SIMON PETROLEUM TECHNOLOGY WELL: 35/8-1

Print: 6734 T	Units: [✓ M] F	Top	Bottom	Scale	TD
Length: 32 FT	Initials: APC	405	4340	1/500	4346

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SIMON PETROLEUM TECHNOLOGY SPT

COMPLETION LOG

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Continuation – 0

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completion 0 5

Norwegian Gulf Exploration Co. A/S 35/8-1

NORWEGIAN GULF EXPLORATION CO. A/S

PRELIMINARY COMPOSITE LOG

Norwegian North Sea – Well 35/8-1

LICENCE : PL 058
WELL CLASS : EXPLORATION
STATUS : P & A GAS CONDENSATE DISCOVERY
SPUDDED : 27 JULY 1980
COMPLETED : 24 JANUARY 1981
TOTAL DEPTH : 4346·5 m (14,260 ft.)

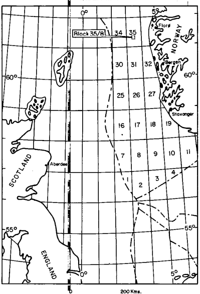
LICENCEES : STATOIL 50%, NORWEGIAN GULF EXPLORATION Co. A/S. 30%, NORSKE GETTY 20%

1981

SCALE 1:500

WELL CLASS :	EXPLORATION	LOCATION :	61° 21' 26·37" N, 03° 21' 44·09" E.
RIG :	SEDCO 704	SEISMIC LINE :	79-2-35A, s.p. 460
CONTRACTOR :	SEDCO	POSITIONING :	DECCA
RIG UNDER TOW :	21 JULY 1980	METHOD :	DECCA PULSE 8 / SAT. NAV.
SPUDDED :	27 JULY 1980	WATER DEPTH :	376·4 m. (1235 ft.)
REACHED TD :	4 DECEMBER 1980	K.B. ELEVATION :	25·9 m. (85 ft.)
RIG RELEASED :	24 JANUARY 1981	T.D. DRILLER :	4344·9 m. (14,255 ft.)
MUD LOGGING :	GEARHART-GEODATA	TVD :	4343·5 m. (14,250 ft.)
VEL. SURVEY :	SEISMOGRAPH SERVICES LTD.	T.D. LOGGER :	4346·5 m. (14,260 ft.)
PALAEONTOLOGY :	PALEOSERVICES	B.H.T. :	143°C. (290°F.)
WELLSITE GEOLOGISTS :	R.E. BIDDLE, M.J. OATES D.H. BODECOTT, O.H. INDERHAUG.	BOTTOMED IN :	TRIASSIC (RHAETIAN)
PREPARED BY :	D.H. BODECOTT, M.J. OATES		
CHECKED BY :	N.H. DEWHIRST		

INDEX MAP



HOLE SIZE/ MUD TYPE	CASING & THREAD	SHOE	CEMENT
	42" GUIDE BASE EXTENSION	412·1m TO BASE	NONE
ML – 577·3m 36" hole SEA WATER	30" 1" WALL 310 lb GRADE B VETCO	565·1m	883 SX 'G' with 0.8 Gal/Sack D-111 and 1220 SX NEAT 'G' +0·3% $CaCl_2$
577·3m – 890m 26" hole SEA WATER with VISCOUS SLUGS Wt. 8·9	20" 0·635" WALL 133 lb GRADE X-56 VETCO 'R' conn.	877·5m	2071 SX 'G' with 0·42 Gal/Sack D-75 and 497 SX NEAT 'G'
890m – 2196·3m 17½" hole Gyp-lignosulfanate Wt. 9·9 Vis 54 Rmf 0·215 @ 69°F	13⅜" 0·514" WALL 72 lb BUTTRESS N-80	2184·3m	2054 SX 'G' with 3% Bentonite + 0·04 Gal/Sack D-81 and 450 SX 'G' + 0·02 Gal/Sack D-81
2196·3m – 3522·6m 12¼" hole KCl Polymer Wt. 10·0 - 13·5 Vis 63 Rmf 0·055 @ 62°F	9⅝" 0·472" WALL 47 lb BUTTRESS P110 N-80	3493·6m	1200 SX 'G' + 0·1 Gal/Sack D-73 + 0·1 Gal/Sack D-80 + 0·01 Gal/Sack D-101 and 400 SX 'G' + same additives as 1st. stage

SCHLUMBERGER LOGS

TOOL	RUN	INTERVAL	DATE	BHT °C(°F)
ISF/SONIC/GR/SP	1 (GR to seabed)	736·0m – 565·0m	3 . 8 . 80	<38° (100°)
	2 (GR to 480m)	2174·0m – 876·0m	18 . 8 . 80	52° (125°)
	3 (with caliper)	3511·0m – 2177·0m	17 . 9 . 80	84° (185°)
	4	3582·0m – 3492·0m	8 . 10 . 80	97° (207°)
	5	3789·0m – 3492·0m	29 . 10 . 80	104° (220°)
	6	4342·0m – 3492·0m	5 . 12 . 80	138° (280°)
FDC/CNL/GR/CAL	1 (Not CNL)	732·0m – 575·0m	4 . 8 . 80	<38° (100°)
	2	2169·0m – 876·0m	18 . 8 . 80	53° (128°)
	3	3510·5m – 2177·0m	18 . 9 . 80	88° (190°)
(Run 4 : CNL-GR logged thru csg. while RIH 3135-3514m)	4	3583·0m – 3492·0m	8 . 10 . 80	94° (202°)
	5	3788·0m – 3492·0m	29 . 10 . 80	108° (226°)
	6	4345·0m – 3492·0m	5 . 12 . 80	138° (280°)
DLL/MSF/GR/SP/CAL	1	3765·0m – 3492·0m	29 . 10 . 80	115° (240°)
	2	4335·0m – 3492·0m	6 . 12 . 80	143° (290°)
HDT	1	3510·0m – 2981·0m	18 . 9 . 80	95° (204°)
	2	4342·0m – 3492·0m	7 . 12 . 80	127° (260°)
NGT	1	3787·0m – 3492·0m	31 . 10 . 80	115° (240°)
LDT	1	3787·0m – 3492·0m	31 . 10 . 80	110° (230°)
HRT/CCL	1	876·0m – 400·0m	7 . 8 . 80	29° (85°)
	2	2184·0m – 100·0m	20 . 8 . 80	59° (138°)
LSS/VDL/SONIC WAVEFORM	1	4343·0m – 3492·0m	6 . 12 . 80	143° (290°)
CBL/VDL/CCL/GR	1	3492·0m – 2040·0m	24 . 9 . 80	97° (207°)
	2	4327·0m – 3350·0m	17 . 12 . 80	142° (287°)
CCL x PR	1	3645·3m – 3636·5m	19 . 12 . 80	NR
	2	3575·7m – 3565·5m	6 . 1 . 81	110° (230°)

CST DEPTHS (m) (Reference Log FDC Run 6)

Attempted 53, Recovered 15

3522·6m – 4346·5m			
8½" hole	7" Liner		750 SX'G' + 0·35
KCl Polymer	0·408" WALL	3352m – 4343·7m	Gal/Sack D-73, 0·25
Wt. 14·5 Vis 64	29 lb		Gal/Sack D-80, 0·04
Rmf 3587m : 0·07 @ 61°F 3787m : 0·66 @ 67°F 4346·5m : 0·078 @ 62°F	X - Line P110		Gal/Sack D-109

CEMENT PLUGS

1. 3611·9m – 3596·6m
2. 3541·8m – 3291·8m
3. 2194·6m – 2150·1m
4. 548·6m – 449·6m

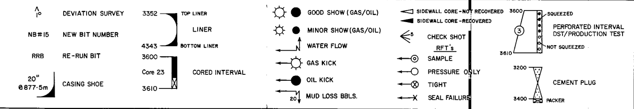
RFT RESULTS : MAX BHT : Run 1 : 103°C (218°F), Runs 2-5 : 119°C (247°F), Runs 6-8 : 143° (290°F)

