THE ANAL

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WELL COMPLETION REPORT

Phillips Petroleum Co Norway

1/9-6

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THE ANALYSTS INTERNATIONAL S.A

WELL COMPLETION REPORT

COMPANY:	Phillips Petroleum Company Norway
WELL:	1/9-6
AREA:	Offshore, Norway, North Sea
PLATFORM:	Sedco 703

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FOREWORD

The purpose of this well completion report is to provide a concise summary of the information collected by The Analysts International S.A on well 1/9-6 and to highlight the more pertinent observations made.

Any interpretation of the data in this report is made in the light of our experience and with the information made available to us whilst logging. Such interpretation is made in good faith every effort having been made to present an accurate evaluation of the available information.

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SECTION A

1. | | |
|---|---|
| Company | : Phillihs Petroleum Company, Norway |
| Well number | : 1/9-6 |
| Area | : Offshore Norway, North Sea. Gamma structu |
| Rig | : Sedco 703 |
| R.K.B. - M.S.L. | : 25.36 m |
| M.S.L. - Sea bed | : 75.59 m |
| Spud date | : 21st. March 1982 |
| Logging commenced | : 26th. March 1982 at 167.79 m |
| Logging completed | : 13th. July 1982 at 3880 m |

2. Well 1/9-6 is an appraisal well on the north-west flank of the gamma structure. The purpose is to get more information about the size, reservoir quality and fluid properties of the hydrocarbon accumulations in the Ekofisk and Tor formations

3. Casing programme.

		Measured depth	True Vertical Depth
30"	casing shoe	167.79m	167.79m
20"	casing shoe	462.05m	462.05m
13 3/8"	casing shoe	1452.70m	1367.35m
9 5/8"	casing shoe	3140.09m	2867.0 m
7"	liner shoe	3866.50m	3514.0 m

4. Logging services provides by The Analysts Schlumberger.

A. Total concept logging service was provided comprising:-

(a) Idel system
(b) Engineering and geologocal auxiliary programmes.
(c) Conventional Mud logging system

(a) Idel System (Instantareous drilling evaluation log)

An online system collecting and monitoring relevant drilling parameters and scanning every half metre and computing the following on a real time basis: -

1. 'A' exponent lbs/gal and S.G.
2. Formation pore pressure lbs/gal and S.G.
3. Depth in metres.
4. Rate of penetration - metres/hour.

5. Weight on bit - K lbs
6. Accumulative drilling hours
7. Rotary R.P.M.
8. Cost per half metre
9. Hours on bit.
10. 'D'exponent
11. Bearing wear

Rate of penetration (m/hr), 'A' exponent and 'D' exponent were plotted instantaneously using an x-y plotter.

Computed data displayed on two CRT's one in the logging unit , the other in the company office.

(b) Engineering and Geological Auxiliary Programmes.

1. Equivalent circulating density.
2. Frac gradient calculation.
3. Kill programme.
4. Compensated 'D' exponent calculation.
5. Swab-surge calculation
6. Hydro
7. T.V.D.
8. Trip monitor

(c) Conventional Mud logging system.

1. Continuous monitoring of total gas content of mud.
2. Continuous chromatographic analysis of hydrocarbon gases in mud.
3. Continuous monitoring of drilling rate.
4. Continuous monitoring of pump strokes.
5. Continuous monitoring of torque.
6. Continuous monitoring of pit volume, reserve, active pits and trip tank.
7. Continuous monitoring of mud weight in/out.
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13. Calcimetry.

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16. Fluoroscopic examination of drill cuttings.
17. Connection gas notation.
18. Trip gas notation.
19. Mud properties, drilling parameters notation.
20. Preparation of a log in sepia form to Phillips Norway specifications.
21. Collection, washing and packing of lagged cutting sample
22. Collection of mud samples as and when required.

Sample Collection.

1. Phillips Samples

4 wet and 4 dry samples over the following intervals:-

(a) 30" casing shoe to 3140m. Every 10m
(b) 3140m to T.D. Every 3m

One composite sample of unwashed cuttings for petro-chemical studies were canned at 30m intervals throughout the whole well.

2. Mud Samples.

At the discretion of the wellsite geologist.

5. Analysts Schlumberger Personnel.

K.A. Lander	Unit Manager
A.T. Palin	Unit Manager
G. Jones	Unit Manager
K.A. Jappy	Assistant unit manager
A.J. Smith	Assistent unit manager
I.M. Gostick	Logging engineer
J.K. Blackburn	Logging engineer
S.A. Banks	Logging engineer
R. Du Fresne	Junior logging engineer
W.J. Wallace	Junior logging engineer.

SECTION B

GEOLOGICAL SUMMARY

200 - 450 m

In the upper part of this section, sand beds interlayered with clay are dominant.
The sand are mainly clear, fine to very fine grained, subrounded and moderately well sorted.
These fairly thick sands frequently contain traces of shell fragments, lignite, carbonaceous material, wood fragments and pyrite in varying amounts.

The interbedded clay layers are usually light brown to light grey, soft, sticky, amorphours and are slightly to very calcareous.

450 - 800 m

Clays dominate the lithology in this interval, becoming siltier but otherwise as those described above.
Some siltstones are present, which are generally brown, soft, blocky and slightly calcareous, as well as some thin sand stringers consisting of clear, white and orange coloured, very fine grained, poorly sorted, loose quartz grains.

800 - 1000 m

The grey, soft, sticky, slightly calcareous clays, similar to those above become darker and firmer in this section, and a black, soft to firm, calcareous claystone is also present.

1000 - 1580 m

The claystones above are gradually replaced by siltstones down to 1325 m after which claystones once again predominate, although the silts maintain a fairly high percentage of the formation. These siltstones are typically light green, light brown and medium grey, soft to firm, blocky and slightly calcareous.

Occassionally traces of dull yellow fluorescence, with a slow diffuse cut are found in the silts.
From 1375 - 1475 m, thin limestone stringers are present. These are generally white to buff, firm to hard and microcrystalline,frequently showing a dull yellow flourscence with a slow streaming cut.
Traces of shell fragments and pyrite are common accessories in this section.

<u>1580 - 2000 m</u>

Interbedded clays and claystones are the most common in this interval. The claystones are generally medium to dark grey, brown moderately firm, blocky and calcareous, tending to become sub-fissile with depth. The interbedded clays are similar to those found above, which are typically light to medium grey-brown, very soft to firm, amorph to blocky and calcareous.
Limestone stingers gain increasing importance in this section, and are generally off-white or occassionally brown, crumbly to hard and frequently show a dull yellow flourescence with a slow streaming cut. This limestone is variably dolomitic in places.
Occassionally thin stringers of clear, milky, very fine, rounded, moderately well sorted sand are also present.
As well as traces of shell fragments and pyrite a small band of coal in present at 1610 m.

<u>2000 - 2850 m</u>

Claystones are again the dominant lithology. The claystones are generally dark grey, brown, grey-green, soft to firm, blocky to sub-fissile and non to very calcareous. Dark grey, very hard, blocky, microcrystalline, argillaceous stringers of limestone as well as the off-white, firm, blocky variety are frequently encountered in this section. Traces of shell fragments, forams and pyrite are also present.

2850 - 3225 m

The claystones of the previous section bacome firmer and grade into a shale in this interval.
The claysotnes/shales are generally dark grey and brown, firm to hard, subfissile to fissile, and slightly calcareous.
Beds of cream to buff, firm to hard, argillaceous, laminated limestones are also common.

3225 - 3250 m

This section is characterised by a tuffaceous zone, typically light grey with fine black and white speckles and is moderately hard. A small gas peak was noted through this zone.

3250 - 3375 m

This section is dominated by interbedded claystones and sandstone, with frequent sand and limestone streaks. A grey-green, moderately hard, blocky, glauconitic claystone is common, while the sandstones are generally buff, off-white, translucent, very fine, well cemented and glauconitic. The sand lenses consist of clear, very fine, subrounded, well sorted, loose quartz grains. The limestone streaks are frequently off-white, pink firm to moderately hard, microcrystalline and argillaceous.

3375 - 3415 m

This section sees the apperance of a "marl" formation, occuring in this well as a buff to off-white very soft, amorphous, very calcareous claystone.

3415 - 3800 m

The lithology in this section is almost exclusively limestone, unusually white to buff, very soft to hard and chalky, and contains thin dark grey to black shale laminae. Some stylolites occur and the limestone is frequently fractured.

Pyrite is occassionally found as an accessory. With depth, the limestone changes to a medium grey, hard, microcrystalline, argillaceous variety, containing abundant stylolites and fracture zones, as well as some traces of chert.
In the lower part of the interval, light buff, white, occassionally pink, soft to firm occassionally hard, microcrystalline limestone is common.

3800 - 3880 m

This interval consist of limestone interbedded with thin silty claystone Stringers and shale laminae. The limestone is essentially the same as that above. The claystones are generally grey to dark grey, firm, blocky, silty and calcareous, in places grading to siltstone. The shales are mainly dark grey, firm , subfissile, silty in parts and slightly calcareous.

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TABLE 1

<u>STRATIOGRAPHIC SEQUENCE</u>

QUATERNARY

PLIOCENE

MIOCENE

OLIGOCENE

EOCENCE

PALAEOCENE	BALDER		
	SELE		
	LISTA		
	MAUREEN		
	DENIAN	EKOFISK FORMATION	CHALK GROUP
UPPER CRERACEOUS	MAASTRICHTIAN	TOR FORMATION	
	CAMPANIAN		
	SANTONIAN	HOD FORMATION	
	CENOMIAN		
	TURONIAN		
	BASAL TURONIAN	PLENUS MARL	
	ALBIAN	HIDRA FORMATION	
	APTIAN		

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TABLE 2

LITHOSTRATIGRAPHIC TOPS

UNIT	MEASURED DEPTH	TVD	TVD from S-S GYRO
TOP BALDER	3242 m	2958.3 m	2960.23
TOP EKOFISK	3411 m	3107.8 m	3109.80
TOP TZ	3464.5 m	3154.6 m	3155.61
TOP TOR	3516.5 m	3199.8 m	3199.85
TOP HOD	3781.5 m	3424.5 m	3432.46
T.D.	3-82 m	3486.0 m	3227.17 (assuming constant angle from last station 15° 58' at 12500 ft to TD)

SECTION C

PRESSURE EVALUATION

From the seabed down to the 20" casing shoe a normal pore pressure gradient of 8.6 ppg (1.03 SG) exists.
Evidence of this can be seen from the pressure parameter table in which most of the parameters show normal pressure regime trends.

The normal gradient continues below the 20" shoe to a depth of approximately 1200 m, after which pore pressure increases steadily. The mud weight was increased accordingly in this zone in order to maintain hydrostatic balance.
The pressure parameters show good agreement on picking the top of the transition zone at 1200 m with most of the parameters showing abnormal trends below this depth.

It was decided to set the 13 3/8" casing midway through the trasition zone, at which point pore pressure was estimated at 10.1 ppg (1.210 S.G).
On drilling out the 13 3/8" shoe with a mud weight of 14.0 ppg (1.68 S.G) the pressure integity test recorded a leak off at 15.5 ppg (1.86 S.G) mud weight equivalent.
Pore presure continued to increase down to a depth of approximately 2400 m, where the pore pressure was calculated to be 15.1 ppg (1.81 S.G), after which the pressure parameters suggest a regression. The 9 5/8" casing was set in the regression at a depth of 3140 m where pore pressure was calculated to be 14.3 ppg (1.714 SG)

The 9 5/8" shoe was drilled out with a mud weight of 14.2 ppg (1.70 SG) and leak off was established at 17.16 ppg (2.05 SG) mud weight equivalent.
The pore pressure continued to decrease with depth down to 13.3 ppg (1.59 SG) at 3400 m.
Using the few pressure parameters available while drilling through a carbonate sequence the pore pressure was seen to decrease through the "chalk" to 12.7 ppg (1.52 SG) at 3720 m.

This decrease in pore pressure, in conjunction with drilling through porous zones resulted in stuck pipe (differential sticking) at 3530.5 m. Mud weight was reduced to 13.2 ppg (1.58 SG) and was further reduced at 3076 m to 13.0 ppg (1.56 SG).
This reduction in mud weight resulted in high levels of trip, connection and flow check gas which continued in variable amounts to T.D.

