

NL BAROID LOGGING SYSTEMS
Anchorage, Alaska

RELEASED TO PUBLIC FILE

DATE 02 DEC 1992 JMB

ADT WELL SUMMARY REPORT
Tenneco Oil Company
OCS-Y-0338-1
Phoenix No. 1
Beaufort Sea, Alaska

RELEASED TO PUBLIC FILE

RECEIVED
OCS DISTRICT OFFICE
DATE 02 DEC 1992
JAN 29 1987

MINERALS MANAGEMENT SERVICE
ANCHORAGE, ALASKA

December 1986

PREPARED FOR:
Mr. Frank Henicke
Tenneco Oil Co.
Anchorage, Alaska

PREPARED BY:
Mr. John Patton
NL Baroid Logging Systems
Anchorage, Alaska

TABLE OF CONTENTS

INTRODUCTION	A
WELL SUMMARY BY INTERVALS	B
CONCLUSIONS AND RECOMMENDATIONS	C
APPENDIX:	
WELL DIAGRAM	D
SHOW EVALUATION REPORTS.	E
PARAMETERS VS. DEPTH	F
1.) DAYS DRILLING	
2.) ROTATING HOURS	
3.) PORE PRESSURE - MUD DENSITY	
4.) Dc EXPONENT	
5.) WOB/RPM	
6.) HYDRAULIC HORSEPOWER - JET IMPACT	
7.) PENETRATION RATE OVERLAY	
BIT RECORD	G
DRILLING MUD RECORD.	H
TWENTY-FIVE FOOT INTERVAL REPORTS.	I
ADT LOG.	J

OCS-Y-0338-1 was spudded September 23, 1986, by Tenneco Oil Company. The well was named Phoenix No. 1 and was drilled by Canadian Marine's Rig SSDC on block no. 284 in Harrison Bay of the Beaufort Sea, offshore Alaska. The hole was drilled to a maximum depth of 9,866', 68 days from spud, penetrating more than the required 100' of economic basement. Testing operations were initiated 12-4-86, at the completion of wire line log evaluations. Two zones of interest were tested for production potential, and the well was plugged and abandoned.

An NL Baroid Logging Systems MWD 2000 Unit was in operation from surface to TD providing full mud logging and ADT services; and in addition, real time data transmission linked with Tenneco's Data Center in Lafayette, Louisiana. The 2000 Unit and crew provided assistance in drilling Phoenix No. 1 in monitoring drilling parameters and gas levels; and in providing fluid hydraulics information, pore pressure- necessary mud weight evaluation, and a wide range of geological interpretations and sampling services.

The following pages of this report are designed to provide concise historical data of the events that occurred on Phoenix No. 1, as well as some analysis and recommendations for specific problems that were experienced during different sections of the hole. This report consists of three major sections. They

include: an interval summary, a conclusion and recommendation section, and an appendix section that contains a statistical analysis of the well.

All of the information in this report was acquired and recorded by the MWD 2000 Logging Unit at the well site. Its sensors are independent from the rig sensors and may differ from those reported by the rig contractor.

WELL SUMMARY BY INTERVALS

Interval: 344' to 915'

Days:	16	Average WOB:	15 KLB
Hole Size:	26"	Average RPM:	70
No. Bits:	2	Average GPM:	845
Rotating Hours:	12.4	Average SPP:	850 PSI
Deviation:	0°	Average ROP:	46 FT/HR
Mud Weight:	8.5 - 9.1 PPG	Mud Type:	Gel/Benex

Discussion:

Structural casing was set prior to spud and drilling operations on OCS-Y-0338-1 (Phoenix No. 1) began September 23, 1986 at 1:30 a.m. washing out of the 30" conductor pipe set at 344'. Slow penetration rates were experienced with Bit No. 1, mainly because of bit "balling" associated with soft clays found in this interval. Two 26" bits with 24/32" jets were required to reach TD of 915'. The hole was circulated and conditioned prior to running 20" 133 lb./ft. casing from the sub-sea well head at 207'. The 20" casing was then cemented in place.

Considerable problems were experienced as a result of this cementing job, causing the inability to unlatch the 30" conductor-riser latch. A 24" low pressure riser was installed to the well head. Blow out preventers were then nipped up and tested prior to drilling the 17 1/2" interval.

Lithology of this section included the typical marine sands, gravels, silts, and clays encountered on the Beaufort Shelf.

Formations penetrated in this interval include the Gubik and possibly part of the Sagavanirktok. Pore pressures appeared normal throughout this section (8.5 to 8.7 ppg). 9.0 ppg mud weight was the average density used and was more than enough to compensate for the observed formation pressures.

Interval: 915' to 3,126'

Days:	11	Average WOB:	5/20 KLB
Hole Size:	17 1/2"	Average RPM:	85/130
No. Bits:	5	Average GPM:	700
Rotating Hours:	15.3	Average SPP:	2200 PSI
Deviation:	.25°	Average ROP:	145 FT/HR
Mud Weight:	9.0 PPG	Mud Type:	Gel/Water

Discussion:

Drilling operations were resumed 10-9-86, by running in the hole with Bit No. 3, a 17 1/2" bit, and testing the casing to 1000 psi. After drilling out the float collar and shoe, Bit No. 3 was pulled on torque at 1,113'. The bottom hole assembly was changed and Bit No. 4 was run into the hole. This bit was used to drill to the interval TD of 3,126' with good penetration rates. Bottoms were circulated up and a short trip with an additional circulation was made prior to running electric logs.

At the completion of logging, a wiper trip was performed to condition the hole to run casing. 13 3/8"- 72 lb./ft. casing was run from the well head to 2,875'. When cementing the casing, the cement appeared to set up while attempting to displace, leaving cement in the 13 3/8" casing.

The well head was then washed out with sea water. The blow out preventers were nipped down and the 24" riser was replaced with a 18" high pressure system. After nipping up the BOP's and successfully testing them, a 12 1/4" bit (#5) was picked up and run into the hole on 8" drill collars. The cement was

tagged at 225'. Bit No. 5 was used to drill to 371' where it was pulled on very slow penetration rates. Bit No. 6 was then run into the hole on a mud motor assembly. This assembly experienced problems drilling. An additional trip was made with a junk sub retrieving a piece of the wiper plug. Bit No. 6, with a mud motor assembly, was again run into the hole and used to drill to 576'. Because of poor drilling rates, this assembly was changed to a conventional assembly and Bit No. 7 was run into the hole. This bit was used to drill the remainder of the cement using sea water as drilling fluid.

Lithologies in this interval consisted of the soft clays, sands, gravels, and coals found in the two formations that were penetrated: the Sagavanirktok and part of the Schrader Bluff (Colville). Pore pressures remained basically normal (8.7 ppg). 9.1 ppg mud weight was used and provided sufficient overbalance to avoid hole problems.

Interval: 3,126' to 7,549'

Days:	16	Average WOB:	35/50 KLB
Hole Size:	12 1/4"	Average RPM:	125
No. Bits:	3	Average GPM:	530/600
Rotating Hours:	82.7	Average SPP:	3000 PSI
Deviation	.4°	Average ROP:	53 FT/HR
Mud Weight:	8.8 - 10.8 PPG	Mud Type:	Lignosulfonate

Discussion:

Bit No. 7 was used to drill out the 13 3/8" float collar and shoe. A formation integrity test of 12.5 ppg equivalent mud weight was performed at 3,126', 56' below the shoe depth of 3,080'. Drilling was continued with Bit No. 7 to 3,244', where the bit and bottom hole assembly were changed. Bit No. 8 was run into the hole without problems. Slow penetration rates with high rotary torque were noted during this bit run at 3,705', 3,845' and 4,005'; probably the result of stabilizers dragging through coal-sand beds while drilling. Also noted on this run were turbulent flow rates around the drill pipe- drill collars and open hole. A yield point of the mud of 5 to 6 was maintained to a depth 5,000'.

Two additional days were needed to repair the rig rotary at 4,740'. Bit No. 9 was then run into the hole and used to drill to 6,017'. The YP of the mud was raised during this bit run putting the hole in laminar flow. Drilling was continued with Bit No. 10 without problems.

The mud weight was increased gradually to 9.5 ppg after

encountering a slowly increasing pore pressure trend below 6,500' and again raised to 10.0 ppg after a short trip at 7,460' to counter an increase in shale slough. A high viscosity sweep was pumped around the hole and drilling was continued to 7,549'. A short trip at this depth revealed significant fill on bottom. A high viscosity sweep was pumped and the mud weight was raised to 10.3 ppg. Another short trip was made with this mud weight and experienced some fill. The mud weight was then gradually increased to 10.8 ppg. 50 bbl. of 200+ viscosity mud was then spotted outside of the drill string to condition the hole in preparation for electric logs.

Three days of rig time were needed to complete logging operations and included a wiper trip with a reverse circulating junk basket to clean out the bottom of the hole. 9 5/8", 47 lb./ft. casing was run from the sub-sea wellhead to 7,512'.

Lithologies of this section consisted of coal stringers, claystone, siltstone, shale, sand, and thin layers of volcanic ash (tuff). The Schrader Bluff, the West Sak, and the Seabee of the Colville Group, along with the Torok and part of the Pebble Shale were penetrated in this interval. A heavy oil show was noted in the normally pressured sands of the West Sak. Pore pressures remained basically normal until encountering a slowly increasing trend in the Torok Formation below 6,500'. This trend became more obvious after drilling into the radioactive zone (HRZ) of the Pebble Shale at 7,300'. A maximum formation

pressure estimate of 10.0 ppg was made at the bottom of this interval.

Most of the hole problems for this interval occurred while drilling through the Pebble Shale. This Shale is primarily a firm to hard dark gray shale that is laminated, very water susceptible, and slightly pressured. The laminations include carbonaceous and calcareous materials, and sometimes thin layers of volcanic ash. This formation is somewhat unstable in a water-base mud system and after a period of time, contributes considerable amounts of shale slough to the hole. Because of the necessity of running logs and casing as near to bottom as possible, very little slough could be allowed to fall to bottom. Additional time was needed to condition the hole. This procedure included weighting up the mud to provide considerable overbalance (10.8 ppg) and spotting a very high viscosity pill at the bottom of the hole to suspend any slough off bottom. The logging operations were completed without difficulty, and only one minor problem was noted while running casing: 45 bbl. of mud were lost to the formation while running pipe in the open hole.

Interval: 7,549' to 9,866'

Days:	25	Average WOB:	18/40 KLB
Hole Size:	8 1/2"	Average RPM:	70/65
No. Bits:	14	Average GPM:	295
Rotating Hours:	293.9	Average SPP:	1100/1750 PSI
Deviation:	.4 to 6.5°	Average ROP:	7.9 FT/HR
Mud Weight:	10.8 - 10.2 PPG	Mud Type:	Lignosulfonate

Discussion:

The 9 5/8" casing was set at 7,512' leaving 37' of 12 1/4" rat hole below the shoe. This casing was tested to 3000 psi and Bit No. 11 was run into the hole and used to drill out the float collar, shoe, and six feet of new hole to 7,555'. A leak-off test was performed at this depth yielding a fracture pressure equivalent of 14.0 ppg. This compares to a 16.0+ ppg calculated weight using the Eaton Method for shales.

After running the leak-off test, Bit No. 11 was used to drill ahead. Flow rates for this bit run exceeded 475 gpm. and put all sections of the hole in turbulent flow. The connection at 7,587' could not be made without excessive fill on bottom. The flow rate was then reduced to 360 gpm to put the hole in laminar flow. After circulating for a short time at the reduced flow rate, the hole cleaned up enough to make the connection. A high viscosity sweep was pumped around the hole after drilling with Bit No. 11 to a TD of 7,592', to further clean the hole in preparation for coring.

The following coring operations, from 7,592' to 8,543', included

14 cores and two standard bit runs (No. 14 & 18). Bit No. 14 was used to drill from 7,714' to 7,730', between Core No. 2 & 3 after tight hole conditions were encountered while pulling core No. 2 off bottom. Noticeable shale slough occurred at this depth, as the 12 1/4" hole below the casing was difficult to clean. Bit No. 18 was used to drill from 8,362' to 8,377' between Core No. 11 and 12 in preparation for electric logs to immediately evaluate sands penetrated by this depth. The amount of formation that was cored totaled 920 feet, of which 907 feet were recovered. This represents a 98% recovery rate and is quite good considering the formation changes encountered in this interval.

At the completion of coring, 11-19-86, Bit No. 21 was run into the hole and used to drill to 9,075' without problems. The top of the Lisburne Formation was penetrated on this bit run at 8,720'. Drilling was continued with Bit No. 22 in the Lisburne to 9,160', where a lost circulation zone was encountered. 10.8 ppg mud weight had been used up to this point to control shale slough from the section of the Pebble Shale that had not been covered by casing. Immediately after penetrating the lost circulation zone, a 60 bbl. Quick Seal pill was pumped into the hole. The bit was then pulled back inside the 9 5/8" casing and time was allotted for the Quick Seal to set up.

The bit was then staged into the hole to 7,438' and 9,130' respectively. The mud weight was reduced to 10.5 ppg while

circulating on each stage without losing fluid to the hole. However, reduced returns were experienced after breaking circulation on bottom. The mud weight was reduced to 10.4 ppg. while drilling ahead losing 30-40 bbl./hr. Constant additions of lost circulation material (LCM) to the mud system reduced this loss to 20 bbl./hr. Bit No. 22 was pulled out of the hole at 9,475' without any loss of fluid on the trip out.

Bit No. 23 was also staged in the hole breaking circulation well inside the casing and near the shoe. Approximately 20 bbl. of mud was lost to the hole on the trip in. After reaching bottom and drilling ahead, a 30-40 bbl./hr. mud loss was again experienced. Considerable additions of LCM and a reduction of the mud weight to 10.3 ppg decreased the fluid loss to 15-20 bbl./hr. by 9,525'. A further reduction of mud lost to the hole was noted after reducing the mud weight to 10.2 ppg at 9,685'. Fluid lost to the hole was recorded at less than 5 bbl./hr. and additions of LCM were discontinued. Bit No. 23 was used to drill to 9,751' where a LCM pill was spotted on bottom and the bit pulled out of the hole.

Bit No. 24 was then run into the hole and staged at 4,000' and 7000'. This bit was used to drill to TD of the well, 9866', recording a mud loss of 10-15 bbl./hr. A considerable change in deviation was noted on this bit run: from 2° to 6.5°. This dramatic change in deviation can be attributed to a formation change at 9,690'. Metamorphic basement was penetrated at this

depth, which has a much different bedding plane than the previous formations, and probably exhibits a high degree of dip.

After reaching total depth, 3:20 a.m. 11-29-86, additional circulating time along with a short trip were used to condition the hole in preparation for logging. Logging operations were continued for three days. The open hole was plugged, 12-3-86, and flow testing of the well was initiated to evaluate two zones covered by the 9 5/8" casing.

Lithologies of this interval included a variety of formations: the Pebble Shale, the Sag River, the Shublik, Formations of the Sadlerochit Group, a section of the lower Lisburne, a part of the Endicott Group and pre-Mississippian Basement. Oil and gas shows were noted in the Sag River, Shublik, and Lisburne Formations. Production from these formations is difficult to estimate as permeability and volume in these zones may be low. Poor shows were recorded in the Ivishak Formation of the Sadlerochit Group (the primary target for this well) as well as sands drilled in the Endicott. Basement for this well appeared to be a good example of the "Argillite", a medium to dark gray metamorphosed shale.

Pore pressures for this interval displayed a moderately decreasing trend with depth. An estimate of 9.7 to 9.8 ppg was made for the Sag River and Shublik Formations. This estimate was decreased to 9.5 ppg for the Ivishak Sandstone and was

again reduced to 9.2 ppg for the Lisburne Formation. This decreasing trend was continuous to TD where formation pressures for basement should be less than 9.0 ppg. 10.8 ppg mud weight was used to drill most of the interval and provided far too much overbalance to drill the lower part of the Lisburne. The mud weight had to be reduced at 9,160' to 10.4 ppg to minimize fluid loss to the hole. The weight was gradually dropped to 10.2 ppg by 9,685'. No adverse effects were noted from the upper formations after reducing the mud weight on each sequence.

The only major hole problem for this interval was associated with drilling through the lost circulation zone at 9,160'. This zone, located in the lower part of the Lisburne, was probably a fractured carbonate with little fracture fill. As a result of penetrating this zone and the continued drilling operations to TD, over 1000 barrels of mud were lost to the hole.

