**SIMON PETROLEUM TECHNOLOGY** WELL: 34/7-12

| Print: 7567k | Units: [✓ M] F | Top | Bottom | Scale | TD |
|---|---|---|---|---|---|
| Length: FT | Initials: AW | 320 | 2787 | 1:500 | 2784 |

DIGITAL WIRELINE LOGS PACKAGE
1995
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SIMON PETROLEUM TECHNOLOGY SPT

## COMPLETION LOG

51

Enclosure I b.

ESSO / STATOIL / NORSK HYDRO / ELF
DEMINEX / DNO

saga

# Saga Petroleum a.s.

# Composite Well Log

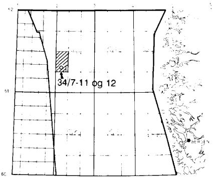
## ● Well 34/7-12

| | | | |
|---|---|---|---|
| **SCALE** | 1:500 | **RIG** | TREASURE SAGA |
| **COUNTRY** | NORWAY | **LOCATION COORDINATES** | |
| **AREA** | B-STRUCTURE | **LATITUDE** | 61° 1~~7~~6' 17.86" |
| **OPERATOR** | SAGA PETROLEUM A.S. | **LONGITUDE** | 02°06" 47.26" |
| **LICENCE** | 089 | **UTM COORDINATES** | 6 793 527.6m N<br>452 441.5m E |
| **RIG TAKEN OVER BY THE LICENCE** | 30.09.87 | **ELEVATIONS** | |
| **DATE SPUDDED** | 11.10.87 | **RKB-MEAN SEA LEVEL** | 26m |
| **T.D. DATE** | 15.11.87 | **RKB-SEA FLOOR** | 216m |
| **RIG RELEASED** | 16.12.87 | **WATER DEPTH** | 190m |
| **COMPLETION STATUS** | OIL DISCOVERY | **TOTAL DEPTH** | |
| | | **driller's depth** | 2784m |
| | | **logger's depth** | 2785m |

| DRILLING CONTRACTOR | MUDLOGGING SERVICE |
|---|---|
| WILH. WILHELMSEN | EXPLORATION LOGGING |

| CASING | SHOE (mRKB) | HOLE SIZE | INTERVALL (mRKB) |
|---|---|---|---|
| 30" | 327 | 36" | 216-332 |
| 20" | 838 | 26" | 332-852 |
| 13 3/8" | 1851 | 17 1/2" | 852-1865 |
| 9 5/8" | 2366 | 12 1/4" | 1865-2784 |

## LOCATION MAP



## OPEN HOLE LOGS

TELECO (MWD) / ATLAS WIRELINE SERVICES

| Casing Record | Hole Size | Logged Interval (m RKB) | Type of Log | Run No. | Date |
|---|---|---|---|---|---|
| 30"<br>327 m | 36"<br>to<br>332 m | 216.0 - 327.0 | GR to surface | 1A | 25.10.87 |
| 20"<br>838 m | 17 1/2"<br>(26")<br>to<br>852 m | 327.0 - 852.0 | MWD<br>(GR, Res, Dir)<br>GR to surface | 1A | 25.10.87 |
| 13 3/8"<br>1851 m | 17 1/2"<br>to<br>1865 m | | MWD | | |
| | | 837.7 - 1852.6 | DIFL-LSBHC-GR | 1A | 25.10.87 |
| | | 837.7 - 1836.1 | CDL-GR | 1A | 25.10.87 |
| | | 858.0 - 1848.7 | COREGUN | 1A | 25.10.87 |
| 9 5/8"<br>2366 m | 12 1/4"<br>to<br>T.D. | | MWD | | |
| | | 2100.0 - 2476.0 | DLL-MLL-GR | 2A | 06.11.87 |
| | | 2100.0 - 2479.5 | CDL-CNL-GR | 2A-B | 06.11.87 |
| | | 2171.0 - 2312.0 | FMT | 2A-E | 06.11.87 |
| | | | MWD | | |
| | | 1852.0 - 2784.3 | DIFL-LSBHC-GR | 3B | 15.11.87 |
| | | 600.0 - 1852.0 | ACBL | 3A | 15.11.87 |
| | | 1852.0 - 2784.4 | CNL-CDL-GR | 3C | 15.11.87 |
| | | 2210.0 - 2474.0 | FMT | 3G | 15.11.87 |
| | | 2210.0 - 2692.0 | FMT | 3H | 17.11.87 |
| | | MISRUN | DIPMETER | 3A | 17.11.87 |
| | | 1850.0 - 2784.0 | DIPMETER | 3B | 18.11.87 |
| | | 2140.0 - 2784.0 | CNL-CDL-GR | 3D | 18.11.87 |
| | | 2125.0 - 2784.0 | DLL-MLL-GR | 3B | 18.11.87 |
| | | | VSP | 3A | 18.11.87 |
| | | 1875.0 - 2775.0 | COREGUN | 3B-C | 19.11.87 |
| T.D.<br>2785 m<br>(logger's depth) | | | | | |

