Natural Resources and Environment

... LAND • RESOURCES • CONSERVATION • LAND MANAGEMENT

WELL SUMMARY

TILDESLEY EAST - 3

W942

2 Referred to	3 Date	4 Clearing Officer's Initials	1 Folio No.	2 Referred to	3 Date	4 Clearing Officer's Initials

E

Tildesley East-3
(W942)

Well Summary Report

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QUARTERLY REPORTS

Arena Petroleum Limited
Incorporated in Victoria

P Clark
M J. Davin

REC'D 6.11.86

06 NOV 1986

PETROLEUM DIVISION

30th October, 1986.

The Secretary,
Department of Industry,
Technology and Resources,
Oil and Gas Division,
151 Flinders Street,
MELBOURNE, VIC., 3000.

TILDESLEY EAST — 3.

Attention: Mr. R. Spence,

Dear Sir,

PEP 116 - Quarterly Report

In accordance with the provision of Section 70 (1) (b) of the Petroleum Act, we are pleased to submit our report for the quarter ended 30th September, 1986.

1. LAKES ENTRANCE FIELD

No further work has been carried out on E.C.R. development in this area during the quarter under review. While early in the quarter, it was thought possible that crude oil prices might be on the way up by end 1986, this no longer appears to be the case unless all OPEC members are prepared to stand solidly behind a production limitation agreement yet to be devised.

2. EXPLORATION

Following upon discussions held some months ago between the Department and Arena, the idea of obtaining jointly, additional geological / geophysical information within the permit area was actively developed. This culminated in September in an agreement under which Arena would contribute toward the cost of two stratigraphic water bores to be drilled by the I.T.R. Drilling Unit within the P.E.P 116.

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3. Both parties were flexible enough in their ideas of locations such that agreement was reached as to where the two bores would be located so as to provide benefit to each.

4. The locations chosen - in order of drilling - are

a) Latitude 37 deg - 46' - 37" south
Longitude 148 deg - 18' - 02" east

b) Latitude 37 deg - 47' - 14" south
Longitude 148 deg - 06' - 38" east

These sites were pegged by a joint team of ITR/Arena personnel on September 2nd. The ITR Drilling Unit began physical operations at the first site, during the following week.

5) Justification by Arena for the choice of sites is as follows.

a) A gravity anomoly centered on a position between Wombat track and Dinner Creek was revealed by the gravity survey commissioned by Arena early this year. The anomoly is interpreted as having sufficient sedimentary section to warrant further investigation.

b) A large gravity minimum near Lake Tyers indicates sediments of sufficient thickness to contain a sizeable Lakes Entrance Formation reservoir. Although five wells have been drilled on the periphry of this, the deep central section has not been tested. The area of this central section is of a size that could entrap 100 million barrels of oil. The ideal site as defined by the above co-ordinates, is located within a closely held reservation. It was therefore considered disirable to shift the well site towards magnetic north by 375 m.

6) Expenditure details for the third quarter are not yet complete. They are however estimated to approximate A$11,000.00. The correct figure will be advised to you in due course.

Yours faithfully,
ARENA PETROLEUM LIMITED,

John M. L. Clarke.

Arena Petroleum Limited
Incorporated in Victoria

27-1-87

27 JAN 1987

27 JANUARY 1987

PETROLEUM DIVISION

THE SECRETARY,
DEPARTMENT OF INDUSTRY, TECHNOLOGY
AND RESOURCES,
OIL AND GAS DIVISON,
151 FLINDERS STREET,
MELBOURNE, VIC. 3000

ATTENTION ; MR. R. SPENCE

TILDESLEY EAST - 3.

DEAR SIR,

PEP-116 - QUARTERLY REPORT.

IN ACCORDANCE WITH THE PROVISIONS OF SECTION 70 (1)(B) OF THE PETROLEUM ACT, WE SUBMIT OUR REPORT IN RESPECT OF OPERATIONS CARRIED OUT WITHIN PEP 116 DURING THE QUARTER ENDED 31ST DECEMBER 1986.

1. LAKES ENTRANCE FIELD

NO FIELD WORK CARRIED OUT ON E.O.R. DEVELOPMENT IN THE AREA DURING THIS QUARTER FOR REASONS ADVANCED IN PREVIOUS REPORTS. HOWEVER SOME ADDITIONAL RESEARCH ON THE POSSIBLE EFFECTS OF VARIOUS STIMULATION AGENTS, OTHER THAN THOSE ALREADY CONTEMPLATED, HAS BEEN PUT IN HAND. COST IS OF COURSE STILL THE MAIN OBSTACLE TO PRACTICAL EXPERIMENT.

2. EXPLORATION

THE MAIN WORK CONSISTED OF THE DRILLING OF TWO STRATIGRAPHIC WELLS IN THE AREA AT THE POSITIONS NOMINATED AND IDENTIFIED TO YOU WITHIN OUR REPORT DATED 30 OCTOBER 1986.

THE INFORMATION, WHICH IS EXPECTED TO BE YIELDED BY STUDIES OF THE DATA, WILL BE MOST USEFUL IN GUIDING THE FUTURE DIRECTION AND TYPE OF WORK TO BE CONTEMPLATED.

COPIES OF THE APPROPRIATE REPORTS ARE ATTACHED, BUT, IN SUMMARY, BOTH HOLES WERE DRY AND WERE SUBSEQUENTLY PLUGGED AND ABANDONED ALTHOUGH THE TILDSLEY EAST NO.3 WELL SHOWED SLIGHT HYDROCARBON TRACES ON MATERIAL RECEOVERED FROM THE ZONES OF INTEREST. NO HYDROCARBON TRACES WERE DETECTED IN COLQUHOUN EAST NO.6.

..../2..

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Arena Petroleum Limited
Incorporated in Victoria

SUBJECT TO THERE BEING SEPARATED AN ADEQUATE QUANTITY OF APATITE FROM THE FIVE DOWNHOLE SAMPLES TAKEN FROM THE COLQUHOUN WELL, GEOTRACK INTERNATIONAL WILL PROCEED WITH A PALEO TEMPERATURE ANALYSIS PROGRAMME USING THE APATITE FISSION TRACK ANALYSIS TECHNIQUE. RESULTS OF THIS WORK ARE NOT EXPECTED BEFORE 30 JUNE 1987.

AS REGARDS SUBMISSIONS, YOU WILL BE AWARE THAT THE DRILLING REPORTS, WIRELINE LOG TRACES AND CORES, ARE ALREADY IN THE POSSESSION OF THE APPROPRIATE DIVISIONS OF ITR. IT REMAINS, THEREFORE, TO SEND YOU COPIES OF SERVICE AND GEOLOGICAL REPORTS PREPARED BY OUR CONSULTANTS.

ATTACHED THEREFORE ARE :

Box 942 945

1) GEOLOGICAL REPORTS (2) IN RESPECT OF BOTH WELLS, PREPARED BY ROBIN GLENIE AND ASSOCIATES PTY LTD.

2) WIRELINE LOG EVALUATIONS (2) IN RESPECT OF BOTH WELLS, PREPARED BY BOWLER LOG CONSULTING SERVICES PTY LTD.

3) CORE ANALYSES IN RESPECT OF 4 SAMPLES DRAWN FROM TILDSLEY EAST-3, CARRIED OUT BY AMDEL.

YOURS FAITHFULLY,

J.M.L. CLARKE
DIRECTOR.

C.C. : GRANADA ENERGY CORPORATION.

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QUARTERLY REPORT

PEP 116

PERIOD ENDING 31ST MARCH, 1987

A) During the period under review, work continued on assessment of the two stratigraphic holes drilled within the permit namely Colquhoun East No. 6 and Tildesley East No.3.

B) In both areas, basement was reached at about 300m, some 100m above that previously estimated, although Dr. K. Hegarty holds that in the case of Colquhoun East No 6 at least, a gravity value model she constructed could have provided a close indication of the sediment depth actually found.

C) An extract from her report reads as follows

"Enclosed are some brief comments to keep you posted on some of my work relevant to the Arena exploration program in the onshore Gippsland Basin.

1) We have nearly completed heavy mineral separation of five downhole samples from the second Arena well. If the mineral apatite is present, I will proceed with the paleo-temperature analysis using Apatite Fission Track Analysis (AFTA). I will also try some exposed basement rocks (just north of Nowra Nowra - these samples were collected with Barrett) to compare with the drilling results. I expect to complete the separation and analysis no sooner than mid - 1987.

2) I was initially puzzled by the drilling results at the second well in light of the gravity survey. Specifically, the shallow basement seemed to be a scientific as well as commercial problem. While the second remains true, the first does not. In short, gravity models are consistent with the observed values.

