THE ANALYSTS
Schlumberger

WELL COMPLETION REPORT

COMPANY: STATOIL

WELL: 15/9-14

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COMPANY	:	STATOIL
WELL	:	15/9-14
COORDINATES	:	58° 17′23"N. 01° 41′28"E
RIG	:	Deep Sea Saga
AREA	:	Norwegian North Sea Sleipner
DESIGNATION	:	Exploration
SPUD DATE	:	01/05/1982
T.D. REACHED	:	17/06/1982
DAYS TO DRILL	:	48
RKB-MSL	:	25 M
MSL-SEABED	:	102.5 M

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CASING DEPTHS

30"	at	187	M RKB
20"	at	500	M RKB
13 3/8"	at	1351	M RKB
9 5/8"	at	3001	M RKB

MUD TYPES

SPUD MUD	to	561	M RKB
SEAWATER/GEL/LIGNO	to	1371	M RKB
SEAWATER/GYP/LIGNO	to	3016	M RKB
LIGNITE/LIGNOSULPHONATE		3563	M RKB (T.D.)

ANALYSTS PERSONNEL ONBOARD

W.D.R. Bell	Units Manager
A. Nickson	Assistant unit Manager
S. Hyslop	Assistant Unit Manager
T. Aldwinckle	Senior Logging Engineer
M. Collins	Logging Engineer
M. Varco	Logging Engineer
J. Hagan	Logging Engineer
P. Wilson	Logging Engineer

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INTRODUCTION

Logging Unit no TC 1054, constructed and supplied to the special requirements of Statoil. According to DNV regulation.
The logs produced were:

1. Total concept log of special format for Statoil, sent in weekly and final master copy at the end of the well.

2. Well conpletion and pressure log of special format for Statoil, sent in at the end of the well.

3. Supplementary sheets of bit data, mud data and deviation survey data for the well, included in the well completion report.

In addition the following data was telexed twice daily to Statoil in town at 5 Metre intervals: Depth, ROP (heave and tide compensated), modified "D" Exponent, gas, formation bulk density, mud temperature out, mud weight RPM, WOB and any trip or connection gases recorded.

The Analysts new TC III system was employed for the well giving impproved flexibility for customer and user requirements. A data base of all available parameters was accesible at any time during the drilling to allow modification to displayed information on the VDUś and data printout,as well as the option to print any vaiable to any scale on the "on line" plotting system. Two VDUś were installed in the Statoil office, and the providing on a half metre basis, drilling parameters as required, and the second display providing instantaneous surface data, including hole depth and bit tracking to 0.05 Metre resolution.

The data monitored and recorded for future use was: heave and tide compensated ROP in M/HR and Min/Mtr, total hookload and weight on bit, rotary RPM and cumulative bit revolutions, all computed data derived therefrom, torque, all pump stroke functions, totalised active andreserve pit volumes, trip tank ,pump pressure, continous total gas and chromatographic analysis, mud temperature in and out of the hole. H_2S measurements, mud conductivity in and out of the hole, formation bulk density and shale factor, calcimetry tests. Also the usual lithological analysis of drill cuttings for rock type and hydrocarbon shows was performed. Cuttings samples were caught and packaged according to the requirements of Statoil, and the usual services were provided whilst coring.

During trips, swab-surge and trip monitor programmes were run and displayed, as well as any off-line auxilliary programmes as required.

At the end of the well, all logs, charts and records were sent ashore to Statoil.

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GEOLOGY

Only when a full apprisal of all data available has been made (previous well data, electric logs and palaeontological analysis) can a complete geological evaluation be attempted. This section of the report is designed to provie an on-site, fresh description of lithologies with a view to aiding future reports and prognoses. All depths referred to are from RKB. All formation tops are deduced from data available at the time.

1. TERTIARY

From 190 M (30" casing shoe at 187 M) sampling commenced whilst drilling the 12 1/4" hole, utilising the marine riser. A fairly uniform section of alternating sand and sticky "gumbo" clays was encountered, the sand between 130 and 320 M being particularly well developed in thickness, consisting of clear loose, fine to medium sized sub rounded quartz grains.
The clays in the section were typlically grey, soft, soluble and amphorous, often containing shell fragments. These clays persisted to 925 M changing in colour with depth to a green-grey variety, and again containing thin stringers of sand.
A drilling break of 400+ M/HR at 925 M indicated the top of the Utsira and a corresponding increase in gas levels to 0.4% (C_1 only) maximum. Loose clear sand of medium to fine grain size, showing traces of cementation and often containing abundant shell fragments, extended down to 1074 M, where again, grey and olive green soft clays became the predominant lithology, having an increasing silty content with depth. From 1257 M to 1305 M a further well developed sand was encountered, again appearing in surface as loose, white or clear fine to medium grains. At 1305 M a change to grey and brown silty claystones and a reduction in ROP to 40M/HR marked the top of the Oligocene. Between 1890 M and 1950 M orange-brown hard limestone stringers appeared, corresonding to the top of the Eocene before reverting back to the aformetioned silty claystones.
A positive drilling break to 115 M/HR maximum at 2048m and a change in lithology to clear, white and light brown, fine grained sand, often with calcareous cement, is taken as the top of the Frigg formation.

the sands persisting erratically to 221 M and becoming increaseingly well cemented with depth before reverting to green-grey micaceous and pyritous claystones with thin limestone stringers. Gas levels throughout the sand remained low and no hydrocarbon shows were seen.