RUN	No.	DEPTH (m)	FORM. PRESS.	SAMPLE	RUN	No.	DEPTH (m)	FORM. PRESS.	SAMPLE
1	1	3521	7972	Pressure	6	6	3929·5	Tight	Pressure (2)
	2	3550·5	7998	..		7	3930·0	8984	..
	3	3565·9	8000	..		8	4001·0	No Seal	.. (2)
	4	3570·5	8003	..		9	4001·5	Tight	.. (3)
2	1	3552·2	8015	..		10	4145·0	No Seal	.. (5)
	2	3606·2	8033	..		11	4175·8	9700	.. (2)
	3	3653·5	8060	..		12	4201·0	9769	..
	4	3687·8	8111	..		13	4238·5	9792	..
	5	3671·5	8086	Sample		14	4313·0	9897	..
	6	3671·0	8082	Partial Sample		15	4313·0	9897	Fluid Sample
3	1	3524·6	7979	Sample		16	4313·0	Tight	Pressure
4	1	3576·5	8000	..		17	4249·0	..	..
5	1	3637·5	8036	..	7	1	4248·0	9905	..
	2	3576·5	8017	Pressure		2	4229·0	Tight	.. (2)
	3	3552·2	8018	..		3	4210·5	No Seal	..
	4	3524·6	7987	..		4	4176·0	9698	Failed Sample
6	1	3530·5	7985	..		5	4109·0	9416	Pressure
	2	3567·5	8004	..		6	3576·0	8025	Sample
	3	3654·0	8056	..	8	1	3524·5	7977	..
	4	3831·5	8680	..		2	4248·0	9861	Pressure
	5	3881·5	8876	..		3	4313·0	9846	..

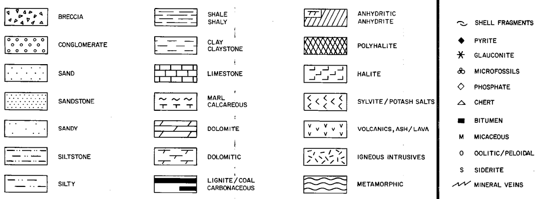
3726	3878·4		4014		4233	
3744	3881·5		4031·5	Rec.	4248	
3779·5	3884·7		4077·5		4262	
3790	3889·5	Rec	4099	Rec.	4275·5	
3813·3	3892·5		4104·5		4282·2	
3816·2	3903	Rec	4130		4295·5	
3831·4	3909·5	Rec	4145		4297	Rec.
3832·5	3930		4161·2		4306	Rec.
3833·6	3957·4		4167		4317	
3858·5	3964	Rec	4180·5		4324·1	Rec.
3863	3975	Rec	4200		4326·5	Rec.
3866·7	3982	Rec	4209·5		4332	
3869	3991·5		4217		4337·6	Rec.
					4340	Rec.

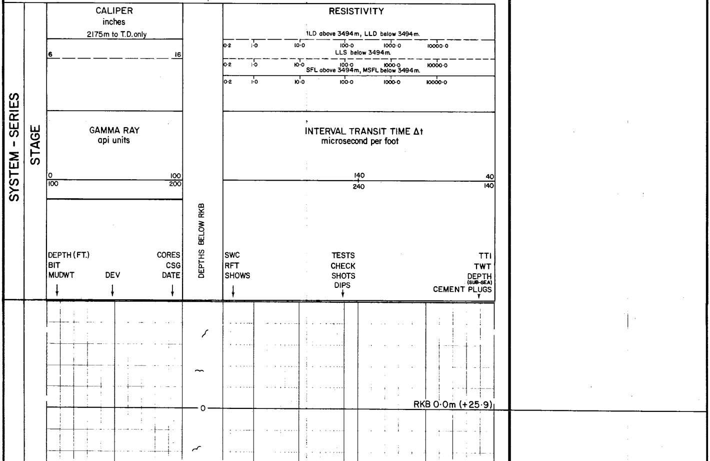
CONVENTIONAL CORES

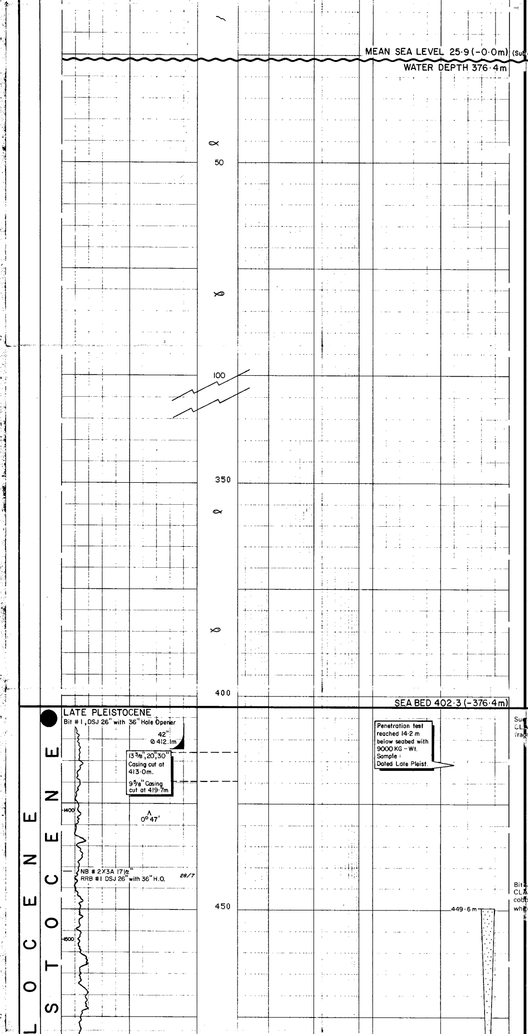
No.	INTERVAL CUT	RECOVERED	RECOVERY	FORMATION
1	3522·6m – 3531·1m	6·13	72%	Brent Sst.
2	3531·1m – 3549·4m	18·3	100%	..
3	3549·4m – 3567·7m	17·7	97%	..
4	3567·7m – 3569·8m	2·1	100%	..
5	3569·8m – 3587·3m	16·9	96·6%	..
6	3587·3m – 3602·43m	14·6	95·4%	..
7	3602·43m – 3610·35m	7·92	100%	..
8	3610·35m – 3628·1m	17·75	100%	..
9	3628·1m – 3647·3m	19·2	100%	..
10	3647·3m – 3665·95m	18·65	100%	..
11	3665·95m – 3671·9m	5·95	100%	..
12	3671·9m – 3690·95m	19·05	100%	..
13	3690·95m – 3709·65m	18·7	100%	..