I picked values along an east-west line (Profile A - marked in pencil on the Wongela gravity map) across the lowest depression in the area of the second drilled well. These observed values are shown as wee (blue) circles on the enclosed figures. These values should be compared with the continuous (purple) modelled line. Clearly, MODEL ARENA 3 best fits the observed values suggesting that about 300m of sediment underlie the area of the gravity low (consistent with drilling results). MODEL DEEP demonstrates that even as little as 500m of sediment is too thick. So in summary, we should not have expected much more than 300m prior to drilling.

Arguably, we can fiddle with my assumed values for the density of the sediments and sympathetically move the sediment/basement boundary deeper. However to do so, requires anomalously high density values for the sediments. From drilling, we now know that

the sediments are loosely compacted, friable and low density, so it is untenable to invoke such an argument.

We can conclude from the gravity modelling that:
a) this small sub-basin in which you drilled is about 18km wide,
b) the sub-basin is nearly symmetrical with a rather steep-sided westerly face,
c) sediments within the sub-basin may range from 1.4-2.1 gm/cm3, and
d) with higher assumed density values for the sediments, basement-depth may extend to 500-600m but not more."

A copy of Dr. Hegarty's sketches of various model profiles is attached.

The line of latitude, used as a reference in her report is at 37:44':25"s between Longitudes 148:02:06E and 148:14':10" E.

D) In general, the results provided adequate confirmation that the area to the east of longitude 148:20'E is most unlikely to be of further interest from a petroleum exploration point of view. On the other hand, further attention should be given to the area to the west both within PEP 116 and, when possible, to the west of the Permit's western boundary.

E) Application was made for an extension to the Permit and this was subsequently granted. While the existing price of crude oil hardly justifies the recovery of 17.5 API gravity material, there is some hope that later this year, the market will strengthen. In the meantime a modest exploration effort is contemplated.

In this connection, and in an attempt to obtain a Q.D. value on a sample of crude oil from the Lakes Entrance field, contact was made with the Department of Resources and Energy, Industry Operations Branch. They were very helpful but after considering the very limited quality information we were able to provide and of course the uncertainties surrounding the provinance and condition of the only samples held, it was decided that any value assessment at this stage would be far too unreliable.

F) Exploration expenditure during IQ 1987 totalled $40,848.00.

April, 1987

LITHOLOGY AND CORE DESCRIPTION

27-1-87

ROBIN GLENIE & ASSOCIATES PTY LTD

Geological Consultants

27 JAN 1987

PETROLEUM DIVISION

8 Hartley Street
Brighton Beach
Victoria 3186
Australia

Telephone (03) 592 2072

Mr. John Clarke
Arena Petroleum Limited
153 Wellington Parade South
East Melbourne, Vic 3002

23 December, 1986

Dear John,

Please find enclosed my final geological reports on the two recently drilled Arena wells in the onshore Gippsland Basin.

The formation picks from the DITR geophysical wireline logs are still to be added to the composite lithologic log sheets.

I have also enclosed my invoice for the Tyers well. No claims have been made for debriefing discussions, consultation with Geotrack personnel or, as agreed previously, for disbursements. The total claims cover 14 days which is in excess of the original agreement of 3 to 4 days per well.

Although the results are disappointing in several aspects, the wells have added to an understanding of the Lakes Entrance Platform and to interpretation of the gravity survey data.

Thank you for engaging me to carry out the well site duties for this stage of your project. Please contact me if you have any questions regarding my reports.

With kind regards,

Rob Glenie

Rob Glenie

TILDESLEY EAST No.3

CORE 1 53.00 - 54.70 m Recovery 1.70 m (100%)

MARLY LIMESTONE/LIMEY MARLSTONE

faintly greenish, medium grey; soft to moderately soft; contains entire well-preserved abundant bryozoans and large common pelecypods (pectinids) and irregular shelly layers and clayey layers with silt to clay grade particles.

CORE 2 102.20 - 103.90 m Recovery 1.70 m (100%)

CALCARENITIC LIMESTONE

pale grey; moderately soft, firm to friable; skeletal bryozoans predominant and Ditrupa worm tubes; alternates with shell-rich layers containing pelecypods and worm tubes.

CORE 3 151.20 - 152.90 m Recovery 1.60 m (94%)

155 cm SILTY MICACEOUS MARLSTONE/MARL

slightly brownish grey; indistinctly bedded; soft; contains micaceous patches, scarce pelecypods; speckled with very fine even-grained micaceous silt.

5 cm LIMESTONE (85 - 90 cm from top)

light grey; hard, cemented; limestone band with sparse bryozoans and dark speckled grains (glauconite/ limonite).

CORE 4 200.00 - 202.60 m Recovery 1.15 m (68%)

MICACEOUS CALCAREOUS SILTSTONE/SILT

dark greenish grey; soft; lower very fine grained; quartzose sandy silt; contains abundant mica flakes an buff calcareous shell fragments; includes decayed calcitic shells with outer layers preserved, scarce Ditrupa and pelecypods; contains brown irregular nodular crystalline dolomitic limestone concretions; lithology uniform throughout - generally non-calcareous.

CORE 5 212.00 - 214.00 m Recovery 1.65 m (97%)

20 cm SANDY (CALCARENITIC) LIMESTONE

faintly greenish, yellow brown with streaky white; very soft, friable; lower fine grained (125-177μ); slightly micaceous, weakly ferruginous, quartzose: contains clear to iron-stained, lower fine grained quartz grains, with occasional greyish white (1 mm thick) platy microcrystalline shell fragments including scarce white soft calcareous bryozoans.

20 cm FERRUGINOUS SANDY LIMESTONE

faintly greenish, pale brown with streaky white; hard, cemented; lower fine grained: contains greenish glauconitic/chloritic mud patches and streaks, common brown oolithic limonite grains; includes grey-brown, microsucrosic bryozoans, pelecypods and forams; with lower fine grained quartz; limestone contains small vugs from shell solution.

110 cm SANDY (CALCARENITIC) LIMESTONE

as above, but white calcareous paste/loose cement; contains soft bryozoans and partially decayed calcitic pelecypods; includes more carbonate than top interval.

10 cm FERRUGINOUS SANDY LIMESTONE (5 cm band)

as above.

BROWN COAL (2.0 - 0.5 cm irregular)

dark brownish black, woody grained, coalified wood fragments; occurs as an irregularly shaped pod with very fine quartz partings.

10 cm SANDY (CALCARENITIC) LIMESTONE (5 cm band)

as above.

BROWN COAL (3.0 - 1.5 cm irregular)

as above.

Note that bedding is indistinct throughout core.

CORE 6 298.30 - 300.00 m Recovery 1.70 m (100%)

CLAYSTONE/SILTSTONE

brownish grey; hard; contains sparsely distributed ferro-magnesian mineral flecks and secondarily infilled fractures 0.5 to 2.0 cm apart network.

SLATE

dark grey; very hard; uniformly clay grade; shows vertical to near-vertical cleavage.

HYDROCARBON TESTS

Regular testing of dried cuttings and cores with solvents failed to reveal significant hydrocarbons. Oil globules with dilute HCl acid from Core 5 were probably related to carbonaceous particles and coalified wood fragments. Slight oil films on water formed while washing cuttings at 208-211 m, 229-232 m, and 241-244 m.

TILDESLEY EAST No.2 (WATER BORE)

CORE 0 27.30 - 28.70 m Recovery 0.90 m (64%)

CLAYEY CALCAREOUS LIMESTONE

reddish yellow (orange); very soft, loosely compacted, friable; contains comminuted calcareous particles and skeletal shelly fragments; includes many moderately hard patches and bands.

Note: This well was drilled as a water supply bore for the adjacent stratigraphic well Tildesley East No.3. Core 0 was taken in the calcarentic limestone despite problems with circulation loss. However, no attempt was made to core the similar interval in Tildesley East No.3.

