SIMON PETROLEUM TECHNOLOGY WELL: 2/5-2

Print: 1953G	Units: M [✓ F]	Top	Bottom	Scale	TD
Length: 27 FT	Initials: Mcw	210	11780	1/500	11800

DIGITAL WIRELINE LOGS PACKAGE
1994
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SIMON PETROLEUM TECHNOLOGY

COMPLETION LOG

2-5 Final Merit For 500-11800 ft 1:20

B11-

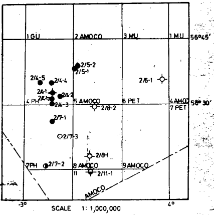
Completion - Ø
G

AMOCO NORWAY OIL CO.

FINAL WELL LOG

2/5-2

VERTICAL SCALE 1:500



LOCATION: 56° 38' 41' 6" N 03° 22' 20 · 6" E

"TORFELT" DELINEATION WELL

AREA: NORWEGIAN N. SEA SOUTHERN AREA

K.B.E.: 115' above MSL

WATER DEPTH: 216' below MSL

DATE SPUDDED: January 15th, 1971

DATE COMPLETED: APRIL 20, 1971

TOTAL DEPTH: 11800 (-11685')

PLUG BACK TOTAL DEPTH:

CASING: 36" at 448'; 20" at 1313'; 13 3/8" at 5215'; 9 5/8" at 10173'; 7" liner at 11792' (top of liner at 10044')

RIG TYPE: Maersk Explorer 3 leg jackup

LEG PENETRATION: 14 feet

CLASSIFICATION WHEN STARTED: Delineation Well

DISTANCE FROM BOTTOM OF BARGE TO M.S.L.: 65'

CLASSIFICATION AFTER COMPLETION: Oil Well

METHOD OF COMPLETION:

LITHOLOGIC SYMBOLS

- BRECCIA
- CONGLOMERATE
- SANDSTONE
- SILTSTONE
- CALCAREOUS SILTSTONE
- CLAY
- SHALE
- CALCAREOUS SHALE
- MARL
- CHALK
- ARGILLACEOUS LIMESTONE
- LIMESTONE
- DOLOMITIC LIMESTONE
- DOLOMITE
- GYPSUM
- ANHYDRITE
- SALT
- K POTASSIUM SALT
- CHERT
- COAL

OPERATIONAL SYMBOLS

- C.I. INTERVAL CORED
- CASING SEAT
- 2131 2151 INTERVAL PERFORATED
- SIDEWALL CORE
- PLUG BACK T.D.
- DST DRILL STEM TEST

ACCESSORY MINERALS AND MATERIALS

- PYRITE
- LIMONITE HEMATITE
- SIDERITE
- GLAUCONITE
- OOLITES and PISOLITES
- CONCRETIONS
- PEBBLES

FOSSILS

- SHELL DEBRIS
- FORAMINIFERA
- BRYOZOA
- SPICULES

AGE | FORMATION | CASING, PLUGS, PACKER, LINER, PERF, DEVIAT.

CALIPER HOLE DIAMETER IN INCHES 6" 16"