CONCLUSIONS AND RECOMMENDATIONS

The drilling program for OCS-Y-0338-1 was primarily designed to drill and evaluate sands found in the Ivishak Formation of the Sadlerochit Group; and as a secondary target, to effectively penetrate 100 feet of pre-Mississippian basement. These objectives were reached in 68 days after spudding in the well, somewhat over the allotted time predicted to drill the hole. All open-hole logging operations were completed without problems, and cased-hole testing of the well was begun 12-4-86.

In conclusion, the well program for OCS-Y-0338-1 was adequate to complete this project. However, there are basic potential problems associated with two formations for wells drilled in this area. The two formations that provided hole problems for this well were the Pebble Shale and Lisburne Formation.

The basic problems associated with the Pebble Shale is shale sloughing into the well bore. Since this shale is a water sensitive shale, it is doubtful that the slough can be eliminated with a water base fluid. Control of the shale problem does appear to improve with an overbalance of mud weight. However, we believe that there is a time factor also involved where additional circulating time is needed to wash out this section and reduce the influence of mechanical factors of fluid velocities. This concept is supported while drilling Phoenix No. 1 after reducing the mud weight in the 8 1/2" interval and experiencing

no severe affects from the shale exposed below the 9 5/8" shoe. At any rate, it is highly recommended to make sure all of this formation is put behind casing before drilling the next zone; especially for a deviated well.

The main problem associated with the Lisburne, lost circulation, has been documented for a number of wells drilled on the North Slope. The Lisburne generally contains a number of zones that are basically fractured carbonates. These zone may have little or no fracture fill. In the event of drilling a zone that is completely open, the maximum mud weight that can be tolerated is very close to the formation pressure. For the Prudhoe Bay Unit, the upper Lisburne (Wahoo) is typically drilled with 9.6 ppg mud weight and sometimes experiences partial returns. Wells drilled through the lower Lisburne (Alapha) generally have less permeability and can tolerate slightly higher mud weights. For OCS-Y-0338-1, only the lower Lisburne was penetrated. Given the history of wells drilled in this area, we would recommend a maximum mud weight of 10.0 to 10.2 ppg with Lisburne exposed.

Another point we would like to address in this report concerns the hydraulics and mud properties used on Phoenix No. 1. In an effort to reduce the effects of fluid invasion in the upper part of the 12 1/4" interval, we would recommend a slightly lower filtrate. Also, the recommendations for mud weights and yield points for the given intervals should provide sufficient

overbalance; as well as, good hole cleaning characteristics for the given interval flow rates. These suggestions are based on the casing program used on Phoenix No. 1 and should work well for any future wells drilled in this area.

Recommended Hydraulics

Hole Size	26"	17½"	12¼"	12¼"	8½"
Depth	800	2500	3500	6500	9000
Gallons per Min.	850	750	600	500	350
Nozzle Size	18-18-18	16-16-16	13-13-13	12-12-12	11-11-11
Pump Pressure	1600	2500	3000	3000	2300

Recommended Mud Properties

<u>Depth</u>	<u>Mud Weight</u>	<u>Yield Point</u>	<u>Water Loss</u>
0-900 (20")	9.0	+ Spud Mud	+ Spud Mud
900-3000 (13 3/8")	9.0	12-15	<15
3000-4800	9.0	>8	<12
4800-6500	9.2	>8	<8
6500-7600 (9 5/8")	9.2-10.5	>8	<6
7600-TD	10.0	>10	<6

This section of the report contains copies of Show Evaluation Reports for OCS-Y-0338-1. These reports are based on chromatograph evaluations of gases developed from mud samples injected into Baroid's Steam Still apparatus. They are not always included in the well report analysis because of restricted information requirements on wildcat wells. They do offer some insight on fluid content on potential producing zones of good permeability. However, they are often inadequate on tight zones or when mud samples are taken while coring.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK
 FORMATION - SAG RIVER
 DEPTH 7715 - 7730
 PROBABLE PRODUCTION GAS CONDENSATE &
HIGH GRAVITY OIL

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>7720</u>	DEPTH <u>7725</u>
METHANE - ppm C ₁	1000	17223	18267
ETHANE - ppm C ₂	150	1320	1533
PROPANE - ppm C ₃	—	1109	1381
BUTANE - ppm C ₄	—	1104	1267
PENTANE+ - ppm C ₅₊	—	924	1965
METHANE % - UNITS X	10	1050	1042
TOTAL % - UNITS X	11	1528	1498
CHLORIDES	3900	3600	

DRILLING RATE: FT/HR X MIN/FT
 FROM 94 TO 137

LITHOLOGY SS - lt gy, clr, s+p, vf gr, rnd, w srt,
qtz, glauc, sl calc, fri, carb, no flor,
fish bri yel ct

REMARKS High ratios suggest gas/gas condensate
situation however lithology may limit
production.

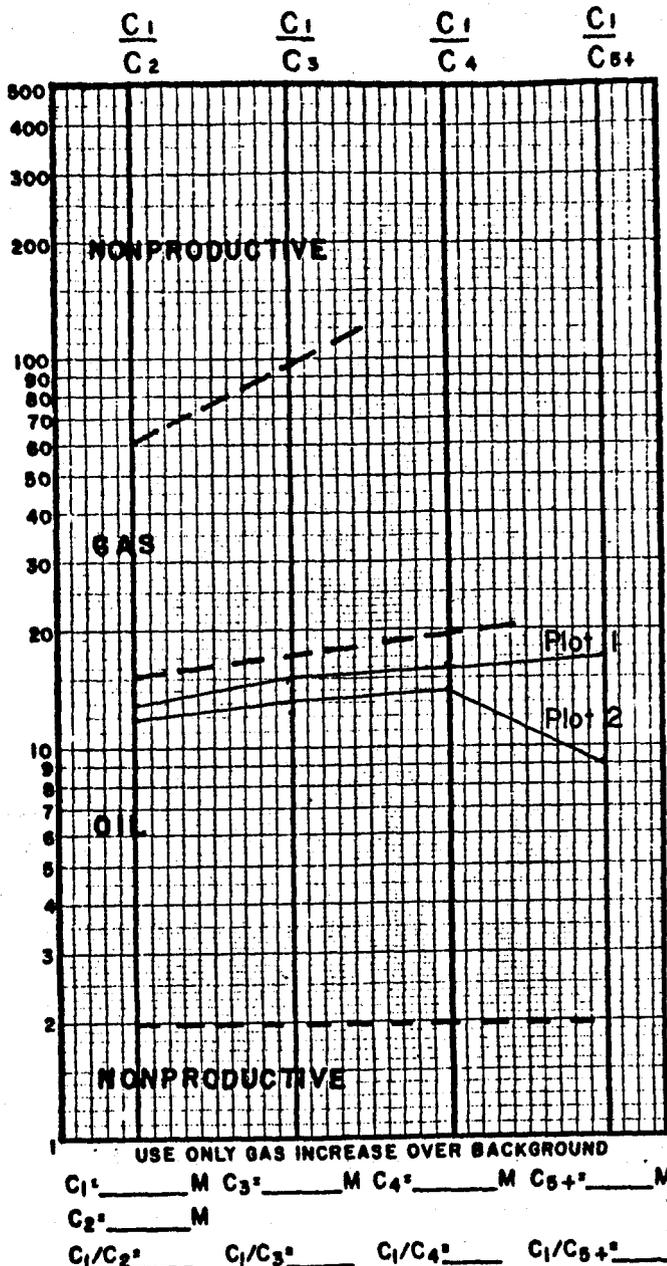
NEW ORDERS _____

CALLED IN BY W. ANDERSON

TALKED TO F. WALLE

DATE 11/7/86 TIME 18:30 AM PM X

HYDROCARBON RATIOS



1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₂ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₂ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK
 FORMATION SAG RIVER
 DEPTH 7740 - 7758
 PROBABLE PRODUCTION HIGH GRAVITY OIL

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>7740</u>	DEPTH <u>7758</u>
METHANE - ppm C ₁	500	22900	18000
ETHANE - ppm C ₂	100	1600	1700
PROPANE - ppm C ₃	200	1100	1100
BUTANE - ppm C ₄	300	900	900
PENTANE+ - ppm C ₅₊	700	900	700
METHANE % X UNITS	27%	83%	80%
TOTAL % UNITS X		163	147
CHLORIDES	3600	3600	

DRILLING RATE: FT/HR X MIN/FT
 FROM 33 Avg TO

LITHOLOGY SS-lt-m brn, vf-fgr, w srted, fri,
calc cmt, vis ø, no flor, fast strmg yel-wh ct

Poor sample quality while coring

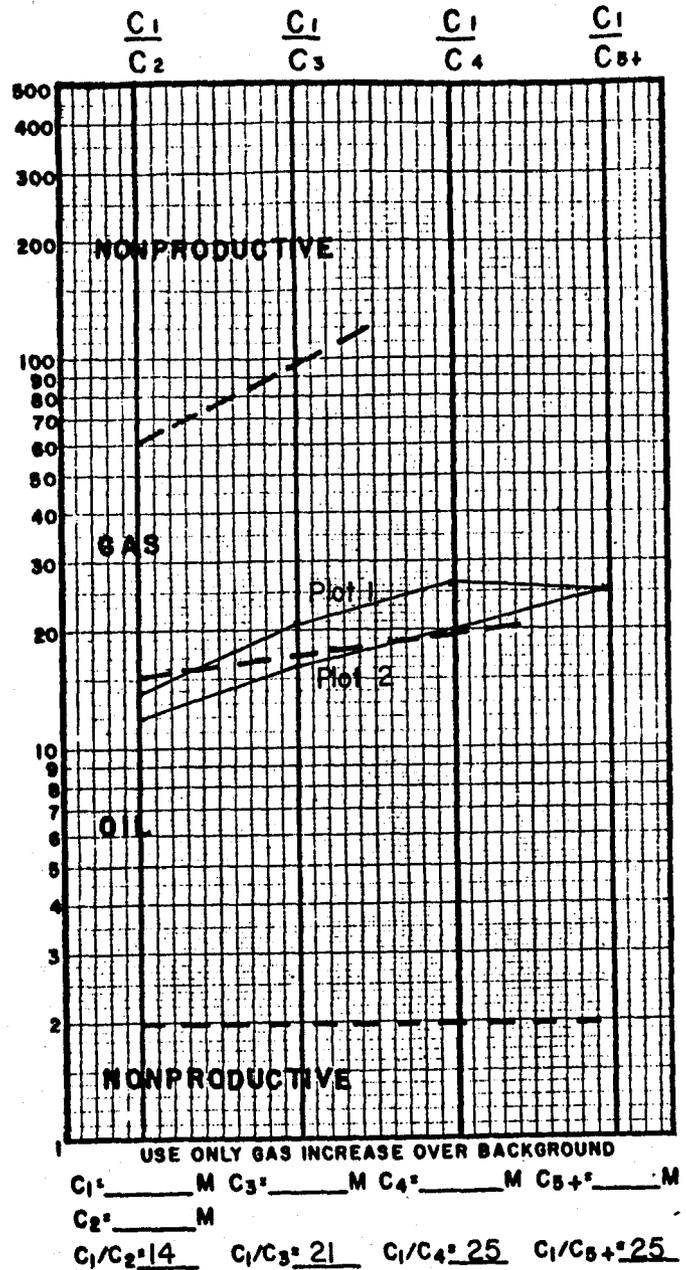
REMARKS Plot indicates high gravity oil-gas. No
flor with good cut often indicates heavy oil.
Vis ø increase HCL.

NEW ORDERS

CALLED IN BY J. PATTON
 TALKED TO F. WALLE

DATE 11/8/86 TIME 10:00 AM X PM

HYDROCARBON RATIOS



1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₂ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₂ IS LESS THAN C₁/C₃, THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK
 FORMATION SAG RIVER
 DEPTH 7786-7804
 PROBABLE PRODUCTION Mod - High Gravity Oil

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>7786</u>	DEPTH <u>7804</u>
METHANE - ppm C ₁	750	13750	10250
ETHANE - ppm C ₂	150	1250	1050
PROPANE - ppm C ₃	300	850	800
BUTANE - ppm C ₄	500	500	700
PENTANE+ - ppm C ₅₊	800	500	700
METHANE %X UNITS	30%	82%	76%
TOTAL % UNITSX		75	60
CHLORIDES	3700	3700	

DRILLING RATE: FT/HR X MIN/FT
 FROM 25 avg TO 15 avg

LITHOLOGY SS-lt-m brn, vf gr, w srted, fri,
calc, vis ø, no flor, fast strmg yel-wh ct

REMARKS Plot indicates high gravity oil. No flor
with good cut indicates heavy oil.
Vis ø increases with HCL.

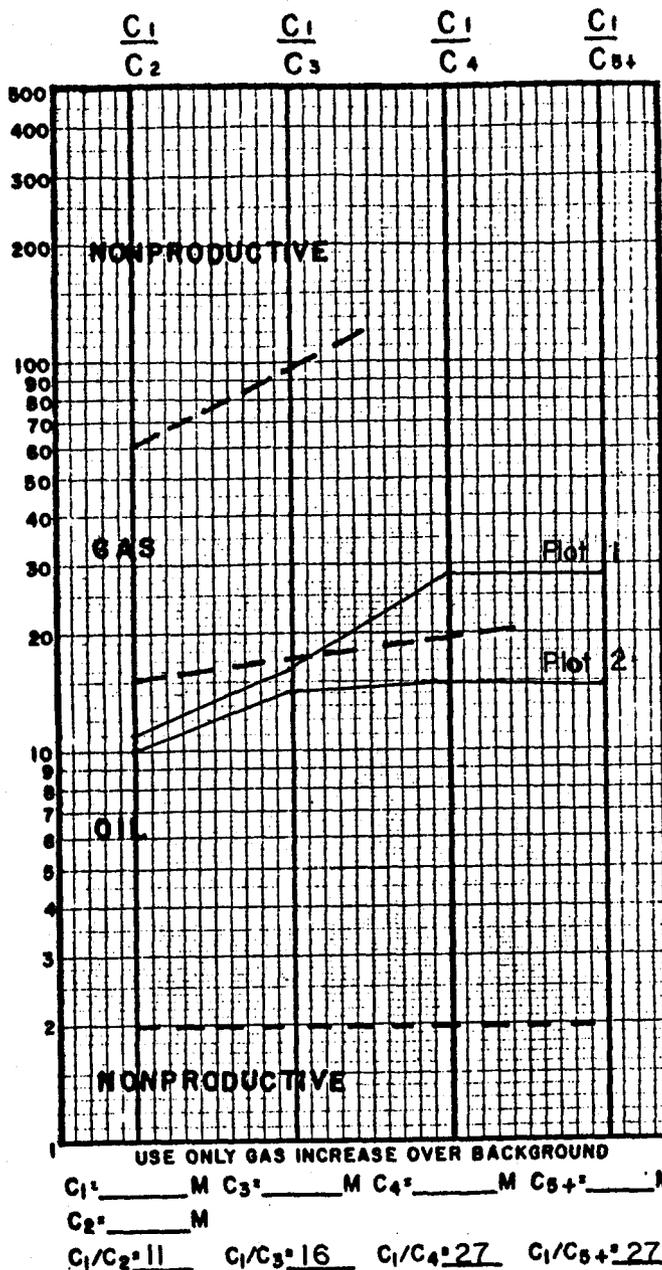
NEW ORDERS _____

CALLED IN BY J. PATTON

TALKED TO F. WALLE

DATE 11/8/86 TIME 11:00 AM X PM

HYDROCARBON RATIOS



1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C_n EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK
 FORMATION — SHUBLIK
 DEPTH 7860
 PROBABLE PRODUCTION _____

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>7860</u>	DEPTH _____
METHANE—ppm C ₁	1600	15700	
ETHANE—ppm C ₂	250	1850	
PROPANE—ppm C ₃	400	1200	
BUTANE—ppm C ₄	600	1200	
PENTANE+—ppm C ₅₊	800	1400	
METHANE %—UNITS—			
TOTAL %—UNITS—	20	77	
CHLORIDES	3800	3600	

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 20 TO 30

LITHOLOGY SS-lt brn, clr, gy, vf-f gr, p srted, sb md,
v. calc, tr glauc, lt yel flor, wh strmg ct

REMARKS Appears tight. Probable med-heavy
gravity oil present. Product is doubtful.
Samples from cored interval too poor for conclusive
report.

