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BA 77-45-1

ESSO EXPLORATION AND PRODUCTION NORWAY INC.

GEOLOGICAL COMPLETION REPORT

16/1-2

January 1977

Stavanger, Norway

Esso 16/1-2

I. Introduction

- A. Well Designation: Esso 16/1-2
- B. Well Classification: New Field Wildcat
- C. Well Location
  - 1. Country: Norway
  - 2. License: 001
  - 3. Coordinates: Latitude: 58° 56' 9,223" N  
Longitude: 02° 13' 20,063" E
  - 4. Seismic Location: Line: CS 75-30  
Shot point: 2658
  - 5. Water Depth: 138 meters

II. Purpose of Well

The well was designed to test all potential reservoirs through the Permian on a closure on a large, rotated fault-block on the west flank of the Utsira High. Primary objectives were Jurassic sandstones; secondary objectives were Paleocene sandstones.

III. Results of Well

The 16/1-2 was drilled to total depth of 2918,5 m in granite. No shows of oil and gas of sufficient quality to warrant testing were observed. Approximately 12 m of oil stained Paleocene sand were judged by log analysis to be water-productive. The primary Jurassic objectives were absent. A zone of high permeability in the Zechstein resulted in loss of circulation; however, there were no shows from either the Zechstein or the Rotliegende sandstone.

IV. Well History

- A. General:
  - 1. Obtained Rig: 3 July, 1976
  - 2. Spud: 4 July, 1976
  - 3. Drilling completed: 31 July, 1976 } 27 days
  - 4. Rig released: 7 August, 1976
  - 5. Status: Plugged and abandoned
  - 6. Total depth: 2,918.5 meters
  - 7. K.B. depth: 25 meters
- B. Contractor and Rig: Ross Drilling Co. A/S - Ross Rig

C. Casing

- 1. 30 inch at 172 meters
- 2. 20 inch at 325 meters
- 3. 13 3/8 inch at 1,264 meters
- 4. 9 5/8 inch at 2,664 meters

D. Mud program: Initial drilling from the sea floor to 1,286 meters was with sea water and gel. Below this depth a fresh water and lignosulfonate mud system was used.

E. Drilling Problems:  
The loss of circulation in Zechstein carbonates was the only significant problem encountered during the drilling of 16/1-2.

F. Coring:

- 1. No conventional cores were cut
- 2. Sidewall cores - 3 runs
  - a) Shot 30 Rec. 28
  - b) Shot 30 Rec. 14
  - c) Shot 30 Rec. 20

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G. Logging:

- 1. Baroid ADT unit
- 2. Schlumberger - see attached Table I

H. Testing:

- 1. No tests were run

I. Abandonment:

The well was permanently plugged and abandoned and the rig moved from location on 7 August, 1976.

2192 m Tertiäre sed.  
 6 m ündie Kluft  
 183 m Malm  
 288 m TRIASS  
 95 m ZECH  
 104 m ROTZ.

## V. Stratigraphy

### A. Table of stratigraphy (KB. 25 m)

<u>Stratigraphic Unit</u>	<u>Drilled Depth</u>	<u>Sub-Sea Depth</u>	<u>Thickness</u>
Recent - Pliocene	138.0	113.0	628.0
Miocene	766.0	741.0	321.0
Oligocene	1,087.0	1,062.0	427.0
Eocene	1,514.0	1,489.0	459.0
Paleocene	1,973.0	1,948.0	219.0
Danian <i>Tethys</i>	<u>2,192.0</u>	2,167.0	44.0
Cretaceous	2,236.0	2,211.0	6.0
Upper Cretaceous	Absent	-	-
Lower Cretaceous	2,236.0	2,211.0	6.0
Jurassic	2,242.0		
Malm	2,242.0	2,217.0	183.0
Dogger	Absent	-	-
Lias	Absent	-	-
Triassic	2,425.0	2,400.0	288.0
Permian	2,713.0	2,688.0	199.0
Zechstein	2,713.0	2,688.0	95.0
Rotliegende	2,808.0	2,783.0	104.0
Basement	2,912.0	2,887.0	6.5
Total Depth	2,918.5	2,893.5	-

x Tops subject to paleontological revision.

### B. Discussions of Stratigraphy

The basement (2,912 to 2,918.5 meters) is granite.

The Permian Rotliegende section

from 2,808 to 2,912 meters is a medium to coarse grained sandstone, with traces of biotite with no shows. The

Q sandstone was massive and porosities were generally less than 5 percent.

The Permian Zechstein section from 2,713 to 2,808 meters consisted of white vulgular dolomites grading to limestone, with occasional thin stringers of shale and anhydrite. Good permeabilities were exhibited in the upper section where circulation was lost after drilling a 3 meter interval. No hydrocarbon shows were seen in this section.

The Triassic section from 2,425 to 2,713 meters consisted of alternating sandstones, siltstones, shales, and limestones in the upper 83 meters and predominately a massive sandstone grading to siltstone in the lower section. The porosity in the sandstones averages between 10 and 15 percent, with no shows.

Eroded

The Middle and Lower Jurassic Dogger and Lias sections which were the primary objective in this well are missing.

The Jurassic Malm section from 2,425 to 2,242 meters consisted of a very fine grained sandstone with alternating thin stringers of limestone and shale in the upper 50 meters. The lower section was predominately shale and siltstone with occasional limestone stringers. The porosity in the upper sandstones ranged between 15 and 20% with no shows.

The Lower Cretaceous section from 2,236 to 2,242 meters consisted of a thin shale stringer underlain by a thin very hard silty shale.