0 GAMMA RAY API UNITS 100

TEST | CORES | GRAPHIC LITHOLOGY

INTERVAL TRANSIT TIME mic sec / ft 240 140 40

POROSITY | SHOWS | DESCRIPTION PALEONTOLOGY REMARKS

DRILLING RATE AND DATA

☐ FT/HR

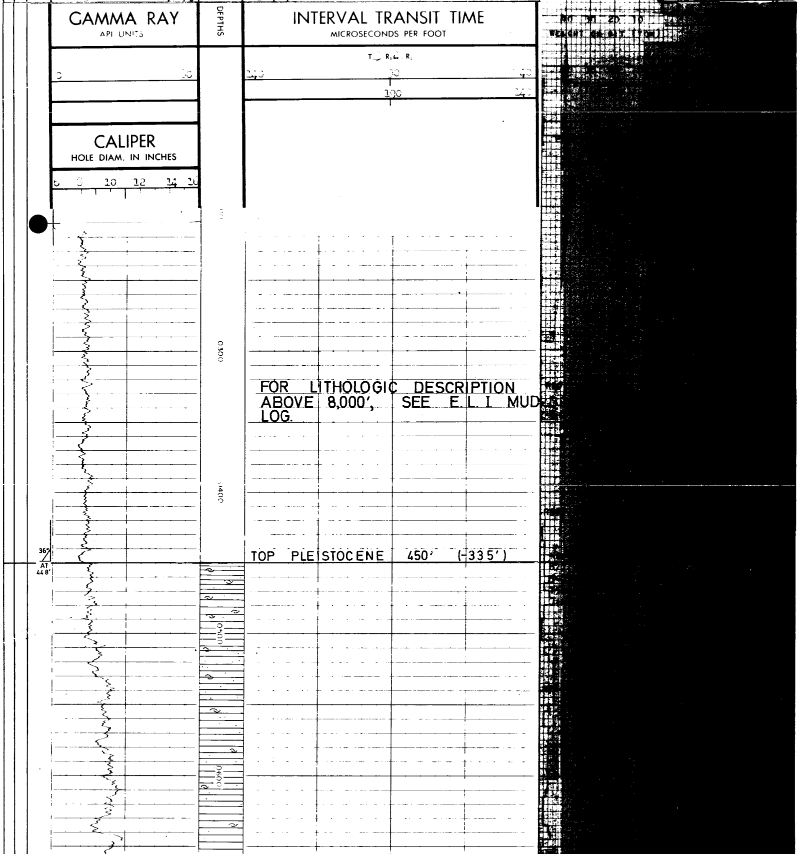
☒ MIN/FT

CHROMATOG

METHANE

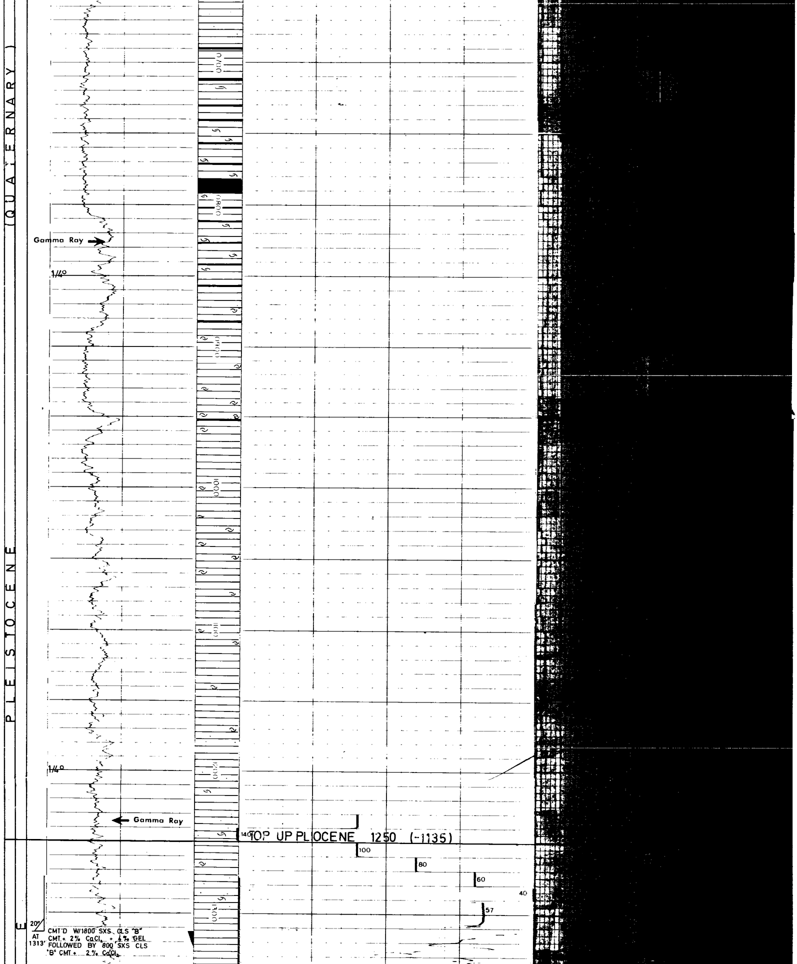
