Dunk 1

QGC
A BG Group business

Scale 1:500

Composite Well Log

Well Data

Well Name:	Dunk 1
Status:	Exploration
Area:	Surat (8743)
Basin:	Bowen Basin
Location:	ATP 645
UWI:	100000789132
Partners:	
BNG (Surat) Pty Ltd	100%

Rigs:	TCL 1, EWE106
Latitude:	27° 04' 04.3781" S
Longitude:	149° 25' 30.8309" E
Spud Date: TD	20-09-2014 (TCL 1)
Date: Rig	27-12-2014 (EWE 106)
Release:	15-01-2015 (EWE 106)
Datum:	Mean Sea Level
RT Elevation:	295.71m
GL Elevation:	286.94m
TD Formation:	Combarngo Volcanics
TD Depth:	3180.00mMDRT (Driller) 3183.56 (Logger)
Remarks:	

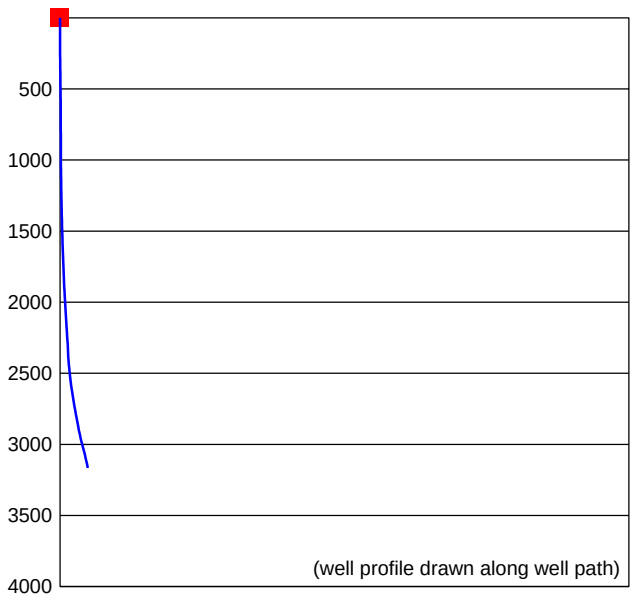
Geologists:

Operations Geologist:	Anthony Mountford
Wellsite Geologist:	Anthony Drake
Wellsite Geologist:	Jim Mitchell
Wellsite Geologist:	Brendan Lacy
Wellsite Geologist:	John Pitman

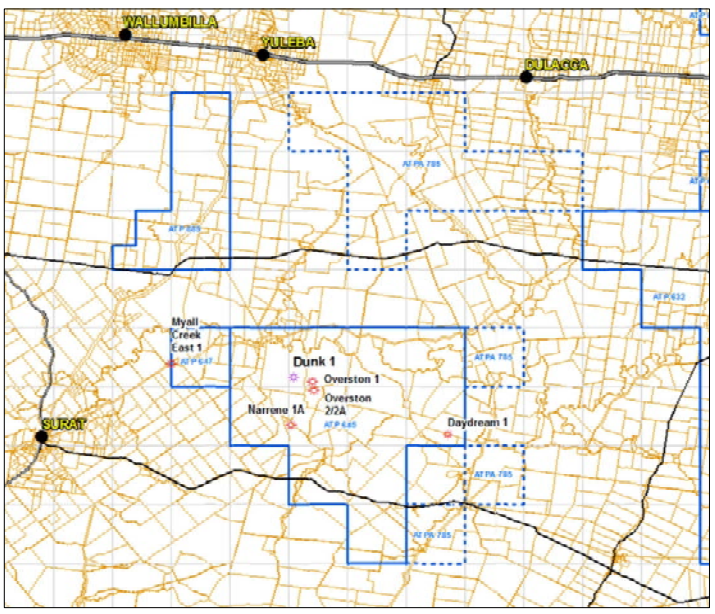
Contractors:

Drilling:	Easternwell Energy
Wireline Logging:	Schlumberger
Cementing:	Halliburton
Mud Engineering:	Newpark
Mud Logging:	Weatherford
MWD:	Pathfinder
Coring:	Halliburton

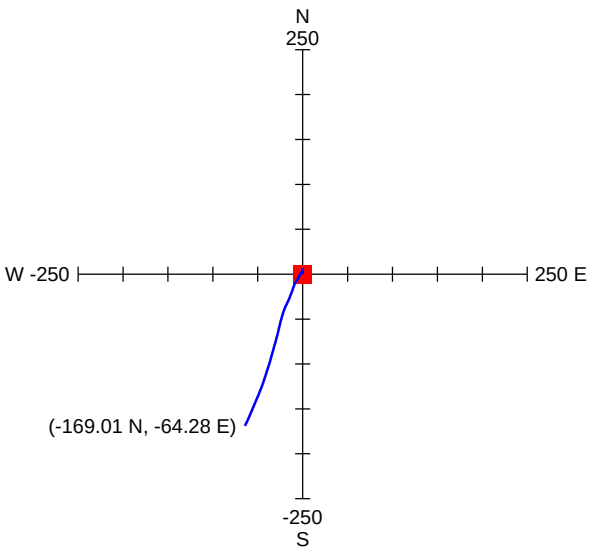
Profile View of Well Path



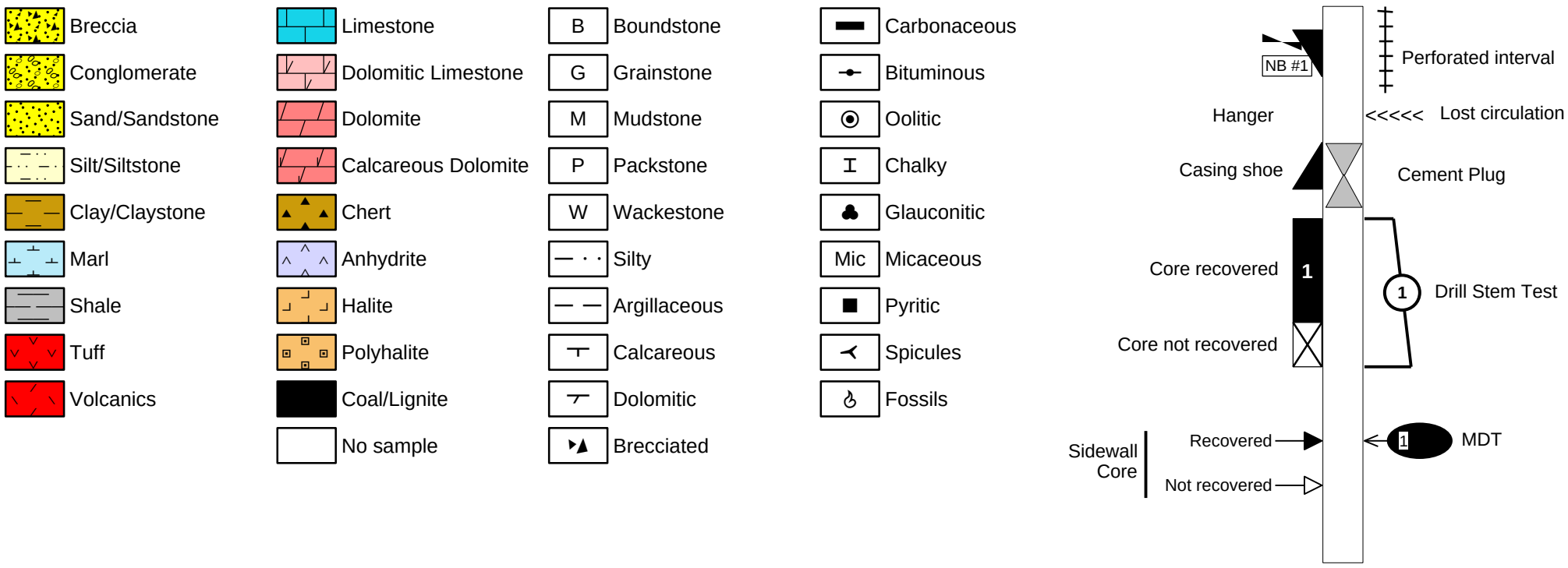
Location Map



Plan View of Well Path



Key



Well Configuration

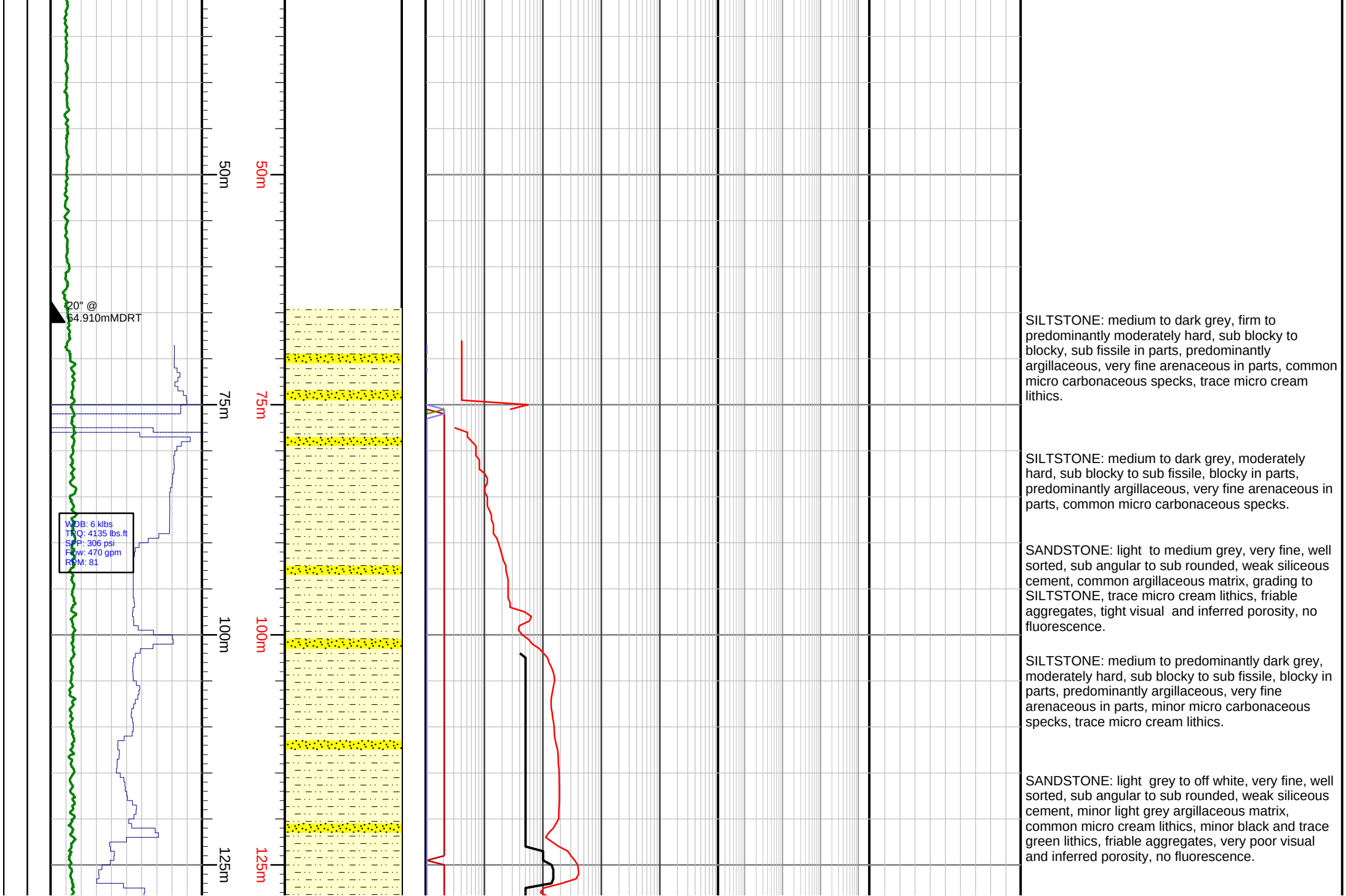
Hole and Casing Details

Hole Size	Hole (mMDRT)	Casing Size	Shoe (mMDRT)	Hanger (mMDRT)	Comments
26"	68.61	20"	64.91		
17 1/2"	1106.38	13 3/8"	1101.04		
12 1/4"	2330.00	9 5/8"	2326.84		Reached section TD @ 09:30 06-12-2014

6 3/4"	3180.00	4 1/2"	3178.00	2221.13	

Wireline Logging Summary

Suite/Run No	Hole/Casing Size	Suite	Date(s)	Interval (mMDRT)	Max Temp (°C)	Comments
1.1	12 1/4"	PEX-HRLA-SSCAN-PPC-GPIT-SP	07/12/14 to 08/12/14	1099.00 - 2332.70	77.8	12 1/4" open hole
1.1	12 1/4"	GR	07/12/14 to 08/12/14	20.00 - 2332.70	77.8	GR to surface inside 13 3/8" casing
2.1	6 3/4"	FMI-SSCAN-PPC	28/12/2014	2328.06 - 3183.56	115.5	
2.2	6 3/4"	PEX-HRLA-APS- HNGS-SP-GR	28/12/2014	2328.06 - 3183.56	106.0	
2.3	6 3/4"	CMR-ECS	28/12/2014 to 29/12/2014	2328.06 - 3183.56	110.0	
2.4	6 3/4"	MDT	29/12/2014	2812.79 - 2933.31	110.0	Station log
2.5	6 3/4"	MSCT	31/12/2014	3005.00 - 3133.75	104.5	Station log
2.6	6 3/4"	MSCT	31/12/2014 to 01/01/2015	2384.85 - 3008.81	104.5	Station log
2.7	6 3/4"	VSI4 (4 shuttle seismic)	01/01/2015	8.70 - 3117.97	110.0	Station log
2.8	6 3/4"	USIT-CBL-CCL	02/01/2015	800.00 - 2328.00	102.0	



SILTSTONE: medium to dark grey, firm to predominantly moderately hard, sub blocky to blocky, sub fissile in parts, predominantly argillaceous, very fine arenaceous in parts, common micro carbonaceous specks, trace micro cream lithics.