ARENA PETROLEUM

TILDESLEY EAST No.3

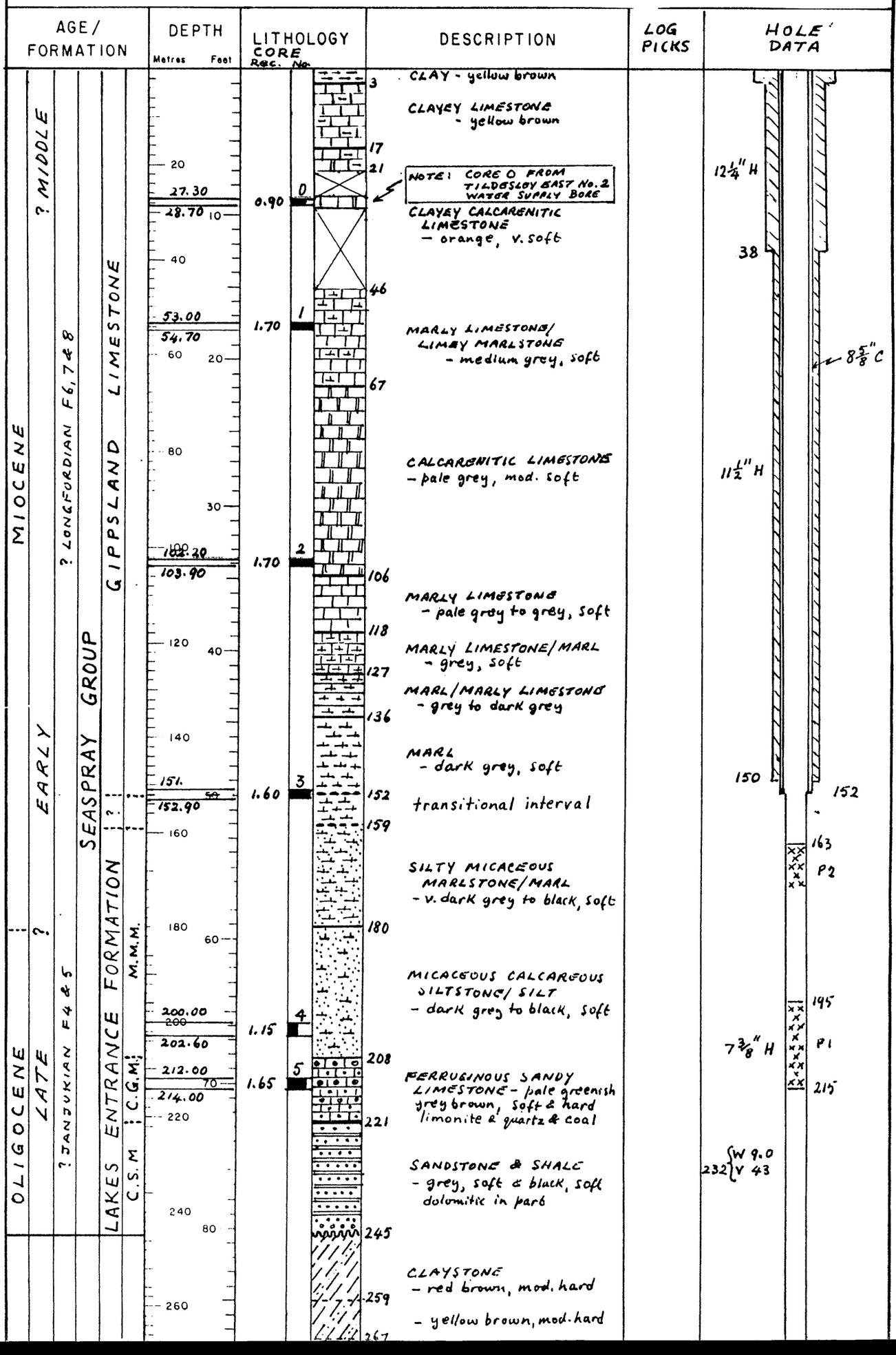
Location: LAT. 37°46'30"
LONG. 148°18'25"

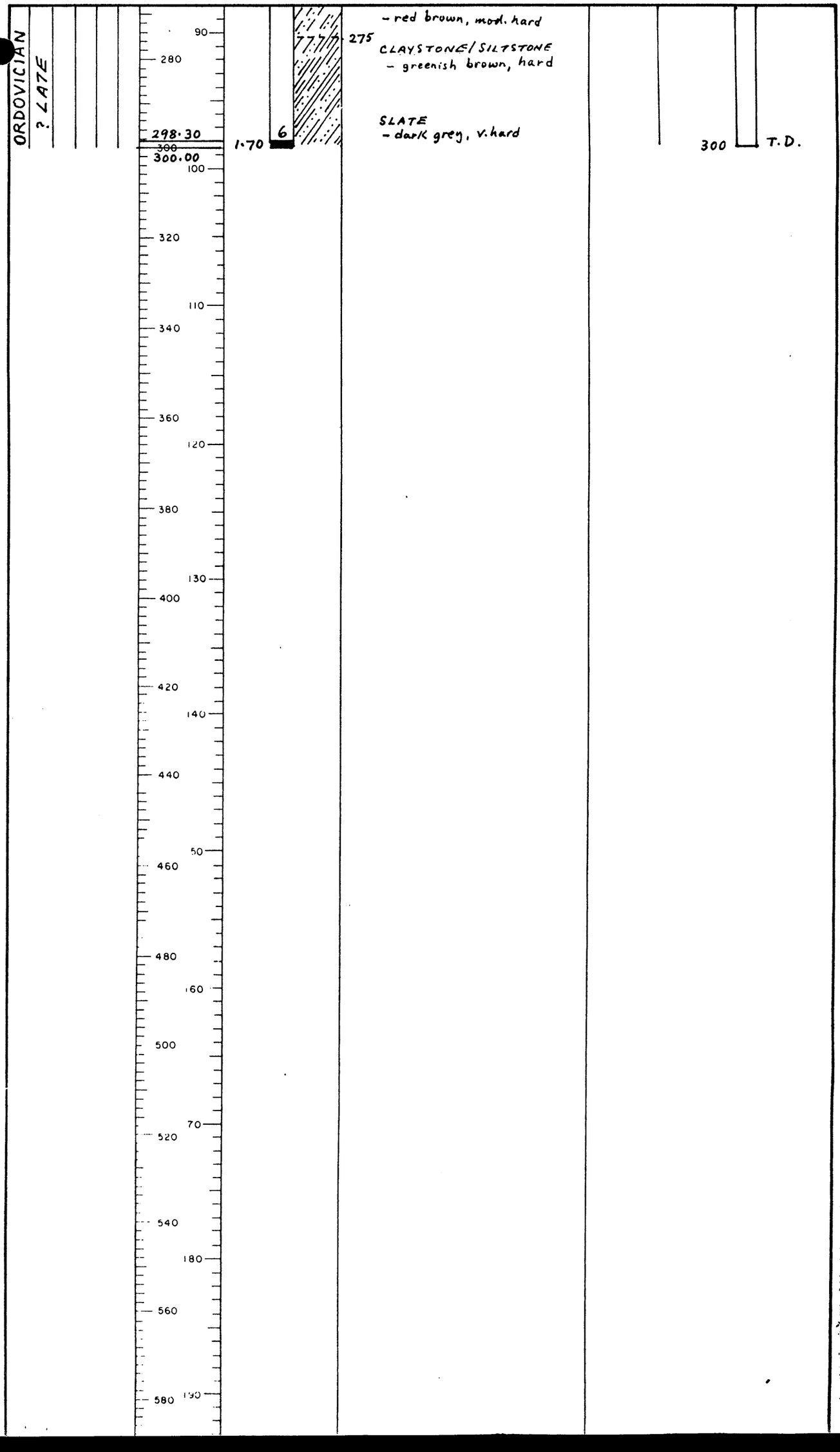
Elevation: + 20 m MSL (GL)
DEPTH DATUM

Total Depth: 300.0 m

Tenement: VIC/PEP
Well Type: STRATIGRAPHIC
Spudded: 7 OCT. 1986
Completed: 21 OCT. 1986
Status: PLUGGED & ABANDONED

Basin: GIPPSLAND ONSHORE
Contractor: DITR VIC.
Driller: F. FULFORD
Geologist: R. GLENIE




ORDOVICIAN
? LATE
90
280
298·30
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300.00
100
320
110
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360
120
380
130
400
420
140
440
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460
480
160
500
70
520
540
180
560
580
190
1·70
6
- red brown, mod. hard
275
CLAYSTONE/SILTSTONE
- greenish brown, hard
SLATE
- dark grey, v. hard
300
T.D.

CORRESPONDENCE

Arena Petroleum Limited
Incorporated in Victoria

29th October, 1986.

Department of Industry,
Technology and Resources,
Oil and Gas Division,
151 Flinders Street,
MELBOURNE, VIC., 3000.

ATT: Dr. Bruce Thompson,

Dear Dr. Thompson,

PEP 116 / Wireline Log Evaluation

As discussed, I am enclosing two copies of Jack Bowler's evaluation of Logs run recently in the Wombat well, and draw your attention to his recommendations which arise as the consequence of some technical difficulties.

As you know we have already dealt with one of his recommendations by proposing a slimmer hole for the next stratigraphic.

I think you mentioned that you would refer the report to Geoff Pettifer of Survey Division for which many thanks.

Yours sincerely,

ARENA PETROLEUM LIMITED.

CC: Granada Energy Corporation.

Enclosure.