NEW ORDERS _____

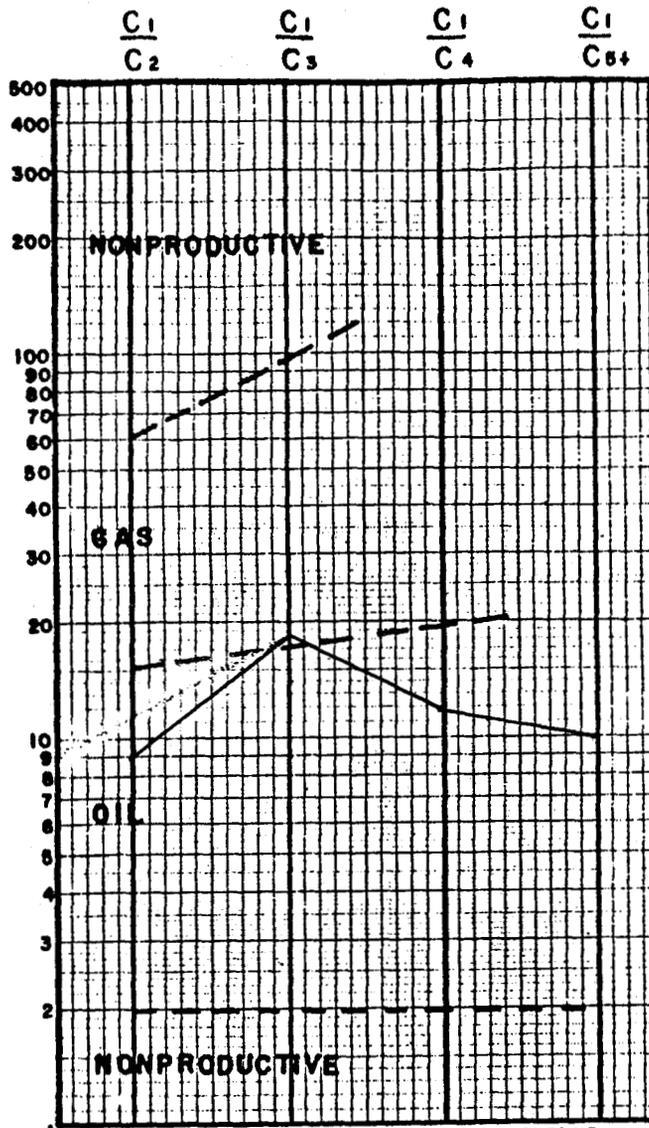
CALLED IN BY J. PATTON

TALKED TO F. WALLE

DATE 11/9/86 TIME 01:30 AM X PM

BR-30615

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁ = 14100 M C₃ = 800 M C₄ = 600 M C₅₊ = 600 M
 C₂ = 1600 M
 C₁/C₂ = 9 C₁/C₃ = 18 C₁/C₄ = 12 C₁/C₅₊ = 10

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₆ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY Tenneco Oil Co.
 WELL Phoenix No. 1
 LOCATION Beaufort Sea
 FORMATION SHUBLIK
 DEPTH 7965
 PROBABLE PRODUCTION Med. Gravity Oil

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>7965</u>	DEPTH _____
METHANE - ppm C ₁	1200	8300	
ETHANE - ppm C ₂	75	820	
PROPANE - ppm C ₃	-	630	
BUTANE - ppm C ₄	-	550	
PENTANE+ - ppm C ₅₊	-	950	
METHANE % - UNITS	-	-	
TOTAL % UNITS	.15%	.52%	
CHLORIDES	3300		

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 3 TO 5

LITHOLOGY Ls-dk gy, gy, micro xln, mas, hd

REMARKS Interval occurred during coring. Probable med gravity oil. Zone probably too tight for production.

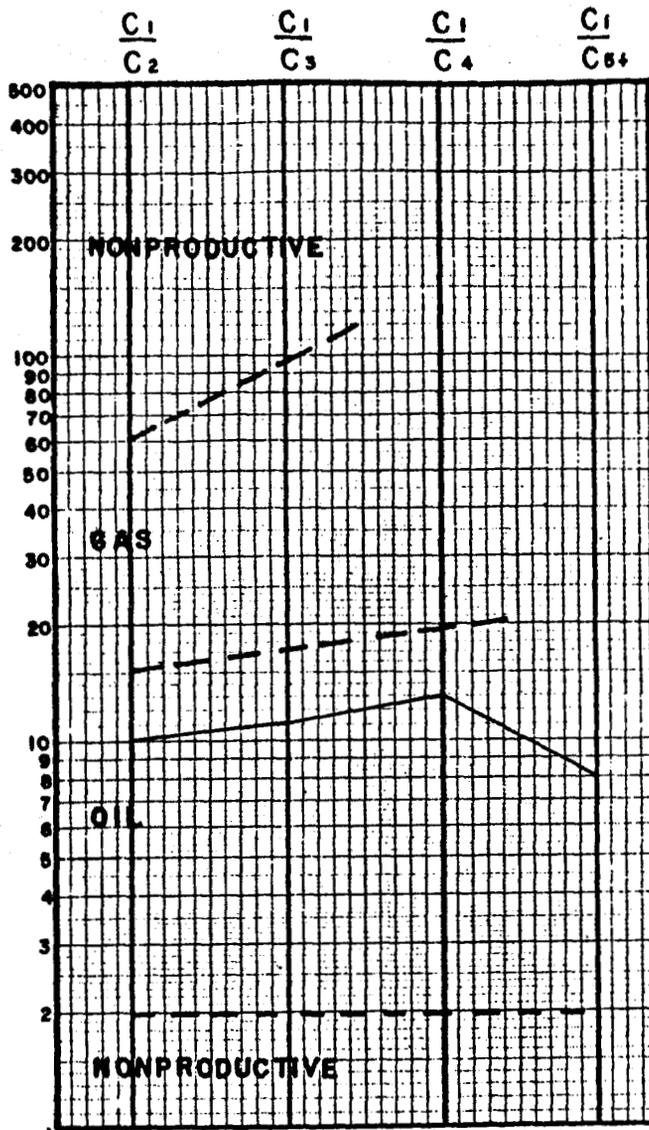
NEW ORDERS _____

CALLED IN BY J Patton

TALKED TO F Wallis

DATE 10/11/86 TIME 08:00 AM X PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁ = 7100 M C₃ = 630 M C₄ = 550 M C₅₊ = 950 M
 C₂ = 745 M
 C₁/C₂ = 10 C₁/C₃ = 11 C₁/C₄ = 13 C₁/C₅₊ = 8

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₅ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK
 FORMATION — SHUBLIK
 DEPTH 7995
 PROBABLE PRODUCTION GAS + HIGH GRAVITY OIL

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>7995</u>	DEPTH _____
METHANE—ppm C ₁	1800	98900	
ETHANE—ppm C ₂	100	7700	
PROPANE—ppm C ₃		5800	
BUTANE—ppm C ₄		5650	
PENTANE+—ppm C ₅₊		9650	
METHANE %—UNITS—			
TOTAL %—UNITS—		1280	
CHLORIDES	3300		

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 5 TO 8

LITHOLOGY SLTST-lt gy, gy, v calc, arg i.p.,
lt yel flor, fht lt yel ct

REMARKS Interval depth occurred while coring.
Probable gas and high gravity oil. Zone
appears tight, no permeability.

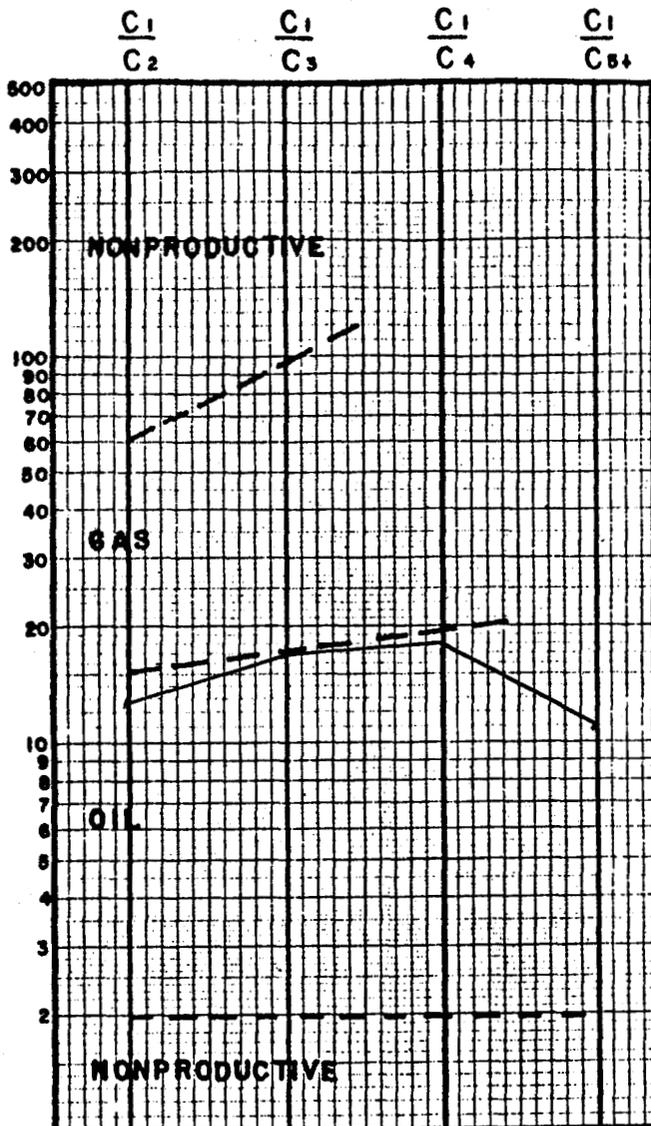
NEW ORDERS _____

CALLED IN BY W. ANDERSON

TALKED TO F. WALLS

DATE 11/10/86 TIME 23:00 AM _____ PM X

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁•97000M C₃•5800M C₄•5650M C₅₊•9050M
 C₂•7600M
 C₁/C₂•13 C₁/C₃•17 C₁/C₄•17 C₁/C₅₊•11

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C_n EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK.
 FORMATION SHUBLIK
 DEPTH 8013 & 8020
 PROBABLE PRODUCTION _____

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH 8013	DEPTH 8020
METHANE - ppm C ₁	195	9328	7426
ETHANE - ppm C ₂	65	735	655
PROPANE - ppm C ₃	70	680	605
BUTANE - ppm C ₄	140	811	725
PENTANE+ - ppm C ₅₊	305	1665	730
METHANE % X UNITS -	.0195%	.933%	.74%
TOTAL % X UNITS -	.26%	2.27%	1.71%
CHLORIDES			

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 4 TO 8

LITHOLOGY SLTST-m-dk brn, arg, calc
LS-wh, tn, mott, slty, arg

REMARKS V dul gld flor, m strmg wh ct
Minor oil on shakers at 8020'-yel flor

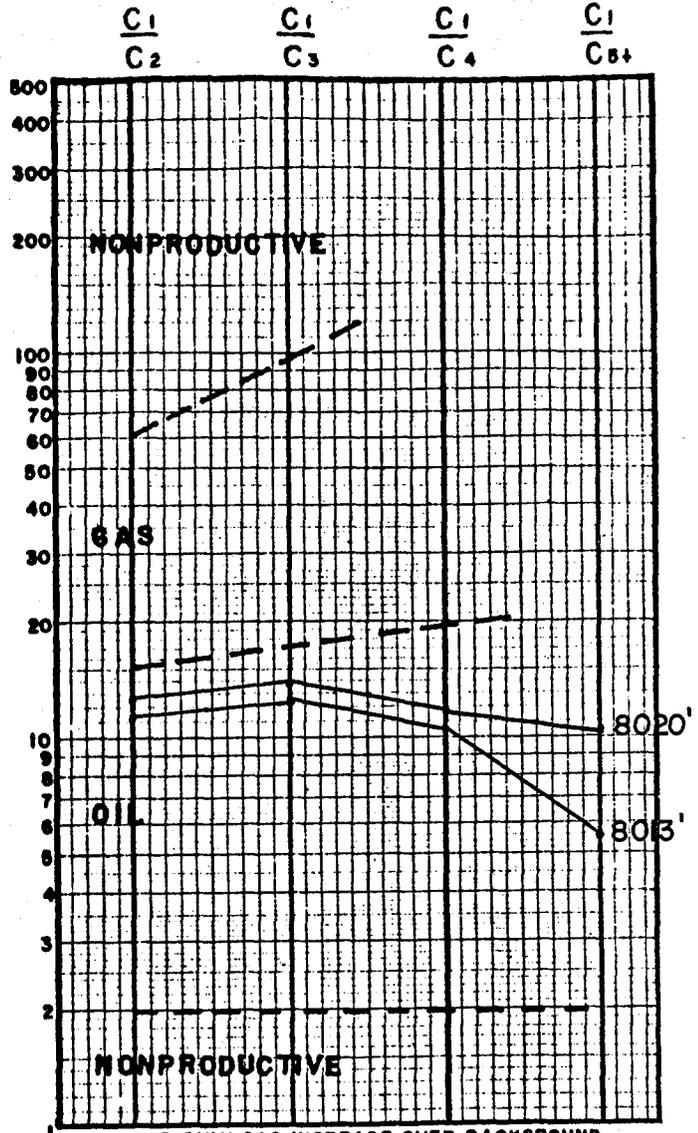
NEW ORDERS _____

CALLED IN BY Sheperd/ Leschen

TALKED TO F. Wallis

DATE 11/11/86 TIME 04:00 AM X PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁: _____ M C₃: _____ M C₄: _____ M C₅₊: _____ M
 C₂: _____ M
 C₁/C₂: _____ C₁/C₃: _____ C₁/C₄: _____ C₁/C₅₊: _____

- PLOT RATIOS ON LINES INDICATED.
- EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - IF ANY RATIO (C₁/C₂ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO.1
 LOCATION BEAUFORT SEA, AK.
 FORMATION IVISHAK
 DEPTH 8082/8093/8103
 PROBABLE PRODUCTION WATER

MUD ANALYSIS

	BACKGROUND		NET INCREASE	
	Back-ground	8082	PLOT 1	PLOT 2
			DEPTH 8093	DEPTH 8103
METHANE - ppm C ₁	110	7627	3285	3640
ETHANE - ppm C ₂	-	668	358	280
PROPANE - ppm C ₃	86	402	227	154
BUTANE - ppm C ₄	181	379	204	119
PENTANE+ - ppm C ₅₊	650	776	479	862
METHANE % - UNITS -				
TOTAL % - UNITS X		156	79	95
CHLORIDES	3400	2000	2000	2000

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 7 TO 36 (8080-8123)

LITHOLOGY Core interval. See geologist' description.

REMARKS Because of steep drop in C₁/C₅ ratio
formation appears wet. Also note decrease in chlorides.