SILTSTONE: medium to dark grey, moderately hard, sub blocky to sub fissile, blocky in parts, predominantly argillaceous, very fine arenaceous in parts, common micro carbonaceous specks.

SANDSTONE: light to medium grey, very fine, well sorted, sub angular to sub rounded, weak siliceous cement, common argillaceous matrix, grading to SILTSTONE, trace micro cream lithics, friable aggregates, tight visual and inferred porosity, no fluorescence.

SILTSTONE: medium to predominantly dark grey, moderately hard, sub blocky to sub fissile, blocky in parts, predominantly argillaceous, very fine arenaceous in parts, minor micro carbonaceous specks, trace micro cream lithics.

SANDSTONE: light grey to off white, very fine, well sorted, sub angular to sub rounded, weak siliceous cement, minor light grey argillaceous matrix, common micro cream lithics, minor black and trace green lithics, friable aggregates, very poor visual and inferred porosity, no fluorescence.

Wallumbilla Formation

150m
175m
200m
225m
250m
275m
300m
325m

WOB: 3 klbs
TRQ: 4164 lbs.ft
SPP: 1847 psi
Flow: 1041 gpm
RPM: 98

208.8mRT
208.8mTVD
Incl: 0.26°
Azi: 324.93

WOB: 7 klbs
TRQ: 6483 lbs.ft
SPP: 2065 psi
Flow: 1068 gpm
RPM: 97

SILTSTONE: dark grey, moderately hard, subblky to blocky, sub fissile in parts,common black lithics,trace cream lithics and carbonaceous specks, predominantly argillaceous, very fine arenaceous in parts.

SANDSTONE: light to medium grey, very fine to fine, well sorted, sub angular to sub rounded, friable to predominantly moderately hard aggregates, weak siliceous cement, trace weak calcareous cement, common light grey argillaceous matrix, common micro black and cream lithics, no fluorescence.

SILTSTONE: medium to dark, moderately hard, sub blocky to blocky, sub fissile in parts, argillaceous, common micro carbonaceous specks and laminations.

SILTSTONE: dark grey, moderately hard, subblky to blocky, sub fissile in parts,common black lithics,trace cream lithics and carbonaceous specks, predominantly argillaceous, very fine arenaceous in parts.

SILTSTONE: medium grey, argillaceous, arenaceous in parts interbedded with very fine SANDSTONE, moderately hard, blocky to sub blocky, trace very fine lithics, trace carbonaceous inclusions.

SANDSTONE: light grey, translucent, clear, very fine to predominantly fine grained, well sorted, sub angular to sub rounded, friable to moderately hard, weak calcareous cement, rare siliceous cement, common light grey argillaceous matrix, interbedded with and grading to SILTSTONE, minor carbonaceous fragments, poor to fair visual porosity, no fluorescence

SANDSTONE: off white, translucent, light grey, very fine to predominantly fine grained, moderately well sorted, sub angular to sub rounded, moderately hard, friable in parts, moderately strong siliceous cement, minor light grey argillaceous matrix, minor carbonaceous inclusions, trace lithics, poor to fair visual porosity, no fluorescence

SILTSTONE: light to medium brownish grey, light to medium grey, moderately hard, arenaceous grading to silty SANDSTONE, trace carbonaceous specks, trace fine grained lithics.

SILTSTONE: medium brownish grey, medium grey, moderately hard, arenaceous grading to silty SANDSTONE, trace carbonaceous specks, trace fine grained lithics.

SANDSTONE: light to medium brownish grey, off white, translucent, very fine to fine grained, moderately well sorted, sub angular to sub rounded, moderately hard, friable in parts, moderately strong siliceous and calcareous cement, common light grey argillaceous matrix, minor carbonaceous inclusions, trace lithics, poor visual porosity, no fluorescence

SILTSTONE: medium brownish grey, medium grey, moderately hard, argillaceous, arenaceous in parts, trace carbonaceous specks, trace fine grained lithics.

SANDSTONE: light grey, off white, light to medium brownish grey, translucent, very fine to fine grained, moderately well sorted, sub angular to sub rounded, moderately hard, friable in parts, moderately strong calcareous and siliceous cement, minor very light grey argillaceous matrix, minor carbonaceous inclusions, trace lithics, poor visual porosity, no fluorescence

SILTSTONE: medium to dark grey, medium to dark brownish grey, moderately hard, argillaceous, trace very finely arenaceous, sub blocky to sub fissile, blocky in part, trace carbonaceous specks.

SANDSTONE: light grey, off white in parts, very fine to fine grained, well sorted, sub angular to sub rounded, silty, interbedded with arenaceous SILTSTONE, moderately hard, friable in parts, moderately strong calcareous and siliceous cement, common light grey argillaceous matrix, common carbonaceous fragments and thin laminae, trace very fine cream lithics, very poor to poor visual porosity, no fluorescence.

Bungil Formation

350m
375m
400m
425m
450m
475m
500m
525m
550m

WOB: 9 klbs
TRQ: 7975 lbs.ft
SPP: 2057 psi
Flow: 1058 gpm
RPM: 99

410.3mRT
410.29mTVD
Incl: 0.7°
Azi: 355.19

WOB: 9 klbs
TRQ: 6928 lbs.ft
SPP: 2038 psi
Flow: 1041 gpm
RPM: 112

SILTSTONE: medium to dark grey, medium to dark brownish grey, moderately hard, argillaceous , trace very finely arenaceous, sub blocky to sub fissile, blocky in part, trace carbonaceous specks.

SILTSTONE: medium to dark grey, medium to dark brownish grey, moderately hard to hard, dominantly argillaceous , trace very finely arenaceous, sub blocky to sub fissile, trace micromicaceous, trace disseminated pyrite.

SILTSTONE: dark grey, dark brownish grey, moderately hard to hard, argillaceous, trace very finely arenaceous, sub blocky to sub fissile, trace micromicaceous, trace disseminated pyrite, rare micro cream lithics .

SANDSTONE: light grey, light green, very fine to fine, well sorted, sub angular to sub rounded, hard, strong calcareous and siliceous cement, common light grey argillaceous to silty matrix, common glauconite, common cream lithics,very poor to poor visual porosity, no fluorescence.

SILTSTONE: medium to predominantly dark grey, moderately hard to hard, sub blocky to sub fissile, blocky in parts, argillaceous, trace very finely arenaceous, trace micromicaceous, trace micro carbonaceous specks, trace disseminated pyrite.

SANDSTONE: off white, light grey, very fine to fine, well sorted, sub angular to sub rounded, moderately hard to hard, firm in parts, strong calcareous cement, weak siliceous cement in parts, white to light grey argillaceous to silty matrix, common micro carbonaceous specks and cream lithics, trace green lithics, very poor to poor visual porosity, trace dull orange mineral fluorescence.

SILTSTONE: dominantly medium brown, medium grey, moderately hard, sub blocky to sub fissile, argillaceous, trace very fine arenaceous, minor carbonaceous specks & laminations, trace micro cream lithics, trace medium brown DOLOMITE fragments.

COAL: black, very dark brown, dull to sub vitreous, hard, blocky, uneven fracture.

SANDSTONE: off white, light grey, very fine to fine, well sorted, sub angular to sub rounded, moderately hard to hard, firm in parts, common loose grains, strong calcareous cement, weak siliceous cement in parts, white to light grey argillaceous to silty matrix, common micro carbonaceous specks and cream lithics, trace green lithics, very poor to poor visual porosity, trace to 5% dull orange mineral fluorescence.

SILTSTONE: medium grey, moderately hard, sub blocky to sub fissile, argillaceous, trace very fine arenaceous, minor carbonaceous specks & laminations, trace micro cream lithics.

SANDSTONE: off white, light grey in parts,very fine to medium, predominantly fine, moderately well sorted, sub angular to sub rounded, moderately hard to hard aggregates, friable in parts, common loose grains, strong calcareous cement, weak siliceous cement in parts, off white argillaceous matrix, common micro carbonaceous specks and laminations, common cream lithics, trace mica flakes, trace green lithics, very poor to porosity visual porosity, 5% dull orange mineral fluorescence.

SILTSTONE: medium to dark brown, light grey in parts, moderately hard, sub blocky to sub fissile, common micro carbonaceous laminations and specks, minor micro cream lithics, trace micromicaceous.

SANDSTONE: white, translucent, clear, light grey, fine to medium, moderately sorted, sub angular to sub rounded, white argillaceous matrix, trace carbonaceous fragments, trace coarse quartz grains, common lithics, fair inferred porosity, no fluorescence.

SILTSTONE: light to medium brown, brownish grey, moderately hard, blocky to sub fissile, trace carbonaceous specks

Mooga Sandstone

575m
600m
625m
650m
675m
700m
725m
750m

612.9mRT
612.88mTVD
Incl: 0.53°
Azi: 347.55

WOB: 4 klbs
TRQ: 5021 lbs.ft
SPP: 2208 psi
Flow: 1040 gpm
RPM: 112

SANDSTONE: translucent, clear, white, fine to coarse predominantly medium, poor sorting, sub angular to sub rounded, common calcareous cement, minor white argillaceous matrix, trace carbonaceous inclusions, minor lithics, fair to good inferred porosity, trace dull orange mineral fluorescence.

SILTSTONE: light to medium brown, brownish grey, moderately hard, blocky to sub fissile, trace carbonaceous specks

SANDSTONE: translucent, clear, white, fine to coarse predominantly medium, poor sorting, sub angular to sub rounded, common calcareous cement, minor white argillaceous matrix, trace carbonaceous inclusions, minor lithics, fair to grain inferred porosity, trace dull orange mineral fluorescence.

SILTSTONE: light to medium brown, brownish grey, moderately hard, blocky to sub fissile, trace carbonaceous specks

SANDSTONE: translucent, clear, fine to predominantly medium grained, sub angular to predominantly sub rounded, moderately sorted, friable to loose, trace siliceous cement, minor white argillaceous matrix, rare carbonaceous fragments, trace lithics, good inferred porosity, trace dull orange mineral fluorescence

SANDSTONE: translucent, clear, fine to coarse, poor sorting, predominantly sub rounded, slightly silty, predominantly loose, friable in parts, trace siliceous cement, minor light grey silty matrix, trace carbonaceous fragments, trace lithics, fair inferred porosity, trace dull orange mineral fluorescence.

SILTSTONE: light to medium brownish grey, very finely arenaceous, moderately hard, trace lithics, trace carbonaceous fragments.

COAL: black, dull to sub vitreous lustre, moderately hard to brittle, blocky.

SILTSTONE: light to medium brownish grey, very finely arenaceous, moderately hard, blocky to sub fissile, trace very fine lithics.

SANDSTONE: translucent, clear, light brownish grey, fine to coarse, poor sorting, sub angular to sub rounded, moderately hard fine grained aggregates, medium to coarse grains predominantly loose, moderately strong cement in fine grained aggregates, minor light grey argillaceous matrix, trace lithics, trace carbonaceous fragments, poor visual porosity in fine grained aggregates, trace dull orange mineral fluorescence

SILTSTONE: light grey, light to medium brownish grey, moderately hard, very finely arenaceous grading to and interbedded with very fine sandstone, trace carbonaceous fragments, trace lithics.

