International Oil Development Ltd.

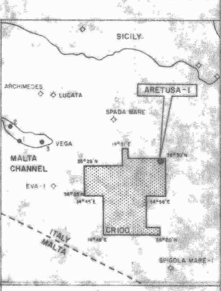
ARETUSA - 1
COMPOSITE LOG

1/1000

AREA OFFSHORE SICILY, ITALY
BLOCK CRIOO HO
LATITUDE 36° 29' 39·53" N
LONGITUDE 14° 56' 56·92" E

RIG SAIPEM DUE (DRILLSHIP)
CONTRACTOR SAIPEM
MUD LOG GEOSERVICES
ELECTRIC LOG : SCHLUMBERGER

KB ELEVATION 13m
WATER DEPTH 83m
T.D. (DRILLER) 3741m
SPUD DATE 13th NOVEMBER 1984
T.D. (REACHED) 13th MARCH 1985
COMPLETION 10th APRIL 1985
STATUS P+A, OIL DISCOVERY
RIG RELEASED 10th APRIL 1985



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LITHOLOGICAL SYMBOLS

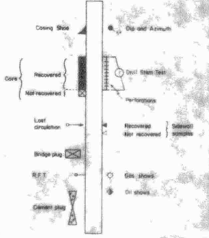
CLAY/CLAYSTONE/SHALE
SILTSTONE
SANDSTONE
CONGLOMERATE
MARL
LIMESTONE
CHALK

DOLOMITE
POTASSIUM SALT
SALT
GYPSUM
ANHYDRITE
CHERT
COAL

VOLCANICS
IGNEOUS
METAMORPHIC (BASEMENT)
MUDSTONE
WACKESTONE
PACKSTONE
GRAINSTONE

CHERT
STYLOLITES
SHELL DEBRIS
PELLETS
FORAMINIFERA
BIOCLASTIC MATERIAL
RADIOLARIA
BIVALVES
ROUNDED MUDSTONE GRANULES
CALCITE CRYSTALS
DISTURBED BEDDING
OOIDS
BIOTURBATION
ANGULAR MUDSTONE FRAGMENTS

ENGINEERING / GEOLOGICAL



WIRE LINE LOGGING

DATE	LOG	RUN	INTERVAL
27/11/84	DIL-SLS-SP-GR	1	470-1234m
	GR Only		To Seabed (96m)
26/11/84	DIL-SLS-SP-GR	2	1083-2679m
10/2/85	DIL-SLS-SP-GR	3	2676-3152m
15/3/85	DIL-SLS-SP-GR	4	3152-3702m
27/12/84	FDC-CNL-GR-Cal	1	1750-2680m
11/2/85	LDL-CNL-GR-Cal	2	2676-3153m
14/3/85	LDL-CNL-GR-Cal	3	3151·5-3657m
27/12/84	DLL-MSFL-GR-Cal	1	2375-2679m
11/2/85	DLL-MSFL-GR-Cal	2	2676-3149m
14/3/85	DLL-MSFL-GR-Cal	3	3151·5-3655m
27/12/84	HDT	1	1750-2679m
	Caliper Only		Up to 1219m
11/2/85	SHDT	2	2676-3153m
16/3/85	SHDT	3	3151·5-3714m
5/12/84	Dual Caliper	1	474-1236m
16/3/85	Waveforms and O.H. VDL	1	3151·5-3704m
17/3/85	CBL-VDL-GR-CCL	1	2400-3148m

CORE No.	CORE INTERVAL	RECOVERY
1	3261-3270·4m	100%

CASING

SIZE	WEIGHT	SHOE	CEMENT
30"	1" Wall (5 Joints)	157m	1000 SX 'G' at 15·8ppg
20"	94 PPF (31 Joints)	474m	600 SX 'G' LEAD at 11·5PPG 1000 SX 'G' TAIL at 15·8PPG
13⅜"	68 PPF (90 Joints)	1227m	1477 SX 'G' LEAD at 13·2PPG 500 SX 'G' TAIL at 15·8PPG
9⅝"	47 PPF (207 Joints)	2676m	1055 SX 'G' LEAD at 13·2PPG 500 SX 'G' TAIL at 15·8PPG
7"	29 PPF (45 Joints)	3150m HUNG at 2556m	500 SX 'G' GEOTHERM at 15·5PPG

DRILLING FLUID
Seawater with high Viscous Pills 96-488m
Dispersed/Bentonite/CMC 488-3741m

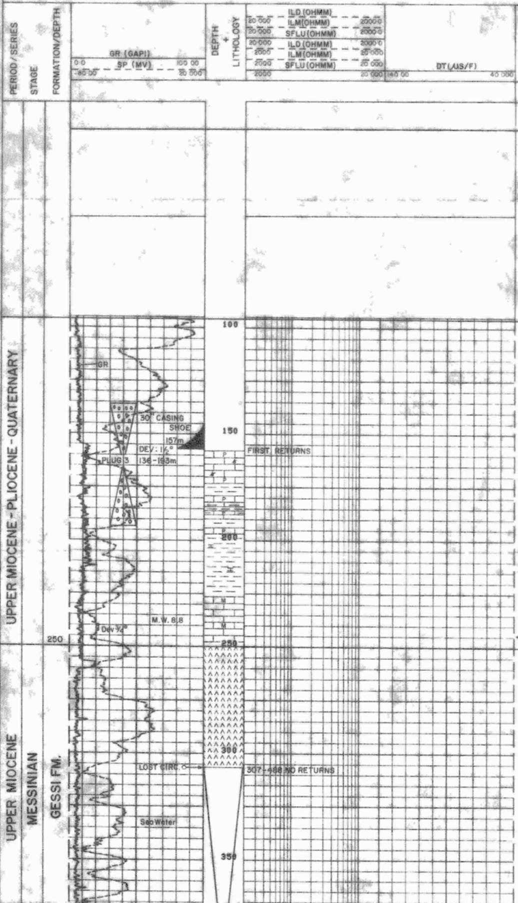
CEMENT PLUG No.	INTERVAL
1	2530-2852m
2	1180-1270m
3	136-193m