Copy forwarded to Director and Survey with Bowler's permission, re wireline log problems.

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Arena Petroleum Limited

Incorporated in Victoria

NOTED BPT. 5.11.86. → J. Davis

RECD 5.11.86 RS

Greenfield

30th October, 1986.

Department of Industry,
Technology and Resources,
Oil and Gas Division,
151 Flinders Street,
MELBOURNE, VIC., 3000.

Attention: Dr. Bruce Thompson,

Dear Dr. Thompson,

PEP 116 / 2ND STRATIGRAPHIC WELL

It is possible that our recommendations for the drilling programme in respect of the second well have already been conveyed to those concerned by Barrett Duff prior to his return to California. However, for the sake of good order, I propose to outline them as follows.

1. Drill to metamorphic basement, as in the Wombat well. (TILDESLEY EAST-3)

2. Core greensand, Colqouhoun gravel, red claystone and basement.

3. (a) Drill below casing with slim hole to obtain better logs with slim hole tools; that is, to achieve the minimum annulus between tool and bore hole.

   (b) Run caliper (which failed to work in Wombat well) to identify washouts, etc.

   (c) Obtain resistivity of mud filtrate (which requires a filter press to obtain filtrate).

   (d) Density tool should be working satisfactorily, both long and short.

   (e) Ensure both long normal and short normal resistivity tools are accurate.

4. Examine cuttings with UV light to confirm any oil shows.

5. Collect 20 - 30 lbs of cuttings from red-pink claystone below Colqouhoun member, for subsequent work by Dr. Kerry Hegarty of Geotrack.

A copy of this letter goes to Rob Glenie and I assume you will wish to advise those concerned within ITR Department who should also be informed.

With kind regards,
Yours sincerely,

ARENA PETROLEUM LIMITED.

CC: Mr. R. Glenie
CC: Granada Energy Corporation

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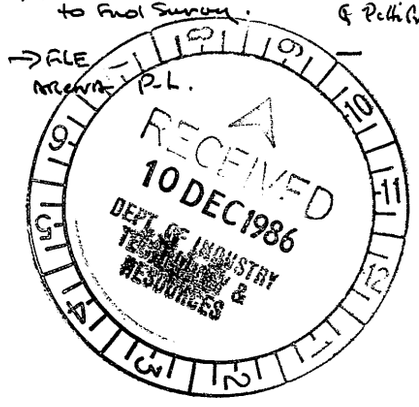
Geoff Pettifer

J. Davin
→ Please forward a copy RS
to Final Survey. & Pettifer
→ File
Arena - P.L.

RECD
10.12.86

Arena Petroleum Limited

Incorporated in Victoria



9 DECEMBER 1986

DEPARTMENT OF INDUSTRY, TECHNOLOGY
AND RESOURCES,
OIL AND GAS DIVISION,
151 FLINDERS STREET,
MELBOURNE, VIC. 3000

PETROLEUM DIVISION

10 DEC 1986

ATTENTION : DR BRUCE THOMPSON

DEAR DR THOMPSON,

PEP 116/WIRELINE LOG EVALUATION

I AM ENCLOSING TWO COPIES OF JACK BOWLER'S EVALUATION OF LOGS RUN RECENTLY IN THE TYERS WELL. REGRETTABLY, THE EVALUATION DOES NOT GIVE US MUCH COMFORT AS REGARDS THE POSSIBLE OCCURRENCE OF HYDRO CARBONS.

AS BEFORE, I ASSUME THAT YOU WILL ARRANGE TO SEND A COPY TO SURVEY DIVISION. THE ORIGINALS OF THE VARIOUS TRACES WILL BE HANDED TO GEOFF PETTIFER WHEN COPIES HAVE BEEN OBTAINED.

YOURS SINCERELY,

ENCL.

C.C. GRANADA ENERGY CORPORATION.

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CORE ANALYSIS

The Australian
Mineral Development
Laboratories

Flemington Street, Frewville,
South Australia 5063
Phone Adelaide (08) 79 1662
Telex AA82520

Please address all
correspondence to
P.O. Box 114 Eastwood
SA 5063
In reply quote:

amdel

RECD
27-1-87
SY.

-3

PETROLEUM ... TION

27 JAN 1987

27 November 1986

F 3/0/0
F 6597/87

Arena Petroleum
153 Wellington Parade South
EAST MELBOURNE VIC 3002

Attention: John Clarke

REPORT F 6597/87

YOUR REFERENCE: Verbal

TITLE: Tildesley East-3

MATERIAL: Core and cuttings

WORK REQUIRED: Various

Investigation and Report by: Robert D. East and
Dr David M. McKirdy

Manager-Petroleum Services Section: Dr Brian G. Steveson

Brian G Steveson

for Dr William G. Spencer
General Manager
Applied Sciences Group

cap

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1. INTRODUCTION

A total of 4 samples from Tildesley East-3 were received at our Adelaide Laboratories for various tests to determine the presence of hydrocarbons and provide basic petrophysical data.

2. METHODS

The 3 tins containing cuttings samples were analysed for the presence of hydrocarbons in the gas space between the sample and the lid of the tin (Headspace gas analysis). Part of the core sample was extracted to remove any hydrocarbons present. A chromatographic analysis was then performed to provide compositional data.

A one inch diameter plug was drilled from the core piece using tap water as a bit lubricant and coolant; trimmed, extracted and dried at 80°C prior to conventional core analysis measurements.

Helium injection porosity and air permeability measurements were performed, grain density was measured in conjunction with the porosity data.

3. RESULTS

The headspace gas analysis indicated minimal hydrocarbons present. This was backed up by the low extractable organic matter value (180 ppm) obtained from the core sample. The chromatogram obtained from the extract was indicative of an indigenous bitumen and not of a migrated mature oil. Petrophysical data show a medium porosity but low permeability carbonate.

Results of the above analysis are tabulated overleaf.

It has been a pleasure performing this work for Arena Petroleum. If you have any questions concerning this report please do not hesitate to contact us.

HEADSPACE GAS ANALYSIS

			CH_4 (Methane)	C_2H_6 Ethane
Sample	1	211 M	5.3 ppm	0.4 ppm
	2	212-214 M	6.6 ppm	0.2 ppm
	3	214-244 M	10.8 ppm	0.7 ppm