ETHANE

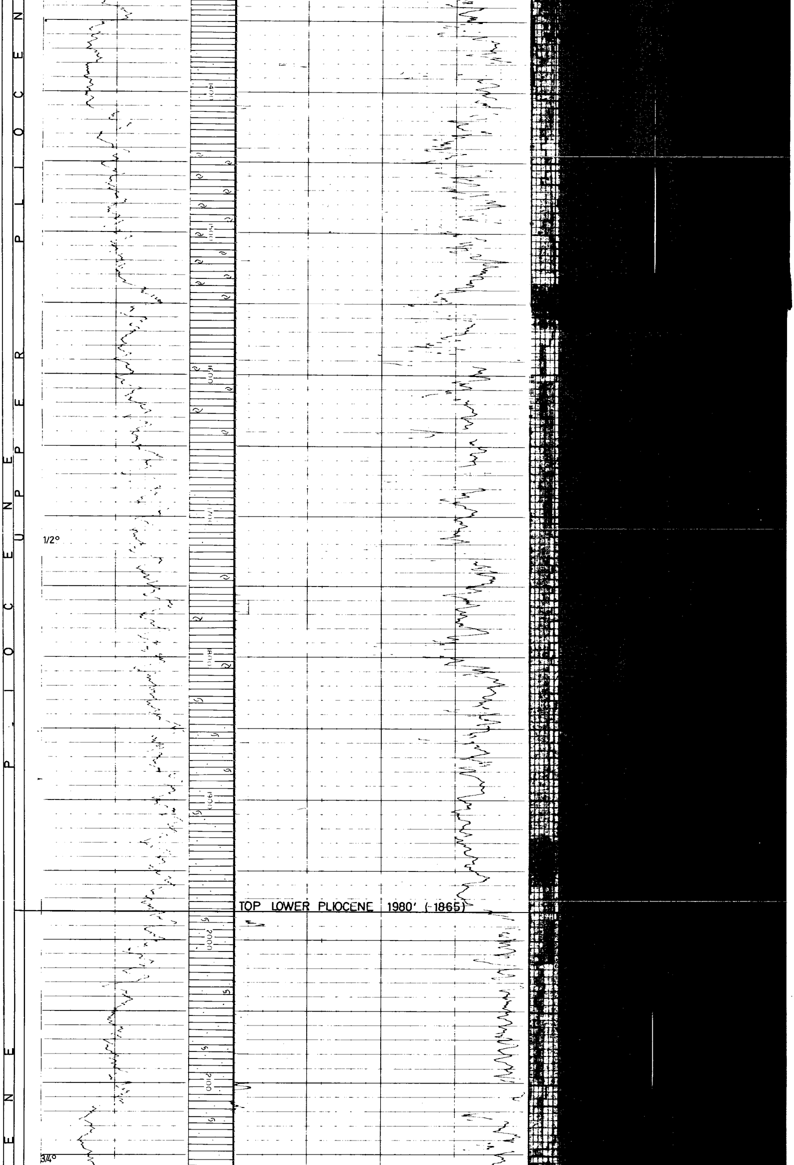
PROPANE

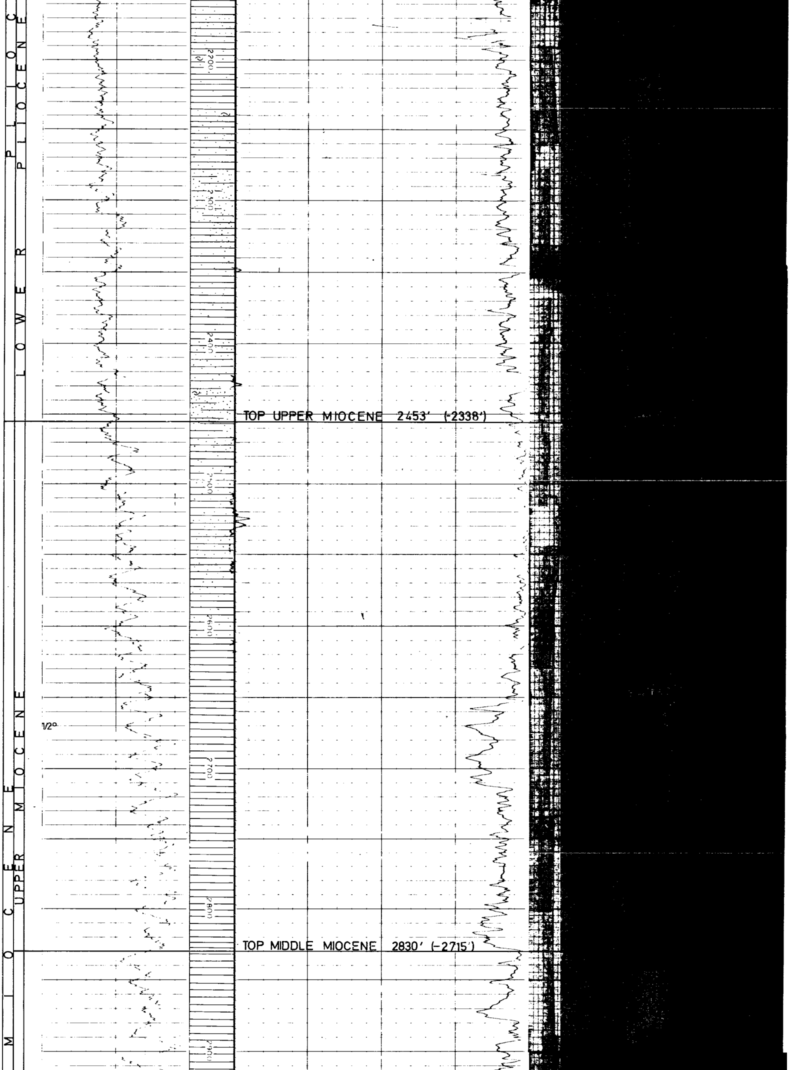


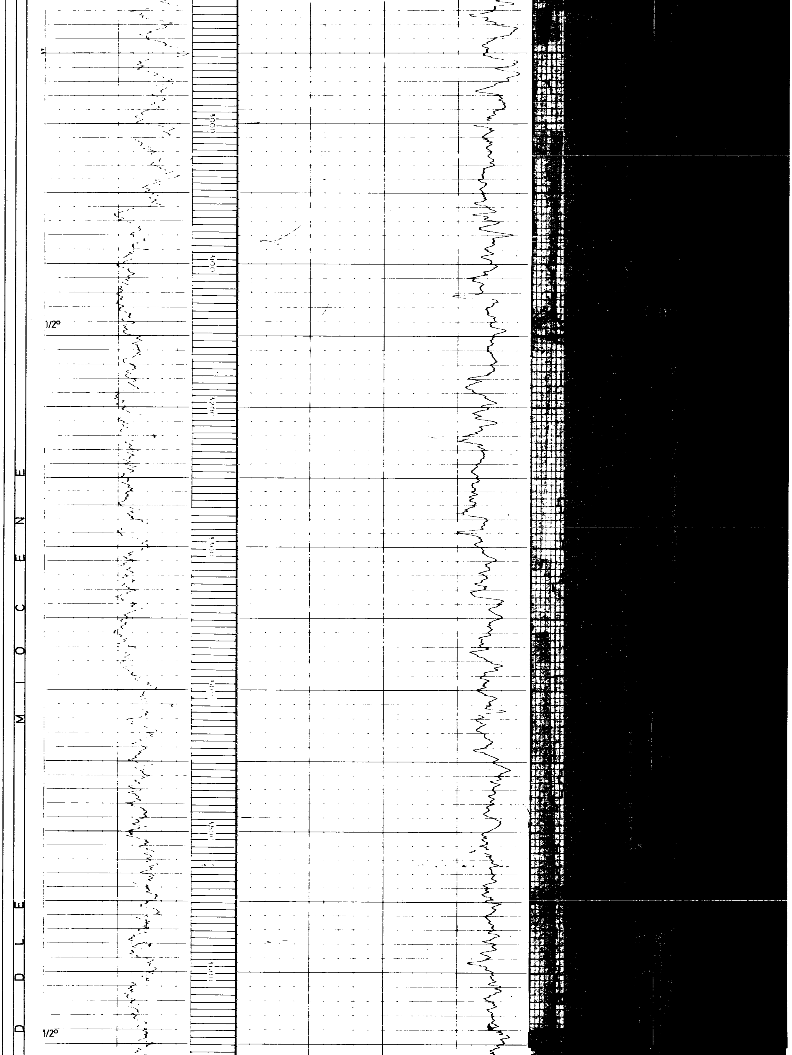
FOR LITHOLOGIC DESCRIPTION ABOVE 8,000', SEE E.L.I. MUD LOG.

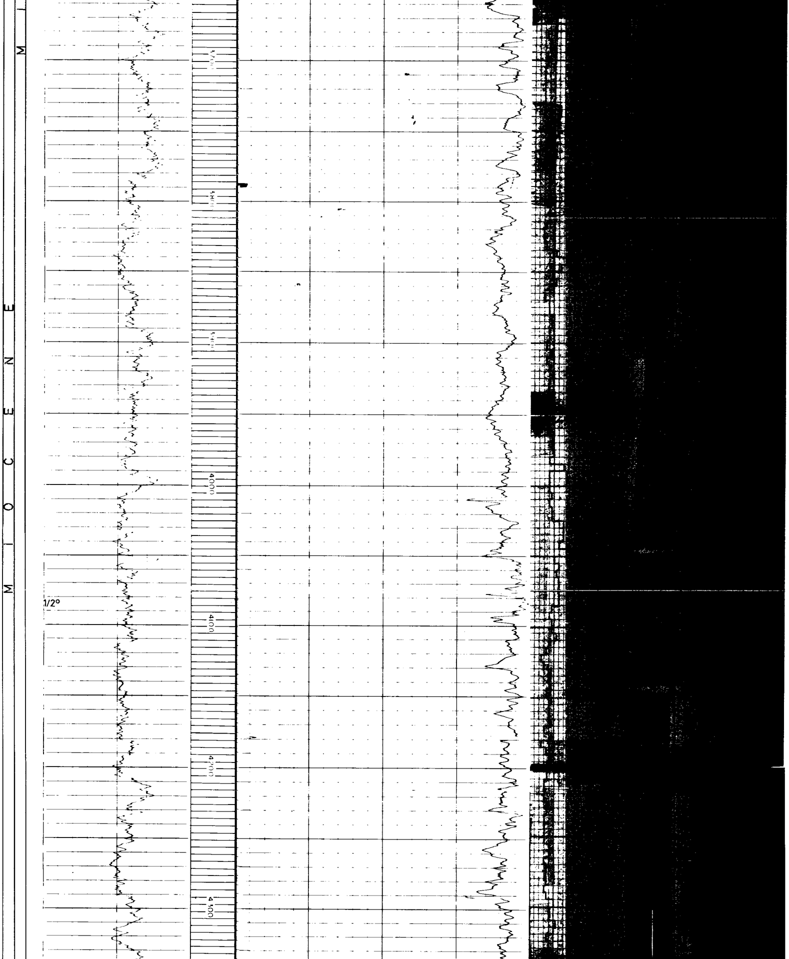
TOP PLEISTOCENE 450' (-335')