TESTING

DST No.	INTERVAL	RESULT	REMARKS
1	2676-2778m	201 BOPD, 29·5° API + 1·48 MMSCFD INITIAL SIP: 3324 p.s.i.	OPEN HOLE ⅝" CHOKE FLOW: 16hrs 3min
2	3150-3706m	1400 BOPD, VARIABLE GRAVITY+11·5 MMSCFD INITIAL SIP: 4145 p.s.i.	OPEN HOLE ¾" CHOKE ACIDIZED DEPLETING FLOW: 6hrs
3	2871-93m 2902-11m 2916-25m	NO FLOW INITIAL SIP: 2557 p.s.i.	ACIDIZED

HOLE SIZE	INTERVAL
36" 14/" (Opened to 26") 14/" (Opened to 18/") 12¼" 8½" 6"	96 - 158m 158 - 488m 488 - 1238m 38 - 2683m 2683 - 3154m 3154 - 3741m

4	2770 - 2818m 2825 - 52m	100 BOPD, 30 - 35° API + 0·9 MMSCFD + 400 BW INITIAL SIP : 4090 p.s.i.	½" CHOKE DEPLETING FLOW: 14hrs



LITHOLOGICAL DESCRIPTIONS

K.B. 0m

SEA LEVEL 13m (0m)

SEA BED 96m (-83m)

158-173m LIMESTONE: fair intergranular porosity, occasionally vuggy, I B/C, orange-yellow, occ. white, compact packstone, bioclastic, hard.

173-190m LIMESTONE: argillaceous, fair intergranular porosity, occ. vugs, I B/C, grey, compact packstone, bioclastic, moderately hard.

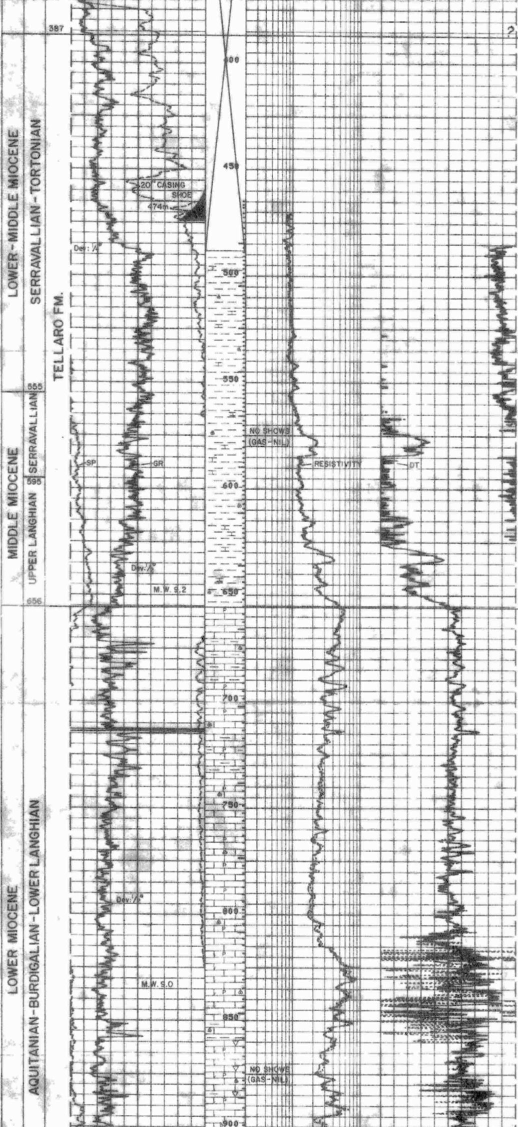
190-227m CLAY: grey, plastic, calcareous.

227-260m LIMESTONE: fair intercrystalline porosity, occ. vugs, I B/C, white, extremely fine to very finely crystalline, moderately hard.
LIMESTONE: occ. vugs, I B/C, white, compact mudstone, moderately hard.

TOP GESSI FM. 250m (-237m)

250-307m: GYPSUM

307-387m: NO RETURNS



? TOP TELLARO FM. 387m (-374m)

387-488m: NO RETURNS

488-530m CLAY/CLAYSTONE: light-medium grey, green grey, soft, plastic, occasionally firm, calcareous, microfossils and occ. macrofossil fragments.

530-550m CLAY/CLAYSTONE: a/s, commonly silty and grading to siltstone, light grey-green grey, soft, argillaceous, calcareous.

550-635m CLAY/CLAYSTONE: light-medium grey, green grey, becoming locally yellow brown-brown grey towards base, soft, plastic, occ. firm, calcareous, microfossils and occ. macrofossil fragments.
LIMESTONE: fair intergranular porosity, white, packstone, bioclastic, friable, abundant glauconitic grains.

635-656m CLAY/CLAYSTONE: light-medium grey, brown grey, soft, plastic, commonly moderately firm, calcareous, becoming off white, very calcareous, grading to MARL.