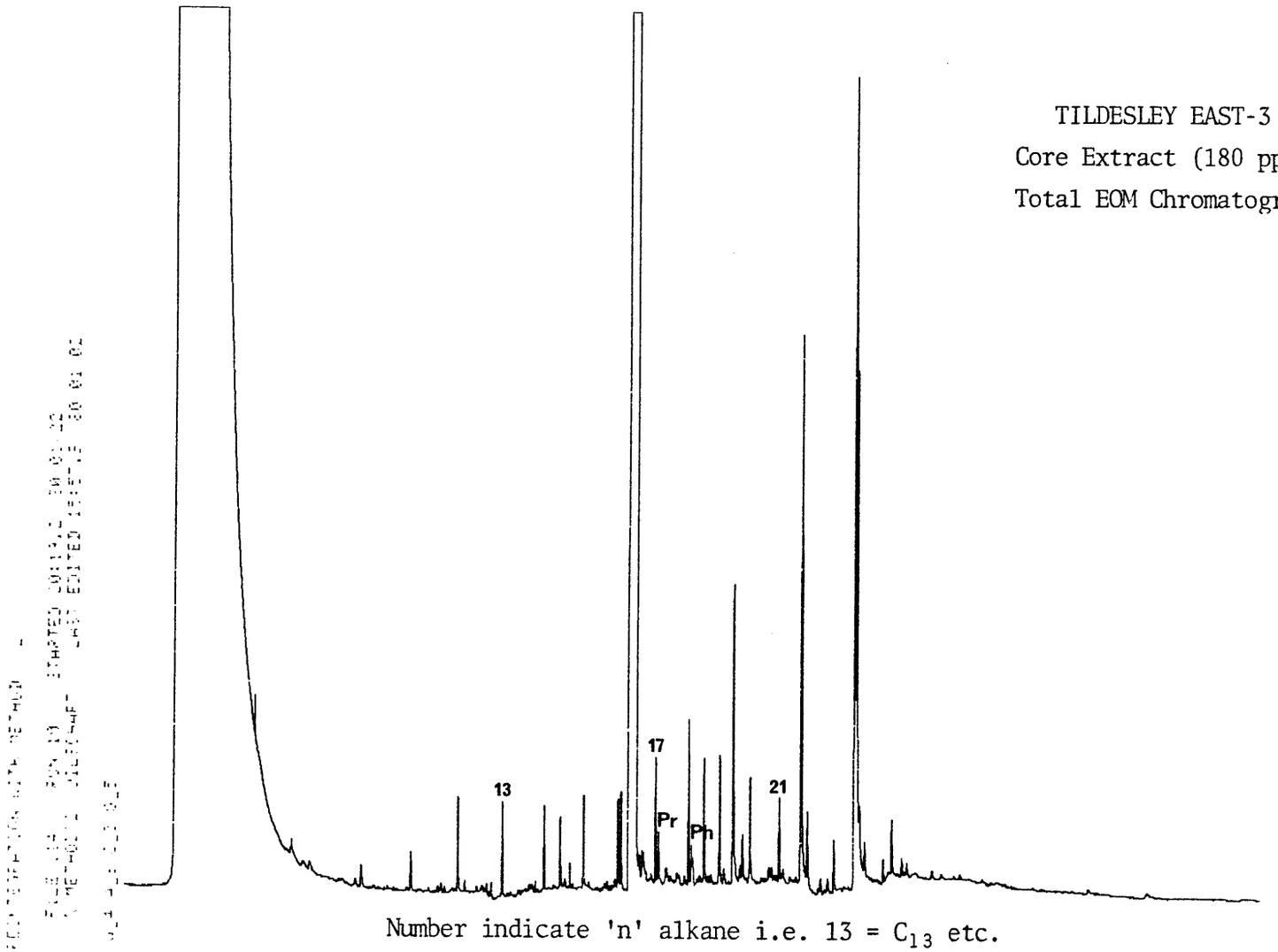
Sample 4 Wrapped Core Piece

Porosity = 17.8%
Grain density = 2.74 g/cc
Air Permeability = 0.111 millidarcies

TILDESLEY EAST-3

Core Extract (180 ppm)

Total EOM Chromatogram



Number indicate 'n' alkane i.e. 13 = C_{13} etc.

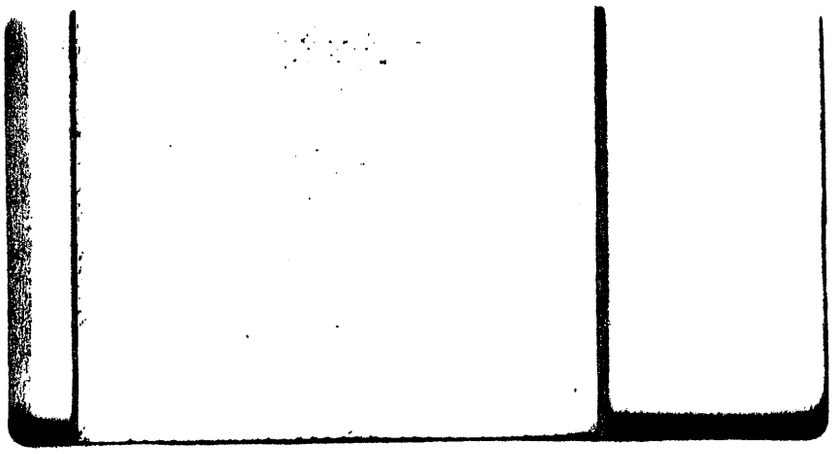
Pr = Pristane

Ph = Phytane

amdel

Log Analysis

BOWLER LOG CONSULTING SERVICES PTY. LTD.



JACK BOWLER,
167 WESTERN BOULEVARD,
RAYMOND ISLAND,
PAYNESVILLE, VICTORIA.
3880
Telephone: (051) 56 6170

P.O. BOX 2,
PAYNESVILLE,
VICTORIA,
AUSTRALIA.
3880

ARENA PETROLEUM LTD.

DPI#35/86/07

WIRELINE LOG EVALUATION

BOWLER LOG CONSULTING SERVICES PTY. LTD.

BOWLER
Telephone: (051) 56 6170

P.O. BOX 2,
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Mr. John Clarke
Arena Petroleum Ltd.
153 Wellington Parade South
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4 December, 1986

Dear Sir,

Please find my evaluation of the ITR and GO wireline logs run on DPI*35/86/07 on 2 December, 1986.

Log Quality

Logs available include LN-SN-SP (both GO and ITR), Gamma Ray Neutron, Caliper and Sonic. The caliper shows the average hole size to be about 7.5" which is about 3/4" larger than the 6 3/4" bit diameter. Only the interval from 264-274 meters was badly washed out (greater than 12" which is the maximum caliper reading). Because some of the logs are off depth with each other the sonic log has been chosen as the base depth log and all other log depths have been correlated to the sonic log depths. Because 2 1/8" OD tools have been used all measurements suffer from a borehole effect which has not been corrected for because correction charts are not available.

The SP obtained has good character and is useful in identifying permeable beds. Based on the SP and the LN-SN separation the Limestone from (casing shoe) 76 meters to 130 meters has the best permeability in the well. The SP repeats well between the ITR and GO logs and the up and down runs of each log. This well developed SP is due to the very fresh water gel mud of 8 ohm.m at 78°F. The drill water for this well was obtained from a creek near Nowa Nowa while the drill water on DPI*35 came from a water well at the drill site.

The ITR LN repeats well over the up and down runs while the SN does not repeat over the top part of the hole. The ITR SN does not read zero in casing as would be expected. The SN and LN do not read the same values in the impermeable marls from 130 to 170 meters as does the GO log. In general the ITR SN reads higher than the GO SN and the ITR LN reads lower than the GO LN. The GO LN and SN both read zero in the casing as expected. Repeatability of the GO LN and SN is good everywhere except over the high resistivity basement. Readings from the two tools are listed in Table One. In my opinion it seems that the GO redings are more correct and as a result they have been used for the evaluation in Table Two and for the crossplots.

Repeatability of the GRN is very good and repeatability between the up and down run of the sonic is fair but it is full of cycle skipping and noise and as a result requires editing prior to use in the evaluation.

Generally the logs were somewhat better than in DPI#35.

Log Evaluation

As with the previous well (DPI#35) it is possible to make a reasonable evaluation from the logs keeping in mind the uncertainties associated with the measurements and the poorly compacted formations.

For evaluation purposes the well has been broken down into several "formations" based on log character and tops given to me by the wellsite geologist, Rob Glenie. These may not always be geologic formations but they do generally exhibit similar log characteristics.

Table One contains depth-matched log data at representative intervals. LN readings in resitive zones less than 64" thick have been estimated because they will tend to look less resistive due to measurement theory. The sonic has been edited where it is thought to be affected by cycle skipping and noise and as a result some of the log derived porosities and resulting water saturation calculations may be in error if the editing is wrong.

For comparison purposes the same evaluation techniques as on DPI#35 have again been used. Four Resistivity-Porosity plots were made and it can be seen that the SN and LN Sonic plots suggest that the formations are mostly of a constant water saturation close to 100%. Further, the straight line of data through all the formations except for the limestone and basement suggests that they all contain the same resistivity formation water and that the lithology is very similar. The Limestone points plot below the 100% water line due to fresher formation water. The basement points fall above the 100% water line due to different lithology while the thin limey stringers fall above the line due the resistivity tools not reading high enough resistivity values because the stringers are too thin compared to the tool spacing. The apparent formation water resistivity (Rwa) of 2.9 ohm.m from the LN-Sonic plot in this well agrees well with Rwa=2.77 from the LN-Sonic plot of DOI#35. The two plots using the Neutron log show it has poor resolution for all of the formations except for the Limestone and Basement. I think the Neutron log would be more useful if the hole diameter were considerably smaller.

Mud characteristics are: vis=39 secs, wt:9.9#/gal, sand=3.5%, Rm=8 ohm.m @ 78°F. Rmf is estimated at 6.75 ohm.m @ 78°F and bottom hole temperature is 79°F. Drillers TD is 298 meters and drillers casing 83 meters.

Formation water resistivities computed from the resistivity-sonic plots are 3.6 ohm.m @ 79°F from the GO SN (1,400 PPM NaCleqv) and 2.9 ohm.m @ 79°F from the GO LN (1,800 PPM NaCl) and are similar to that expected in the area. The negative SP of 20-35 mv confirms that the formation water is less resistive than the mud filtrate.

Table Two contains porosity values computed from the sonic using a compaction correction of 1.6 and Archie water saturation values using both the GO LN and SN resistivity devices. These computations show that the formations are water-wet. Total porosities range from 20 to 50% in the Greensand and are about 50% in the Colquhoun Sand. The higher porosities in this well may be due to a lack of compaction because the Greensand and the Colquhoun Sand are found at shallower depths than at DPI#35. These porosities are at best an estimate and are somewhat higher than those in other shallow wells in the same formations in the area derived from large diameter oil-well logging tools.