TABLE 3

PRESSURE PARAMETERS

Seabed	R.O.P.	Dxc	TOTAL GAS	Delta Temp.	Bulk Density	Shale Factor	Sonic	IDEL pore pressure	MUD weight	FRAC
20" shoe	Erratic due to frequent sand beds	Increasing trend	Low levels no trend	increasing trend	Slight increasing trend	no definite trend	Decreasing trend	Normal trend 8.6 ppg (1.03 sg)	8.6 ppg (1.035 sg)	1.46SG
462 m Approx. 1200 m to 1250 m	Decreasing trend to 800m increasing trend to 1100m Decreasing trend 1100 - 1200 m	Increasing trend to 800 m Decreasing 800 -900 m Increasing trend 1100-1250 m.	Steady levels of 1-2% to 1200 m	Normal gradient to 1200 m	No Definite Trend	No Definite Trend	Decreasing Trend to 1200 m	Normal trend of 8.6 ppg (1.035 SG) to 1250 m	8.6 ppg (1.035 SG) 9.1 ppg (1.095 SG) at 525 m 9.4 ppg (1.13 SG) at 800 m	12.2ppg
3 3/8" shoe	Increasing trend from 1250 m.	Decreasing trend from 1250 m	Rapid increase 1200 m-shoe	Abnormal increasing trend to shoe			Increasing trend to shoe	Rapid increase to 10.1 ppg (1.21 SG) at shoe	11.0 ppg (1.32 SG) at shoe	1.74SG
452.7 m Approx. 2400 m	Erratic trend to 2400 m	Decreasing trend to 1800 m vertical trend 1800-2200 m.	Continued high levels and increasing trend to 2100 m	No definite Trend	Decreasing trend to 2000 m	No definite Trend	Slight increasing trend to 1700 m	Steady increase to 12.5ppg (1.5 SG) at 1900 m Increase to 15.1 ppg (1.81 SG) at 2400 m.	14.0 ppg (1.68 SG) at shoe 15.2 ppg (1.82 SG) at 1780 m 15.4 ppg (1.35 SG) at 1900 m	14.5ppg
9 5/8" shoe	Decreasing trend 2400 m-shoe	Increasing trend to shoe	Decreasing trend to shoe	No definite Trend	Increasing trend to shoe	Increasing trend to shoe	Decreasing trend to shoe	Steady 15.1 ppg (1.81SG) to 3075 Decreasing to 14.3 ppg (1.71 SG) at shoe	15.7 ppg (1.88SG) at Shoe.	2.05SG
140 m Top Danian 3400 m	Decreasing Trend	Increasing Trend	Decreasing Trend	Slow increasing Trend	No Definite Trend	Decreasing Trend	Decreasing Trend	Decreasing to 13.3ppg (1.59) at 3400 m.	14.2 ppg (1.70SG) at Shoe 14.2 ppg (1.70SG) at 3400 m	17.1ppg
	TRANSITION ZONE - PRESSURE INCREASE									

SECTION D

RESERVOIR ANALYSIS

The reservoirs in this well are contained within the carbonate sequence of The Ekofisk and Tor Formations. A total of 14 cores were taken, with good recovery, using fibre glass sleeving.

As can be seen from the show evaluation table there appear to be 3 main zones of interest-:

1. 3415.5 - 3430 m
2. 3440 - 3465 m
3. 3520 - 3580 m

The lowermost zone shows a gradual decrease in quality with depth.

Total gas levels through the above 3 zones averaged between 3-8%, comprising C_1, C_2, C_3, C_{4i}, C_{4n}.
Very few of the samples were examined because of the plastic sleeving, but those examined showed occassional traces of light brown oil.
Percentage Fluorescence was generally low at trace amounts, however, between 3440 m - 3565 m percentage fluorscence increased to 20 - 80% being generally dull yellow indicating an API gravity of 25 - 30°.
Cuts were generally moderate to fast streaming and occassionally flash.
Cuttings gas throughout the reservoir was generally low being 0.05 - 0.07 % in the 3 main zones of interest and 0.07 - 0.13 % in the intervening zones.
Hydrocarbon ratio plots indicate that the reservoirs are potentially producible gas condensate accumulations.
Visible porosity was generally poor to nil in the core Fragments or cuttings samples.(Cuttings samples were very poor during coring and complised mostly cavings).
Interpretation of ROP and quick look calculation of porosity from bulk density would indicate that porosity is moderate to good throughout the above 3 zones.

However, bulk density values may be erroneous as the majority of the cuttings sample would probably be cavings.

A quantitative estimate of permeability is difficult,on the one hand low permeabillity is indicated by the steep nature of the plots on the hydrocarbon ratio analysis sheets, and on the other moderate to good permeability is indicated by low amounts of cuttings gas and also moderate to fast streaming and occassional flash solvent cut.

Conclusion

Interpretation of data seems to indicate that the 3 zones are good porous and low to moderately permeable gas condensate reservoirs. Quick look interpretation of electric logs confirm the quality of these zones as potential gas producers.

TABLE 4

RESERVOIR ANALYSIS

DEPTH (mtr)	ROP (mtr/hr)	TOTAL GAS %	COROMATOGRAPH ANALYSIS % C_1	C_2	C_3	C_4	nC_4	CUTTINGS GAS %	BULK DENSITY gm/cc	DRILLING POROSITY %	LITHOLOGY	FLUORESCENCE %	COLOUR	CUT	REMARKS
3415.5 - 3430	Average 5	3-8	5.7	1.1	0.31	0.17	0.23	0.07	1.71	5-15	Limestone	Trace	Dull Yellow	Fast Streaming	Good porous Low moderately permable Gas/conden-sate reserv-oir
3430 - 3440	Average 2	0.5-4	2.4	0.41	0.14	0.05	0.07	0.07	1.71	0.1-5	Limestone	Trace	Light Yellow	Slow to mode-rately Fast streaming	Low porosity permeability zone
3440 - 3465	5	8	6.5	1.27	0.28	0.03	0.06	0.05	1.55	7.5 - 4.5	Limestone	20 80	Dull Yellow	Flash to mod. streaming	Good porous low moderate-ly permeable Gas conden-sate reservo-ir.
3465 - 3520	2.5	Average 2, Peaks of 5	1.5	0.26	0.09	TR	TR	0.13	1.67	1-2	Limestone	Trace	Dull Yellow	Moderate streaming to slow diffuse	Low porosity and permea-bility zone
3520 3580	8-2.5 Decreasing with depth	7-0.8 Decreasing with depth	4.9 0.37	0.87 0.06	0.17 0.02	0.01 -	0.02 -	0.05	1.75	10-2 Decreasing with depth	Limestone	Trace	Dull Yellow	Fast streaming Very slow streaming Moderately streaming	Good porous and low perm-eability Gas/conden-sate Reservoir
3580 3619	3.5-1 Decreasing with depth	1-0.1 Decreasing with depth	0.23	0.04	0.01	-	-	N/A	1.64 -1.55	2.5-1 Decreasing with depth	Limestone	Trace	Dull Yellow	Slow cloudy	Low porosi-ty and perm-eability zone

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SECTION E

WELL PROBLEMS AND LOST TIME

1. Previous to spudding well, find that guide base damaged, possibly by rogue anchor. New guide base arrives 8th March. Adjustments ect. necessary. Eventually spud 21st March.

2. On setting 20" casing, running stack and riser and testing stack (1-4-82) find test plug stuck in stack. Pull stack, work on same, test on surface OK. Run stack and riser, stack tests OK. Find leak in 20" casing on pressure testing same. After squeeze jobs eventually overcome leak. Drilling new formation 12-4-82.

3. Hole very tight. Stabilisers keep getting caught up just below 20" shoe (14-4-82).

4. 1472.5 m cannot get Schlumberger logs below 1345 m (first attempt) or 1022 m (second attempt), 21/22-5-82. Abandon further attempts to run 'E' logs.

5. Poor cement job on 1378' casing (25-4-82) squeeze cement. Start drilling new formation 1-5-82.

6. Lose circulation. Hole packed off at 2870 m (17/18-5-82).

7. 16-6-82 Stuck at 3530.5 m. Probably differential sticking. Reduce mud weight. Pump lightweight pill. Eventually free pipe. Ream and clean hole. Back to coring 20-6-82.

8. 22-6-82 BOP stack does not test. Pump and set cement plugs (trouble with cement). Pull riser and stack 26/27-6-82. Repair same and run . Back to coring 30-6-82.

9. 5-7-82 stuck at 3676 m. Reduce mud weight and spot 30 bbls' "Black Magic" free pipe.

10. Whilst cleaning out hole at TD (wiper trip after run 4 of Schlumbergers logs) Get stuck pipe 15-7-82. Rft. tool stuck in hole 19-7-82, retrieve same. Run in to 9 5/8" shoe and ream out open hole one single at a time, getting moderate sticking all the time. (22-7-82 to 27-7-82). 7" liner eventually all in hole 30-7-82.

11. 5-8-82 to 7-8-82 Repair draw works.

APPENDIX I

CORING DETAILS

Using fibreglass sleeving

CORE	DEPTH INTERVAL CORED	CORED	RECOVERY	%
1	3415.2m to 3428.5 m	11.6 m	11.6 m	100 %
2	3428.5m to 3445.2 m	18.3 m	18.1 m	99 %
3	3445.2m to 3463.4 m	18.3 m	12.4 m	68 %
4	3463.4m to 3481.7 m	18.3 m	18.15 m	99,2 %
5	3481.7m to 3500 m	18.3 m	18.3 m	100 %
6	3500m to 3518.3 m	18.3 m	18.3 m	100 %
7	3518.3m to 3530.2 m	12.2 m	12.2 m	100 %
8	3530m to 3537.86 m	7.31 m	4.32 m	59 %
9	3537.86m to 3556.15 m	18.3 m	18.3 m	100 %
10	3556.5m to 3574.39 m	17.89 m	17.81 m	100 %
11	3574.5m to 3585 m	10.5 m	9.5 m	90 %
12	3585 m to 3598 m	13 m	13 m	100 %
13	3598 m to 3616 m	18 m	18 m	100 %
14	3616 m to 3619 m	3 m	0.6 m	20 %

Total cored zone 3415.2 m to 3619 m - 203.8 m

APPENDIX I

ELECTRIC LOGGING DETAILS

SEABED - 30" casing shoe	GR
30" - 20"	ISF/SONIC/GR/SP
20" - 13 3/8"	ISF/SONIC/GR/SP FDC/GR
13 3/8" - 9 5/8"	ISF/SONIC/GR/SP FDC/GR
9 5/8" - T.D.	ISF/SONIC/GR/SP/ LDT/CNL/GR/CAL/ DLL/MSFL/GR/CAL/ FDC/GR SDT RFT

