1.0	2.4
			Gelovitrinite	1.0	2.4	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	31	6.1	15.0
						Cutinite	0	0.0	0.0
						Resinite	3	0.6	1.4
						Liptodetrinite	0	0.0	0.0
Liptinite	16.1	39.6		16.1	39.6	Alginite	0	0.0	0.0
						Suberinite	48	9.4	23.2
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	9	1.8	4.3
			Telo-inertinite	2.6	6.2	Semifusinite	4	0.8	1.9
Inertinite	4.0	9.6				Sclerotinite	0	0.0	0.0
			Detro-inertinite	1.4	3.4	Inertodetrinite	7	1.4	3.4
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	59.3	n/a		59.3	n/a		301	59.3	n/a
Total	100.1	99.9		100.1	99.9		508	100.1	99.9

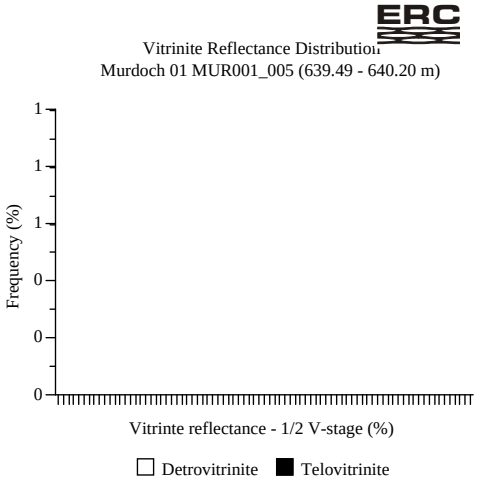
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare carbonates in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_006 (640.20 - 641.01 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	23.4	33.5	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	119	23.4	33.5
Vitrinite	27.2	38.9				Attrinite	0	0.0	0.0
			Detrovitrinite	2.4	3.4	Densinite	0	0.0	0.0
						Desmocollinite	12	2.4	3.4
						Corpogelinite	7	1.4	2.0
			Gelovitrinite	1.4	2.0	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	42	8.3	11.8
						Cutinite	3	0.6	0.8
						Resinite	2	0.4	0.6
						Liptodetrinite	0	0.0	0.0
Liptinite	39.2	56.0		39.2	56.0	Alginite	0	0.0	0.0
						Suberinite	152	29.9	42.8
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	1.4	2.0	Semifusinite	7	1.4	2.0
Inertinite	3.6	5.1				Sclerotinite	0	0.0	0.0
			Detro-inertinite	2.2	3.1	Inertodetrinite	11	2.2	3.1
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	30.1	n/a		30.1	n/a		153	30.1	n/a
Total	100.1	100.0		100.1	100.0		508	100.1	100.0

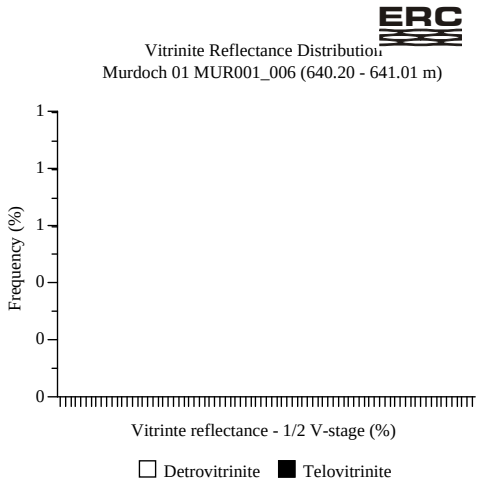
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Common coarse carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_007 (642.75 - 643.35 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	11.4	43.0	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	58	11.4	43.0
Vitrinite	12.6	47.4				Attrinite	0	0.0	0.0
			Detrovitrinite	0.6	2.2	Densinite	0	0.0	0.0
						Desmocollinite	3	0.6	2.2
						Corpogelinite	3	0.6	2.2
			Gelovitrinite	0.6	2.2	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	5	1.0	3.7
						Cutinite	1	0.2	0.7
						Resinite	2	0.4	1.5
						Liptodetrinite	0	0.0	0.0
Liptinite	13.4	50.3		13.4	50.3	Alginite	0	0.0	0.0
						Suberinite	60	11.8	44.4
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.4	1.5	Semifusinite	2	0.4	1.5
Inertinite	0.6	2.2				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.2	0.7	Inertodetrinite	1	0.2	0.7
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	73.5	n/a		73.5	n/a		374	73.5	n/a
Total	100.1	99.9		100.1	99.9		509	100.1	99.9