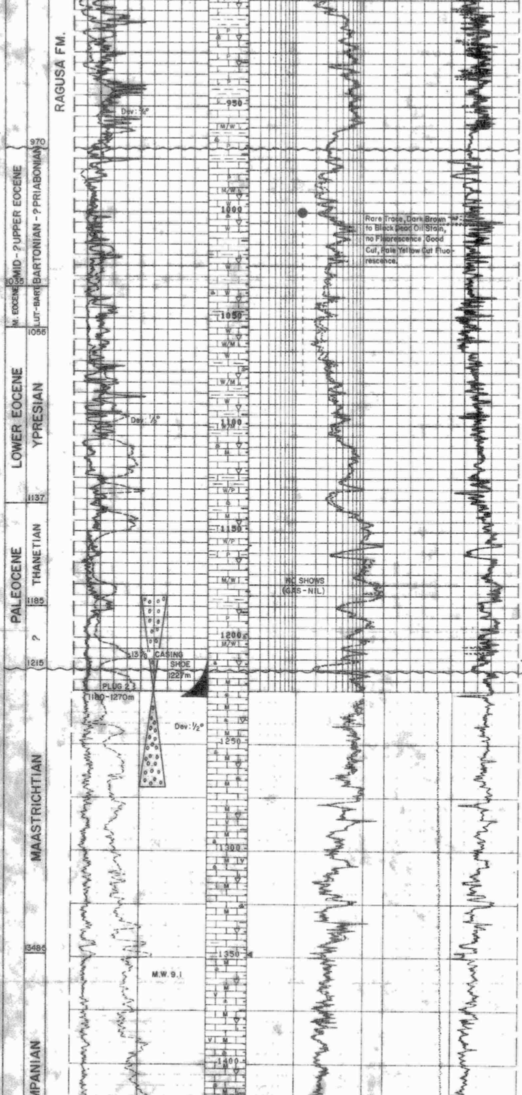
TOP RAGUSA FM. 656m (-643m)

656-815m LIMESTONE: fair intergranular porosity, off white-cream, packstone, intraclastic, slightly bioclastic, fine-medium calcisand, friable — moderately hard, traces of glauconite diminishing towards base, occ. dark brown argillaceous carbonaceous and lignite specks and laminae, increasing towards base.

815-840m LIMESTONE: fair intergranular porosity, off white-cream, packstone, intraclastic, slightly bioclastic, friable-moderately hard.
LIMESTONE: very poor visible porosity, cream-light tan, compact packstone, intraclastic, slightly bioclastic, hard, commonly partly dolomitized.

840-860m LIMESTONE: very poor visible porosity, off white-light tan, compact packstone, fine-medium calisand, intraclastic, slightly bioclastic, hard, commonly partly dolomitized.

860-920m LIMESTONE: very poor visible porosity, occ interbeds with fair intergranular porosity, off white-light tan, compact packstone, intraclastic, occ. bioclasts, fine calcisand, hard, occ friable — moderately hard, commonly partly dolomitized, traces brown translucent chert.



920-955m **LIMESTONE**: very poor visible porosity, off white-cream-light tan, compact packstone, intraclastic, occ bioclasts, hard, locally slightly dolomitized.

955-975m **LIMESTONE**: very poor visible porosity, white-off white, compact packstone, intraclastic, slightly bioclastic, hard, rare trace glauconite, no apparent dolomitization.
LIMESTONE: no visible porosity, white, chalky mudstone/wackestone, bioclastic, soft-firm.
975-995m LIMESTONE: very poor visible porosity, off white-light tan, compact packstone, intraclastic, slightly bioclastic, hard, rare trace glauconite.
LIMESTONE: very poor visible porosity, occ. intergranular porosity, compact — occ. chalky mudstone/wackestone, bioclastic, soft-firm.
995-1055m LIMESTONE: very poor visible porosity, white-cream, compact wackestone, intraclastic, slightly bioclastic, calcisilt — fine calcisand, moderately hard, occ. soft and chalky, traces dark brown-black carbonaceous and lignitic specks and laminae, traces brown-grey, translucent chert.

1055-1120m LIMESTONE: v. poor visible porosity, rare intergranular porosity, white-off white, compact wackestone/mudstone, occ. chalky, intraclastic, occ. bioclastic, mod. hard-soft, rare stylolites, decreasing traces carbonaceous and lignitic specks and laminae.
LIMESTONE: poor visible porosity, occ. fair intergranular porosity, light-medium brown, compact wackestone, locally packstone, intraclastic sl. bioclastic, mo. hard, commonly with abundant dark brown carbonaceous specks and laminae, decreasing towards base, sl. argillaceous, locally grading to CLAYSTONE: brown grey, firm, v. calcareous.

1120-1154m LIMESTONE: no visible porosity, white-off white-pale grey, compact mudstone, bioclastic, firm-mod. hard, sl. argillaceous in part.
LIMESTONE: poor visible porosity, light-medium brown, compact wackestone/packstone, intraclastic, sl. bioclastic, mod. hard, sl. argillaceous. Minor CLAYSTONE: green-green grey, soft-mod. firm, v. calcareous.

1154-1215m LIMESTONE: v. poor visible porosity, occ. intergranular porosity, white, porcellanous lustre, compact mudstone/wackestone, occ packstone, intraclastic, bioclastic, hard.