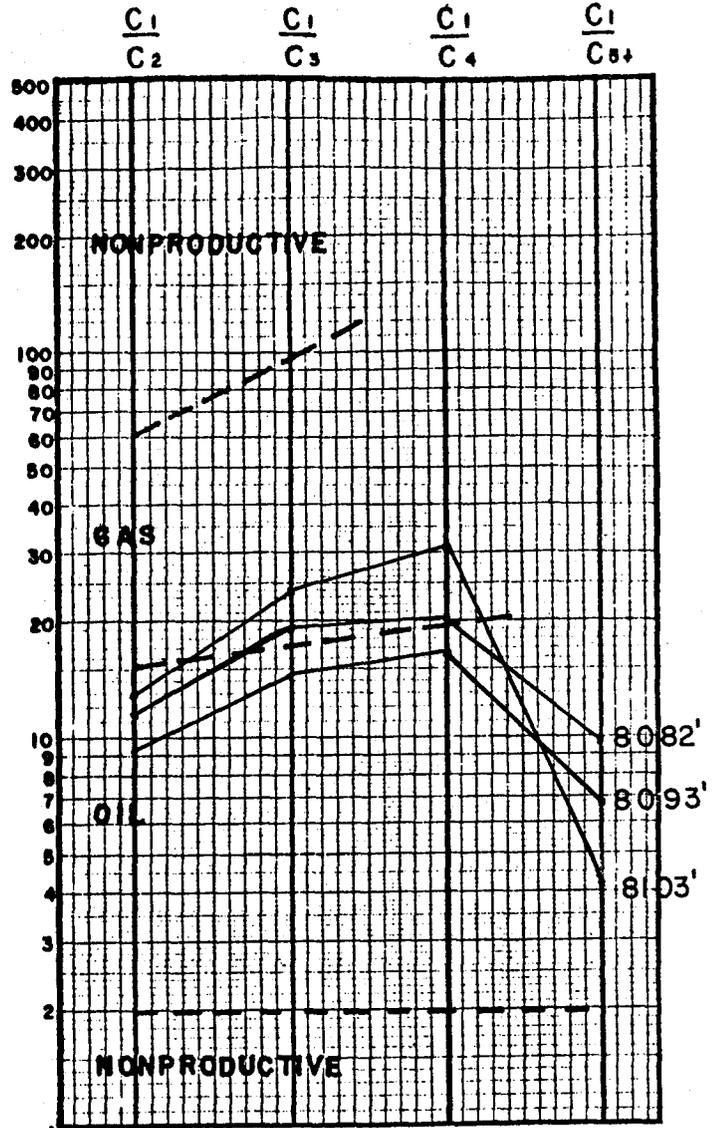
NEW ORDERS _____

CALLED IN BY Sheperd/Leschen

TALKED TO F. WALLE

DATE 11/12/86 TIME 8:30 AM X PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁: _____ M C₃: _____ M C₄: _____ M C₅₊: _____ M
 C₂: _____ M
 C₁/C₂: _____ C₁/C₃: _____ C₁/C₄: _____ C₁/C₅₊: _____

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₅ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃, THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK.
 FORMATION IVISHAK
 DEPTH 8300'
 PROBABLE PRODUCTION WATER

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>8300</u>	DEPTH _____
METHANE - ppm C ₁	750	1550	
ETHANE - ppm C ₂	65	145	
PROPANE - ppm C ₃		170	
BUTANE - ppm C ₄		210	
PENTANE+ - ppm C ₅₊		420	
METHANE % - UNITS			
TOTAL % - UNITS		53	
CHLORIDES	3000		

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 26 TO 64

LITHOLOGY SS-m-crs gr, qtz+cht as lse grs, fgr ss
cmt, dk gy sh, tr rd sh, dul gld flr, flash-strmg mlky yel ct,
gd brn resid ring

REMARKS _____

NEW ORDERS _____

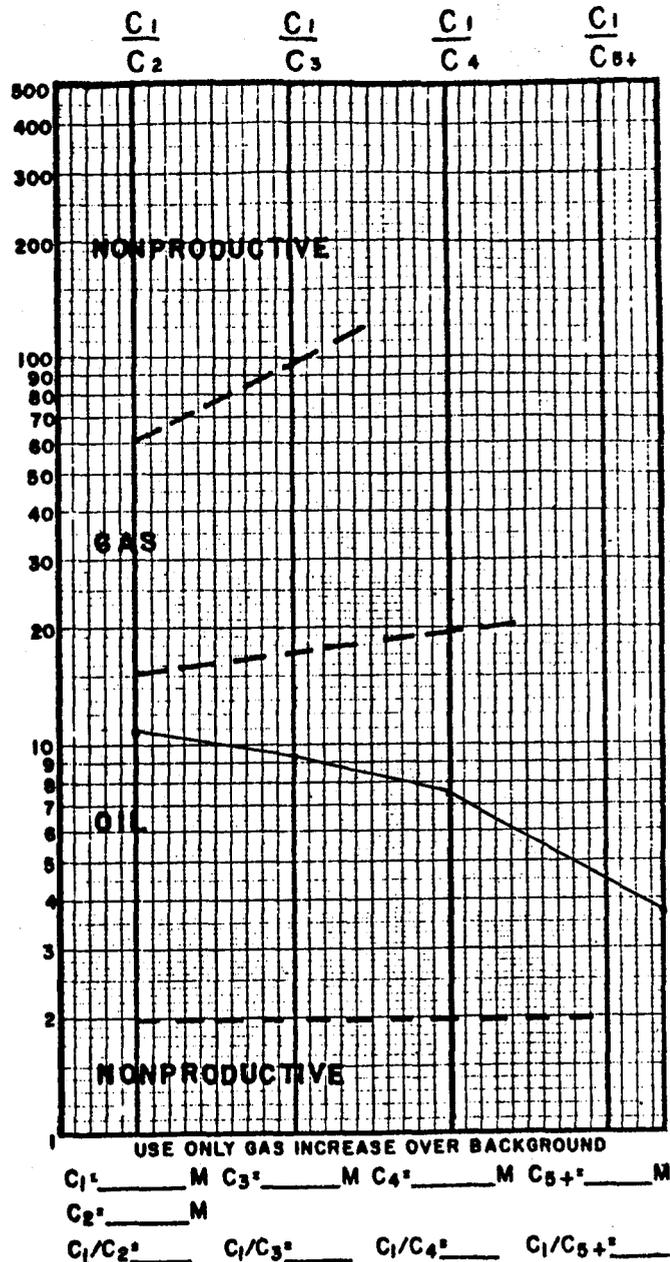
CALLED IN BY Sheperd/Leschen

TALKED TO F. Walles

DATE 11/14/86 TIME _____ AM _____ PM _____

BR-30615

HYDROCARBON RATIOS



1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₂ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK.
 FORMATION IVISHAK
 DEPTH 8343'
 PROBABLE PRODUCTION WATER

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>8343</u>	DEPTH _____
METHANE - ppm C ₁	750	5750	
ETHANE - ppm C ₂	65	465	
PROPANE - ppm C ₃		410	
BUTANE - ppm C ₄		460	
PENTANE+ - ppm C ₅₊		950	
METHANE % - UNITS -			
TOTAL % - UNITS %		145	
CHLORIDES	3000		

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 5 TO 60

LITHOLOGY SS - f - vcrs gr, lse grs, clr + wh qtz,
gy cht, rd sh, dk gy, brn sh,
wh - gy tuff

REMARKS Dul qld flwr, v sl strmg yel-wh strmg ct

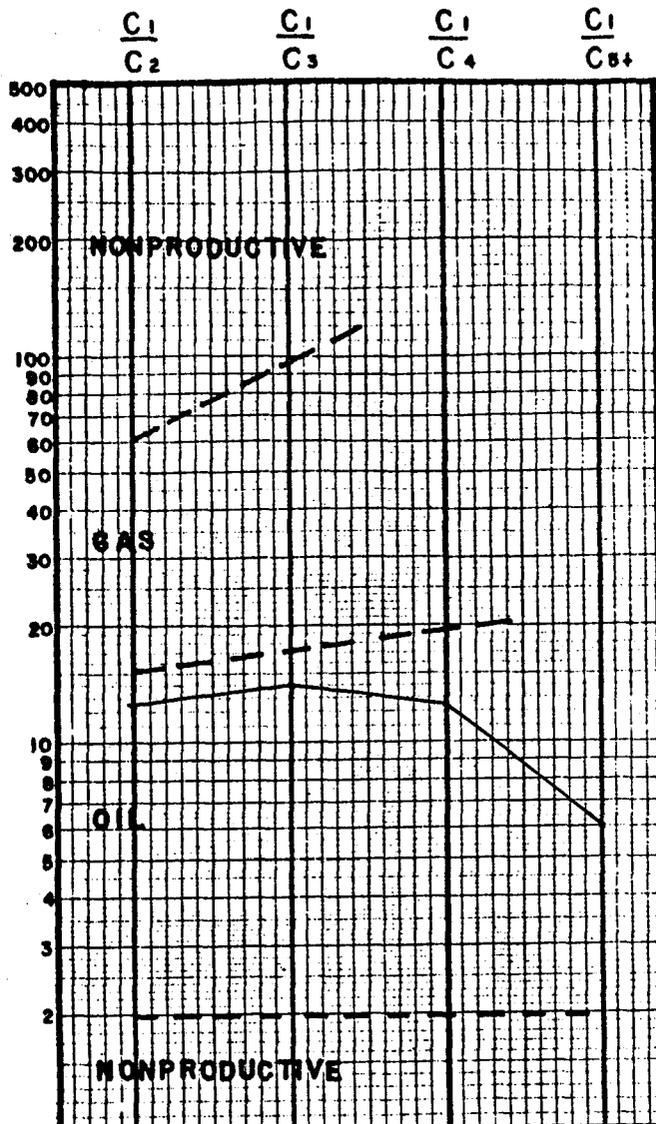
NEW ORDERS _____

CALLED IN BY Sherperd/Leschen

TALKED TO E. WALLE

DATE 11/14/86 TIME _____ AM _____ PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁: 5.0 M C₃: .41 M C₄: .47 M C₅₊: 1.0 M
 C₂: .4 M
 C₁/C₂: 12.3 C₁/C₃: 14.0 C₁/C₄: 12.5 C₁/C₅₊: 6.0

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₅ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO.1
 LOCATION BEAUFORT SEA, AK
 FORMATION IVISHAK
 DEPTH 8375'
 PROBABLE PRODUCTION WATER

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>8375</u>	DEPTH _____
METHANE - ppm C ₁	—	2679	
ETHANE - ppm C ₂	—	216	
PROPANE - ppm C ₃	—	144	
BUTANE - ppm C ₄	—	157	
PENTANE+ - ppm C ₅₊	TR	0	
METHANE % - UNITS -			
TOTAL % - UNITS %		35	
CHLORIDES	2900		

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 10 TO 65

LITHOLOGY m-crs gr ss as lse grs, qtz, cht, lith, pyr, clr,
wh, gy, tr f gr ss cmt, m gn flor, tr v dul gld flor, v sl gld ct flor

in smpl, m strng wh ct from f gr cmt ss. No C₅.

REMARKS _____

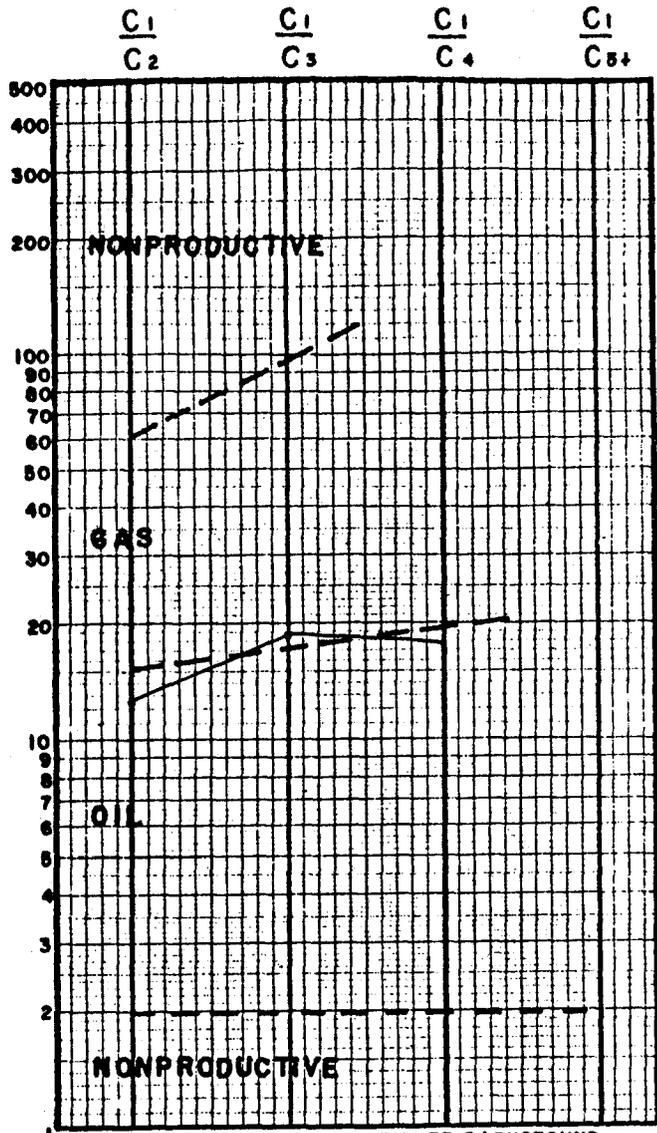
NEW ORDERS _____

CALLED IN BY Sheperd/Leschen

TALKED TO F. Wallis

DATE 11/16/86 TIME 11:00 AM X PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁⁺ _____ M C₃⁺ _____ M C₄⁺ _____ M C₅⁺ _____ M
 C₂⁺ _____ M
 C₁/C₂⁺ _____ C₁/C₃⁺ _____ C₁/C₄⁺ _____ C₁/C₅⁺ _____

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₃, EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK
 FORMATION IVISHAK
 DEPTH 8428-8444
 PROBABLE PRODUCTION INCONCLUSIVE

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>8431</u>	DEPTH _____
METHANE - ppm C ₁	—	6425	
ETHANE - ppm C ₂	—	588	
PROPANE - ppm C ₃	—	420	
BUTANE - ppm C ₄	—	379	
PENTANE+ - ppm C ₅₊	—	623	
METHANE % - UNITS			
TOTAL % - UNITS		135	
CHLORIDES	3000		

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 24 TO 39

LITHOLOGY SS-clr, ay, wh, f-m gr, ang-sb ang, atz, cht,
tr cmt fgr ss TR TUFF, qld flor in cmt fgr ss w/v sl wh

halo cut flor _____

REMARKS Plot indicates high gravity oil.

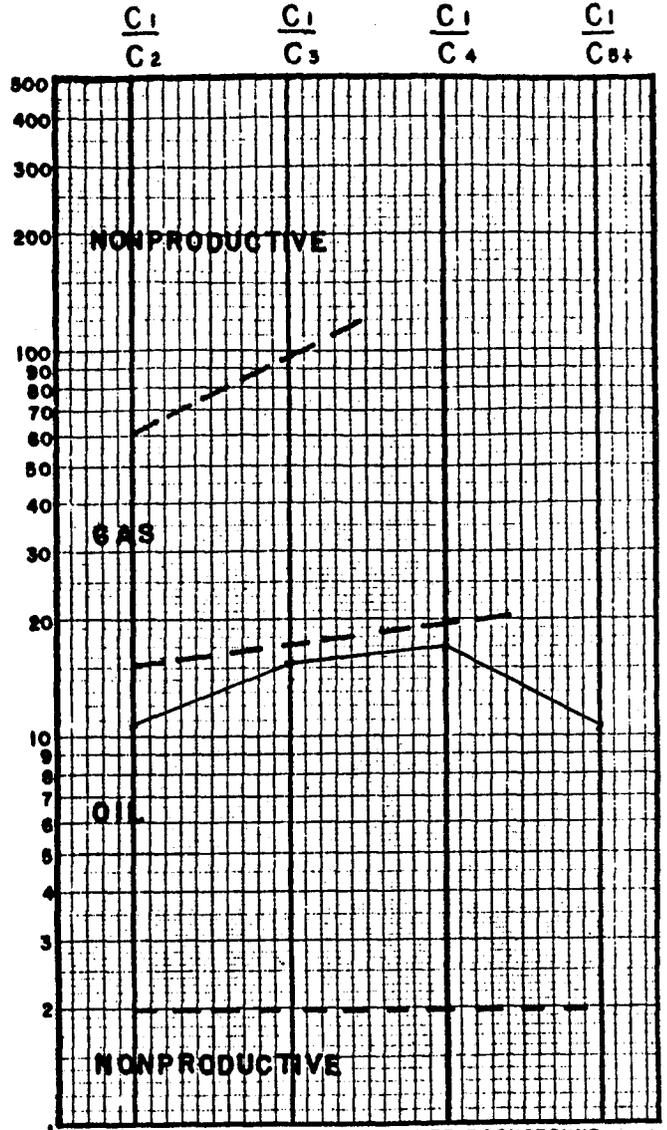
NEW ORDERS _____

CALLED IN BY Sheperd/Leschen

TALKED TO G. Christianson

DATE 11/18/86 TIME 4:00 AM X PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁: _____ M C₃: _____ M C₄: _____ M C₅+: _____ M
 C₂: _____ M
 C₁/C₂: _____ C₁/C₃: _____ C₁/C₄: _____ C₁/C₅+: _____

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₃ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK.
 FORMATION LOWER SADLEROCHIT
 DEPTH 8702'
 PROBABLE PRODUCTION WATER

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>8702'</u>	DEPTH _____
METHANE—ppm C ₁	738	2098	
ETHANE—ppm C ₂	—	169	
PROPANE—ppm C ₃	—	130	
BUTANE—ppm C ₄	—	112	
PENTANE+—ppm C ₅₊	—	—	
METHANE %—UNITS—			
TOTAL %—UNITS %	17	80	
CHLORIDES			

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 10 TO 51

LITHOLOGY SS- lt brn, f gr, w srted, sil cmt, hd-fri,
qtz, tr glauc, n flor, gd straw yel strmg of

REMARKS No C₅. Zone probably wet.