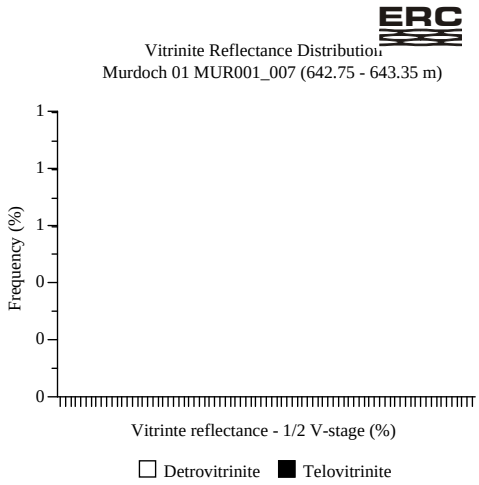
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Common coarse calcite grians



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_008 (643.58 - 644.12 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	36.3	43.8	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	196	36.3	43.8
Vitrinite	38.6	46.4				Attrinite	0	0.0	0.0
			Detrovitrinite	0.4	0.4	Densinite	0	0.0	0.0
						Desmocollinite	2	0.4	0.4
						Corpogelinite	10	1.9	2.2
			Gelovitrinite	1.9	2.2	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	40	7.4	8.9
						Cutinite	5	0.9	1.1
						Resinite	6	1.1	1.3
						Liptodetrinite	0	0.0	0.0
Liptinite	41.1	49.6		41.1	49.6	Alginite	0	0.0	0.0
						Suberinite	171	31.7	38.3
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	6	1.1	1.3
			Telo-inertinite	2.4	2.9	Semifusinite	7	1.3	1.6
Inertinite	3.1	3.8				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.7	0.9	Inertodetrinite	4	0.7	0.9
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	17.2	n/a		17.2	n/a		93	17.2	n/a
Total	100.0	99.8		100.0	99.8		540	100.0	99.8

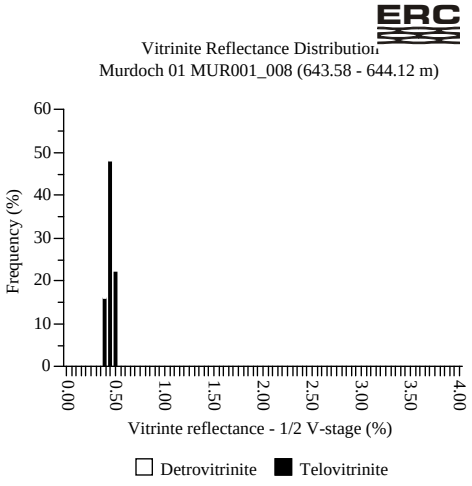
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite	0.47	0.42 - 0.52	43	0.025
Detrovitrinite	0.45	0.41 - 0.48	7	0.023
Total Vitrinite	0.47	0.41 - 0.52	50	0.026

Comments

Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_009 (682.84 - 683.14 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	63.6	68.0	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	327	63.6	68.0
Vitrinite	68.9	73.6				Attrinite	0	0.0	0.0
			Detrovitrinite	4.5	4.8	Densinite	0	0.0	0.0
						Desmocollinite	23	4.5	4.8
						Corpogelinite	4	0.8	0.8
			Gelovitrinite	0.8	0.8	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	31	6.0	6.4
						Cutinite	11	2.1	2.3
						Resinite	1	0.2	0.2
						Liptodetrinite	0	0.0	0.0
Liptinite	24.3	25.9		24.3	25.9	Alginite	0	0.0	0.0
						Suberinite	82	16.0	17.0
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	1	0.2	0.2
			Telo-inertinite	0.4	0.4	Semifusinite	1	0.2	0.2
Inertinite	0.4	0.4				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	6.4	n/a		6.4	n/a		33	6.4	n/a
Total	100.0	99.9		100.0	99.9		514	100.0	99.9

