

Borehole No. **FINGAL41B**

# Engineering Log - Cored Borehole

Sheet 1 of 19  
Project No: **MINENTWN00134AA**

Client: **Pure Energy Resources**

Date started: **14.6.2007**

Principal:

Date completed: **30.6.2007**

Project: **Fingal Valley Coal Seam Gas Drilling**

Logged by: **NW**

Borehole Location:

Checked by: **DA**

drill model & mounting:		Easting: 588949		slope: -90°		R.L. Surface:							
hole diameter: mm		Drilling fluid:		Northing: 5386618		bearing: datum:							
drilling information		material substance				rock mass defects							
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	RQD %	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH				30 100 300 1000 3000	type, inclination to core axis, planarity, roughness, coating, thickness
Continued from non-cored borehole													
				180		DOLERITE: Grey, fine-grained, hard							
				182									
				184									
				186									
				188									
				190									
				192									
				194		Subvertical healed fracture with calcite (1 mm thick)							
method		core-lift		water		weathering		defect type		roughness			
DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core		casing used barrel withdrawn graphic log/core recovery core recovered - graphic symbols indicate material no core recovered		10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown		FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) strength VL very low L low M medium H high VH very high EH extremely high		JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam planarity PL planar CU curved UN undulating ST stepped IR irregular		VR very rough RO rough SO smooth SL slickensided coating CN clean SN stained VN veneer CO coating			

Borehole No. **FINGAL41B**

Sheet 2 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**




## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:		Easting: 588949		slope: -90°		R.L. Surface:										
hole diameter: mm		Drilling fluid:		Northing: 5386618		bearing: datum:										
drilling information		material substance				rock mass defects										
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description  type, inclination to core axis, planarity, roughness, coating, thickness
								VL	L	M	H	VH				
				196		DOLERITE: Grey, fine-grained, hard ( <i>continued</i> )										
				198												
				200												
				202												
				204		Healed fracture at 80 degrees to core axis (1 mm thick)										
				206												
				208												
<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core		<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered  - graphic symbols indicate material  no core recovered		<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown		<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high		<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating								

Borehole No. **FINGAL41B**

# Engineering Log - Cored Borehole

Sheet 3 of 19  
Project No: **MINENTWN00134AA**

Client: **Pure Energy Resources**

Date started: **14.6.2007**

Principal:




















Date completed: **30.6.2007**

Project: ***Fingal Valley Coal Seam Gas Drilling***

Logged by: **NW**

Borehole Location:

Checked by: **DA**

drill model & mounting:					Easting: 588949		slope: -90°		R.L. Surface:							
hole diameter:		mm		Drilling fluid:		Northing: 5386618		bearing:		datum:						
drilling information					material substance					rock mass defects						
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					Is <sub>(50)</sub> MPa D- diam- etral A- axial	defect spacing mm	defect description	
								VL	L	M	H	VH			EH	RQD %
				210		DOLERITE: Grey, fine-grained, hard (continued)										
				212		Greenish grey with drill induced fractures perpendicular to core axis										
				214												
				216		Subvertical healed fracture (~80 degrees)										
				218												
				220												
				222												
				224												
method DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core				core-lift  casing used  barrel withdrawn  graphic log/core recovery  core recovered  - graphic symbols  indicate material  no core recovered		water  10/1/98 water level on date shown   water inflow  partial drill fluid loss  complete drill fluid loss   water pressure test result (lugeons) for depth interval shown		weathering FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW)  strength VL very low L low M medium H high VH very high EH extremely high				defect type JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam  planarity PL planar CU curved UN undulating ST stepped IR irregular  roughness VR very rough RO rough SO smooth SL slickensided  coating CN clean SN stained VN veneer CO coating				

# Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

Borehole No. **FINGAL41B**

Sheet 4 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**










Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:  
hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	RQD %	defect spacing mm	defect description	
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH					type, inclination to core axis, planarity, roughness, coating, thickness	
													particular	general
				226		DOLERITE: Grey, fine-grained, hard ( <i>continued</i> )								
						Very fine grained; brittle; green (Irregular basal contact – intrusive? - no apparent bake zone in sandstone)								
				228		SANDSTONE; Medium grained lithic sandstone; light grey to creamy white; muddy bands throughout at 0 – 20 degrees; moderate to poor sorting - sparse mud pellets with silty mix throughout, irregular bedding throughout								
				230		Medium grained well sorted sand zone - Sharp basal contact								
				232		SILTSTONE; Fine creamy greenish grey; with thinly bedded minor sandstone interbeds Siltstone/Sandstone; Becoming sandy in parts. Sharp basal contact								
				234		SANDSTONE; Medium grained grey; moderately to well sorted; sharp basal contact MUDSTONE; Creamy grey/white; laminae with mottled/disturbed bedding(?) Badly broken, soft and clayey Fracture at 85 degrees; gradational basal contact								
						SANDSTONE/SILTSTONE (60:40); Light grey creamy white; thinly bedded and interbedded; very gradational contact; increasing sand								
				236		SANDSTONE; White creamy; fine to medium grained with moderate sorting, thin bedded; bedding at 0 – 5 degrees; sharp erosional basal contact MUDSTONE/SILTSTONE: Light greyish green to white (?); fining upwards Irregular fracture at 88 degrees and 10 degrees; gradual basal contact								
				238		SANDSTONE; Very fine grained; greenish grey with light tan bedding @ 0 degrees; well sorted, minor siltstone bands throughout  Thin band of greenish siltstone Thin band of tan siltstone with rusty brown sandstone								