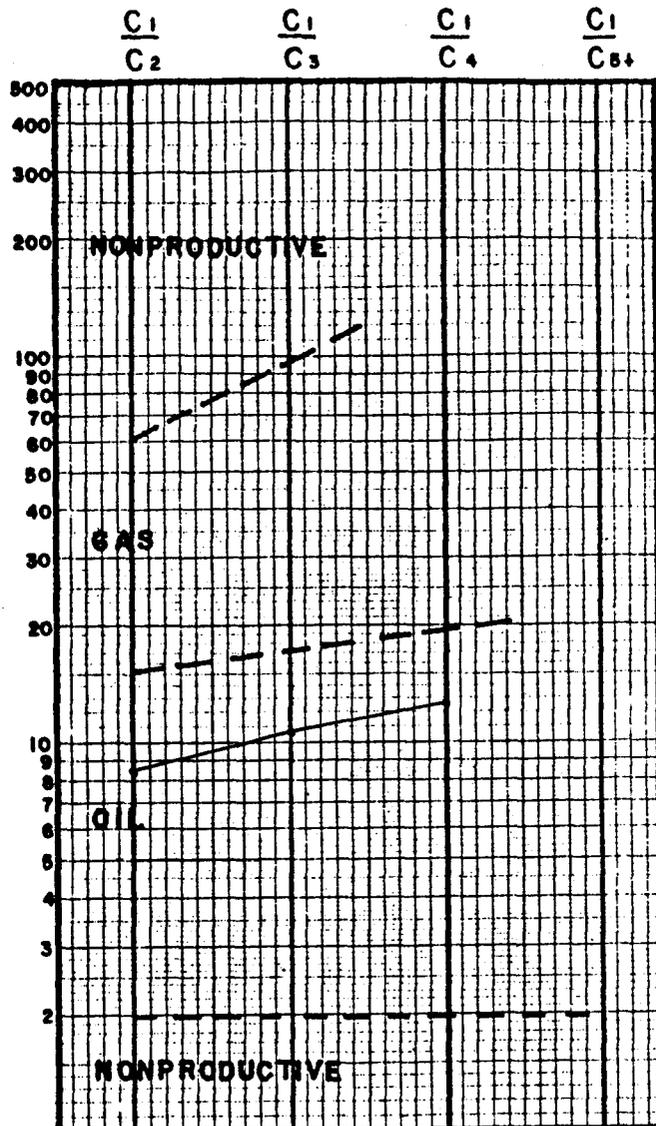
NEW ORDERS _____

CALLED IN BY Sheperd/Ridley

TALKED TO G. Christianson

DATE 11/20/86 TIME 1:00 AM X PM _____

HYDROCARBON RATIOS



USE ONLY GAS INCREASE OVER BACKGROUND
 C₁: 1.4 M C₃: .130 M C₄: .112 M C₅+: _____ M
 C₂: .169 M
 C₁/C₂: 8.3 C₁/C₃: 10.8 C₁/C₄: 12.5 C₁/C₅+: _____

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C₁/C₃ EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

**BAROID ppm LOG
SHOW EVALUATION REPORT**

COMPANY TENNECO OIL CO.
 WELL PHOENIX NO. 1
 LOCATION BEAUFORT SEA, AK.
 FORMATION LISBURNE
 DEPTH 8757'
 PROBABLE PRODUCTION _____

MUD ANALYSIS

	BACKGROUND	NET INCREASE	
		PLOT 1	PLOT 2
		DEPTH <u>8757'</u>	DEPTH _____
METHANE - ppm C ₁	750	6000	
ETHANE - ppm C ₂	50	650	
PROPANE - ppm C ₃	TR	400	
BUTANE - ppm C ₄	TR	400	
PENTANE+ - ppm C ₅₊	—	TR	
METHANE % - UNITS -			
TOTAL % - UNITS -	10	183	
CHLORIDES			

DRILLING RATE: FT/HR X MIN/FT _____
 FROM 10 TO 35

LITHOLOGY LS-wh, crm, lt brn, m-crs xln, ool, rthy,
styo l p, blk, tr glauc, straw yel flor, vlt yel strmg ct

REMARKS No C₅ Zone probably wet; however,
C₁-C₄ ratios indicate possibility of oil in zone. Considerable
overbalance while drilling - + 1.5 ppg.

NEW ORDERS _____

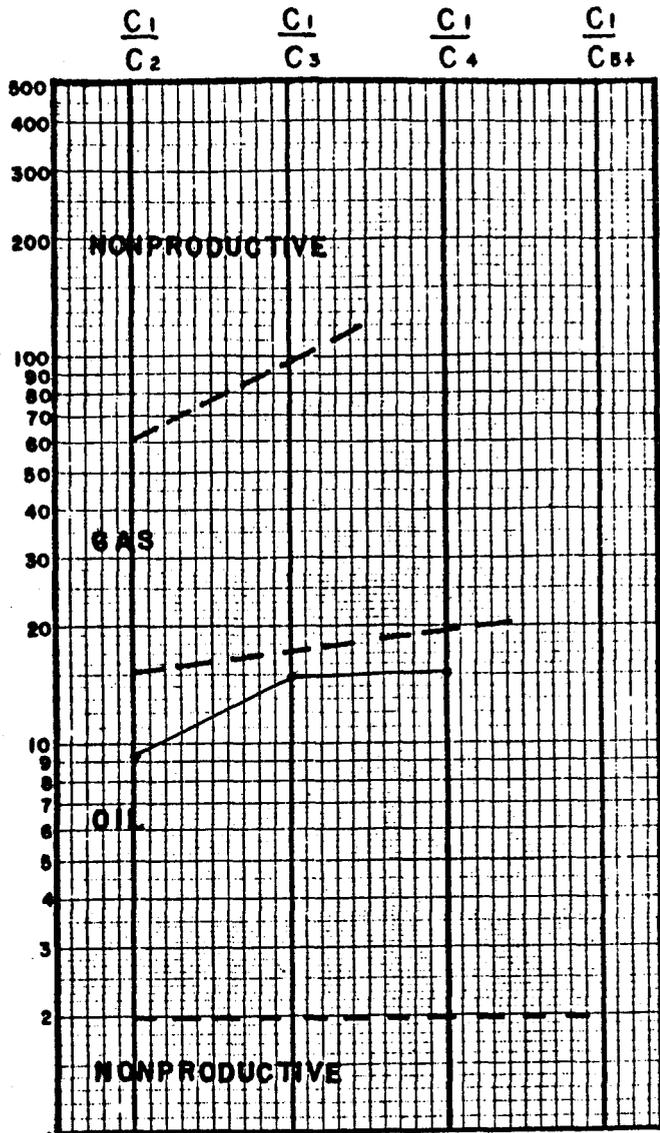
CALLED IN BY Sheperd/Ridley

TALKED TO G. Christianson

DATE 11/20/86 TIME 3:00 AM X PM _____

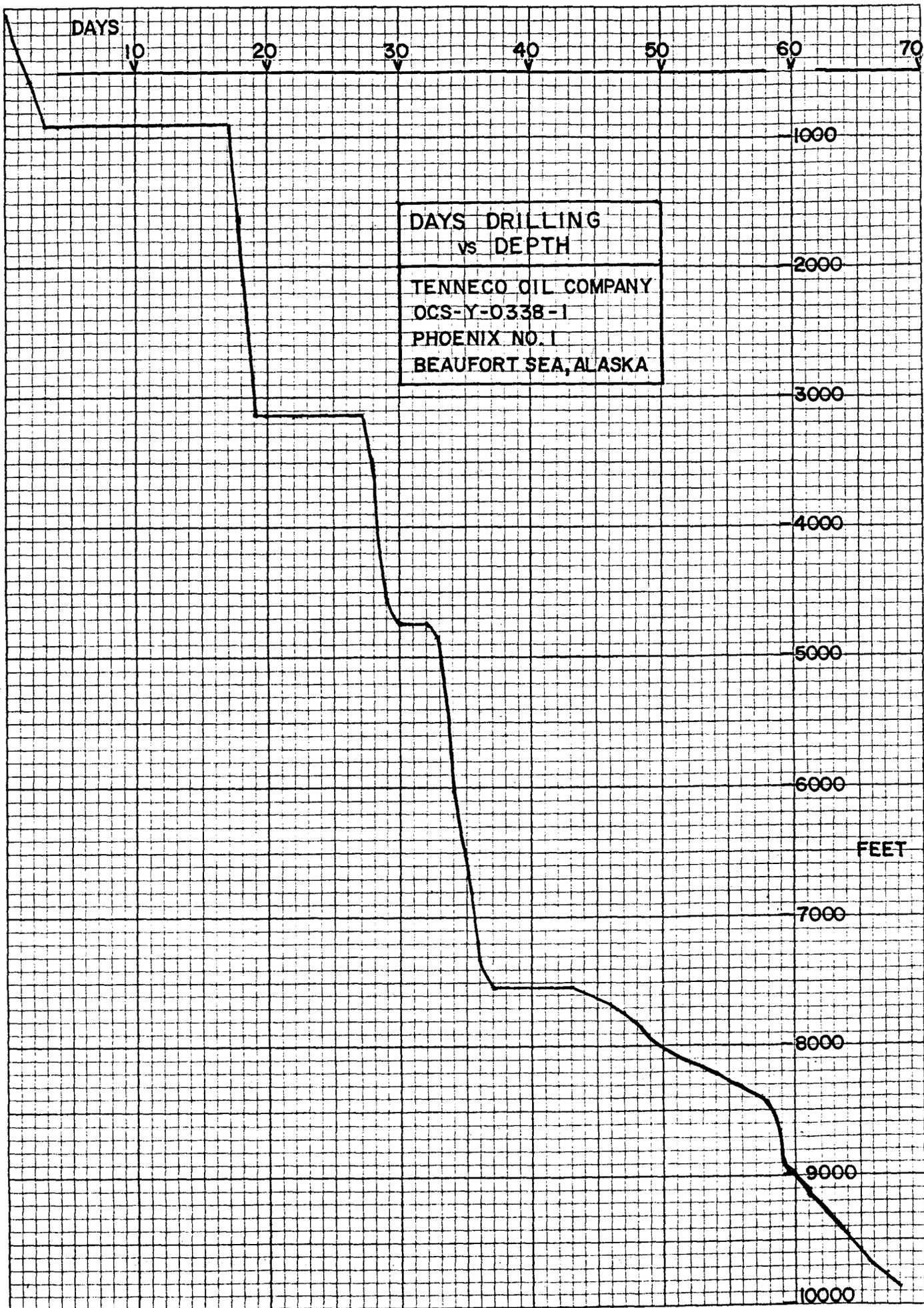
BR-30615

HYDROCARBON RATIOS

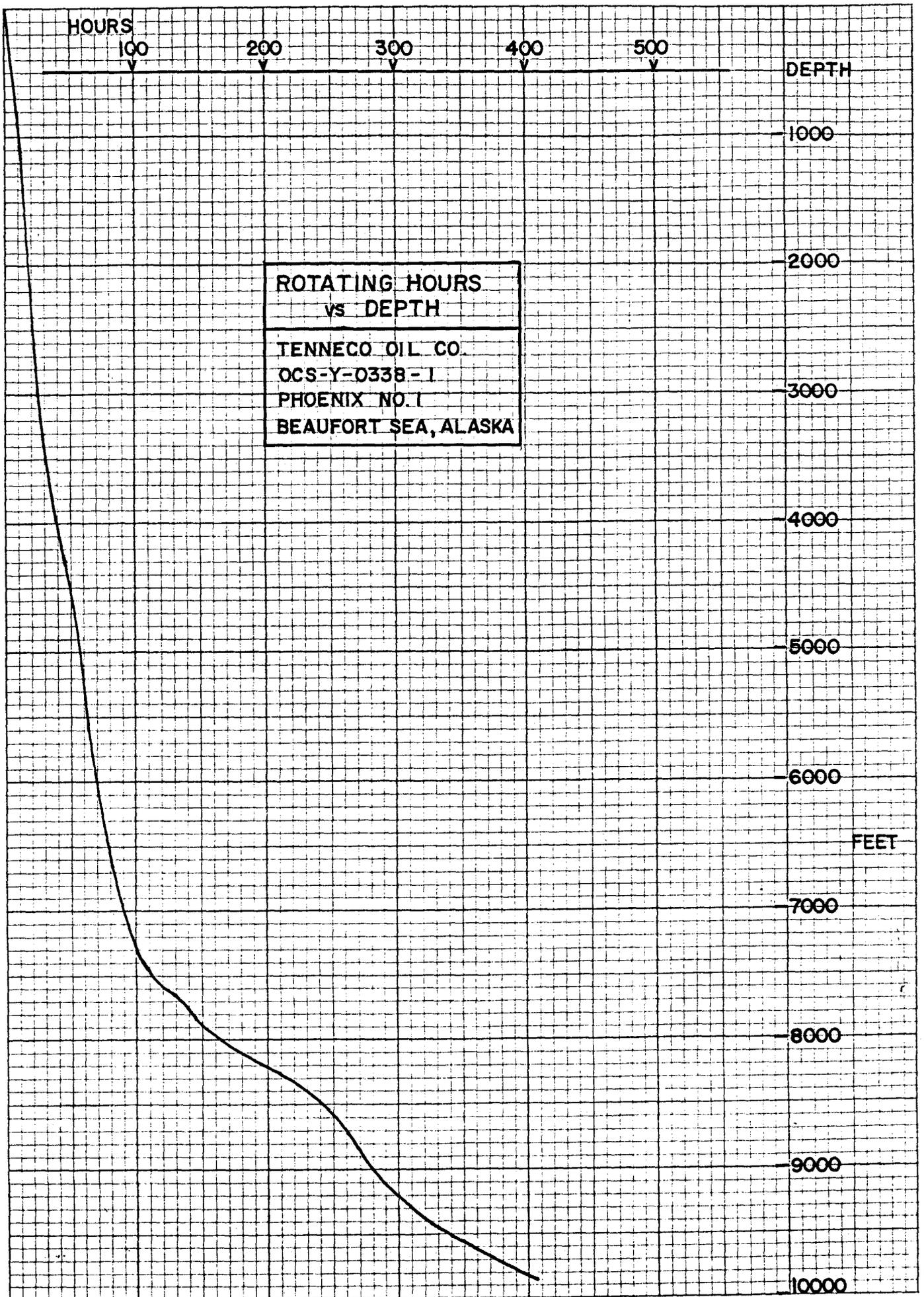


USE ONLY GAS INCREASE OVER BACKGROUND
 C₁: _____ M C₃: _____ M C₄: _____ M C₅+: _____ M
 C₂: _____ M
 C₁/C₂: _____ C₁/C₃: _____ C₁/C₄: _____ C₁/C₅+: _____

1. PLOT RATIOS ON LINES INDICATED.
2. EVALUATE SECTION FOR PROBABLE PRODUCTION AS INDICATED BY THE PLOTTED CURVE WITHIN THE FOLLOWING LIMITS:
 - a. PRODUCTIVE DRY GAS ZONES MAY SHOW ONLY C₁ BUT ABNORMALLY HIGH C₁ ONLY SHOWS ARE USUALLY INDICATIVE OF SALT WATER.
 - b. IF THE C₁/C₂ RATIO FALLS LOW IN THE OIL SECTION AND THE C₁/C₄ RATIO FALLS HIGH IN THE GAS SECTION THE ZONE IS PROBABLY NONPRODUCTIVE.
 - c. IF ANY RATIO (C_i/C_j EXCEPTED IF OIL MUD IS USED) IS LOWER THAN A PRECEDING RATIO THE ZONE IS PROBABLY NONPRODUCTIVE. FOR EXAMPLE, IF C₁/C₄ IS LESS THAN C₁/C₃ THE ZONE IS PROBABLY WET.
 - d. THE RATIOS MAY NOT BE DEFINITIVE FOR TIGHT, LOW PERMEABILITY ZONES.