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APPENDIX III

DAILY MUD RECORD

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DAILY MUD PROPERTIES

PHILLIPS PETROLEUM COMPANY NORWAY WELL: 1/9-6

DATE	DEPTH	WT.	VISCOSITY SEC.	VISCOSITY CPS.	CORR. 115 °F PV	CORR. 115 °F YP	GELS 0	GELS 10	pH BECK ☐ STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 300 °F HT-HP	CL ☐ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	ACTIVITY As	ACTIVITY Am	# Bbl CEC	REMARKS
12 APR 82	460	8·8	35						NO CONTROL – SEAWATER														20" SHOE
13 "	568	9·0	35																				
14 "	702	9·1	34																				
17 "	1064	9·4	30																				
18 "	1216	9·4	31																				
19 "	1235	9·7	33																				
20 "	1386	10·5	35																				
21 "	1472	11·0	53																				
22 "	1472	11·0	50																				13 3/8" CSG
2 MAY 82	1606	11·1	54																				
3 "	1721	14·8	64		52	28	6	18	11·0	4·5		26k				130	TR	28	72				
4 "	1920	15·2	85		35	19	11	27	10·5	4·0		25k				150	TR	28	72				
5 "	2111	15·4+	66		28	17	10	27	10·5	4·5		28k				300	TR	28	72				
8 "	2197	15·5	66		38	21	3	20	10·5	4·2		23k				200	TR	28	72				
9 "	2235	15·6	72		36	15	3	16	10·5	3·6		24k				180	TR	28	72				
10 "	2283	15·7	64		28	18	6	22	10·5+	4·3		24k				180	TR	28	72				
11 "	2283	15·7	71		26	19	8	28	10·0	3·5		23k				150	2	29	69				
13 "	2515	15·7	72		37	14	7	29	10·0	3·6		24k				180	3	30	67				
14 "	2629	15·7	65		28	18	6	29	10·0	4·2		24k				100	2	29	69				
15 "	2696	15·6	65		28	18	5	32	10·0	4·0		23k				80	1	30	69				
16 "	2726	15·7	68		28	20	7	30	10·0	4·8		23k				100	1	30	69				
17 "	2821	15·8	60		34	18	4	25	10·0	5·5		24k				60	0·5	30	69·5				
18 "	2870	15·7	66		28	20	5	27	9·5	5·1		23k				80	TR	30	70				
19 "	2935	15·7	65		30	15	8	31	10·2	5·3		24k				60	TR	30	70				
20 "	2966	15·7	66		32	24	9	31	10·1	5·0		23k				100	TR	30	70				
21 "	3005	15·7	65		28	18	8	26	10·3	4·7		21k				100	TR	30	70				
22 "	3098	15·7	65		28	16	6	23	10·0	5·0		21k				120	0	29	71				9 5/8" CSG.
4 JUN 82	3214	14·2	57		22	12	3	10	11·5	4·0		9k				50	0	22	78				
5 "	3243	14·2	57		20	15	3	10	11·5	4·0		10k				50	0	22	78				
6 "	3311	14·2	51		24	16	6	12	10·9	4·0		15k				80	0	23	77				
7 "	3358	14·2	54		22	16	7	10	10·5	4·2		20k				80	0	22	78				

DATE SPUD: 21/3/82 DATE T.D.: 13/7/82 B.H.T. NOTE: MUD PROPERTIES MONITORED ONLY AFTER DRILLING OUT 20" SHOE.

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DAILY MUD PROPERTIES

PHILLIPS PETROLEUM COMPANY NORWAY   WELL: 1/9-6

DATE	DEPTH	WT.	VISCOSITY SEC.	VISCOSITY CPS.	CORR. 115 °F PV	CORR. 115 °F YP	GELS 0	GELS 10	pH BECK ☐ STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 300 °F HT-HP	CL ☐ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	ACTIVITY As	ACTIVITY Am	# Bbl CEC	REMARKS
8 JUN 82	3411	14·2	57		24	18	5	17	10·5	4·0		21k				120	0	23	77				
9 "	3415	14·2	54		23	18	7	15	10·5	4·0		21k				120	0	23	77				
10 "	3426	14·2	55		18	18	4	15	10·3	4·2		21k				120	0	22	78				
11 "	3445	14·2	51		18	17	3	14	9·8	4·1		20k				100	0	21	79				
12 "	3463	14·0	58		22	16	5	16	10·0	4·1		21k				100	0	22	78				
13 "	3476	14·0	53		18	16	3	15	10·3	4·3		20k				150	0	22	78				
14 "	3495	13·8	58		26	20	7	25	10·8	4·3		20k				100	0	22	78				
15 "	3512	13·8	57		17	17	3	8	10·5	4·2		20k				100	0	18	82				
16 "	3518	13·8	53		16	14	3	10	10·7	4·0		20k				180	0	24	76				
17 "	3531	13·2	47		15	15	2	11	10·5	4·1		22k				70	1	18	81				STUCK PIPE
18 "	3531	13·2	48		29	14	2	9	10·5	4·0		22k				60	1	21	78				
19 "	3531	13·2	54		26	15	2	11	10·4	3·8		22k				60	1+	21	78				CLEAN-OUT
20 "	3531	13·2	55		28	20	2	11	10·5	3·8		22k				70	1	20	79				TRIP
21 "	3538	13·2+	50		28	16	2	9	10·3	3·0		22k				70	1	21	78				
22 "	3564	13·2	56		29	17	2	9	10·2	3·0		21k				80	1	21	77				
23 "	3574	13·2	54		30	19	2	11	10·1	3·0		22k				80	1	22	77				
24 "	3574	13·5	47		31	21	2	12	10·0	3·0		22k				80	1	22	77				PULL STACK
5 JUL 82	3627	13·2	58		37	15	2	10	11·8	4·0		23k				60	TR	21	79				
6 "	3676	13·0	48		28	14	2	8	12·1	3·8		19k				70	TR	21	79				
7 "	3714	13·0	51		28	14	2	9	12·1	3·7		21k				70	TR	21	79				
8 "	3761	13·0	51		33	14	2	8	11·3	3·3		20k				50	TR	20	80				
9 "	3783	13·0	52		29	14	2	8	11·2	3·4		21k				50	TR	21	79				
10 "	3810	13·0	54		35	14	2	8	11·5	3·5		23k				60	TR	20	80				
11 "	3831	13·0	52		29	16	2	8	11·3	3·4		23k				50	TR	20	80				
12 "	3850	13·0	50		36	15	2	8	10·7	3·6		23k				70	TR	21	79				
13 "	3873	13·0	53		34	17	2	9	10·5	3·3		23k				50	TR	21	79				
14 "	3880	13·3	52		37	16	2	9	10·2	3·5		23k				50	TR	22	78				T.D.
15 "	3880	13·3	52		37	16	2	9	10·2	3·5		23K				60	TR	22					
17 "	3880	13·2	51		28	14	3	8	10·0	3·8		21K				120	TR	21					
19 "	3880	13·3	50		29	15	3	9	10·2	4·0		21K				120	TR	20					
21 "	3880	13·5	50		31	15	3	9	10·0	3·8		21K				160	TR	22					

DATE SPUD: 21/3/82   DATE T.D.: 13/7/82   B.H.T.

THE ANALYSTS

Schlumberger

DAILY MUD PROPERTIES

PHILLIPS PETROLEUM COMPANY NORWAY WELL 1/9-6 SHEET 3

			VISCOSITY		CORR. 115 °F		GELS		pH BECK ☐ STRIP ☐	FLUID LOSS		CL ☑ CACL ☐ NACL ☐	ALKALINITY				RETORT			ACTIVITY		# Bbl	
DATE	DEPTH	WT.	SEC.	CPS.	PV	YP	0	10		100 PSI API	500 PSI 300 °F HT-HP		PF	PM	MF	CA ppm	% OIL	% SOL	% WATER	As	Am	CEC	REMARKS
24 JULY 81	12 730	13.2	75		30	18	6	15	11.0	4.0		14 K				120	4	18					LOGGING
27 "	12 730	13.0	68		26	20	5	19	10.5	5.0		14 K				120	3	20					-
30 "	12 730	13.2	75		28	22	5	25	10.0	4.0		14 K				40	2	22				5	SET 7" LINER
2 AUG 81	12 730	13.5	62		20	17	3	15	9.0	5.3		15 K				80	1	24					
5 "	12 730	13.5	65		27	23	4	33	10.0	7.2		19 K				20	1	25					
8 "	12 730	13.5	57		23	16	3	20	10.0	6.9		19 K				200	3	23					

DATE SPUD: DATE T.D.: B.H.T.

THE ANALYSTS
Schlumberger

A P P E N D I X   II

B I T   R E C O R D

THE ANALYSTS
Schlumberger

BIT RECORD

COMPANY PHILLIPS PETROLEUM CO. NORWAY WELL NO. 1/9-6

BIT NO.	DEPTH IN	SIZE	MAKE	TYPE	JETS 32 NDS.	FEET METRE	HOURS	WT./1000	R.P.M	COND. T.	B.	G.	T. REVS K	REMARKS
1	101·95	26"	HTC	OSC 3A	20-20-20	71·9	25							SPUDDED ON 21st MARCH '82. DRILL 26" PILOTHOLE.
1 (RR1)	101·95	26"	"	"	"	71·9	5	0-5	80-100	6	5	IN	23·9	OPEN PILOTHOLE TO 36" W/HOLE OPENER.
2	174	17·5"	SEC	S 35J	"	304·5	12·9	0-7	80-130		NG		88·9	DRILL 17·5" PILOT HOLE
2 (RR1)	174	"	"	"	"	304·5	15·8	0-5	80-130		NG		25·7	OPEN HOLE TO 26"
2 (RR2)	272	"	"	"	"	165·5	3·8	0-9	50-80		NG		13·5	DRILL CMT TO 437M
RR3,4,5		"	"	"	"									CLEAN CMT FROM CSG. AFTER SQUEEZE JOBS
2 (RR6)	478·5	"	"	"	"	30·5	2·5	6-20	90-100	3	3	IN	34	DRILL CMT FROM 102M TO SHOE. DRL 3M NEW HOLE
3	509	"	"	"	"	193	8·3	0-10	TURBO	2	4	IN		W/TURBINE & 2° BENT SUB. 14·75° DEV
4	702	"	"	"	"	104	2·9	20-45	40-95	1	1	IN	17·2	W/ANGLE BUILD ASSEMBLY
5	806	"	HTC	OSC 3AJ	18-18-18	125·5	2·7	20-40	140		NG		17	W/HOLD ASSEMBLY
5 (RR1)	931·5	"	"	"	"	284·5	4·2	35-40	140-170	3	4	IN	29·5	POOH, TO CONTROL DIRECTION
6	1216	"	"	X 3A	"	19	3·0	2-8	~ 1088	1	1	IN		W/TURBINE & 2° BENT SUB
6 (RR1)	1235	"	"	"	"	236·5	4·3	45-50	90-100	3	3	IN	26·8	DRILL TO 13 3/8" CASING POINT
7	—	12·25"	"	"	18-18-20	—	0·5	0-10	65		NG		8·6	DRILL OUT PLUG, FLOAT COLLAR & SHOE
8	1427·5	"	"	"	14-14-14	47	1·6	10-25	40-80		NG		6	DRILL CMT, 3M NEW FORMN AFTER SQUEEZE JOB
8 (RR1)	1409	"	"	"	"	46·5	1·8	10-15	40-50		NG		4·5	DRILL CMT AFTER SQUEEZE # 2
8 (RR2)	1421	"	"	"	"						NG			" " " " # 3
8 (RR3)	1452	"	"	"	"	20	TOT=9·4	28	160	2	3	IN	36·2	
9	1472	"	"	"	"	258	14·5	30	180	2	3	IN	156	
10	1730	"	"	"	"	381	3·4	35	160	3	3	IN	26	CONTROLLED DRILLING OF 12·25" HOLE

THE ANALYSTS
Schlumberger

BIT RECORD

COMPANY **PHILLIPS PETROLEUM CO. NORWAY** WELL NO. **1/9-6**

BIT NO.	DEPTH IN	SIZE	MAKE	TYPE	JETS 32 NDS.	FEET METRE	HOURS	WT./ 1000	R.P.M	COND. T.	B.	G.	T.REVS K	REMARKS
11	2111	12·25"	HTC	X 3A	16-16-16	22	2·5	5-10	700	1	2	IN	105	W/TURBINE. & 1 1/2° BENT SUB
12	2133	12·25"	HTC	X 3A	14-14-14	150	2·3	22	150	1	2	IN	25·1	
13	2283	12·25"	HTC	X 3A	14-14-15	356	4·7	35	180	6	3	O	53·8	JETS PLUGGED W/CMT.
14	2639	12·25"	HTC	X 3A	14-14-15	181·5	3·4	25-35	180	3	3	IN	37·3	POOH TO CHANGE BIT & BHA.
15	2820·5	12·25"	HTC	OSC 3AJ	15-15-15	49·5	0·8	35-40	175	5	5	IN	7·9	JETS PLUGGED.
16	2870	12·25"	HTC	XV	16-16-16	135	5·65	40	177	6	5	O	55·3	JETS PLUGGED.
17	3005	12·25"	HTC	XV	16-16-20	150	21·7	40-45	175	8	8	IN	215·2	DRILLED TO 3155M T.D. 12·25" OPEN HOLE.
18	3108	8·5"	HTC	X 1G	16-16-16	26	1·0	5-15	55	1	1	IN	2·6	DRILL CMT & FLOAT COLLAR.
19	3134	8·5"	HTC	X 1G	11-11-14	109	8·2	3-10	160	5	4	IN	79	DRILL OUT SHOE & FORMATION.
20	3243	8·5"	HTC	J 33	12-12-12	172·5	43·8	20-40	75	4	7	IN	225	DRILL TO TOP OF DANIAN LMST.
CH 1	3415·5	8·5"x4"	D.B.	CB 303	——	11·5	2·0	15	68	——			9·56	CORE 1. 100% REC.
CH 1(RR	3427	"	"	"	——	18·29	6·85	15·2	69	——			28·53	" 2. 98·75% REC.
CH 1(RR2	3445	"	"	"	——	18·25	3·25	15·2	70-80	——			14·65	" 3. 68% REC.
21	——	8·5"	HTC	J4	12-12-12	——	——		——	1	1	IN		REAM TIGHT SPOTS. CLEAN OUT TRIP.
CH1(RR3	3463·5	8·5"x4"	D.B.	CB 303	——	18·29	8·15	14·18	70	——			31·95	CORE 4. 100% REC.
CH 2	3481·5	"	"	"	——	18·29	7·7	20	76	——			33·47	" 5. "
CH 2(RR1	3500	"	"	"	——	18·29	8·3	15·25	77	——			37·72	" 6. "
CH2(RR2	3518·5	"	"	"	——	12·2	4·8	15-25	70	——			19·91	" 7 "
21(RR1)	——	8·5"	HTC	J4	12-12-12	——	——	——	——	2	2	IN		REAM TIGHT SPOT & CORED SECTION
CH2(RR3)	3530·5	8·5"x4"	D.B.	CB 303	——	7·32	1·8	15-18	70-80	——			8·92	CORE 8. 59% REC.