The Balder formation, approximating to the top of the Palaeocene, appeared in cuttings samples at 2330 M, being blue grey, cream containing small black volcanic inclusions and being slightly clacareous,.and persisted in traces to 2425 M. Claystones below the Balder were of a red-brown varity, typical of the Palaeocene and cont aining frequent thin , hard limestone stringers, easily picked out from the drilling porosity plot.
The first occurence of Palaeocene sand (Heimdal) corresponded with an increase in ROP at 2550 M and a marked shift in the "A" Exponent and drilling porosity trend lines. These sands were often interbedded initially with green-grown claystones and thin very hard limestone stingers, but became more persistant by 2625 M ,grading into a very fine grained sandstone, well cemented with a calcite cement. Gas levels increased in the sandswith a maximum of 4% (C_1 only) at th top. No shows were seen in the sandstone which extended to 2685 M. There then followed a short 15 metre section of claystone of a light grey, light green variety, before a sudden and marked change in formation to light grey marls, well picked out by calcimetry tests at 2703 M.

2. CRETACEOUS

The exact top of the Ekofisk formation is somewhat difficult to pick due to the gradational change in formation from the above-mentioned marls to chalk. The chalk first appears conclusively at 2729 M, being typically white and soft,but no containing hydro-carbon accumulations, as can be seen by the rapidly reducing gas levels as the chalk was drilled.. Although this section of the well was drilled with a turbine assembly and Lynx bit, no problems were encountered with cuttings volume or nature, and sufficient cuttings were available for sample analysis requirements.

By 2825 M the chalk had changed to a pink variety, more properly termed limestone, which increased in hardness with depth, becoming very hard by 2915 M. A change to a light grey and red brown marl (Plenus Marl) at 2945 and associated grey green, dark and light brown claystones with a slight increase in background gas levels persisted to 2975 M, when once again, white and pink limestones became the predominant lithology down to 3045 M. At 3045 M a light grey Marl (Sola Formation) and subsequent white claystones and brown siltstones occurred, and eventually by 3127 M the base of the main limestone body had been passed, brick red claystones becoming dominant.

JURASSIC

The brick red claystone mentioned above are thought to mark the top of the Kimmeridigan in this locality, although the more typical associated increase in gas levels did not occur until 3175 M (maximum 0,4% with C_1, C_2 and C_3 being present) in dark grey and occassionally brown claystones and siltstones. Subsequent electric logs served to further subdivide the Cretaceous/Jurassic boundary area. In retrospect, comparison can be seen between logs.
The increase in marl at 3 072 M and the pronounced "spike" on the "A" Exponent and drilling porosity plots at 3070 correspond closely with the top of the Hidra formation, placed at 3075 M. Again a change from the marls and limestones to the above mentioned brick red claystones at 3127 M and another kick in the "A" Exponent and drilling porosity plots at 3129 M correspond closely with the top of the Rødby at 3131 M. Increases in "A" Exponent and drilling porosity to a maximum at 3176 M corresponding with increased mud gas levels and the incoming of dark grey siltsones and silty claystones, correspond exactly with the top of the Kimmeridge Clay, picked from "E" logs also at 3176 M.
A fairly short section of Kimmeridigan was encountered in this well and at 3224 M a drilling break to 15 M/HR from 3 M/HR signalled the top of the Jurassic sands (Hugin being placed at 3226 M). The first core was cut from 3228 M to 3243 M and recovered 42%. Gas

levels in the sand increased to 0.5% maximum, with C_1, C_2 and C_3 being present, and up to 10% fluorescence was seenin the sandstones at 3255 M being dull yellow to orange, with a very slow streaming white solvent cut. The lithology in this section was varied, being interbedded sandstone, grading to siltstone, with thin coal seams. The sand stone was white and brown, poorly cemented with a calcareous cement, very fine grained, sub angular to sub rounded, grading to silt size.