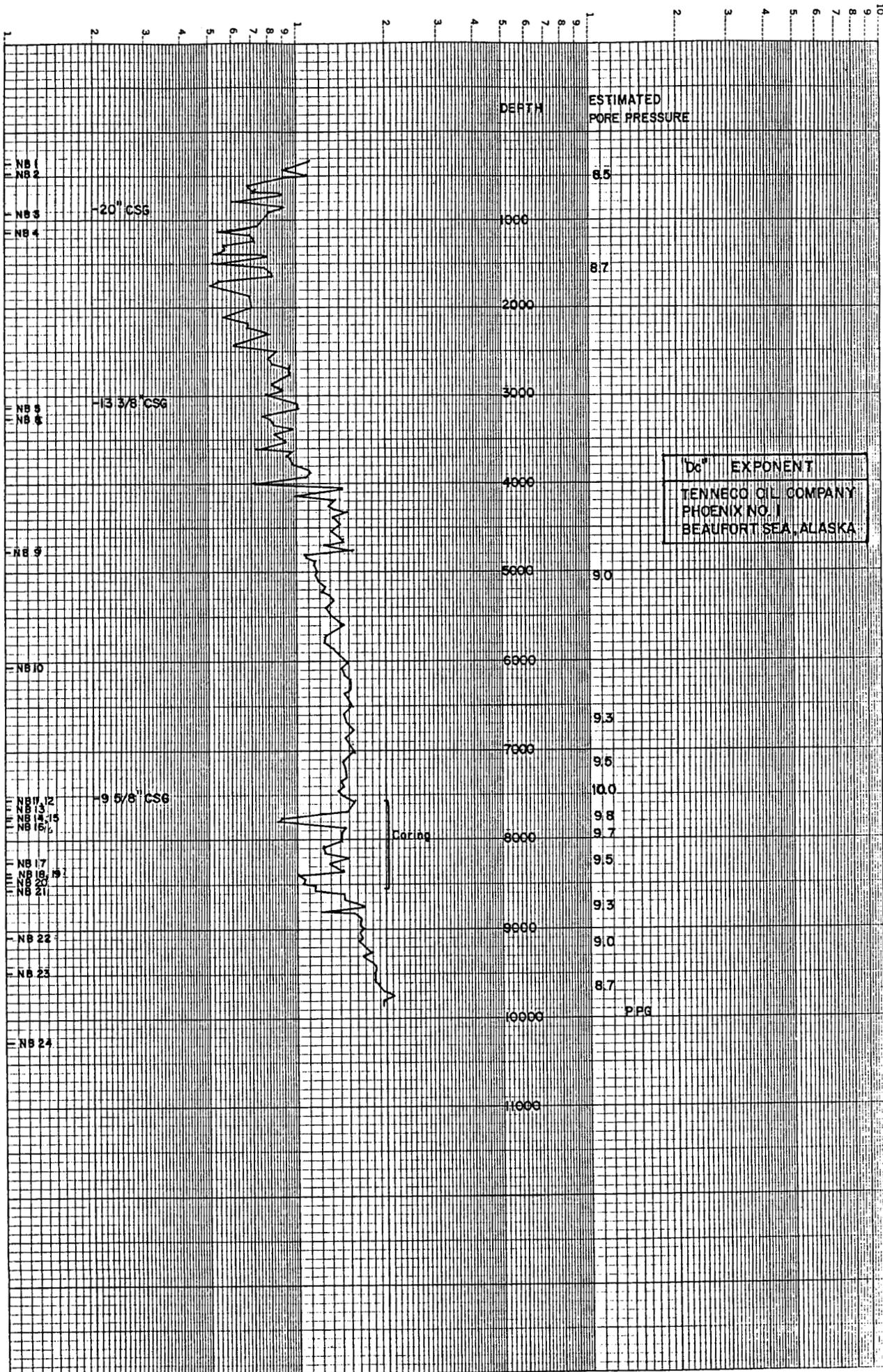


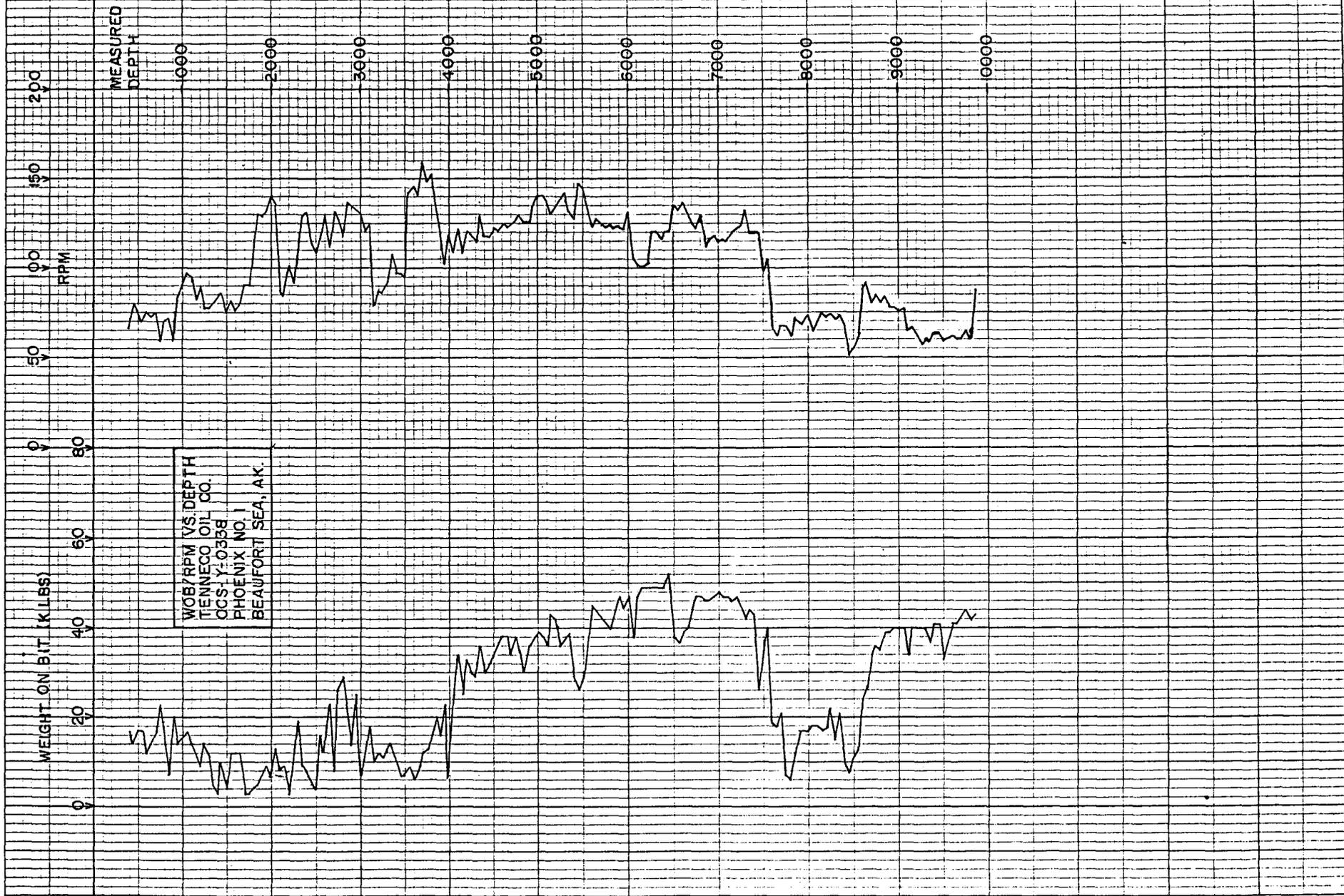
CLEARPRINT PAPER CO. C35 10 X 10 DIVISIONS PER INCH. 70 X 100 DIVISIONS.

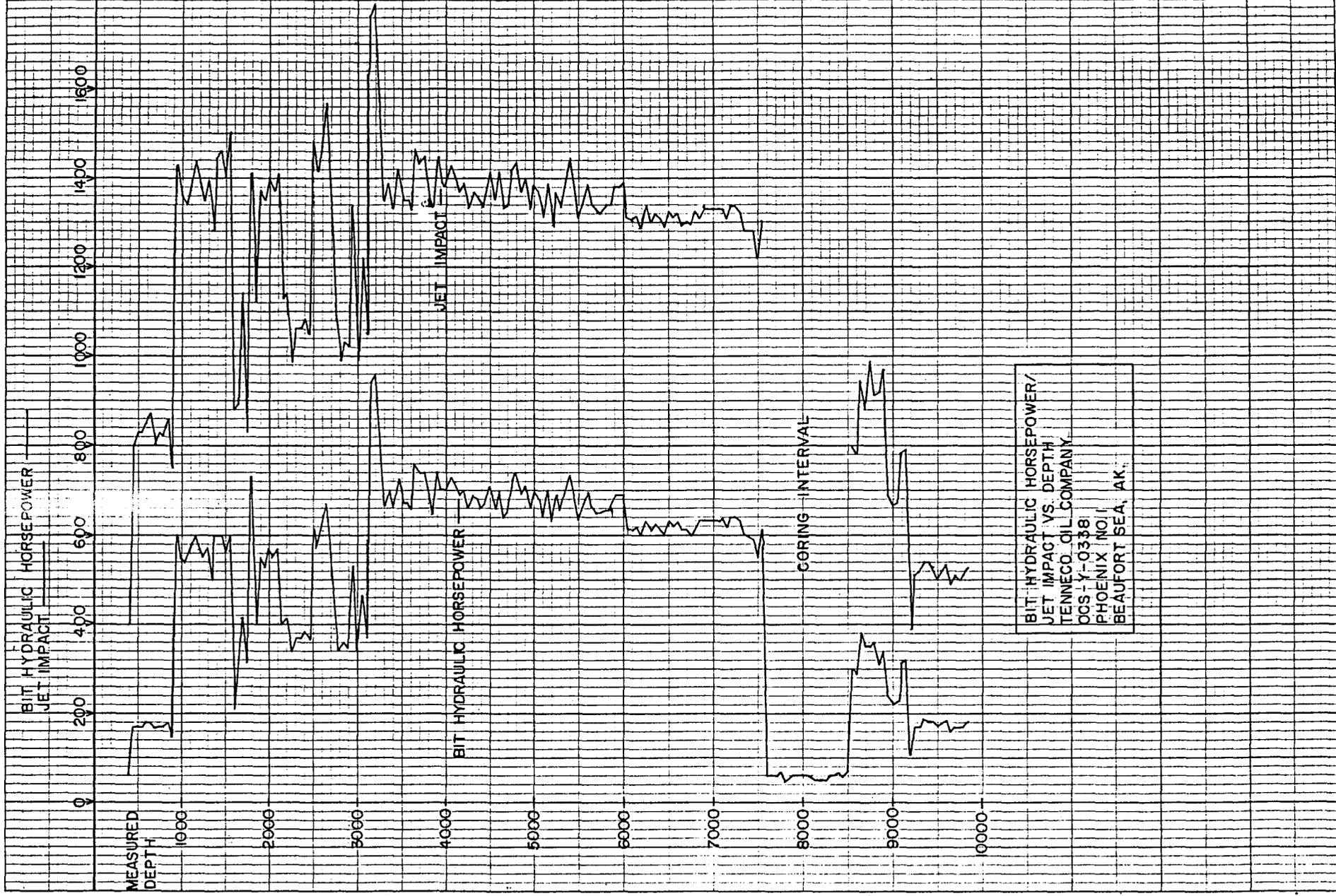


CLEARPRINT PAPER CO. C-35 10 X 10 DIVISIONS PER INCH. 70 X 100 DIVISIONS

PRINT







BIT RECORD

COUNTY			STATE			FIELD			SEC	TWP	RNG	LOCATION			WELL NO.			PAGE	
BEAUFORT SEA			ALASKA			WIDLCAT						BLK 284 HARRISON BAY			OCS-Y-0338-1			-1-	
CONTRACTOR			OPERATOR			SPUD			UNDER SURF	UNDER INT	UNDER LONG	UNDER LINER	UNDER LINER	REACHED TD	WELL NAME				
CANMAR			TENNECO			9/23/86			9-25-86	10-12-86	11-2-86	--	--	11-29-86	PHOENIX NO. 1				
NO.	SIZE	TYPE	JET	DEPTH OUT	FEET	HOURS	FT HR	ACCUM. DRLG. HRS.	TRIP TIME	HOURLY RIG COST	COST FT	WOB	RPM	PUMP PRES	FLOW GPM	GRADE T B G	VERT DEV	MUD WT	REMARKS
1	26	R-1	24,24 24	394	40	2.8	14.4	2.8	1000/ HR	7300	320	16	65	335	612	1 N C	3/4	8.7	
RR 1	26	R-1	24,24 24	471	77	2.3	33.5	5.1	1000/ HR	7300	363	15/20	75	350/ 770	610/ 800	2 4 I	---	9.1	
2	26	R-1	24,24 24	915	444	7.3	60.7	12.4	1000/ HR	7300	159	16	67	900	845	1 1 I	0	9.1	
3	17 1/2	R-1	16,16 16	1113	198	1.2	165.0	13.4	1000/ HR	7300	130	2/15	85/90	2360	716	2 3 I	1/2	9.0	
4	17 1/2	R-1	16,16 16	3126	2013	14.3	141.0	27.7	1000/ HR	7300	85	2/22	130	2200	684	3 3 1/8	1/4	9.1	
5	12 1/4	X3A	18,18 18	371	146	7.6	21.0	---	1000/ HR	7300	---	15/30	100	1200	800	1 1 I	---	8.5	DRLG. CEMENT
6	12 1/4	R419	3-6 6-9	372	1	1.0	1.0	---	1000/ HR	7300	---	0/5	375	900	480	NEW	---	8.5	DRLG. WITH MUD MOTOR
RR 5	12 1/4	X3A	18,18 18	540	168	1.2	140.0	---	1000/ HR	7300	---	15	100	1000	700	2 2 I	---	8.8	DRLG. CEMENT
RR 6	12 1/4	R419	3-6 6-9	576	36	0.7	51.0	---	1000/ HR	7300	---	0/5	375	900	480	INC	---	8.5	DRLG. WITH MUD MOTOR
7	12 1/4	X3A	16,16 16	3026	2450	15.3	75.0	---	1000/ HR	7300	75	20	100	2800	925	INC	.25	8.5	DRLG. CEMENT WITH SEA WATER
RR 7	12 1/4	X3A	16,16 16	3244	218	2.5	87.0	30.3	1000/ HR	7300	223	10	87	3030	887	2 2 I	0.4	8.8	DRLG. OUT SHOE

BIT RECORD

COUNTY			STATE			FIELD			SEC	TWP	RNG	LOCATION			WELL NO.		PAGE				
BEAUFORT SEA			ALASKA			WIDL CAT						BLK 284 HARRISON BAY			OCS-Y-0338-1		-2-				
CONTRACTOR			OPERATOR			SPUD			UNDER SURF	UNDER INT	UNDER LONG	UNDER LINER	UNDER LINER	REACHED TD	WELL NAME						
CANMAR			TENNECO			9/23/86			9-25-86	10-12-86	11-2-86	--	--	11-29-86	PHOENIX NO. 1						
NO.	SIZE	TYPE	JET	DEPTH OUT	FEET	HOURS	FT HR	ACCUM. DRLG. HRS.	TRIP TIME	HOURLY RIG COST	COST FT	WOB	RPM	PUMP PRES	FLOW GPM	GRADE T B G			VERT DEV	MUD WT	REMARKS
8	12 1/4	X3A	13,13 13	4740	1495	22.8	66.0	53.8	1000/ HR	8300	156	35	120	3000	605	7	3	1/8	0.4	9.2	
9	12 1/4	X3A	13,13 13	6017	1277	15.9	80.3	69.7	1000/ HR	8300	167	40/ 45	120/ 130	3000	566	5	2	I	0.8	9.4	
10	12 1/4	J11	13,13 13,13	7549	1532	40.5	38.0	110.4	1000/ HR	8300	322	25/ 50	120/ 130	3000	527	8	3	I	0.4	10.0	POH E LOG
-	12 1/4	JUNK BASKET	---	7549	--	0.6	5.0	111.0	1000/ HR	8300	---	8	25	1400	571	-	-	-	0.8	10.8	
11	8 1/2	X3A	12,12 12	7592	43	2.1	24.0	113.1	1000/ HR	8300	---	5/ 20	65	3000	474	5	1	I	0.8	10.5	
12	8 1/2	C201	TFA 0.5	7653	61	15.7	3.9	128.8	1000/ HR	8300	---	18	65	1150	297	100	-	-	--	10.5	CORE 1
13	8 1/2	C201	TFA 0.5	7714	61	11.8	5.3	140.6	1000/ HR	8300	---	20	70	110	303	10	-	-	--	10.5	CORE 2
14	8 1/2	X3A	12,12 12	7730	16	0.2	100.0	140.8	1000/ HR	8300	---	25	105	2675	450	1	1	I	--	10.8	
15	8 1/2	RC476	TFA 0.5	7816	86	4.3	20.0	145.1	1000/ HR	8300	---	7	65	835	286	N/A	N/A	-	--	10.8	CORE 3
RR	8 1/2	RC476	TFA 0.5	7889	73	4.6	16.0	149.7	1000/ HR	8300	---	15	75	1000	286	N/A	N/A	-	--	10.8	CORE 4
16	8 1/2	SC276 FD	TFA 0.5	8276	387	57.8	6.7	207.5	1000/ HR	8300	---	18	75	1000	286	N/A	N/A	-	--	10.8	CORE 5-9