SANDSTONE: translucent, clear, off white, fine to coarse, poor sorting, sub angular to predominantly sub rounded, friable to moderately hard fine grained aggregates, moderately strong siliceous cement in aggregates, trace calcareous cement, predominantly loose medium to coarse grains, rare off white to light grey argillaceous matrix, trace carbonaceous specks, fair inferred porosity, trace dull mineral fluorescence.

SILTSTONE: light grey, light to medium brownish grey, moderately hard, very finely arenaceous grading to and interbedded with very fine sandstone, trace carbonaceous fragments, trace lithics.

SANDSTONE: translucent, clear, off white, fine to coarse, poor sorting, sub angular to predominantly sub rounded, friable to moderately hard fine grained aggregates, moderately strong siliceous cement in aggregates, trace calcareous cement, predominantly loose medium to coarse grains, rare off white to light grey argillaceous matrix, trace carbonaceous specks, fair inferred porosity, trace dull mineral fluorescence

SILTSTONE: medium grey brown, moderately hard, slightly arenaceous, trace carbonaceous specks, trace lithics.

Orallo Formation

775m
800m
825m
850m
875m
900m
925m
950m
975m

814.7mRT
814.68mTVD
Incl: 0.18°
Azi: 280.96

WOB: 10 klbs
TRQ: 7302 lbs.ft
SPP: 2307 psi
Flow: 1069 gpm
RPM: 112

SANDSTONE: white, translucent, clear, fine to medium grained, moderately sorted, sub angular to sub rounded, moderately hard, moderately strong siliceous cement, trace calcareous cement, common white argillaceous matrix, trace lithics, trace carbonaceous specks, poor visual porosity, no fluorescence

SILTSTONE: light to medium grey brown, moderately hard, locally slightly arenaceous interbedded with very fine SANDSTONE, trace carbonaceous specks, trace lithics.

SANDSTONE: white, translucent, clear, fine to coarse grained, poor sorting, sub angular to sub rounded, moderately hard fine grained aggregates, loose medium to coarse grains, moderately strong siliceous cement in fine grained aggregates, trace calcareous cement, common white argillaceous matrix, trace carbonaceous specks, poor visual porosity, no fluorescence.

SANDSTONE: white, translucent, clear, fine to coarse predominantly medium grained, poor sorting, sub angular to sub rounded, friable to loose, weak calcareous cement, trace siliceous cement, common white argillaceous matrix, trace carbonaceous flakes, fair inferred porosity, no fluorescence

SANDSTONE: white, translucent, clear, fine to coarse predominantly medium grained, poor sorting, sub angular to sub rounded, friable to loose, weak calcareous cement, trace siliceous cement, common white argillaceous matrix, trace carbonaceous flakes, fair inferred porosity, no fluorescence.

SILTSTONE: medium grey, medium brown in parts, moderately hard, sub blocky to sub fissile, minor mico carbonaceous laminations & specks, micromicaceous in parts.

SANDSTONE: clear to translucent, off white, very fine to coarse, predominantly medium, poorly sorted, sub angular to predominantly sub rounded, friable aggregates, common loose grains, weak siliceous cement, trace weak calcareous cement, common white argillaceous matrix, common cream lithics, trace carbonaceous specks, fair inferred porosity, no fluorescence.

SILTSTONE: medium grey, medium brown in parts, moderately hard, sub blocky to sub fissile, minor mico carbonaceous laminations & specks, micromicaceous in parts.

SANDSTONE: clear to translucent, off white, very fine to coarse, predominantly medium, poor ly sorted, sub angular to predominantly sub rounded, predominantly loose grains, friable aggregates in parts, weak siliceous cement, trace weak calcareous cement, common white argillaceous matrix, common cream lithics, trace carbonaceous specks, fair inferred porosity, no fluorescence.

SANDSTONE: clear to translucent, off white in parts, very fine to very coarse, predominantly medium to coarse, poorly sorted, sub angular to sub rounded,predominantly loose grains, friable aggregates in parts, weak siliceous cement, minor argillaceous matrix, minor lithics, trace micro carbonaceous specks, very good inferred porosity, poor to fair visual porosity, no fluorescence.

SILTSTONE: light brown, light grey in parts, predominantly argillaceous, very fine arenaceous in parts, grading to to very fine SANDSTONE in parts, sub blocky to blocky, sub fissile in parts, trace micro carbonaceous laminations and specks, micromicaceous in parts.

SILTSTONE: light grey, light to medium brown, argillaceous, moderately hard, sub blocky to sub fissile, trace micro carbonaceous laminations and specks.

SANDSTONE: clear to translucent, pale grey and off white in parts, rare pale yellow, medium to very coarse, predominantly coarse, moderately well sorted, sub angular to sub rounded, angular in parts, common fractured grains, predominantly loose, friable aggregates in parts, weak siliceous cement, trace weak calcareous cement, trace off white argillaceous matrix, minor cream lithics, minor pale pink to medium red garnet fragments, trace micro carbonaceous specks, rare pale green lithics, very good inferred porosity, poor to fair visual porosity, no fluorescence.

Gubberamunda Sandstone

1000m
1000m
1007.1mRT
1007.08mTVD
Incl: 0.44°
Azi: 164.24
1025m
1025m
1050m
1050m
WOB: 18 klbs
TRQ: 9943 lbs.ft
SPP: 2245 psi
Flow: 1040 gpm
RPM: 88
1075m
1075m
13 3/8" @
1101.040mMDRT
1100m
1100m
1125m
1125m
Westbourne Formation
1150m
1150m
1175m
1175m

SANDSTONE: clear to translucent, off white, very fine to very coarse, predominantly coarse, poorly sorted, sub angular to sub rounded, generally loose grains, trace friable aggregates, trace weak siliceous cement, trace off white argillaceous matrix, common pale pink to medium red garnet fragments, trace micro carbonaceous specks and cream liths, very good inferred porosity, poor to fair visual porosity, no fluorescence.

SANDSTONE: clear to translucent, pale grey, fine to very coarse, predominantly medium to coarse, poorly sorted, sub angular to sub rounded, angular in parts, generally loose and clean, occasionally friable aggregates, weak siliceous cement, trace white argillaceous matrix, minor pale pink to abundant red garnet fragments, minor grey and cream lithics, fair to good inferred porosity, poor visual porosity, no fluorescence.

SILTSTONE: (Tr) light brown, dark grey in parts, argillaceous, firm sub blocky to sub fissile.

SANDSTONE: clear to translucent, pale grey, fine to very coarse, predominantly fine to medium, moderately sorted, sub angular to sub rounded, angular in parts, generally loose and clean, occasionally friable aggregates, weak siliceous cement, trace white argillaceous matrix, minor pale pink to abundant red garnet fragments, minor grey and cream lithics, trace COAL fragments, fair to good inferred porosity, poor visual porosity, no fluorescence .

SILTSTONE: light grey, argillaceous, firm, sub blocky to sub fissile.
SANDSTONE: clear-translucent, very fine to very coarse, predominantly fine to medium, moderate to poorly sorted, sub angular to sub rounded, generally loose grns, trace friable aggregates, trace weak siliceous cement,minor cream lithics, minor pale pink to light red garnet fragments, trace carbonaceous specks,fair to good inferred porosity, poor visual porosity, no fluorescence.

SILTSTONE: medium to dark brownish grey, medium dark brown, medium grey, moderately hard, slightly arenaceous in parts, blocky to sub blocky, trace lithics, common fine carbonaceous specks.

SILTSTONE: medium to dark brownish grey, moderately hard, slightly arenaceous in parts, blocky to sub blocky, trace lithics, common fine carbonaceous specks.

SANDSTONE: translucent, white, clear, fine to medium, moderately sorted, sub angular to sub rounded, friable to loose, weak siliceous cement, minor white argillaceous matrix, trace calcareous specks,poor to fair inferred porosity, no fluorescence.

SANDSTONE: white, very light grey, very light brownish grey, translucent, very fine to fine grained, well sorted, sub angular to sub rounded, friable, weak calcareous cement, common white argillaceous matrix, trace carbonaceous inclusions, poor visual porosity, no fluorescence.

SILTSTONE: very light brownish grey, light brown, firm, grading to very fine SANDSTONE, blocky, trace fine carbonaceous specks

SANDSTONE: white, translucent, fine grained, trace medium, well sorted, sub rounded, friable to loose, minor siliceous cement, common white argillaceous matrix, trace lithics, rare carbonaceous fragments, trace disseminated pyrite, fair visual porosity, no fluorescence

SILTSTONE: very light brown, firm, grading to very fine SANDSTONE, blocky, minor carbonaceous specks, slightly calcareous.

SANDSTONE: off white, very light brownish grey, fine grained, well sorted, sub angular to sub rounded, friable to firm, weak calcareous and siliceous cement, abundant off white argillaceous matrix, minor carbonaceous fragments, trace lithics, poor visual porosity, no fluorescence.

SANDSTONE: translucent, clear, white, fine to coarse, poor sorting, sub angular to predominantly sub rounded, friable to loose, weak calcareous and siliceous cement, minor white argillaceous matrix, trace pyrite, minor carbonaceous fragments, fair visual porosity, no fluorescence.

SILTSTONE: light brown, light brownish grey, firm, very finely arenaceous grading to very fine

Springbok Sandstone

1200m
1225m
1250m
1275m
1300m
1325m
1350m
1375m
1400m

1201.5mMD
1201.46mTVD
Incl: 0.97°
Azi: 205.67°

WOB: 13 klbs
TRQ: 9911 lbs.ft
SPP: 1079 psi
Flow: 725 gpm
RPM: 68

WOB: 9 klbs
TRQ: 11164 lbs.ft
SPP: 1371 psi
Flow: 762 gpm
RPM: 35

1404mMD
1403.92mTVD

SANDSTONE, blocky, trace fine carbonaceous specks.

SANDSTONE: translucent, clear, fine to coarse, poor sorting, sub rounded, loose, friable in parts, rare white argillaceous matrix, trace carbonaceous flakes, good inferred porosity, no fluorescence.

SILTSTONE: light brown, light brownish grey, firm to friable, very finely arenaceous grading to and interbedded with very fine SANDSTONE, blocky, trace fine carbonaceous specks.

SANDSTONE: translucent, clear, fine to medium grained, moderately sorted, sub rounded, loose, trace white argillaceous matrix, common carbonaceous flakes, good inferred porosity, no fluorescence.

SILTSTONE: light brownish grey, light to medium brown, firm to friable, very finely arenaceous, blocky, common carbonaceous fragments.

SANDSTONE: white, translucent, clear, fine to medium grained, moderately sorted, sub rounded, friable, minor calcareous cement, common white argillaceous matrix, common carbonaceous fragments, trace green lithics, poor to fair visual porosity, no fluorescence.
SILTSTONE: light brownish grey, light to medium brown, firm to friable, very finely arenaceous, blocky, common carbonaceous fragments.

SANDSTONE: white, translucent, fine to medium grained, moderately sorted, sub rounded, firm to friable, moderate calcareous and siliceous cement, common white argillaceous matrix, common carbonaceous fragments, poor visual porosity, no fluorescence.

COAL: black, vitreous to sub vitreous, brittle, firm, blocky, uneven to sub conchoidal fracture.

SANDSTONE: white to very light grey, translucent to transparent, fine to medium grained, moderately sorted, rounded to sub angular, predominantly sub rounded, firm to friable, moderate calcareous and siliceous cement, common white argillaceous matrix, common carbonaceous fragments, poor visual porosity, no fluorescence.

SANDSTONE: very light grey to light grey, white, translucent, trace transparent, very fine to medium grained, predominantly fine, trace coarse, moderately sorted, sub rounded to sub angular, firm to friable, moderately hard in part, loose, weak calcareous and siliceous cement, common white argillaceous matrix, trace carbonaceous specks, poor visual porosity, poor to fair inferred porosity, no fluorescence.
SILTSTONE: light grey to brownish grey, light reddish brown, argillaceous, arenaceous in part grading to very fine SANDSTONE, firm to hard, fissile to sub blocky, rare carbonaceous specks and micro laminations.

SANDSTONE: white, very light grey, light grey, very fine to medium grained, trace coarse, predominantly very fine to fine, moderate to poorly sorted, well sorted, sub rounded to sub angular, friable, loose, abundant very weak calcareous cement, minor carbonaceous specks, rare lithics, poor visible porosity, poor inferred porosity, no fluorescence.
SILTSTONE: light grey to light brownish grey, dark grey, firm to hard, carbonaceous in part, sub fissile, micro micaceous in part.