THE ANALYSTS
Schlumberger

BIT RECORD

COMPANY **PHILLIPS PETROLEUM CO. NORWAY** WELL NO. **1/9−6** PAGE NO. **3**

BIT NO.	DEPTH IN	SIZE	MAKE	TYPE	JETS 32 NDS.	FEET METRE	HOURS	WT./ 1000	R.P.M	COND. T.	B.	G.	T. REVS K.	REMARKS
CH2(RR4)	3538	8·5"x4"	D.B.	CB 303	——	18·29	3·25	12-16	70-80	—	—	—	14·65	CORE 9. 100% REC.
CH2(RR5)	3556	"	"	"	——	18·29	5·8	12-17	75-80	—	—	—	26·82	" 10. "
21(RR2)	——	8·5"	HTC	J4	OPEN	——	0·5	5-15	40	2	2	IN	9·29	DRILL OUT CMT. PLUGS SET PRIOR TO PULLING STACK.
22	——	8·5"	HTC	J4	15-15-15	——	—	6	——	2	2	IN		
CH2(RR6)	3574·5	8·5"x4"	D.B.	CB303	——	10·36	3	10-15	76	—	—	—	13·23	CORE 11. 90% REC. JAMMED OFF.
CH2(RR7)	3585	"	"	"	——	13·1	5·1	10-15	69-72	—	—	—	22·9	" 12. 100% " . "
CH2(RR8)	3598	"	"	"	——	18·29	11·3	17	67-71	—	—	—	48·1	" 13. "
22(RR1)	——	8·5"	HTC	J4	15-15-15	——	—	—	——	2	2	IN	0·43	CLEAN OUT TRIP.
CH2(RR9)	3616	8·5"x4"	D.B.	CB303	——	3	3·3	10-18	67	—	—	—	10·8	" 14. 20% REC.
23	3619	8·5"	HTC	J 33	15-15-15	16·1	49·4	20-30	60-85	3	3	IN	118·9	
24	3783	8·5"	HTC	J 33	15-15-15	97	68·9	30-40	60-80	3	6	IN	288·5	REACH T.D. 8·5" HOLE.

HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9 - 6

AREA ____________ COUNTRY O/S NORWAY

DEPTH 3425 M CORE # 1

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1 % C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

NET GAS %

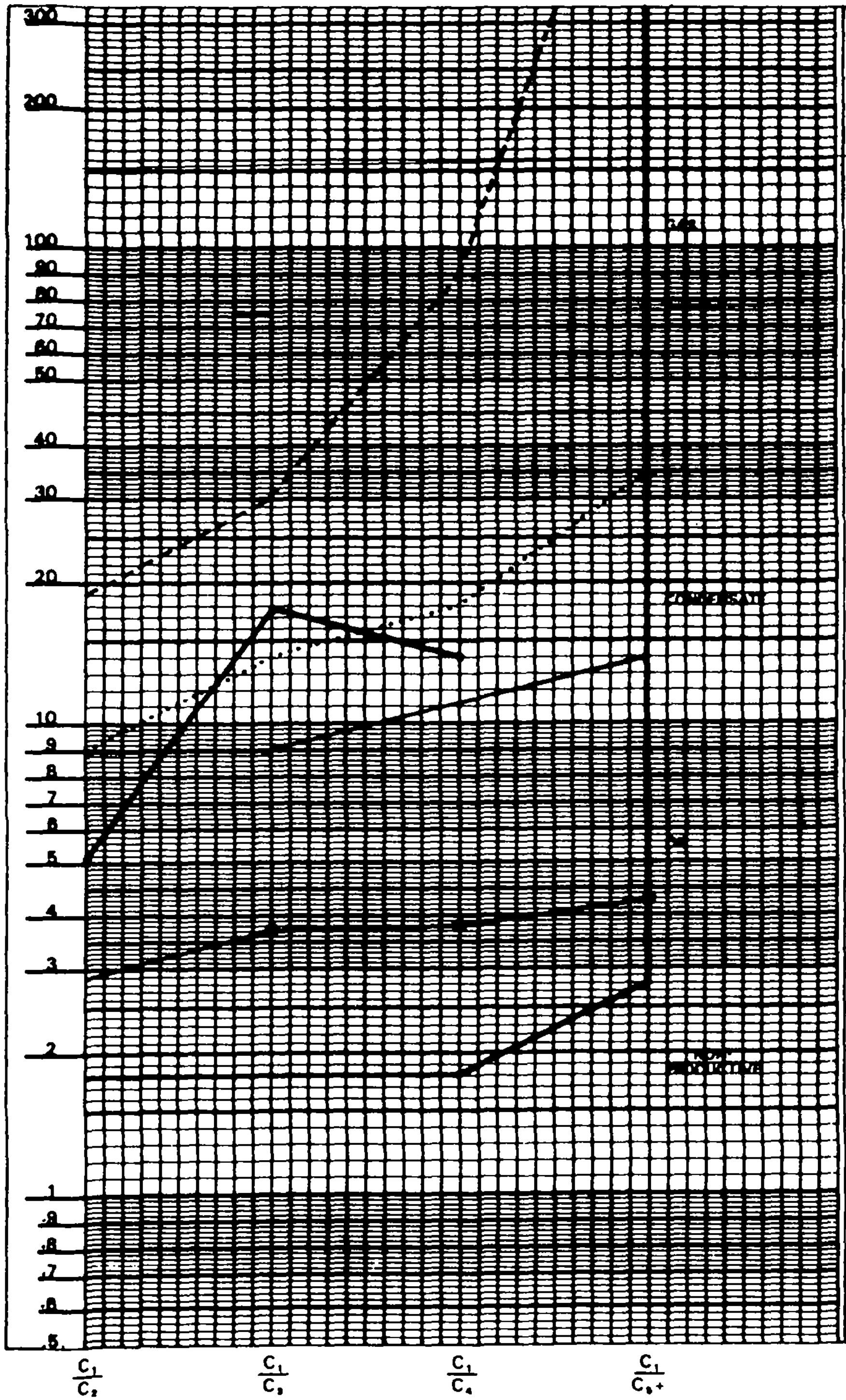
C_1 5·5 C_2 1·07 C_3 0·31 iC_4 0·169 nC_4 0·22

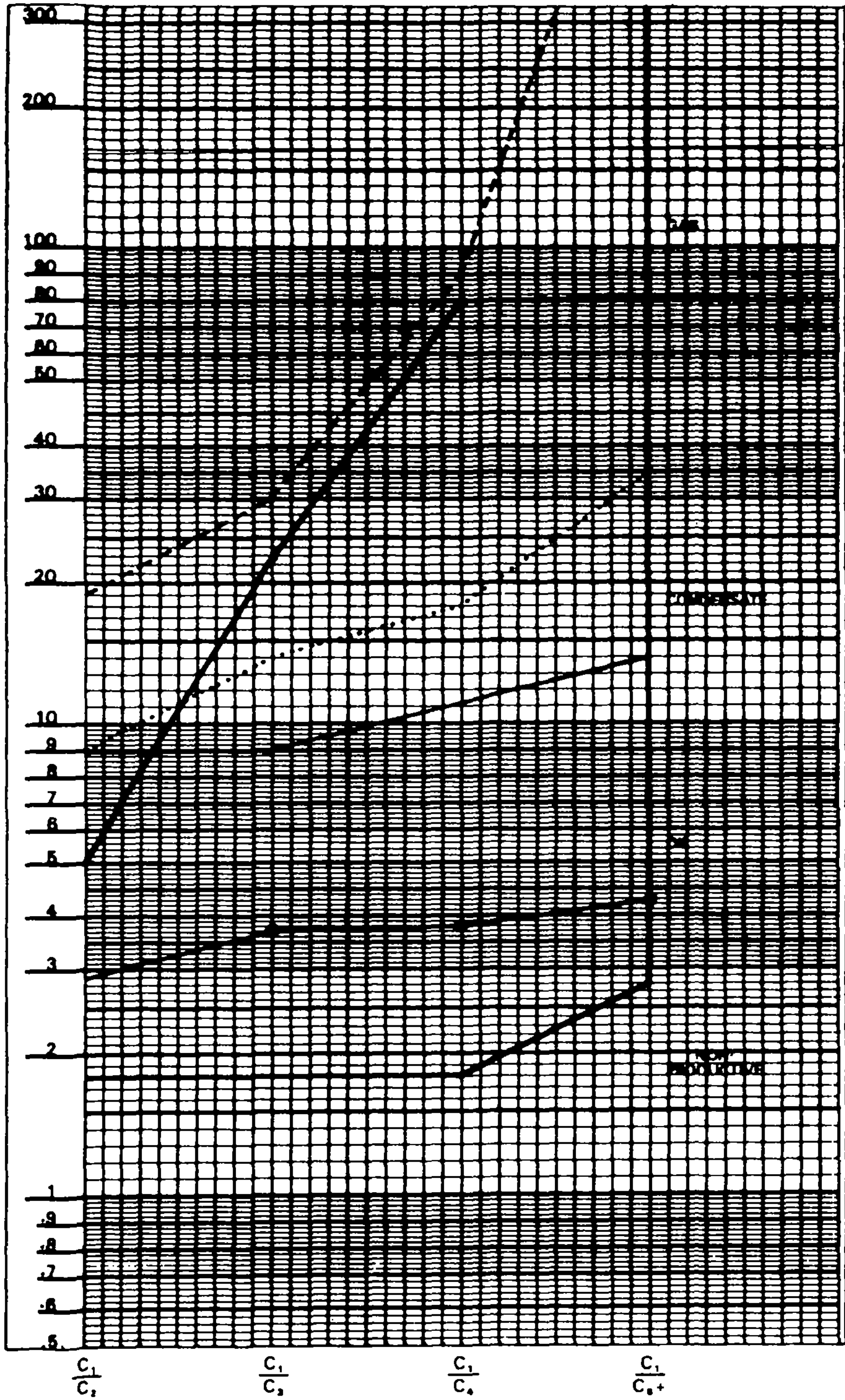
RATIO

C_1/C_2 5·14 C_1/C_3 17·7 C_1/C_4 14

TEST DATA / REMARKS

CORE # 1 CUT IN ZONE WHICH IS POSSIBLY WATER BEARING





HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9 - 6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3443 M CORE # 2