The Upper Cretaceous section has been eroded from this area.

The Paleocene Danian section from 2,192 to 2,236 meters consists predominately of white limestone with thin stringers of siltstone and shale.

The Upper Paleocene section from 1,973 to 2,192 meters consists of an upper 40 meters of alternating siltstones, shales, and red tuffs. The next section was 85 meters thick and was predominately shale with occasional sandstones. The Paleocene sand section was 35 meters thick and consisted of a very fine grained to medium grained sand with 25% porosity and a water saturation of 90% in the upper 12 meters of the sand. The lowermost section which was 59 meters thick was predominately medium gray shale.

The Eocene section from 1,514 to 1,973 meters consisted predominantly of shale and stringers of limestone with occasional sandstones with

good porosities and no shows. The shales become red in the lower 40 meters of the Eocene.

The Oligocene section from 1,087 to 1,514 meters was sandstones and a medium gray clay with occasional stringers of limestone and siltstone.

The Miocene section from 766 to 1,087 meters consisted of alternating massive sandstones with no shows and clays.

The Pliocene - Recent section from 138 to 766 meters are predominately clays with scattered siltstone, very fine grained sandstones, and shales. No shows were encountered in this section.

C. Lithologic Descriptions.

1. Sample Descriptions - attached.
2. Sidewall Core Descriptions - attached.

VI. Summary and Conclusions

The primary objective Middle Jurassic Dogger sands were not encountered in the well and assumed to have been eroded from this structure. The Paleocene sands, which were the secondary objectives, has insignificant shows near the top of the sand.

This well is the fifth wildcat and the ninth well to be drilled on Production Licence 001. The well was abandoned as a dry hole at a depth of 2,918.5 meters on 7 August, 1976.

T A B L E I  
WIRELINE LOGGING SUMMARY

Well 16/1-2

<u>Log Type</u>	<u>Interval Logged (m)</u>	<u>Date</u>
<u>First Log Run</u>		
✓BHC/Sonic/GR	136-340	6 July, 1976
<u>Second Log Run</u>		
✓ISF/Sonic/GR	324-1,286	11 July, 1976
✓CBL	-	-
<u>Third Log Run</u>		
✓ISF/Sonic/GR	1,264-2,485	18 July, 1976
<u>Fourth Log Run</u>		
✓ISF/Sonic/GR	2,050-2,713	22 July, 1976
CST-1	200-1,193	23 July, 1976
HDT-1	1,800-2,705	24 July, 1976
✓CBL-2	1,714-2,578	30 July, 1976
<u>Fifth Log Run</u>		
✓ISF/Sonic/GR	2,622-2,921	2 August, 1976
✓FDC/CNL	2,662-2,921	2 August, 1976
CST 2 and 3	-	2 August, 1976
HDT-2	2,662-2,921	2 August, 1976
Velocity Survey		

# C O N T E N T

16/1-2 Esso Exploration and Production Norway Inc.

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## Appendix

- A. Completion Log
- B. Sidewall Core Descriptions
- C. Sample Descriptions



SIDEWALL CORE DESCRIPTION		COMPANY:	WELL:	
RUN NO: 1		DATE: 24/7-76	GEOL.: Jess Hulsey	
TYPE: HOLE SIZE: 12 1/4"				
DEPTH m	REC. INC.	LITHOLOGIC DESCRIPTION	POROSITY	SHOW
2075	1.5	shale, lt gy, non-calc		
2092.5	.5	siltstone, gray marly, v calc (did not clean off drlg mud)		
2096	2.0	shale, lt gray-green w/reddish shale lump		
2102	1.75	sandstone, FG qtz, silty, fair-poor sorting rnd larger grains, uniform, heavy dark brownish oil stain, strong oil odor, dull gold fluor uniform throughout core, strong, quick white cut fluor, residue on evaporation covers entire dish and has yellow-white fluor which turns to pail yellow upon aging, fair porosity in core. Looks like a residual oil show. From poor natural fluor.		
2107	1.75	sandstone with show as above		
2156		shot off		
2190		shot off		
2206	.75	limestone, micritic, marly, gray-white		
2221	1.75	siltstone, green-gray, slightly calc, crumbly		
2237	2	siltstone, green-gray, calc		
2270.5	1	shale, black, laminated, calc		
2286.5	1.25	shale, black laminated, non-calc		
2296	1	shale, black, laminated, v calc		
2352.5	1.75	shale, as above		
2384.5	1.5	shale, black, non-calc		
2423.5	1.25	mudstone, sdy-silt-clay rock, dark brown with many white specks 1 mm in size of authigenic clear (Pest 2.7+) (hydrates to soft wh.) gypsum-like crystals (anhydrite?) giving core a speckled appearance. Core is slightly calc and has greenish streaks suggestive of organic? materials. Not morphological glauconite. Some black carb. matl.		
2446	1.75	shale, brick red w/gray-white large calc lump		
2462	.75	sandstone, FG very silty, very calc		
2470	1.5	shale, dark red very sli calc - (washed part - no forams seen)		
2485	1	claystone, gray white, sli calc		
2491.5	1	marl, white-gray, w/lumps lime		