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered - graphic symbols indicate material  no core recovered	<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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Borehole No. **FINGAL41B**

Sheet 5 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole








Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:				Easting: 588949		slope: -90°		R.L. Surface:				
hole diameter: mm				Drilling fluid:		Northing: 5386618		bearing: datum:				
drilling information				material substance				rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH			RQD %	particular
				240		SANDSTONE; Very fine grained; greenish grey with light tan bedding @ 0 degrees; well sorted, minor siltstone bands throughout ( <i>continued</i> )						
						Fine-grained; reddish brown; thinly bedded at 0 degrees to core axis; gradational basal contact as part of fining upwards package						
				242		SANDSTONE; Medium grained lithic sandstone, brown to rusty brown with thin band of very fine grey sandstone or siltstone (widely spaced - > 0.4 m); bedding at 0 - 8 degrees; no fractures or breaks in core						
						Reddish brown colour fading to grey at 246						
						Minor black specks in sand						
				244								
				246		Bedding thin at 5 to 10 degrees						
				248		Irregular fracture at 60 to 80 degrees TCA						
						Irregular shaped brown mud pellets ( < 1 cm dia. ) in grey sand with bedding at 0 - 5 degrees						
				250		SANDSTONE; Grey and green bands of medium grained sandstone with small subround mud pellets; muddy throughout; soft rock (easily scratched with chisel); bedding at 15 degrees; sharp basal contact						
				252		SANDSTONE; Fine-medium grained in fining upwards package; moderate sorting; grey with beds at 0 - 5 degrees;						
						Large 1-2 cm mud pellet in sand mud pellets - elliptical						
						Medium-grained grey sandstone beds at 5 degrees						
				254		SANDSTONE; Medium-grained with abundant carbonaceous debris/grains and sparse medium pellets throughout; grey to dark grey						
						Subangular pellets 1-3 cm						
						Mud pellets and carbonaceous throughout						

method		core-lift		water		weathering		defect type		roughness	
DT	diatube		casing used		10/1/98 water level on date shown	FR	fresh	JT	joint	VR	very rough
AS	auger screwing		barrel withdrawn		water inflow	SW	slightly weathered	PT	parting	RO	rough
AD	auger drilling				partial drill fluid loss	MW	moderately weathered	SM	seam	SO	smooth
RR	roller/tricone				complete drill fluid loss	HW	highly weathered	SZ	sheared zone	SL	slickensided
CB	claw or blade bit					XW	extremely weathered	SS	sheared surface		
NMLC	NMLC core					DW	distinctly weathered (covers MW and HW)	CS	crushed seam		
NQ, HQ, PQ	wireline core										
		graphic log/core recovery				strength		planarity		coating	
						VL		PL		CN	
		- graphic symbols				L		CU		SN	
		indicate material				M		UN		VN	
						H		ST		CO	
						VH		IR			
		no core recovered				EH					
						water pressure test result (lugeons) for depth interval shown					

Borehole No. **FINGAL41B**

# Engineering Log - Cored Borehole

Sheet 6 of 19  
Project No: **MINENTWN00134AA**

Client: **Pure Energy Resources**

Date started: **14.6.2007**

Principal:

Date completed: **30.6.2007**

Project: **Fingal Valley Coal Seam Gas Drilling**











Logged by: **NW**

Borehole Location:

Checked by: **DA**

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:  
hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	RQD %	defect spacing mm	defect description	
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH					type, inclination to core axis, planarity, roughness, coating, thickness	
													particular	general
				256		SANDSTONE; Medium-grained with abundant carbonaceous debris/grains and sparse medium pellets throughout; grey to dark grey ( <i>continued</i> )								
						Bedding at 5 degrees								
						Abundant carbonaceous debris – darker grey to black in colour								
				258		Band with mud pellets and carbonaceous debris; gradational contact								
				260		SANDSTONE: With abundant carbonaceous debris and black muddy pellets; poor sorting; bedding at 5 degrees; Coal band cleated and bright								
						Carbonaceous Mudstone band and bedding at 10 degrees								
						Black and grey; medium grained bedding at 0 degrees								
				262										
				264		Abundant carbonaceous mudstone debris								
						CARBONACEOUS MUDSTONE: Black thinly bedded; less dense than above sand								
						SANDSTONE: Dark grey to black; medium grained Abundant carbonaceous material; bedding at 5 – 10 degrees								
				266										
						Irregular shaped mud pellets in sand mixture								
				268		3 thin (<2 mm thick) bright coal bands								
						Carbonaceous Mudstone pellets irregular bedding at 5 degrees								
						Carbonaceous Mudstone band; dark black; sandy throughout								
						Thin bright coal band; gradational contact								

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered  - graphic symbols indicate material  no core recovered	<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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Borehole No. **FINGAL41B**