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

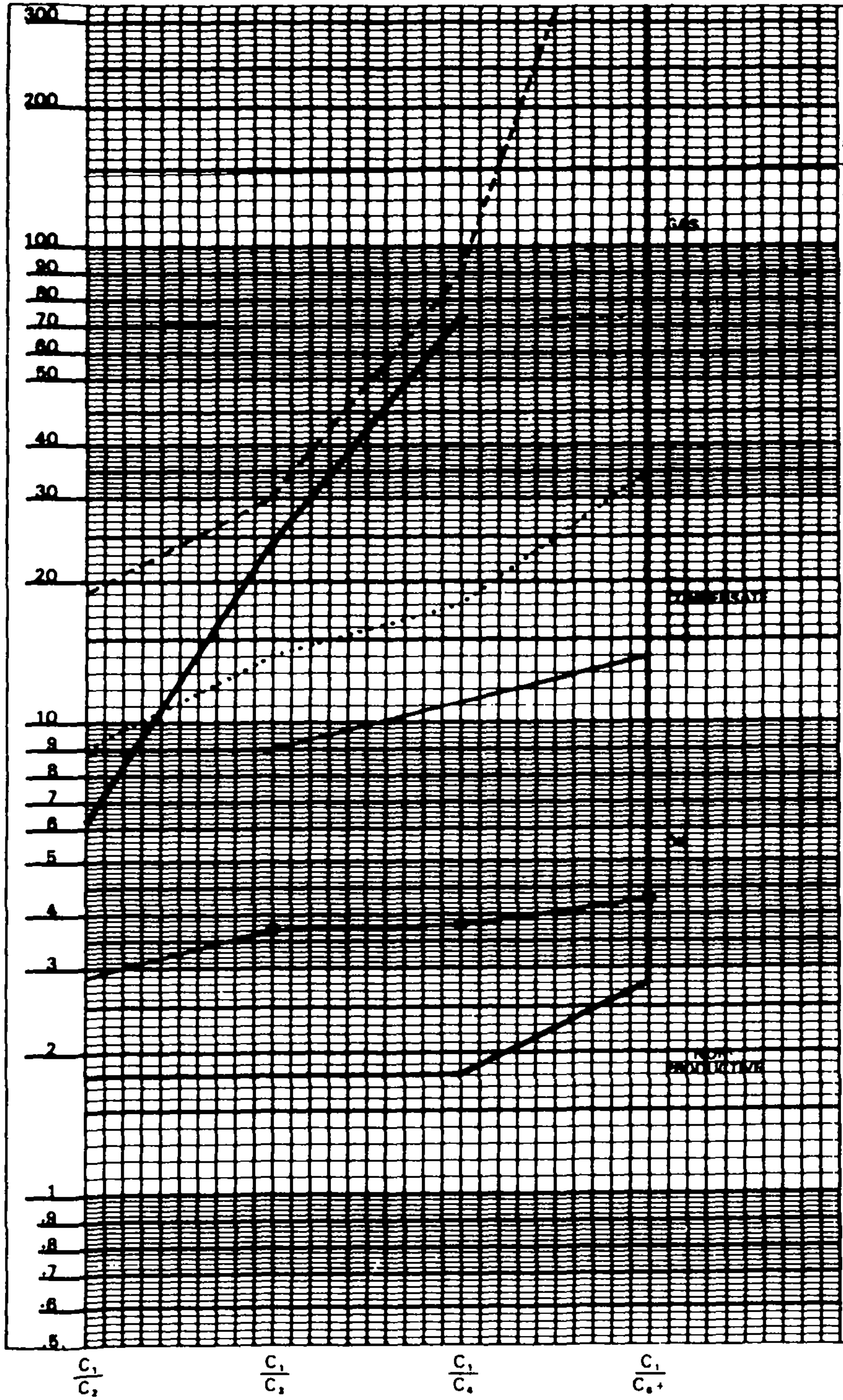
NET GAS %

C_1 6·4 C_2 1·28 C_3 0·28 iC_4 0·02 nC_4 0·06

RATIO

C_1/C_2 5 C_1/C_3 22·8 C_1/C_4 80

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9 -6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3455 M CORE # 3

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

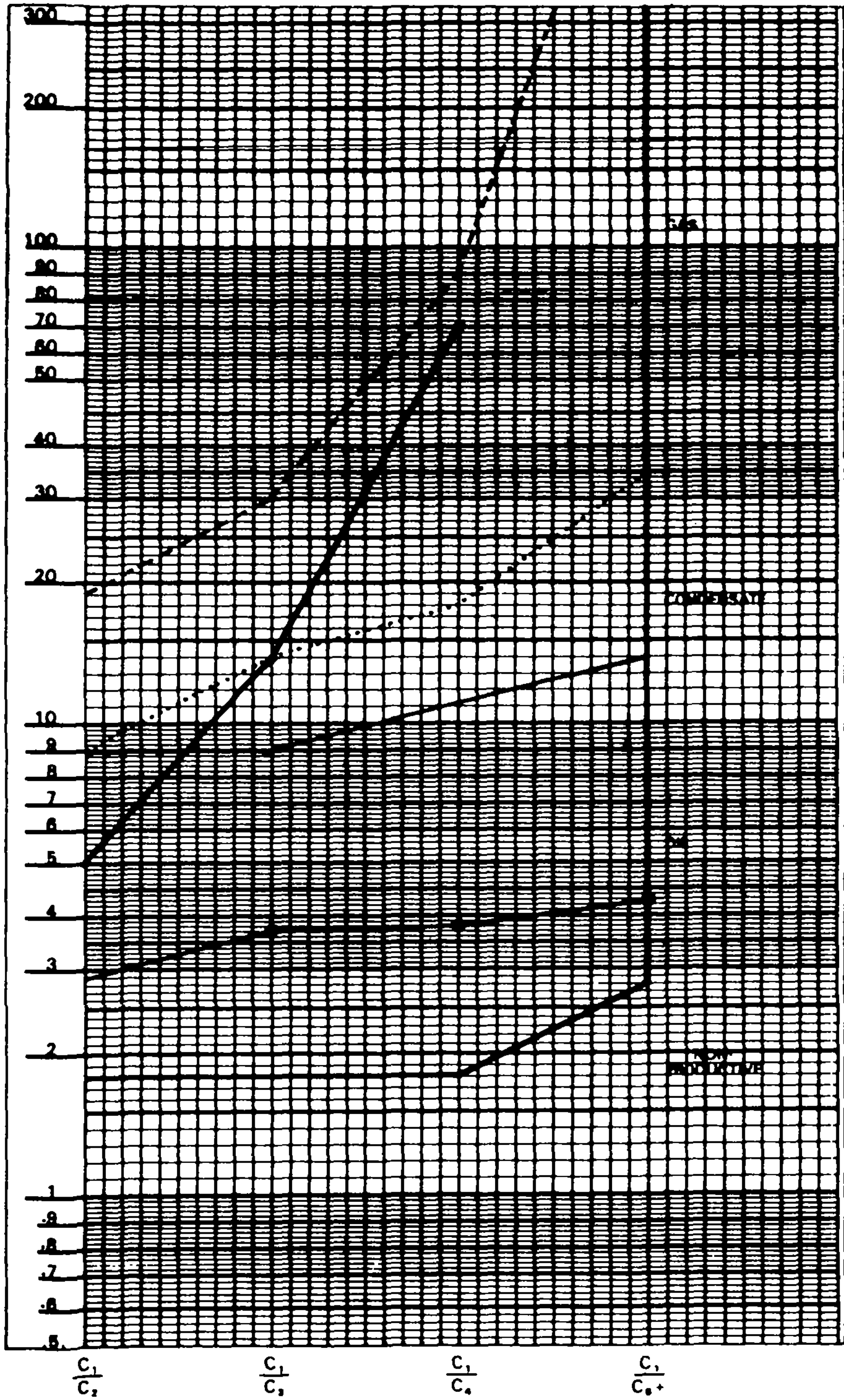
NET GAS%

C_1 6·1% C_2 0·97 C_3 0·25 iC_4 0·026 nC_4 0·057

RATIO

C_1/C_2 6·2 C_1/C_3 24·4 C_1/C_4 73·4

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9 – 6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3470 M CORE # 4

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·11% C_2 0·01% C_3 ______ iC_4 ______ nC_4 ______

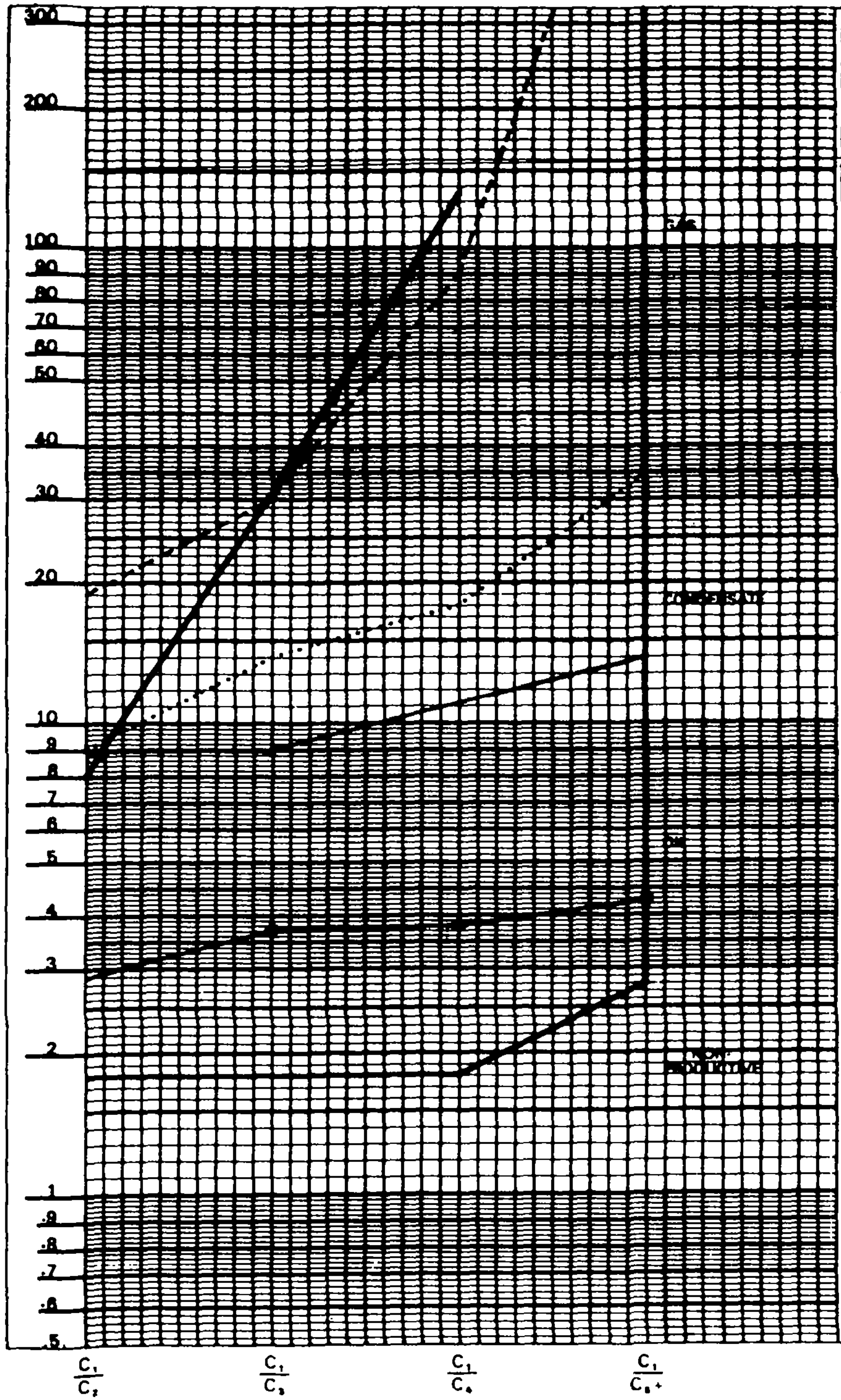
NET GAS%

C_1 1·4 C_2 0·28 C_3 0·1 iC_4 0·01 nC_4 0·01

RATIO

C_1/C_2 5 C_1/C_3 14 C_1/C_4 70

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY: PHILLIPS PETROLEUM COMPANY NORWAY