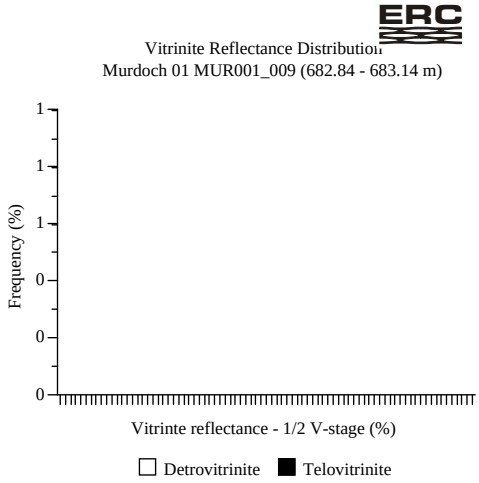
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare carbonate in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_010 (696.65 - 697.44 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	38.4	53.8	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	198	38.4	53.8
Vitrinite	45.0	63.1				Attrinite	0	0.0	0.0
			Detrovitrinite	3.7	5.2	Densinite	0	0.0	0.0
						Desmocollinite	19	3.7	5.2
						Corpogelinite	15	2.9	4.1
			Gelovitrinite	2.9	4.1	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	19	3.7	5.2
						Cutinite	5	1.0	1.4
						Resinite	7	1.4	1.9
						Liptodetrinite	0	0.0	0.0
Liptinite	26.1	36.5		26.1	36.5	Alginite	0	0.0	0.0
						Suberinite	103	20.0	28.0
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.4	0.5	Semifusinite	2	0.4	0.5
Inertinite	0.4	0.5				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	28.5	n/a		28.5	n/a		147	28.5	n/a
Total	100.0	100.1		100.0	100.1		515	100.0	100.1

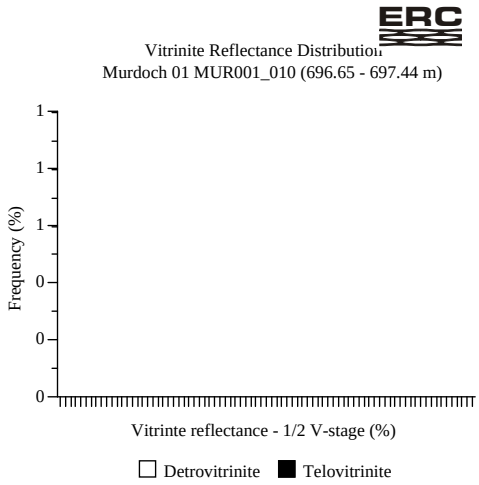
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare calcite in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_011 (708.34 - 709.06 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	37.7	43.4	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	195	37.7	43.4
Vitrinite	44.8	51.6				Attrinite	0	0.0	0.0
			Detrovitrinite	2.7	3.1	Densinite	0	0.0	0.0
						Desmocollinite	14	2.7	3.1
						Corpogelinite	23	4.4	5.1
			Gelovitrinite	4.4	5.1	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	32	6.2	7.1
						Cutinite	28	5.4	6.2
						Resinite	7	1.4	1.6
						Liptodetrinite	0	0.0	0.0
Liptinite	41.2	47.4		41.2	47.4	Alginite	0	0.0	0.0
						Suberinite	146	28.2	32.5
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	2	0.4	0.4
			Telo-inertinite	0.8	0.8	Semifusinite	2	0.4	0.4
Inertinite	0.8	0.8				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	13.2	n/a		13.2	n/a		68	13.2	n/a
Total	100.0	99.8		100.0	99.8		517	100.0	99.8