A further drill break to 17 M/HR from 10 M/HR at 3260 marked the probable top of the Sleipner sand (subsequently placed at 3262 M by "E" logs). Gas levels increased to 0.7% max at 3261 M with C_1, C_2 and C_3 again being present, and up to 10% fluorescence in the cuttings samples , being dull yellow with a slow streaming white solvent cut from the sand stone of a slightly coarser grain size. A second core was cut from 3267 M to 3286 M and recovered 100%. Whilst drilling through the sand section the drilling porosity plot was very useful in determining sand and coal section and corresponded closely with that seen in the cores.

Normally drillin then resumed to T.D in an essentially sandstone sequence, interbedded with siltstones, limestones and claystones. Gas levels throughout the section remained low with a maximum of 0.2% at 3462 M, corresponding to a drilling break of 80 M/HR from 20-30 M/HR. Methane was the only component present.

The sand in the section was generally fine to medium clear quartz, often loose or poorly cemented with calcite, containing some visible porosity, but with no hydrocarbon shown. The sands were occassionally puncturated by thin hard srtingers of silty claystone and claystone, being grey to black and brown to red in colour, but below 3485 M the claystone changed to a predominantely white or cream colour.

By 3540 M the ROP slowed from 10-20 M/HR to 2-4 M/HR until T.D at 3563 M, corresponding with a large increase in the claystone content in the samples, and some white microcrystalline limestone from 3536 M to 3557 M.

PRESSURE

A large number of parameters were collected, plotted and evaluated in order to determine the pore pressure regime dowhole as the well was drilled. IDEL pore pressure ,"D" EXponent shale factor, formation bulk density, delta chlorides, delta temperature, gas levels whilst drilling, whilst tripping and during connection, cuttings shape and size were all used in order to construct a complete a picture as possible. Clear definite trends are recognisable, and it is intended to compare and contrast the results from observations and discuss the merits and discrepancies (if any) of the observations. Reference need be made of the well completion/pressure log.

TOP HOLE to 13 3/8" CASING POINT

Well defined "D" Exponent trend lines, sonic plots and IDEL data showed a normally pressured regime existed for much of the top hole section. Shale factor remained fairly constant in the clay sections, varying between a figure of 12 and 16 with no marked changes being seen. Mud weights through the section varied from 1.08 S.G below the 30" casing shoe to 1.12 S.G. at 13 3/8" casing point at 1371 M. Background gas levels were low until 13 3/8" casing point was reached.

Both the "D" Exponent plot and the sonic plot show trend line changes below the Miocene sands at1073 M, also shown as irregularities on the"A" Exponent plot. It is thought that below the sands some pressure irregularities may have existed. Lithology below the sand was essentially silty claystone with interbeds of sand. Although the overall pressure regime for the section was normal 1.03-1.04 S.G. it is thought that localised abnormally pressured sections, increasing to a value of 1.10 S.G max at 1250M mayhave been responsible for any tight hole problems encountered during trips. This would certainly explain the deviation from the normal compaction trends seen eventually resulting in trend line reversals on "D" Exponent, "A" Exponent and sonic plots from 1325 to 1400 M,with increases in gas levels from 0.1% background to 0.5% maximum at 1335 M,associated

trip gases being of the order of 1.3% compared with figures of 0.1-0.5% for trips higher up the section.
In conclusion it can be seen that this section of hole presents some interresting points. The section was drilled using 1.12 S.G. Mud and many sections of sand were penetrated. No flow occurred and for much of the section normal pore pressure must have existed, but trend anomolies in "D" Exponent "A" Exponent and sonic plots of local duration, along with slight increases in shale factor readings (although this is not too clear) and increased trip and background gas levels all point to localised abnormally pressure sections with subsequent regression to normal 1.03-1.04 pore pressure. Of course this explanation of hole conditions in this section would explain problems during trips due to heaving and sloughing of abnormally pressured zones. Alternatively, basing observations on the delta chloride plot wich tends to show large negative peaks in these sections, excessive hydration of the clays was the sole agent responsible.

13 3/8" CASING POINT TO 9 5/8" CASING POINT

From 13 3/8" casing point (1371M) to the top of the Cretaceous at approx. 2730M, normal trend lines were again established showing an overall normal 1.03-1.04 pore pressure, but with local irregularities in sections between 1785-1800M, 1940-2010 M and possibly from 2200-2350M. Shale factor readings in these zones also tended to be higher (although discrepancies do exist). Background gas levels through the sections remained low and fairly constant at 0.1%-0.2%, but trip and wiper gases (usually 0.2%-0.4%)tended to be much higher (1.1% max.). Mud weights were increased in stages at 1600, 1875, 2225 & 2600M from 1.12 to 1.25 S.G. No real reduction in ROP was seen to correspond to the mud weight increases and so a proable high overbalance existed troughout most of the section (apart from the above) and pore pressure remained at 1.03-1.04 S.G.