Recommendations

Please find the latest recommendations that will improve log quality and evaluation in future wells:

1. Run the GO SN-LN-SP instead of the ITR tool.
2. If the 2 1/8" tools are to be used next time drill a smaller diameter hole.
3. Have a mud filtrate press on location so that an accurate mud filtrate resistivity can be measured and not just estimated from the mud resistivity.
4. Use creek water for the drill-water to obtain SP with plenty of character.
5. Try to get the density tool working so that readings in g/cc can be obtained. This should give the best porosity measurement free from compaction effects. It will also be less affected by clay and shale content than the Sonic and Neutron logs.
6. Try to get a microlog which would be useful in identifying permeable zones.
7. Have the lithology log available at the wellsite during logging and for evaluation.

If there are any questions on the evaluation please let me know.

Yours truly,

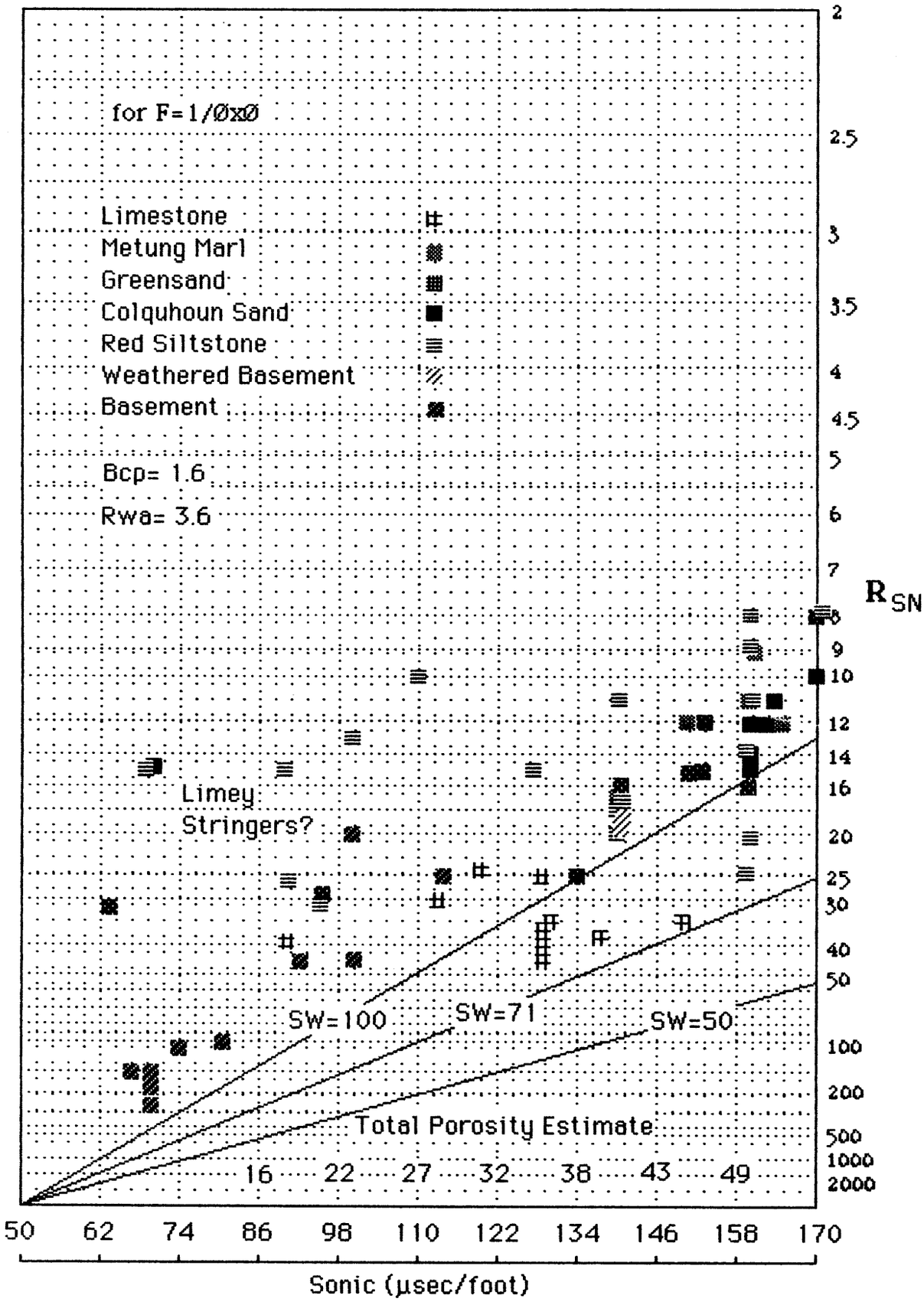
J Bowler

Jack Bowler

Arena Petroleum Ltd

DPI#35/86/07

RESISTIVITY-POROSITY



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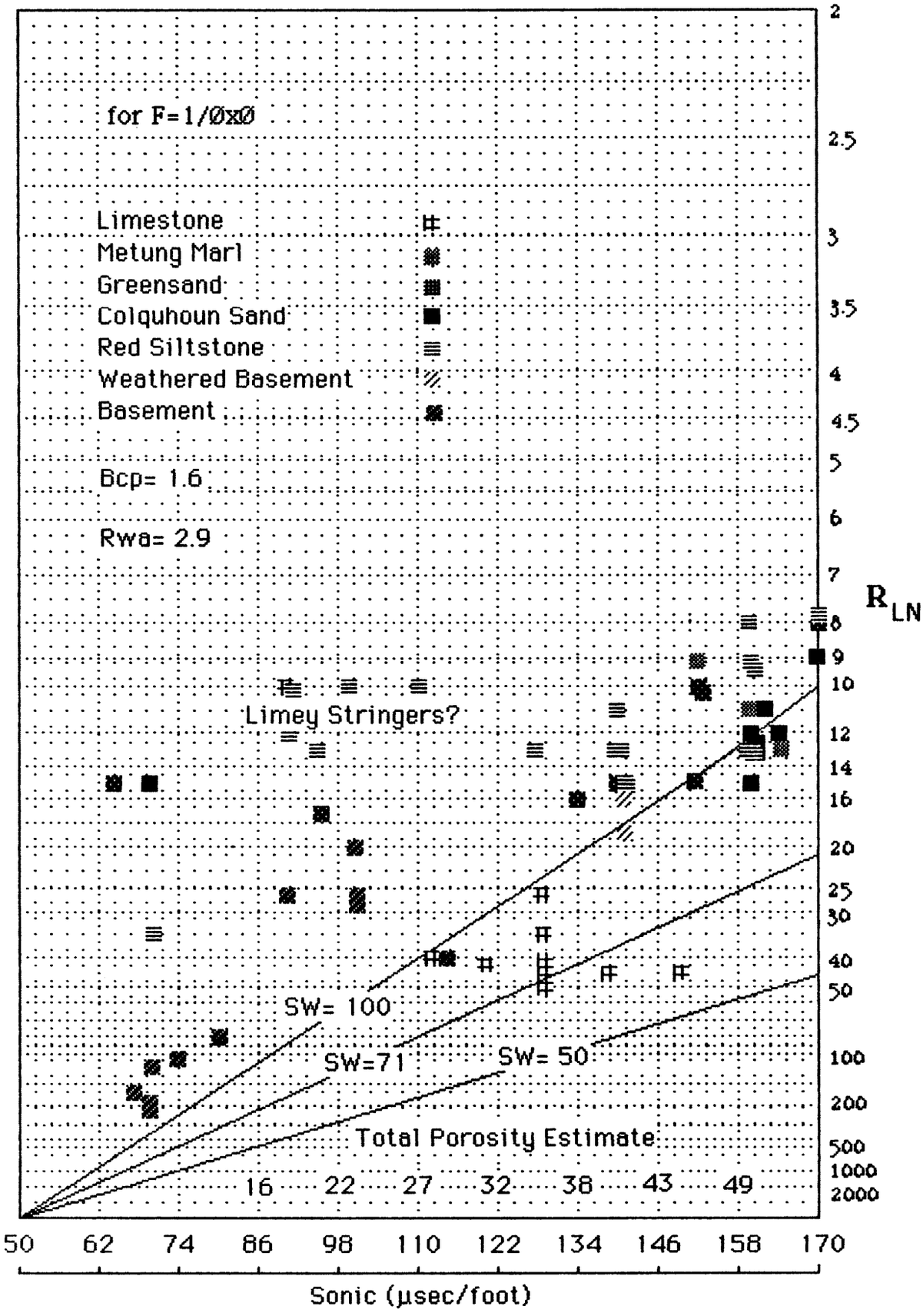
DPI*35/86/07