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## GEOLOGICAL SYMBOLS

- ▤ CLAY/CLAYSTONE
- ▤ SHALE
- ▤ SILTSTONE
- ▨ SAND/SANDSTONE
- ▨ CONGLOMERATE
- ▨ BRECCIA
- ▦ LIMESTONE
- ▤ CHALK
- ▨ DOLOMITE
- ▨ MARL
- ▦ SALT
- ▨ ANHYDRITE/GYPSUM
- ▨ VOLCANICS
- ▬ COAL
- ▨ GNEISSEOUS/BASEMENT

## LITH.PREFIXES

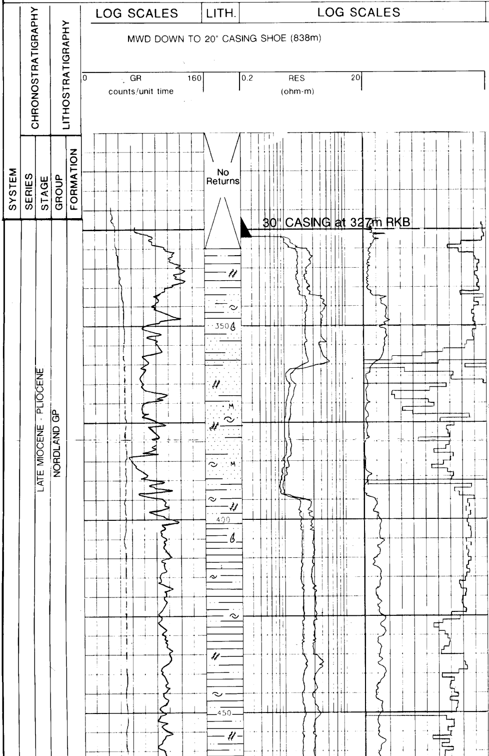
- ⊥ CALCAREOUS
- ∠ DOLOMITIC
- _ ARGILLACEOUS
- ▽ CHERTY
- * GLAUCONITIC
- M MICACEOUS
- P PYRITIC
- v TUFFACEOUS
- ∬ METAMORPHICS
- ⊕ SIDERITE

## FOSSILS

- ∞ FORAMINIFERA
- ~ SHELL DEBRIS
- ⌒ MACROFOSSILS
- 6 [illegible]

## WELL LOG SYMBOLS

- ▶ SIDEWALL CORE
- ▷ SIDEWALL CORE, NO RECOVERY
- ▮ CORE
- -● RFT
- ◕ SHOWS, FLUORESCENCE AND CUT
- ◐ SHOWS STAIN FLUORESCENCE, AND CUT
- ☼ GAS, ON LOGS
- ◣ CASING SHOE
- ⊔ DRILL STEM TEST



DESCRIPTION AND REMARKS

BOREHOLE CORRECTION APPLIED TO RESISTIVITY. IN HIGH RESISTIVE ZONES SHORT NORMAL AND FOCUSED DEVICE RESPONSES MAY DIFFER

[illegible]

30" CASING SET AT 327m

MUD SYSTEM SEAWATER w/BENTONITE

CLAY INTERBEDDED WITH SAND

Cly: aren, m gy - m lt gy, sft, non-sl calc

RUN 1 3??m - 662m

TOOL NO [illegible] (RGD-TF2, x4M)

Sd: slty, clr-trnsl, occ wh, vf-f, mod-w srtd, sbang, sl mica

Tr: rk frag, shell deb, fos

ERRATIC GAMMA VALUES FROM 333m TO 379m DUE TO LEAK OF HIGHLY RADIOACTIVE KCl - MUD INTO THE ACTIVE SYSTEM.