BIT RECORD

COUNTY				STATE				FIELD				SEC	TWP	RNG	LOCATION				WELL NO.		PAGE
BEAUFORT SEA				ALASKA				WIDL CAT							BLK 284 HARRISON BAY				OCS-Y-0338-1		-3-
CONTRACTOR				OPERATOR				SPUD				UNDER SURF	UNDER INT	UNDER LONG	UNDER LINER	UNDER LINER	REACHED TD	WELL NAME			
CANMAR				TENNECO				9/23/86				9-25-86	10-12-86	11-2-86	--	--	11-29-86	PHOENIX NO. 1			
NO.	SIZE	TYPE	JET	DEPTH OUT	FEET	HOURS	FT HR	ACCUM. DRLG. HRS.	TRIP TIME	HOURLY RIG COST	COST FT	WOB	RPM	PUMP PRES	FLOW GPM	GRADE T B G			VERT DEV	MUD WT	REMARKS
17	8 1/2	FD	SC276 TFA 0.5	8358	82	12.4	6.6	219.9	1000/ HR	8300	NA	18	75	1000	286	N/A	N/A	-	--	10.8	CORE 10
16	8 1/2	FD	SC276 TFA 0.5	8362	4	1.8	2.2	221.7	1000/ HR	8300	NA	22	65	1200	286	N/A	N/A	-	--	10.8	CORE 11
18	8 1/2	J33	13,13 13	8377	15	0.9	16.7	231.0	1000/ HR	8300	6058	18	71	2600	400	OBT	SE	I	--	10.8	
19	8 1/2	SC226	TFA 0.5	8424	47	5.1	9.2	236.1	1000/ HR	8300	"	18	60	1250	300	-	-	-	--	10.8	CORE 12
20	8 1/2	SC226	TFA 0.5	8493	69	3.4	20.0	239.5	1000/ HR	8300	1783	9	54	1233	289	-	-	-	--	10.8	CORE 13
20	8 1/2	SC226	TFA 0.5	8543	50	8.4	6.0	247.9	1000/ HR	8300	3423	11	64	1347	306	-	-	-	--	10.8	CORE 14
21	8 1/2	J22	12,12 12	9075	532	35.6	14.9	283.5	1000/ HR	8300	814	40	70	2200	357	7	5	16	1.1	10.8	
22	8 1/2	J33	11,11 11	9475	400	47.1	8.5	330.6	1000/ HR	8300	1350	40	65	1750	287	4	SE	16	1.6	10.4	
23	8 1/2	J33	11,11 11	9751	276	53.4	5.2	384.0	1000/ HR	8300	2176	40	62	1750	294	4	5	16	2.0	10.2	
24	8 1/2	J33	11,11 11	9866	115	20.9	5.5	404.9	1000/ HR	8300	2557	42	60/85	1750	291	3	SE	I	6.5	10.2	T.D.

NL BAROID LOGGING SYSTEMS

DRILLING MUD RECORD

COMPANY: TENNECO OIL CO.
 WELL: PHOENIX NO. 1
 CONTRACTOR: CANMAR SSDC
 STOCKPOINT: PRUDHOE BAY, ALASKA

STATE: ALASKA
 COUNTY: OFFSHORE-BEAUFORT SEA
 LOCATION: BLK 284 HARRISON BAY
 ENGINEER: MIL PARK

CASING PROGRAM: 20 inch at 881 ft.
 13 3/8 inch at 3080 ft.
 9 5/8 inch at 7512 ft.
 TOTAL DEPTH: 9866 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	FILTRATION			RETORT			SAND	CEC	pH	FILTRATION ANALYSIS				REMARKS AND TREATMENT		
			Sec	API			PV	10 sec/10 min	ml API	HTHP	Cake	Solids %				Oil %	Water %	Mud Strip []	Pm		PF/ MF	CI ppm
1986	feet	lb/gal																				
9/22	344	8.5	82	9	40	29/33	15.6		2	6	0	94	1/8	31	9.5	0.40	.1/.3	3400	680		30" CONDUCTOR @ 344'	
9/23	471	9.0	67	11	43	30/38	16.0		2	5	0	95	1/2	32	9.0	0.70	.4/.6	3400	560		SPUD WELL	
9/24	915	9.1	72	14	37	27/38	15.6		2	6	0	94	1	30	10.0	0.80	.45/.6	3800	500		RUN 20" CSG	
9/25	915	9.0	66	13	29	23/37	16.2		2	5	0	95	1/2	30	9.5	0.60	.3/.5	3900	450		CMT 20"	
9/26	915	9.0	63	12	27	22/35	16.5		2	5	0	95	1/2	30	9.5	0.50	.25/.4	3900	450		WORK ON RISER	
9/27	915	8.8	42	9	22	17/29	18.4		2	4	0	96	1/4	20	9.0	0.35	.1/.2	1000	120		"	
9/28	915	8.8	40	7	18	15/24	18.2		2	4	0	96	1/4	20	9.0	0.30	.1/.15	800	80		"	
9/29	915	8.8	48	8	24	17/29	17.2		2	4	0	96	1/4	20	9.0	0.30	.1/.15	800	80		"	
9/30	915	8.6	38	5	14	10/17	17.4		2	3	0	97	1/4	15	9.0	0.30	.1/.15	700	80		"	
10/1	915	8.6	39	5	15	9/15	16.4		2	3	0	97	0	18	9.0	0.30	.15/.2	700	80		"	
10/2	915	8.6	38	5	17	11/17	17.2		2	3	0	97	0	18	9.0	0.30	.15/.2	700	80		"	
10/3	915	8.6	42	6	19	12/20	17.0		2	3	0	97	NIL	18	9.0	0.25	.15/.2	700	80		"	
10/4	915	8.6	40	6	17	9/18	16.6		2	3	0	97	NIL	18	9.0	0.25	.15/.2	700	80		CUT 30" CSG	
10/5	915	8.6	38	5	15	7/12	17.6		2	3	0	97	NIL	18	9.0	0.25	.15/.2	700	80		PULL RISER	
10/6	915	8.6	37	5	13	6/11	17.0		2	3	0	97	NIL	18	9.0	0.25	.15/.2	700	80		"	
10/7	915	8.6	38	6	15	8/12	16.6		2	3	0	97	NIL	18	9.0	0.25	.15/.2	700	80		RETRIEVE RISER LATCH	

NL BAROID LOGGING SYSTEMS

DRILLING MUD RECORD

COMPANY: TENNECO OIL CO.	STATE: ALASKA	CASING PROGRAM: 20 inch at 881 ft.
WELL: PHOENIX NO. 1	COUNTY: OFFSHORE-BEAUFORT SEA	13 3/8 inch at 3080 ft.
CONTRACTOR: CANMAR SSDC	LOCATION: BLK 284 HARRISON BAY	9 5/8 inch at 7512 ft.
STOCKPOINT: PRUDHOE BAY, ALASKA	ENGINEER: MIL PARK	TOTAL DEPTH: 9866 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	FILTRATION			RETORT			SAND	CEC	pH	FILTRATION ANALYSIS				REMARKS AND TREATMENT		
			Sec	API			PV	10 sec/ 10 min	ml API	HTHP	Cake 32nds	Solids %				Oil %	Water %	%	Mud me/mt		Strip [] Meter []	Pm
1986	feet	lb/gal																				
10/8	915	8.6	43	8	19	10/17	15.4		2	4	0	96	TR	20	10.5	0.85	.6/.75	700	80		RUN RISER & NIPPLE UP	
10/9	1088	9.0	85	12	39	18/25	20.8		2	6	0	94	1/2	25	11.0	2.40	1/1.1	900	200		DRLG.	
10/10	2790	9.1	65	15	29	13/22	13.5		2	6	0	94	3/4	22.5	10.5	1.50	.6/.8	1100	100		DRLG.	
10/11	3126	9.2	63	16	25	12/21	12.8		2	6.5	0	93.5	3/4	25	10.5	1.40	.55/.7	1100	80		E LOG	
10/12	3126	9.15	48	14	15	8/15	12.5		2	6	0	94	1/2	22.5	10.0	1.10	.5/.7	1000	100		RUN 13 3/8"	
10/13	3126	9.15	48	14	15	8/15	12.5		2	6	0	94	1/2	22	10.5	1.10	.5/.7	1000	100			
10/14	3126	9.15	49	15	16	9/17	12.8		2	6	0	94	1/2	25	10.0	1.10	.5/.7	1000	100			
10/15	3126	9.1	56	16	16	12/19	13.0		2	6	0	94	1/2	25	10.0	0.70	.5/.7	900	80		DRLG. CMT.	
10/16	3126	9.1	58	17	15	10/17	12.6		2	6	0	95	1/2	22	10.0	0.70	.4/.6	900	80		DRLG. CMT.	
10/17	3126	8.8	115	11	72	22/34	25.0		3	5	0	95	3/4	16	12.0	6.90	2.1/2.6	4300	1040		CEMENT CONTAMINATION	
10/18	3126	8.75	55	18	14	9/16	9.8		2	4	0	96	NIL	24	10.0	0.70	.5/1.1	500	40		LIGHTLY DISPERSE	
10/19	3262	8.8	43	14	6	3/10	11.1		2	4	0	96	1/8	22	10.5	0.80	.2/.5	1300	280		DRLG. FORMATION	
10/20	4437	9.2	39	9	6	4/11	12.4		2	5	0	95	1/4	22	10.5	1.40	.3/.6	7000	800		DRLG. FORMATION	
10/21	4739	9.2	39	10	5	5/13	15.2		2	5	0	95	1/4	20	10.5	1.60	.3/.7	6400	720		DRLG. FORMATION	
10/22	4739	9.2	39	11	7	4/13	15.0		2	5	0	95	1/4	20	10.5	1.60	.4/.7	6400	720		REPAIR RIG	
10/23	4739	9.2	40	12	8	5/14	15.8		2	5	0	95	1/4	20	10.5	1.50	.4/.7	6400	670		REPAIR RIG	

NL BAROID LOGGING SYSTEMS

DRILLING MUD RECORD

COMPANY: TENNECO OIL CO.	STATE: ALASKA	CASING PROGRAM: 20 inch at 881 ft.
WELL: PHOENIX NO. 1	COUNTY: OFFSHORE-BEAUFORT SEA	13 3/8 inch at 3080 ft.
CONTRACTOR: CANMAR SSDC	LOCATION: BLK 284 HARRISON BAY	SEC: TWP: RNG: 9 5/8 inch at 7512 ft.
STOCKPOINT: PRUDHOE BAY, ALASKA	ENGINEER: MIL PARK	TOTAL DEPTH: 9866 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	FILTRATION			RETORT			SAND	CEC	pH	FILTRATION ANALYSIS				REMARKS AND TREATMENT		
			Sec API	PV			10 sec/10 min	ml API	HTHP	Cake	Solids %	Oil %				Water %	Mud me/mt	Strip [] Meter []	Pm		PF/ MF	CI ppm
1986	feet	lb/gal																				
10/24	4739	9.2	38	10	6	4/12	15.6		2	5	0	95	1/4	20	10.0	1.40	.3/.4	6400	600	REPAIR RIG		
10/25	5732	9.3	42	10	9	5/21	12.8		2	6	0	94	1/4	32	11.0	2.00	.5/.75	2200	200			
10/26	6307	9.5	40	12	10	5/16	9.8		2	7.5	0	92.5	1/4	32	11.0	1.80	.45/.7	5400	100			
10/27	7323	9.5	40	10	9	4/12	8.2	17.5	2	7	0	93	1/4	32	10.5	1.40	.35/.55	3100	60			
10/28	7541	10.0	41	13	10	5/14	7.2	14.0	2	9	0	91	1/4	35	10.5	1.50	.35/.65	2800	60			
10/29	7541	10.8	55	25	14	3/9	4.2	12.8	2	14	0	86	1/4	30	10.5	1.70	.8/1.9	2300	180	RAISE WT.		
10/30	7541	10.8	58	26	16	4/9	4.4	12.8	2	14	0	86	1/4	30	10.5	1.30	.7/1.7	2200	120	E LOG		
10/31	7544	10.8	55	25	15	4/8	4.4	12.6	2	15	0	85	1/4	30	10.5	1.20	.5/1.6	2100	120			
11/1	7544	10.8	54	29	15	4/8	4.2	12.4	2	14	0	86	1/4	30	10.5	1.40	.6/1.7	2200	120	RUN 9 5/8" CSG		
11/2	7544	10.8	44	30	11	4/7	4.4	12.6	2	14	0	86	1/4	30	10.5	1.40	.6/1.3	2200	120	CMT		
11/3	7544	10.8	46	29	9	2/4	4.2	12.6	2	14	0	86	1/4	30	10.5	1.20	.6/1.8	2200	340	WOC		
11/4	7552	10.55	44	22	10	2/7	4.4	12.6	2	12	0	88	1/4	30	11.2	1.50	.7/1.7	3200	180	DRLG. CMT.		
11/5	7620	10.5	43	21	9	2/6	4.4	12.5	2	12	0	88	1/4	30	11.4	2.60	.7/1.5	3100	150			
11/6	7676	10.5	43	22	9	2/6	4.2	12.2	2	12	0	88	1/4	32	11.0	2.20	.6/1.5	3700	110	CORING		
11/7	7730	10.8	43	23	10	3/6	4.1	12.0	2	13.5	0	86.5	1/4	35	11.0	2.10	.45/1.5	4000	200	CORING		
11/8	7889	10.8	48	27	15	3/7	4.0	12.1	2	14	0	86	1/4	35	10.7	2.00	.45/1.5	3900	150	CORING		

NL BAROID LOGGING SYSTEMS

DRILLING MUD RECORD

COMPANY: TENNECO OIL CO.

 WELL: PHOENIX NO. 1

 CONTRACTOR: CANMAR SSDC

 STOCKPOINT: PRUDHOE BAY, ALASKA

STATE: ALASKA

 COUNTY: OFFSHORE-BEAUFORT SEA

 LOCATION: BLK 284 HARRISON BAY

 ENGINEER: MIL PARK

CASING PROGRAM: 20 inch at 881 ft.

 13 3/8 inch at 3080 ft.

 9 5/8 inch at 7512 ft.

