

Trefoil-2

Date : 17 Nov 2009

Geology Report Number : 35

(associated DDR # 48)

Well Details

Depth MDBRT:	3208.0m	Rig:	Kan Tan IV	Date:	17 Nov 2009
Depth TVDBRT:	3208.0m	Progress:	33.0m	Report Start:	0000
Depth TVDSS:	3182.0m	RTE agl:		Report End:	2400
Hole Size:	8.500in	GLE amsl:	0 (m)	Days On Location:	47.38
Hole Size Carbide:		Last Csg Size:	9.625in	Days since Spud:	42.67
Water Depth (MSL)	69.0m	Last Csg Shoe:	2520.0m		
RT-ASL(MSL)	26.0m	F.I.T. / L.O.T.:	11.00ppg /		

Operations Summary

24hr Summary:	Ran in hole with 216 mm (8 1/2") LWD BHA. Troubleshot drawworks problems. Ran in hole to 2937 mMDRT. Washed down from 2937-3120 mMDRT. Wipe logged LWD tools from 3120-3175 mMDRT. Drilled ahead in 216 mm (8 1/2") hole section.
Forward Plan:	Continue drilling ahead in 216 mm (8 1/2") hole section to TD, POOH, run wiper trip to 245mm (9 5/8") casing shoe, POOH, rig up and run wireline logs.

General Comments

00:00 TO 24:00 Hrs ON 17 Nov 2009

Operational Comments	Geoservices: 2 Data engineers, 2 mudloggers, 2 sample catchers on board. Gas equipment calibrated 12 Nov 09. Sperry: 3 MWD engineers on board. Schlumberger Wireline: 2 engineers, 4 operators, 1 technician on board. Main tool strings for PEX-CMR, FMI-DSI and MDT/XPT runs checked OK.
Operational Comments	FEWD sensor distances from bit from 3175 mMDRT: Vibration 0.00 m Gamma (DGR) 2.83 m Resistivity (EWR-P4) 5.17 m Directional (PCD) 10.07 m Density (ALD) 15.56 m Porosity (CTN) 19.43 m Sonic (BAT) 24.20 m Caliper (ACAL) 31.02 m

WBM Data

Mud Type: KCI POLYMER	Flowline Temp:	Cl: 38000mg/l	Low Gravity Solids:	Viscosity	56sec/qt
Sample From: 2	MWD Circ Temp:	Hard/Ca: 400mg/l	High Gravity Solids:	PV	14cp
Time: 22:00 hrs	Glycol CP Temp:	MBT: 11	Solids (corrected):	YP	29lb/100ft²
Weight: 9.50ppg	Glycol:	PM: 0.3	H2O: 93%	Gels 10s	8
ECD TD:	Nitrates:	PF: 0.25	Oil:	Gels 10m	12
ECD Shoe:	Sulphites:	MF: 2.1	Sand: .25 %	Fann 003	9
ECD Cuttings:	API FL: 5.0cc/30min	pH: 9	Barite:	Fann 006	10
KCI Equiv: 8%	API Cake: 1/32nd"	PHPA Excess:		Fann 100	28
				Fann 200	37
				Fann 300	43
				Fann 600	57

Shakers, Volumes and Losses Data

Engineer : Mike Lawrance / Fergus Spencer

Available	1601.0bbl	Losses	0.0bbl	Equip.	Descr.	Mesh Size	Hours
Active	680.0bbl	Downhole		Shaker 1	Brandt VSM 300	20 top/50 bottom	16
Mixing	0.0bbl	Surf+ Equip	0.0bbl	Shaker 2	Brandt VSM 300	20 top/50 bottom	16
Hole	683.0bbl	Dumped		Shaker 3	Brandt VSM 300	20 top/50 bottom	24
Slug		De-Gasser		Shaker 4	Brandt VSM 300	20 top/50 bottom	
Reserve	238.0bbl	De-Sander					
Kill		De-Silter					
		Centrifuge					