SAND WITH MINOR CLAY

Sd: pred f, occ m-c, else a/a

Cly: a/a

◁ 371.0 71.0 0.6

Tr: a/a

Rm = 0.28 ohm-m @ 30C

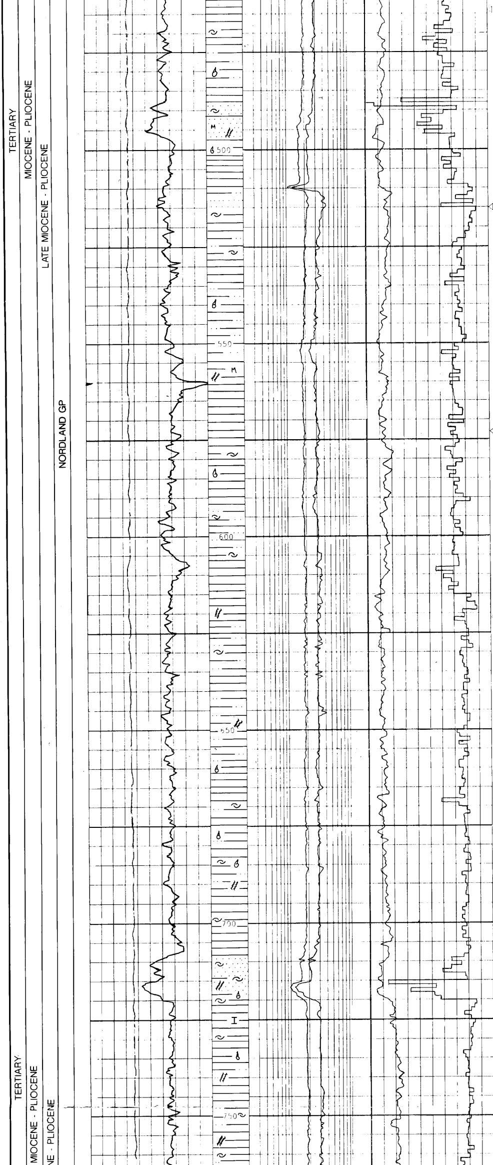
CLAY WITH MINOR SAND

Cly: sl aren, else a/a

Sd: a/a

Tr: a/a

◁ 417.0 73.5 0.8



464.0 57.3 1.0

Sd: slty, pred vf, else a/a

Cly: pred m dk gy, else a/a

515.0 59.0 0.9

Rm = 0.25 ohm-m @ 36C

573.0 51.7 0.7

621.0 43.2 0.8

668.0 58.7 0.6

CLAY WITH MINOR SAND

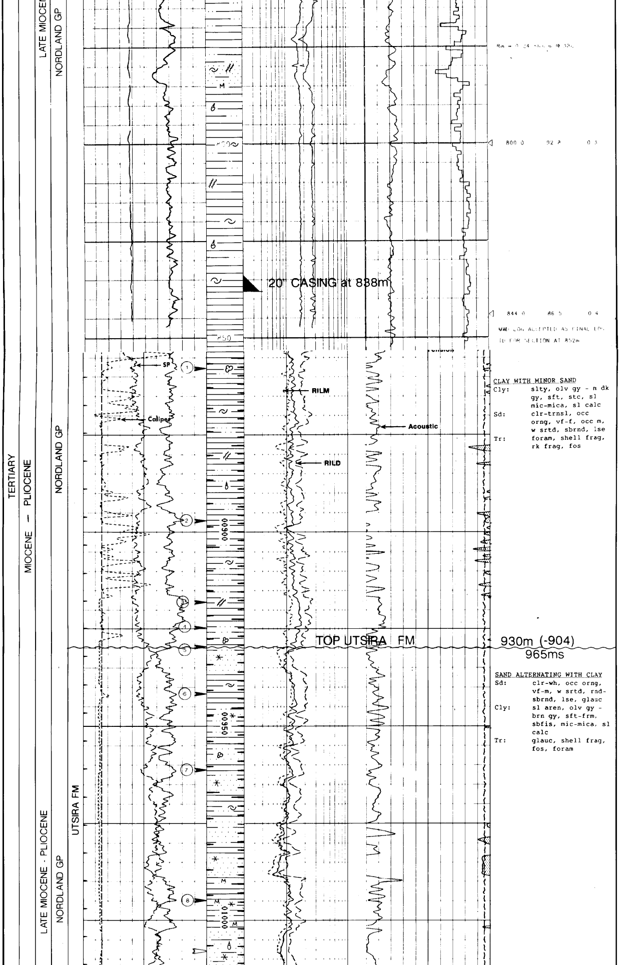
Cly: aren, m gy - m dk gy, occ stc, sft, non-sl calc

Sd: clr-wh, pred vf-f, occ m, mod srtd, sbrnd

Tr: rk frag, shell deb, pyr, fos

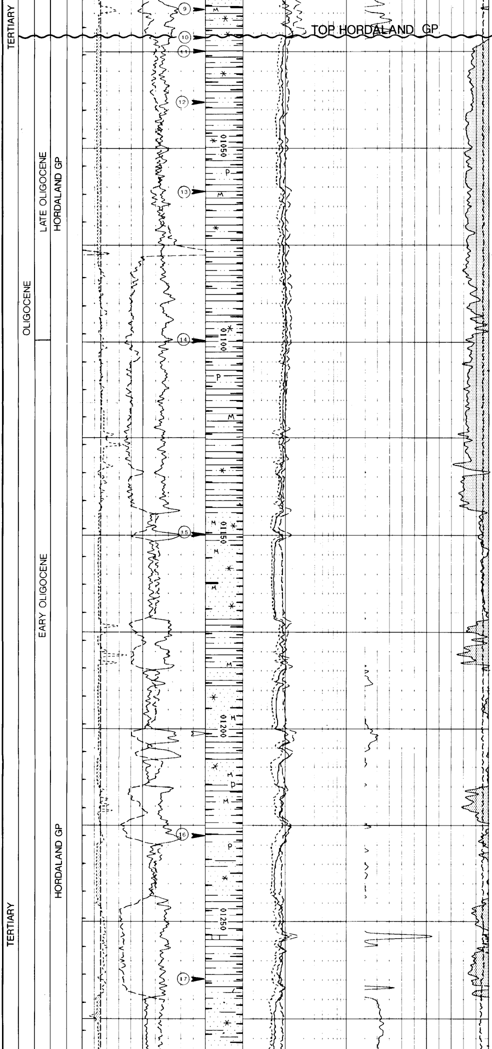
713.0 45.3 0.4

753.0 91.4 0.3



CLAY WITH MINOR SAND
Cly: slty, olv gy - m dk gy, sft, stc, sl mic-mica, sl calc
Sd: clr-trnsl, occ orng, vf-f, occ m, w srtd, sbrnd, lse
Tr: foram, shell frag, rk frag, fos