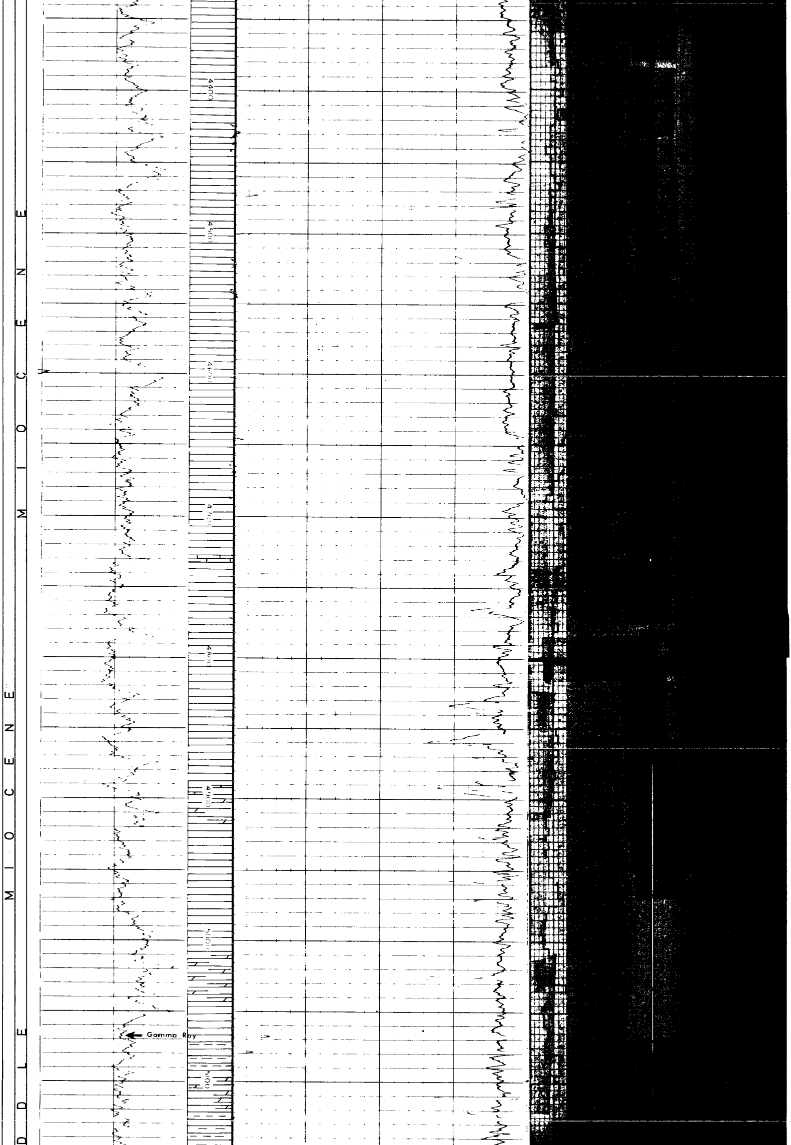


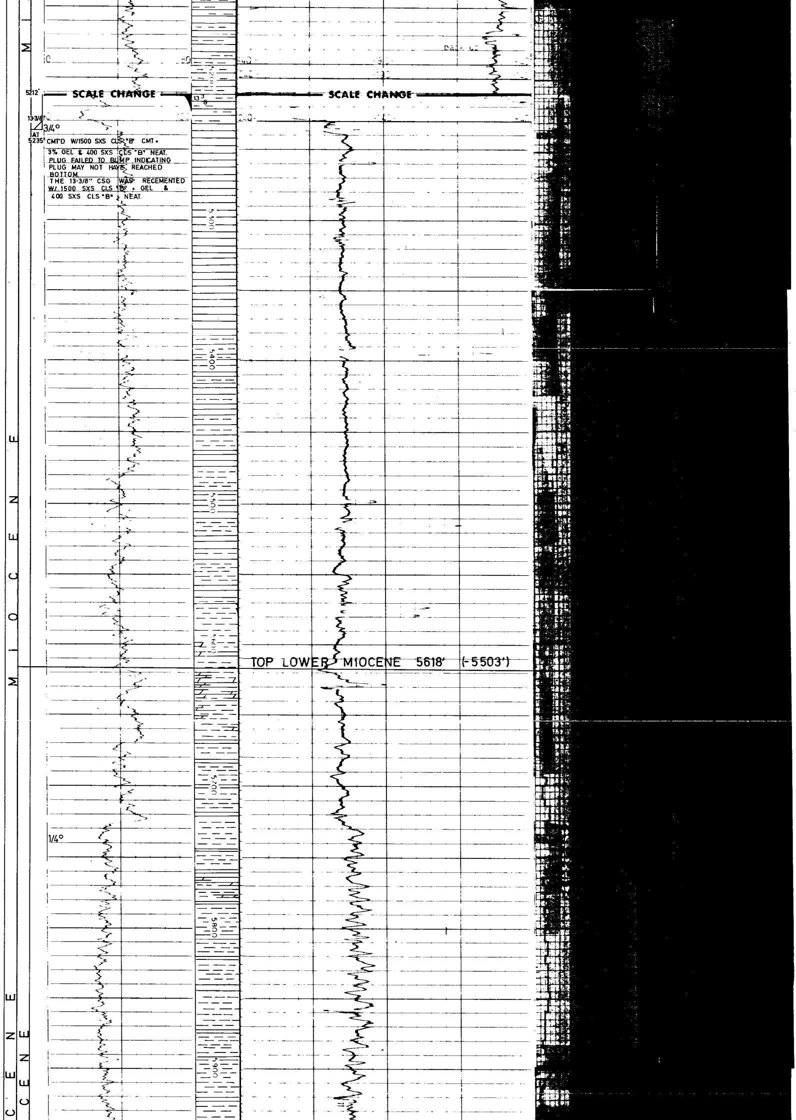








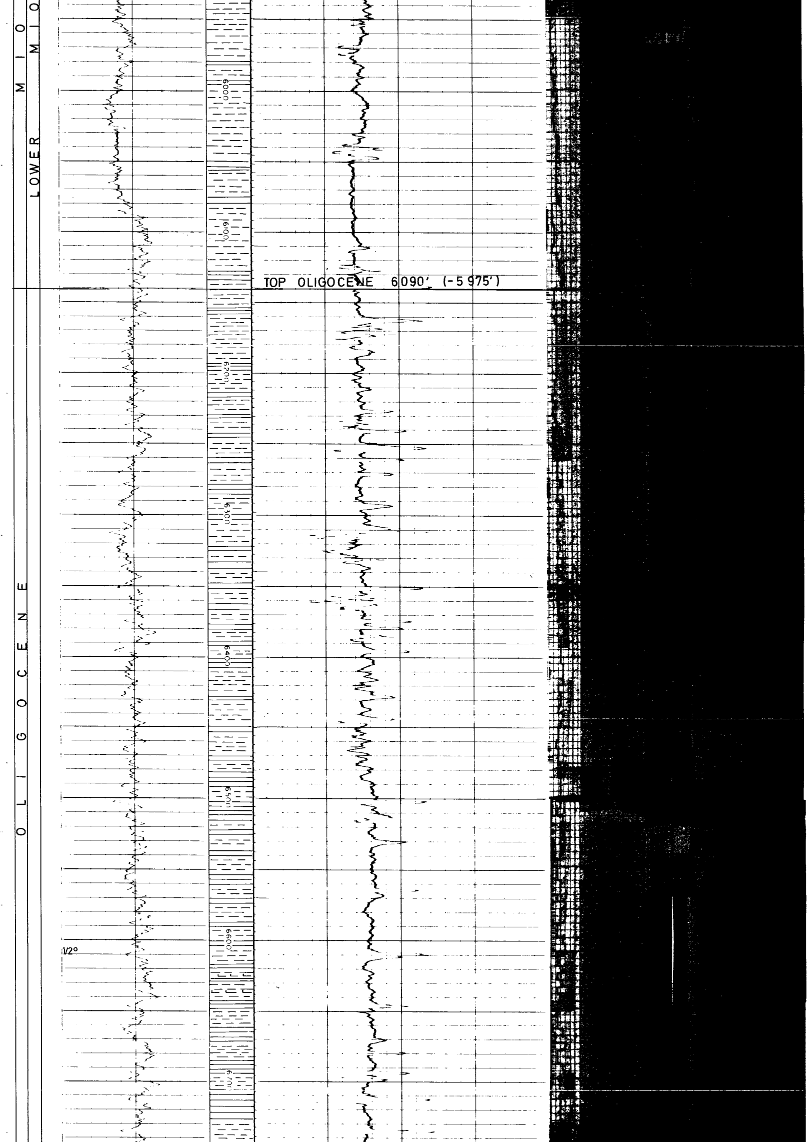


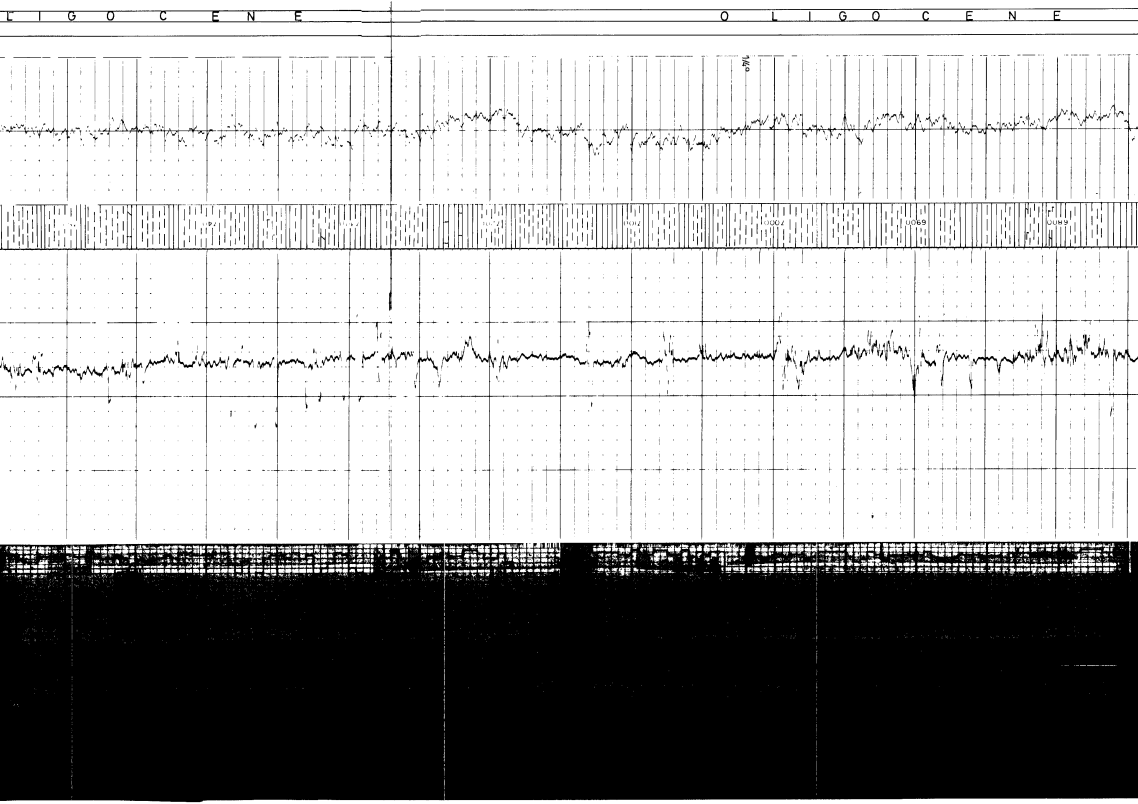


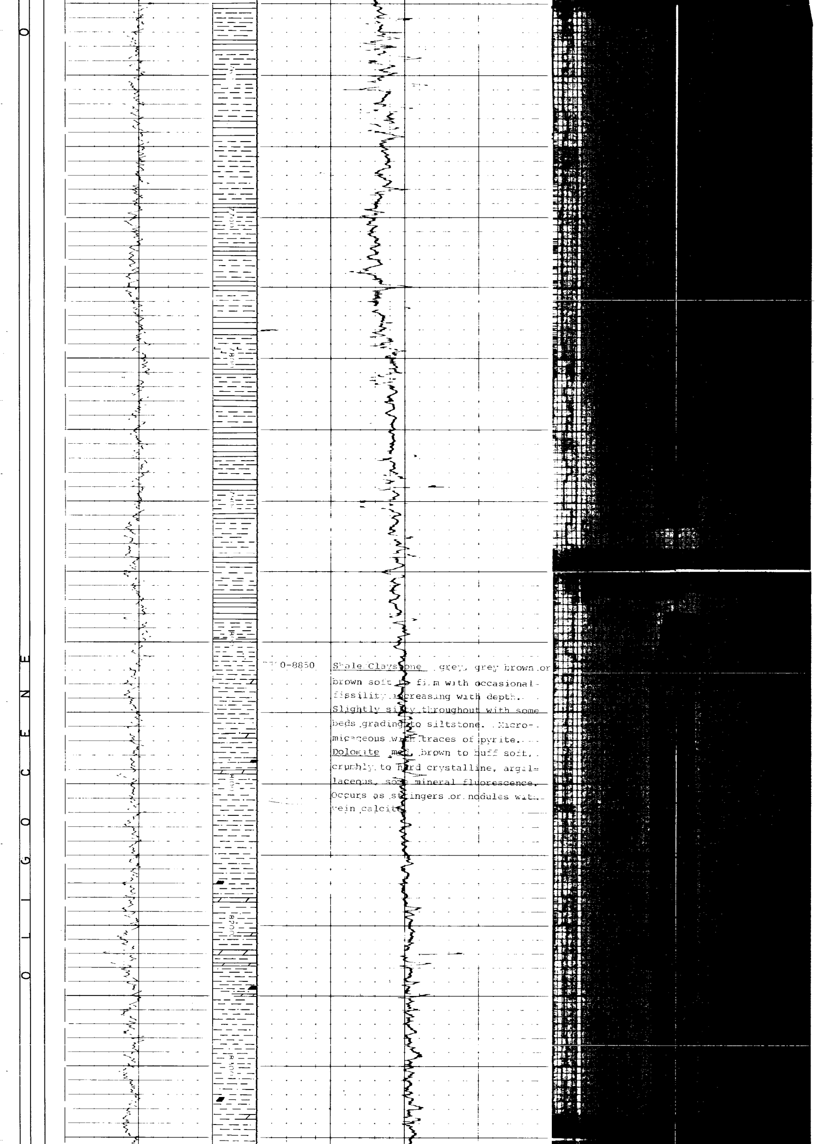
CMT'D W/1500 SXS CLS "B" CMT + 3% GEL & 400 SXS CLS "B" NEAT. PLUG FAILED TO BUMP INDICATING PLUG MAY NOT HAVE REACHED BOTTOM.

THE 13-3/8" CSG WAS RECEMENTED W/ 1500 SXS CLS "B" + GEL & 400 SXS CLS "B" + NEAT.