GEOLOGICAL LEGEND

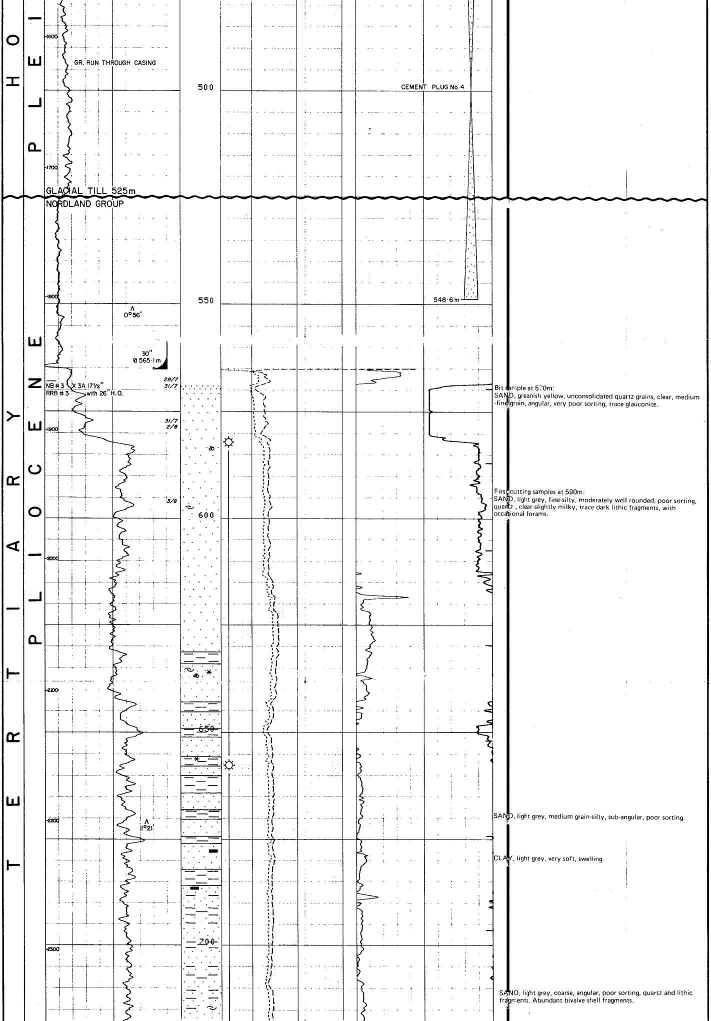






Surface sample from pre-spud test.
CLAY, brown-grey, slightly silty-fine sandy, with occasional fragments of angular metamorphic rock.

Bit sample at 444m:
CLAY, grey-brown grey, soft, sticky, sandy, with pebbles and cobbles of gneiss, basalt, pelite, psammite and Limestone white, moderately hard-soft, chalky.



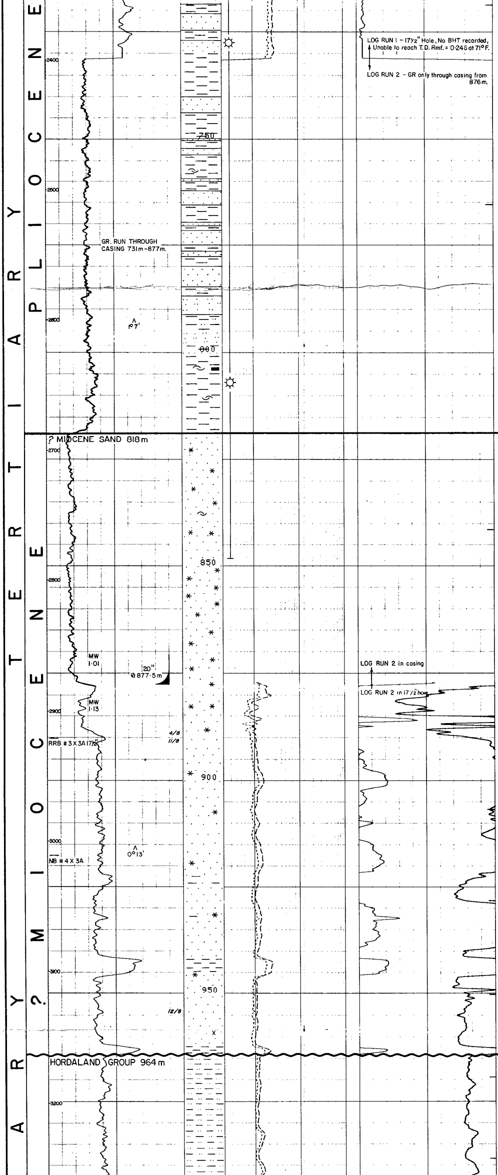
Bit sample at 570m:
SAND, greenish yellow, unconsolidated quartz grains, clear, medium-fine grain, angular, very poor sorting, trace glauconite.

First cutting samples at 590m:
SAND, light grey, fine-silty, moderately well rounded, poor sorting, quartz, clear-slightly milky, trace dark lithic fragments, with occasional forams.

SAND, light grey, medium grain-silty, sub-angular, poor sorting.

CLAY, light grey, very soft, swelling.

SAND, light grey, coarse, angular, poor sorting, quartz and lithic fragments. Abundant bivalve shell fragments.



CLAY, light grey, soft, silty fine sandy, swelling.

CLAY, light grey, soft, sticky, very silty - sandy, swelling.

orange refl.

SILT, light grey, argillaceous, occasional fine sandy, very poorly sorted, angular quartz grained

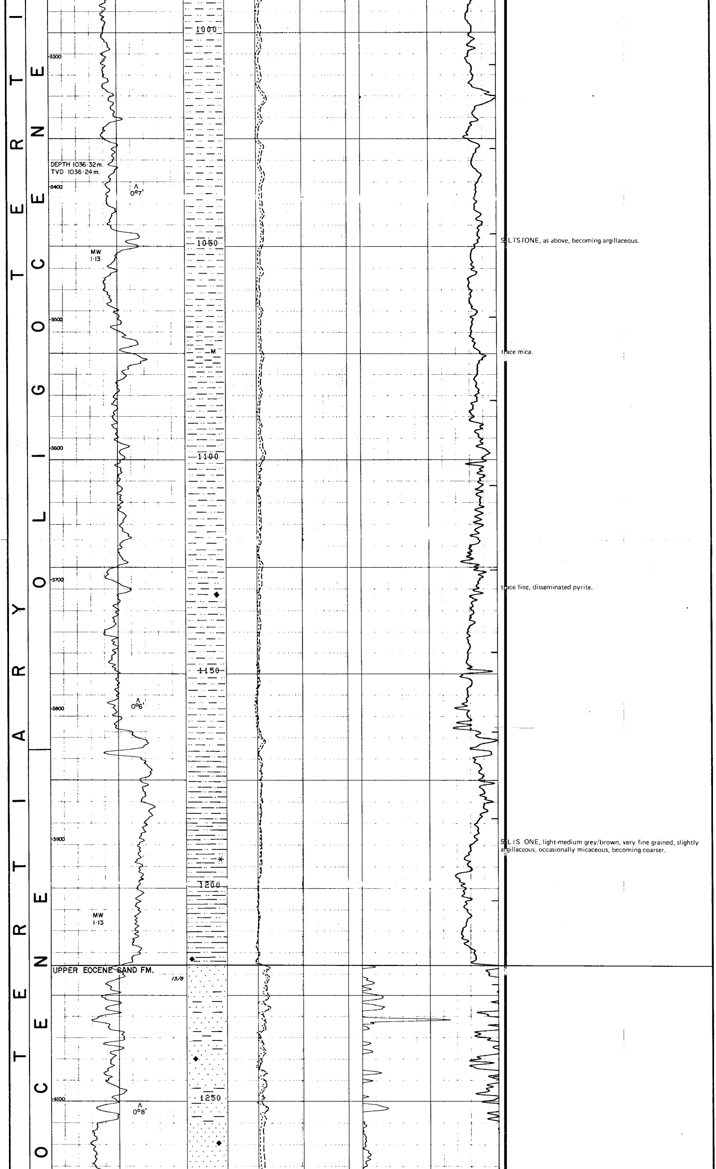
SAND, greenish grey, fine - medium, moderately well rounded, moderately sorted, quartz, clear-milky. Abundant glauconite, very dark green, rounded reniform grains, fine-medium grained, well sorted, moderately hard, brittle.

Bit sample at 890m:
SILT/SAND, dark green, very fine grain, quartz and abundant glauconite.

SAND, clear, green, red, yellow, coarse grain, sub-rounded, moderately well sorted, abundant glauconite.

green refl.

SILTSTONE, light grey-brown, moderately soft, slightly argillaceous and glauconitic, shalier with depth.