Comment

Formation Tops							
Formation	Prognosed		Actual		Diff.	Thickness MD (m)	Pick Criteria
	MDBRT (m)	TVDSS (m)	MDBRT (m)	TVDSS (m)	+ / - TVD (m)		
Torquay Group	95.00	69.00	95.00	69.00	0.00	823.00	Sea floor
Lower Miocene	904.00	878.00	918.00	892.00	-14.00	244.00	GR increase
Seismic Marker							
Upper Angahook	1168.00	1142.00	1162.00	1136.00	6.00	169.00	GR decrease, res increase
Angahook Volcanics Equiv	1323.00	1297.00	1331.00	1305.00	-8.00	238.00	GR decrease, res increase
Lower Angahook	1564.00	1538.00	1569.00	1543.00	-5.00	281.00	GR decrease, res increase
Demons Bluff	1839.00	1813.00	1850.00	1824.00	-11.00	255.00	Res increase
Eastern View Coal Measures	2092.00	2066.00	2105.00	2079.00	-13.00	596.50	Res decrease
Eocene Unconformity	2691.00	2665.00	2701.50	2675.10	-10.10	157.30	GR decrease
2973 Seismic Marker	2841.00	2815.00	2858.80	2832.40	-17.40	79.00	GR decrease, res decrease
Base Low A1 Zone	2922.00	2896.00	2937.80	2911.40	-15.40	38.70	GR increase, res increase
TL40 Sand	2971.00	2945.00	2976.50	2950.10	-5.10	8.50	GR decrease
TL50 Sand	2981.00	2955.00	2985.00	2958.40	-3.40	9.50	GR decrease
TL60 Sand	2992.00	2966.00	2994.50	2967.90	-1.90	73.50	GR decrease
Cretaceous	3056.00	3030.00	3068.00	3041.70	-11.70	62.50	GR decrease
TF50 Sand	3123.00	3097.00	3130.50	3103.70	-6.70	19.30	GR decrease
TF80 Sand	3142.00	3116.00	3149.80	3123.00	-7.00	30.20	GR decrease
Total Depth (TD)	3221.00	3195.00	3235.00	3208.00	-13.00	0.00	

Lithology Summary			
Interval MDBRT (m) From To	ROP (m/hr)	Lithology	
3175.00 - 3180.00	Min:4 Avg:12 Max:26	Interbedded SANDSTONE and SILTSTONE, with minor thin CLAYSTONE beds SANDSTONE (15-95%): white to very light grey, clear, light grey, trace yellowish grey, trace pinkish grey, very disaggregated, 5% very fine, 60% coarse, 30% very coarse, 5% granular grains, firm to moderately hard, moderately sorted, subrounded to angular, subspherical to spherical, trace mica flakes, trace carbonaceous material, trace coal, good inferred visual porosity, no hydrocarbon fluorescence, traces of ARGILLACEOUS SANDSTONE. SILTSTONE (0-80%): medium grey to dark grey, olive black, soft to firm, subblocky to subfissile, trace micromica, trace carbonaceous material. CLAYSTONE (0-5%): light brownish grey to brownish grey, moderate yellowish grey to greyish brown, soft to firm, subblocky to blocky, trace carbonaceous material.	
Interval MDBRT (m) From To	ROP (m/hr)	Lithology	
3180.00 - 3208.00	Min:2 Avg:18 Max:30	SILTSTONE interbedded with SANDSTONE, with minor thin CLAYSTONE beds SILTSTONE (60-80%): medium light grey to medium grey, dark grey to olive black, soft to firm, subblocky to subfissile, trace micromica, trace carbonaceous material. SANDSTONE (15-40%): white to very light grey, light grey, clear, 10% very fine, 60% fine, 20% medium, 10% coarse, disaggregated quartz grains and very fine argillaceous aggregates, soft to moderately hard, poorly to moderately sorted, subrounded to rounded, subspherical to spherical, trace carbonaceous material, trace coal, fair to good inferred visual porosity, no hydrocarbon fluorescence, grading to ARGILLACEOUS SANDSTONE in part. CLAYSTONE (0-5%): light brownish grey to brownish grey, moderate yellowish grey to greyish brown, soft to firm, subblocky to blocky, trace carbonaceous material.	