RESISTIVITY-POROSITY



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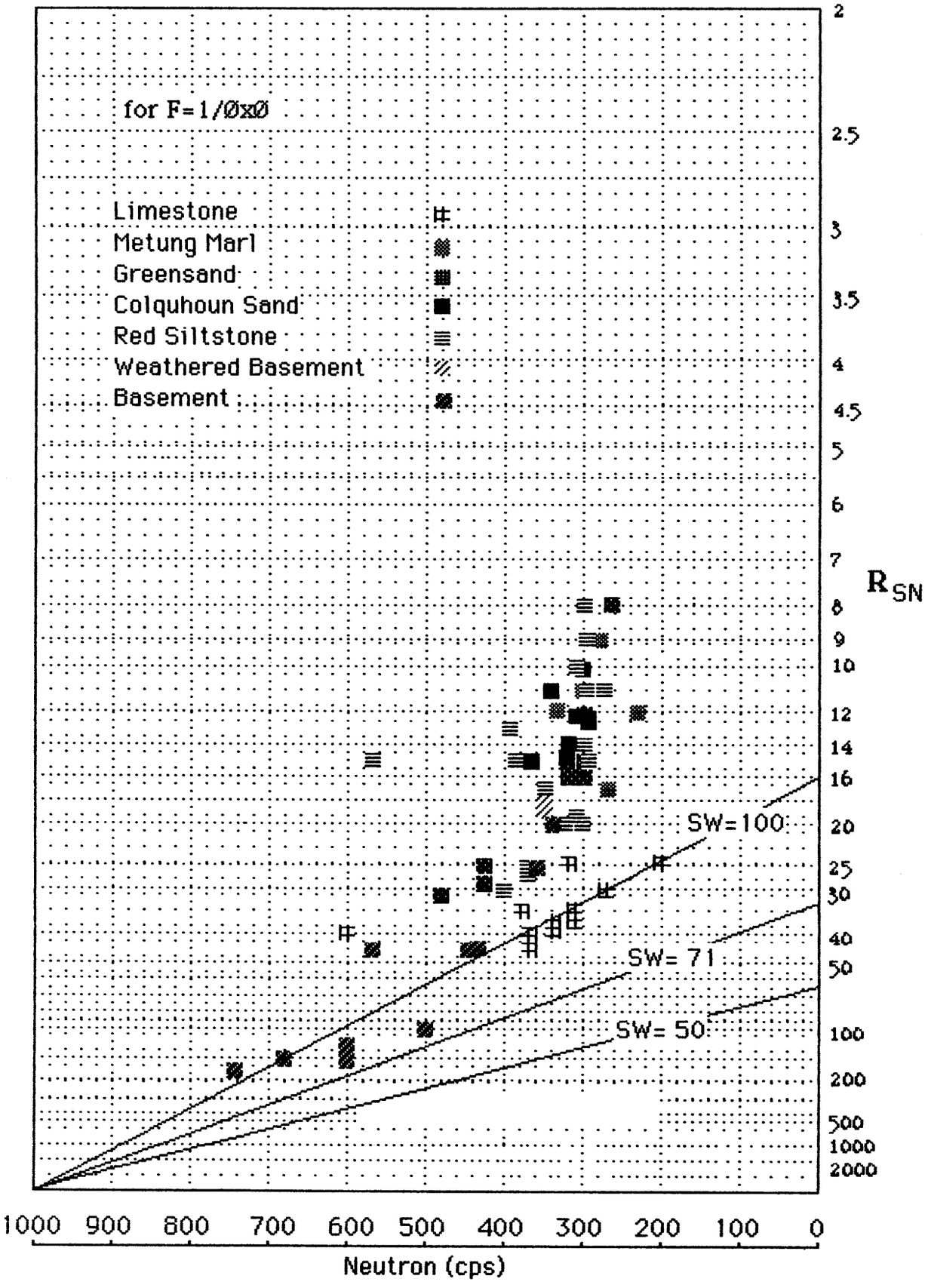
RESISTIVITY-POROSITY



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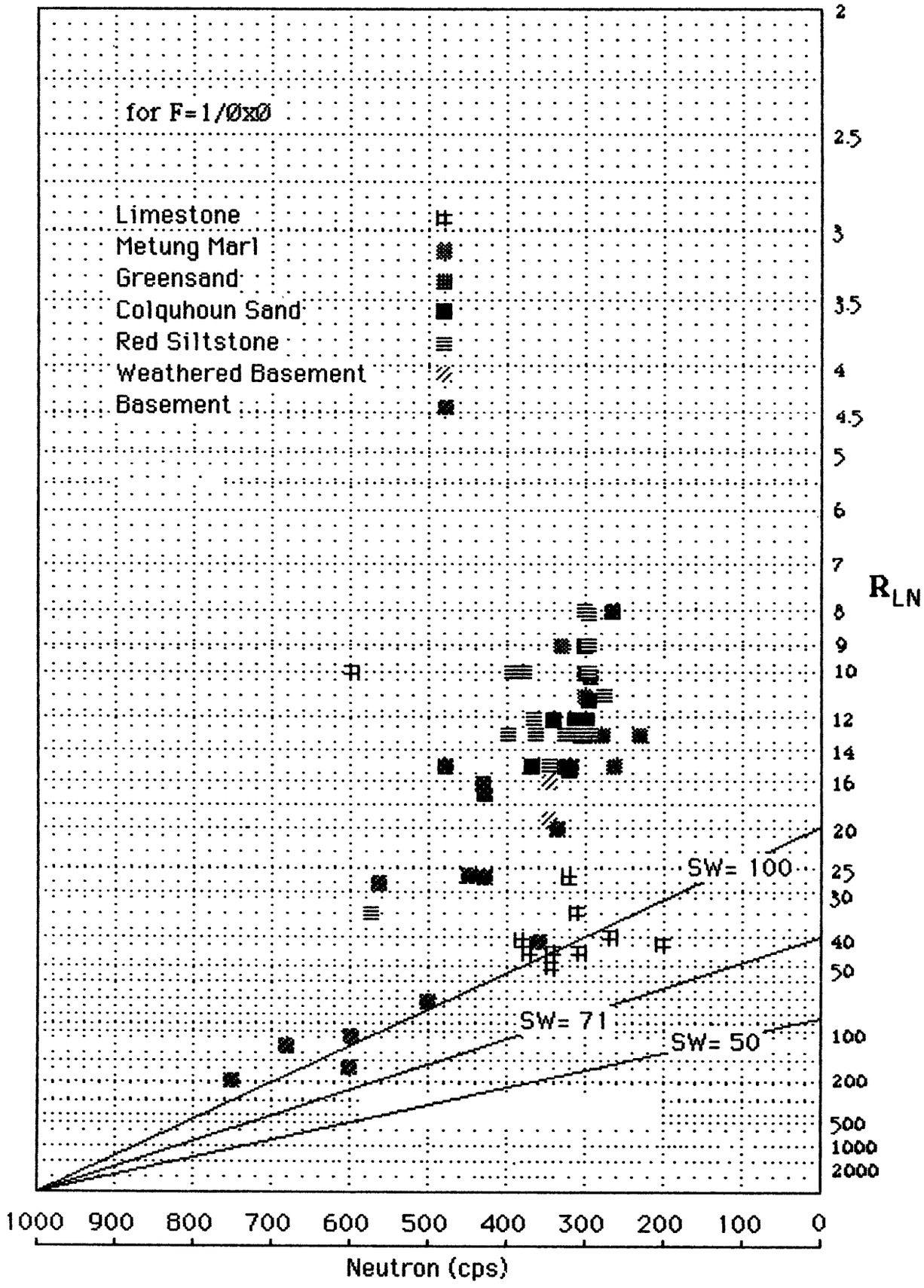
RESISTIVITY-POROSITY