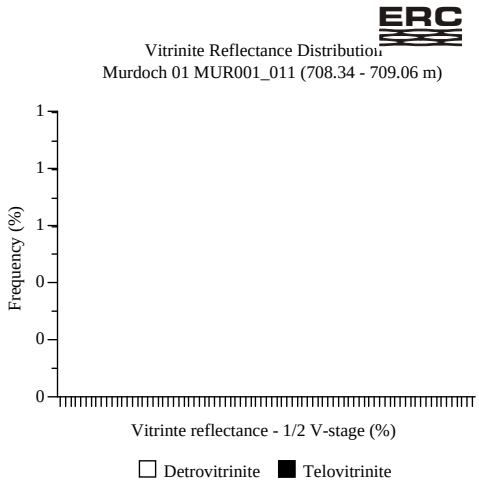
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare carbonates in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_012 (709.06 - 709.72 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	44.5	47.3	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	225	44.5	47.3
Vitrinite	57.7	61.3				Attrinite	0	0.0	0.0
			Detrovitrinite	4.7	5.0	Densinite	0	0.0	0.0
						Desmocollinite	24	4.7	5.0
						Corpogelinite	43	8.5	9.0
			Gelovitrinite	8.5	9.0	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	34	6.7	7.1
						Cutinite	16	3.2	3.4
						Resinite	6	1.2	1.3
						Liptodetrinite	0	0.0	0.0
Liptinite	36.2	38.5		36.2	38.5	Alginite	0	0.0	0.0
						Suberinite	127	25.1	26.7
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.0	0.0	Semifusinite	0	0.0	0.0
Inertinite	0.2	0.2				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.2	0.2	Inertodetrinite	1	0.2	0.2
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	5.9	n/a		5.9	n/a		30	5.9	n/a
Total	100.0	100.0		100.0	100.0		506	100.0	100.0

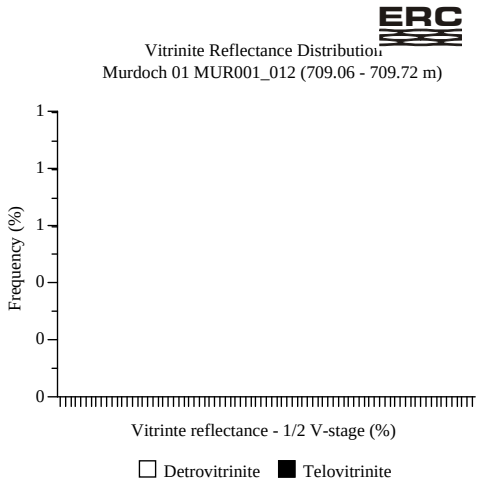
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare carbonates in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_013 (709.72 - 710.29 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	40.2	50.0	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	204	40.2	50.0
Vitrinite	46.3	57.6				Attrinite	0	0.0	0.0
			Detrovitrinite	2.6	3.2	Densinite	0	0.0	0.0
						Desmocollinite	13	2.6	3.2
						Corpogelinite	18	3.5	4.4
			Gelovitrinite	3.5	4.4	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	21	4.1	5.1
						Cutinite	9	1.8	2.2
						Resinite	7	1.4	1.7
						Liptodetrinite	0	0.0	0.0
Liptinite	33.7	41.8		33.7	41.8	Alginite	0	0.0	0.0
						Suberinite	134	26.4	32.8
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	2	0.4	0.5
			Telo-inertinite	0.4	0.5	Semifusinite	0	0.0	0.0
Inertinite	0.4	0.5				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	19.7	n/a		19.7	n/a		100	19.7	n/a
Total	100.1	99.9		100.1	99.9		508	100.1	99.9

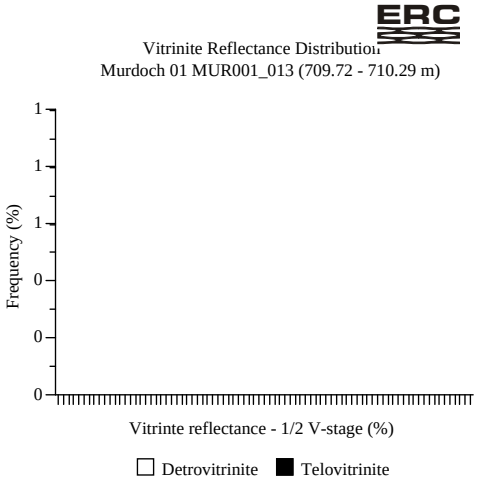
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals as cell infill
Rare carbonates in veins