Sheet 7 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**











## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:		Easting: 588949		slope: -90°		R.L. Surface:										
hole diameter: mm		Drilling fluid:		Northing: 5386618		bearing: datum:										
drilling information			material substance				rock mass defects									
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description  type, inclination to core axis, planarity, roughness, coating, thickness
								VL	L	M	H	VH				
				270		SANDSTONE: Grey; medium grained; thinly bedded; no fractures but sandstone is soft; dark grey ( <i>continued</i> )										
				272												
				274		Bedding at 15 degrees with white calcareous interbeds; soft rock										
				276												
				278		Thin carbonaceous mudstone laminae at 0 degrees; sharp basal contact										
						CARBONACEOUS MUDSTONE: Dark black; dense with plant debris on fresh fractures; gradational basal contact										
						SILTSTONE: Dark grey and silty; very fine laminae, gradational basal contact										
				280		COAL: Boney dull coal; dense and black CARBONACEOUS MUDSTONE: Dark black; dense with thin interbeds of siltstone and boney coal										
						COAL: Very dull coal; with bands in Carbonaceous Mudstone										
				282		CARBONACEOUS MUDSTONE: Dark black and dense COAL: Dark black with interbeds Carbonaceous Mudstone CARBONACEOUS MUDSTONE: Black laminae COAL/CARBONACEOUS MUDSTONE (60:40) MUDSTONE: Dark grey and carbonaceous at the top; laminae throughout										
				284												
<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core			<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered  - graphic symbols indicate material  no core recovered			<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown			<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high			<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating				

Borehole No. **FINGAL41B**

Sheet 8 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:

hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance							rock mass defects													
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					Is <sub>(50)</sub> MPa  D- diam- etral A- axial	RQD %	defect spacing mm					defect description  type, inclination to core axis, planarity, roughness, coating, thickness					
								VL	L	M	H	VH	EH		30	100	300	1000	3000	particular	general				
						CARBONACEOUS MUDSTONE: Dark black, dense and fissile; friable, badly broken throughout (continued) COAL/CARBONACEOUS MUDSTONE (50:50)																			
				286		CARBONACEOUS MUDSTONE: Dark grey to black VOLCANIC TUFF: Creamy tan; sharp basal contact CARBONACEOUS MUDSTONE: red mineralisation on fracture COAL: Thin coaly laminae in carbonaceous mudstone CARBONACEOUS MUDSTONE: Dark black, dense; grading to mudstone at base SILTSTONE: Dark grey; thin laminae; sharp basal contact CARBONACEOUS MUDSTONE: Dark black; dense COAL/CARBONACEOUS MUDSTONE (50:50)																			
				288		CARBONACEOUS MUDSTONE/COAL (70:30): Dark black with thin (mm thick) coal bands; gradational contact SANDSTONE: Very fine grained; thinly bedded; carbonaceous beds throughout Sandstone: Small scale cross bedding; dark grey with dark black Carbonaceous Mudstone and Siltstone beds throughout																			
				290		Thin siltstone bands																			
				292																					
				294																					
				296		SANDSTONE/SILTSTONE (60:40): Thinly interbedded grey sands with darker greyish brown carbonaceous siltstone beds throughout																			
				298		SANDSTONE: Fine to medium grained well sorted sand; grey Thin carbonaceous wisps; sharp basal contact COAL: C4/C5; Dark black with bright bands; low density VOLCANIC TUFF: Dark brown tuff band COAL: C5 dark black coal; cleated with calcite on cleat VOLCANIC TUFF: Dark brown and dense COAL: Black; moderately bright coal at top (2 cm); dull CARBONACEOUS MUDSTONE/COAL: Black and denser SANDSTONE: Very fine sand; thinly bedded																			
<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core					<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered		<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown		<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high					<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular					<b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating						

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# Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Date started: **14.6.2007**

Principal:

Date completed: **30.6.2007**

Project: **Fingal Valley Coal Seam Gas Drilling**











Logged by: **NW**

Borehole Location:

Checked by: **DA**

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:  
hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description		
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH				type, inclination to core axis, planarity, roughness, coating, thickness	particular	general
				300		SANDSTONE: Fine grained; light brownish grey with abundant carbonaceous beds (dark black); (continued)								
						COAL: Dull dark black; cleated with kaolinite on cleat								
						CARBONACEOUS MUDSTONE: thinly laminated								
						CARBONACEOUS MUDSTONE: Dark black with thin interbeds (laminae) of mudstone or volcanic tuff								
				302		COAL: Dull coal C6(?); fracture with slickenside at 301.48 m								
						Dull coal: hard with abundant subvertical fractures filled with calcite; muddy but less dense								
						Dull coal and tuffaceous wisps and pellets(?)								
						Carbonaceous mudstone band								
						Dull coal; black with metallic sheen; rocky/muddy throughout with thin tuffaceous partings throughout								
				304										
				306		Volcanic tuff: creamy brown								
						Dull black and badly broken; irregular fractures; minor thin cleating								
						Carbonaceous mudstone/volcanic tuff: interbeds of dark black and creamy brown								
						VOLCANIC TUFF: Creamy brown, dense								
						CARBONACEOUS MUDSTONE: Dense, black, gradational basal contact								
				308		SILTSTONE: Dark grey, laminae; bedding at 0 degrees								
						SANDSTONE: Fine grained, light grey, well sorted								
				310		SANDSTONE: Grey, fine grained, well sorted, carbonaceous laminations throughout, silty in parts								
						SILTSTONE: Grey, slightly sandy in parts, laminated appearance								
						SANDSTONE: Grey, fine to medium grained, well sorted, laminated, very thin carbonaceous bands								
				312		SANDSTONE: Grey, medium to coarse grained, well sorted, carbonaceous parts at 311.6m with minor tuff, lithic fragments								
				314		SANDSTONE: Grey, fine grained with silty partings, laminated, minor carbonaceous bands throughout, well sorted								

method	core-lift	water	weathering	defect type	roughness
DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	 casing used  barrel withdrawn  <b>graphic log/core recovery</b>  core recovered  - graphic symbols indicate material  no core recovered	 10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss   water pressure test result (lugeons) for depth interval shown	FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW)  <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam  <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular	VR very rough RO rough SO smooth SL slickensided      <b>coating</b> CN clean SN stained VN veneer CO coating