WELL: 1/9 – 6

AREA: ______ COUNTRY: O/S NORWAY

DEPTH: 3491 M CORE # 5

MUD GAS

C_1 ____ C_2 ____ C_3 ____ iC_4 ____ nC_4 ____

BACKGROUND GAS

C_1 0·09% C_2 ____ C_3 ____ iC_4 ____ nC_4 ____

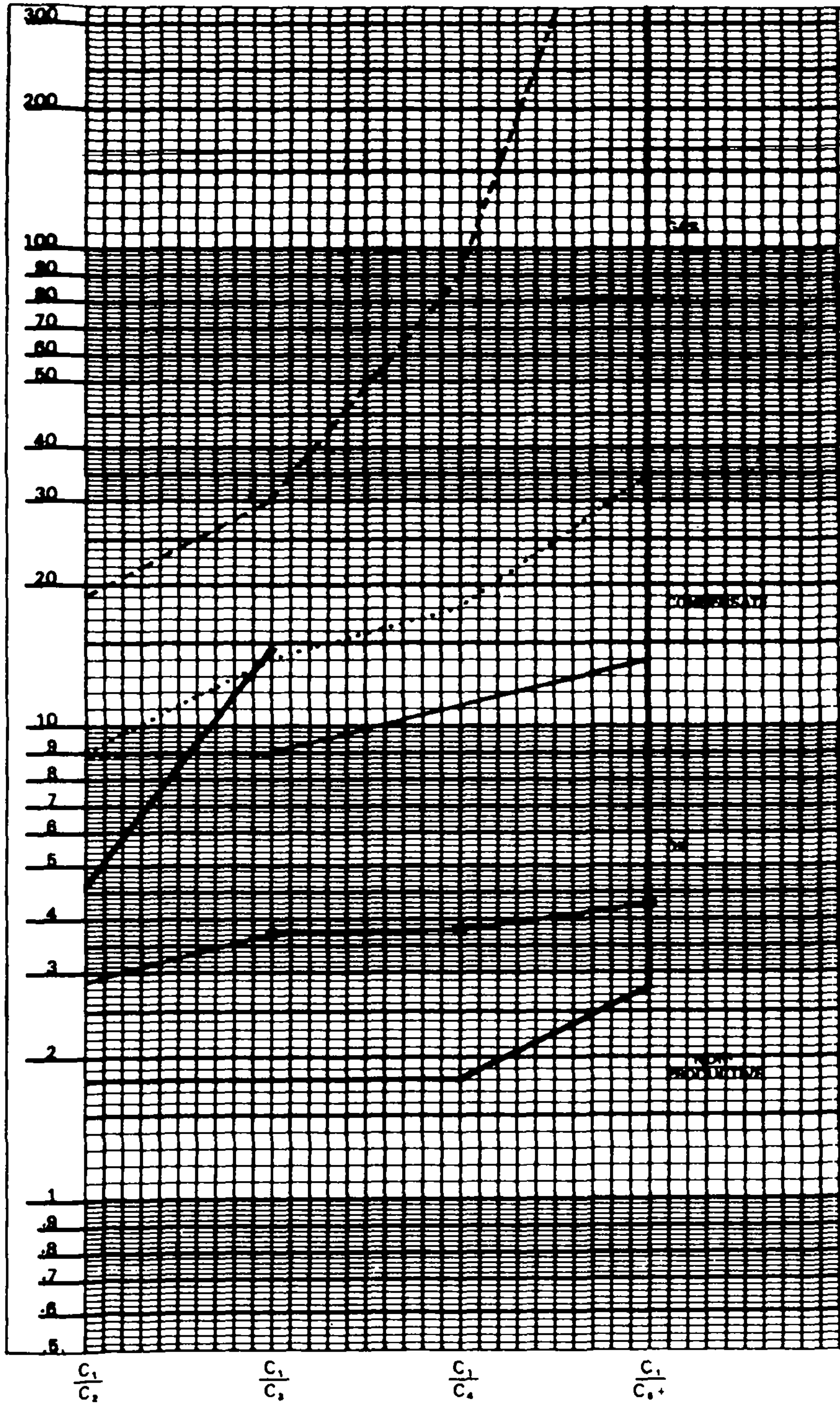
NET GAS %

C_1 6·4 C_2 0·8 C_3 0·2 iC_4 0·015 nC_4 0·036

RATIO

C_1/C_2 8 C_1/C_3 32 C_1/C_4 133

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3518 M CORE # 6

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

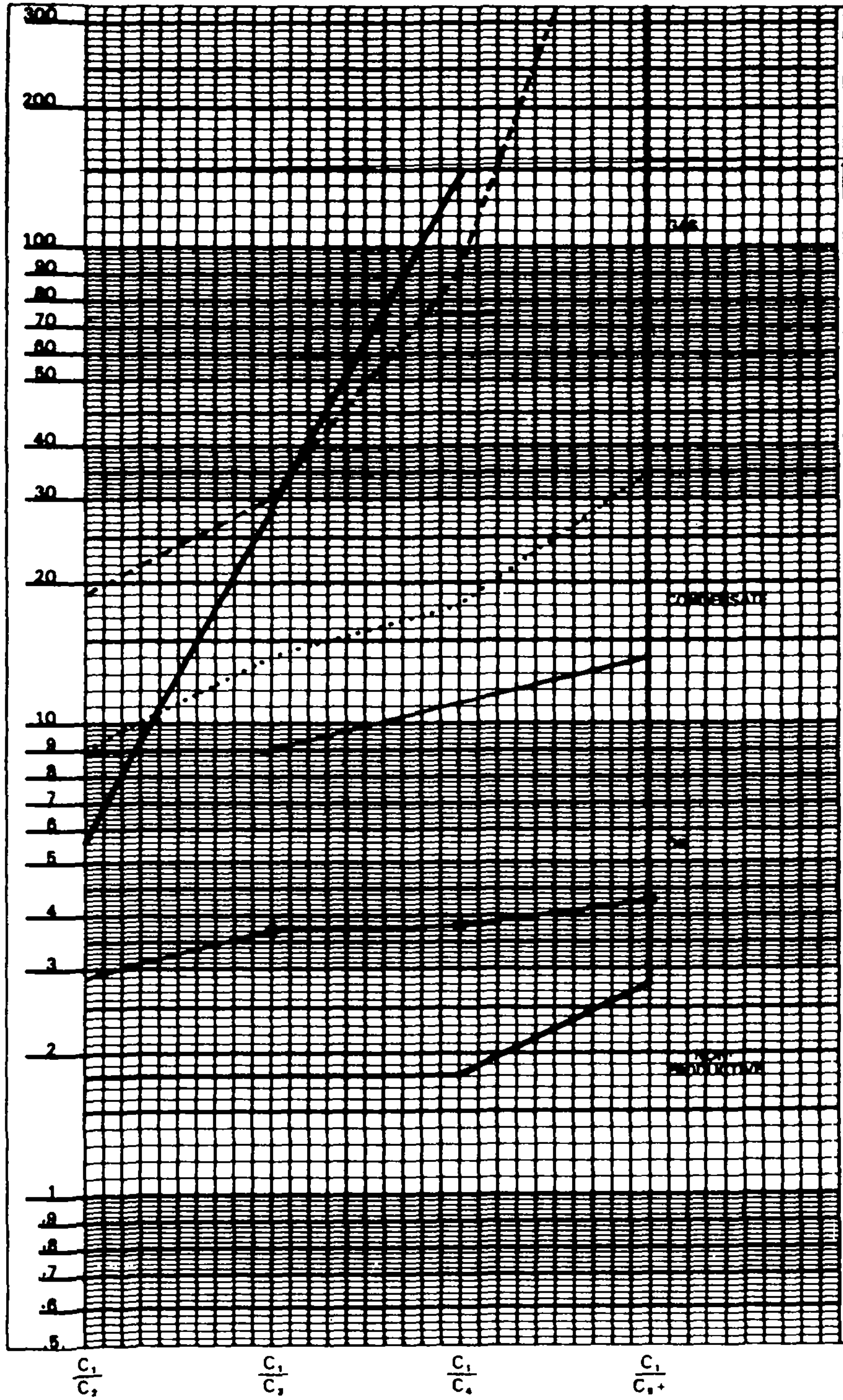
NET GAS %

C_1 0·53 C_2 0·09 C_3 0·03 iC_4 – nC_4 –

RATIO

C_1/C_2 4·7 C_1/C_3 14·7 C_1/C_4 ______

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY 0/S NORWAY

DEPTH 3527 M CORE # 7

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

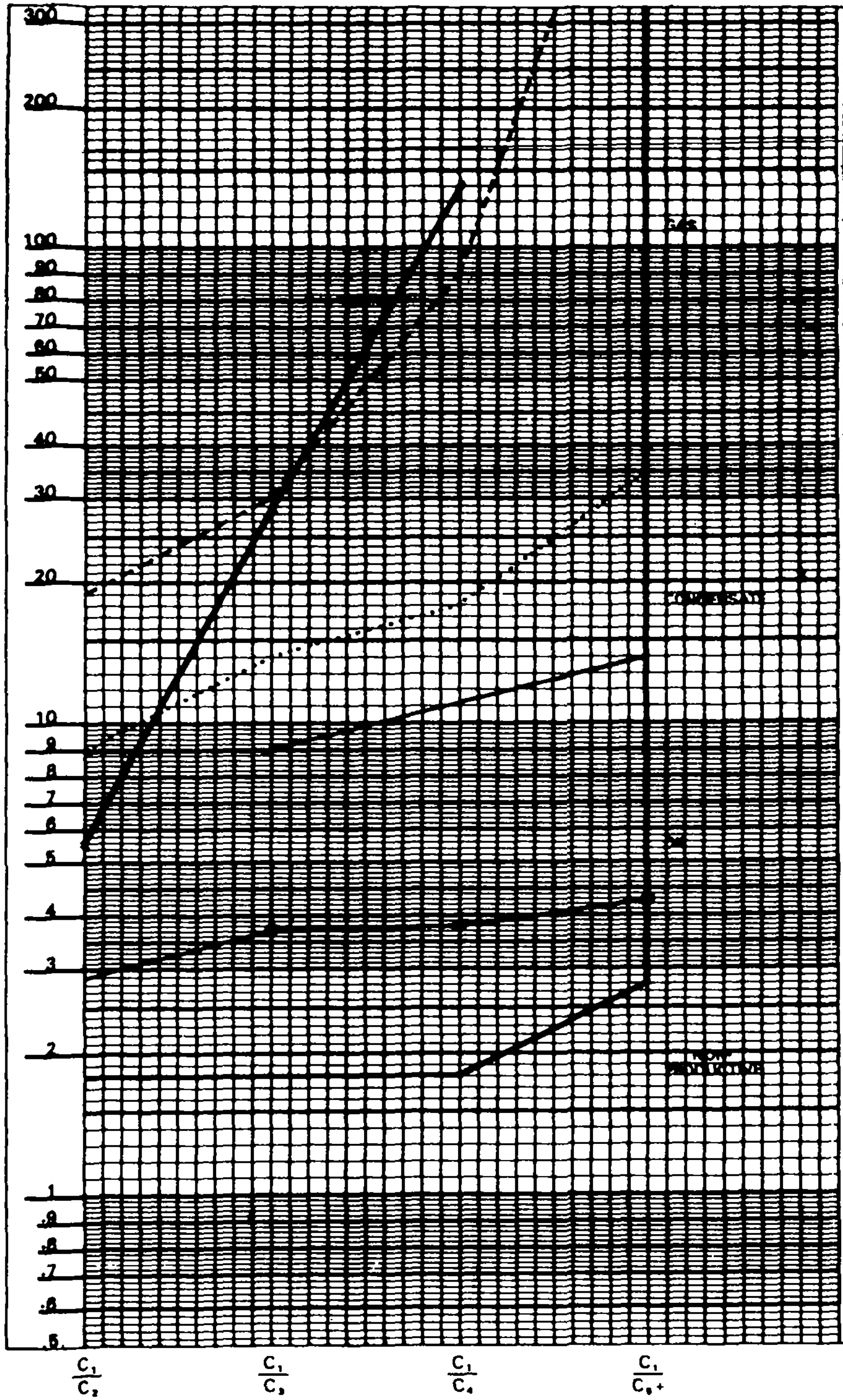
NET GAS

C_1 2·3 C_2 0·4 C_3 0·09 iC_4 0·007 nC_4 0·009

RATIO