SANDSTONE: very light grey, very fine to fine grained, well sorted, well sorted, sub rounded to sub angular, firm to hard, siliceous cement, trace carbonaceous specks, rare lithics, poor visible porosity, poor inferred porosity, no fluorescence.

SILTSTONE: light grey to light brownish grey, firm, sub blocky to sub fissile, arenaceous in part grading to very fine SANDSTONE.

CLAYSTONE: brownish grey to medium dark grey, brownish black, firm to hard, sub fissile to blocky, carbonaceous.

SANDSTONE: very light grey to light grey, very fine to fine grained, well sorted, sub angular to sub rounded, friable, weak calcareous cement, common white to light brown argillaceous matrix, trace lithics, rare carbonaceous inclusions, poor visual porosity, no fluorescence.

Walloon Coal Measures

1425m
1450m
1475m
1500m
1525m
1550m
1575m
1600m

Incl: 1.49°
Azi: 210.15

1606.3mRT
1606.14mTVD
Incl: 2.02°
Azi: 199.69

SILTSTONE: light grey to light to medium brownish grey, firm, very finely arenaceous, blocky, trace lithics, rare carbonaceous inclusions.

SANDSTONE: white to very light grey, very fine to fine grained, well sorted, sub angular to sub rounded, weak calcareous and siliceous cement, common white argillaceous matrix, friable to moderately hard, trace carbonaceous specks, trace lithics, poor visual porosity, no fluorescence.

SILTSTONE: medium brown, medium brownish grey, firm, argillaceous grading to CLAYSTONE, blocky to sub fissile, trace carbonaceous specks.

COAL: black, dull to sub vitreous lustre, hard to brittle, blocky to splintery.

SANDSTONE: white, very fine to fine grained, well sorted, sub angular to sub rounded, friable, well siliceous cement, common white to very light grey argillaceous matrix, minor carbonaceous fragments, poor visual porosity, no fluorescence.

SANDSTONE: white, very fine to medium grained, moderately sorted, sub angular to sub rounded, friable, well siliceous cement, common white to very light grey argillaceous matrix, minor carbonaceous fragments, poor visual porosity, no fluorescence.

SILTSTONE: medium brown, firm, argillaceous, arenaceous in part, blocky to sub blocky, minor carbonaceous fragments.

SANDSTONE: white, very fine to medium grained, moderately sorted, sub angular to sub rounded, friable, moderately strong siliceous cement, weak calcareous cement, common white to very light grey argillaceous matrix, minor carbonaceous fragments, poor visual porosity, no fluorescence.

SILTSTONE: medium brown, medium brownish grey, firm, argillaceous grading to CLAYSTONE, arenaceous in part, blocky to sub blocky, minor carbonaceous fragments.

CaCO3 added to the mud system.

SILTSTONE: light to medium grey, light to medium brownish grey, medium brown, moderately hard, slightly arenaceous locally grading to very fine SANDSTONE, blocky to sub fissile, trace micro carbonaceous specks.

SILTSTONE: light to medium grey, light to medium brownish grey, medium brown, moderately hard, slightly arenaceous locally grading to very fine SANDSTONE, blocky to sub fissile, trace micro carbonaceous specks.

SANDSTONE: translucent, clear, white, fine to medium grained, moderately sorted, sub rounded, friable to loose, trace weak siliceous cement, rare white argillaceous matrix, minor red and cream lithics, fair inferred porosity, no fluorescence

SILTSTONE: medium grey, firm, arenaceous grading to very fine SANDSTONE, blocky, trace carbonaceous fragments.

SANDSTONE: white, very fine to fine grained, well sorted, sub angular to predominantly sub rounded, moderately hard, moderately strong siliceous cement, trace calcareous cement, common white argillaceous matrix, common fine carbonaceous specks, poor visual porosity, no fluorescence.

SANDSTONE: translucent, clear, white in part, fine to coarse, poor sorting, sub rounded, predominantly loose clean quartz grains, trace white argillaceous matrix, good inferred porosity, no fluorescence.

SANDSTONE: translucent, clear, white in part, fine to coarse, poor sorting, sub rounded, predominantly loose clean quartz grains, trace white argillaceous matrix, good inferred porosity, no fluorescence.

Hutton Sandstone

Evergreen Formation

1625m
1650m
1675m
1700m
1725m
1750m
1775m
1800m
1825m

WOB: 10 klbs
TRQ: 7551 lbs.ft
SPP: 1519 psi
Flow: 767 gpm
RPM: 59

1808.7mRT
1808.41mTVD
Incl: 2.55°
Azi: 202.59

WOB: 5 klbs
TRQ: 8141 lbs.ft
SPP: 1487 psi
Flow: 769 gpm
RPM: 59

SILTSTONE: medium brownish grey, moderately hard, argillaceous grading to CLAYSTONE, blocky, trace micro mica.

SANDSTONE: translucent, clear, white in part, fine to coarse, poor sorting, sub rounded, predominantly loose, rare white argillaceous matrix, good inferred porosity, no fluorescence.

SILTSTONE: light brownish grey to medium brownish grey, light bluish grey, firm to moderately hard, sub blocky to sub fissile, argillaceous grading to CLAYSTONE, blocky, trace micro mica, trace carbonaceous specks.

SANDSTONE: translucent, clear, white to very light grey in part, very fine to coarse, poor sorting, sub rounded, commonly loose, rare white argillaceous matrix, moderately hard to hard aggregates, trace lithics, trace carbonaceous specks, poor to fair visible porosity, fair to good inferred porosity, no fluorescence.

SANDSTONE: very light grey to light grey, transparent to translucent, very fine to medium grain, predominantly fine, trace coarse to very coarse, moderately well sorted, sub rounded to sub angular, moderately argillaceous cement, white argillaceous matrix, firm to moderately hard, loose, trace lithics, trace carbonaceous specks, poor to fair visual porosity, fair inferred porosity, no fluorescence.

SILTSTONE: light grey to moderately brownish grey, blocky to sub blocky, soft to firm, trace carbonaceous fragments.

SANDSTONE: white to very light grey, very fine to very coarse, predominantly fine to medium, poorly sorted, angular to sub rounded, minor calcareous cement, abundant white argillaceous matrix, rare lithics, trace carbonaceous specks, minor loose and fractured medium to very coarse quartz, loose, rare moderately hard aggregates, poor visual porosity, poor inferred porosity, no fluorescence.

SILTSTONE: pale brown, very light grey, blocky to sub blocky, argillaceous in part grading to CLAYSTONE, trace carbonaceous specks, firm, sub blocky to sub fissile.

SILTSTONE: very light grey to medium brownish grey, commonly arenaceous grading to very fine SANDSTONE, argillaceous grading to CLAYSTONE in parts, rare to minor carbonaceous specks and micro laminations, firm to hard, sub blocky to sub fissile.

SANDSTONE: very light grey to light grey, very fine to fine grained, moderately well sorted, sub angular to sub rounded, moderately cemented, minor white argillaceous matrix, argillaceous grading to SILTSTONE, hard, minor carbonaceous specks and micro laminations, trace lithics.

SILTSTONE: medium grey, medium dark grey, firm to moderately hard, blocky, very finely arenaceous in parts, common fine carbonaceous specks.

SANDSTONE: very light grey to off white, very fine to fine grained, well sorted, sub angular to sub rounded, friable to moderately hard, moderately strong siliceous cement, abundant white argillaceous matrix, minor micro carbonaceous specks and laminae, poor visual porosity, no fluorescence.

SILTSTONE: medium grey to medium dark grey, medium dark brownish grey, firm to moderately hard, argillaceous in parts, blocky, rare fine carbonaceous specks.

SANDSTONE: translucent, clear, white, very fine to medium grained, moderately sorted, sub angular to predominantly sub rounded, loose to friable, trace weak siliceous cement, minor white argillaceous matrix, trace fine carbonaceous specks, fair inferred porosity, no fluorescence.

SILTSTONE: medium dark grey, medium brownish grey, moderately hard, blocky to sub fissile, argillaceous.

Precipice Sandstone

1850m
1875m
1900m
1925m
1950m
1975m
2000m
2025m

WOB: 11 klbs
TRQ: 8258 lbs-ft
SPP: 1789 psi
Flow: 826 gpm
RPM: 83

2011.1mRT
2010.57mTVD
Incl: 3.25°
Azi: 199.86

SILTSTONE: medium dark grey, medium to dark brownish grey, moderately hard, sub blocky to sub fissile, argillaceous, trace carbonaceous fragments.

SILTSTONE: medium dark grey, medium to dark brownish grey, moderately hard, sub blocky to sub fissile, argillaceous, trace carbonaceous fragments.

SANDSTONE: light to medium grey, translucent, fine to medium grained, sub angular to sub rounded, moderately hard, strong siliceous cement, minor white argillaceous matrix, common carbonaceous fragments, trace green lithics, poor visual porosity, no fluorescence.

SILTSTONE: medium dark grey, medium to dark brownish grey, moderately hard, sub blocky to sub fissile, argillaceous, trace carbonaceous fragments.

SANDSTONE: white, very light brownish grey, fine to medium, moderately sorted, sub angular to sub rounded, minor calcareous and siliceous cement, common white argillaceous matrix, rare carbonaceous fragments, poor visual porosity, no fluorescence.

SILTSTONE: medium dark brownish grey, medium to dark grey, moderately hard, sub blocky to sub fissile, argillaceous, trace carbonaceous flecks.

SANDSTONE: very light brownish grey, fine to medium, moderately sorted, sub angular to sub rounded, siliceous cement, common off white argillaceous matrix, rare carbonaceous fragments, trace medium to coarse loose quartz grains, poor visual porosity, no fluorescence.

SANDSTONE: very light grey, very fine to medium grain, trace coarse, predominantly very fine to fine, well sorted, sub rounded to sub angular, firm to very hard, minor calcareous cement, localized strong siliceous cement, abundant white argillaceous matrix/rock flour?, trace lithics, trace carbonaceous specks, loose in parts, poor visual porosity, no fluorescence.

SILTSTONE: light grey to brownish grey, arenaceous grading to very fine SANDSTONE, minor to common carbonaceous specks and micro laminations, firm to moderately hard, sub blocky to sub fissile.

SANDSTONE: very light grey to light grey, very fine to medium, trace coarse, predominantly fine, moderately to well sorted, rounded to sub angular, predominantly rounded, moderately strong siliceous cement, moderately common white argillaceous matrix, trace carbonaceous specks, trace mica.

SILTSTONE: light grey to light brownish grey, olive grey, argillaceous grading to very fine SANDSTONE, slightly carbonaceous, firm, blocky to sub fissile.

SANDSTONE: white, very light grey, transparent to translucent, very fine to coarse, predominantly fine to medium, poorly sorted, sub rounded to sub angular, predominantly loose, rare siliceous cement, common white argillaceous matrix/rock flour, trace lithics poor to fair inferred porosity.

SILTSTONE: light grey to light brownish grey, olive grey, argillaceous grading to very fine SANDSTONE, slightly carbonaceous, firm, sub fissile.

SANDSTONE: very light grey to light grey, transparent to translucent, very fine to medium grain, moderately well sorted, sub rounded to sub angular, loose, rare argillaceous cement, abundant white argillaceous matrix/rock flour, minor lithics, trace carbonaceous specks, poor to fair inferred porosity.

SILTSTONE: very light grey to light grey, brownish grey, olive grey, argillaceous grading to CLAYSTONE, arenaceous grading to SANDSTONE, minor carbonaceous specks, firm to hard, sub blocky to sub fissile.

SANDSTONE: very light grey to light grey, very fine to fine grained, well sorted, sub rounded, predominantly loose, minor firm to moderately hard, moderately argillaceous cement, minor white argillaceous matrix, trace lithics, trace carbonaceous specks, poor visual porosity, poor to fair inferred porosity.

SILTSTONE: light grey, brownish grey to dark grey, carbonaceous grading to CARBONACEOUS CLAYSTONE, firm, sub blocky to sub fissile.

Moolayember Formation

2050m
2075m
2100m
2125m
2150m
2175m
2200m
2225m

WOB: 17 klbs
TRQ: 10095 lbs.ft
SPP: 1838 psi
Flow: 831 gpm
RPM: 86

2213.1mRT
2212.22mTVD
Incl: 3.87°
Azi: 204.88

4 1/2" @
2221.13mMDRT

SANDSTONE: white, very light grey to light grey, very fine to fine grain, well sorted, sub angular to sub rounded, predominantly loose, minor firm aggregates, minor argillaceous cement, rare argillaceous matrix, poor to fair visual porosity, no fluorescence.

