

<b>FLUID SAMPLE DATA</b>		Date 28-12-81	Ticket Number 046862
Sampler Pressure _____ P.S.I.G. at Surface	Kind of Job CASED HOLE	Halliburton District	NORWAY
Recovery: Cu. Ft. Gas _____	TENNANT, WILLETT +		
cc. Oil _____	Tester HIGHTOWER	Witness P. ROGERS	
cc. Water _____	Drilling Contractor GLOBAL MARINE		
cc. Mud _____	<b>EQUIPMENT &amp; HOLE DATA</b>		
Tot. Liquid cc. _____	Formation Tested MIDDLE JURASSIC		
Gravity _____ ° API @ _____ °F.	Elevation 82 FT. RKB - SEA LEVEL Ft.		
Gas/Oil Ratio _____ cu. ft./bbl.	Net Productive Interval 32 - 81 Ft.		
	All Depths Measured From R.K.B.		
	Total Depth _____ Ft.		
	Main Hole/Casing Size 7"		
	Drill Collar Length _____ I.D. 2.25"		
	Drill Pipe Length _____ I.D. _____		
	Packer Depth(s) 3613.83 Ft.		
	Depth Tester Valve 3608.02 Ft.		
	RESISTIVITY	CHLORIDE CONTENT	
Recovery Water _____ @ _____ °F. _____ ppm			
Recovery Mud _____ @ _____ °F. _____ ppm			
Recovery Mud Filtrate _____ @ _____ °F. _____ ppm			
Mud Pit Sample _____ @ _____ °F. _____ ppm			
Mud Pit Sample Filtrate 12.2 @ _____ °F. _____ ppm			
Mud Weight 12.2 vis 54 cp			

Cushion	TYPE H <sub>2</sub> O	AMOUNT 11,714	Depth Back Ft. Pres. Valve	Surface Choke 56/64	Bottom Choke 1.99
---------	-----------------------	---------------	----------------------------	---------------------	-------------------

Recovered	Feet of	RECOVERED TOTAL H <sub>2</sub> O CUSHION.	Field Area
Recovered	Feet of	2	
Recovered	Feet of		
Recovered	Feet of		
Recovered	Feet of		

Remarks CO CONTENT ABOVE 10% ALL SURFACE DATA BY OTIS  
2

SPOT READINGS ONLY AS STYLUS RUNNING ERATICALLY THROUGH TIME AXIS -  
MCALLISTER - LONDON LAB.

County NORWAY

TEMPERATURE	Gauge No. 5634		Gauge No.		Gauge No.		TIME	
	Depth: 11,956 Ft.	Ft.	Depth: Ft.	Ft.	Depth: Ft.	Ft.	Hour Clock	Hour Clock
Est. °F.	14226 - 120 Hour Clock		Blanked Off		Blanked Off		Blanked Off	
Actual 245 °F.	Pressures		Pressures		Pressures		Tool Closed	
	Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic	7403.36	7445						
First Period Flow	Initial	5049.12	5091					
	Final	5467.12	5514				19	
	Closed in	6393.67	6448				123	
Second Period Flow	Initial	5286.82	5309					
	Final	4657.12	4693				523	
	Closed in	6409.93	6460				1548	
Third Period Flow	Initial							
	Final							
	Closed in							
Final Hydrostatic	-	-						

Legal Location Sec. - Twp. - Rng. Lease Name Well No. Test No. Tested Interval County NORWAY State NORTH SEA Lease Owner/Company Name

Casing perms. \_\_\_\_\_ Bottom choke \_\_\_\_\_ Surf. temp. \_\_\_\_\_ °F Ticket No. \_\_\_\_\_  
 Gas gravity \_\_\_\_\_ Oil gravity \_\_\_\_\_ GOR \_\_\_\_\_  
 Spec. gravity \_\_\_\_\_ Chlorides \_\_\_\_\_ ppm Res. \_\_\_\_\_ @ \_\_\_\_\_ °F

INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED \_\_\_\_\_

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
DEC 28						
0417						ENGAGE STYLUS ON BT GAUGE.
0440						MAKE UP AP BT CASE ON 2½ TAIL PIPE.
0445						AP BT CASE THRU ROTARY.
0453						MAKE UP XN NIPPLE ON TAIL PIPE. RUN
						OTIS & SPERRY SUN AMERADAS.
0515						RTTS PACKER, SAFETY JOINT & BIG JOHN JARS
						THRU ROTARY.
0526						MAKE UP HYDRAULIC BY-PASS IN TEST STRING
0534						APR-N TESTER VALVE THRU ROTARY.
0548						SLIP JOINT THRU ROTARY TABLE.
						RUN ONE STAND 6½ DRILL COLLARS.
0607			2000			PRESSURE TEST APR-N TESTER VALVE.
0632						DRILL PIPE TESTER VALVE & APR-M THRU
						ROTARY.
						RUN ONE STAND OF DRILL COLLARS.
0709						MAKE UP RTTS CIRCULATING VALVE ON STAND
						OF DRILL COLLARS.
						RUN FOUR STAND OF DRILL COLLARS.
0734						MAKE UP LAST PAIR OF SLIP JOINTS IN
						TEST STRING.
0805			7500			RUN FIRST STAND 3½ TDS TBG. PRESSURE TEST
						STRING TO 500PSI + 7500 PSI.
1205			7500			RUN 57 STANDS OF 3½ TDS TBG. TEST TBG
						STRING TO 500 PSI + 7500 PSI.
2005			7500			RUN REMAINDER OF TEST STRING. 114 STDS

PRODUCTION TEST DATA

Casing perms. \_\_\_\_\_ Bottom choke \_\_\_\_\_ Surf. temp. \_\_\_\_\_ °F Ticket No. \_\_\_\_\_  
 Gas gravity \_\_\_\_\_ Oil gravity \_\_\_\_\_ GOR \_\_\_\_\_  
 Spec. gravity \_\_\_\_\_ Chlorides \_\_\_\_\_ ppm Res. \_\_\_\_\_ @ \_\_\_\_\_ °F

INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED \_\_\_\_\_

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
						+ 1 SINGLE. TEST TO 500PSI & 7500PSI
2125						SET RTTS PKR.
						RIG UP TEST SURFACE EQUIPMENT.
DEC 29						
0219						APPLY 2000PSI TBG PRESSURE. CYCLE
						DRILL PIPE TESTER.
						BLEED OFF TBG. PRESSURE.
0232			1400			CLOSE LOWER PIPE RAMS. PRESSURE UP ON
						ANNULUS. OPEN APR-N TEST VALVE TOOL OPEN
						@ 900 PSI.
0251						BLEED OFF ANNULUS PRESSURE. CLOSE APR-N
						TESTER VALVE.
0454						PRESSURE UP ON ANNULUS. OPEN N-TOOL START
						MAJOR FLOW PERIOD.
0500		32/64	1559			ON 32/64 ADJUSTABLE CHOKE WELL FLOWING
						17% CO <sub>2</sub>
0530		32/64	2200			ADJUSTABLE CHOKE.
0600		56/64	1249			FIXED CHOKE. WELL FLOWING 17% CO <sub>2</sub>
0700		"	1429			FIXED CHOKE.
0800		"	1515			FIXED CHOKE. WELL FLOWING 16% CO <sub>2</sub>
0900		"	1532			FIXED CHOKE.
1000		"	1546			FIXED CHOKE.
1100		"	1551			FIXED CHOKE. WELL FLOWING 10% CO <sub>2</sub>
1200		"	1558			FIXED CHOKE.
1300		"	1565			FIXED CHOKE.
1337		"	1572			SHUT WELL IN. CLOSE APR-N TESTER VALVE.

Casing perms. \_\_\_\_\_ Bottom choke \_\_\_\_\_ Surf. temp \_\_\_\_\_ °F Ticket No. \_\_\_\_\_  
 Gas gravity \_\_\_\_\_ Oil gravity \_\_\_\_\_ GOR \_\_\_\_\_  
 Spec. gravity \_\_\_\_\_ Chlorides \_\_\_\_\_ ppm Res. \_\_\_\_\_ @ \_\_\_\_\_ °F

**INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED**

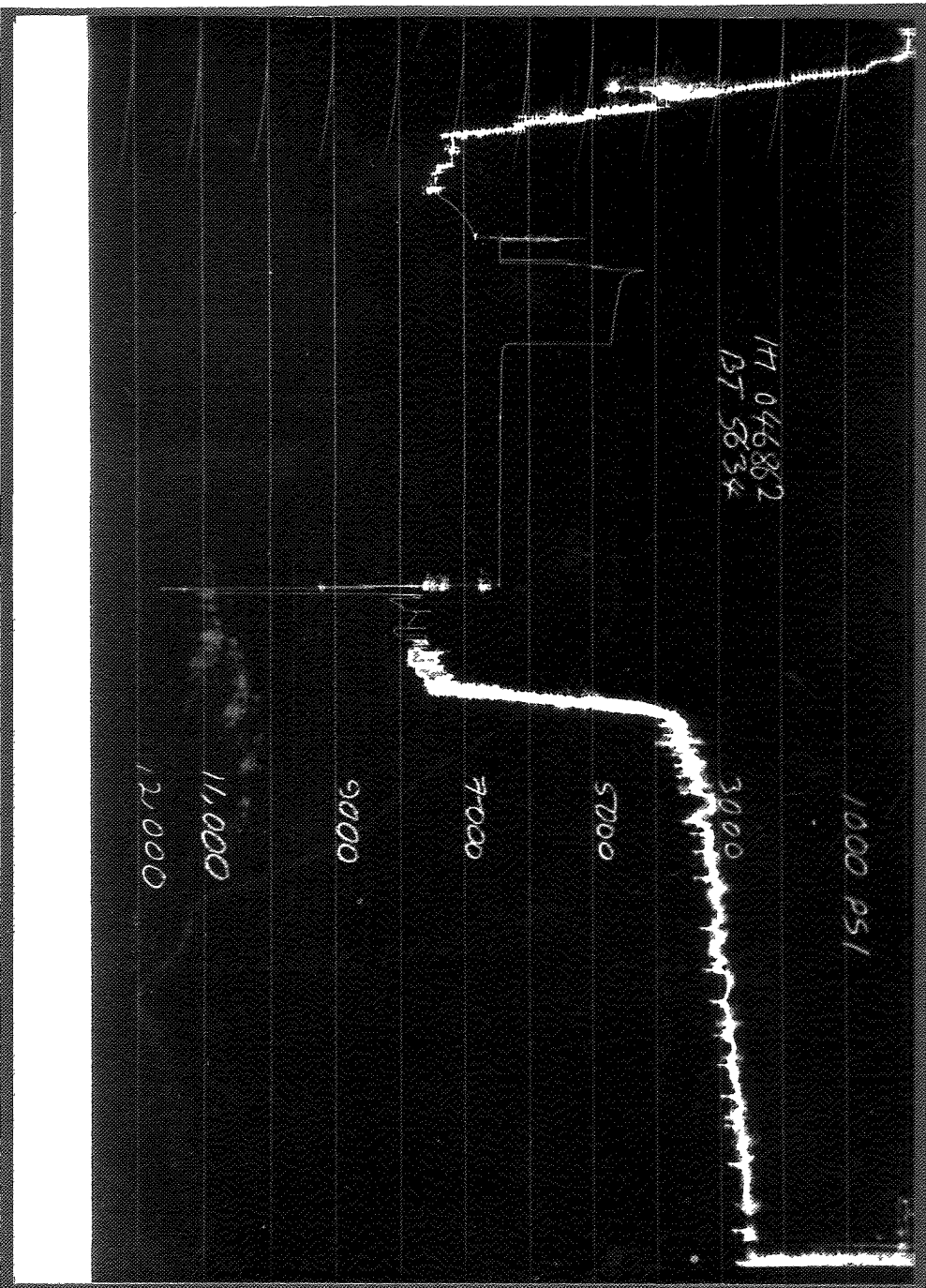
Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
2128						SHEAR APR-M. 3350PSI ON ANNULUS.
DEC 30						
1525						UNSEAT PACKER.
1550						START BULL HEADING.
1700						CIRCULATE.
2200						POOH.
DEC 31						
0700						START LAYING DOWN BHA.
1145						OUT OF HOLE.