No unusual trends were noted in the Paleocene and normal pore pressure was calculated, extending down into the top of the Cretaceous chalk. Due to the change in rock type from clay-stone to limestone and the added fact that the section was turbodrilled, some difficulty could be expected with drilling parameters, but once trend lines had been established for the most part "D" Exponent and "A" Exponesnt plots continued to point to normal 1.03-1.04 S.G. pore pressure. (Shale factor, bulk density and sonic plots all being of no real value in a limestone sequence). At 2850M IDEL pore pressure began to rise steeply in the shales below the limestone and "D" Exponent began to show a trend reversal, pore pressure rising to 1.10 S.G. by 3016 M (9 5/8" casing point).

9 5/8" casing point to T.D (3563M)

From 9 5/8" casing point IDEL pore pressure continued at 1.10 S.G. to 3125M, through the interbedded shales and limestones of the lower cretaceous, but at the base of the Cretaceous pore pressure began to rise steeply, reaching 1.24 S.G. at the top of the Jurassic sands at 3222M. Shale factor readings at this depth are of no real value due to the effect of subaerial explosure at the Base Cretaceous Unconformity, but bulk density readings between the base of the limestons at 3125M and the top of the sands, do show an overall reduction in value from 2.00-1.80 S.G. further pointing to increasing pore pressure. Gas levels at this depth are thought to be more typically due to the nature of the Kimmeridge Clay itself, being carbonaceous, rather than pressure, but levels do tend to increase towards the top of the Jurassic sands as pore pressure, rises to a maximum of 0.4% at 3220M. Unfortunately the sonic data for this section was not good (due to the limestones) until 3200M and so no conclusions can be drawn from this. Mud weight for this section was 1.35 S.G.

There then followed to T.D. an essestially continuous section of sandstone. Pore pressure was expected to remain fairly uniform through the section due to its obvious porosity and permeability, but abnormal pressure continued to rise, and the well flowed at 3466M. Mud weight was consequentley increased from 1.35 S.G. to 1.38 S.G. to kill the well. Due to the absence of good shale sections within the sand from which all drilling parameters are obtained, no forewarning of this continuing rise in pore pressure could be made.

It is thought that very thin laterally continous stringers of impermeable shales were responsible for partitioning off the sand section into separate non-connected areas, and as each stringer was crossed, pore pressure could rise. 10 metres prior to the flow, the only forwarning of any kind was the increase in background gas levels from 0.1% to 0.3%, no connection gases being evident with a maximum of 0.4% (C1 only) from the shut in. Subsequent mud checks on bottoms up and delta chloride measurements indicated a salt water flow.

Mud weight was kept at 1.38 S.G. until T.D. and no further problems were encountered. By 3500M the shale content of the rock was sufficient to obtain some trend lines, and both the "D" Exponent and "A" Exponent showed that pore pressure had started to regress and a normal had once again established. By T.D. pore pressure had regressed to a figure of 1.15 S. G. Subsequent RFT pressure points indicated that pore pressure had risen to a maximum of 1.38 S.G. in the sand.

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CONNLUSIONS.

Well 15/9-14 reached T.D. on 17th June 1982 48 days after spud, good progress, virtually no downtime and mostly reasonable weather accounting for this. A number of points can be drawn from the data obtained during the drilling of the well.

1. No significant hydrocarbon accumulations were found and the well was not tested, abandonment being initiated soon after T.D. was reached.

2. Despite Garrat Gas Train tests every 100 metres, no accumulations of sulphides or H_2S was detected

3. It is thought that in the 17 1/2" and 12 1/4" hole, locally abnormally pressured sections of short duration (50-100M), could be contributory to the causes of heaving, sloughing and hydration so often found in these sections, although no hard evidence could be obtained to substantiate this.

4. Some treds could be established in the cretaceous, despite the prescence of the limestones and the fact that the section was drilled using a turbine assembly.

5. The unexpected continuance of the pore pressure rise through the Jurassic sands was not predicted due to the lack of shaley sections of sufficient thickness to enable "D" Exponent trends to be established and interpreted, also insufficient shaley material was present to perform bulk density readings, shale factor not being relevant in the Jurassic. Fortunately the kick experienced was not large.
   More research needs to be performed in the area of pore pressure prediction in essentially sand sequences, as at present in such a situation, prediction methods are not good, relying on data obtained from shale sections only.

The Analysts.

DAILY MUD PROPERTIES

STATOIL: 15/9-14.