Level	Depth (meters)	SN(GO) (ohm.m)	LN(GO) (ohm.m)	SN(ITR) (ohm.m)	LN(ITR) (ohm.m)	GR (API)	Neutron (cps)	Sonic (µsec/foot)
					LIMESTONE			
1	80	30	40	30	30	38	270	112
2	83	24	41	26	31	35	200	120
3	93	35	40	40	32	40	380	130
4	100	37	45	40	38	25	340	138
5	102.4	45	45	48	39	20	370	130
6	109	40	44	46	38	20	370	130
7	110	39	50	46	42	15	340	130
8	114.4	34	45	37	38	20	310	150
9	120	36	35	40	30	15	310	130
10	126	25	27	30	22	20	320	130
11	127.6	38	10	42	9	20	600	90
					METUNG MARL			
12	128.4	12	9	16	10	20	330	150
13	130	9	13	11	10	25	280	160
14	138.4	12	13	16	11	32	230	164
15	142	17	15	21	11	40	270	140
16	160	11	11	16	9	50	300	160
					GREENSAND			
17	173	15	15	18	12	65	320	150
18	174	25	16	28	12	60	430	134
19	175	16	13	20	10	50	300	160
20	176	15	10	18	9	35	300	152
21	177	29	17	32	14	70	425	95
22	178.8	12	10	14	7.5	35	300	152
23	180	31	15	32	11	50	480	63
24	180.8	16	15	20	10	65	320	140
25	189	8	8	10.5	6	75	265	170
					COLQUHOUN SAND			
26	197	12	11	14	10	65	300	162
27	198	14	13	16	10	65	320	160
28	199	15	15	16	10	65	320	70
29	200	15	15	20	10	70	370	160
30	201	12	12	16	10	70	300	160
31	202	12	12	16	10	65	310	160
32	203	11	12	15	8	65	340	163
33	205	10	9	14	7	55	300	170
					RED SILTSTONE			
34	206	8	8	14	6	65	300	170
35	219	9	9	11	7	75	300	160
36	220	13	10	16	7	90	395	100
37	220.4	11	8	15	8	60	300	160
38	225	8	8	12	6	65	300	160
39	225.4	15	10	18	8	75	380	90
40	230	10	10	14	8	65	300	110
41	235	11	11	14	8	65	275	140
42	236	26	12	26	10	55	365	90
43	236.6	20	13	27	10	75	300	160
44	250	14	9	18	8	70	300	160
45	253.6	17	15	20	10	60	350	140
46	254	15	34	32	10	60	570	70
47	256	20	13	22	10	50	320	140
48	258	19	13	21	9	70	310	140
49	259	31	13	31	10	155	400	95
50	260	25	13	26	10	155	370	160
51	261	15	13	17	10	35	300	127
					WEATHERED BASEMENT?			
52	270	18	16	20	13	75	350	138
53	273	19	19	22	16	75	350	138

TABLE ONE ARENA PETROLEUM LTD. DPI*35/86/07

Level	Depth (meters)	SN(GO) (ohm.m)	LN(GO) (ohm.m)	SN(ITR) (ohm.m)	LN(ITR) (ohm.m)	GR (API)	Neutron (cps)	Sonic (µsec/foot)
					BASEMENT			
54	274.8	20	20	22	16	75	340	100
55	276.4	45	27	43	22	100	450	100
56	278.8	45	29	44	22	110	570	100
57	280	46	27	46	22	130	430	90
58	282	25	40	23	28	140	360	114
59	283	100	75	60	60	80	500	80
60	284	130	115	80	70	100	600	74
61	285.5	155	125	120	120	110	680	70
62	288	150	165	180	160	125	600	65
63	290	170	190	200	200	110	750	70
64	292	180	220					70
65	294	280	250					70

TABLE ONE ARENA PETROLEUM LTD. DPI#35/86/07

Level	Depth (meters)	a	m	n	RW(SN)	SW ARCHIE (SN) %	POROSITY (Total %)	SW ARCHIE (LN) %	RW(LN)
						LIMESTONE			
1	80	1	2	2	4	131	28	136	5.8
2	83	1	2	2	4	129	32	119	5.8
3	93	1	2	2	4	94	36	106	5.8
4	100	1	2	2	4	83	40	91	5.8
5	102.4	1	2	2	4	83	36	100	5.8
6	109	1	2	2	4	88	36	101	5.8
7	110	1	2	2	4	89	36	95	5.8
8	114.4	1	2	2	4	76	45	80	5.8
9	120	1	2	2	4	92	36	113	5.8
10	126	1	2	2	4	111	36	129	5.8
11	127.6	1	2	2	4	180	18	423	5.8
						METUNG MARL			
12	128.4	1	2	2	3	111	45	126	2.9
13	130	1	2	2	3	117	50	95	2.9
14	138.4	1	2	2	3	97	51	92	2.9
15	142	1	2	2	3	104	41	108	2.9
16	160	1	2	2	3	105	50	104	2.9
						GREENSAND			
17	173	1	2	2	3	99	45	98	2.9
18	174	1	2	2	3	92	38	113	2.9
19	175	1	2	2	3	87	50	95	2.9
20	176	1	2	2	3	97	46	117	2.9
21	177	1	2	2	3	159	20	204	2.9
22	178.8	1	2	2	3	109	46	117	2.9
23	180	1	2	2	3	531	6	751	2.9
24	180.8	1	2	2	3	107	41	108	2.9
25	189	1	2	2	3	113	54	111	2.9
						COLQUHOUN SAND			
26	197	1	2	2	3	99	50	102	2.9
27	198	1	2	2	3	93	50	95	2.9
28	199	1	2	2	3	496	9	488	2.9
29	200	1	2	2	3	90	50	89	2.9
30	201	1	2	2	3	101	50	99	2.9
31	202	1	2	2	3	101	50	99	2.9
32	203	1	2	2	3	103	51	97	2.9
33	205	1	2	2	3	101	54	105	2.9
						RED SILTSTONE			
34	206	1	2	2	2	92	54	92	2
35	219	1	2	2	2	95	50	95	2
36	220	1	2	2	2	174	23	199	2
37	220.4	1	2	2	2	86	50	101	2
38	225	1	2	2	2	101	50	101	2
39	225.4	1	2	2	2	203	18	248	2
40	230	1	2	2	2	165	27	165	2
41	235	1	2	2	2	105	41	105	2
42	236	1	2	2	2	154	18	227	2
43	236.6	1	2	2	2	64	50	79	2
44	250	1	2	2	2	76	50	95	2
45	253.6	1	2	2	2	85	41	90	2
46	254	1	2	2	2	405	9	269	2
47	256	1	2	2	2	78	41	97	2
48	258	1	2	2	2	80	41	97	2
49	259	1	2	2	2	125	20	194	2
50	260	1	2	2	2	57	50	79	2
51	261	1	2	2	2	105	35	113	2
						WEATHERED BASEMENT?			
52	270	1	2	2	3.6	113	40	107	2.9
53	273	1	2	2	3.6	110	40	99	2.9

TABLE TWO ARENA PETROLEUM LTD. DPI*35/86/07

Level	Depth (meters)	a	m	n	RW(SN)	SW ARCHIE (SN) %	POROSITY (Total %)	SW ARCHIE (LN) %	RW(LN)
						BASEMENT			
54	274.8	1	2	2	2	140	23	122	1.5
55	276.4	1	2	2	2	94	23	105	1.5
56	278.8	1	2	2	2	94	23	101	1.5
57	280	1	2	2	2	116	18	131	1.5
58	282	1	2	2	2	98	29	67	1.5
59	283	1	2	2	2	105	14	105	1.5
60	284	1	2	2	2	115	11	106	1.5
61	285.5	1	2	2	2	126	9	122	1.5
62	288	1	2	2	2	171	7	141	1.5
63	290	1	2	2	2	120	9	99	1.5
64	292	1	2	2	2	117	9	92	1.5
65	294	1	2	2	2	94	9	86	1.5

TABLE TWO ARENA PETROLEUM LTD. DPI*35/86/07

NOTES

ARENA. STATE OF THE ART

WOMBAT TK. TOSTAREE? TILDESLEY EAST-3 ?

- Spudded in 22/09/86
- completed on 20/10/86 met/ord. TD 300m.

Loss of circulation

Cored: 53m - 54.7m
102.2m - 103.9m
151.2m - 152.9m
} all 1.7 Rec.

200 - 202.6m 1.3m Rec → 3 cores for Arena.

. Oil show in greensand. 212 - 214m

297.8 - 299.8m.

208 - 244 greensand - 46m thick.

244 - 298 Ordovician.

- logged bore Tuesday (21/10/86) - 12 mins.
- plug/abandon done probably 24/10/86.
- cleaning new site today.
- shifting Monday? - written approval from all authorities
-

At present other wells in the area are:

East Lake Tyers – 1 ('62 T.D 470m.
Dome Frome L.T. 4 ('58) TD 396m.
East Nowa [redacted] – 1 ('62) TD 365m.
East End – 1 ('59) TD 375m.

FROM TOMLINSONS REPORT:

BHPs two wells OD6 } were drilled NW of Lakes Entrance
OD7 }

granite basement at 90' & 150'

= extensive gravity high.

Oilco #1 - granite basement at 1366'

Woodside - Lakes Entrance #1 - granite at 1384'

Dome Frome #1 - ordovician basement at 564'

Lake Tyers #1

Embayment south of ~~Lat~~ Orbost in the Tildesley Cast & Lakes Oil Co. bores area.

Large gravity anomaly around Lake Tyers → related to basinal structure

Dome Frome LT 3 → was ~ 400' UMS then straight into granite. Dome Frome LT. 4 → Ord seds at depth. Reasonable thickness of sediments.