Borehole No. **FINGAL41B**

Sheet 10 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:				Easting: 588949		slope: -90°		R.L. Surface:								
hole diameter: mm		Drilling fluid:		Northing: 5386618		bearing:		datum:								
drilling information				material substance				rock mass defects								
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description  type, inclination to core axis, planarity, roughness, coating, thickness
								VL	L	M	H	VH				
				316		SANDSTONE: Grey, medium to coarse grained, minor lithic and carbonaceous fragments, massive, well sorted <i>(continued)</i>										
						SANDSTONE: Grey, fine to coarse grained in parts, carbonaceous laminations at 315.8m										
						SANDSTONE: Light grey, medium grained, laminated in parts, lithic fragments, carbonaceous stringers at 316.4m and 316.65m										
						SILTSTONE: Grey, well sorted, carbonaceous stringers on joint surfaces										
						SANDSTONE: Lightly grey, medium to coarse grained with sub-rounded clasts up to 10mm, thin carbonaceous bands, poorly to moderately sorted										
				318		SANDSTONE: Grey, medium grained, laminated in parts, well sorted, carbonaceous mudstone bands at 318.7m and 318.8m										
				320		SANDSTONE: Grey, fine to medium grained, well laminated, moderately to well sorted, lithic fragments										
				322		SANDSTONE: Grey, fine to medium grained, well sorted, carbonaceous laminations from 320.8-320.9m, 321.2m, 322.5-322.8m										
				324		SANDSTONE: Grey, medium grained, abundant sub-rounded clasts to 10mm, poorly sorted, carbonaceous stringers throughout										
						SANDSTONE: Grey, fine to medium grained, minor carbonaceous coaly stringers, well sorted, rare sub-rounded clasts, minor laminations										
						SANDSTONE: Grey, fine to medium grained with abundant rounded clasts to 10mm, poorly sorted										
				326		SANDSTONE: Light to medium grey, laminated in parts, occasional rounded clasts, coaly stringers from 325.3-325.8m, becoming slightly silty in parts										
						VOLCANIC TUFF: Light brown grey to cream, soft, strongly foliated										
						CARBONACEOUS MUDSTONE: with thin interbeds of Volcanic Tuff										
				328		CARBONACEOUS MUDSTONE: Dark brown grey to black in parts, slightly tuffaceous, highly carbonaceous										
						VOLCANIC TUFF: Light brown grey to cream, soft, strongly foliated										
						COAL: C SEAM: Black, slightly tuffaceous in parts, slight to moderate cleating, vertical fracture, mostly dull, Sample 5										
						CARBONACEOUS MUDSTONE: with thin interbeds of Volcanic Tuff										

method		core-lift		water		weathering		defect type		roughness	
DT	diatube		casing used		10/1/98 water level on date shown	FR	fresh	JT	joint	VR	very rough
AS	auger screwing		barrel withdrawn		water inflow	SW	slightly weathered	PT	parting	RO	rough
AD	auger drilling				partial drill fluid loss	MW	moderately weathered	SM	seam	SO	smooth
RR	roller/tricone				complete drill fluid loss	HW	highly weathered	SZ	sheared zone	SL	slickensided
CB	claw or blade bit					XW	extremely weathered	SS	sheared surface		
NMLC	NMLC core					DW	distinctly weathered (covers MW and HW)	CS	crushed seam		
NQ, HQ, PQ	wireline core										

graphic log/core recovery		strength		planarity		coating	
	core recovered	VL	very low	PL	planar	CN	clean
	- graphic symbols	L	low	CU	curved	SN	stained
	indicate material	M	medium	UN	undulating	VN	vener
	no core recovered	H	high	ST	stepped	CO	coating
		VH	very high	IR	irregular		
		EH	extremely high				

Borehole No. **FINGAL41B**

Sheet 11 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:

hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	defect spacing mm	defect description		
						rock type; grain characteristics, colour, structure, minor components						type, inclination to core axis, planarity, roughness, coating, thickness		
												particular	general	
				330		COAL: C SEAM: Black, slightly tuffaceous in parts, minor cleating with some jointing, dull, Sample 6								
						VOLCANIC TUFF: Light brown grey to cream, soft, moderately foliated								
						CARBONACEOUS MUDSTONE: Dark brown grey to black in parts, moderately tuffaceous throughout, highly carbonaceous								
				332		MUDSTONE: Light grey, massive, well sorted, minor carbonaceous partings, some tuff throughout								
						SILTSTONE: Light grey, massive, minor carbonaceous debris on fresh fractures, minor very fine sand throughout								
				334		CARBONACEOUS MUDSTONE: Dark black with thin interbeds/laminae of Siltstone; gradational basal contact; increasing Siltstone								
						SILTSTONE: Grey, badly broken; - Note: lost core run out of inter tube and had to re-core section, therefore, badly broken throughout								
						SANDSTONE: Grey and fine grained; badly broken								
				336		MUDSTONE: Grey, massive; sharp basal contact								
						SANDSTONE: Greenish grey, fine to medium grained with fining upwards packages 0.5-0.75 m thick, bedding at 0 degrees, 337.6-337.8 Medium grained; 337.8-338.2 Very fine grained sand; 340.2 - 340.3 Fine grained with coaly wisps and debris; gradational basal								
				338										
						SANDSTONE: Fine to medium grained, grey, poor to moderate sorting; 341.3-342.0 coaly debris and laminae interbeds; bedding at 0 to 5 degrees and finer sand; gradational basal contact								
				340										
						SANDSTONE: Grey, Medium grained, well sorted; bedding at 0 - 10 degrees, cross bedded; 343.4 - 343.5 minor carbonaceous laminae; sharp irregular basal contact at 20 degrees								
				342										
				344										