SILTSTONE: medium dark grey to medium dark brownish grey, firm to moderately hard, blocky to sub fissile, argillaceous in part grading to CLAYSTONE, trace carbonaceous fragments.

SILTSTONE: medium grey to medium dark grey, blocky to sub blocky, firm to moderately hard, very finely arenaceous in parts, trace carbonaceous fragments.

SANDSTONE: white to very light grey, very fine to fine grained, well sorted, sub angular to sub rounded, firm to friable, weak siliceous cement, abundant white argillaceous matrix, trace carbonaceous flecks, poor visual porosity, no fluorescence.

SILTSTONE: medium grey, light to medium brownish grey, firm to moderately hard, argillaceous, locally arenaceous, blocky to sub fissile, trace carbonaceous flecks.

SANDSTONE: very light grey, off white, very fine to fine grained, sub angular to sub rounded, friable to moderately hard, minor calcareous and siliceous cement, common light grey argillaceous matrix, rare carbonaceous specks, poor visual porosity, no fluorescence.

SILTSTONE: brown grey to dark brown grey, occasionally medium dark grey, sub blocky, firm, argillaceous, occasionally arenaceous in part, trace carbonaceous specks and flakes.

SANDSTONE: light grey, minor light brown grey, very fine to fine, sub angular to sub rounded, firm, calcareous cement, common argillaceous / silty matrix, carbonaceous specks, trace altered feldspar, trace micro mica, trace lithics, grades to SILTSTONE in parts, very poor visible porosity, no fluorescence.

SANDSTONE: light to medium grey, very fine to fine, occasional medium grains, moderately well sorted, firm to moderately hard, calcareous cement, occasional argillaceous matrix, trace to occasional lithics, trace carbonaceous specks and micro mica, poor to very poor visible porosity, no fluorescence.

SILTSTONE: light grey to medium grey, argillaceous grading to SHALE, arenaceous grading to very fine SANDSTONE, firm to hard, sub blocky to sub fissile.

SANDSTONE: very light grey to light grey, very fine to fine grain, well sorted, sub rounded to sub angular, predominantly loose, friable to moderately hard, minor white argillaceous cement, minor white argillaceous matrix, trace lithics, trace carbonaceous specks, poor visual porosity, poor to fair inferred porosity, no fluorescence.

SILTSTONE: light grey to medium grey, brownish grey, arenaceous grading to very fine SANDSTONE, firm to hard, sub blocky to fissile.

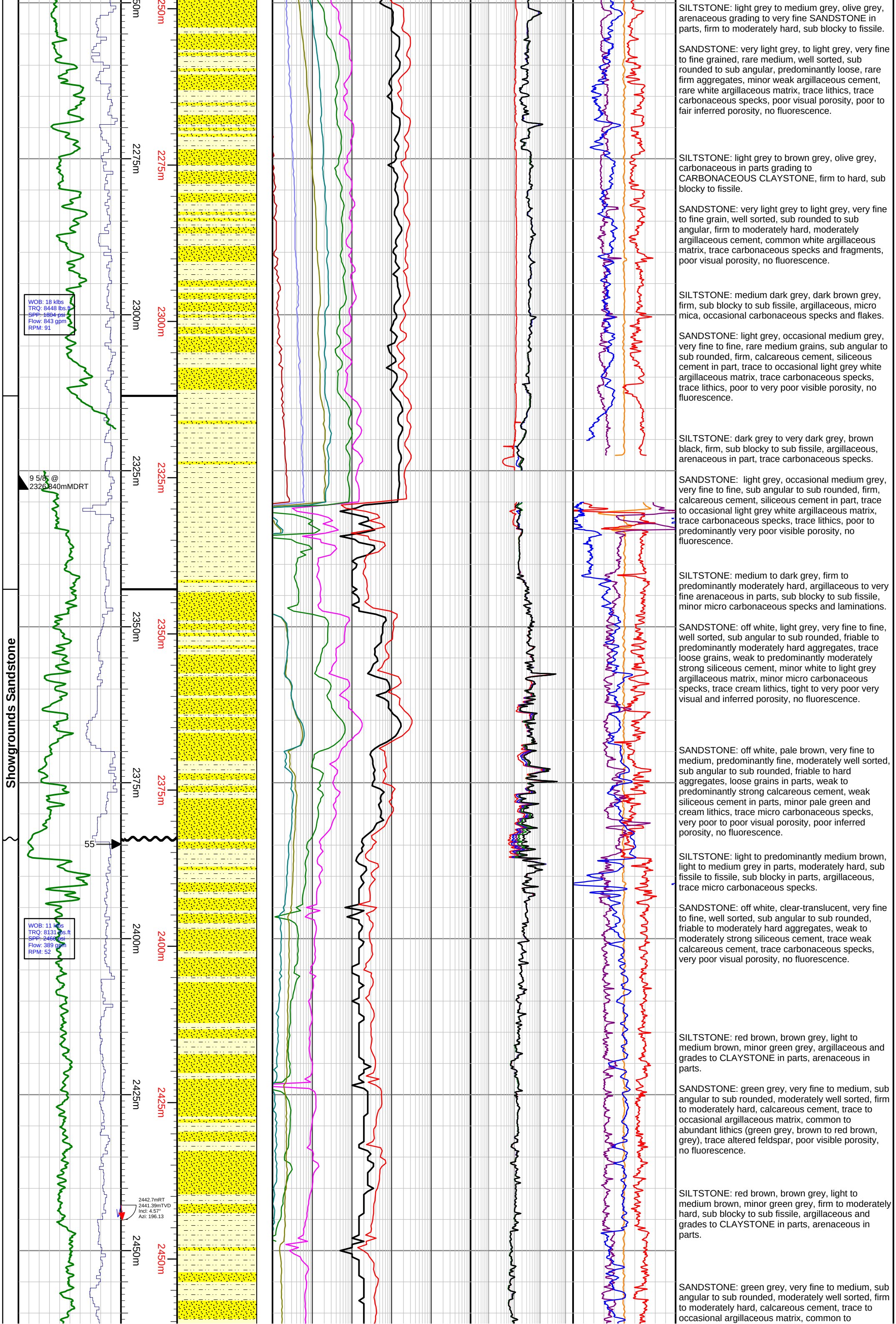
SANDSTONE: very light grey to light grey, very fine to fine grained, occasionally medium, well sorted, sub rounded to sub angular, loose, minor white argillaceous matrix, minor lithics, rare carbonaceous specks, fair inferred porosity.

SILTSTONE: light grey to medium grey, arenaceous grading to very fine SANDSTONE, firm to moderately hard, carbonaceous, slightly calcareous in parts, sub blocky to sub fissile.

SANDSTONE: very light grey to light grey, very fine to medium, well sorted, sub rounded to sub angular, commonly loose, common hard aggregates, minor white argillaceous cement and matrix, trace carbonaceous specks, trace lithics, poor visual porosity, poor to fair inferred porosity.

SILTSTONE: light grey to light brownish grey, arenaceous grading to very fine SANDSTONE, minor carbonaceous specks and micro laminations, firm to moderately hard, sub blocky to fissile.

SANDSTONE: very light grey to light grey, very fine to fine grained, well sorted, sub rounded to sub angular, firm to hard, moderately argillaceous cement, argillaceous matrix, trace lithics, trace carbonaceous specks, poor visual porosity, no fluorescence.



SILTSTONE: light grey to medium grey, olive grey, arenaceous grading to very fine SANDSTONE in parts, firm to moderately hard, sub blocky to fissile.

SANDSTONE: very light grey, to light grey, very fine to fine grained, rare medium, well sorted, sub rounded to sub angular, predominantly loose, rare firm aggregates, minor weak argillaceous cement, rare white argillaceous matrix, trace lithics, trace carbonaceous specks, poor visual porosity, poor to fair inferred porosity, no fluorescence.

SILTSTONE: light grey to brown grey, olive grey, carbonaceous in parts grading to CARBONACEOUS CLAYSTONE, firm to hard, sub blocky to fissile.

SANDSTONE: very light grey to light grey, very fine to fine grain, well sorted, sub rounded to sub angular, firm to moderately hard, moderately argillaceous cement, common white argillaceous matrix, trace carbonaceous specks and fragments, poor visual porosity, no fluorescence.

SILTSTONE: medium dark grey, dark brown grey, firm, sub blocky to sub fissile, argillaceous, micro mica, occasional carbonaceous specks and flakes.

SANDSTONE: light grey, occasional medium grey, very fine to fine, rare medium grains, sub angular to sub rounded, firm, calcareous cement, siliceous cement in part, trace to occasional light grey white argillaceous matrix, trace carbonaceous specks, trace lithics, poor to very poor visible porosity, no fluorescence.

SILTSTONE: dark grey to very dark grey, brown black, firm, sub blocky to sub fissile, argillaceous, arenaceous in part, trace carbonaceous specks.

SANDSTONE: light grey, occasional medium grey, very fine to fine, sub angular to sub rounded, firm, calcareous cement, siliceous cement in part, trace to occasional light grey white argillaceous matrix, trace carbonaceous specks, trace lithics, poor to predominantly very poor visible porosity, no fluorescence.

SILTSTONE: medium to dark grey, firm to predominantly moderately hard, argillaceous to very fine arenaceous in parts, sub blocky to sub fissile, minor micro carbonaceous specks and laminations.

SANDSTONE: off white, light grey, very fine to fine, well sorted, sub angular to sub rounded, friable to predominantly moderately hard aggregates, trace loose grains, weak to predominantly moderately strong siliceous cement, minor white to light grey argillaceous matrix, minor micro carbonaceous specks, trace cream lithics, tight to very poor very visual and inferred porosity, no fluorescence.

SANDSTONE: off white, pale brown, very fine to medium, predominantly fine, moderately well sorted, sub angular to sub rounded, friable to hard aggregates, loose grains in parts, weak to predominantly strong calcareous cement, weak siliceous cement in parts, minor pale green and cream lithics, trace micro carbonaceous specks, very poor to poor visual porosity, poor inferred porosity, no fluorescence.

SILTSTONE: light to predominantly medium brown, light to medium grey in parts, moderately hard, sub fissile to fissile, sub blocky in parts, argillaceous, trace micro carbonaceous specks.

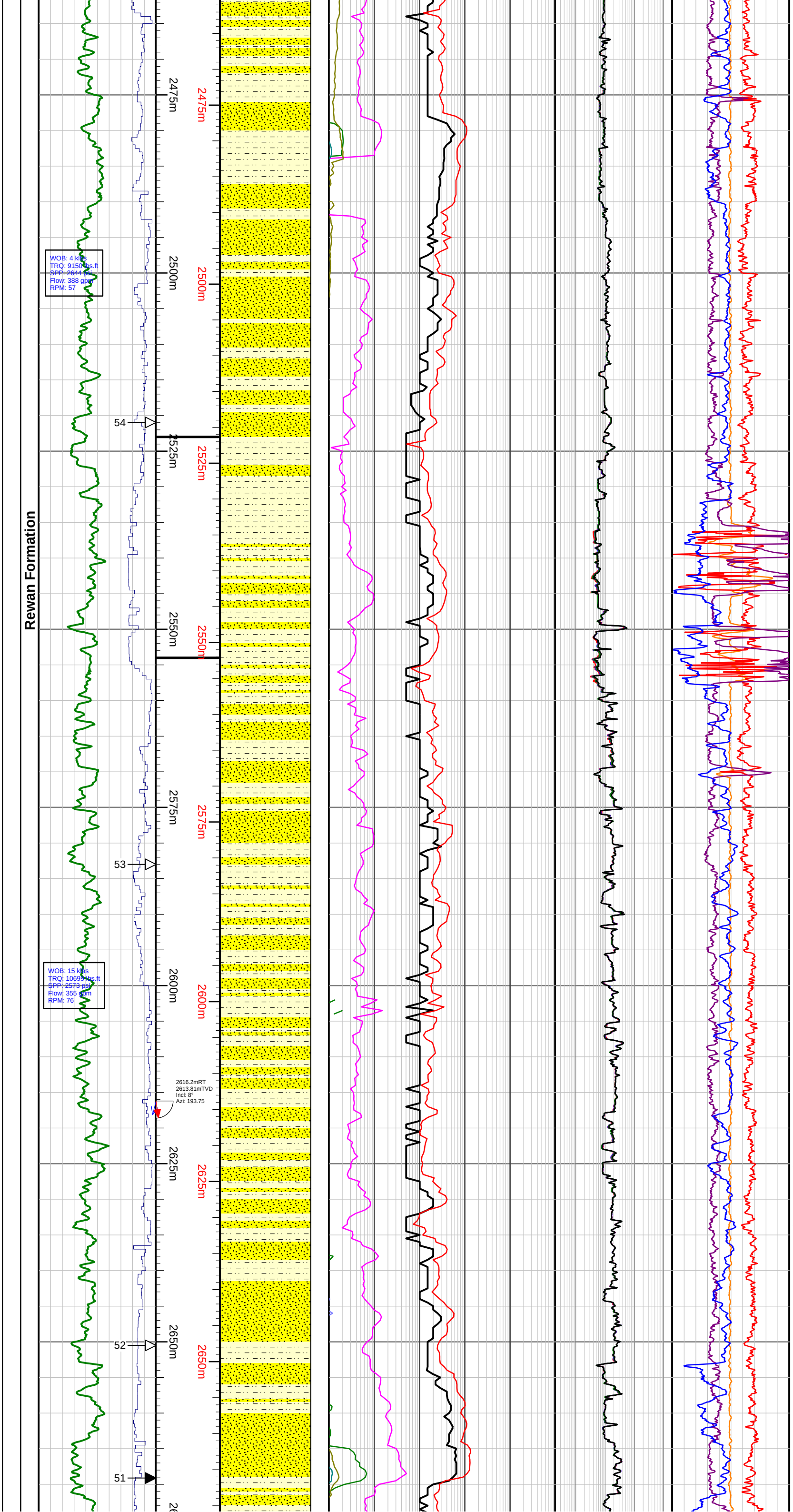
SANDSTONE: off white, clear-translucent, very fine to fine, well sorted, sub angular to sub rounded, friable to moderately hard aggregates, weak to moderately strong siliceous cement, trace weak calcareous cement, trace carbonaceous specks, very poor visual porosity, no fluorescence.