DESCRIPTION	O.D.	I.D.	LENGTH	DEPTH
BTTM OF SURFACE TEST TREE				+ 8.31
X-OVER 4 $\frac{3}{8}$ 6 STUB ACME - 3 $\frac{1}{2}$ TDS (P)			.38	+ 7.93
3 $\frac{1}{2}$ TDS TBG. PUP			2.61	+ 5.32
3 $\frac{1}{2}$ TDS TBG.			37.82	32.50
X-OVER 3 $\frac{1}{2}$ TDS - 4 $\frac{1}{2}$ 4 STUB ACME			.38	32.88
LUBRICATOR VALVE	10.75	2.88	2.37	35.25
X-OVER 4 $\frac{1}{2}$ 4STUB ACME - 3 $\frac{1}{2}$ TDS (P)			1.07	36.32
3 $\frac{1}{2}$ TDS TBG.			84.48	120.80
3 $\frac{1}{2}$ TDS TBG. PUP			2.57	123.37
3 $\frac{1}{2}$ TDS TBG. PUP			2.64	126.01
X-OVER 3 $\frac{1}{2}$ TDS (B) - 4 $\frac{1}{2}$ 4 STUBG ACME			.38	126.39
SUB SEA TEST TREE	13.0		6.20	132.59
X-OVER 4 $\frac{1}{2}$ 4 STUB ACME - 3 $\frac{1}{2}$ TDS (P)			.67	133.26
3 $\frac{1}{2}$ TDS TBG.			3220.00	3353.26
X-OVER 3 $\frac{1}{2}$ TDS - 3 $\frac{1}{2}$ IF (P)	3.50		.40	3353.66
SLIP JOINT OPEN	5.00	5.54	5.54	3359.20
SLIP JOINT CLOSED	5.00	4.02	4.02	3363.22
DRILL COLLARS	4.75	2.25	142.59	3505.81
X-OVER 3 $\frac{1}{2}$ IF (B) - 2 $\frac{7}{8}$ EUE (P)	4.75	2.25	.23	3506.04
RTTS CIRCULATING VALVE	4.62	2.44	.99	3507.03
X-OVER 2 $\frac{7}{8}$ EUE (B) - $\frac{1}{2}$ IF (P)	4.75	2.62	.20	3507.23
DRILL COLLARS	4.75	2.25	28.51	3535.74
SLIP JOINT CLOSED	5.00	2.25	4.02	3539.76
DRILL COLLARS	4.75	2.25	28.51	3568.27
APR-M SAFETY REVERSING VALVE	5.00	2.25	1.85	3570.12
DRILL PIPE TESTER VALVE	5.00	2.25	1.43	3571.55
DRILL COLLARS	4.75	2.25	28.51	3600.06
SLIP JOINT CLOSED	5.00	2.25	4.02	3604.08
APR-N TESTER VALVE	4.63	2.00	3.94	3608.02
FUL-FLO HYDRAULIC BY PASS	4.63	2.25	2.08	3610.10
BIG JOHN JARS	5.03	2.25	1.58	3611.68
RTTS SAFETY JOINT	4.87	2.37	.82	3612.50
TOP RTTS PKR TO CENTRE	5.75	1.99	.51	3613.01
CENTRE TO BTTM OF RTTS PKR	5.75	1.99	.82	3613.83
X-OVER 2 $\frac{3}{8}$ EUE (P) - 2 $\frac{7}{8}$ EUE (P)			.17	3614.00
2 $\frac{7}{8}$ PERFORATED TBG.			9.05	3623.05
X/N NIPPLE W/X-OVERS			.89	3623.94

CONT.