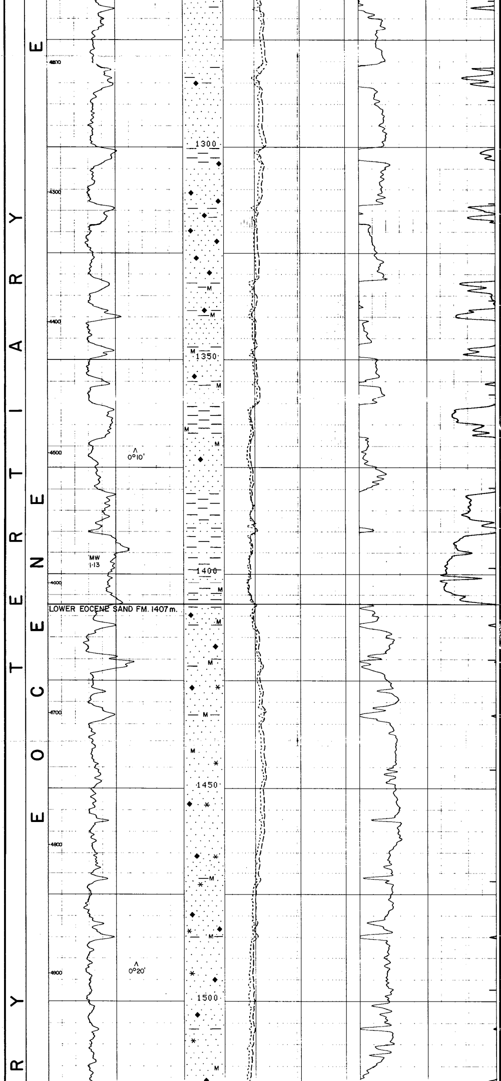


SILTSTONE, as above, becoming argillaceous.

trace mica.

trace fine, disseminated pyrite.

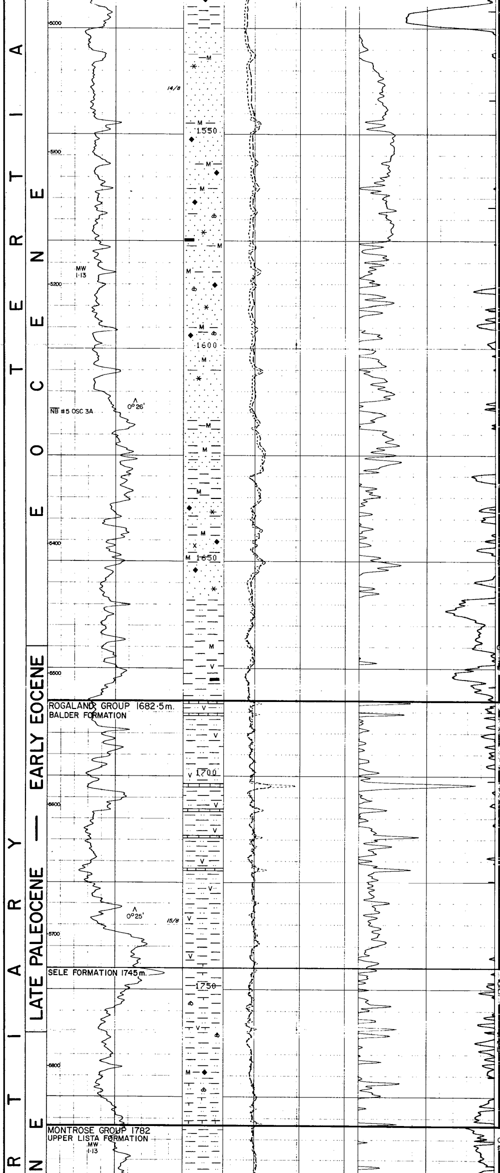
SILTSTONE, light-medium grey/brown, very fine grained, slightly argillaceous, occasionally micaceous, becoming coarser.



CLAYSTONE, light grey-green, soft, crumbly, micromicaceous, occasionally silty, non-calcareous.

CLAYSTONE, light red-brown in part.

SAND, clear, translucent, milky, occasionally green, medium-coarse grained, angular-subangular, subspherical, moderate-poor sorting, quartz, with occasional mica, glauconite pellets and pyrite. Becoming more cemented, occasionally well cemented.



CLAYSTONE, light grey, soft, crumbly, non-calcareous.

traces of CLAYSTONE, red, very silty.

SANDSTONE, clear, medium-coarse grain, siliceous cement.

CLAYSTONE, red.

trace SILTSTONE, brown-grey, tuffaceous.

SILTSTONE, grey, grey-brown, soft-firm, argillaceous, micromicaceous non-calcareous, poorly cemented, occasionally tuffaceous, pyritic, glauconitic, lignitic.

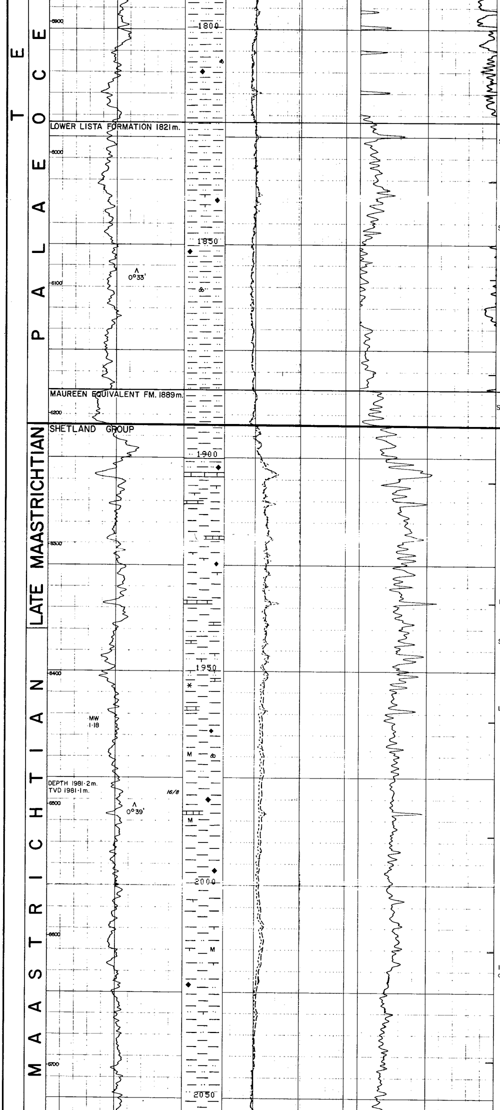
CLAYSTONE, red, soft-firm, silty, micromicaceous, non.calcareous.
and green,as above, slightly silty,
and tan, as above , soft, amorphous.

TUFF. light grey, grey, white, firm-moderately hard, occasionally calcareous, moderately welded, angular red-brown-buff lithic fragments, crystal overgrowths, feldspar phenocrysts.

CLAYSTONE, black-green, soft-firm, blocky, micromicaceous, traces of glauconite and micropyrite.

SILTSTONE, light grey, grey, occasionally brown-tan, soft-moderately hard, micaceous, lithic and volcanic fragments becoming less frequent with depth.

CLAYSTONE, light brown, light grey, green, mottled, soft-firm, sub-fissile, trace glauconite, occasionally silty.



SILTSTONE, light grey, grey, occasionally brown-tan, soft-moderately hard, very argillaceous, micaceous.
with thin laminœ of:
SILTSTONE, tan, round-angular grains, trace glauconite and pyrite, calcareous.

SILTSTONE, as above.

SILTSTONE, as above, becoming more calcareous.

SILTSTONE, as above

CLAYSTONE, light grey, grey, green, occasionally brown, soft, crumbly, occasionally silty, calcareous.

LIMESTONE, white, micritic, soft-firm, pure.