SIDEWALL CORE DESCRIPTION			COMPANY :	WELL :
RUN NO: 1	TYPE :	HOLE SIZE: 12 1/4"	Esso	16/1-2
			DATE :	GEOLOGIST :
			24/7-76	Jess Hulsey
DEPTH	REC.	LITHOLOGIC DESCRIPTION	POROSITY	SHOW
2495	1.75	siltstone, gray white, non-calc no pyrite or glauc		
2500.5	1.75	shale, red non-calc, generally but has calcite vein and a lime nodule		
2503	1.5	shale, sandy red with gray mottled due calc lumps		
2514	1.75	sandstone, shaly, v calc, gray white with red tinged lams		
2562.5	1.75	shale, sandy, dark red		
2649	1.5	shale, sandy, dark red with sand lams		
2693.5	1.5	sandstone, VFG silty, clean white, calc		
2702.5	1.5	siltstone, sandy, red to maroon		
2706	1.25	sandstone, shaly, red-orange iron stain and cement, also calc		
		shot 30 recovered 28		

# SIDEWALL CORE DESCRIPTION

COMPANY : Esso	WELL : 16/1-2
DATE : 3/8-76	GEOL. : J.C. Parmenter

RUN NO:                      TYPE:                      HOLE SIZE:

DEPTH m	REC. inc.	LITHOLOGIC DESCRIPTION	POROSITY	SHOW
2900	1/4	loose grains coarse angular sand calc.	-	no
2880	3/4	sandstone, med-coarse grain grey calcareous cement	poor	no
2865	1/4	as 2900	-	no
2850	1/2	A/A	-	no
2832	3/4	as 2880 with 5% heavy mineral	v poor	no
2817	1/4	A/A	none	no
2812	1/4	A/A	none	no
2807	1/4	A/A	"	"
2804	1/2	grey shale silty	-	-
2802	1/2	A/A	-	-
2797	3/4	soft white chalky limestone	-	-
2793.5	1/2	A/A	-	-
2772	1/2	A/A, argillaceous	-	-
2775.5	1/2	A/A, dolomitic	-	-
2782	1/2	A/A, not dolomitic	-	-
2784	1/2	A/A	-	-
2787.5	1/4	A/A	-	-
2791.5	1/2	A/A	-	-
2769	3/4	A/A	-	-
2762.5	1	dolomite white-grey, partly xline	-	-
2747	3/4	dolomite brown/buff relict texture	-	-
2744	1/2	A/A	-	-
2735	1½	very soft mixture cement etc	-	-
2732	1½	coarse intercrystalline vugular dolomite white	very good	-
2726	3/4	chalky white dolomite	no	-
2732	1/2	grey green chalky dolomite	fair	-
2722	3/4	red brown silty calcareous mudstone	-	-
2718	3/4	chalk white grey calcareous dolomite	fair	-
2717	3/4	A/A	-	-
2756	3/4	as 2762.5	-	-
2753	1/4	dolomite brown very fine grains	-	-



WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
HOLE SIZE:		Esso	16/1-2
GEOL.: R.L. Koenig		DATE:	COUNTRY
		13/7-76	Norway
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1264-90	30	clay, med gray	no show
	70	shale, predom. med. grey, abund., red, mica	
	tr.	glauc., VF sand, silt, mica, forams	
90-1300	30	clay A/A	no show
	70	shale, silt, med. gray micaceous	
	tr.	pyrite, glauc, v.f. sand, ls tan.	
1300-50		A/A	no show
1350-1442	100	shale, med. gray, mica	no show
	tr.	glauc, mica, microfossils	
1442-48	70	shale A/A	no show
	30	Ls, tan, arenaceous, dolomitic, hard	
48-54	60	shale A/A	no show
	40	limestone A/A	
54-60	80	shale A/A	no show
	20	Ls A/A	
60-84	100	shale A/A	no show
	tr.	Ls A/A	
84-90	100	shale A/A	no show
90-1502	100	shale A/A	no show
	tr.	Ls	
02-32	100	shale A/A	no show
	tr.	forams	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 14/76	COUNTRY Norway
GEOL.: R.L. Koenig			
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1532-44	100	shale A/A tr. silt, abundant, tubular forams	no show
44-50	100	shale A/A	no show
50-56	100	shale A/A tr. trace forams, increasingly glauconitic	no show
56-68	100	shale A/A becoming 50% green and 50% red-gray	no show
68-74	100	shale A/A tr. v.f. sand	18 hot wire units no oil show
1574-1616	100	shale A/A decrease in green color	no show
		Note: at approximately 1600 meters abundant sand was seen coming through the desander, but very rare traces came over shaker. Sand is very fine grained, very well rounded, very poorly consolidated to non-consolidated	no show
1616-58	70	shale A/A	no show
	30	sand A/A	
58-70	80	sand v.f. fine grained, clear unconsol., mica- v. well rounded, clean	no show cecus
	20	shale A/A	
70-82	100	shale A/A	
		Note: sand may be present but passing through shaker	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
		DATE:	COUNTRY
HOLE SIZE:		14/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1682-94	80	shale soft, gray-gn	no show
	20	sand, vf-fine gned, loose gns, A/A	
1694-1700	90	shale A/A	no show
	10	sand A/A	
1700-1718	70	sand A/A	no show
	30	sh A/A	
1718-30	70	shale A/A	no show
	30	sand A/A	
1730-48	100	shale A/A	no show
1748-60	100	shale A/A	no show
160-1638	100	shale A/A	no show
1838-50	100	shale A/A	no show
1850-62	100	shale A/A	
1862-92	100	shale A/A	
1892-98	95	shale A/A	
	5	Ls, Lt, tan, Brittle	
1898-1940	100	shale A/A	
	tr.	Ls A/A	
1940-1946	80	shale gray/gn as above	
	10	shale red/brown	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
HOLE SIZE:		Esso	16/1-2
		DATE:	COUNTRY
GEOL. R.L. Koenig		14/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1946-58	50	shale gray/gn	
	50	shale red/brn	
1958-70	60	sh. red/brn	
	30	sh gray/gn	
	10	sh. cream	
1970-82	60	shale red/br	fluor., streaming
	30	sh gray/gn	cut.
	10	sh. cream	
	tr.	tuff cream speckled, sft.	
	tr.	siltstone	
1982-88		as above slight increase in tuff and siltstone	cut., fluor
1988-94	50	shale red/brown	cut., fluor
	20	shale gray/gn	
	10	shale cream	
	5	tuff A/A	
	5	siltstone A/A	
1994-2000	75	shale gray-brown-tan	cut., fluor
	10	shale gray/green	
	15	tuff A/A	
	tr.	siltstone	



WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
HOLE SIZE:		DATE:	COUNTRY
GEOL.: R.L. Koenig		15/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2000-	100	shale - A/A , tr of tuff, decreasing	
48		downwards	
	tr	siltstone	
2054	60	shale, lt gy - lt grn, soft	fluor (siltstone
	30	shale, brn - dk gy, tr blk shale	caving from above?)
	10	siltstone, gy, hd, calc	No increase in gas
	tr	pyrite	units.
	tr	ss, vy fn - fn, clear	
2060	80	shale, lt gy - lt grn, some dk grn , soft	
	20	shale, dk gy - brn	
	tr	siltstone - A/A, pyrite - A/A	
	tr	ss - A/A	
2066		A/A	
2072		A/A	
2072-		A/A	
2084		A/A	
2088	80	shale, - A/A, brn - dk gy, lt gy - lt grn	
	10	shale, lt gy, soft	no shows
	10	sd, vy fn - fn, clear grns, sub-rnd	
2096	90	sd, vy fn - med, clear, sub-rnd - sub-angular	no shows
	10	shale - A/A	
2102	90	sand - A/A	no shows
	10	shale - A/A	
2108	90	sand, vy fn - med, sub-run - sub-ang. loose	no fluor
		grns, pyritic, clear to white	weak cut
	10	shale, green, lt green, gy, soft, sticky	
		brn - dk gy	
	tr	pyrite	
2114		A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)	
		Esso	16/1-2	
HOLE SIZE:		DATE:	COUNTRY	
GEOL.: S. Hanslien		15/7-76	Norway	
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION		SHOWS & REMARKS
2120		A/A, tr mica		weak cut very weak fluor
2126	70	shale, lt gy - grn to gy, soft, shale, dk gy - brn		
	30	sd, clear, vy fn - med, some coarse grns,		no fluor, no cut
		sub-rnd - sub-ang, poorly sorted		
	tr	sst, clear to wh, brittle, pyritic		
2132	75	shale, dk gy - brn - A/A		
	15	shale, lt gy - grn - A/A		no fluor, no cut
	10	sand - A/A		
	tr	sst - A/A		
2138		A/A		
2144	90	shale, dk gy - brn, lt gy - grn - A/A		
	10	sd - A/A		
	tr	chalk, soft, white		
2150		A/A		
2156	40	sd grns - A/A		
	60	shale - A/A		no fluor
	tr	sandstone, wh - clear, vy fn, pyritic		
2162		A/A		no fluor
	tr	limestone, brn-gy, hd, chalk, soft, white		
2168	70	shale, A/A, sticky, calc in parts		
	30	sand - A/A		
2174	50	shale, gy, dk gy to brn, sticky, calc in parts		
	40	sand, wh to clear, vy fn - med, sub-ang -		
		sub-rnd, moderate sorting		
	10	limestone, white, xln, hd		
	tr	pyrite		
2180	80	shale - A/A		
	20	sand - A/A		
2186	70	shale - A/A		
	20	sand - A/A		
	10	limestone, wh - lt gy to brn, vy soft, sticky, chalky		