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 SAND (%)
3.5.82	189	1.04	78		14	57	34	40	10	22.4		9K	.4		.68	25	-	3.5	96.5				.5
4.5.	516	1.04	58		8	48	28	31	10	26		10K	.65		1.0	45	-	7	93				.5
5.5.	230	1.10	47		7	40	24	27	9.4	32.2		10.5K	.23		.54	55	-	6	94				.5
6.5.	519.5	1.08	45		6	28	15	17	10	-		9K	.45		.7	40	-	6	94				.5
7.5.	519.5	1.07	62		15	20	16	81	10	24.2		11.5K	.32		.7	50	-	6	94				.5
8.5.	519.5	1.08	42		8	17	10	19	11.2	16.4		12.5K	.7		1.0	48	-	6	94				.5
9.5.	852	1.09	52		13	19	20	29	9.9	11		11.5K	.3		.68	50	-	6	94				.5
10.5.	1160	1.12	43		8	14	10	60	10	14		18K	.14		.58	70	-	8	92				.5
11.5.	1371	1.11	46		12	14	8	35	10	10.4		16K	.34		1.0	40	-	6	94				.5
16.5.	1375	1.13	45		10	16	6	17	11	9.6		14K	.75		1.2	1320	-	6	94				Tr.
17.5.	1514	1.15	58		14	17	7	20	10.5	8.6		16K	.4		.95	1920	-	7	93				.5
18.5.	1690	1.14	50		11	14	6	18	9.9	8.6		16K	.3		.8	1800	-	8	92			20	Tr.
19.5.	1887	1.20	51		13	11	7	18	10.4	8.1		16.5K	.4		1.0	1560	-	11	89			26	Tr.
20.5.	2011	1.21	50		13	11	4	13	10.8	9		17K	.45		1.1	1760	-	12	88			30	.25
21.5.	2194	1.20	50		13	15	5	24	11	8.8		18.5K	.5		1.05	2150	-	10	90			30	.25
22.5.	2314	1.23	52		15	12	5	28	10.4	8.6		18.5K	.3		.8	2080	-	11	89			32	.25
23.5.	2381	1.23	49		14	11	4	28	10.7	9.4		18.5K	.45		.9	1720	-	12	88			36	Tr.
24.5.	2517	1.25	51		18	12	4	37	10.7	7.4		20K	.37		.8	2120	-	12	88			36	Tr.
25.5.	2579	1.25	50		18	13	5	21	10.9	7		21K	.48		1.0	1880	-	12	88			35	Tr.
26.5.	2663	1.25	50		16	11	3	22	11.1	7.2		21K	.6		1.2	2000	-	13	87			32	Tr.
27.5.	2684	1.25	51		15	12	3	20	10.5	7.2		21K	.38		.8	1920	-	13	87			32	.33
28.5.	2753	1.26	56		20	14	4	16	10.6	7.1		21K	.27		.62	1900	-	14	86			35	.5
29.5.	2850	1.25	50		18	14	3	16	10.6	6.3		21K	.34		.73	1920	-	14.5	85.5			34	.25
30.5.	2947.5	1.25	52		16	13	3	15	10.3	6.2		21K	.32		.8	1920	-	14	86			33	.25
31.5.	2968	1.25	50		16	13	2	13	10.8	6.2		21K	.28		.72	1840	-	12.5	87.5			32	.5
1.6.82	3016	1.25	59		20	18	3	28	11.4	6.5		21K	.48		.95	1840	-	12	88			30	.5
6.6.	3024	1.35	54		13	12	2	9	10.1	5.6		21K	.3		.87	1120	-	15	85			24.5	.25
7.6.	3055	1.35	55		15	12	4	17	10	5.3		20.5K	.22		.61	1280	-	14.5	85.5			24.5	.25
8.6.	3104	1.35	58		17	13	3	14	10.6	5.2		21K	.23		.5	1160	-	14.5	85.5			23.5	.25
9.6.	3150	1.35	59		16	13	3	14	10.5	5		20.5K	.22		.53	1200	-	14.5	85.5			24.5	.25
10.6.	3178	1.35	62		17	14	3	14	10.3	4.9		20.5K	.18		.57	1100	-	14.5	85.5			23	.25

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

The Analysts.

DAILY MUD PROPERTIES

STATOIL: 15/9-14.

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 Aw	ACTIVITY Am	# Bbl CEC	REMARKS SAND(%)
11.6.	3228	1.35	56		16	13	3	16	10.5	5.4		22K	.2		.65	1120	-	14.5	85.5			23	.25
12.6.	3238	1.35	58		17	12	3	17	10.7	5		21.5K	.25		.8	1080	-	15	85			22	.25
13.6.	3267	1.35	55		15	12	3	15	10.5	5		21.5K	.2		.6	920	-	15	85			21	.25
14.6.	3296	1.35	57		15	12	3	14	10.4	4.8		21.5K	.15		.6	1000	-	15	85			19	.25
15.6.	3366	1.35	59		15	12	3	14	10.6	5.1		21.5K	.2		.8	980	-	15	85			20	.25
16.6.	3466	1.38	59		18	12	3	17	9.8	5.4		21.5K	.15		.6	960	-	16	84			19	.5
17.6.	3562	1.38	58		17	12	3	15	10.2	4.8		21.5K	.2		.7	760	-	16	84			19	.25

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

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BIT RECORD

COMPANY STATOIL   WELL NO. 15/9 -14   PAGE NO.