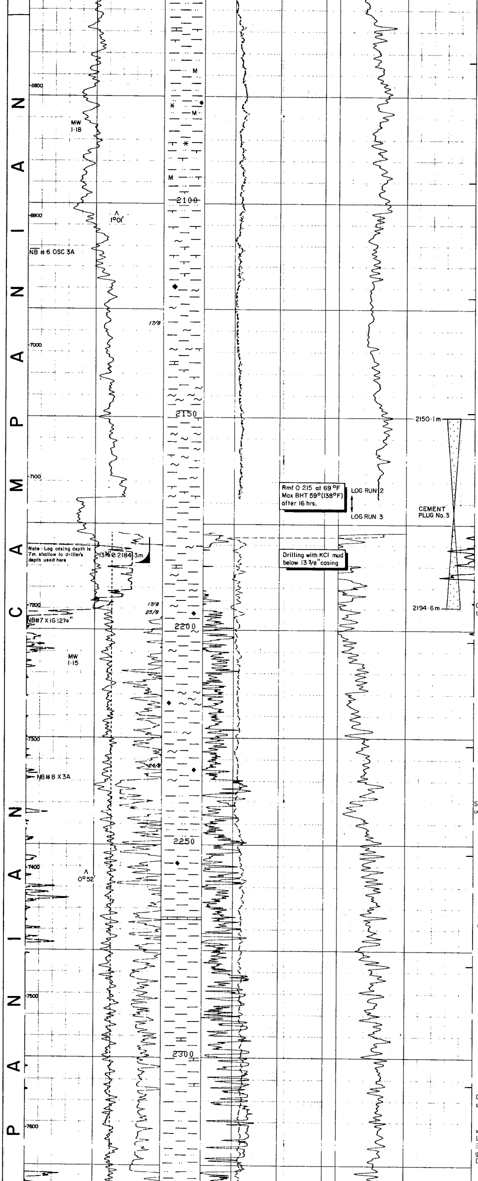
LIMESTONE, white, soft, chalky, pure.

LIMESTONE, as above, becoming harder.

SILTSTONE, as above.

LIMESTONE, as above, slightly argillaceous.

Interbeds of SILTSTONE, grey, light grey, dark grey, micaceous, occasionally calcareous.



LIMESTONE, white, buff, soft-moderately hard, slightly argillaceous, micritic.

SILTSTONE, grey-brown, soft, very argillaceous, micaceous traces of pyrite and glauconite.

CLAYSTONE, as above, becoming softer and marly,
MARL, light grey, soft, glauconitic, grading into
CLAYSTONE as above.

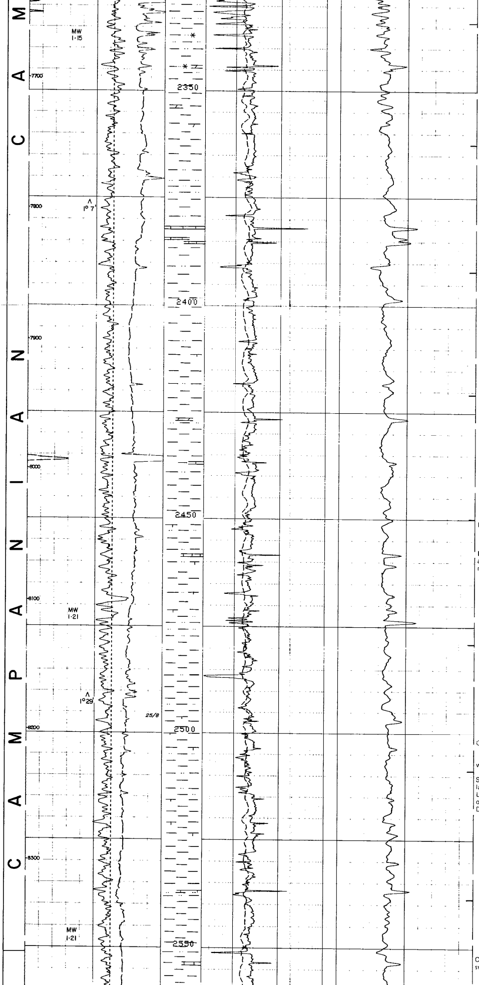
CLAYSTONE, light-dark grey, soft-moderately hard, silty, trace pyrite, calcareous.

SILTSTONE, light grey, light brown, moderately hard-soft occasionally fissile.

LIMESTONE, orange, orange-brown, hard, argillaceous, silty, microcrystalline, angular fracture, secondary white calcite veining.

CLAYSTONE, light grey, light grey-brown, grey-brown, light brown, soft, blocky, slightly swelling, calcareous.

with traces of:
LIMESTONE, white, hard, microcrystalline.
SILTSTONE, dark grey, moderately hard, calcareous, becoming glauconitic.
DOLOMITE, buff-cream, hard, microcrystalline.



strong trace DOLOMITE, as above.

Trace SHALE, black, hard, laminated, non calcareous.

CLAYSTONE, grey, grey-brown, light brown, soft, slightly swelling
occasionally calcareous.
with occasional laminæ of :
SILTSTONE, light-dark grey, grey-brown, green grey, poorly sorted,
soft, non calcareous.

DOLOMITE, buff, cream, yellow, hard, microcrystalline..

LIMESTONE,brown-red brown, hard, microcrystalline.

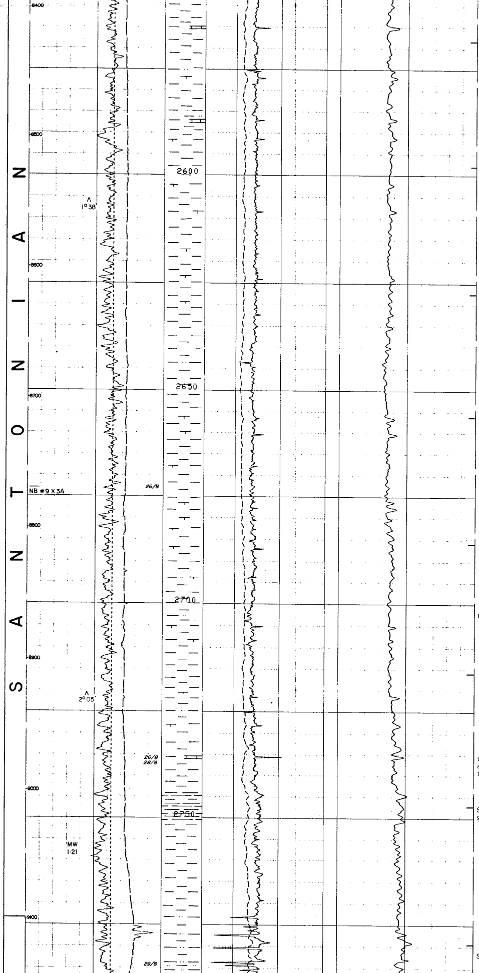
LIMESTONE, white-off white, soft-moderately hard, micaceous,
argillaceous, occasionally dolomitic and ferruginous,
microcrystalline, trace of bioturbation.

CLAYSTONE, light grey, dark grey, green, as above.

with interbeds of:

SILTSTONE, light-dark grey, grey-brown, soft-moderately hard,
laminated, calcareous.
LIMESTONE, white, buff, moderately hard,micritic,
occasionally argillaceous.
DOLOMITE, brown, cream, very hard, sucrosic.

CLAYSTONE, light-medium grey, soft-firm, blocky, occasionally
swelling, occasionally silty, more uniform than above.

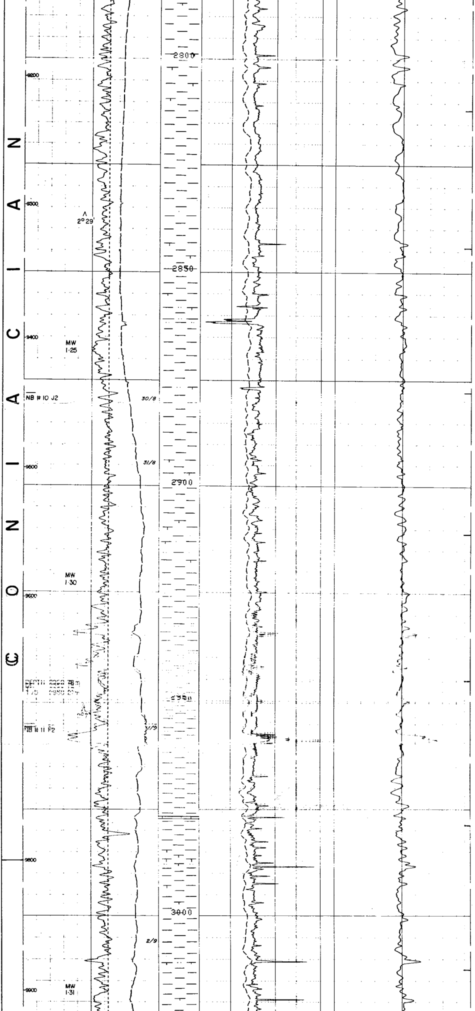


CLAYSTONE, as above.

trace LIMESTONE, white, cream, buff, orange-brown, soft, argillaceous or silty.
trace DOLOMITE, dark orange-brown, hard.