SAND ALTERNATING WITH CLAY
Sd: clr-wh, occ orng, vf-m, w srtd, rnd-sbrnd, lse, glauc
Cly: sl aren, olv gy - brn gy, sft-frm, sbfis, mic-mica, sl calc
Tr: glauc, shell frag, fos, foram



1021m (-995)
1046ms

CLAYSTONE

Clyst: slty, brn gy - olv gy - dk yel brn, frm, mic-mica, non-sl calc

Tr: ss; lt gy - lt brn gy, vf-f, w srtd, rnd-sbrnd, lse, mica, calc

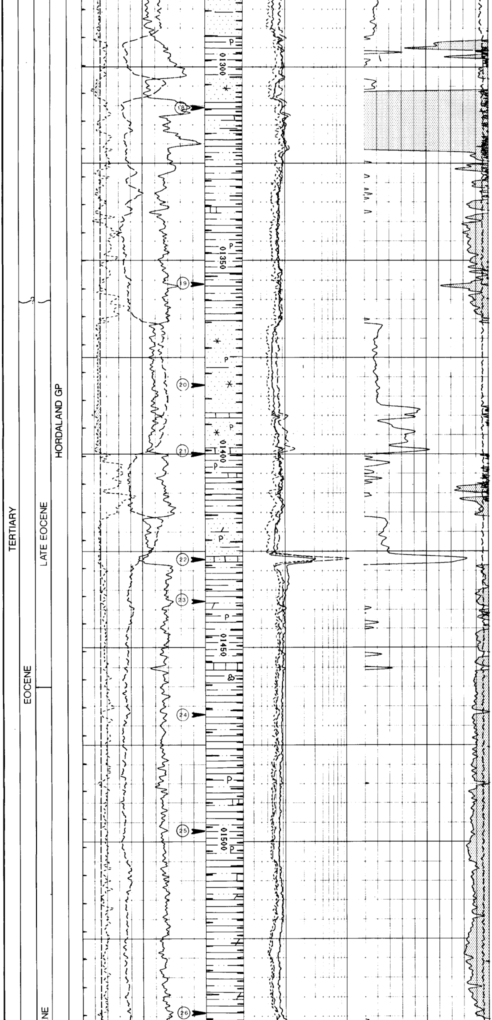
Tr: glauc, pyr

CLAYSTONE ALTERNATING WITH SANDSTONE

Clyst: slty-aren, olv gy - dk gn gy, m dk gy - m bl gy, wxy, frm, occ hd, sbfis, sl mic-mica, non calc, occ calc

Ss: sl arg, clr-wh and m lt gy - olv gy, f-m, occ c, w-mod srtd, rnd-sbrnd, lse, occ calc cmt

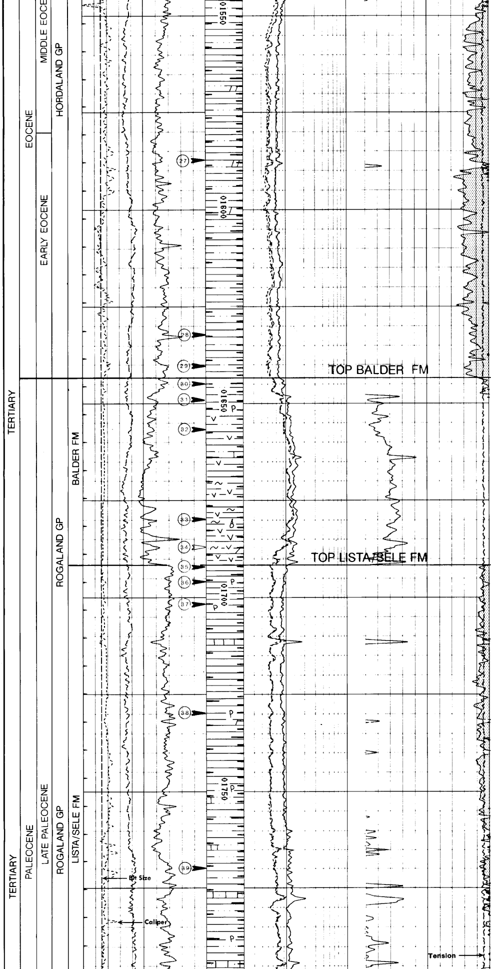
Tr: ls; lt gy - lt brn gy, pred frm, occ h dol; lt brn - brn gy, hd - v hd glauc, pyr, mica



CLAYSTONE

Clyst: occ slty, v col, m gy - m bl gy - dk gn gy, occ brn gy, wxy, frm-hd, sbfis non calc, occ calc

Tr: ss; sl arg, clr-wh and v lt gy, f-m, w srtd, rnd-sbrnd, lse, non calc, sl mica
ls; wh-lt gy brn, sft-frm
dol; brn-dk brn orng, hd
pyr, foram