method	core-lift	water	weathering	defect type	roughness
DT diatube	casing used	10/1/98 water level on date shown	FR fresh	JT joint	VR very rough
AS auger screwing	barrel withdrawn	water inflow	SW slightly weathered	PT parting	RO rough
AD auger drilling		partial drill fluid loss	MW moderately weathered	SM seam	SO smooth
RR roller/tricone		complete drill fluid loss	HW highly weathered	SZ sheared zone	SL slickensided
CB claw or blade bit			XW extremely weathered	SS sheared surface	
NMLC NMLC core			DW distinctly weathered (covers MW and HW)	CS crushed seam	
NQ, HQ, PQ wireline core					
	graphic log/core recovery		strength	planarity	coating
	core recovered	water pressure test result (lugeons) for depth interval shown	VL very low	PL planar	CN clean
	- graphic symbols indicate material		L low	CU curved	SN stained
	no core recovered		M medium	UN undulating	VN veneer
			H high	ST stepped	CO coating
			VH very high	IR irregular	
			EH extremely high		

# Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

Borehole No. **FINGAL41B**

Sheet 12 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**











Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:  
hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description		
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH				type, inclination to core axis, planarity, roughness, coating, thickness	particular	general
				346		SANDSTONE: Grey, Medium grained, well sorted; bedding at 0 – 10 degrees, cross bedded; 343.4 – 343.5 minor carbonaceous laminae; sharp irregular basal contact at 20 degrees ( <i>continued</i> )								
				348		MUDSTONE: Black to brownish grey; badly broken with slickensides(?) on some surfaces; carbonaceous on top; sharp basal contact SANDSTONE: Med to coarse grained; moderate to poor sorting with abundant carbonaceous grains and flecks and debris throughout; transitional base Abundant carbonaceous wisps, coaly fragments and bands, and irregular shaped siltstone pellets.  Carbonaceous pellets on bedding at 0 degrees to core axis  Coarse grained at base w/ fine to medium grained bands; larger mud pellets in coarse sand matrix at base								
				350		SANDSTONE: Fine to medium grained; moderate sorting; gradational contact  SANDSTONE: Medium to coarse grained; poor sorting; abundant coaly debris, wisps and mud pellets; mud pellets at base (1-2 cm) and elliptical in shape; transition to less debris at base  SANDSTONE: Fine to medium grained; abundant mudstone pellets in matrix (1 – 3 cm dia and elliptical); high density of mud clasts at base; sharp basal contact								
				352		Fracture at 70 degrees to core axis (TCA) Thin coaly laminae with calcite bedded at 0 degrees								
				354		Fracture at 50 degrees with slicken sides in mud pellet COAL: Dull and black, moderately dense VOLCANIC TUFF: brown and muddy CARBONACEOUS MUDSTONE: Dense and black COAL: Dull with moderately bright band at 354.16 – 354.19 m, bedded with some cleat development; kaolinite on subvertical fractures and cleated planes SILTSTONE: Medium grey with very fine sand interbeds and minor carbonaceous laminae; sharp basal contact Fracture at 50 degrees w. undulose slickensides								
				356		COAL: Dull; black and moderately dense, carbonaceous VOLCANIC TUFF: Brown, fissile; irregular basal contact COAL: Dull black, minor cleat development CARBONACEOUS MUDSTONE: Black to brown; fissile and moderately dense COAL: Black, badly broken on irregular fractures and cleat planes; moderately bright (C4/C5?); minor carbonaceous fissile layers near base; kaolinite on fracture and cleat planes CORE LOSS: 256.3 - 256.6 Driller change over and potential loss in coal? SANDSTONE: Grey, very fine sand, sharp basal contact Thin band of carbonaceous mudstone Badly broken (Drill induced?) MUDSTONE: Grey, massive with minor clayey bands; Muddy and carbonaceous at base and badly broken SILTSTONE: Grey and massive with bedding at 0 degrees; gradational basal contact Fractures at 80 – 90 degrees to core axis								
				358										

method	core-lift	water	weathering	defect type	roughness
DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	 casing used  barrel withdrawn  <b>graphic log/core recovery</b>  core recovered  indicate material  no core recovered	 10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss   water pressure test result (lugeons) for depth interval shown	FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW)  <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam  <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular	VR very rough RO rough SO smooth SL slickensided  <b>coating</b> CN clean SN stained VN veneer CO coating