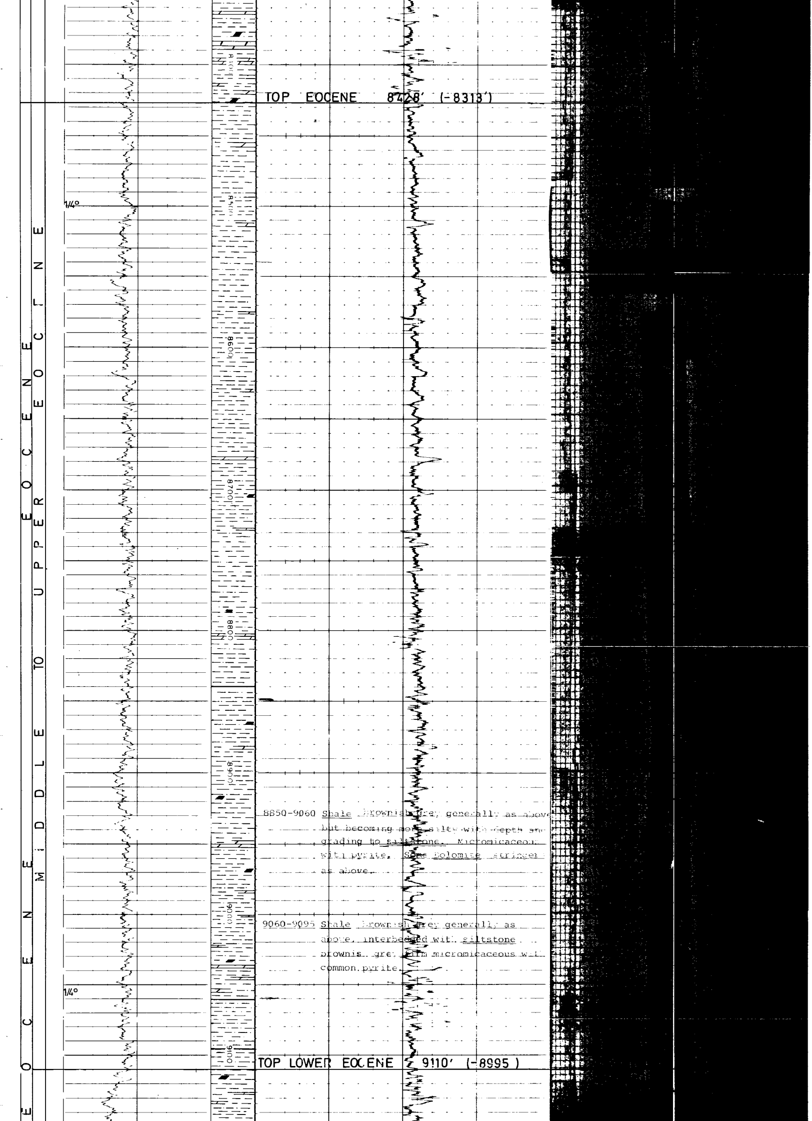
TOP LOWER MIOCENE 5618' (-5503')







[illegible]0-8850 **Shale/Claystone** grey, grey brown or brown soft to firm with occasional fissility increasing with depth. Slightly silty throughout with some beds grading to siltstone. Micromicaceous with traces of pyrite. **Dolomite** med. brown to buff soft, crumbly to hard crystalline, argillaceous, some mineral fluorescence. Occurs as stringers or nodules with vein calcite.