SHALE, dark-medium grey, firm, blocky-fissile, micromicaceous, slightly glauconitic, non-swelling, sucrosic.

SILTSTONE, light grey, hard, calcareous, glauconitic.



traces of CLAYSTONE, dark grey, grey-black, hard, angular fracture slightly silty, sub-fissile, non-swelling, slightly calcareous, to [illegible]m:-

CLAYSTONE, as at 2550m, becoming siltier and shalier.

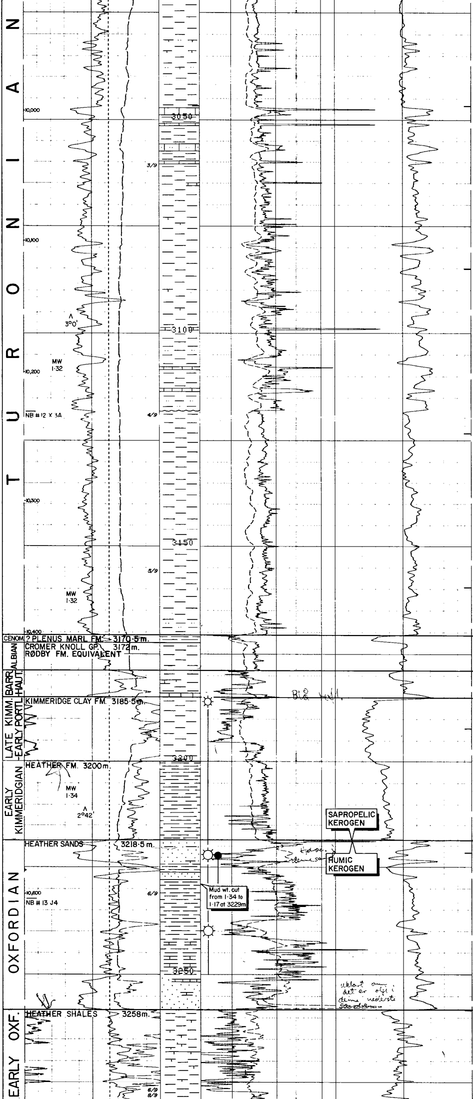
SILTSTONE, medium-light grey, very hard, splintery fracture, quartz, slightly calcareous.

CLAYSTONE, medium grey, soft,-moderately hard, occasionally carbonaceous,and glauconitic, grading to:-
SILTSTONE, as above, argillaceous.

SILTSTONE, white light grey, hard, blocky, quartz, non- calcareous.

CLAYSTONE, medium grey, moderately hard, blocky-sub fissile, trace silt, non-calcareous.

SILTSTONE white, hard, quartz, glauconite, calcareous matrix



LIMESTONE, white-off white, soft, chalky, pure.

CLAYSTONE, light-medium grey, soft, calcareous, occasionally marly, glauconitic.
LIMESTONE/SILTSTONE, white-medium grey, hard, quartzitic, micaceous, glauconotic, abundant forams.

CLAYSTONE, light-medium grey, soft-moderately hard, blocky, occasionally sub-fissile, calcareous, with occasional beds of:-
CLAYSTONE, as above, green-grey, glauconitic, and:-
CLAYSTONE, as above, very calcareous-marly.

LIMESTONE, white, tan, hard, slightly argillaceous, occasionally slightly silty, microcrystalline-sucrosic.

Minor unconformity or fault.

CLAYSTONE, medium grey, dark grey, soft-firm, blocky-sub-fissile, slightly micromicaceous, silty, non-swelling, becoming more calcareous.

SHALE, dark grey-black, hard, fissile, micromicaceous, calcareous, occasionally silty.

CLAYSTONE, red-brown, soft, sticky, slightly swelling, slightly silty, non-calcareous.

CLAYSTONE, white, light grey, green-grey, as above.

LIMESTONE, white-off white, soft-firm, argillaceous.

CLAYSTONE, dark grey, brown, soft, sticky, slightly swelling, occasionally slightly silty, calcareous.

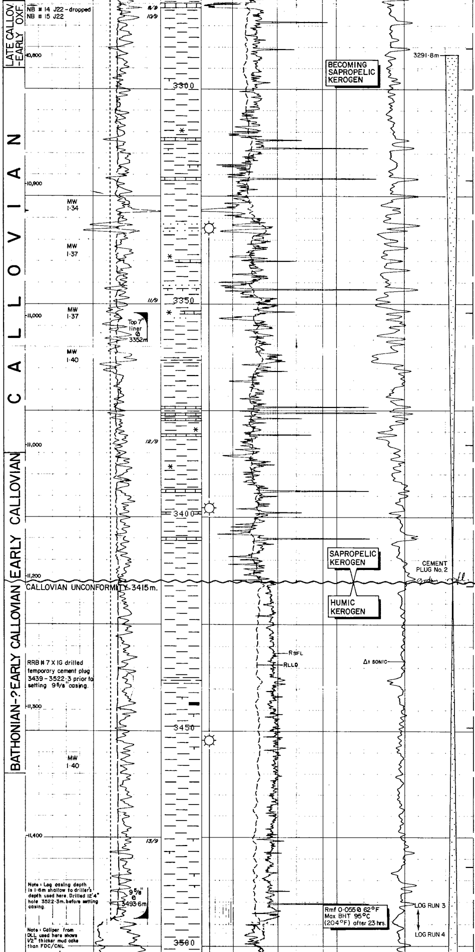
SHALE, medium-dark grey, olive-grey, grey-brown, micromicaceous pyritic, slightly silty, slightly calcareous.

SANDSTONE, white, buff, clear, upper fine-fine grain, sub-round – sub angular, friable, slightly argillaceous, non-calcareous.

SHALE, grey, brown, moderately firm-hard, fissile, silty, micromicaceous, carbonaceous (lignitic).
with occasional thin interbeds of:-
SHALE, green, light green-grey, as above, glauconitic.
SHALE, light grey, as above,
SILTSTONE, green, hard.

SANDSTONE, as above.
LIMESTONE, buff, white, soft, silty, occasionally dolomitic.

CLAYSTONE, brown, soft-firm, carbonaceous, slightly calcareous.
with stringers of:-
LIMESTONE/DOLOMITE, medium brown, hard, argillaceous, microcrystalline.



CLAYSTONE, tan, buff, soft-firm, slightly calcareous, carbonaceous, slightly silty.

CLAYSTONE, as above, becoming more calcareous.

LIMESTONE, tan, brown, buff, soft-moderately hard, argillaceous, microcrystalline.

SANDSTONE, predominantly clear quartz, fine-coarse, subangular-subrounded, well sorted.

LIMESTONE, light brown, brown, hard, pyritic, carbonaceous, occasionally dolomitic, splintery fracture.

SHALE/CLAYSTONE, light-medium brown, grey-brown, firm-hard, slightly silty, micromicaceous, pyritic, moderately calcareous, subfissile.

CLAYSTONE, light grey, grey-brown, firm-soft.

LIMESTONE, white, tan, buff, soft-moderately hard, carbonaceous, microcrystalline.