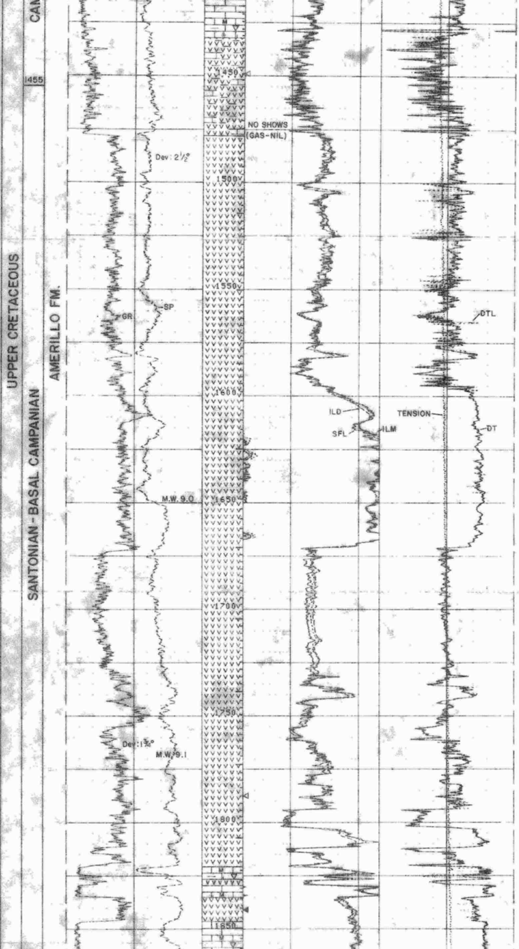
TOP AMERILLO FM. 1215m (-1202m)

1215-1238m LIMESTONE: no visible porosity, off white-pale grey, chalky mudstone, occ. compact, bioclastic, mod. hard, occ. stylolites, trace pyrite.

1238-1295m LIMESTONE: no visible porosity, white, mudstone, becoming chalky, bioclastic, firm-mod. hard, occ. styloilites, trace pyrite, good trace white-pale grey chert.

1295-1330m LIMESTONE: chalky a/a, good traces chert.
V. minor TUFFACEOUS CLAYSTONE: grey, green-grey, green, blue grey, occ. mottled, mod. firm-soft, sl. — mod. calcareous, sl. silty.

1330-1360m LIMESTONE: no visible porosity, white, mudstone, chalky, bioclastic, soft-mod. hard, rare stylolites, locally argillaceous, trace chert.
Minor LIMESTONE: no visible porosity, white-cream, compact mudstone/wackestone, bioclastic, occ. intraclastic, hard, trace pyrite, rare trace glauconite.
V. minor TUFFACEOUS CLAYSTONE: a/a.
1360-1432m LIMESTONE: no visible porosity, white-buff, mudstone, chalky, occ. bioclastic, soft-firm, occ. argillaceous, trace chert.
Minor TUFFACEOUS CLAYSTONE: grey green, grey, green, mottled, firm, sl.-mod. calcareous, occ. crystals and lithoclasts.



1432-1478m LIMESTONE: chalky mudstone a/a.
CLAYSTONE: light-dark brown, subfissile, soft-firm, mod. calcareous, occ. sl. silty.
TUFF: grey, green, grey green, firm, silt-size crystals and vitric clasts.

1478-1590m BASALT: dark grey green, hard, brittle, calcite-filled vessicles, sl. calcareous, rare feldspars, ?pyroxene phenocrysts, highly altered, ?chloritized and serpentanized, associated vein calcite and pyrite.
V. minor TUFF: light-dark green, mottled, vesicular, calcitic, zeolites, occ. laminated and brecciated.

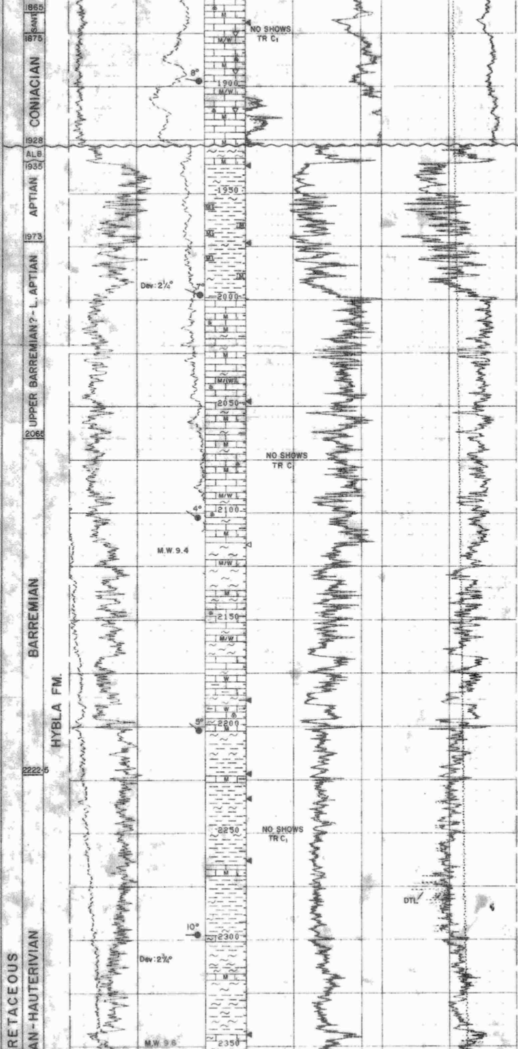
1590-1673m BASALT: a/a, less altered, less vesicular, occ. ?orthoclase and ?divine phenocrysts, decrease in vein calcite and pyrite, ?zeolites in vesicules.
V. minor TUFF: a/a

1673-1820m TUFF: light brown, light grey, light-dark green, mottled, soft-hard vesicular, sl. calcareous, occ. laminated, occ. brecciated, zeolites, calcite vesicules increase towards base, trace pyrite, rare trace vein calcite.