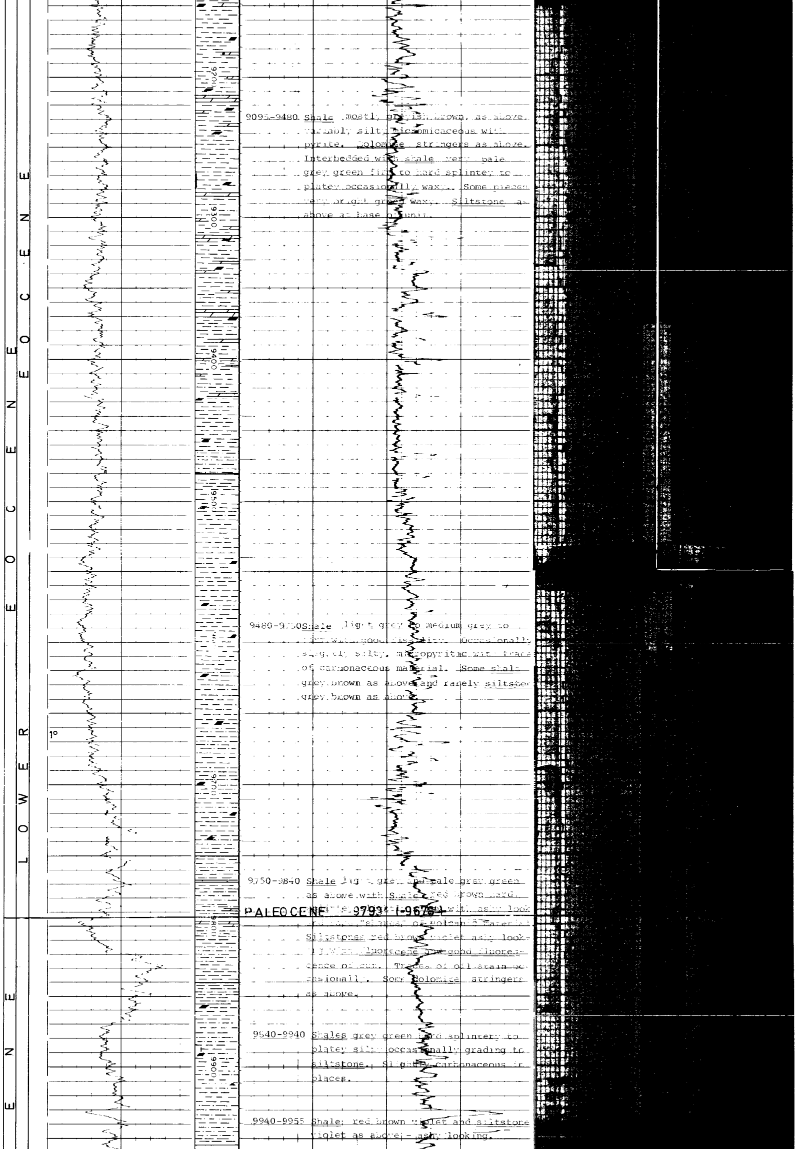


TOP EOCENE 8428' (-8313')

8850-9060 Shale brownish grey generally as above but becoming more silty with depth and grading to siltstone. Micromicaceous with pyrite. Some Dolomite stringers as above.

9060-9095 Shale brownish grey generally as above, interbedded with siltstone brownish grey firm micromicaceous with common pyrite.

TOP LOWER EOCENE 9110' (-8995)



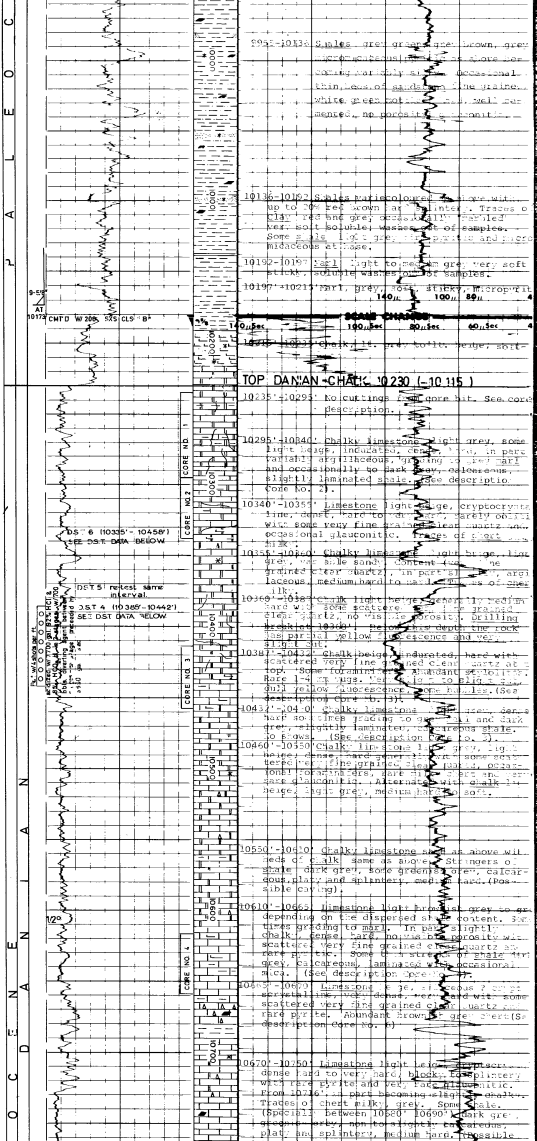
9095-9480 Shale mostly greyish brown, as above, variably silty, micromicaceous with pyrite. Dolomite stringers as above. Interbedded with shale very pale grey green firm to hard splintery to platey occasionally waxy. Some pieces very bright green waxy. Siltstone as above at base of unit.

9480-9750 Shale light grey to medium grey to [illegible] with good fissility. Occasionally slightly silty, micropyritic with trace of carbonaceous material. Some shale grey brown as above and rarely siltstone grey brown as above.

9750-9840 Shale light green and pale grey green as above with Shale red brown hard, [illegible] with ashy look and some "shards" of volcanic material. Siltstones red brown violet ashy looking [illegible] fluorescence and good fluorescence of cut. Traces of oil stain occasionally. Some Dolomite stringers as above.

9840-9940 Shales grey green hard splintery to platey silty occasionally grading to siltstone. Slightly carbonaceous in places.

9940-9955 Shale red brown violet and siltstone violet as above - ashy looking.



9955-10136 Shales grey green, grey brown, grey microcalcareous pyritic as above becoming variably silty. Occasional thin beds of sandstone fine grained, white green mottled, hard, well cemented, no porosity, glauconitic.

10136-10192 Shales variecoloured as above with up to 20% red brown hard splintery. Traces of Clay red and grey, occasionally marbled very soft soluble, washes out of samples. Some shale light grey firm pyritic and micro micaceous at base.

10192-10197 Marl light to medium grey very soft sticky, soluble washes out of samples.

10197'-10215' Marl, grey, soft, sticky, micropyrit

10215'-10235' Chalk, lt. grey to lt. beige, soft-

TOP DANIAN CHALK 10 230 (-10 115)

10235'-10295' No cuttings from core bit. See core description.