BIT NO.	DEPTH IN	SIZE	MAKE	TYPE	JETS 32 NDS.	FEET METRE	HOURS	WT./ 1000	TOTAL REVS	COND. T.	B.	G.	DEV.	REMARKS
1	127.5	36"												SPUD WELL W/36" HOLE OPENER.
		26"	HTC	OSC 3HA										
2	187	26"	HTC	"										DRILL 30" CASING SHOE.
3	190	12¼"	HTC	X3	3x16	326	4.1	10K	120	1	1	1		DRILL 12¼" PILOT HOLE.
4	190	26"			3x16	329	4.9	5-18K	120					REAM PILOT HOLE W/26" HOLE OPENER.
5	516	17½"	HTC	X3A	3x18	855.5	4.9	5-10K	181.4K					
6	1371	12¼"	"	X1G	3x15	41.0	0.8	15-20K	11K	2	2	I		
7	1412	12¼	"	X3	2x15,1x14	561	27.5	10-15K	198K	4	3	I		
8	1973	12¼	"	X3	3x15	370	34.6	11K	263K	7	4	1/16"OUT.		
9	2343.5	12¼"	"	XDG	3x15	236	31.6	20-45K	190K	5	5	"		
10	2579	12¼	"	"	3x15	105	21.7	12-19K	121K	7	5	"		
11	2684	12¼"	AGC	LYNX	-	262	49.7	22K	2200K	100% WORN.				TURBODRILL
12	2946	12¼"	HTC	XDG	3x15	70	23.4	25K	140.4K	4	5	I		
13	3016	8½"	"	X1G	3x13	3	4.4	15K	23.3K	3	3	I		DRILL CEMENT,SHOE,3m.FORMATION.
14	3019	8½"	"	XDG	3x11	37	17.1	25-30	81.5K	4	8	1/16OUT		
15	3056	8½"	"	"	1x10,2x11	49	16.6	30-35K	89.6K	3	8	I		
16	3105	8½"	"	J2	1x10,2x11	64.5	20.8	40K	124.8K	7	3	I		
17	3169.5	8½"	"	XDG	1x10,2x11	58.5	16.7	15K	100.2K	4	2	I		

The Analysts

BIT RECORD

COMPANY STATOIL. WELL NO. 15/9-14 PAGE NO.

BIT NO.	DEPTH IN	SIZE	MAKE	TYPE	JETS 32 NDS.	FEET METRE	HOURS	WT./ 1000	TOTAL REVS.	COND. T.	B.	G.	DEV.	REMARKS
18	3228	815/32"	DIAMANT	BOART CB 403		17.45	9.4	15K	66K	0% WORN.			4STONES/CARAT.	CORE No.1.
19	3242.3	8½"	HTC	J2	1x10,2x11	24	3.1	13K	18.6K	3	2	I		
20	3267.4	815/32"	DIAMANT	BOART	CB403(RR)	17.5	12.5	8-17K	82.5K					
21	3285.9	8½"	HTC	XDG	1x10,2x11	10.1	1.2	15-17K	6.1K	1	1	I		WASHOUT ON ONE JET.
22	3296	8½"	"	"	1x10,2x11	136	14.2	35K	35K	7	3	I		
23	3432.5	8½"	"	"	1x10,2x11	131.3	19.2	15-18K	83.5K	5	3	1/16" OUT.		

STATOIL WELL 15/9-14 DEVIATION SURVEY RESULTS

SURVEY No.	INCLINATION	DIRECTION	DEPTH
1	1/2°	N 83 W	176 M
2	1/4°	N 48 E	500 M
3	1/4°	S 48 W	507 M
4	1/4°	N 52 E	603 M
5	1/2°	N 03 W	698 M
6	1/4°	N 40 E	793 M
7	1/2°	S 90 E	888 M
8	1/8°	S 77 E	983 M
9	3/4°	N 32 W	1077 M
10	3/4°	N 42 W	1172 M
11	1/2°	N 39 W	1266 M
12	3/4°	N 72 W	1365 M
13	1/2°	S 79 W	1406 M
14	1/2°	S 78 W	1495 M
15	1/2°	S 87 W	1589 M
16	3/4°	S 39 W	1684 M
17	3/4°	S 31 W	1778 M
18	1°	S 29 W	1873 M
19	1°	S 19 W	1967 M
20	1 3/8°	S 26 W	2064 M
21	3/8°	S 37 W	2157 M
22	0°		2252 M
23	3/4°	N 56 E	2337 M
24	7/8°	S 76 E	2427 M
25	7/8°	S 69 E	2522 M
26	1 3/8°	S 70 E	2573 M
27	1 3/8°	S 56 E	2663 M
28	2 7/8°	S 39 E	2678 M
29	1 1/2°	S 55 E	2729 M
30	1 3/8°	S 54 E	2822 M
31	2 3/8°	S 54 E	2917 M
32	3 1/4°	S 57 E	3012 M
33	3 1/4°	S 51 E	3052 M
34	3 3/8°	S 53 E	3100 M
35	3 7/8°	S 52 E	3165 M
36	4 1/4°	S 56 E	3225 M
37	4 1/4°	S 58 E	3261 M
38	3 3/4°	S 58 E	3366 M
39	MISS RUN		3419 M
40	3 1/4°	S 72 E	3466 M
41	3 1/4	S 66 E	3557 M