1820-1835m LIMESTONE: no visible porosity, white-cream, mudstone, compact, occ. chalky, firm-hard, occ. argillaceous, rare stylolites, bioclastic, trace chert.
Minor LIMESTONE: no visible porosity, wackestone/mudstone, white-light pink, bioclastic, occ. intraclastic, hard, compact.
Minor TUFF: a/a.

1835-1846m TUFF: a/a.

1846-1928m LIMESTONE: no visible porosity, white-cream, mudstone a/a, trace chert.
Minor LIMESTONE: white-light pink, mudstone/wackestone a/a



TOP HYBLA FM. 1928m (-1915m)

1928-1933m MARL: Light-medium brown, firm, occ. subfissile, mottled, v. calcareous, argillaceous, rarely bioclastic.
Minor LIMESTONE: mudstone, *a/a.*

1933-1999m CLAYSTONE: light-medium olive green, firm, subfissile, occ. waxy lustre, mod. calcareous, pyritic, rarely carbonaceous, occ. laminated.
Minor MARL: *a/a.*
Minor LIMESTONE: no visible porosity, white-v. light green, v. soft-soft, occ. firm, mudstone, chalky, rarely bioclastic, occ. argillaceous.

1999-2017m LIMESTONE: no visible porosity, white-off white, occ. v. light grey, soft-firm, mudstone, chalky, bioclastic.
Minor LIMESTONE: white-cream, firm-hard, compact mudstone, bioclastic, rare stylolites, no visible porosity.

2017-2060m LIMESTONE: no visible porosity, off white-light grey, mudstone, chalky, rarely bioclastic, argillaceous, soft-firm.
V. minor MARL: light brown, firm, argillaceous, subfissile in part.

2060-2113m LIMESTONE: no visible porosity, white-off white, mudstone, soft-v. soft, rarely bioclastic, argillaceous.
Increasing LIMESTONE: no visible porosity, light grey-white-v. light green, mudstone, grading to mudstone/wackestone in part, bioclastic, firm — hard, becoming marly with depth.
Minor MARL: light-medium olive green, firm-hard, occ. subfissile.

2113-2157m MARL: light olive green-grey, firm-hard, brittle, blocky, v. argillaceous, pyritic in part.
LIMESTONE: no visible porosity, white-off white-light grey, mudstone, chalky, occ. compact, v.soft-firm, occ. hard, argillaceous, rarely bioclastic.
Minor LIMESTONE: no visible porosity, off white-v. light brown, wackestone, hard, brittle, bioclastic, occ. intraclastic, rare stylolites, occ. argillaceous.

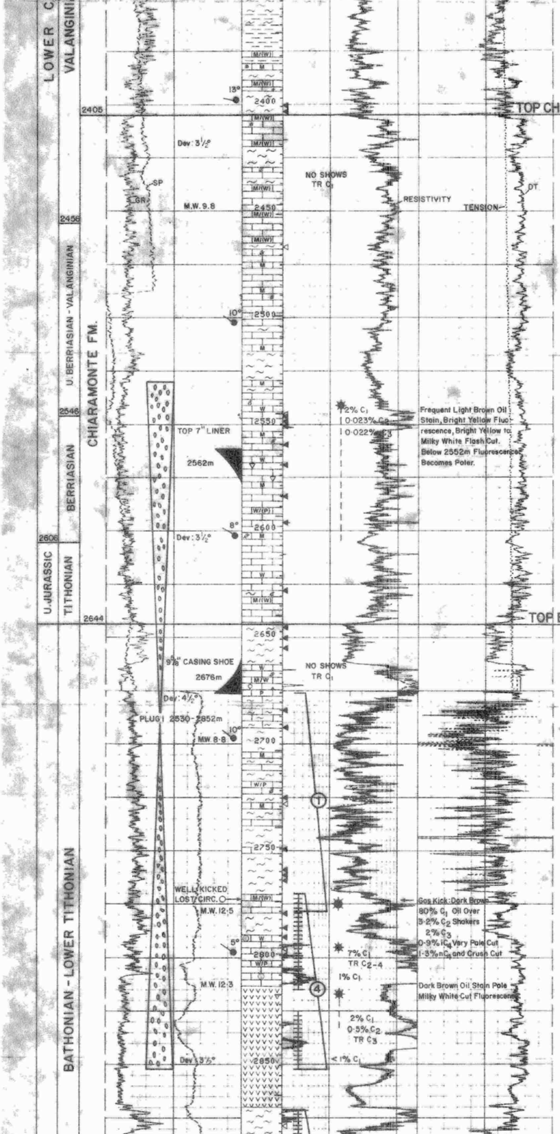
2157-2176m MARL: light olive grey green, generally firm, occ. soft, blocky-subfissile, waxy, argillaceous — v. argillaceous, grading to CLAYSTONE in part.
LIMESTONE: no visible porosity, white-light grey, mudstone, chalky, soft-firm, rarely bioclastic, argillaceous, rarely pyritic.
V. minor CLAYSTONE: dark olive green, firm, subfissile, calcareous, waxy, occ. pyritic.

2176-2202m MARL *a/a:*
LIMESTONE: no visible porosity, white-light grey, occ. yellow grey, compact wackestone, firm-hard, bioclastic, rarely intraclastic, argillaceous, blocky.
Minor LIMESTONE: no visible porosity, white-light grey, chalky, mudstone, a/a.
V. Minor CLAYSTONE: a/a.