1643.5m (-1617.5)
1659ms

TUFFACEOUS AND MARLY CLAYSTONE

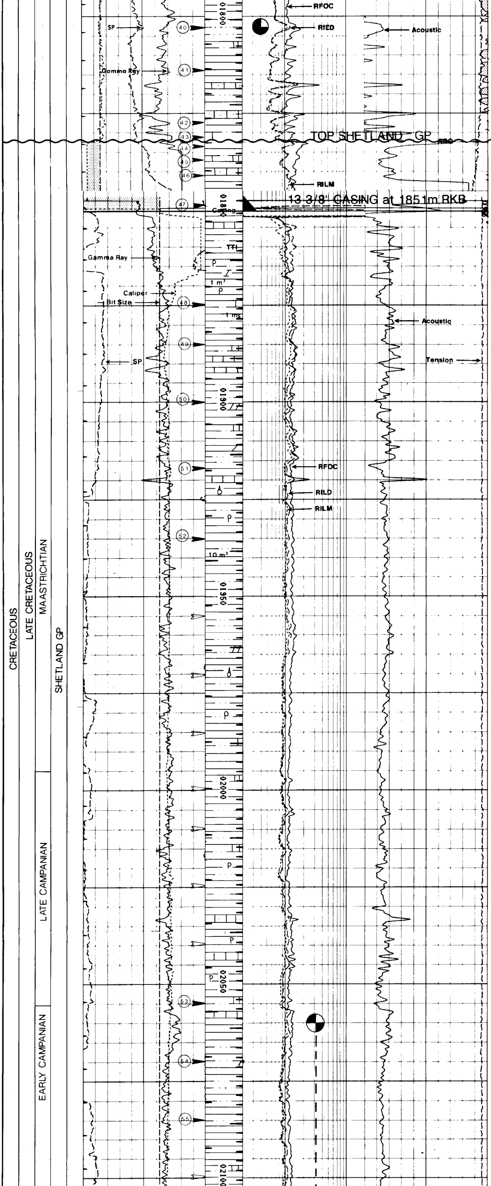
| | |
|---|---|
| Clyst: | tuff and mrly, v col, olv gy - gy brn, m dk gy - gy blk, occ lt gy, occ wh and blk spec, sft-frm, non - v calc |
| Tr: | pyr, fos, ls and dol |

1691.5m (-1665.5)
1700ms

CLAYSTONE WITH MINOR OCCURENCE OF SANDSTONE AND LIMESTONE

| | |
|---|---|
| Clyst: | m gy - dk gy, olv gy - dk gn gy, occ brn gy, frm-hd, occ stc, occ wxy, non calc from the top, calc - v calc towards btm |
| Ss: | arg, clr - lt brn gy, pred vf-f, occ f-c, w-mod srtd, rnd-sbang, lse-frm, occ calc cmt, g vis por |
| Ls: | arg, wh-lt gy, sft-frm |
| Tr: | dol; brn - dk orng brn, hd<br>pyr |

Shows in ss from 1800 m:
Strong HC-od, exc brn stn,
100% mod-strong yel flor,
inst-fast strmg strong
yel-wh cut, yel res upon evap



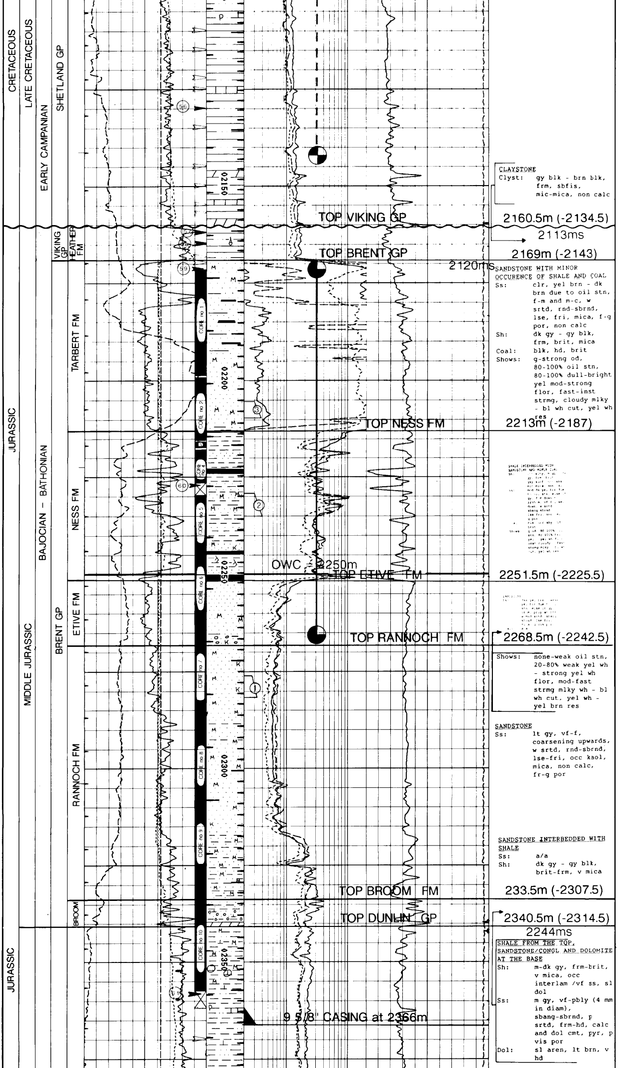
**CLAYSTONE WITH OCCASIONAL STRINGERS OF LIMESTONE AND DOLOMITE**

| | |
|---|---|
| Clyst: | occ slty and aren, m gy - m dk gy - brn gy, occ gn gy dk gn gy, pred frm, occ stc, calc from the top, non-sl calc from 2000 m |
| Tr: | ls; occ v arg - mrly, occ aren, wh-lt gy, sft-frm, occ hd<br>dol; lt yel brn - dk brn, splty-blky, hd<br>ss; clr, occ orng, pred f-c, occ vf-f, mod srtd, sbang-sbrnd, lse, occ fri pyr, fos |