CLAYSTONE, light grey, soft, sticky, slightly calcareous, pyritic.

SHALE interbeds.

'Callovian Unconformity'

CLAYSTONE, brown, dark brown, grey, soft-firm, slightly silty, non calcareous, micromicaceous, pyritic.

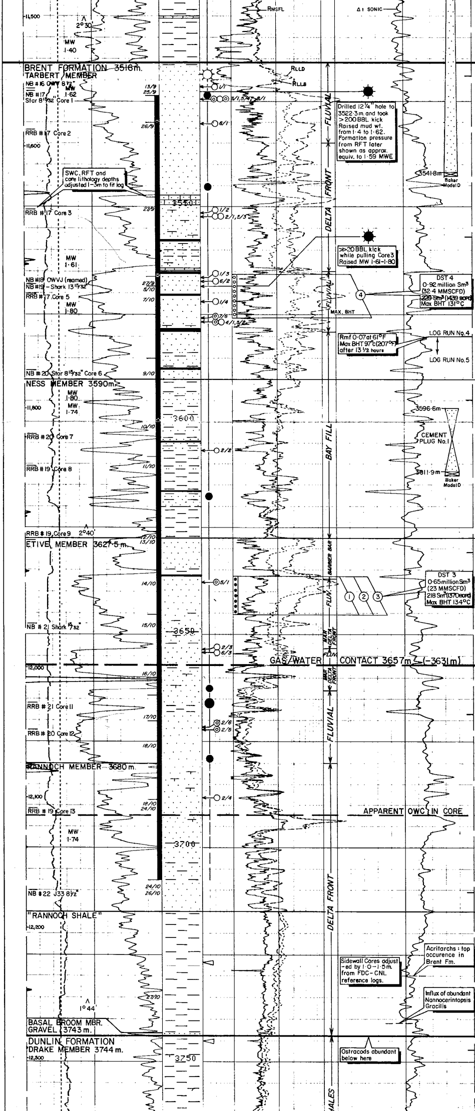
CLAYSTONE, brown

SHALE, dark grey, firm, fissile, non calcareous.

trace lignite, black.

CLAYSTONE, as above, becoming greyer, softer, siltier.

CLAYSTONE as above, becoming shalier.



SANDSTONE, dark yellow-brown, fine-very coarse, subangular-subrounded, hard, slightly calcareous, good visible porosity

SANDSTONE, grey, very hard, very calcareous, sparry matrix.

SANDSTONE, light grey, light brown, very fine-fine grained, angular-subround, moderately sorted, micaceous laminæ, with interbeds of :- SILTSTONE, very calcareous cement.

LIMESTONE, grey, hard, sandy.
COAL, black, moderately hard, vitreous lustre, angular-conchoidal fracture.

SANDSTONE, dark yellow-brown, finr-grain, angular, poor-medium sorted, siliceous cement, Good visible porosity.

MUDSTONE, black, hard, tight.

SANDSTONE, dark yellow-brown, very fine grain, angular, well sorted quartz, with interbeds of
SILTSTONE/SANDY SILTSTONE, yellowish grey, mica laminae, very poor visible porosity.

MUDSTONE, black, hard, tight.
COAL, black, vitreous, brittle.

SANDSTONE, dark yellow-brown, very fine, angular, well sorted, quartz, mica, carbonaceous, bioturbated.

MUDSTONE, black, hard, splintery, micromicaceous, occasionally carbonaceous, slightly silty.

SANDSTONE, dark yellow-brown, medium-coarse grained, angular, moderately sorted, Good visible porosity at top of unit.

SANDSTONE, dark yellow-brown, coarse, subangular-subround, very well sorted, Good visible porosity.
passing down into:-
SANDSTONE, as above, fine-coarse grained, in small coarsening-up cycles.

SANDSTONE, light grey-brown, fine-medium grained, angular, calcareous, micaceous, Fair visible porosity.

Concretionary doggers:-SANDSTONE, as above, calcareous.

Good visible porosity.

SANDSTONE, grey-medium grey, fine-very fine grained, well sorted, hard, mica laminae, trace pyrite, Low visible porosity.
Interbeds of:-

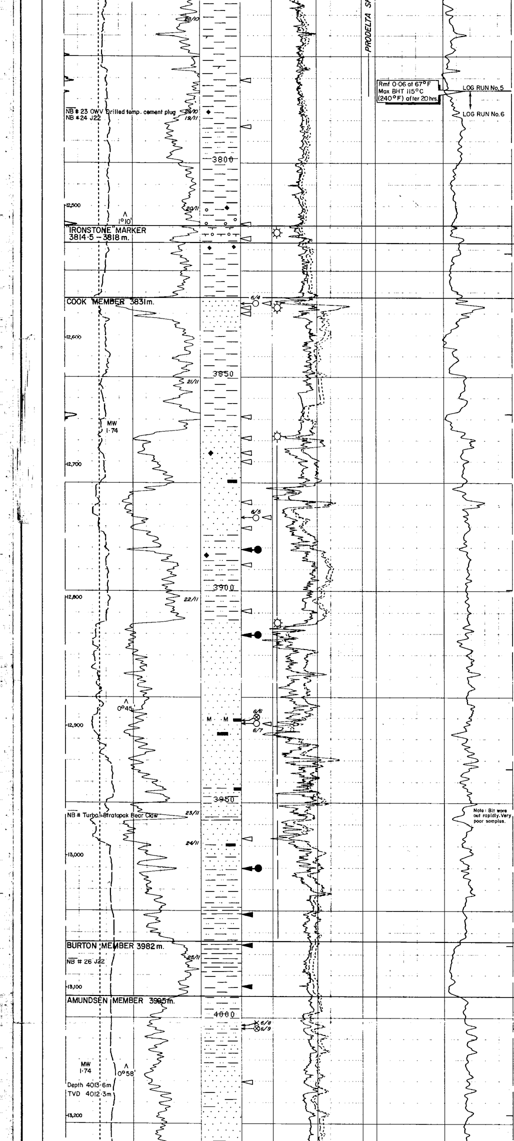
SHALE, black, moderately hard, silty, micaceous.

Appearance of first micaceous CLAYSTONE.

SHALE/CLAYSTONE. light-dark grey, soft-firm, sticky-crumbly, silty, slightly micaceous, occasionally with disseminated pyrite,

SANDSTONE, fine-coarse, angular-round, very poorly sorted. Occurs as quartz grains at base of silty micaceous shale/claystones.

SHALE/CLAYSTONE as above, less silty with traces of :
LIMESTONE, white, hard splintery fracture, microcrystalline, and:-
DOLOMITE, light brown, hard, splintery, microcrystalline.



CLAYSTONE/SHALE, light-dark grey, soft-firm, occasionally slightly micaceous, silty, swelling, calcareous.

SILTSTONE, light grey, coarse-very fine sand grained, angular, well sorted, very argillaceous, pyritic, non calcareous.

CLAYSTONE, medium grey, soft-firm, plastic, silty, swelling, trace pyrite, slightly calcareous.

IRONSHOT LIMESTONE, white-cream, moderately hard, white clay insoluble residue, abundant greenish-white chamositic ooliths.

SANDSTONE, clear-buff, lower medium grained , angular, very well sorted, quartz, trace mica, occasional large coarse frosted quartz grains, occasionally moderately well cemented, siliceous, very slightly calcareous, Poor visible porosity.

CLAYSTONE, dark brownish grey, light grey, soft-firm, occasionally slightly shaly, non-slightly calcareous, occasionally slightly swelling.

SANDSTONE, clear-brownish white, medium-fine grained, occasionally silty, subangular-subrounded, very well sorted, Quartz, traces of chlorite and pyrite, chalky calcareous cement, Often very friable, Poor visible porosity.

SANDSTONE, light brown-white, upper medium-fine grained, subangular (larger grains rounded) well sorted, Quartz, traces of muscovite, lignite, disseminated pyrite, slightly calcareous kaolinitic matrix, Poor visible porosity.