2202-2281m LIMESTONE: no visible porosity, white-light grey, mudstone, chalky, v.soft-soft, rarely bioclastic, argillaceous, becoming increasingly argillaceous with depth, grading to MARLY LIMESTONE.
MARL: light olive grey green, *a/a.*
CLAYSTONE: dark-medium olive green, firm, subfissile, waxy, slightly-moderately calcareous, pyritic in part.

2281-2326m LIMESTONE: no visible porosity, white-off white, mudstone, chalky, v.soft-soft, argillaceous, grading to MARLY LIMESTONE.
CLAYSTONE: light-dark olive green, firm, subfissile, slightly-moderately calcareous, pyritic, occ. orange brown laminae, grading to MARL.

2326-2367m LIMESTONE: *a/a* becoming more consolidated, firm.
CLAYSTONE: *a/a.*
LIMESTONE: no visible porosity, white, rarely light grey, compact wackestone, hard, brittle, bioclastic, rarely argillaceous.



2367-2405m **LIMESTONE**: no visible porosity, occ. poor intergranular porosity, compact mudstone, occ. chalky white – light grey, bioclastic, grading to wackestone/packstone, friable, brittle, moderately hard, occ. soft, occ. v. argillaceous, increasing hardness with depth.
CLAYSTONE/MARL: compact, light-medium grey green, grading to CLAYSTONE, crumbly, moderately hard.

TOP CHIARAMONTE FM. 2402m (-2392m)

2405-2430m **LIMESTONE**: a/a, hard. **MARL**: a/a.

2430-2446m **MARL**: a/a, occ. pinkish brown.
LIMESTONE: a/a becoming light grey-light brown-white.

2446-2515m **LIMESTONE**: a/a, occ. v. poor isolated vuggy porosity.
LIMESTONE: no visible porosity, compact, mudstone, occ. chalky, white-light grey green, occ. slightly bioclastic, splintery crumbly, hard-v. hard, occ. friable, abundant radiolaria, carbonaceous material.

2515-2529m **MARL**: salmon pink — slightly pinkish grey-orange, crumbly, friable-soft moderately hard.

2529-2542m **LIMESTONE**: a/a.
MARL: medium-dark grey green, crumbly, friable-moderately hard.

2542-2572m **LIMESTONE**: extremely poor intergranular porosity, white-buff, slightly chalky, wackestone, occ. marly, bioclastic, hackly-crumbly, moderately hard-hard.
CHERT: light brown, translucent, conchoidal break, hard, brittle.

2572-2586m **LIMESTONE**: a/a growing to packstone.

2586-2606m **LIMESTONE**: extremely poor porosity, mudstone and wackestone a/a, becoming light grey green, bioclastic, splintery, hard-v. hard, calcite.

2606-2644m **LIMESTONE**: a/a white-light grey green beige.
LIMESTONE: no visible porosity, compact mudstone-wackestone, white-grey green, rarely pinkish, bioclastic, angular-crumbly, well cemented, hard-v.hard, abundant radiolaria, calcite.

TOP BUCCHERI FM. 2644m (-2631m)

2644-2662m **LIMESTONE**: a/a rarely packstone, occ. marly
MARL: white-light grey green, occ. pinkish, crumbly-earthy, soft-plastic, occ. medium grey green, splintery-fissile, moderately hard-brittle.

2662-2692m **LIMESTONE**: mudstone, compact, a/a, yellow, stylolitic, brittle, splintery, occ. wackestone, white, bioclastic, moderately hard, angular, grading to MARL.
LIMESTONE: packstone, compact, a/a, white-beige, peloids, sparry calcite.

2692-2717m **CLAYSTONE**: medium grey, platey-fissile, moderately hard, moderately calcareous, carbonaceous specks and microfossils.

2717-2760m **LIMESTONE**: no visible porosity, mudstone, occ. wackestone/packstone, white-off white-light grey, bioclastic (bivalves), occ. sparry-microspar cement, ooids and peloids, occ. silty, grading to MARL.
MARL: medium grey-light-medium grey green and blue grey, firm-hard, blocky-fissile, silty
V. minor **TUFF/ASH**: light grey-light green, angular grains/clasts, speckled, slightly-non calcareous, blocky, brittle.

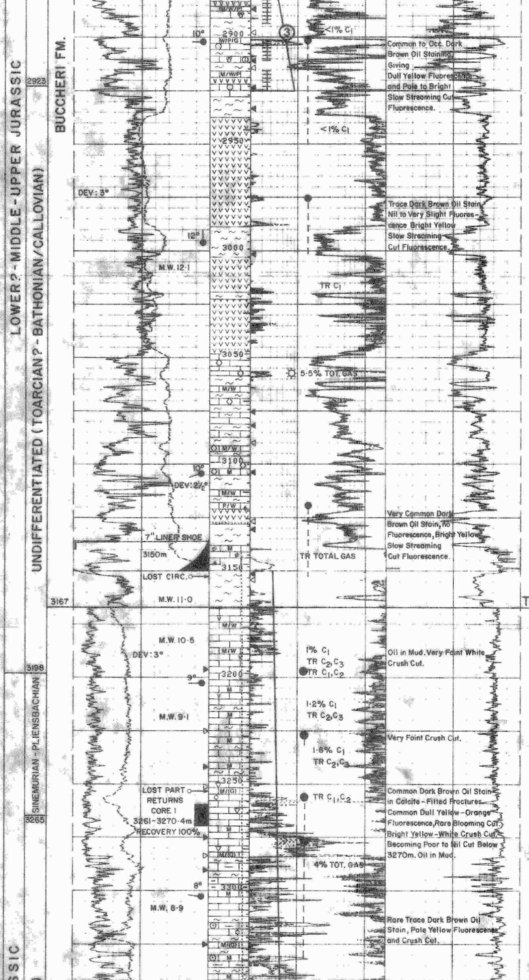
2760-2778m: **MARL and LIMESTONE**: a/a.
MARL: red brown, firm, blocky, amorphous.
LIMESTONE: no visible porosity, white, occ. pale brown, mudstone-wackestone, hard angular, blocky.
LIMESTONE: occ. intergranular porosity, generally zero, white, wackestone, occ. packstone.