From 2060 m
**LAMINATIONS OF SILTSTONE IN CLAYSTONE**

| | |
|---|---|
| Sltst: | lt gy, sl mica |
| Clyst: | a/a |

Shows in sltst:
No stn, no od, 80-100% mod pale yel flor, slow strmg pale yel - bl wh cut, yel wh res



CLAYSTONE
Clyst: gy blk - brn blk, frm, sbfis, mic-mica, non calc

2160.5m (-2134.5)

2113ms

2169m (-2143)

SANDSTONE WITH MINOR OCCURENCE OF SHALE AND COAL
Ss: clr, yel brn - dk brn due to oil stn, f-m and m-c, w srtd, rnd-sbrnd, lse, fri, mica, f-g por, non calc
Sh: dk gy - gy blk, frm, brit, mica
Coal: blk, hd, brit
Shows: g-strong od, 80-100% oil stn, 80-100% dull-bright yel mod-strong flor, fast-inst strmg, cloudy mlky - bl wh cut, yel wh res

2213m (-2187)

SHALE INTERBEDDED WITH SANDSTONE AND MINOR COAL

2251.5m (-2225.5)

2268.5m (-2242.5)

Shows: none-weak oil stn, 20-80% weak yel wh - strong yel wh flor, mod-fast strmg mlky wh - bl wh cut, yel wh - yel brn res

SANDSTONE
Ss: lt gy, vf-f, coarsening upwards, w srtd, rnd-sbrnd, lse-fri, occ kaol, mica, non calc, fr-g por

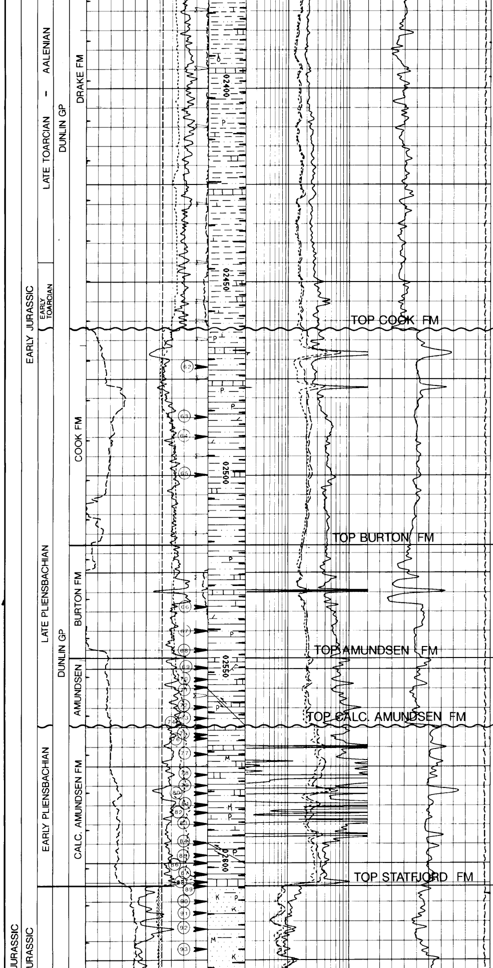
SANDSTONE INTERBEDDED WITH SHALE
Ss: a/a
Sh: dk gy - gy blk, brit-frm, v mica

233.5m (-2307.5)

2340.5m (-2314.5)

2244ms

SHALE FROM THE TOP, SANDSTONE/CONGL AND DOLOMITE AT THE BASE
Sh: m-dk gy, frm-brit, v mica, occ interlam /vf ss, sl dol
Ss: m gy, vf-pbly (4 mm in diam), sbang-sbrnd, p srtd, frm-hd, calc and dol cmt, pyr, p vis por
Dol: sl aren, lt brn, v hd



SHALE
Sh: slty, brn gy - m dk gy - gy blk, frm, brit, mic-mica, sl calc and dol
Tr: ss; qtz, clr, vf-m, mod srtd, sbrnd, lse
ls; partly nodular, gy wh - yel wh, sft-frm
dol; sl aren, lt brn, v hd
pyr

2462m (-2436)

CLAYSTONE INTERBEDDED WITH SANDSTONE AND MINOR LIMESTONE
Clyst: slty, olv gy - m gy - gy brn, frm, mic-mica, sl calc
Ss: slty, clr - lt olv gy, pred vf, occ f-m, w-mod srtd, sbang-sbrnd, lse-fri, mica, occ calc cmt, p por
Ls: aren, wh - gy wh, sft-frm
Tr: dol; yel wh, frm-hd
pyr

2518m (-2492)