Gas Data									
Depth Interval (m)	Gas Type	Total Gas (%)	C1 (%)	C2 (%)	C3 (%)	iC4 (%)	nC4 (%)	C5 (%)	CO2 (%)
3175.00 -	Trip	0.963	0.5436	0.0204	0.0102	0.0024	0.0019	0.0012	0.000
3175.00 - 3180.00	Drilled	0.178	0.1081	0.0041	0.0013	0.0008	0.0006	0.0007	0.000
3180.00 - 3208.00	Drilled	0.393	0.2647	0.0179	0.0067	0.0021	0.0015	0.0013	0.000

Hydrocarbon Shows											Rating
From (m)	To (m)	Formation	Lithology	Percentage	White Light			UV Light			
					Stain	Cut	Residue	Fluor.	Cut Fluor.	Residue	
3146.00	3174.25	Eastern View Coal Measures	Sandstone	100				Dull yellow	Predominantly slow diffuse yellow white	Predominantly dull yellow film	Poor
Shows Description:			Based on core chips: Overall dull yellow fluorescence, slow diffuse to crush cut yellow white fluorescence, thin yellow white ring to film residue.								

Hydrocarbon Shows											Rating
From (m)	To (m)	Formation	Lithology	Percentage	White Light			UV Light			
					Stain	Cut	Residue	Fluor.	Cut Fluor.	Residue	
3155.00		Eastern View Coal Measures	Sandstone	100				Yellow green fluorescence	Slow blooming to streaming blue white cut	Blue yellow bright film residue	Poor to fair
Shows Description:			Core chip sample: Overall yellow green fluorescence, slow blooming to streaming blue white cut, blue yellow bright film residue.								
Survey											
MDBRT (m)	Incl. (deg)	Corr. Az (deg)	TVDBRT (m)	'V' Sect (deg)	Dogleg (deg/30m)	N/S (m)	E/W (m)	Tool Type			
3167.65	3.8	84.1	3166.80	34.0	0.1			MWD			
3194.79	3.9	83.3	3193.88	35.4	0.1			MWD			
3223.60	4.3	83.4	3222.62	36.9	0.5			MWD			
3235.00	4.3	83.4	3233.99	37.6	0.0			MWD			