Borehole No. **FINGAL41B**

Sheet 13 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:				Easting: 588949		slope: -90°		R.L. Surface:					
hole diameter: mm				Drilling fluid:		Northing: 5386618		bearing: datum:					
drilling information				material substance				rock mass defects					
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	IS <sub>(50)</sub> MPa D- diam- A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description type, inclination to core axis, planarity, roughness, coating, thickness	
												particular	general
				360		SANDSTONE: Grey, very fine sand, well sorted, massive; silty interbeds and gradational basal contact							
				362		SILTSTONE: Grey, massive, sharp basal contact and carbonaceous at base							
				364		VOLCANIC TUFF: brown with calcite dendritic veins throughout; Fracture at upper contact with undulose slickensides at 40 degrees MUDSTONE: Grey with carbonaceous wisps; basal contact at 10 degrees COAL: Dull and dense/hard; with tuffaceous interbeds TUFF: Dark brown COAL: Dull and black, with very thin tuff interbeds (three 2 - 4 mm bands); kaolinite on fracture and cleat planes; sharp basal contact Subvertical fractures, minor cleat development Coal: black C6, bedded, no mineralisation Coal: broken on subvertical fractures and minor cleated surfaces MUDSTONE: Grey and massive Broken; subvertical fracture with slickensides and calcite							
				366		SANDSTONE: Very fine grained, bedding at 0 degrees, gradational basal contact with muddy interbeds MUDSTONE: Grey massive, laminae, bedding at 0 degrees; gradational basal contact							
				368		SILTSTONE: Grey with minor sand (very fine), muddy throughout; sharp basal contact							
				370		SANDSTONE: Fine to medium grained, grey, moderately to well sorted, bedding at 0 degrees; gradational basal contact to medium grained sand Carbonaceous laminae							
				372									
				374		SANDSTONE: Medium grained, moderate to well sorted, grey with carbonaceous grains and carbonaceous debris on fresh fractures throughout, massive; gradational basal contact							

method		core-lift		water		weathering		defect type		roughness	
DT	diatube		casing used		10/1/98 water level on date shown	FR	fresh	JT	joint	VR	very rough
AS	auger screwing		barrel withdrawn		water inflow	SW	slightly weathered	PT	parting	RO	rough
AD	auger drilling				partial drill fluid loss	MW	moderately weathered	SM	seam	SO	smooth
RR	roller/tricone				complete drill fluid loss	HW	highly weathered	SZ	sheared zone	SL	slickensided
CB	claw or blade bit					XW	extremely weathered	SS	sheared surface		
NMLC	NMLC core					DW	distinctly weathered (covers MW and HW)	CS	crushed seam		
NQ, HQ, PQ	wireline core										
		graphic log/core recovery				strength		planarity		coating	
						VL		PL		CN	
						L		CU		SN	
						M		UN		VN	
						H		ST		CO	
						VH		IR			
						EH					

Borehole No. **FINGAL41B**

Sheet 14 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:

hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description		
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH				type, inclination to core axis, planarity, roughness, coating, thickness	particular	general
				376		SANDSTONE: Medium grained, moderate to well sorted, grey with carbonaceous grains and carbonaceous debris on fresh fractures throughout, massive; gradational basal contact ( <i>continued</i> )								
						Abundant carbonaceous laminae, mud pellets and carb. mud pellets								
				378		CONGLOMERATE: Grey, mud pellets 1 – 10 cm in diameter (elliptical) in a medium grained sand matrix; bedding at 0 degrees								
						SANDSTONE: Grey with black carbonaceous grains throughout (salt and pepper)								
				380		Carbonaceous grains/pellets on bedding at 0°; thinly bedded								
						Irregular bedding with calcification								
						Thin siltstone								
						Siltstone horizon								
						CORE LOSS								
				382		SANDSTONE: Grey to dark grey, thinly bedded with interbeds of carbonaceous siltstone, bedding at 0 degrees								
						Muddy siltstone horizon with irregular fracturing								
						Bedding at 10 – 20 degrees irregular								
						Increasing carbonaceous material; bright flecks of coaly material on fresh fractures								
				384		CARBONACEOUS MUDSTONE: Black laminae; gradational basal contact with sandy interbeds								
						SILTSTONE: Grey with minor sand throughout; sharp erosional contact								
						SANDSTONE: Grey, fine to medium grained, well sorted; sharp and irregular basal contact								
				386		SANDSTONE: Grey, fine to very fine grained with minor carbonaceous wisps/beds at 0 degrees to core axis with small scale cross bedding in thin beds, sharp basal contact at 10 degrees								
						SANDSTONE: Grey, fine to medium grained with fine grained horizons; gradational bottom contact to medium sand								
						Finer grained with erosional contacts at top and bottom								
				388		Carbonaceous wisps; bedding at 15 degrees to core axis								

method	core-lift	water	weathering	defect type	roughness
DT diatube	casing used	10/1/98 water level on date shown	FR fresh	JT joint	VR very rough
AS auger screwing	barrel withdrawn	water inflow	SW slightly weathered	PT parting	RO rough
AD auger drilling		partial drill fluid loss	MW moderately weathered	SM seam	SO smooth
RR roller/tricone		complete drill fluid loss	HW highly weathered	SZ sheared zone	SL slickensided
CB claw or blade bit			XW extremely weathered	SS sheared surface	
NMLC NMLC core			DW distinctly weathered (covers MW and HW)	CS crushed seam	
NQ, HQ, PQ wireline core					
	graphic log/core recovery		strength	planarity	coating
	core recovered		VL very low	PL planar	CN clean
	- graphic symbols indicate material		L low	CU curved	SN stained
	no core recovered		M medium	UN undulating	VN veneer
		water pressure test result (lugeons) for depth interval shown	H high	ST stepped	CO coating
			VH very high	IR irregular	
			EH extremely high		