****
* THE ANALYSTS *
****
* SCHLUMBERGER *
****

15/9-14 SLEIPNER

RECORD OF SURVEY-RADIUS OF CURVATURE METHOD

KELLY BUSHING TO SEA/SURFACE LEVEL 25.0 (FT/M)
SEA LEVEL TO MUD LINE 100.0 (FT/M)

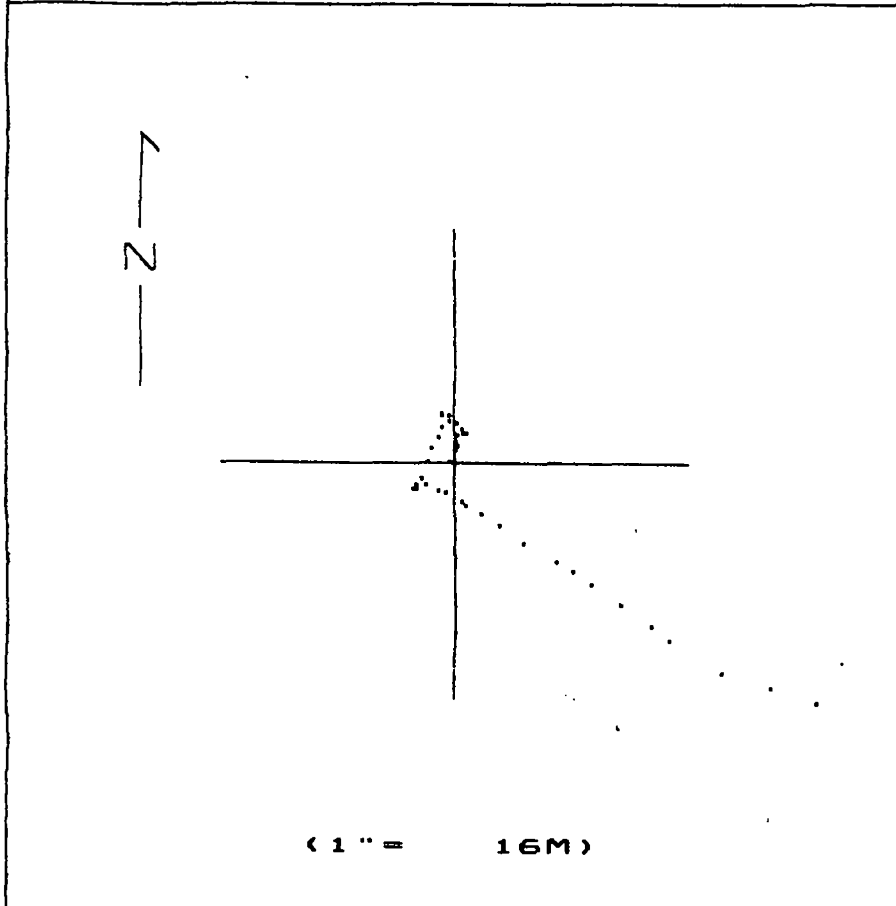
SURVEY BASED ON DATA ORIGINATING FROM
DEPTH = 125.00 TVD = 125.00
DIRECTIONAL COORDINATES: 0.00 N 0.00 E
METRIC UNITS