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_014 (712.97 - 713.32 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	27.2	57.5	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	138	27.2	57.5
Vitrinite	32.0	67.5				Attrinite	0	0.0	0.0
			Detrovitrinite	2.0	4.2	Densinite	0	0.0	0.0
						Desmocollinite	10	2.0	4.2
						Corpogelinite	14	2.8	5.8
			Gelovitrinite	2.8	5.8	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	24	4.7	10.0
						Cutinite	10	2.0	4.2
						Resinite	3	0.6	1.3
						Liptodetrinite	0	0.0	0.0
Liptinite	14.8	31.3		14.8	31.3	Alginite	0	0.0	0.0
						Suberinite	38	7.5	15.8
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.4	0.8	Semifusinite	2	0.4	0.8
Inertinite	0.6	1.2				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.2	0.4	Inertodetrinite	1	0.2	0.4
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	52.8	n/a		52.8	n/a		268	52.8	n/a
Total	100.2	100.0		100.2	100.0		508	100.2	100.0

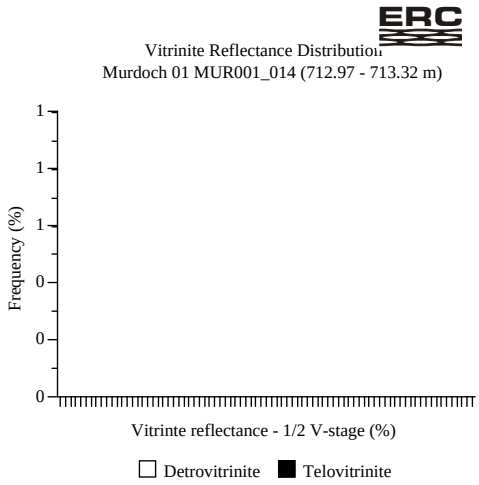
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals as cell infill



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_015 (744.66 - 744.98 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	24.8	54.2	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	129	24.8	54.2
Vitrinite	27.5	60.1				Attrinite	0	0.0	0.0
			Detrovitrinite	0.6	1.3	Densinite	0	0.0	0.0
						Desmocollinite	3	0.6	1.3
						Corpogelinite	11	2.1	4.6
			Gelovitrinite	2.1	4.6	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	24	4.6	10.1
						Cutinite	2	0.4	0.8
						Resinite	2	0.4	0.8
						Liptodetrinite	0	0.0	0.0
Liptinite	18.3	39.9		18.3	39.9	Alginite	0	0.0	0.0
						Suberinite	67	12.9	28.2
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.0	0.0	Semifusinite	0	0.0	0.0
Inertinite	0.0	0.0				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	54.2	n/a		54.2	n/a		282	54.2	n/a
Total	100.0	100.0		100.0	100.0		520	100.0	100.0

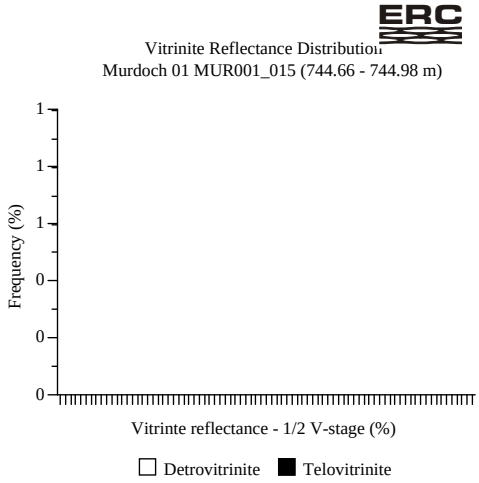
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_016 (777.81 - 778.15 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	27.7	76.8	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	142	27.7	76.8
Vitrinite	28.3	78.4				Attrinite	0	0.0	0.0
			Detrovitrinite	0.2	0.5	Densinite	0	0.0	0.0
						Desmocollinite	1	0.2	0.5
						Corpogelinite	2	0.4	1.1
			Gelovitrinite	0.4	1.1	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	21	4.1	11.4
						Cutinite	9	1.8	4.9
						Resinite	1	0.2	0.5
						Liptodetrinite	0	0.0	0.0
Liptinite	7.7	21.1		7.7	21.1	Alginite	0	0.0	0.0
						Suberinite	8	1.6	4.3
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.2	0.5	Semifusinite	1	0.2	0.5
Inertinite	0.2	0.5				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	63.9	n/a		63.9	n/a		327	63.9	n/a
Total	100.1	100.0		100.1	100.0		512	100.1	100.0