SILTSTONE: red brown, brown grey, light to medium brown, minor green grey, argillaceous and grades to CLAYSTONE in parts, arenaceous in parts.

SANDSTONE: green grey, very fine to medium, sub angular to sub rounded, moderately well sorted, firm to moderately hard, calcareous cement, trace to occasional argillaceous matrix, common to abundant lithics (green grey, brown to red brown, grey), trace altered feldspar, poor visible porosity, no fluorescence.

SILTSTONE: red brown, brown grey, light to medium brown, minor green grey, firm to moderately hard, sub blocky to sub fissile, argillaceous and grades to CLAYSTONE in parts, arenaceous in parts.

SANDSTONE: green grey, very fine to medium, sub angular to sub rounded, moderately well sorted, firm to moderately hard, calcareous cement, trace to occasional argillaceous matrix, common to



abundant lithics (green grey, pale brown, red brown, grey), trace altered feldspar, poor visible porosity, no fluorescence.

SILTSTONE: red brown to dark red brown, minor medium grey to green grey, firm to moderately hard, sub blocky to sub fissile, argillaceous and grades to CLAYSTONE in parts, slightly arenaceous in parts, trace carbonaceous specks and micro mica, trace to rare light brown TUFF fragments.

SANDSTONE: green grey to grey, light brown grey, very fine to medium, minor fine grained aggregates, sub angular to sub rounded, moderately well sorted, firm to moderately hard, trace loose grains, calcareous cement, trace argillaceous matrix, common lithics (green grey, grey, red brown to orange, light brown), poor to very poor visible porosity, poor inferred porosity, no fluorescence.

SILTSTONE: red brown to dark red brown, minor medium grey to green grey, firm to moderately hard, sub blocky to sub fissile, argillaceous and grades to CLAYSTONE in parts, slightly arenaceous in part, trace carbonaceous specks and micro mica, trace to rare light brown TUFF fragments.

SILTSTONE: red brown to dark red brown, occasional medium grey to green grey, firm to moderately hard, sub blocky to sub fissile, argillaceous and grades to CLAYSTONE in parts, slightly arenaceous in part, trace carbonaceous specks and micro mica, trace to rare light brown to light grey TUFF fragments.

SANDSTONE: green grey to medium grey, minor light brown grey, very fine to fine, trace medium grains, sub angular to sub rounded, moderately well sorted, firm to moderately hard, calcareous cement, trace to occasional argillaceous matrix, occasional to common lithics (green grey, grey, red brown to orange, light brown, cream), very poor visible porosity, no fluorescence.

SANDSTONE: pale grey, off white, clear to translucent, pale orange and green in parts, very fine to medium, predominantly fine, moderately well sorted, sub angular to sub rounded, generally loose and clean grains, friable to moderately hard aggregates in parts, weak to moderately strong siliceous cement, trace weak calcareous cement, common red, grey and cream lithics, trace carbonaceous specks, poor visual and inferred porosity, no fluorescence.

SILTSTONE: medium grey to green grey, some red brown and brown grey, firm to moderately hard, sub blocky to sub fissile, argillaceous and grades to CLAYSTONE in parts, rare carbonaceous specks, trace TUFF fragments (off white, pale brown, rare black specks and pyrite).

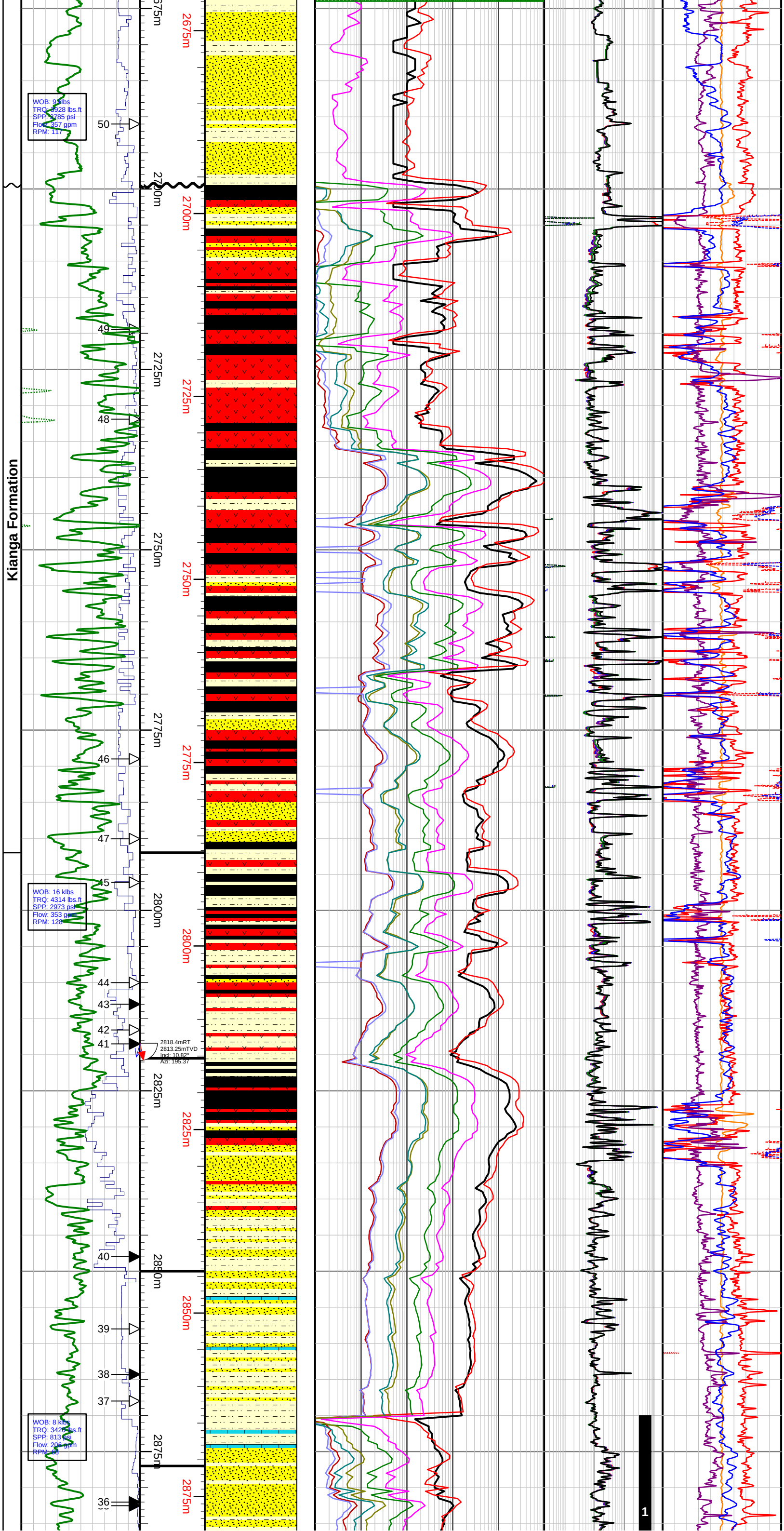
SANDSTONE: medium grey, very fine to medium, rare coarse grains, angular to sub rounded, moderately sorted, firm to moderately hard, common loose grains, calcareous cement, occasional to common argillaceous matrix, common to abundant lithics (green grey, grey, red brown, pale yellow, cream), rare carbonaceous specks, poor visual and inferred porosity, no fluorescence.

SILTSTONE: light to medium grey, brown grey, minor green grey and trace red brown, firm, sub blocky to sub fissile, argillaceous, grades to CLAYSTONE in parts, occasionally arenaceous in parts, rare TUFF fragments, rare carbonaceous specks.

SANDSTONE: medium grey, green grey, very fine to medium, rare coarse grains, minor very fine to fine aggregates, angular to sub rounded, moderately sorted, moderately hard, occasional loose grains, calcareous cement in parts, siliceous cement in parts, trace to occasional argillaceous matrix, occasional to common lithics, poor to very poor visual and inferred porosity, no fluorescence.

SANDSTONE: light grey, off white, clear to translucent, pale orange, light green, very fine to medium, moderately sorted, sub angular to sub rounded, rounded in parts,friable to moderately hard aggregates, common loose grains, weak to moderately strong calcareous cement, weak siliceous cement in parts, minor off white argillaceous matrix, common cream, grey and orange lithics, trace biotite flakes, trace carbonaceous specks, poor visual & inferred porosity, no fluorescence.

SILTSTONE: medium grey, medium greenish grey, trace reddish brown and light brown, moderately hard to hard, sub blocky to sub fissile, argillaceous, trace very fine arenaceous, micro micaceous in parts, trace micro carbonaceous specks.



SANDSTONE: pale grey, off white, clear to translucent, light green, pale orange, very fine to coarse, predominantly fine to medium, moderately sorted, sub angular to sub rounded, friable to moderately hard aggregates, common loose grains, weak to moderately strong calcareous cement, weak siliceous cement in parts, minor off white argillaceous matrix, common cream, grey and green lithics, rare carbonaceous specks, poor visual porosity, poor to rare fair inferred porosity, no fluorescence.

COAL: black, very dark brown in parts, dull to sub vitreous, moderately hard, sub blocky to sub fissile, blocky in parts, uneven to sub conchoidal fracture in parts.

SILTSTONE: medium to dark grey, moderately hard to hard in parts, argillaceous, very fine arenaceous in parts, sub fissile to sub blocky, minor micro carbonaceous specks.

TUFF: off white, pale grey, hard to very hard, micritic, sub blocky to sub fissile, common mico carbonaceous specks.

COAL: black, dull to occasionally sub vitreous, argillaceous to earthy, firm to moderately hard, sub blocky to blocky.

TUFF: light grey, occasional light brown grey, firm to hard, siliceous in parts, trace black specks, dull orange mineral fluorescence.

SILTSTONE: brown black, firm to moderately hard, sub blocky to sub fissile, carbonaceous and grades to COAL in parts, argillaceous in parts.

COAL: black, dull to occasionally sub vitreous, argillaceous to earthy, firm to moderately hard, sub blocky to blocky.
TUFF: light grey, occasional light brown grey, firm to hard, siliceous in parts, trace black specks, dull orange mineral fluorescence.
SILTSTONE: brown grey to brown black, firm to moderately hard, sub blocky to sub fissile, carbonaceous and grades to COAL in parts, argillaceous in parts.

SANDSTONE: light to medium grey, brown grey, very fine to fine, trace medium, sub angular to sub rounded, moderately well sorted, firm to moderately hard, calcareous cement, occasional argillaceous matrix, carbonaceous specks, trace lithics, poor to very poor visible porosity, no fluorescence.

SILTSTONE: brown black, dark grey, firm to moderately hard, sub blocky to sub fissile, carbonaceous in parts and grades to COAL in parts, argillaceous in parts.