2778-2789m **MARL**: a/a, grading to **LIMESTONE**: no visible porosity, compact mudstone/wackestone, occ. packstone, frequently sparry, white-light grey, angular, hard-brittle, pyritic, v. argillaceous, radiolaria, sponge spicules.

2789-2812m **LIMESTONE**: no visible porosity, compact wackestone/packstone, white-light grey, abundant radiolaria, angular-splintery, well cemented, occ. sparry, hard-brittle.
LIMESTONE: compact mudstone/wackestone a/a.
MARL: light-dark grey, fissile-blocky-crumbly, well cemented, hard-brittle.

2812-2870 **VOLCANICS**: medium-dark grey becoming light grey towards base, moderately soft, unconsolidated, crumbly, medium grains quartz, zeolites, feldspars mafics, slightly calcareous, argillaceous matrix, banded, weathering at top, finer grained at base.
LIMESTONE: no visible porosity, compact mudstone/wackestone, white-light grey-light brown, angular, hard-v.hard, well cemented, argillaceous, radiolaria.

2870-2892m **MARL**: medium-dark grey green, crumbly-fissile, moderately hard-hard, becoming soft, pyritic, silty and sandy with depth, radiolaria.
LIMESTONE: occ. slight vuggy porosity, compact mudstone/wackestone, grading to packstone with depth, white-light brown, microcrystalline, hard-v.hard, fissile-blocky, occ.-abundant thin-shelled bivalves, radiolaria.



2892-2921m **LIMESTONE**: compact mudstone/wackestone a/a, becoming light grey, soft-hard, partly microcrystalline-sparry.
LIMESTONE: no visible porosity, v. occ. slight visible porosity, compact wackestone/packstone, grading to packstone, light brown, partly sucrosic, microcrystalline, hard, friable, peloids, bioclastic.
MARL: medium-dark grey green, occ. slightly blue, crumbly-fissile, firm-moderately hard, radiolaria, bivalues.

2921-2937m **VOLCANICS**: ash/tuff, breccia and agglomerate, light-dark grey green, mottled and spotted, chloritic, argillaceous matrix, pyrite, calcite in vessicules.
LIMESTONE: mudstone/wackestone a/a, grading to packstone, forams, bivalues and ammonite, gastropod and echinoid fragments.
MARL: a/a.

2937-3049m **VOLCANICS**: light-medium-dark grey green, ash/tuff, soft-brittle, crumbly-angular, mafics in fine, slightly calcareous matrix, green volcanic glass, with calcite cement in vessicules, basalt, dark grey-black, hard.

MARL: a/a.

3049-3076m **LIMESTONE**: sparry calcite, white-translucent, microcystalline-sparry.
MARL and **VOLCANICS**: a/a.

3076-3088m **MARLY LIMESTONE/MARL**: no visible porosity, light grey-light brown, occ. light grey green, compact mudstone, fissile-blocky, friable-moderately hard, silty.
LIMESTONE: sparry calcite a/a.

3088-3102 **LIMESTONE**: no visible porosity, compact mudstone/wackestone, white-light grey brown, hard-v.hard, well cemented, crumbly-angular, abundant sponge spicules.
MARLY LIMESTONE and **VOLCANICS**: a/a.

3102-3144m **LIMESTONE**: no visible porosity, compact mudstone, light grey-light brown, cream, mottled, microcystalline, moderately hard-v.hard, brittle, angular-blocky, v.rare-absent bivalues, radiolaria, stylolites.
MARL: light grey green, fissile-blocky, friable-moderately hard, slightly dolomitic.
LIMESTONE: no visible porosity, wackestone/packstone, detritic, mottled light brown, irregular intraclasts and disturbed bedding, moderately soft-hard, crumbly, calcite veins.
LIMESTONE: v. rare intercrystalline porosjty, generally no visible porosity, compact wackestone/packstone, sponge spicules, microcrystalline, v.hard, crumbly-angular, slightly dolomitic.
VOLCANICS: a/a.

3144-3167m **LIMESTONE**: compact mudstone, a/a, splintery, chert, porcellaneous, generally barren of fossils, v. occ. radiolaria and bivalues.
LIMESTONE: compact wackestone/packstone a/a.
MARL: a/a, not dolomitic.