Borehole No. **FINGAL41B**

Sheet 15 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole




Client: **Pure Energy Resources**


Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:				Easting:	588949	slope:	-90°	R.L. Surface:				
hole diameter:				mm	Drilling fluid:	Northing:	5386618	bearing:				
drilling information				material substance				rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components						type, inclination to core axis, planarity, roughness, coating, thickness
				390		Thin light brown beds at 15 degrees SANDSTONE: Grey, fine to medium grained with fine grained horizons; gradational bottom contact to medium sand ( <i>continued</i> )						
						SANDSTONE: Medium grained; grey, massive						
				392								
				394								
				396								
				398		397.7 – 398.1 – sparse coaly debris and mud pellets						
						398.1 – gradational/transitional base to finer sand SANDSTONE: Grey, fine to medium grained, bedding at 10 degrees						
				400		SANDSTONE: Medium grained and medium grey; abundant carbonaceous debris/wisps/fragments throughout.						
				402		SANDSTONE: Fine to medium grained, bedding at 10 degrees; sparse carbonaceous debris at 401.6 m						
						402.1 – 402.3 – coaly wisps in sandstone matrix; bedding at 5 degrees at base; sharp basal contact						
				404		CONGLOMERATE: Greenish grey, medium grained sand; lenticular coaly fragments abundant at top; mud and tuff(?) pebbles (1-5 cm diameter) throughout						
						SANDSTONE: Medium grained; grey, massive; sharp basal contact						

method		core-lift		water		weathering		defect type		roughness	
DT	diatube		casing used		10/1/98 water level on date shown	FR	fresh	JT	joint	VR	very rough
AS	auger screwing		barrel withdrawn		water inflow	SW	slightly weathered	PT	parting	RO	rough
AD	auger drilling				partial drill fluid loss	MW	moderately weathered	SM	seam	SO	smooth
RR	roller/tricone				complete drill fluid loss	HW	highly weathered	SZ	sheared zone	SL	slickensided
CB	claw or blade bit					XW	extremely weathered	SS	sheared surface		
NMLC	NMLC core					DW	distinctly weathered (covers MW and HW)	CS	crushed seam		
NQ, HQ, PQ	wireline core										

graphic log/core recovery		strength		planarity		coating	
	core recovered	VL	very low	PL	planar	CN	clean
	- graphic symbols indicate material	L	low	CU	curved	SN	stained
	no core recovered	M	medium	UN	undulating	VN	vener
		H	high	ST	stepped	CO	coating
		VH	very high	IR	irregular		
		EH	extremely high				



Borehole No. **FINGAL41B**

Sheet 16 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:

hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa D- diam- etral A- axial	defect spacing mm	defect description			
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH		RQD % 30 100 300 1000 3000	particular	general		
				406		COAL: (C4 - C5) black and moderately dense								
						TUFF: creamy brown								
						COAL: C5, black and moderately dense								
						TUFF: brown								
						COAL: Dull; black and moderately dense								
						COAL: Dull coal; kaolinite on subvertical fractures								
						COAL: C4 cleated and badly broken; minor kaolinite								
						COAL: C5; moderately dense, ashy throughout								
				408		TUFF: Thin band of brown								
						COAL: Dull black C5/C6 with bright bands								
						CARBONACEOUS MUDSTONE: dense								
						MUDSTONE: Grey, massive; sharp basal contact								
						SANDSTONE: Brownish grey; fine grained; sharp base								
						MUDSTONE: Grey; massive; gradational contact								
				410		SANDSTONE: Fine to medium grained; grey; moderately to well sorted, grey with minor carbonaceous flecks/grains throughout; transition to conglomerate								
				412		Sparse carbonaceous flecks								
				414		Thin carbonaceous flecks and debris, bedding at 5 degrees								
				416		Horizon with carbonaceous grains								
				418		SANDSTONE and CONGLOMERATE: large siltstone pellets and carbonaceous pellets and debris (lenticular and round); erosional basal contact								
						Coal bed thin bright with kaolinite								
						SANDSTONE: White to grey, fine to medium grained, massive, minimal fracturing; sharp basal contact								

method	core-lift	water	weathering	defect type	roughness
DT diatube	casing used	10/1/98 water level on date shown	FR fresh	JT joint	VR very rough
AS auger screwing	barrel withdrawn	water inflow	SW slightly weathered	PT parting	RO rough
AD auger drilling		partial drill fluid loss	MW moderately weathered	SM seam	SO smooth
RR roller/tricone		complete drill fluid loss	HW highly weathered	SZ sheared zone	SL slickensided
CB claw or blade bit			XW extremely weathered	SS sheared surface	
NMLC NMLC core			DW distinctly weathered (covers MW and HW)	CS crushed seam	
NQ, HQ, PQ wireline core					
	graphic log/core recovery		strength	planarity	coating
	core recovered	water pressure test result (lugeons) for depth interval shown	VL very low	PL planar	CN clean
	- graphic symbols indicate material		L low	CU curved	SN stained
	no core recovered		M medium	UN undulating	VN veneer
			H high	ST stepped	CO coating
			VH very high	IR irregular	
			EH extremely high		



Borehole No. **FINGAL41B**

Sheet 17 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:

Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting:		Easting: 588949		slope: -90°		R.L. Surface:										
hole diameter: mm		Drilling fluid:		Northing: 5386618		bearing: datum:										
drilling information		material substance				rock mass defects										
method	core-lift	water	RL	depth metres	graphic log core recovery	material  rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength					IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description  type, inclination to core axis, planarity, roughness, coating, thickness
								VL	L	M	H	VH				
				420		SANDSTONE: White to grey, fine to medium grained, massive, minimal fracturing; sharp basal contact (continued)										
				422												
				424		422.80 – 423.10 – mud pellets on bedding dipping at 15 degrees										
				426												
				428		427.00 – 427.20 – sparse carbonaceous laminae										
				430		428.95 – 429.20 – Carbonaceous laminae and lenticular debris 429.20 – 434.09 – no fractures, massive										
				432												
				434		MUDSTONE: Grey and black; convoluted bedding with tuffaceous (brown) interbeds(?); sharp basal contact										
method		core-lift		water		weathering		defect type		roughness						
DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core		casing used barrel withdrawn graphic log/core recovery core recovered - graphic symbols indicate material no core recovered		10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown		FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) strength VL very low L low M medium H high VH very high EH extremely high		JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam planarity PL planar CU curved UN undulating ST stepped IR irregular		VR very rough RO rough SO smooth SL slickensided coating CN clean SN stained VN veneer CO coating						

Borehole No. **FINGAL41B**

Sheet 18 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:











Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:

hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa D- diam- etral A- axial	RQD %	defect spacing mm	defect description		
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH				particular	general	
				436	✓	COAL: Dull and dense with carbonaceous interbeds, black streak TUFF: Carbonaceous interbeds; black and brown, sharp basal contact ( <i>continued</i> ) SANDSTONE: Medium grained, grey; well sorted; gradational basal contact (colour change)								
				438		SANDSTONE: green-grey, medium grained with sharp basal contact								
				440		MUDSTONE: Grey with minor carbonaceous laminae throughout; gradational basal contact								
				442		SANDSTONE and MUDSTONE: (40:60) grey to dark grey; interbedded throughout with small scale cross bedding visible in fine sand; gradational basal contact MUDSTONE: grey, massive; sharp basal contact CARBONACEOUS MUDSTONE: Black and coaly with very thin tuff band (2 mm ) at top SANDSTONE: Very fine sand, grey with carbonaceous interbeds and muddy throughout								
				444		CARBONACEOUS MUDSTONE AND MUDSTONE: (60:40) thinly bedded, black and grey; gradational contact								
				446		SANDSTONE: Dark grey and black; fine grained; carbonaceous laminae throughout; coarse grained at base; gradational basal contact								
				448		SANDSTONE: Medium grained; grey; carbonaceous laminae at 0 degrees  448.3 – 448.6 less carbonaceous								

method	core-lift	water	weathering	defect type	roughness
DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	 casing used  barrel withdrawn  <b>graphic log/core recovery</b>  core recovered  - graphic symbols indicate material  no core recovered	 10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss   water pressure test result (lugeons) for depth interval shown	FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW)  <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam  <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular	VR very rough RO rough SO smooth SL slickensided  <b>coating</b> CN clean SN stained VN veneer CO coating

Borehole No. **FINGAL41B**

Sheet 19 of 19

Project No: **MINENTWN00134AA**

Date started: **14.6.2007**

Date completed: **30.6.2007**

Logged by: **NW**

Checked by: **DA**

## Engineering Log - Cored Borehole

Client: **Pure Energy Resources**

Principal:











Project: **Fingal Valley Coal Seam Gas Drilling**

Borehole Location:

drill model & mounting: Easting: 588949 slope: -90° R.L. Surface:

hole diameter: mm Drilling fluid: Northing: 5386618 bearing: datum:

drilling information					material substance					rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	RQD %	defect spacing mm	defect description	
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH				30 100 300 1000 3000	particular	general
				450		MUDSTONE: grey, massive ( <i>continued</i> ) Fracture at 449.70 at 50 degrees with slickensides								
						450.99 – 451.10 fracture at 50 degrees with slickensides; sharp basal contact								
				452		SILTSTONE AND SANDSTONE: (60:40) – dark grey silt and light grey fine sand; thinly bedded with bedding at 0 degrees 451.90 – 452.0 – sandy brown								
						CARBONACEOUS MUDSTONE: dark black with sparse light grey sand interbeds; gradational basal contact; increasing sand								
				454		SANDSTONE: dark grey fine sand with abundant carbonaceous laminae; fining upward; sharp basal contact COAL: Dull and moderately dense; bedded(?), poor cleat development if any; muddy/rocky throughout; gradational basal contact								
						CARBONACEOUS MUDSTONE: dark black and dense; grey streak when scratched								
				456		SANDSTONE: Black with carbonaceous interbeds; sharp basal contact SANDSTONE: medium grained; massive; well sorted; sharp basal contact 456.0 – 461.10 – no fractures								
				458										
				460										
				462										
				464		COAL: dull Coal with 3 Tuff bands COAL and CARBONACEOUS MUDSTONE: (50:50) black and moderately dense with very thin tuff bands COAL: Black, badly broken, cleated and fractured TUFF: brown, clayey COAL: Badly broken, C4 SANDSTONE: Very fine grained sand with silty interbeds 464.30 – fracture at 50 degrees with slickensides								

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core		<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered  - graphic symbols indicate material  no core recovered		<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown		<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high		<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating	
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