Core Run					
Core Number	2	Start Depth (MD)	3145.0 (m)	Amount Recovered	29.3
Formation	Eastern View Coal Measures	End Depth (MD)	3175.0 (m)	Sleeve Type	Aluminium
Contractor	CorePro	Core Diameter	102.0 (mm)	Encapsulation Type	Nil
Equipment	5x6m barrels	Barrel Length	30.0 (m)		
Shipping	Core 1 and 2 packed in 4 shocktagged transport boxes. ETD rig Friday the 20 Nov 09.	Comments			
Core Detail					
Core Chip Depth (m)	Description				
3145.00	SANDSTONE: light grey, mottled, quartzose, fine grained, firm to moderately hard, subangular to subrounded, moderately well sorted, subspherical, traces carbonaceous material, mica flakes, 5% white clay matrix, moderate siliceous cement, fair visual porosity, no hydrocarbon fluorescence.				
3146.00	SANDSTONE: white to light grey, trace yellowish grey grains, quartzose, moderately hard, fine to coarse grained, angular to subrounded, poorly sorted, subspherical, 5% white clay matrix, moderately well siliceous cemented, fair visual porosity, dull yellow overall fluorescence, very slow diffuse pale green cut, pale yellow white film residue.				
3147.00	SANDSTONE: medium light grey, quartzose, very fine to coarse grained, hard, subangular to subrounded, moderately to poorly sorted, subspherical, 10% grey clay matrix, well siliceous cemented, 10% muscovitic and biotitic mica flakes, trace carbonaceous material, poor visual porosity, no hydrocarbon fluorescence.				
3148.00	MICACEOUS SILTSTONE: medium dark grey, hard, massive, 40% muscovitic and biotitic mica flakes.				
3149.00	SANDSTONE: white, quartzose, friable, very fine to coarse grained, poorly sorted, subspherical, 5% white clay matrix, trace black to dark grey lithic fragments, poor visual porosity, no hydrocarbon fluorescence.				
3150.00	SANDSTONE: white, trace yellowish grey grains, quartzose, friable to firm, fine to medium grained, subangular to subrounded, poorly sorted, subspherical, traces biotitic mica flakes, traces carbonaceous material, fair visual porosity, no hydrocarbon fluorescence.				
3151.00	CONGLOMERATIC SANDSTONE: light grey, quartzose, fine to very coarse grained, hard to moderately hard, angular to subrounded, very poorly sorted, subspherical to subelongate, 20% white clay matrix, moderate siliceous cement, 2% black, bright, coal coal fragments, fair visual porosity, no hydrocarbon fluorescence.				
3152.00	SANDSTONE: white, quartzose, friable, very fine to coarse grained, poorly sorted, subspherical, 5% white clay matrix, trace black to dark grey lithic fragments, poor visual porosity, no hydrocarbon fluorescence.				
3153.00	SANDSTONE: white, quartzose, firm to hard, fine to coarse grained, subangular to subrounded, poorly sorted, subspherical, traces biotitic and muscovitic mica flakes, traces medium grey lithic fragments, fair visual porosity, no hydrocarbon fluorescence.				
3154.00	SANDSTONE: white, quartzose, firm to hard, fine to coarse grained, subangular to subrounded, poorly sorted, subspherical, traces biotitic mica flakes, traces medium grey lithic fragments, traces carbonaceous material, 15% white clay matrix, fair visual porosity, no hydrocarbon fluorescence.				
3155.00	SANDSTONE: very light grey, trace yellowish grey grains, trace medium grey grains, quartzose, hard to moderately hard, fine to very coarse grained, rounded very coarse grains to sub angular to subrounded, poorly sorted, spherical to subspherical to subelongate, trace amber, trace carbonaceous material, trace biotitic mica flakes, fair visual porosity, overall yellow green fluorescence, slow blooming to streaming blue white cut, blue yellow bright film residue.				
3156.00	SANDSTONE: very light grey, quartzose, fine to very coarse grained, firm to moderately hard, angular to subrounded, poor to moderately sorted, subspherical, trace red brown lithic fragments, trace black, bright coal fragments, poor visual porosity, dull yellow overall fluorescence, very slow diffuse pale green cut, pale yellow white film residue.				
3157.00	SANDSTONE: white to very light grey, moderately hard, fine to very coarse grained, subangular to subrounded, poor visual porosity, subspherical, 2% muscovitic mica flakes, in part as books, trace biotitic mica flakes, moderate siliceous cement, 5% white clay matrix, poor visual porosity, dull yellow overall fluorescence, very slow diffuse pale green cut, pale yellow white film residue.				
3158.00	SANDSTONE: white, quartzose, fine to very coarse grained, firm, subangular to subrounded, poorly sorted, subspherical, 15% white clay matrix, poor siliceous cement, trace amber, poor visual porosity, dull yellow overall fluorescence, very slow diffuse pale green cut, pale yellow white film residue.				
3159.00	SANDSTONE: very light grey, trace yellowish grey grains, quartzose, moderately hard, fine to coarse grained, subangular to subrounded, moderately sorted, trace carbonaceous material, trace mica flakes, trace grey lithic fragments, trace amber, moderate siliceous cement, fair visual porosity, dull yellow overall fluorescence, very slow diffuse dull yellow cut, no residue.				
3160.00	SANDSTONE: white, quartzose, fine to very coarse grained, firm, subangular to subrounded, poorly sorted, subspherical, 15% white clay matrix, poor siliceous cement, trace amber, poor visual porosity, dull yellow overall fluorescence, very slow diffuse dull yellow cut, no residue.				
3161.00	SANDSTONE: white, quartzose, hard, fine to medium grained, subangular to subrounded, poorly sorted, subspherical, traces biotitic mica flakes, traces carbonaceous material, 10% white clay matrix, well siliceous cemented, fair visual porosity, no hydrocarbon fluorescence.				
3162.00	SANDSTONE: white to medium light grey, quartzose, hard, fine grained, subangular to subrounded, well sorted, subspherical, 10% white clay matrix, well siliceous cemented, trace carbonaceous material, 3% mica flakes, poor visual porosity, dull yellow overall fluorescence, very slow diffuse dull pale green cut, pale yellow green thin ring to film residue.				