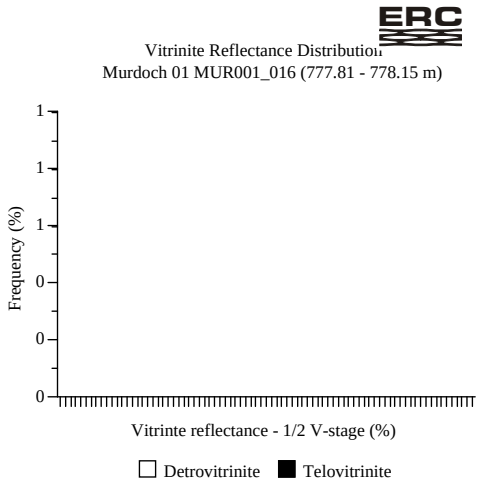
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_017 (782.06 - 782.86 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	8.5	17.3	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	47	8.5	17.3
Vitrinite	14.5	29.4				Attrinite	0	0.0	0.0
			Detrovitrinite	1.6	3.3	Densinite	0	0.0	0.0
						Desmocollinite	9	1.6	3.3
						Corpogelinite	24	4.4	8.8
			Gelovitrinite	4.4	8.8	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	25	4.5	9.2
						Cutinite	5	0.9	1.8
						Resinite	4	0.7	1.5
						Liptodetrinite	0	0.0	0.0
Liptinite	34.6	70.2		34.6	70.2	Alginite	0	0.0	0.0
						Suberinite	157	28.5	57.7
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.0	0.0	Semifusinite	0	0.0	0.0
Inertinite	0.2	0.4				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.2	0.4	Inertodetrinite	1	0.2	0.4
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	50.5	n/a		50.5	n/a		278	50.5	n/a
Total	99.8	100.0		99.8	100.0		550	99.8	100.0

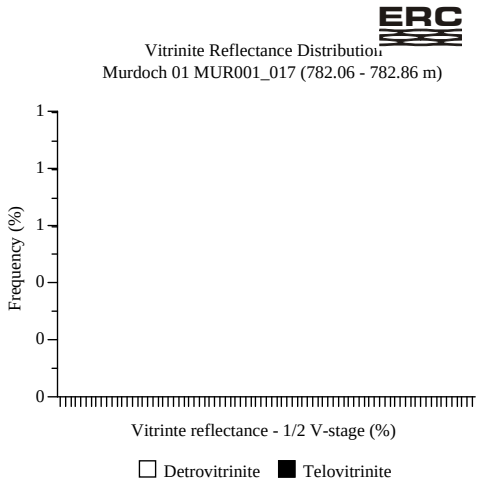
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_018 (787.90 - 788.54 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	10.8	23.0	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	54	10.8	23.0
Vitrinite	16.4	34.9				Attrinite	0	0.0	0.0
			Detrovitrinite	1.4	3.0	Densinite	0	0.0	0.0
						Desmocollinite	7	1.4	3.0
						Corpogelinite	21	4.2	8.9
			Gelovitrinite	4.2	8.9	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	39	7.8	16.6
						Cutinite	6	1.2	2.6
						Resinite	6	1.2	2.6
						Liptodetrinite	0	0.0	0.0
Liptinite	30.5	65.2		30.5	65.2	Alginite	0	0.0	0.0
						Suberinite	102	20.3	43.4
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.0	0.0	Semifusinite	0	0.0	0.0
Inertinite	0.0	0.0				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.0	0.0	Inertodetrinite	0	0.0	0.0
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	53.2	n/a		53.2	n/a		267	53.2	n/a
Total	100.1	100.1		100.1	100.1		502	100.1	100.1