TOP MODICA FM. 3167m (-3154m)

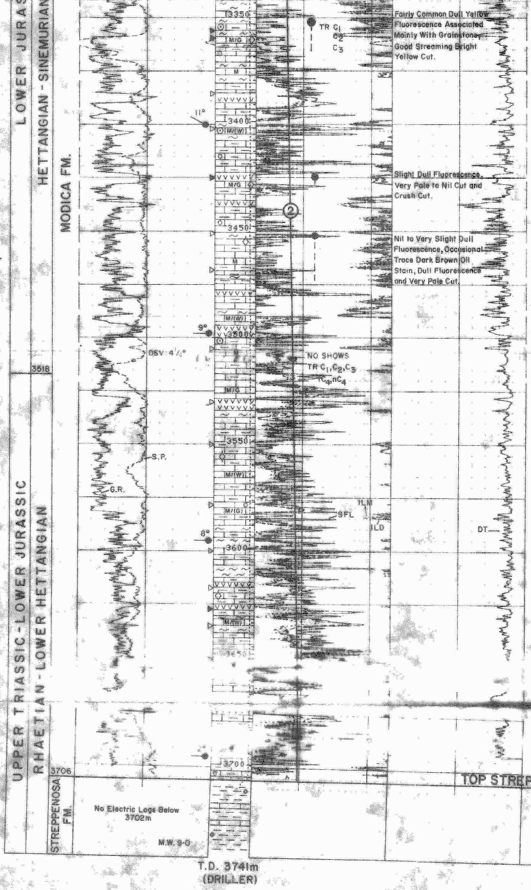
3167-3200m **LIMESTONE**: no visible porosity, mudstone/wackestone, light brown-off white, compact, hard, brittle, carbonaceous flecks, occ. marly, bioclastic, radiolaria and sponge spicules, chert.
V. minor **TUFF**: light grey-light brown, firm, blocky, laminated.

3200-3254m **LIMESTONE**: mudstone/wackestone a/a.
Minor **MARL**: light brown-light grey, firm, fissile, brittle, moderately-v. calcareous, carbonaceous, occ. volcanic material, grading to MARLY LIMESTONE.
V. minor **TUFF**: a/a.

3254-3270m **LIMESTONE**: mudstone, a/a, occ. white, microcrystalline-sparry calcite, beige-light brown.
LIMESTONE: no visible porosity, grainstone, white-light brown, peloids.

3270-3290m **LIMESTONE**: no visible porosity, generally compact mudstone, white-beige, cryptocrystalline, occ. chalky, v.hard-brittle, angular-fissile, occ. crumbly, chert.
V. rare **LIMESTONE**: grainstone, ooliths, peloids.
MARL: medium grey-brown, fissile, carbonaceous.

3290-3390m **LIMESTONE**: no visible porosity, compact mudstone, white-dark grey, cryptocrystalline, translucent, v.hard-brittle, angular-fissile, occ. crumbly, becoming v. argillaceous, grading to marl, occ. chalky, white, moderately soft, crumbly, pyritic, chert.
MARL: medium-dark grey, occ. light grey, crumbly-fissile, firm-brittle.
Rare **LIMESTONE**: no visible porosity, compact grainstone, white-beige, angular-crumbly, brittle.
BASALT: light grey green, crystalline, abundant quartz, chloritic, sparry calcite.



Fairly Common Dull Yellow Fluorescence Associated Mainly With Grainstone, Good Streaming Bright Yellow Cut.

Slight Dull Fluorescence, Very Pale to Nil Cut and Crush Cut.

Nil to Very Slight Dull Fluorescence, Occasional Trace Dark Brown Oil Stain, Dull Fluorescence and Very Pale Cut.

3390-3408m LIMESTONE: no visible porosity, compact mudstone, occ. wackestone, a/a, decreasingly argillaceous, becoming frequently light grey-beige-white, pyrite, frequently slightly chalky.
MARL: a/a, light-dark grey and brown.

3408-3452m LIMESTONE: mudstone, a/a, slightly-v. argillaceous, brittle.
Trace LIMESTONE: grainstone, a/a, pelitic/intraclastic, rarely oolitic.
MARL: a/a, occ. dark grey-black, v. carbonaceous.
BASALT: crystalline, mafic, chloritic, a/a.

3452-3480m LIMESTONE: no visible porosity, mudstone, occ. wackstone, commonly chalky, white, moderately soft, angular-crumbly.
MARL: a/a, frequently v.dark grey, v. carbonaceous, v. fissile, grading to shale, rare intraclasts of lime mudstone.
Trace LIMESTONE: grainstone, a/a.

3480-3560m LIMESTONE: no visible porosity, mudstone, beige-light grey, slightly-very argillaceous, grading to MARL, occ. slightly dolomitic, occ. wackestone, a/a, and chalky mudstone, white, a/a, and occ. grainstone, intraclastic/pelitic, a/a.
MARL/SHALE: light dark grey, occ. black and dark brown, crumbly-v. fissile, firm-brittle.
BASALT: mottled black and white, crystalline, v. mafic, occ. chloritic, dark brown volcanic glass.

3560-3672m LIMESTONE: no visible porosity, mudstone/wackstone, a/a, mottled light-medium gray, beige, increasingly chalky, white, moderately soft-firm, crumbly, wackestone becomes increasingly rare, largely barren of fossils, nil-v. argillaceous, sparry calcite.
MARL: a/a mostly dark grey-black, grading to SHALE.
LIMESTONE: grainstone, a/a, decreasing with depth, with sub-angular intraclasts, poorly sorted.
BASALT: a/a.

mudstone, white, chalky, moderately hard, blocky, occ. microcrystalline, beige-buff.
CLAYSTONE/MARL dark grey occ. black, fissile, laminated, slightly silty.

TOP STREPPENOSA FM. 3706m (-3693m)

3706-3741m CLAYSTONE/SHALE: medium-dark grey, moderately hard-soft, platey-fissile, occ. carbonaceous, specks, slightly silty, micromicaceous, non calcareous, pyritic, mottled.
LIMESTONE: no visible porosity, mudstone, white, chalky, blocky, moderately hard-hard.