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
		DATE:	COUNTRY
HOLE SIZE:		15/7-76	Norway
GEOL.: S. Hanslien			
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2192	60	sh, gy, dk gy, brn, gy-grn, soft to mod hd, non-calc	
	20	sd, clear, vy fn - fn, mod sort, sub-rnd - sub-ang.	
	20	ls, wh tan, mod hd - hd, fossil, micritic	no fluor
	tr	pyrite	
	tr	siltstone, gy, mod hd, calc	
2195	80	sh - A/A	
	10	sd, vy fn, - A/A	
	10	ls, - A/A, pre washed cuttings feels sticky, probably because the chalky parts of the limestone is dissolved.	
	tr	A/A	
2198	60	sh, - A/A, mostly gy, gy-grn, slty	
	20	sd - A/A	no fluor
	20	ls, wh, tan, soft - hd, micritic	
	tr	siltstone, gy, hd, calc and pyritic	
2204	60	ls, wh, tan, soft to hd, micritic	
	10	sd, - A/A	
	30	sh, - A/A	
	tr	siltstone, - A/A, glauc	
	tr	pyrite	
2210	40	sh - A/A	
	30	ls, - A/A	
	30	sd, vy fn - med - A/A	
	tr	A/A, siltstone to vy fn ss, glauc, pyritic	
2216	60	sh, gy, gy - grn, blue-grn, slt calc, soft, glaucanittic, sh, brn, non-calc	
	15	ls - A/A	
	25	sd - A/A, and ss, vy fn, white, calc cemented glaucanittic	
	tr	pyrite	
2222	70	ls, wh, tan, micritic, some micro - A/A	
	20	sh - A/A	
	10	sd - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
HOLE SIZE:		DATE:	COUNTRY
GEOL.: S. Hanslien		15/7-76	Norway
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2228	50	sh, gy - grn - A/A, non-calc mostly	
	40	ls - A/A	
	10	marl, lt brn, vy sft	
	tr	sd, vy fn - A/A	
2234		A/A	
	tr	ls, lt brn, xln	
	tr	sd, vy fn - med, clear to tan	
2240	60	sh - A/A, glauc	
	10	ls - A/A	no fluor
	30	ss, silty - med, white to gy, vy hd, silica cemented, calc in parts, - low $\phi$	
2246		A/A	
2252	60	ss - A/A	
	40	sh - A/A	
	tr	ls - A/A	
2258	80	ss, slty, argill, to med grnd, gy silica and calc cemented, sub-rnd - ang, low $\phi$ , vy hd	
	20	sh - A/A, slty, non-calc	
	tr	ls - A/A, pyrite, glauc	
2264	50	sh, gy, gy - grn, bluish grn	
	40	ss - A/A, grading to gy, slty shale	
	10	ls, white, micritic, firm	
	tr	marl, lt brn, vy sft	
	tr	chert, pyrite, glauc, lignite	
2267		A/A	
2270	40	ss - A/A, grading to sh, gy, slty, slt calc	
	30	sh, gy	
	10	ls, wh - A/A, + marl, lt brn - A/A	
	10	sh, lt gy, grn to bluish grn, vy glauc in parts non-calc	
	tr	chert, tr pyrite	
2273		A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
HOLE SIZE:		DATE:	COUNTRY
GEOL.: S. Hanslien		15/7-76	Norway
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2276		A/A, some crs sd grains	
	tr	lignite	
2279		A/A, some yellow colored qtz grains	
2282	60	sh, gy, dk gy to brn gy, soft to firm	
		non-calc, slty	
	20	ss, slty and argill, some crs grains, clear to	
		gy - A/A, some grns w yellow color	
	10	ls, wh, micritic, firm to hd	no fluor
	10	sh, gy-grn, grn, bluish grn, non-calc	
		vy glauconitic in parts	
2285		A/A	
2288		A/A	
2291	70	sh, gy - A/A	
	15	ls - A/A, argill	
	10	ss - A/A	
	5	sh, grn - A/A	
2294	40	sh, grn-gy, bluish grn - A/A	
	30	sh, gy, slty - A/A	
	15	ss - A/A	
	10	ls - A/A	
	tr	ls, wh, xln, hd	
	tr	ls, tan, argill, hd	
2297	40	sh, grn gy - A/A	
	30	sh, gy, slty - A/A	
	10	ss - A/A	
	5	ls, micritic - A/A, grading to tan, chalky, soft	
	5	ls, wh xln	
	tr	pyrite	
	tr	sh, dk gy - blk, <u>slty</u> , slight lignitic	
2300		A/A	
	tr	more abundant: blk sh	hot shale???
2303	50	ss, vy slty - A/A	
		else - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 17/7-76	COUNTRY Norway
GEOL.: S. Hanslien			
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2306	60	siltst, gy - lt brn, sandy, argill, vy calc soft to firm	one sd grn with stain
	30	sh, lt gy, gy-grn, dk grn, non-calc	and weak fluor
	5	ls, wh micritic - A/A	
	5	ls, tan, hd - A/A + ls, wh xln - A/A	
	tr	sh, blk, slty - A/A	
2309		A/A	occ vy weak fluor
2312	50	sh, lt gy - A/A	
	40	siltst - A/A	
	5	sh, lt grn, soft, calc	
	5	ls,wh + tan - A/A, fossiliferous	
	tr	pyrite	no fluor
2315- 2327	70	siltst - A/A, more argill and less sandy, soft	
	30	sh, lt gy - grn -A/A	
	tr	ls, wh, micritic - A/A + ls, buff - A/A + ls, wh xln - A/A, fossiliferous	no fluor
2330	60	siltst/silty shale - A/A	
	30	sh, lt gy - grn - A/A	no fluor
	10	ls, wh - gy, sft, to firm, microfossiliferous (tubular fossilsand spherical) bellemites? and forams	
2333		A/A	
2336		A/A	
2339	60	siltst - A/A, vy calc, grading to ls, gy to lt brn, vy sft, argill, slty	gas units: max 13
	20	sh - A/A	
	10	sd, clear, vy fn - med, sub-ang - sub-rnd	
	10	ls, wh, gy micritic and microfossiliferous firm	
	tr	sh, brn, calc, soft	
2342-		A/A	
2345		A/A	

# WELLSITE SAMPLE DESCRIPTION

GEOL: S. Hanslien

COMPANY:

Esso

DATE:

17/7-76

WELL NUMBER: 16/1-2

COUNTRY:

Norway

SHOWS & REMARKS

WELL SIZE:

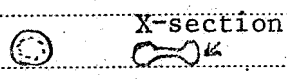
## LITHOLOGIC DESCRIPTION



DEPTH F/M	LITH %		
2348-		A/A, tr lignitic material	
2354		A/A	
2357		A/A	
2360	60	siltst/shale, lt brn gy - A/A	no fluor
	30	sh, lt gy, gy grn - A/A	
	10	ls, micritic, sft, chalky, microfoss	
	tr	sd, clear, brn gy, vy fn - med	
	tr	sh, brn, firm, calc	
2363	60	sh/siltst, gy, lt brn gy, vy slty - A/A	no fluor
	40	sh, lt gy - A/A	
	tr	ls, wh to buff - A/A	
	tr	sd grns, vy fn - A/A	
	tr	sh, brn - A/A	
2366		A/A, more abundant sd, vy fn - crs	
	tr	pyrite	
2366-75		A/A	
2378	50	sh/siltst - A/A	
	40	sh, lt gy - A/A	
	10	ls, wh, micritic, microfoss	
2381	55	sh/siltst, gy to lt brn-gy, calc - A/A	
	30	sh, lt gy, gy-grn - grn - A/A	
	5	sd, clear to gy, vy fn to med, sub-rnd - sub-ang	
		mod srted, some yellow colored	
	10	ls, wh, micritic, firm, microfoss	
	tr	sh, brn	
	tr	calcite xls, wh to clear	
	tr	pyrite, abundant	
2384		A/A	
2387	50	sh/siltst - A/A	
	30	sh, gy-grn - A/A	
	10	ls, wh - buff, micritic, microfoss	
	5	pyrite, often replaced foss	
	5	sd - A/A, tr sh, brn, calcite xls	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
HOLE SIZE:		DATE:	COUNTRY
GEOL.: S. Hanslien		18/7-76	Norway
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2390		A/A	
2393		A/A	
2396		A/A, tr lignitic material	no shows
2399		A/A, only tr pyrite	
2402		A/A, 5% pyrite	
2405	40	sh/siltst - A/A	
		else - A/A, 5% sd, fn - crs, poorly srted	
2408		A/A, 10% sd, clear to gy, fn-crs, poorly srted sub-rnd	
2411		A/A	weak yellow
2414	30	sh/sltst - A/A	fluor, no cut
	40	sh, lt gy, gy-grn, firm, non-calc	
	15	sh, lt brn, calc, soft	
	5	pyrite, replaced fossils	
	5	sd - A/A	
	5	ls, wh to buff, micritic, some xls	
	tr	lignite	
2417		A/A, 10% sd, A/A, clear no stain	fluor A/A
2420	70	sd, clear to lt gry, weak stain on some grns, sub-rnd - sub-ang, fair to good sorting	circulating btms up
	30	sh - A/A	weak yellow
	tr	pyrite (abundant), tr lignite	fluor, no cut
2423		A/A	
2424	70	sd, clear to lt gy, sub-ang - sub-rnd fn-crs, fair srted, some grns with trace of dead oil	weak fluor very weak
	20	sltst, gy - lt brn-gy, vy argill, hd, non-calc	cut
	10	sh, lt gy, bluish gy, some fresk dk grn colored	
	tr	abundand pyrite, tr ls - A/A	



WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
HOLE SIZE:		Esso	16/1-2
GEOL.: S. Hanslien		DATE:	COUNTRY
		18/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2444		A/A	
2447	30	sd - A/A	mineral fluor
	25	ss - A/A	no cut
	25	sh - A/A	no stain
	10	ls - A/A	
	10	marl - A/A, tr A/A	
2450	70	sd, vy fn to med, clear to gy, fair sorted	
	30	sh + ss + dolo + marl - A/A	
2453	25	sd, fn to crs, clear - lt gy, prly srtd	no cut
	25	ls, dolomitic, buff, firm - A/A	no stain
	20	marl - A/A, brn-red, brn	
	20	sh - A/A	
	10	ss - A/A, vy calc, grading to micritic ls, firm	
	tr	pyrite	
2456		A/A	
2459	60	sh, gy, bluish gy, waxy, firm	
		sh, gy, dk gy, vy slty, lt gy	
	20	ls, wh-gy, micritic, soft to hd, sdy	no cut or stain
	10	sd - A/A, a few pale red clrd grns	mineral fluor
	10	ls, buff, gy, hd	
	tr	pyrite	
2462-65		A/A, tr calcite xls	
2468	40	ls, wh, gy, buff, hd	
	20	sh, red brn, calc, soft	
	20	sh, gy - A/A	
	20	sd, - A/A, tr lignite, calcite xls	
2471-74		A/A	
2480	40	ls, wh - buff - A/A	
	20	sd - A/A	
	20	sh, gy - A/A	
	20	sh, red brn - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 18/7-76	COUNTRY Norway
GEOL.: S. Hanslien			
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2426		A/A	shows A/A
2429	50	sd, fn - crs - A/A, some grn have light brn stain and dead oil traces.	
	25	ss, wh, vy fn to slty, vy calc	fluor A/A
	10	sh - A/A	very weak
	10	siltst - A/A, gy, lt brn-gy to buff	yellow cut
	5	ls, wh micritic, firm to soft, sandy	
2430	70	sd, fn - crs, clear to lt gy, sub-ang - sub-rnd, poorly sorted	no stain
	20	sh, lt gy to pale grn gy and sh, slty gy	fluor A/A
	10	ss - A/A, grading to lt gy siltstone, calc pyrite, abundant, tr lignite	
2432	50	sd - A/A	
	40	sh, A/A	
	5	ls, wh, micritic, silty - sandst, wh, vy calc	
	5	pyrite	bright yellow
	tr	ls, buff, micritic, firm	streaming cut
2435		A/A	
2438	50	sd - A/A	microfossil:
	30	sandst, wh, calc cemented, silty vy fn grnd	circular, flat foram (?)
	20	sh - A/A	
	tr	pyrite, ls - A/A	 X-section fluor A/A, no cut
2441	40	sd - A/A, mostly clear, some lt, brn. (stained?)	
	15	marl, lt, brn, vy sft, a lot has been dissolved in mud - probably the main lithology in the slow drlg seq	no cut
	15	ss, wh - A/A, vy calc	
	20	sh, gy soft to firm, vy silty in parts calc + sh, bluish to lt gry	
	10	ls, yellowish gy, hd, dolomittic	
	tr	pyrite, tr lignite	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
HOLE SIZE:		Esso	16/1-2
GEOL.: S. Hanslien		DATE:	COUNTRY
		19/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2483	60	sh, gy, lt gy - grn, dk gy, slty, glauc in parts, non-calc	no cut tr dead oil
	20	ls, wh to buff, tr grnish, micritic, in parts vy sandy, firm-hd, some chalky	mineral fluor
	10	sh, red brn, slty, sl calc, soft, sticky	
	10	sd, clear to gy and red, vy fn (slty) to med, orng - sub-rnd, fair sorted, calc cemented - loose	
	tr	siltst, dk-gy, argill, tr pyrite	
2486		A/A	
2489	30	sh, gy-grn, dk gy - A/A	
	50	ls - A/A	
	10	sh - A/A, red brn	
	10	sh/ss - A/A, tr - A/A	
2492	40	sh, gy-grn - A/A, some vy fresh dk grn	
	40	ls - A/A, more buff - pale red, vy sdy, grading to ss, wh firm, no $\emptyset$	
	10	sh, red brn, - A/A, soft - firm	
	10	sd/ss, - A/A, some red grns	
	tr	pyrite abundant	
2495		A/A	
2498	45	ls, gy to pink, brnish, vy sandy - grading to ss - A/A, micritic, chalky, sft to hd, dolc grns	
	40	sh, gy-grn, dk gy - A/A +10% sh, red brn - A/A	
	15	sd/ss - A/A, mostly pink clrd grns pyrite abundant	
2501	60	ss/sd,	
	20	ls - A/A	
	20	sh, gy-grn + red brn - A/A	
	tr	microfossils: <del>to silic</del> silic coating   replaced by silica	X-section type of foram?
2504	80	sd - A/A, vy fn - crs, mostly rnd - sub-rnd, pink, red brn grns dominate	
	10	ls - A/A	
	10	sh - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 19/7-76	COUNTRY Norway
GEOL.: S. Hanslien			
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2507		A/A	calc, marl-like
	tr	dolo, brnsh gy, vy hd, tr mica	stuff dissolved in
2510	70	sd - A/A	the mud and washed
	15	ls - A/A, dolic	away
	15	sh - A/A	very sticky
	tr	anhydrite, silver luster, almost dissolved	
2513		A/A	
	tr	microfossil (caved)	baryte in the
2516		A/A, tr dk, spotted shale	samples, precipitat-
2519		A/A	ing as wh, fn grnd
2522		A/A, tr of blk sh, non-calc	powder
	tr	siltst, dk gy, mica, tr mica, tr pyrite	
2525		A/A	less
2528	80	sd - A/A, clear, gy to pale red and brown	calc
		vy fn to med, mostly rnd to sub-rnd, some	↓
		sub-ang, fair sorting	
	5	sh, red brn, slty, non-calc	
	5	ls, wh, to pale red brn, dolic, vy hd	
	10	sh, lt grn gy, non-calc, firm	
	tr	mica, pyrite, blk sh - A/A	
2531		A/A, tr ss, vy fn, wh with biotite and muskovite	
		flakes, slty calc	
2531-37		A/A	
	tr	garnet, vy small, dk brn, rnd xls, vy hd	
2540		sd - A/A	
		sh - A/A	
	tr	lignite, ls - A/A	
2543		A/A	
2546	80	sd - A/A	
	10	ss, wh, vy silty, wh, non-calc cementing	
		material	
	5	ls, wh, micritic	
	5	sh - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 20/7-76	COUNTRY Norway
GEOL.: S. Hanslien			
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2549	70	sd, brn-red, clear, fn - med, poor sorting, mostly	sub-rnd - rnd
	10	sh, gy-grn, non-calc	
	10	sh, red brn, brn, slty, sl calc	
	5	ss, wh - red brn, wh cement, non-calc, mica	
	5	ls, wh, pale red, firm	
	tr	garnet	sticky at
2552		A/A	shale shaker, prob
2555		A/A	more brn-red, easily
2558		A/A	dissolved material
2561		A/A Rop 10-20 m/hr	than is represent
2564		A/A with ROP 4-8 stringers	in samples.
2567		A/A	This clay, calc
2570		A/A	causes the ROP
2573		A/A	to slow down
2576		A/A	
2579		sd - A/A, more fn - vy fn grnd else - A/A	
2582-		A/A	
2604			
2604-		sd and sh - A/A, more dissolved	
30		red brn clay in the mud slows the drilling down. ROP - 4-8 m/hr	
2630-32		A/A	
2642	85	sd, clear, gy, red-grn - A/A, vy fn - crs mostly rnd - sub-rnd grns, poor sorting, qtz, tr, mica tr rock frags, meta siltst, gy vy hd, w/weathered surf	
	10	sh, rust brn, slty, firm, sl calc - A/A	
	5	sh, gy grn, non-calc - A/A	
2645		A/A	
2648	60	ss - A/A	
	25	sh, rust brn - A/A	
	10	sh, gy grn - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 20/7-76	COUNTRY Norway
GEOL.: S. Hanslien			
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
	5	ss, wh, sft, vy calc	
	tr	pyrite (caving)	
2651		A/A, tr anhydrite (?), wh cly mat, does not disolv in hot Hcl	cly, red brn washed away by mud
2654		A/A, tr, wh cly - A/A	
-78			
2681		A/A	
2684	60	ss/sd, colored - A/A, some crs, mostly vy fn - med prly srted, argill, mica, mostly sub-rnd - rnd grns, calc cemented	
	25	sh, rust brn, vy slty (grading sh-sltst-ss)	
	10	sh, gy-grn, non calc, sft	
	5	ss, wh, vy fn, argill, calc, mica, grading to cly, wh, gy	
2687-93		A/A, tr ls, wh, sft sucrosic	
	tr	rock fragm, dk, meta siltst?	
	tr	anhydrite, wh, vy sft (?)	
2696		A/A, vy abundant mica	
99		A/A	
2702	70	ss/sd, rust brn, some clear and gy, vy slty argill, calc cemented in parts, sft	
	30	sh, rust brn, vy slty grading to ss - A/A sl calc, firm - sft	
	tr	siltst, clk gy, calc, argill	
	tr	ls, wh, sft, vy reactive w HCL	
2705	50	ss/sd, rust brn - A/A	
	50	sh, rust brn - A/A	
	tr	ls, - A/A	
	tr	cly mat, wh soft, non-calc, undisolvable in hot HCL	
2705-	5	ls - A/A	
2708		else - A/A	