SANDSTONE: light grey to medium grey, fine to medium, trace coarse grains, sub angular to sub rounded, moderately sorted, firm to moderately hard, calcareous cement in parts, siliceous cement in parts, occasional to common argillaceous / tuffaceous matrix, trace green and grey lithics, trace altered feldspar, poor visible porosity, no fluorescence.

COAL: black, dull to earthy, moderately hard, sub fissile to sub blocky, uneven fracture.

TUFF: off white, pale brown, firm to hard, siliceous in parts, waxy texture in parts, trace black specks, dull orange mineral fluorescence.

SILTSTONE: medium to dark grey, moderately hard, sub blocky to sub fissile, argillaceous to very fine arenaceous in parts, trace carbonaceous specks.

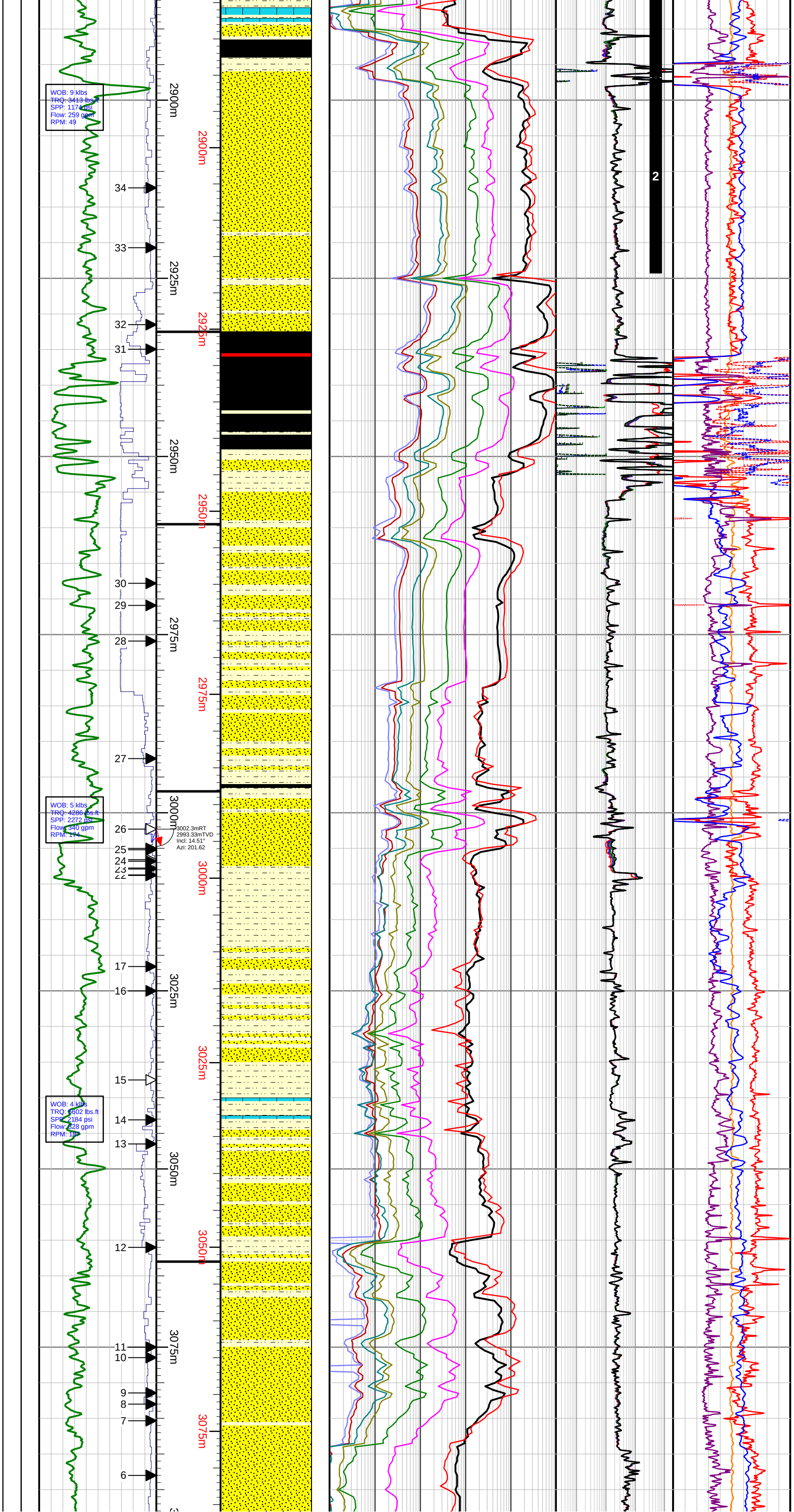
SANDSTONE: off white, light grey, very fine to fine, occasionally medium, moderately well sorted, sub angular to sub rounded, moderately hard to hard aggregates, moderately strong calcareous cement, strong siliceous cement in parts, minor off white argillaceous matrix, common cream and grey lithics, trace carbonaceous specks, very poor to poor porosity, no fluorescence.

SILTSTONE: dark grey, dark brown in parts, moderately hard to hard, sub blocky to sub fissile, argillaceous to very fine arenaceous grading to very fine SANDSTONE, minor cream lithics, minor LIMESTONE laminations, trace carbonaceous specks.

LIMESTONE: pale brown, cream to off white, crystalline, micritic in parts, moderately hard to hard, trace fossil fragments, occurring as micro laminations in SILTSTONE.

SANDSTONE: medium to dark grey, off white in parts, very fine to fine, well sorted, sub angular to sub rounded, hard aggregates, occasional loose grains, strong calcareous cement, strong siliceous cement in parts, grey argillaceous matrix, grading to to arenaceous SILTSTONE in parts, minor cream and pale green lithics, trace carbonaceous specks, tight visual and inferred porosity, no fluorescence.

SANDSTONE: light grey to off white, translucent, very fine to medium grained, moderately sorted, sub angular to sub rounded, firm to friable, common calcareous cement, rare light grey argillaceous / silty matrix, trace green lithics, poor to fair visual



porosity, trace dull orange mineral fluorescence.

COAL: black, very dark brown in parts, dull to earthy, brittle to predominantly moderately hard, sub blocky to blocky, sub fissile in parts, uneven to hackly fracture.

SANDSTONE: white to very light grey, translucent, clear, fine to medium grained, sub angular to sub rounded, fair sorting, friable, rare calcareous cement, common light grey and white argillaceous matrix, trace lithics, trace carbonaceous fragments, poor visual porosity, trace dull orange mineral fluorescence

SANDSTONE: translucent, clear, light grey, fine to medium grained, sub angular to sub rounded, moderate sorting, friable to loose, weak calcareous cement, minor light grey argillaceous matrix, poor to fair visual porosity, trace dull orange mineral fluorescence

COAL: very dark brown to black in parts, dull to earthy, moderately hard, blocky to sub blocky, even to uneven fracture.

CARBONACEOUS SILTSTONE: dark grey to very dark grey black, grading to silty COAL, moderately hard, blocky.

SANDSTONE: translucent, clear, light brown, very fine to medium, fair sorting, sub angular to sub rounded, friable to moderately hard, minor siliceous cement, common light brownish grey argillaceous matrix, rare lithics, rare carbonaceous inclusions, poor visual porosity, trace dull orange mineral fluorescence.

SILTSTONE: medium to dark brownish grey, medium to dark grey, grey black grading to CARBONACEOUS SILTSTONE, trace lithics, moderately hard, sub blocky to sub fissile.

SANDSTONE: light to medium grey, translucent, very fine to medium grained, predominantly medium, moderately sorted, sub angular to sub rounded, friable, weak calcareous cement, common light grey argillaceous matrix, rare green lithics, rare carbonaceous specks, poor visual porosity, trace dull orange mineral fluorescence.

SANDSTONE: translucent, clear, light grey, very fine to medium, poor sorting, sub angular to predominantly sub rounded, friable to loose, weak calcareous cement, minor off white to very light grey argillaceous matrix, commonly loose clean quartz grains, rare green lithics, fair inferred porosity, trace dull orange mineral fluorescence.

SANDSTONE: translucent, clear, medium to coarse grained, fair sorting, sub angular to sub rounded, loose, trace calcareous cement, predominantly loose clean quartz grains, fair inferred porosity, no fluorescence.

SILTSTONE: dark to very dark grey, moderately hard, argillaceous, trace very fine arenaceous, sub fissile to fissile, sub blocky in parts, micro micaceous, trace carbonaceous specks.

SANDSTONE: clear to translucent, off white to pale grey in parts, fine to coarse, predominantly medium, moderately sorted, sub angular to sub rounded, angular in parts, generally loose and clean grains, occasionally friable aggregates, weak calcareous cement, poor to fair inferred porosity, poor visual porosity, no fluorescence.

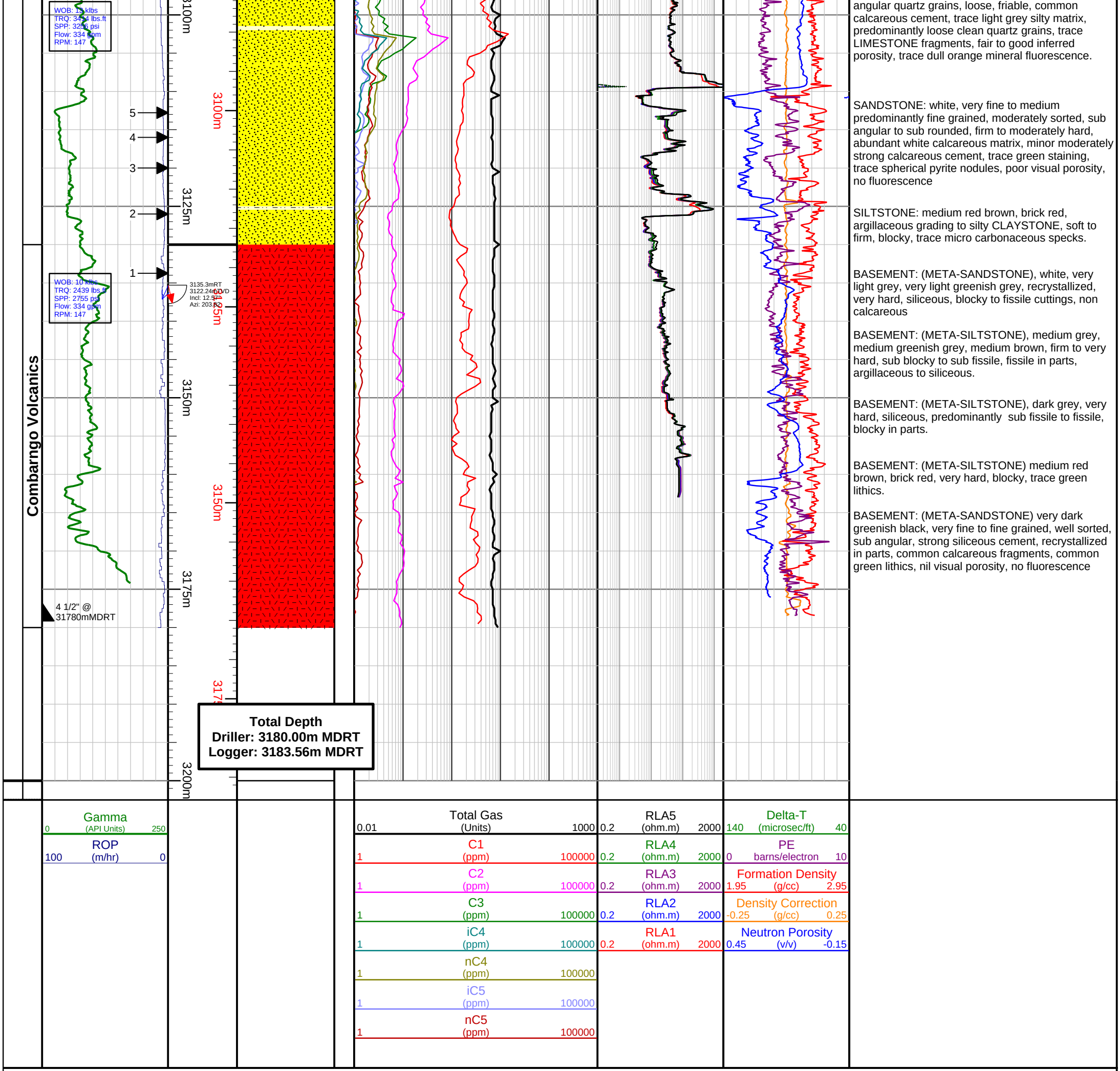
SILTSTONE: very dark grey, grey black in parts, firm to moderately hard, sub fissile to fissile, sub blocky in parts, argillaceous, trace carbonaceous specks.