10295'-10340' Chalky limestone light grey, some light beige, indurated, dense, hard, in part variably argillaceous, grading to grey marl and occasionally to dark grey, calcareous, slightly laminated shale. (See description Core No. 2).

10340'-10355' Limestone light beige, cryptocrystalline, dense, hard to very hard, rarely oolitic with some very fine grained clear quartz and occasional glauconitic. Traces of chert milky.

10355'-10360' Chalky limestone light beige, light grey, variable sandy content (very fine grained clear quartz), in part slightly, argillaceous, medium hard to hard. Traces of chert milky.

10360'-10387' Chalk light beige, generally medium hard with some scattered very fine grained clear quartz, no visible porosity. Drilling break at 10368'. Below this depth the rock has partial yellow fluorescence and very slight cut.

10387'-10432' Chalk beige, indurated, hard with scattered very fine grained clear quartz at top. Some foraminifera. Abundant stylolites. Rare 1-4 mm vugs. Very slight to slight cut, dull yellow fluorescence, some bubbles. (See description Core No. 3).

10432'-10460' Chalky limestone light grey, dense hard sometimes grading to grey marl and dark grey, slightly laminated, calcareous shale. No shows. (See description Core No. 3).

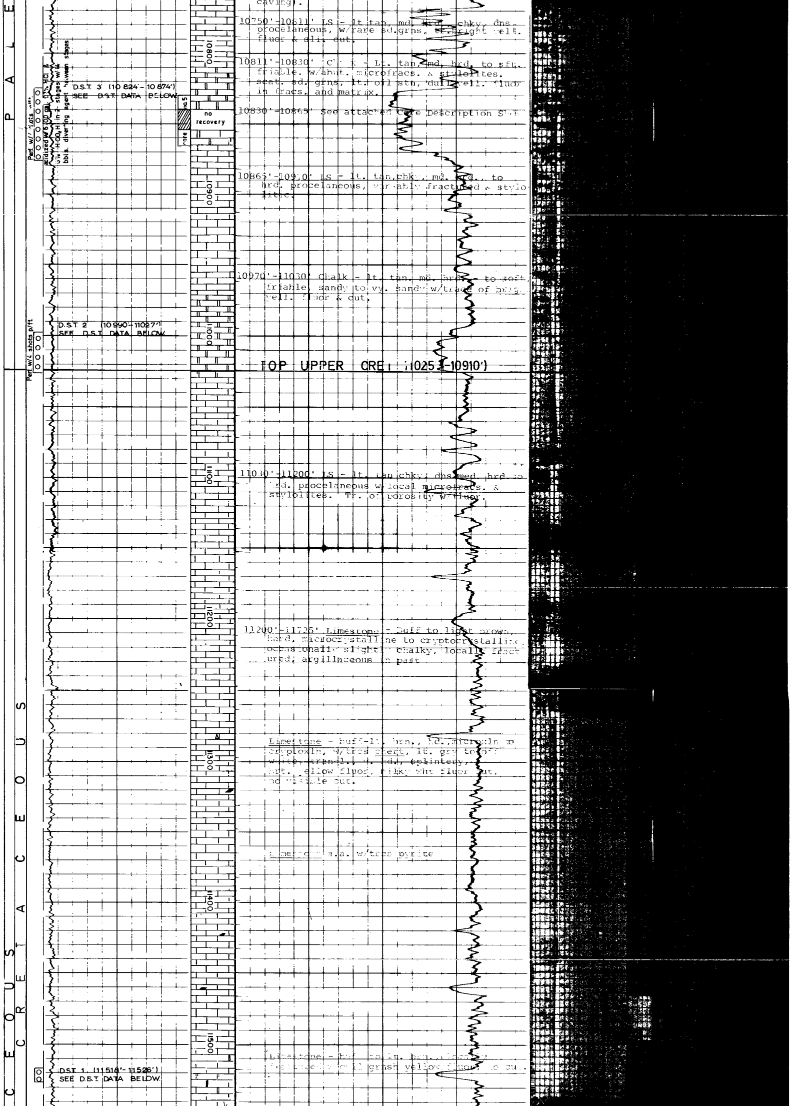
10460'-10550' Chalky limestone light grey, light beige, dense, hard generally with some scattered very fine grained clear quartz, occasional foraminifers, rare milky chert and very rare glauconitic. Alternated with chalk lt. beige, light grey, medium hard to soft.

10550'-10610' Chalky limestone same as above with beds of chalk same as above. Stringers of shale dark grey, some greenish grey, calcareous, platy and splintery, medium hard. (Possible caving).

10610'-10665' Limestone light brownish grey to grey depending on the dispersed shale content. Sometimes grading to marl. In part slightly chalky, dense, hard, no visible porosity with scattered very fine grained clear quartz and rare pyritic. Some thin streaks of shale dark grey, calcareous, laminated with occasional mica. (See description Core No. 4).

10665'-10670' Limestone beige, siliceous ? cryptocrystalline, very dense, very hard with some scattered very fine grained clear quartz and rare pyrite. Abundant brownish grey chert (See description Core No. 6)

10670'-10750' Limestone light beige, cryptocrystalline, dense hard to very hard, blocky to splintery with rare pyrite and very rare glauconitic. From 10716' in part becoming slightly chalky. Traces of chert milky, grey. Some shale. (Specially between 10680' 10690') dark grey, greenish grey, non to slightly calcareous, platy and splintery, medium hard. (Possible



caving).

10750'-10811' LS - lt tan, md, hrd, chky, dns. procelaneous, w/rare sd.grns, tr. bright yell. fluor & sli. cut.

10811'-10830' Chalk - Lt. tan, md. hrd. to sft. friable. w/abnt. microfracs. & stylolites. scat. sd. grns, lt. oil stn, dull yell. fluor in fracs. and matrix.

10830'-10865' See attached Core Description Sh

10865'-10910' LS - lt. tan, chky, md. hrd., to hrd. procelaneous, variably fractured & stylolitic.

10970'-11030' Chalk - lt. tan, md. hrd. - to soft, friable, sandy to vy. sandy w/trace of brig. yell. fluor & cut.

TOP UPPER CRE. (10253-10910')

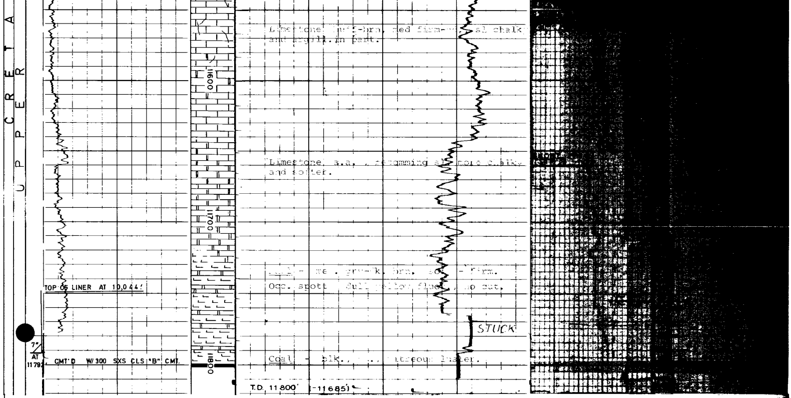
11030'-11200' LS - lt. tan chky, dns, med. hrd. to hrd. procelaneous w/local microfracs. & stylolites. Tr. of porosity w/fluor.

11200'-11725' Limestone - Buff to light brown, hard, microcrystalline to cryptocrystalline, occasionally slightly chalky, locally fractured; argillaceous in part

Limestone - buff-lt. brn., hd., microxln to cryptoxln, w/trcs chert, lt. gry to off white, trandl., v. hd., splintery, bright yellow fluor, milky wht fluor cut, no visible cut.