CLAYSTONE WITH MINOR SANDSTONE AND LIMESTONE
Clyst: slty, olv gy - brn gy, frm, sl calc - calc
Ss: slty, clr, pred vf, occ f-m, w-mod srtd, sbang-sbrnd, lse
-Ls: wh - gy wh, sft-frm
Tr: dol and pyr

2547m (-2521)

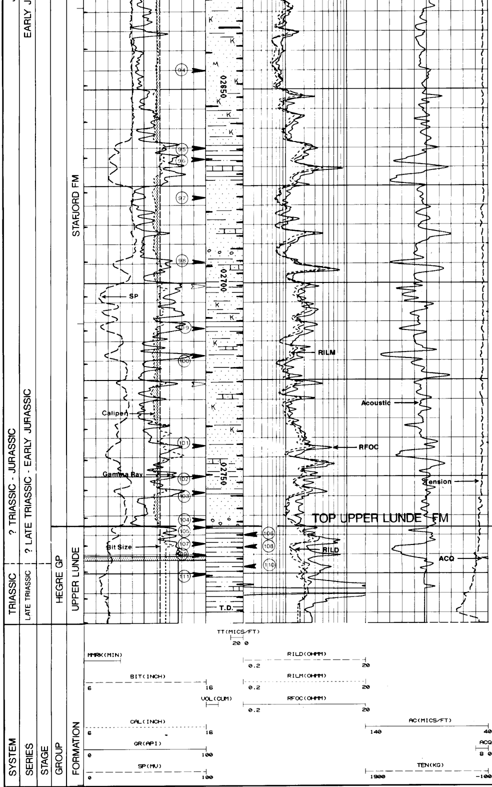
CLAYSTONE WITH MINOR LIMESTONE
Clyst: slty, brn gy [illegible] blk, frm, brit, [illegible] mic-mica, sl calc
Ls: wh - gy wh, sft-frm
Tr: pyr

2564.5m (-2538.5)
2402ms

CLAYSTONE AND SILTSTONE WITH MINOR LIMESTONE
Clyst: slty, olv gy - m gy, frm, mic-mica, calc
Sltst: arg, olv gy - m dk gy, frm, mica, sl calc - calc
Ls: wh - gy wh, sft-frm
Tr: pyr

2606m (-2580)
2426ms

Shows down to 2615 m:
lt brn oil stn, 80-90% weak dull yel - yel brn flor, weak slow strmg bl wh cut, no res flor, no od



SANDSTONE WITH MINOR TO INTERBEDDED CLAYSTONE

| | |
|---|---|
| Ss: | lt gy - v lt gy, occ slty and arg, vf-f, w-mod srtd, occ vc-cgl (max. 5 mm in diam), pred f-c, mod srtd, sbrnd-sbang, lse-fri, occ kaol and mica, f-g vis por, non-sl calc |
| Clyst: | occ slty and shy, occ aren, brn gy - dk gn gy - brn blk, frm, brit, mic-mica, non-sl calc |
| Tr: | ls; wh - gy wh, frm pyr |

2763m (-2737)

2524ms

CLAYSTONE INTERBEDDED WITH SILTSTONE

| | |
|---|---|
| Clyst: | occ slty, olv gy - gy brn - dk gn gy, frm, brit, sbfis, sl calc |
| Sltst: | occ aren grdg to vf-f ss, olv gy - dk gn gy, frm, sl mica, non calc |
| Tr: | ls; wh - gy wh, frm |

WELL 34/7-12 - CORE SUMMARY

| | Cut | | Recovered | | | Correction Factor | Recovered Interval |
|---|---|---|---|---|---|---|---|
| Core No. | Interval m RKB | m | Interval m RKB | m | % | m | Log m RKB |
| 1 | 2169.0 - 2196.5 | 27.5 | 2169.0 - 2196.3 | 27.3 | 99.3 | +2.50 | 2171.50 - 2198.80 |
| 2 | 2196.5 - 2214.0 | 17.5 | 2196.5 - 2212.9 | 16.4 | 93.4 | +2.50 | 2199.00 - 2215.40 |
| 3 | 2214.0 - 2216.0 | 2.0 | 2214.0 - 2215.5 | 1.5 | 75 | +1.75 | 2215.75 - 2217.25 |
| 4 | 2216.0 - 2228.0 | 12.0 | 2216.0 - 2224.9 | 8.9 | 74.2 | +1.75 | 2217.75 - 2226.65 |
| 5 | 2228.0 - 2242.0 | 14.0 | 2228.0 - 2242.0 | 14.0 | 100 | +1.75 | 2229.75 - 2243.75 |
| 6 | 2242.0 - 2262.0 | 20 | 2242.0 - 2261.5 | 19.5 | 97.5 | +2.25 | 2244.25 - 2263.75 |
| 7 | 2262.0 - 2290.0 | 28 | 2262.0 - 2289.9 | 27.9 | 99.6 | +1.75 | 2263.75 - 2291.65 |
| 8 | 2290.0 - 2305.5 | 15.5 | 2290.0 - 2305.0 | 15.0 | 96.8 | +1.75 | 2291.75 - 2306.75 |
| 9 | 2305.5 - 2333.0 | 27.5 | 2305.5 - 2332.5 | 27.0 | 98.2 | +1.25 | 2306.75 - 2333.75 |
| 10 | 2333.0 - 2360.5 | 27.5 | 2333.0 - 2356.3 | 23.3 | 84.7 | +1.00 | 2334.00 - 2357.30 |