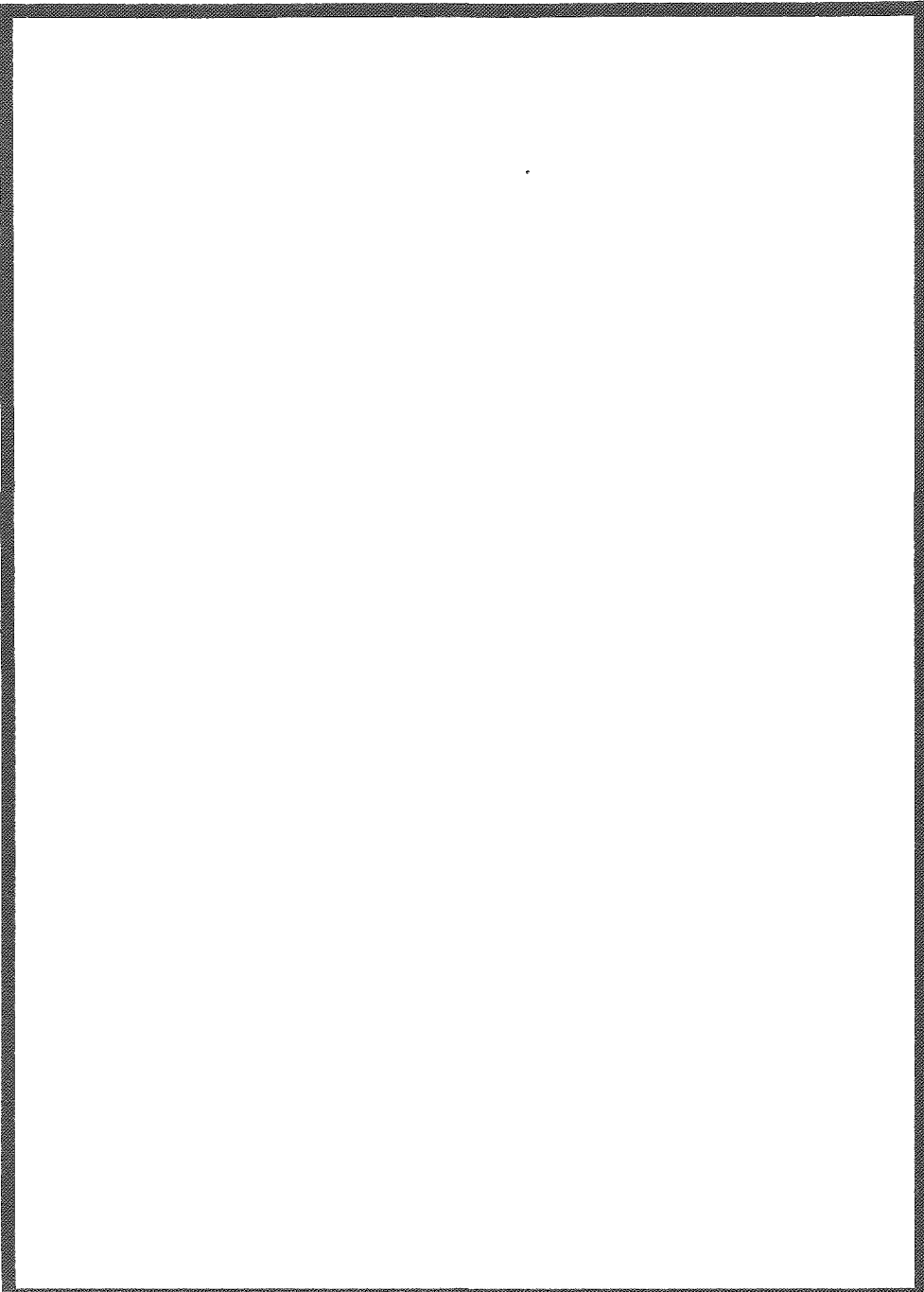
DESCRIPTION	O.D.	I.D.	LENGTH	DEPTH
2 $\frac{1}{8}$ EUE TBG.			18.57	3642.51
RUNNING CASE AP BT			1.77	3644.28

Pressure



PPG time

BT time



# Nomenclature

<b>b</b>	= Approximate Radius of Investigation	Feet
<b>b<sub>1</sub></b>	= Approximate Radius of Investigation (Net Pay Zone h <sub>1</sub> )	Feet
<b>D.R.</b>	= Damage Ratio	—
<b>EI</b>	= Elevation	Feet
<b>GD</b>	= B.T. Gauge Depth (From Surface Reference)	Feet
<b>h</b>	= Interval Tested	Feet
<b>h<sub>1</sub></b>	= Net Pay Thickness	Feet
<b>K</b>	= Permeability	md
<b>K<sub>1</sub></b>	= Permeability (From Net Pay Zone h <sub>1</sub> )	md
<b>m</b>	= Slope Extrapolated Pressure Plot (Psi <sup>2</sup> /cycle Gas)	psi/cycle
<b>OF<sub>1</sub></b>	= Maximum Indicated Flow Rate	MCF/D
<b>OF<sub>2</sub></b>	= Minimum Indicated Flow Rate	MCF/D
<b>OF<sub>3</sub></b>	= Theoretical Open Flow Potential with /Damage Removed Max.	MCF/D
<b>OF<sub>4</sub></b>	= Theoretical Open Flow Potential with /Damage Removed Min.	MCF/D
<b>P<sub>s</sub></b>	= Extrapolated Static Pressure	Psig.
<b>P<sub>f</sub></b>	= Final Flow Pressure	Psig.
<b>P<sub>ot</sub></b>	= Potentiometric Surface (Fresh Water*)	Feet
<b>Q</b>	= Average Adjusted Production Rate During Test	bbls/day
<b>Q<sub>1</sub></b>	= Theoretical Production w/Damage Removed	bbls/day
<b>Q<sub>g</sub></b>	= Measured Gas Production Rate	MCF/D
<b>R</b>	= Corrected Recovery	bbls
<b>r<sub>w</sub></b>	= Radius of Well Bore	Feet
<b>t</b>	= Flow Time	Minutes
<b>t<sub>o</sub></b>	= Total Flow Time	Minutes
<b>T</b>	= Temperature Rankine	°R
<b>Z</b>	= Compressibility Factor	—
<b>μ</b>	= Viscosity Gas or Liquid	CP
<b>Log</b>	= Common Log	

\*Potentiometric Surface Reference to Rotary Table When Elevation Not Given,  
Fresh Water Corrected to 100° F.