LIMESTONE: white, translucent, microcrystalline, hard, brittle in parts, blocky to shardy.
SILTSTONE: medium dark brownish grey, medium dark grey, firm to moderately hard, blocky, slightly arenaceous, slightly calcareous, trace lithics.

SANDSTONE: translucent, clear, white, light grey, fine to medium grained, trace coarse, fair sorting, sub angular to predominantly sub rounded, friable, loose in parts, rare calcareous cement, loose, trace green lithics, trace carbonaceous specks, poor to fair visual porosity, no fluorescence

SILTSTONE: dark grey, dark brown in parts, moderately hard, sub blocky to blocky, argillaceous, micro mica in parts, trace micro carbonaceous specks.
SANDSTONE: clear to translucent, off white to pale grey in parts, very fine to very coarse, predominantly fine to medium, poorly sorted, sub angular to angular, sub rounded in parts, generally loose and clean, common fractured quartz, rare friable aggregates, weak siliceous and calcareous cement, no visual matrix, trace carbonaceous specks, trace TUFF fragments, poor to fair inferred porosity, poor visual porosity, trace dull orange mineral fluorescence.

SANDSTONE: translucent, clear, trace green staining of grains, white, very fine to medium, poor sorting, sub angular to sub rounded, trace coarse



angular quartz grains, loose, friable, common calcareous cement, trace light grey silty matrix, predominantly loose clean quartz grains, trace LIMESTONE fragments, fair to good inferred porosity, trace dull orange mineral fluorescence.

SANDSTONE: white, very fine to medium predominantly fine grained, moderately sorted, sub angular to sub rounded, firm to moderately hard, abundant white calcareous matrix, minor moderately strong calcareous cement, trace green staining, trace spherical pyrite nodules, poor visual porosity, no fluorescence

SILTSTONE: medium red brown, brick red, argillaceous grading to silty CLAYSTONE, soft to firm, blocky, trace micro carbonaceous specks.

BASEMENT: (META-SANDSTONE), white, very light grey, very light greenish grey, recrystallized, very hard, siliceous, blocky to fissile cuttings, non calcareous

BASEMENT: (META-SILTSTONE), medium grey, medium greenish grey, medium brown, firm to very hard, sub blocky to sub fissile, fissile in parts, argillaceous to siliceous.

BASEMENT: (META-SILTSTONE), dark grey, very hard, siliceous, predominantly sub fissile to fissile, blocky in parts.

BASEMENT: (META-SILTSTONE) medium red brown, brick red, very hard, blocky, trace green lithics.

BASEMENT: (META-SANDSTONE) very dark greenish black, very fine to fine grained, well sorted, sub angular, strong siliceous cement, recrystallized in parts, common calcareous fragments, common green lithics, nil visual porosity, no fluorescence

Dunk 1

Sidewall Cores

Depth (mMDRT)	Recovery	Lithology/Comments
3133.75	Good	Volcanics/Metamorphics: mottled red brown fine to medium quartz groundmass, some large green grey deformed phenocrysts/inclusions, trace dark mafic inclusions.
3126.00	Good	Meta-SILTSTONE: light grey to light green grey, red brown, silty groundmass with light green grey granule to pebble TUFF fragments and lithics, with diffuse boundaries.
3120.00	Poor	SANDSTONE: light grey, very fine to fine, occasional medium, re-crystallised in part, hard, very poor visible porosity, no fluorescence.
3116.00	Good	SANDSTONE, light grey mottled with dark grey, very fine to fine, some re-crystallised with diffuse grain boundaries, moderately hard, very poor to tight visible porosity, no fluorescence.
3112.78	Good	SANDSTONE: light grey, very fine to fine, occasional medium, recrystallised in part, occasional red brown silty inclusions, moderately hard to hard, very poor visible porosity, no fluorescence.
3093.00	Good	SANDSTONE: medium dark grey to dark grey, very fine to fine, trace medium grains, occasional light grey LIMESTONE micro laminations and inclusions, silty matrix, very poor visible porosity, trace patchy orange mineral fluorescence.
3085.33	Fair	CONGLOMERATE: medium to dark grey, fine to coarse, common granule to pebble white to light grey and green grey siliceous inclusions, occasional silty inclusions, hard, very poor visible porosity, trace patchy orange mineral fluorescence.
3083.00	Fair	SANDSTONE: brown grey, very fine to medium, occasional coarse grains, sub angular to sub round, trace lithics, occasional quartz overgrowths, hard, very poor visible porosity, trace patchy dull orange mineral fluorescence.
3081.43	Poor	SANDSTONE: very light grey, very fine to very coarse clear to translucent quartz grains, sub angular to sub round, poorly sorted, abundant white to light grey matrix, moderately hard, very poor visible porosity, trace fluorescence as above.
3076.47	Fair	SANDSTONE: light to medium grey, very fine to medium, common coarse to pebble sized inclusions, moderately sorted, trace dark grey lithics, moderately hard, poor to very poor visible porosity, trace dull orange patchy mineral fluorescence.
3075.00	Good	SANDSTONE: light to medium grey, very fine to medium, common coarse to pebble sized inclusions, silty matrix, moderately hard, very poor visible porosity, trace patchy dull orange mineral fluorescence.
3061.00	Good	SANDSTONE: medium dark grey, very fine to medium, trace coarse grains, sub angular to sub round, moderately sorted, silty matrix, occasional light grey to white lithics, silty matrix, moderately hard to hard, very poor visible porosity, patchy dull orange mineral fluorescence.
3046.48	Good	SANDSTONE: medium dark grey, very fine to fine, occasional medium to coarse grains, occasional lithics, silty matrix, moderately hard to hard, very poor visible porosity, trace patchy dull orange mineral fluorescence.
3043.10	Good	SILTSTONE: dark grey, dark brown grey, argillaceous, occasional LIMESTONE micro laminations, moderately hard to hard.
3037.50	None	No sample recovered
3025.00	Good	SILTSTONE: dark grey, dark brown grey, argillaceous, occasionally arenaceous in part, trace lithics, trace micro-mica, moderately hard to hard.
3021.58	Good	SILTSTONE: very dark grey, dark brown grey, argillaceous, trace micro-mica, hard.
3008.72	None	No sample recovered.

3007.76	None	No sample recovered.
3006.58	None	No sample recovered.
3005.00	Fair	Sample recovered (broken) from damaged core head of Run 5. SANDSTONE: light grey, fine to coarse, occasional granular grains, very poorly sorted, trace lithics, quartz overgrowths, moderately hard to hard, poor visible porosity, trace patchy dull orange mineral fluorescence.
3008.80	Good	SANDSTONE: light brown grey, fine to coarse, angular to sub round, poorly sorted, occasional argillaceous matrix, occasional broken grains, trace to occasional lithics, moderately hard, poor visible porosity, patchy dull orange mineral fluorescence.
3007.90	Fair	SANDSTONE: fine to coarse as above.
3006.80	Good	SANDSTONE: light brown grey, fine to very coarse, occasional granular grains, very poorly sorted, angular to sub round, occasional lithics, occasional matrix, poor visible porosity, trace patchy dull orange mineral fluorescence.
3005.20	Poor	Poor quality sample – rubble. SANDSTONE: as above.
3002.30	None	No sample recovered
2992.40	Good	SANDSTONE: medium dark grey brown grey, very fine to fine, trace medium grains, sub angular to sub round, silty matrix, very poor visible porosity, occasional patchy dull orange mineral fluorescence.
2975.90	Good	SANDSTONE with interbedded SILTSTONE. SANDSTONE: as described above. SILTSTONE: dark grey, argillaceous, slightly arenaceous, hard.
2970.90	Good	SANDSTONE: light to medium grey, very fine to fine, trace medium grains, sub angular to sub round, moderately sorted, trace matrix, trace lithics, moderately hard, very poor visible porosity, occasional patchy dull orange mineral fluorescence.
2967.80	Fair	SANDSTONE: light to medium grey, very fine to coarse, angular to sub round, poorly sorted, trace argillaceous matrix, occasional lithics, very rare pyrite, quartz overgrowths, very poor visible porosity, rare patchy dull orange mineral fluorescence.
2934.95	Good	SANDSTONE: medium to dark grey, fine to medium, occasional coarse, poorly sorted, angular to sub round, trace matrix, common altered feldspar, occasional quartz overgrowths, very poor visible porosity, no fluorescence.
2931.50	Good	SANDSTONE: medium dark grey, fine to medium, occasional coarse, angular to sub round, common to abundant altered feldspar (cream to light brown), trace matrix, occasional quartz overgrowths, very poor visible porosity, no fluorescence.
2920.70	Good	SANDSTONE: generally as described above – common to abundant altered feldspar, trace to occasional matrix, trace lithics, moderately hard to hard, very poor visible porosity, no fluorescence.
2912.30	Good	SANDSTONE: medium grey, light brown grey, fine to coarse, trace very coarse grains, trace argillaceous matrix, common lithics, common altered feldspar, occasional quartz overgrowths, moderately hard to hard, very poor visible porosity, no fluorescence.
2882.50	Good	SANDSTONE: medium grey, fine to medium, occasional coarse, sub angular to sub round, moderately sorted, common lithics, occasional altered feldspar (cream, pale brown), moderately hard, very poor visible porosity, no fluorescence.
2882.00	Good	SANDSTONE" medium grey, fine to medium, trace coarse grains, occasional lithics, trace to occasional altered feldspar, moderately hard to hard, very poor visible porosity, no fluorescence.
2868.00	None	No sample recovered
2864.30	Good	SILTSTONE: medium dark grey, abundant LIMESTONE fragments, fossil fragments.
2858.00	None	No sample recovered.
2848.00	Good	SANDSTONE with interbedded SILTSTONE separated by Tuffaceous laminae. SANDSTONE: medium dark grey, very fine to fine, grades to SILTSTONE, occasional lithics, rare carbonaceous specks, moderately hard, very poor visible porosity, no fluorescence. SILTSTONE: light grey, very finely arenaceous and grades to SANDSTONE. TUFF / CLAYSTONE?: pale brown firm.
2818.49	Good	SILTSTONE: light to medium grey, very finely arenaceous and grades to very fine SANDSTONE in part, occasional carbonaceous specks, micro-mica, moderately hard to hard.
2816.57	None	No sample recovered.
2813.00	Fair	SANDSTONE: light grey, very fine, grades to SILTSTONE, sub angular to sub round, occasional cark micro-specks, moderately hard, very poor visible porosity, no fluorescence.
2810.00	None	No sample recovered.
2796.11	None	No sample recovered.
2779.00	None	No sample recovered.
2790.07	None	No sample recovered.
2731.91	None	No sample recovered.
2719.45	None	No sample recovered.
2691.00	None	No sample recovered.
2669.12	Good	SANDSTONE: light to medium grey, green grey, very fine to medium, trace coarse grains, sub angular to sub round, trace carbonaceous specks, common to abundant lithics (green grey, grey, pale orange), trace altered feldspar, moderately hard, very poor visible porosity, no fluorescence.
2650.50	None	No sample recovered.
2582.99	None	No sample recovered.
2520.97	None	No sample recovered.
2384.85	Good	SANDSTONE: light grey, light brown grey, fine to very coarse, angular to sub round, occasional matrix, trace lithics, occasional altered feldspar, poor to fair visible porosity, no fluorescence.

Conventional Core

No	Interval (m MDRT)	Cut (m)	Recovered (m)	Recovery (%)	Formation
1	2870.00 - 2897.00	27.00	26.66	98.7	Scotia Coal Cycle, Tinowon Formation
2	2897.00 - 2924.27	27.27	27.61	101.0	Tinowon Formation, Upper Tinowan Sandstone

MWD Summary

Hole Size (inch)	Tool	Run	Depth Interval (mMDRT)	Date	Max Temp (°C)
17 1/2"	HDS1-L/GAMMA RAY/AWR	1	53 - 1080	21-11-2014 to 26-11-2014	60
12 1/4"	HDS1-L/GAMMA RAY/AWR/DPM	2	1088 - 2313	30-11-2014 to 07-12-2014	70
6 3/4"	HDS1-L/GAMMA RAY/AWR/DPM	3	2316 - 2866	12-12-2014 to 18-12-2014	84
6 3/4"	HDS1-L/GAMMA RAY/AWR/DPM	4	2860 - 3057	22-12-2014 to 25-12-2014	81
6 3/4"	HDS1-L/GAMMA RAY/AWR/DPM	5	3057 - 3153	25-12-2014 to 28-12-2014	83