SILTSTONE, light grey, hard, slightly calcareous, grading into:-
SHALE, dark grey, firm, fissile.

CLAYSTONE, dark brown, firm-soft, occasionally silty.

SILTSTONE/SHALE, laminated, dark brownish grey, light grey, firm-friable.

SANDSTONE, buff, lower medium grained, angular, well sorted, Fair visible porosity, With SHALE lithoclasts, dark brown, firm, friable.

SANDSTONE, white, clear, upper medium grained, subangular, well sorted, quartz, trace of mica and chlorite, siliceous cement, kaolinitic matrix

SANDSTONE, as above, very micaceous, coaly.

COAL, black-dark brown, hard, blocky-crumbly, with thin white calcite veins, and disseminated pyrite

CLAYSTONE, dark brown-dark grey, soft, occasionally slightly shaly, non swelling, non calcareous.

SHALE, dark brown-black, soft, with carbonaceous flakes.

SANDSTONE, light grey, upper fine-lower medium grain, angular, slightly micaceous,and argillaceous, firm-friable.

SILTSTONE/SANDSTONE, buff, silt-lower very fine sand grained, subangular, well sorted, Quartz, with subordinate muscovite, calcareous cement, and occasional laminae of :-
SHALE, dark grey, firm, micromicaceous, fissile.

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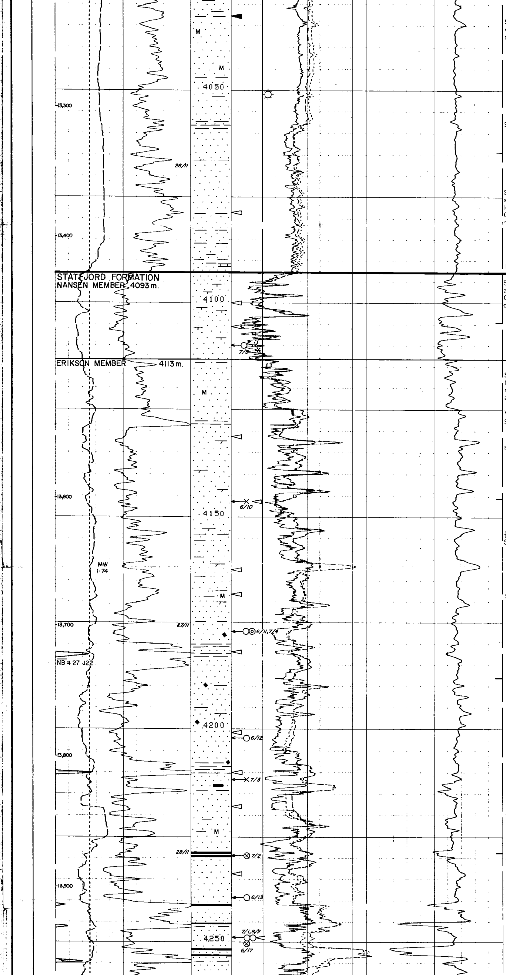
CLAYSTONE/SHALE, dark brown, hard-moderately soft, silty, slightly fissile, non swelling, carbonaceous flakes..
streaks of SILTSTONE, light grey.

SILTSTONE/SANDSTONE, light brownish grey white, coarse silt-lower very fine sand grained, angular, well sorted, Quartz, with traces of mica and chlorite, Siliceous cement, occasionally calcareous,friable

SANDSTONE, grey-white,white, lower very fine grained, angular, well sorted, Quartz, mica, occasionally very calcareous.
with thin interbeds of:-
SHALE, dark brown-grey,hard-soft, micromicaceous, non calcareous, occasional carbonaceous flakes. (Abrupt contacts with sandstones)



SANDSTONE, clear-light grey, lower medium grained, subangular, very well sorted, Quartz, poorly consolidated, Thin argillaceous and micaceous interbeds.

SHALE, dark, grey-black, brittle, fissile.

SANDSTONE, clear-milky, lower fine grained, moderately round-subround, moderately sorted, poorly consolidated quartz, kaolinitic matrix.
CLAYSTONE, brownish grey, firm-soft, occasionally shaly, micromicaceous, silty, trace carbonaceous debris.

LIMESTONE, pale yellow-orange, firm-hard amorphous peloids.

SANDSTONE, white-light grey, coarse-upper medium grained, angular, well sorted, firm-moderately hard, slightly argillaceous, Quartz, with rare sparry calcite cement, kaolinitic matrix, poorly consolidated. Moderate visible porosity.

SANDSTONE, clear-white, medium-coarse grained, subround-round, fair-well sorted, friable-firm, Quartz, with traces of chlorite, muscovite and carbonaceous debris. Cement calcareous, siliceous and dolomitic.

with interbeds of :-
SHALE, dark grey-black, silty, carbonaceous.

strong trace dolomitic cement.

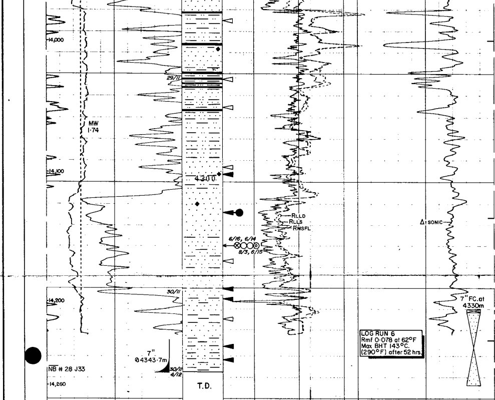
trace SHALE, black-dark grey.
SANDSTONE, as above, becoming more angular.

SILTSTONE, dark brown, sandy, micaceous, non calcareous.

SHALE, dark grey-black, brown-black, silty, carbonaceous-coaly, pyritic, non calcareous,

Occasional laminae of :-
SILTSTONE, medium brown, soft.
SANDSTONE, clear-white, medium-coarse grained, angular-subround, well sorted, loose-firm, Quartz, with traces of pyrite, muscovite, chlorite, carbonaceous debris. Occasional very fine grained mica laminae.
COAL, black, vitreous, brittle.

trace SILTSTONE, brick red, soft, non calcareous.



SILTSTONE, medium brown-light greyish brown, soft, non calcareous.

trace SILTSTONE, brick red.

COAL, as above.

trace SILTSTONE, brick red, dark greyish red, medium-grey brown, soft.
SANDSTONE, clear, white, fine-medium grained, subangular, frequently elongate grains, fair-well sorted,hard, slightly calcareous. Abundant sphaerosiderite (light orange-brown, spherical, pitted grains)

Felsite and siltstone intraclasts appear.

SILTSTONE, light grey, argillaceous, hard, splintery fracture.

SANDSTONE, light grey, coarse-medium grained, angular, poor sorting, Quartz, with dark grey claystone lithoclasts, Kaolinitic matrix. Occasional siliceous cement, poorly consolidated, Arkosic.
with occasional traces of :-

CLAYSTONE/SILTSTONE, orange-red, purple-brown, medium brown-grey brown.

SANDSTONE, buff, medium-fine grain, angular, micromicac., firm.
SANDSTONE, light grey, fine grained, hard, slightly argillaceous.

SILTSTONE/CLAYSTONE, grey, fine grained, hard.
SANDSTONE, grey, fine grained, soft-firm, micaceous, argillaceous.
Interbeds of:- SILTSTONE, grey brown, and:-
CLAYSTONE, light grey, grey, buff, hard-firm, blocky-splintery fracture, non calcareous, occasionally carbonaceous, occasional clear, fine grained matrix-supported quartz grains.

FINAL T.D. DRILLER	4344·9m (-4319m -14170 ft.)
SCHLUMBERGER	4346·5m (-4320m -14175 ft.)
TVD SPERRY SUN	4343·5m (-4317·6m -14165 ft.)
BOTTOM OF HOLE	41·4m in direction S.4°50'E. from the wellhead