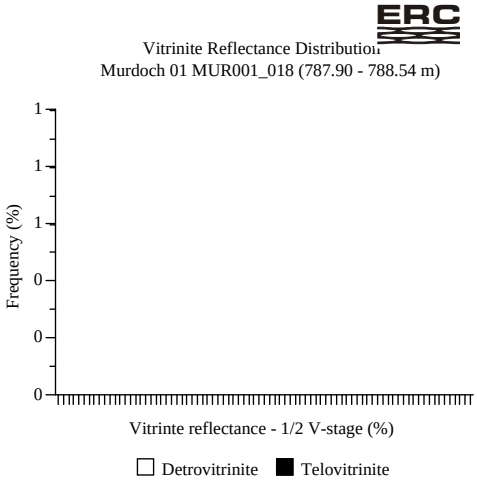
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare coarse calcite grains
Common calcareous fossil fragments



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_019 (803.37 - 803.67 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	15.1	50.3	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	76	15.1	50.3
Vitrinite	18.7	62.3				Attrinite	0	0.0	0.0
			Detrovitrinite	1.8	6.0	Densinite	0	0.0	0.0
						Desmocollinite	9	1.8	6.0
						Corpogelinite	9	1.8	6.0
			Gelovitrinite	1.8	6.0	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	14	2.8	9.3
						Cutinite	2	0.4	1.3
						Resinite	1	0.2	0.7
						Liptodetrinite	0	0.0	0.0
Liptinite	9.8	32.5		9.8	32.5	Alginite	0	0.0	0.0
						Suberinite	32	6.4	21.2
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.0	0.0	Semifusinite	0	0.0	0.0
Inertinite	1.6	5.3				Sclerotinite	0	0.0	0.0
			Detro-inertinite	1.6	5.3	Inertodetrinite	8	1.6	5.3
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	69.9	n/a		69.9	n/a		351	69.9	n/a
Total	100.0	100.1		100.0	100.1		502	100.0	100.1

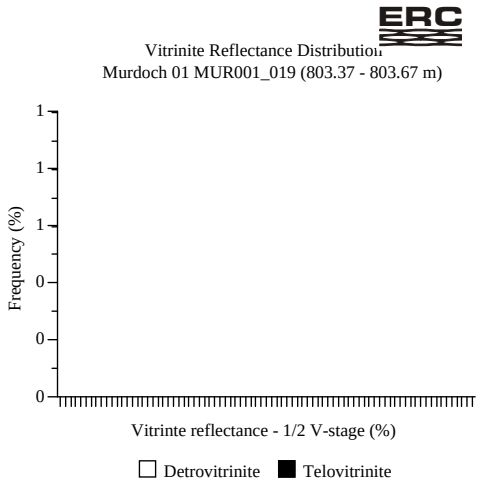
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare carbonate as cleat infill



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_020 (807.29 - 808.09 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	24.8	38.8	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	128	24.8	38.8
Vitrinite	31.6	49.4				Attrinite	0	0.0	0.0
			Detrovitrinite	4.1	6.4	Densinite	0	0.0	0.0
						Desmocollinite	21	4.1	6.4
						Corpogelinite	14	2.7	4.2
			Gelovitrinite	2.7	4.2	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	20	3.9	6.1
						Cutinite	11	2.1	3.3
						Resinite	8	1.5	2.4
						Liptodetrinite	0	0.0	0.0
Liptinite	31.9	50.0		31.9	50.0	Alginite	0	0.0	0.0
						Suberinite	126	24.4	38.2
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.0	0.0	Semifusinite	0	0.0	0.0
Inertinite	0.4	0.6				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.4	0.6	Inertodetrinite	2	0.4	0.6
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	36.2	n/a		36.2	n/a		187	36.2	n/a
Total	100.1	100.0		100.1	100.0		517	100.1	100.0