## WELL 34/7-12 - FORMATION MULTI TESTER

| Depth | Hydrostatic Mud Pressure | | Temperature Corrected Formation Pressure | | Remarks |
|---|---|---|---|---|---|
| m RKB | Before<br>psia | After<br>psia | psia | bar | |
| Run 2A | | | | | |
| 2171.0 | 5372.7 | 5372.3 | 4924.9 | 339.56 | |
| 2182.0 | 5399.4 | 5399.4 | 4936.3 | 340.35 | |
| 2189.5 | 5418.2 | 5417.9 | 4943.8 | 340.86 | |
| 2194.5 | 5430.4 | 5430.0 | 4948.9 | 341.21 | |
| 2203.5 | 5452.5 | 5452.5 | 4958.1 | 341.84 | |
| 2210.0 | 5468.7 | 5468.5 | 4964.9 | 342.32 | |
| 2218.5 | 5489.5 | 5489.4 | 4976.6 | 343.12 | |
| 2230.0 | 5517.3 | 5517.4 | 4986.7 | 343.82 | |
| 2242.0 | 5546.5 | 5546.6 | 5005.1 | 345.09 | |
| 2244.0 | 5551.3 | 5551.3 | 5006.9 | 345.21 | |
| 2249.5 | 5564.6 | 5564.7 | 5007.3 | 345.24 | |
| 2253.0 | 5573.0 | 5573.0 | 5010.2 | 345.44 | |
| 2261.0 | 5592.4 | 5592.5 | 5021.5 | 346.22 | |
| 2271.0 | 5516.8 | 5617.0 | 5037.7 | 347.33 | |
| 2280.0 | 5639.0 | 5639.2 | 5048.5 | 348.08 | |
| 2289.5 | 5662.5 | 5662.5 | 5062.0 | 349.01 | |
| 2302.5 | 5694.2 | 5694.5 | 5080.5 | 350.29 | |
| 2312.0 | 5717.5 | 5717.5 | 5094.2 | 351.23 | |
| 2171.0 | 5372.8 | 5371.5 | 4925.3 | 339.59 | Segregated sample, 1 gallon chamber empty |
| Run 2B | | | | | |
| 2171.5 | 5371.7 | 5371.6 | 4925.8 | 339.62 | Segregated sample, 1 gallon chamber empty. |
| Run 2C | | | | | |
| 2189.5 | 5419.5 | 5418.6 | 4943.4 | 340.84 | Segregated sample. |
| Run 2D | | | | | |
| 2189.5 | 5420.0 | - | 4943.9 | 340.87 | Segregated sample. |
| Run 2E | | | | | |
| 2249.5 | 5565.0 | 5564.4 | 5006.9 | 345.21 | Segregated sample, 1 gallon chamber empty. |
| Run 3G | | | | | |
| 2210.0 | 5477.2 | 5477.4 | 4964.9 | 342.32 | |
| 2312.0 | 5729.8 | 5729.9 | 5094.8 | 351.27 | |
| 2471.0 | 6122.3 | 6122.2 | 5363.2 | 369.78 | Pressure draw down 3000 psi. |
| 2474.0 | 6121.8 | 6122.1 | 5362.3 | 369.72 | Pressure draw down 3500 psi. Tool differential stuck at 2465 m RKB. |
| Run 3H | | | | | |
| 2210.0 | 5294.9 | 5294.9 | 4970.8 | 342.72 | |
| 2210.0 | 5261.4 | 5281.6 | 4964.9 | 342.32 | |
| 2312.0 | 5531.6 | 5533.2 | 5093.6 | 351.19 | |
| 2609.0 | 6259.5 | 6258.9 | 5556.9 | 383.13 | |
| 2626.0 | 6278.2 | 6297.6 | 5581.4 | 383.44 | |
| 2647.0 | 6348.1 | 6347.6 | 5611.7 | 386.91 | |
| 2677.0 | 6420.2 | 6420.2 | 5654.9 | 389.89 | Pressure draw down 1500 psi. |
| 2692.0 | 6459.1 | - | 5676.4 | 391.37 | |
| 2252.5 | 5384.9 | - | 5009.9 | 345.42 | Segregated sample. |

## WELL 34/7-12 - DST SUMMARY

| Test No. | Interval | BHP | BHT | Reference depth | WHP | WHT | Choke size | Flow rate |
|---|---|---|---|---|---|---|---|---|
| | m RKB (logged) | bar | °C | m RKB | bar | °C | mm | $Sm^3$/day |
| 1 | 2276.2 - 2282.2 | 336.5 | 84.2 | 2230.7 | 104.6 | 65.5 | 12.7 | 1297 |
| 2 | 2229.0 - 2235.0 | 294.8 | 83.4 | 2202.6 | 127.0 | 63.2 | 12.7 | 888 |
| 3 | 2205.5 - 2209.5 | 333.2 | 82.1 | 2161.3 | 156.3 | 50.3 | 14.3 | 1460 |

All values are from the end of the main flow in each test.

Reference depth = measuring depth for BHP and BHT.