THE ANALYSTS / SCHLUMBERGER
1-713-491-4949
DATE 00--00

WELL SURVEY ANALYSIS

SUB SEA/ SURFACE	DEPTH MEAS FEET/ METERS	DEPTH TVD FEET/ METERS	DRIFT DIRECT (DEC)	DRIFT ANG (DEG)	HORZ DISP (FT/M)	RECT CORD (N/-S) (FT/M)	RECT CORD (E/-W) (FT/M)	CLOSURE DIST (FT/M)	CLOSURE ANGL (DEG)	DOG LEG DEG/100 FT
151.0	176.0	176.0	277.0	0.5	0.4	0.1	-0.4	176.0	0.14	0.00
475.0	500.0	500.0	48.0	0.2	1.7	1.7	0.1	500.0	0.19	0.28
482.0	507.0	507.0	228.0	0.2	1.7	1.7	0.1	507.0	0.19	11.22
578.0	603.0	603.0	52.0	0.2	1.9	1.9	0.4	603.0	0.19	0.80
673.0	698.0	698.0	357.0	0.5	2.5	2.5	0.1	698.0	0.20	0.46
768.0	793.0	793.0	40.0	0.2	3.1	3.0	0.3	793.0	0.22	0.40
863.0	888.0	888.0	90.0	0.5	3.4	3.3	0.9	888.0	0.22	0.43
958.0	983.0	983.0	103.0	0.1	3.5	3.2	1.4	983.0	0.20	0.40
1052.0	1077.0	1077.0	328.0	0.7	3.8	3.7	1.1	1077.0	0.20	1.28
1147.0	1172.0	1172.0	318.0	0.7	4.6	4.6	0.2	1172.0	0.23	0.14
1241.0	1266.0	1266.0	321.0	0.5	5.4	5.4	-0.4	1266.0	0.24	0.27
1340.0	1365.0	1365.0	288.0	0.7	5.9	5.7	-1.5	1365.0	0.25	0.44
1381.0	1406.0	1406.0	93.0	0.5	5.6	5.4	-1.4	1406.0	0.23	4.43
1470.0	1495.0	1495.0	93.0	0.5	5.4	5.4	-0.6	1495.0	0.21	0.00
1563.9	1589.0	1588.9	267.0	0.5	4.9	4.8	-0.6	1589.0	0.18	1.62
1658.9	1684.0	1683.9	219.0	0.7	4.2	4.0	-1.3	1683.9	0.14	0.61
1752.9	1778.0	1777.9	211.0	0.7	3.5	3.0	-1.9	1777.9	0.11	0.11
1847.9	1873.0	1872.9	209.0	1.0	3.1	1.7	-2.6	1872.9	0.10	0.27
1941.9	1967.0	1966.9	199.0	1.0	3.2	0.2	-3.2	1966.9	0.09	0.19
2038.9	2064.0	2063.9	199.0	1.4	4.2	-1.7	-3.8	2063.9	0.12	0.39
2131.9	2157.0	2156.9	217.0	0.4	5.4	-3.0	-4.5	2156.9	0.14	1.12
2226.9	2252.0	2251.9	360.0	0.0	5.5	-2.9	-4.7	2251.9	0.14	0.63
2311.9	2337.0	2336.9	56.0	0.7	5.1	-2.4	-4.4	2336.9	0.12	0.98
2401.9	2427.0	2426.9	104.0	0.9	4.2	-2.7	-3.2	2426.9	0.10	0.77
2496.9	2522.0	2521.9	111.0	0.9	3.6	-3.1	-1.8	2521.9	0.08	0.11
2547.8	2573.0	2572.8	109.0	1.4	3.5	-3.4	-0.9	2572.8	0.08	0.98
2637.8	2663.0	2662.8	124.0	1.4	4.5	-4.4	1.0	2662.8	0.10	0.40
2652.8	2678.0	2677.8	151.0	2.9	5.0	-4.8	1.4	2677.8	0.11	12.02
2703.8	2729.0	2728.8	119.0	1.5	6.5	-5.7	3.1	2728.8	0.14	3.61
2796.7	2822.0	2821.7	126.0	1.6	8.8	-7.1	5.2	2821.7	0.18	0.25
2891.7	2917.0	2916.7	126.0	2.4	12.0	-9.0	7.9	2916.7	0.24	0.79
2986.6	3012.0	3011.6	123.0	3.3	16.6	-11.6	11.8	3011.6	0.32	0.93
3026.5	3052.0	3051.5	129.0	3.3	18.8	-12.9	13.7	3051.6	0.35	0.85
3074.4	3100.0	3099.4	127.0	3.6	21.7	-14.6	16.0	3099.5	0.40	0.82
3139.3	3165.0	3164.3	128.0	3.9	25.9	-17.2	19.3	3164.4	0.47	0.40
3199.1	3225.0	3224.1	124.0	4.3	30.1	-19.6	22.9	3224.3	0.54	0.78
3235.0	3261.0	3260.0	122.0	4.3	32.8	-21.0	25.1	3260.2	0.58	0.41
3333.8	3360.0	3358.8	117.0	3.7	39.5	-24.2	31.3	3359.0	0.67	0.62
3433.6	3460.0	3458.6	108.0	3.3	45.3	-26.0	37.1	3458.9	0.75	0.74
3530.4	3557.0	3555.4	114.0	3.5	50.9	-28.1	42.4	3555.8	0.82	0.45

DIRECTIONAL PLOT
(PLAN VIEW)
15/9-14 SLEIPNER 00--00



HORIZONTAL DISPLACEMENT
VS
TRUE VERTICAL DEPTH