C_1/C_2 5·7 C_1/C_3 28 C_1/C_4 144

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3542 M CORE # 8

MUD GAS

C_1 ____ C_2 ____ C_3 ____ iC_4 ____ nC_4 ____

BACKGROUND GAS

C_1 0·1% C_2 ____ C_3 ____ iC_4 ____ nC_4 ____

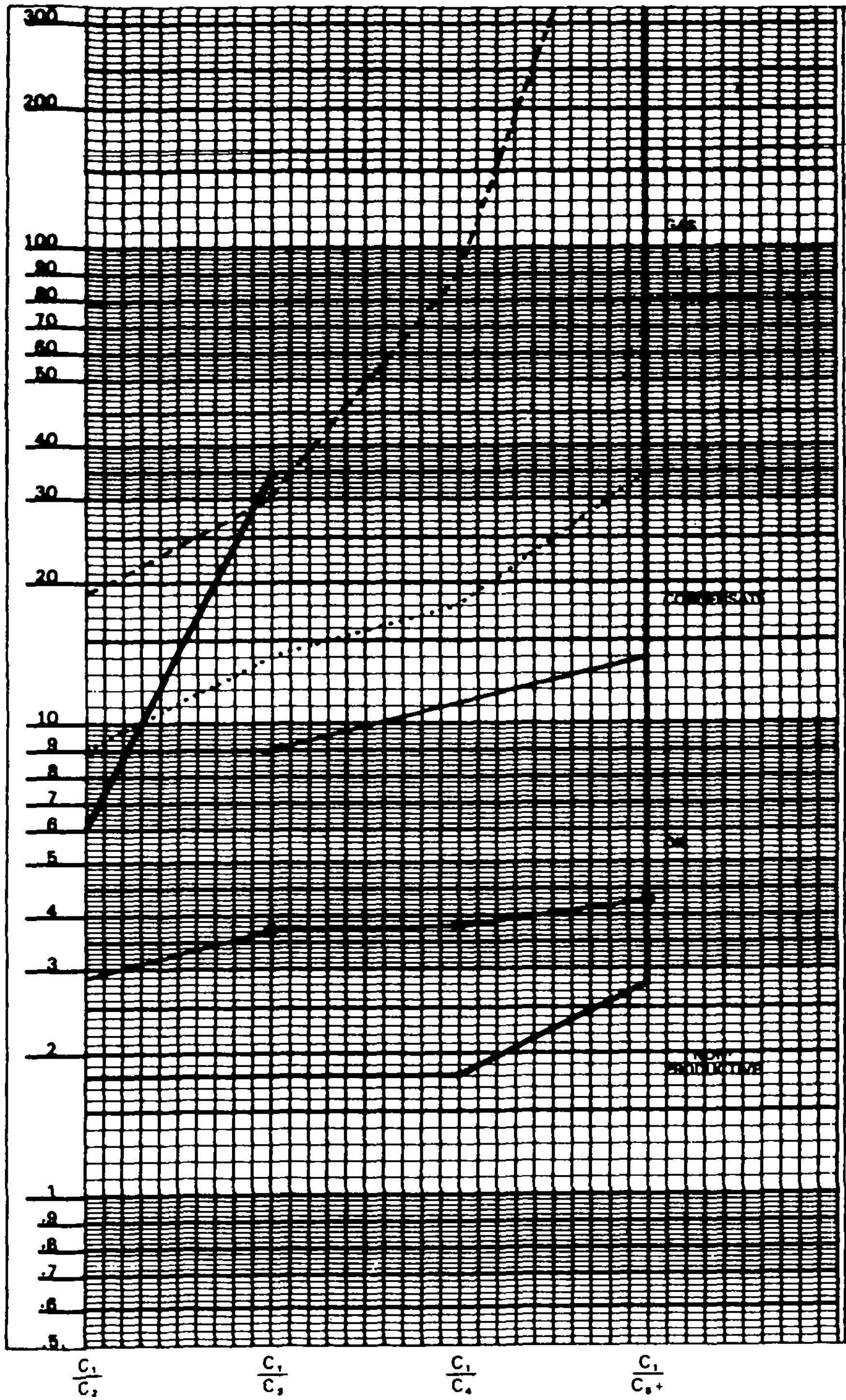
NET GAS %

C_1 4·8 C_2 0·87 C_3 0·17 iC_4 0·011 nC_4 0·023

RATIO

C_1/C_2 5·5 C_1/C_3 28 C_1/C_4 141

TEST DATA ____



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3554M CORE # 9

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

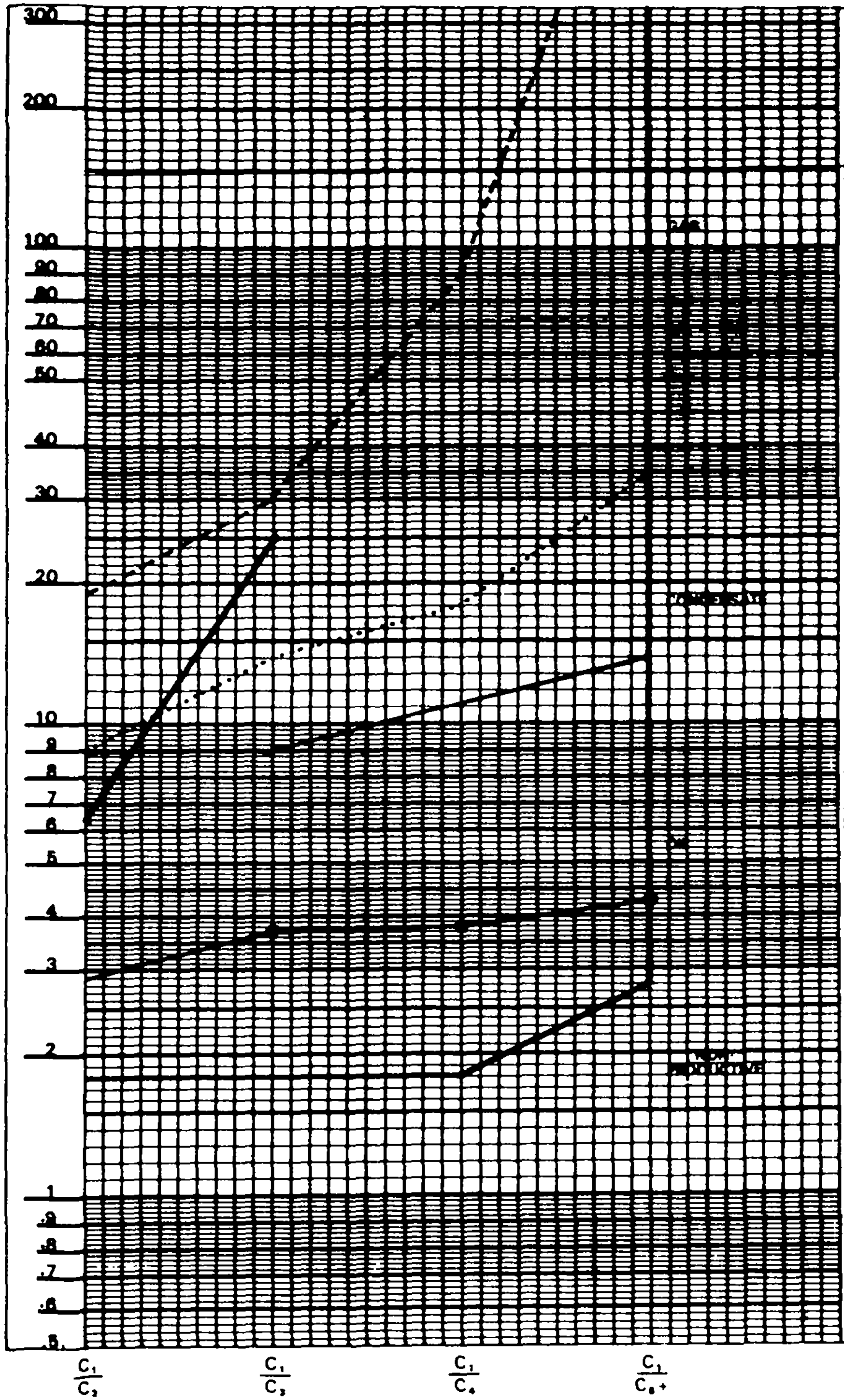
NET GAS %

C_1 2·4 C_2 0·4 C_3 0·07 iC_4 ______ nC_4 ______

RATIO

C_1/C_2 6 C_1/C_3 34 C_1/C_4 ______

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY ______

DEPTH 3563 M CORE # 10

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1 % C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