# WELLSITE SAMPLE DESCRIPTION

COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
DATE: 21/7-76	COUNTRY Norway

HOLE SIZE:                      GEOL.: S. Hanslien

DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2711	50	ss/sd, - A/A, more slty	
	45	sh, rust brn - A/A	
	5	ls - A/A, tr wh cly mat - A/A	
2714	40	ls - A/A, sucrosic, soft	
	50	sh, rust brn - A/A	
	10	sh/ss - A/A	
2717		tr cly mat, wh-gy, vy sft, non-calc, non-dissolvable	
	60	ls, - A/A, vy sft, sucrosic, sandy	
	30	sh - A/A	
	10	ss/sd, - A/A, more clear and gy grns	
2720		tr cly mat, wh gy, - A/A	
	10	anhydrite, gy - silver, rounded hd grns	
	80	ls - A/A	
	10	sd/ss, rust brn - A/A	
		At 2,729 the bit suddenly dropped 9 feet,	

WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
HOLE SIZE:		DATE:	COUNTRY
GEOL.: J.C. Parmenter		31/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2732	60	cement	
	30	skeletal ls white, spar cement	no show
		tight, good mineral fluor, med grn	no show
	10	red siltstone - A/A	
	tr	anhydrite - A/A	no show
	tr	clay - A/A	
2735	80	ls - A/A, limited amount dolomitisation in grains or matrix not both	
	10	red silts, grains do not stain in	
	10	cement, Alizarin red, matrix	no show
2738	90	ls - A/A sometimes does.	
	10	anhydrite	
2741	100	ls to dolomite - still no stain but alizred goes violet after 10 mins, dolomite buff no clear spar	no show
2744	70	dolomite buff - brown grey	no show
	30	ls - A/A	
2747	80	dolomite - A/A	no show
	20	ls - A/A	
2750	90	cement	no show
	10	dolomite - A/A	
2753	95	cement	no show
	5	dolomite - A/A	
2756	95/5	A/A	
2759	95/5	A/A	
2762	60	cement	
	40	ls - A/A	
2765	50	cement	
	50	ls - A/A	
2768	90	ls - A/A	
	10	cement	



WELLSITE SAMPLE DESCRIPTION		COMPANY:	WELL (Onshore/Offshore)
		Esso	16/1-2
HOLE SIZE:		DATE:	COUNTRY
GEOL.: J.C. Parmenter		31/7-76	Norway
DEPTH Ft/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2771	80	ls - A/A	
	20	cement	
2774	80	ls - A/A	
	20	cement	
2777	90	ls - A/A	
	10	cement	
2780	50	ls - A/A	
	50	cement	
2783	50	ls - A/A	
	50	cement	
2786	60	ls - A/A	
	40	cement	
2789	60	ls - A/A	
	40	cement	
2792	80	ls - A/A	
	20	cement	
2795	80	ls - A/A	
	20	cement	
2798	80	ls - A/A	
	20	cement	
2801	50	ls - A/A	
	50	cement	
2804	90	cement	
	tr	sand, med grn, clear qtz	
2807	80	cement	
	20	sand - A/A	
2810	70	cement	
	30	sand - A/A, sub-ang to sub-rnd	no matrix
2819	40	cement, well sorted	
	50	sand	
	tr	anhydrite	
	10	ls - A/A	

WELLSITE SAMPLE DESCRIPTION		COMPANY: Esso	WELL (Onshore/Offshore) 16/1-2
HOLE SIZE:		DATE: 31/7-76	COUNTRY Norway
GEOLOG.: J.C. Parmenter			
DEPTH F/M	LITH %	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2822	80	sand - A/A	
	10	ls - A/A	
	10	cement	
2825	100	sand, med crs grn, white buff pink, tr biotite and ls - A/A, sub-angular, mod sort; no cement	no show
2828	100	sand - A/A, more crs grn, many angular grains, cement pink tr biotite clean, unweathered and ls A/A a very fresh first generation sandstone!	
2831	100	sand - A/A - some calcareous cement	
2834	"	sand - A/A	
2837	"	"	
2840	"	"	
2843	"	"	
2846	"	"	
2849	"	"	
2852	"	"	
2855	"	"	
2861	"	"	
2864	"	"	
2867	"	"	
2870	"	"	
2873	"	"	
2876	"	"	
2879	"	"	
2882	"	"	
2885	"	"	
2888	"	"	
2891	"	"	
2894	"	"	
2897	"	"	
2900	"	"	
2903	"	"	