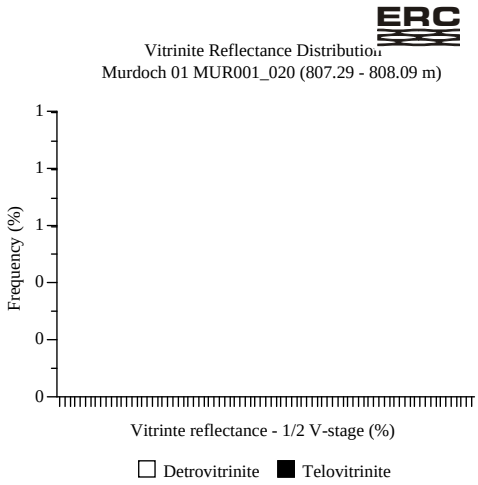
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

PETROGRAPHIC ANALYSIS

Client Queensland Gas Ltd
Sample Details Murdoch 01 MUR001_021 (808.09 - 808.79 m)
Date

Maceral Analysis

Maceral	Vol % (aa)	Vol % (mmf)	Maceral Subgroup	Vol % (aa)	Vol % (mmf)	Maceral	No.	Vol % (aa)	Vol % (mmf)
						Textinite	0	0.0	0.0
			Telovitrinite	30.9	41.6	Texto-ulminite	0	0.0	0.0
						Eu-ulminite	0	0.0	0.0
						Telocollinite	163	30.9	41.6
Vitrinite	35.2	47.4				Attrinite	0	0.0	0.0
			Detrovitrinite	1.1	1.5	Densinite	0	0.0	0.0
						Desmocollinite	6	1.1	1.5
						Corpogelinite	17	3.2	4.3
			Gelovitrinite	3.2	4.3	Porigelinite	0	0.0	0.0
						Eugelinite	0	0.0	0.0
						Sporinite	19	3.6	4.8
						Cutinite	8	1.5	2.0
						Resinite	1	0.2	0.3
						Liptodetrinite	0	0.0	0.0
Liptinite	37.9	51.0		37.9	51.0	Alginite	0	0.0	0.0
						Suberinite	172	32.6	43.9
						Fluorinite	0	0.0	0.0
						Exsudatinite	0	0.0	0.0
						Bituminite	0	0.0	0.0
						Fusinite	0	0.0	0.0
			Telo-inertinite	0.6	0.8	Semifusinite	3	0.6	0.8
Inertinite	1.2	1.6				Sclerotinite	0	0.0	0.0
			Detro-inertinite	0.6	0.8	Inertodetrinite	3	0.6	0.8
						Micrinite	0	0.0	0.0
			Gelo-inertinite	0.0	0.0	Macrinite	0	0.0	0.0
Minerals	25.8	n/a		25.8	n/a		136	25.8	n/a
Total	100.1	100.0		100.1	100.0		528	100.1	100.0

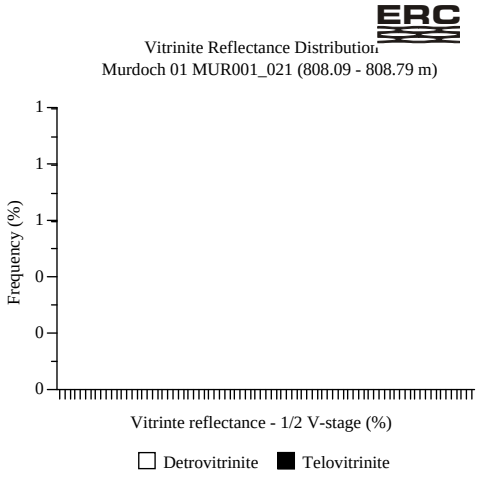
Vitrinite Reflectance

Analysis date
Mean maximum reflectance measured in oil

	Ro max	Range	n	std.dev.
Telovitrinite				
Detrovitrinite				
Total Vitrinite				

Comments

Carbonate minerals
Rare carbonate as cell infill
Rare iron oxides



Determined in accordance with Australian Standards AS 2856.1 (2000); AS 2856.2 (1998); AS 2586.3 (2000)
Conducted by ICCP accredited analyst

Dr Peter Crosdale (MAIG)
Director, ERC
24th November, 2013