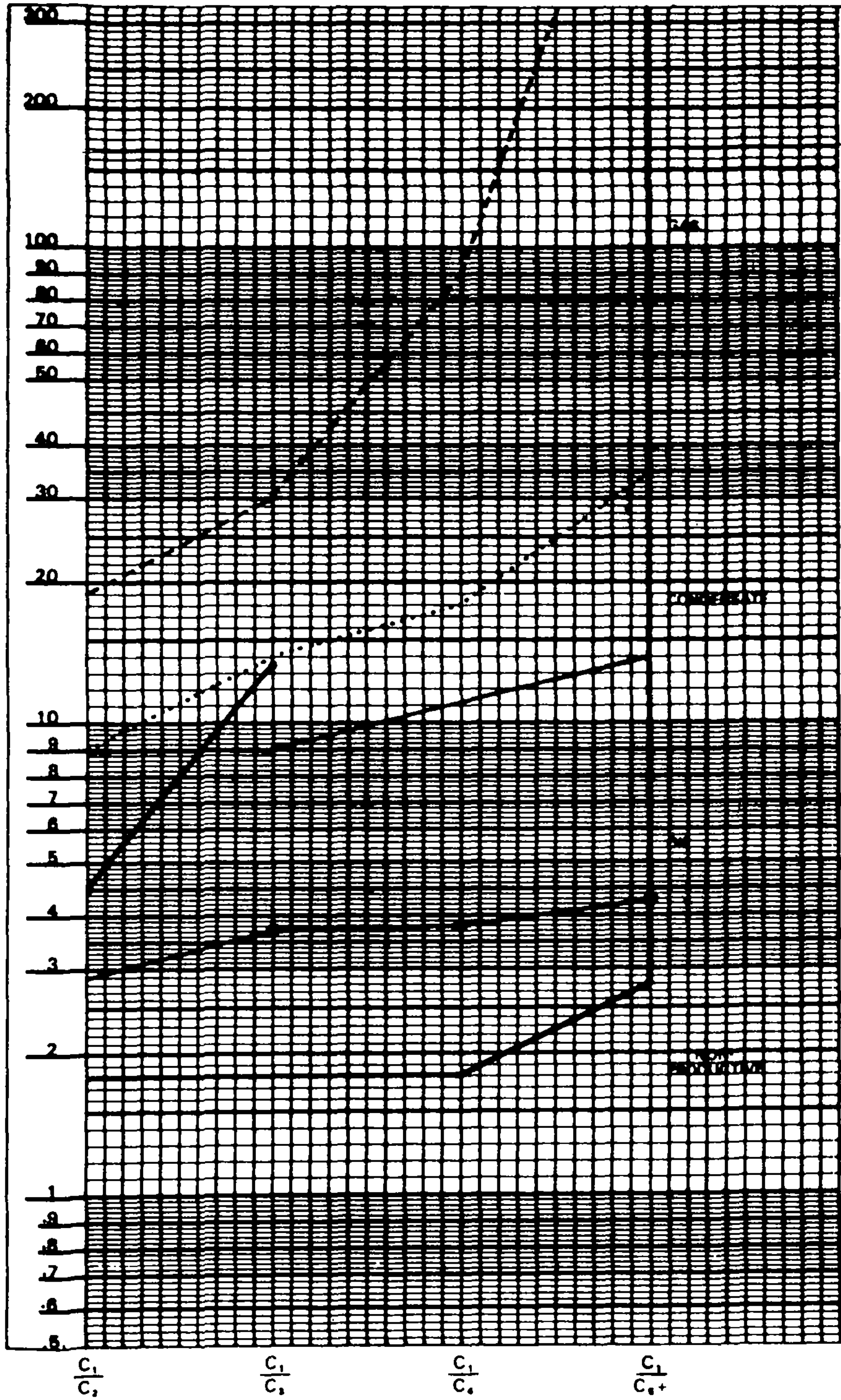
NET GAS %

C_1 1·03 C_2 0·16 C_3 0·04 iC_4 ______ nC_4 ______

RATIO

C_1/C_2 6·4 C_1/C_3 25 C_1/C_4 ______

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY ______

DEPTH 3581M CORE # 11

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

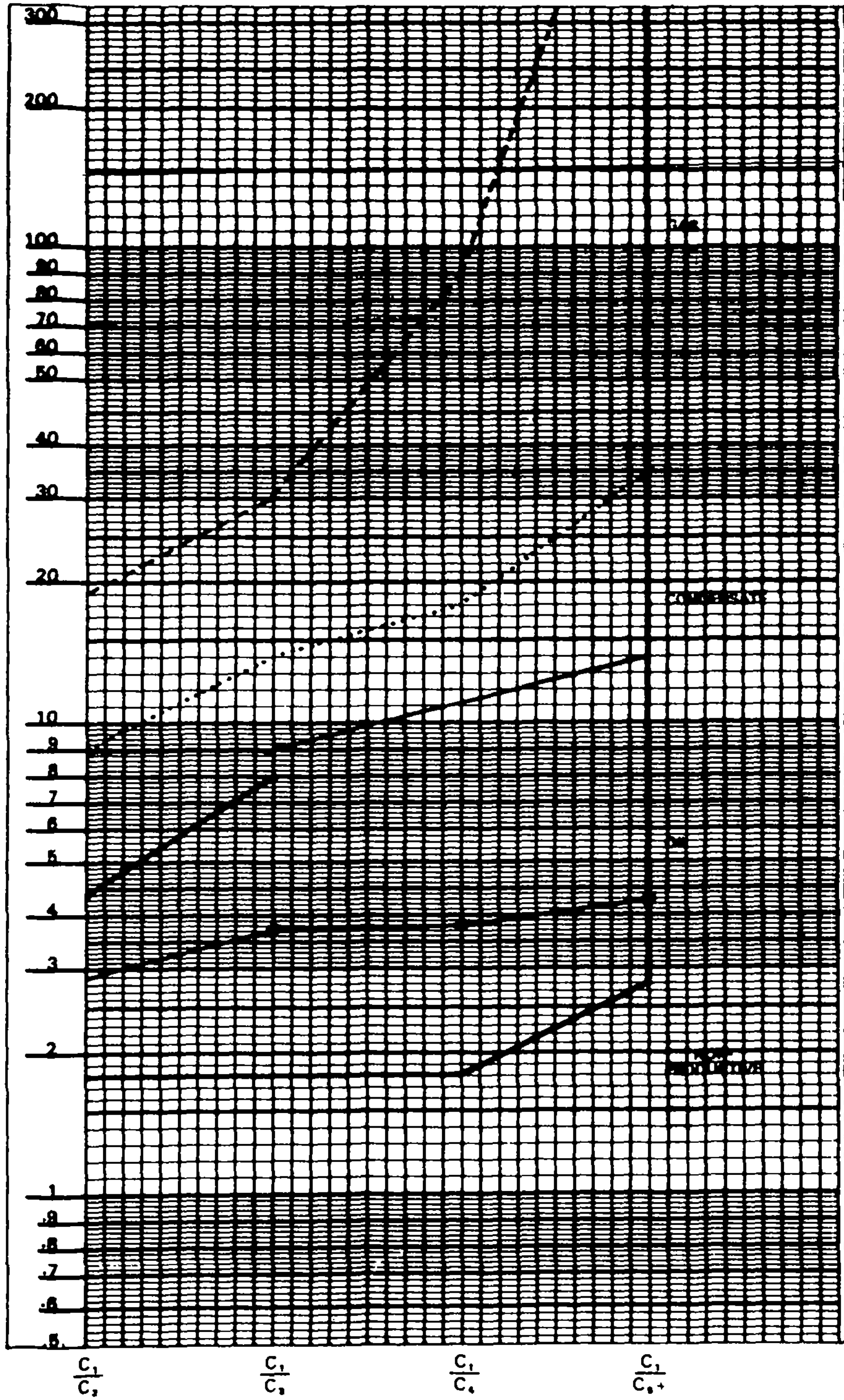
NET GAS %

C_1 0·27 C_2 0·06 C_3 0·02 iC_4 ______ nC_4 ______

RATIO

C_1/C_2 4·5 C_1/C_3 13·5 C_1/C_4 ______

TEST DATA ______



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3593 M CORE # 12

MUD GAS

C_1 ____ C_2 ____ C_3 ____ iC_4 ____ nC_4 ____

BACKGROUND GAS

C_1 0·1% C_2 ____ C_3 ____ iC_4 ____ nC_4 ____

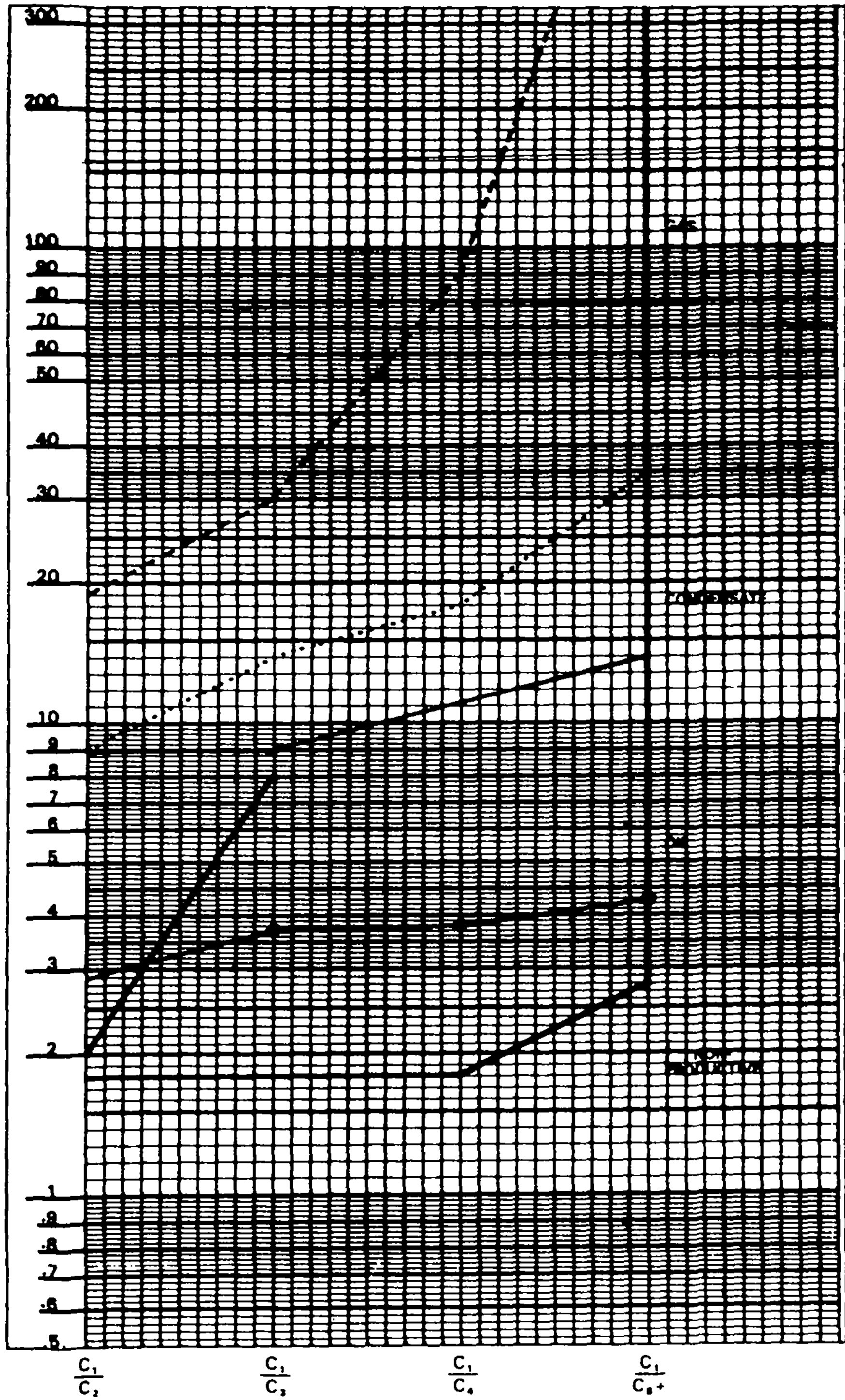
NET GAS %

C_1 0·22 C_2 0·05 C_3 0·02 iC_4 ____ nC_4 ____

RATIO

C_1/C_2 4·4 C_1/C_3 8 C_1/C_4 ____

TEST DATA ____



HYDROCARBON RATIO ANALYSIS

COMPANY PHILLIPS PETROLEUM COMPANY NORWAY

WELL 1/9-6

AREA ______ COUNTRY O/S NORWAY

DEPTH 3606 M CORE #13

MUD GAS

C_1 ______ C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

BACKGROUND GAS

C_1 0·1% C_2 ______ C_3 ______ iC_4 ______ nC_4 ______

NET GAS %

C_1 0·08 C_2 0·04 C_3 0·01 iC_4 ______ nC_4 ______

RATIO

C_1/C_2 2 C_1/C_3 8 C_1/C_4 ______

TEST DATA ______

THE ANALYSTS
Schlumberger

SHOW REPORT NUMBER 1

COMPANY PHILLIPS NORWAY WELL NUMBER 1/9-?

LOCATION O/S NORWAY DATE

1 SHOW INTERVAL 3440 TO 3451M

2 LITHOLOGY LMST: LT-DK BN,HD,XLN SUCR.

3 PENETRATION RATE: BEFORE M/HR 2·5 DURING 5 AFTER 4

4 BACKGROUND GAS: BEFORE % 4 DURING 7 AFTER 7

5 CHROMATOGRAPH: C1 6·5% C2 ·187 % C3 ·028% C4+ 0·06%

6 IDEL POROSITY 2-3% % 5-12 % 9 %

7 VISIBLE POROSITY NIL

8 MUD WT 1·70 SG PORE PRESSURE 1·62 SG ECD

9 FLUORESCENCE 80 %, COLOUR DULL YELL-GOLD

10 CUT FLASH,VEST STRM COLOR WHITE INTENSITY

11 WT· ON BIT 16 K LBS ROTARY SPEED 70 RPM

12 BIT; MAKE D.BOART TYPE CORE HEAD SIZE 8·5 x 4"

13 CHLORIDES : BEFORE —— DURING AFTER

14 REMARKS POOR SAMPLES DURING CORING. ONLY OCCASIONAL CORE SAMPLES [illegible]INED NO VIS Ø.

UNIT OLU-F-002 UNIT MANAGER

THE ANALYSTS
Schlumberger

SHOW REPORT NUMBER 2

COMPANY PHILLIPS NORWAY WELL NUMBER 1/9-6
LOCATION O/S NORWAY DATE

1 SHOW INTERVAL 3455 TO 3463 M
2 LITHOLOGY LMST: LT TAN-BUFF, FM-MOD HD, CRYPTOXLN
3 PENETRATION RATE: BEFORE M/HR 4 DURING 5-8 AFTER 2.5
4 BACKGROUND GAS: BEFORE % 7 DURING 8 AFTER 1
5 CHROMATOGRAPH: %C1 6·8 C2 1·09 C3 0·27 C4+ 0·09
6 IDEL POROSITY 4 % 5-10 % 3 %
7 VISIBLE POROSITY NIL
8 MUD WT 1·68 SG PORE PRESSURE 1·62 SG ECD
9 FLUORESCENCE 20 %, COLOUR DULL YELL-WH
10 CUT MOD STRMG COLOR WHITE INTENSITY
11 WT. ON BIT 18 KLBS ROTARY SPEED 80 RPM
12 BIT; MAKE D.BOART TYPE CORE HEAD SIZE 8·5 x 4"
13 CHLORIDES : BEFORE DURING AFTER
14 REMARKS AS REPORT #1

UNIT 002 UNIT MANAGER