Core Run	
3163.00	SILTSTONE: olive black, hard, massive, 5% biotitic mica flakes.
3164.00	SANDSTONE: white to very light grey, quartzose, hard, very fine to fine grained, subangular to subrounded, moderately well sorted, 5% muscovitic mica flakes, trace carbonaceous material, 10% white clay matrix, well siliceous cemented, poor visual porosity, dull yellow overall fluorescence, very slow diffuse green yellow cut, dull yellow film residue.
3165.00	SANDSTONE: white to very light grey, quartzose, moderately hard, fine to very coarse grained, subangular to subrounded, poorly sorted, subspherical to subelongate, 10% white clay matrix, moderately well siliceous cemented, poor visual porosity, pale yellow overall fluorescence, slow diffuse yellow green fluorescence, dull yellow film residue.
3166.00	SANDSTONE: white, trace yellowish grey grains, quartzose, moderately hard, medium to very coarse grained, angular to subrounded, poorly sorted, subspherical, 10% white clay matrix, moderately siliceous cemented, trace amber, trace grey lithic fragments, dull yellow fluorescence, slow diffuse yellow white cut, dull blue white film residue.
3167.00	SANDSTONE: white, trace yellowish grey grains, quartzose, moderately hard, medium to very coarse grained, angular to subrounded, poorly sorted, subspherical, 10% white clay matrix, moderately siliceous cemented, trace amber, trace grey lithic fragments, dull yellow green fluorescence, slow diffuse yellow white crush cut, dull yellow white thick ring residue.
3168.00	SANDSTONE: very light grey, quartzose, hard, fine to coarse grained, subangular to subrounded, moderately sorted, subspherical, 10% white clay matrix, well siliceous cemented, 2% muscovitic mica flakes, traces lithic fragments, poor visual porosity, pale yellow green overall fluorescence, slow diffuse yellow green crush cut, yellow white ring residue.
3169.00	SANDSTONE: very light grey, quartzose, firm, fine to medium grained, subangular to subrounded, moderately sorted, subspherical, trace white clay matrix, moderate siliceous cement, fair visual porosity, very dull yellow fluorescence, slow blooming diffuse cut, very dull white yellow residue ring.
3170.00	SANDSTONE: white to very light grey, quartzose, friable, medium to very coarse grained, subangular to subrounded, moderately sorted, subspherical to spherical, 5% white clay matrix, poor siliceous cement, fair visual porosity, dull yellow overall fluorescence, no cut, no residue.
3171.00	SANDSTONE: white to very light grey, quartzose, loose quartz grains, disaggregated, medium to very coarse grained, subangular to subrounded, moderately sorted, subspherical to spherical, 5% white clay matrix, fair visual porosity inferred, no hydrocarbon fluorescence.
3172.00	SANDSTONE: white to very light grey, quartzose, loose quartz grains, disaggregated, medium to very coarse grained, subangular to subrounded, moderately sorted, subspherical to spherical, 5% white clay matrix, trace grey lithic fragments, fair visual porosity inferred, dull yellow fluorescence, no cut, dull white yellow residue ring.
3173.00	CONGLOMERATIC SANDSTONE: white, grey mottled, quartzose, friable, fine grained to granular, subangular to subrounded, very poorly sorted, subspherical, 10% white and medium grey clay matrix, poor siliceous cement, traces carbonaceous material, poor visual porosity, dull yellow fluorescence, no cut, blue white film residue.
3174.25	SANDSTONE: white, grey mottled, quartzose, friable, fine grained to granular, subangular to subrounded, very poorly sorted, subspherical, 10% white and medium grey clay matrix, poor siliceous cement, traces carbonaceous material, poor visual porosity, dull yellow fluorescence, no cut, blue white film residue.
06:00 Hrs Update	
Time:	06:00 Hrs on 18 Nov 2009
Depth:	3235 mMDRT/3234 mTVDR
Progress Since Midnight (m):	27
Status @ 0600hrs:	POOH @ 3000m Wiper trip.
Formation:	Eastern View Coal Measures
Lithology:	Interbedded SILTSTONE and ARGILLACEOUS SANDSTONE, minor thin CLAYSTONE beds
ROP:	Average ROP: 14.74 m/hr (2.9 - 26.6 m/hr)
Gas:	Average background gas - 0.2490%, C1: 0.1281%, C2: 0.0097%, C3: 0.0048%, iC4: 0.0020%, nC4: 0.0013%, C5: 0.0011%
Wellsite Geologist(s)	
(Days) - Dennis Archer (Nights) - Larissa Hansen	