Limestone a.a. w/trcs pyrite

Limestone - buff to lt. brn., locally [illegible] grnsh yellow fluor, no cu.



CORE DESCRIPTION

Core No. 1 (10235' - 10295') Rec'd 59'

10235-10245 Chalk, md.hd., lt. gry - beige, patchy. Few microfactures. No apparent porosity. Patchy med. yellow fluor. esp. along microfracs. Occ. carbonaceus slickensided surfaces + argillaceus stringers. Dip. sub horizontal, fractures tend to be sub vertical.

10245 Shale, calc. med. gry, md. hd.

10246-10262 Chalk and limestone chalky lt. gry md. hd. argill. in part rare microfrac. having yellow fluor, along frac. planes. No oil stain or other fluorescense. At 10262' a 6" piece of chalky limestone has 1/4" wide frac. zone - partly healed with calcite. Live med. brown oil & gas seeping from this zone.

10262-10295 Chalk as above, few argillaceous stringers near top. Increasingly microfactured & oil stain in sub horizontal patches & along frac. planes. Oil has strong golden fluorescence. No apparent porosity.

Core no. 2 (10295' - 10338') Rec'd 43'

Chalky limestone light grey some light beige, indurated dense, hard, in part variably argillaceous grading to grey and occasionally to dark grey calcareous slightly, laminated shale especially in the bottom 8'. These shales are represented by thin streaks or stringers (2 mm to 50 mm thick) and irregular lenses. This bottom section contains some small biotite and rare miscovite. Few scattered very fine grained clear quartz is found throughout the core, more frequently around 10327'. Dip. various between subhorizontal and 30°. Rare hairline fractures completely filled with calcite. No visible porosity. The rock is fractured (broken up) between 10313'-10314' and 10329'-10330.5'. No cut, no fluorescense. Few gas bubbles and oil spots when taking out core from core barrel.

Core No. 3 (10413' - 10458') Rec'd 45'

10413'-10432' Chalk beige, indurated, hard, occasionally grading to chalky limestone, light grey, scattered foraminifera. Abundant stylolites where the rugged surfaces are covered with slightly carbonaceous dark grey shaley material. Occasional thin (max. 5 mm thick) streaks of dark grey shale sometimes with slickensides, dipping 15°. Few hairline fractures filled with calcite. Rare 1-4 mm diameter vugs generally connected with the stylolites. Very slight cut, dull yellow fluorescence. Some bubbles when taking out of core barrel. 10432'-10458' Gradually changes to chalky limestone light grey, dense, hard, sometimes grading to grey marl and dark grey, slightly laminated, calcareous shale. These frequent shale stringers are up to 30 mm thick often slickensided with dips varying between 5-30°. Rare up to 30 mm diameter nodules of some chalky limestone. Occasional hairline fractures filled with calcite. No visible porosity. No cut, no fluorescence. The core is broken up at 10433,5'; 10441,5'; 10446' and bottom.

Core No. 4 (10614' - 10669') Rec'd 55'

10614'-10665' Limestone light brownish grey depending on the amount of dispersed shale content sometimes grading to marl in part slightly chalky. Dense, hard, no visible porosity. Scattered very fine grained clear quartz, rare very fine crystalline pyrite groups. Sometimes the shale content becomes very high and thin streaks and lenses **(max. 10 mm. thick)** are formed of dark grey, calcareous, laminated shale with occasional mica. From 10633' the frequency of these shale streaks increases considerably. Several of the shaly surfaces show slickensides. Dip varies between subhorizontal and 25°. Few irregular hairline fractures filled with calcite. No cut, no fluorescence. 10665'-10669' Limestone beige, siliceous? very dense, very hard with conchoidal fracture. Abundant large irregular nodules of brownish grey chert. Some scattered very fine grained clear quartz, rare very fine crystalline pyrite. At 10666,5' a 10 cm. thick shaly interval (as above). No cut, no fluorescence. Core broken at 10668,5'

Core No. 5 (10830 - 10864) Rec'd 24'

10830-10841 Chalk - lt. tan to sli. brn., vfn grn'd med. hrd, fractured, (fractures are gen high angle) w/some gas bubbles from vy. sm.pin point porosity scat. stylolites. Stylolites have some carbonaceous & calcite lining. Light oil staining along fracture planes & w/in matrix indicating prob. fair to good porosity. Good fluor. & cut.

10841-10853 This interval not rec'd based on drilling rate.

10853-10864 Chalk - as above but harder, dense. Rock is gen. vfn. grn'd w/some evidence of recrystalization, & re-working. Stylolites are common, w/occ. irregular chart & other nodules noted which show some evidence of weathering.

Position of best fracturing & stylolites fracturing:

10865 to 10862. 1/4, 10861, 10860.5, 10860, 10859.5, 10859, 10857.5 10856.5, 108545.5, 10853.5, 10848.5, 10852.5, 10850.5 10848, 10845, 10846.5, 10846, 10845.5, 10844.5, 10844, 10841.5, 10841.

Stylolites

10862.25 to 10865, 10859.5, 10856.5, 10850, 10490, 10844, 10841.5

DRILL STEM TESTS

DST No. 1 **(11518'- 11526')** flowed well 30 mins, FSI 1 hour rec'd 220 ft. of slight oil cut mud. Chlorides on No. 1 spl. was 6000 ppm. IH 7959, ISI 6240, IF 2535, FF 2705, FSI 6760 FH 7902

DST No. 2 **(10990'- 11027')** After acidizing w/5000 gals. of spearhead followed by 5000 gals. CI spearhead into FM. At 8 BPM at 5300 psi acid into FM at 8.75 BPM at 5200 psi. Average production over a 4 hour period was 1039 BOPD (39° API) and 211 BWPD with a GOR of 1330 cu/ft per bbl. Surf. pressure during test period was 135 psi with surface temperatures between 88° and 94°.

DST No. 3 **(10824'- 10874')** ISIP before acidizing was 7182 psi. Acidized with 6700 gals. of 92° HLC & 8% formic acid in 2 stages. 1st stage into FM w/4700-4400 psi at 8 to 10 BPM. 2nd stage into FM w/4100 psi at 8-10 BPM. On 4 hr. flw. period, w/surf. pressure of 3749 psi, well flw'd 3958 BOPD, (40.5 api) gas 5647 MCFPD, GOR 1427, & no free water.

DST No. 4 **(10385'- 10442')** Acidized w/7700 gals. (92% acid + 8% formic acid) in 2 stages w/700 bbls of diverting agent between stages-each stage preceded by 3850 gals. of SAC. Flw'd well 14 hrs. 30 mins. (no chokes). At beginning of TST FTP was 3430 psi but dropped to 100 psi after 35 mins. FLW RT after 1 1/2 hrs. was 2280 BOPD, but rapidly dropped to 346 BOPD after 7 hrs & gradually dec'd to 29BOPD at end of tst.

DST No. 5 **re-test (10385'- 10442')** Estimated recovery of 225 bbls of water and 94 bbls of oil during test. During 7 1/2 hrs. test BHP (psi) varied between 1598 to 1823.

DST No. 6 **(10335'- 10458')** No flow. Acidized w/119 bbls. of acid. Opened well after 3 hrs. - flow rate 22 BWPH. Decreasing to 17 BWPH after 40 mins. Gas to surface 3 hrs. 10 mins. after opening. Well flowing on heads, no choke. Formation fluid recovery 22 bbls water & 15 bbls oil.