 TOTAL DEPTH: 9866 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	FILTRATION				RETORT		SAND	CEC	pH	FILTRATION ANALYSIS				REMARKS AND TREATMENT
			lb/gal	Sec API			PV	ml	HTHP	Cake	Solids	Oil				Water	%	Mud	Strip []	
1986	feet					10 sec/ 10 min	API	32nds	%	%	%	%	me/mt	Meter []			ppm	ppm		
11/9	7943	10.8	44	23	10	2/4	3.9	11.5	2	14.5	0	85.5	1/4	35	10.9	2.00	.55/1.6	3800	120	
11/10	8042	10.8	45	23	11	2/5	4.2	12.4	2	14	0	86	1/4	30	11.0	2.00	.65/1.8	3300	180	
11/11	8068	10.8	46	25	12	2/5	4.0	12.0	2	14	0	86	1/4	30	10.7	2.00	.5/1.65	3400	160	
11/12	8203	10.8	45	24	12	2/4	4.0	11.4	2	14	0	86	1/4	30	10.9	2.30	.65/1.9	3300	200	
11/13	8276	10.8	47	27	12	3/6	3.8	13.0	2	17	TR	83	1/4	30	11.0	1.60	.8/2.5	3300	180	
11/14	8358	10.8	45	24	10	2/5	3.9	12.4	2	15	TR	85	1/4	32	11.0	1.70	.75/2.1	3000	200	
11/15	8362	10.8	46	25	10	2/5	3.8	12.2	2	15	TR	85	1/4	32	10.7	1.50	.5/1.7	2900	240	
11/16	8377	10.8	48	24	12	2/6	3.8	12.0	2	16	TR	84	1/4	32	11.0	1.60	.6/1.8	2900	260	
11/17	8455	10.8	47	26	14	2/5	3.8	12.4	2	15	TR	85	1/4	32	11.0	1.80	.7/1.9	3000	260	
11/18	8543	10.8	48	25	12	3/5	4.0	12.6	2	15	TR	85	1/4	32	10.8	1.70	.65/1.5	3000	290	
11/19	8824	10.8	46	25	11	2/4	3.7	11.8	2	15	0	85	1/4	33	10.8	1.90	.45/1.6	3100	250	
11/20	8940	10.8	47	27	10	2/5	3.9	11.5	2	14	0	86	1/4	32	11.0	2.20	.6/1.5	2500	220	
11/21	9092	10.8	48	28	11	2/5	4.1	12.0	2	14	0	86	1/4	32	10.9	2.30	.6/1.8	2500	200	
11/22	9200	10.4	44	22	7	2/4	4.2	12.8	2	12.5	0	87.5	1/4	31	10.7	1.85	.55/1.7	1700	150	Lost Circulation
11/23	9363	10.4	43	22	6	2/4	4.0	12.1	2	13	0	87	1/4	32	11.0	2.40	.7/2.0	1400	120	Partial Returns
11/24	9470	10.4	44	25	7	2/5	3.9	11.8	2	13	0	87	1/4	31	11.1	2.40	.7/1.95	1100	120	PARTIAL RETURNS

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -1-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOO KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
350																
375	10	1.15	15	107	64	188	61	408	611	328	8.7	8.7			44	42
400	29	0.98	17	95	66	189	60	401	613	353	8.6	8.6			44	41
425	66	0.90	24	99	72	189	61	409	611	401	8.6	8.6			42	41
450	47	0.88	14	107	79	145	169	803	677	538	8.6	8.6			43	42
475	10	1.24	15	96	76	149	147	732	825	772	8.6	8.6			42	39
500	19	1.08	17	90	74	177	172	830	837	801	9.0	9.1			46	39
525	29	0.99	16	97	74	145	172	825	851	840	9.0	9.1			47	38
550	250	0.88	17	90	70	137	173	830	853	869	9.0	9.1			47	44
575	94	0.77	17	90	76	148	173	828	856	910	9.0	9.1			48	44
600	62	0.80	12	92	74	116	179	849	862	940	9.0	9.1			47	45
625	59	0.83	14	92	75	114	174	836	857	928	9.0	9.1			47	46
650	126	0.68	14	96	72	156	182	873	855	939	9.0	9.1			47	46
675	108	0.73	18	93	69	150	164	803	857	897	9.1	9.1			48	46
700	140	0.69	17	94	74	143	165	804	839	920	9.1	9.3			48	47
725	179	0.60	13	98	72	130	175	838	855	953	9.1	9.2			48	46

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -2-

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
FT.	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS]FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
750	53	0.90	23	98	60	143	173	832	854	966	9.1	9.4			48	48
775	50	0.92	23	98	63	178	179	849	853	946	9.1	9.4			50	47
800	89	0.78	19	92	68	182	169	818	862	952	9.1	9.4			48	47
825	109	0.79	22	93	76	171	168	817	847	933	9.1	9.4			51	47
850	297	0.45	7	96	73	132	182	860	866	988	9.1	9.4			48	46
875	182	0.57	10	96	72	139	180	853	866	998	9.1	9.4			47	46
900	43	0.91	20	97	61	136	148	748	816	908	9.1	9.4			47	42
925	57	0.93	17	101	70	146	561	1364	742	1973	8.6	8.6	8.9	8.9	40	44
950	191	0.68	14	105	83	141	603	1430	764	2125	8.6	8.6	10.2	10.2	41	44
975	137	0.76	14	102	90	137	551	1358	748	2068	8.8	8.9	10.6	10.6	41	45
1000	188	0.72	15	103	93	151	554	1363	740	2049	8.8	8.9	9.6	9.6	43	46
1025	197	0.72	15	106	97	154	538	1337	740	2080	8.8	8.9	9.3	9.3	43	46
1050	193	0.74	17	107	97	161	541	1341	735	2065	8.8	8.9	9.4	9.4	43	46
1075	177	0.75	17	106	93	169	565	1382	744	2151	8.8	8.9	9.6	9.6	43	46
1100	220	0.67	14	108	95	151	563	1377	744	2156	8.8	9.0	9.8	9.8	43	46
1125	162	0.66	10	122	85	109	612	1457	751	2222	8.8	9.0	10.6	9.8	47	45

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -3-

DEPTH FT.	DRILL RATE [X] FT/HR. [] MIN/FT.	MODIFIED D EXPONENT	WEIGHT ON BIT KLB	MAXIMUM HOOKLOAD KLB	ROTARY SPEED RPM	TORQUE [X]AMPS [] FT/LBS	BIT HYDRAULIC HORSEPOWER	JET IMPACT FORCE	FLOW IN GPM	STANDPIPE PRESSURE PSI	DENSITY IN PPG	DENSITY OUT PPG	CONDUCTIVITY IN MMHO	CONDUCTIVITY OUT MMHO	TEMP. IN (F)	TEMP. OUT (F)
1150	340	0.53	11	118	83	106	600	1438	765	2340	8.8	9.0	7.3	7.3	55	45
1175	122	0.74	11	130	85	109	584	1411	761	2347	8.8	9.0	12.7	7.6	46	55
1200	142	0.69	9	127	90	96	572	1392	754	2354	8.8	9.0	11.9	7.2	46	53
1225	139	0.67	9	131	77	90	560	1373	745	2342	8.8	9.0	11.9	7.2	46	53
1250	157	0.71	14	131	77	101	547	1351	740	2346	8.8	9.0	11.8	7.6	45	53
1275	170	0.70	14	128	78	107	577	1400	746	2416	8.8	9.0	11.9	7.6	45	53
1300	253	0.57	11	128	78	90	574	1395	746	2419	8.8	9.0	12.2	7.4	46	53
1325	174	0.65	11	128	77	86	581	1407	743	2404	8.8	9.0	12.1	7.3	45	53
1350	172	0.57	5	128	80	94	504	1279	745	2411	8.8	9.0	12.1	7.8	45	53
1375	189	0.52	3	129	90	93	556	1367	742	2376	8.8	9.0	11.9	7.6	45	53
1400	189	0.52	3	129	84	86	605	1445	760	2507	8.8	9.0	12.0	7.8	44	53
1425	108	0.73	9	130	85	110	579	1425	750	2475	9.2	9.5	11.9	7.2	43	52
1450	97	0.78	10	133	86	118	603	1463	739	2430	9.2	9.5	12.0	7.1	48	53
1475	180	0.57	5	130	87	87	596	1452	752	2525	9.2	9.5	12.3	7.2	47	55
1500	192	0.51	4	133	75	83	565	1401	739	2488	9.2	9.5	12.1	7.3	46	53
1525	116	0.68	8	134	80	107	552	1379	732	2432	9.2	9.5	12.1	7.1	45	53

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -4-

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
FT.	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
1550	95	0.79	12	133	82	133	605	1496	680	2515	9.2	9.5	12.0	7.0	44	54
1575	101	0.73	9	136	79	118	640	1522	769	2576	9.2	9.5	11.9	6.0	43	57
1600	82	0.81	12	135	76	135	280	879	708	2277	9.2	9.5	11.9	6.2	42	52
1625	72	0.86	12	136	87	135	615	1483	715	2374	9.2	9.5	11.9	6.1	42	52
1650	77	0.83	12	135	79	136	336	991	721	2403	9.2	9.5	11.8	5.2	41	51
1675	97	0.80	13	135	81	139	391	1096	631	1882	9.2	9.5	11.8	5.2	42	51
1700	185	0.54	3	135	91	89	417	1144	653	1994	9.2	9.5	11.7	5.8	42	51
1725	192	0.53	3	137	91	95	282	882	662	2058	9.2	9.5	11.7	5.7	42	51
1750	213	0.51	3	138	92	103	256	826	671	2072	9.2	9.5	11.6	5.8	42	51
1775	181	0.58	4	136	99	113	563	1398	651	2004	9.2	9.5	11.7	5.8	42	51
1800	194	0.58	4	135	118	117	733	1404	733	2460	9.2	9.5	11.9	5.7	42	51
1825	197	0.59	3	137	136	134	482	1260	710	2473	9.2	9.5	11.6	5.3	41	51
1850	172	0.64	5	141	129	147	402	1117	695	2247	9.2	9.5	11.9	5.4	41	51
1875	196	0.65	6	142	134	127	400	1112	655	2034	9.2	9.5	11.7	5.2	41	51
1900	185	0.69	8	148	129	124	547	1371	706	2328	9.2	9.5	11.8	5.3	41	51
1925	180	0.71	9	140	130	131	561	1394	724	2436	9.2	9.5	11.8	5.2	41	51

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -5-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS]FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
1950	237	0.67	9	141	132	131	533	1349	728	2474	9.2	9.5	11.8	5.0	42	51
1975	240	0.74	13	142	138	160	544	1367	728	2480	9.2	9.5	11.8	5.0	42	51
2000	192	0.68	7	141	139	118	568	1406	730	2506	9.2	9.5	11.8	5.2	41	52
2025	186	0.64	5	140	137	113	525	1334	727	2504	9.2	9.6	11.6	5.7	42	50
2050	156	0.81	13	141	135	153	547	1371	723	2506	9.2	9.6	11.5	5.6	41	50
2075	206	0.58	5	141	110	102	570	1409	727	2530	9.2	9.6	11.8	5.8	42	50
2100	183	0.63	8	143	87	121	570	1409	737	2612	9.2	9.6	11.6	5.7	36	50
2125	227	0.50	4	140	77	92	579	1425	740	2651	9.2	9.6	11.6	5.7	38	49
2150	165	0.64	9	144	84	124	405	1123	675	2243	9.2	9.6	11.5	5.6	41	50
2175	98	0.84	14	143	96	141	510	1308	642	2023	9.2	9.6	11.4	5.6	41	50
2200	184	0.55	3	147	101	93	413	1137	668	2246	9.2	9.6	11.2	5.6	42	49
2225	204	0.54	4	148	89	107	328	975	628	1980	9.2	9.6	11.1	5.5	42	49
2250	184	0.64	9	145	92	129	336	991	583	1734	9.2	9.6	11.0	4.9	42	49
2275	191	0.66	9	146	98	130	331	981	615	1956	9.2	9.6	11.1	5.4	43	49
2300	134	0.87	19	146	111	187	371	1059	621	2050	9.2	9.6	10.9	5.2	40	49
2325	140	0.91	20	145	129	202	371	1059	639	2063	9.2	9.6	10.7	5.3	40	49

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -6-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOO KLB	SPEED RPM	[X] AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
2350	121	0.79	9	145	139	136	371	1059	639	2073	9.2	9.6	10.6	5.4	38	49
2375	151	0.82	13	149	133	166	392	1094	651	2147	9.1	9.3	10.7	4.9	38	49
2400	179	0.69	8	149	131	133	385	1081	658	2159	9.1	9.3	10.7	4.8	39	49
2425	180	0.60	4	148	122	121	373	1058	646	2067	9.1	9.3	10.7	4.7	39	49
2450	160	0.63	5	149	114	146	367	1048	642	2051	9.1	9.3	10.7	4.7	39	49
2475	138	0.77	10	151	119	173	373	1058	640	2053	9.1	9.3	10.6	4.8	40	49
2500	101	0.67	4	148	109	161	618	1482	751	2726	9.1	9.3	10.6	5.3	41	50
2525	84	0.92	14	166	118	174	611	1472	756	2771	9.1	9.3	10.9	4.6	41	49
2550	110	0.91	18	149	116	217	575	1413	750	2711	9.1	9.3	10.7	4.1	43	49
2575	160	0.80	13	156	136	179	616	1478	744	2639	9.1	9.3	10.5	4.1	43	48
2600	168	0.83	16	157	130	160	613	1475	675	2752	9.1	9.3	10.5	4.1	43	48
2625	196	0.65	8	158	108	110	590	1437	773	2712	9.1	9.3	10.5	4.0	41	48
2650	104	0.97	23	163	113	159	670	1565	768	2844	9.1	9.3	10.6	3.8	39	48
2675	143	0.97	30	156	118	223	590	1437	760	2776	9.1	9.3	10.5	3.7	42	48
2700	186	0.70	8	156	132	114	547	1367	746	2657	9.1	9.3	10.5	3.8	43	48
2725	106	0.97	21	157	124	136	575	1413	741	2634	9.1	9.3	10.6	3.7	43	48

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -7-

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
FT.	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
2750	131	0.98	26	157	128	195	386	1084	677	2266	9.1	9.3	10.9	3.7	44	48
2775	157	0.93	25	160	134	202	448	1197	674	2255	9.1	9.3	11.4	3.4	44	48
2800	112	1.02	29	159	118	209	339	993	680	2295	9.1	9.3	11.9	3.4	45	49
2825	155	0.95	27	159	129	210	343	1002	621	1945	9.1	9.3	11.3	3.5	45	49
2850	166	0.90	22	160	136	191	360	1035	634	2027	9.1	9.3	11.2	3.7	45	49
2875	174	0.87	19	160	138	173	354	1022	632	2011	9.1	9.3	10.9	3.5	44	49
2900	188	0.78	14	161	134	156	354	1022	631	1999	9.1	9.3	10.8	3.1	45	49
2925	161	0.86	19	160	128	200	343	1002	629	1991	9.1	9.3	11.2	3.4	46	49
2950	153	0.94	25	161	133	202	529	1337	722	2562	9.1	9.2	11.7	3.6	46	49
2975	204	0.73	12	162	125	207	590	1437	747	2743	9.1	9.2	12.0	3.4	46	49
3000	108	0.78	7	163	131	218	339	993	682	2371	9.1	9.2	12.3	3.4	45	49
3025	101	0.85	11	158	125	205	295	905	605	1881	9.1	9.2	11.1	3.4	44	48
3050	92	0.92	15	157	120	213	463	1222	639	2063	9.1	9.2	10.9	3.4	44	48
3075	93	0.92	15	159	122	226	369	1051	684	2319	9.1	9.2	10.6	3.4	44	48
3100	62	1.05	18	160	124	175	371	1054	641	2054	9.1	9.2	10.6	3.3	39	48
3125	71	1.08	22	161	127	195	427	1159	666	2192	9.1	9.2	10.9	3.3	40	48

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -8-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS []FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
3150	99	0.80	10	142	79	117	941	1940	886	3009	8.8	8.8	9.0	10.4	67	67
3175	100	0.83	12	142	80	123	941	1940	885	3001	8.8	8.8	9.0	10.5	67	67
3200	135	0.80	12	144	87	128	960	1966	860	3016	8.8	8.8	9.0	10.8	67	67
3225	141	0.75	10	144	87	112	928	1922	887	3034	8.8	8.8	9.0	11.0	68	71
3250	133	0.78	11	173	86	121	147	489	808	3003	8.8	8.8	9.0	9.6	72	68
3275	209	0.58	4	158	89	146	685	1367	617	2942	8.8	8.8	9.0	9.2	72	68
3300	127	0.82	12	159	93	169	668	1345	603	2987	8.8	8.8	9.0	9.8	78	68
3325	62	1.13	21	157	100	176	702	1390	604	2985	8.8	8.8	9.0	9.4	72	70
3350	157	0.84	14	158	108	166	698	1385	608	2290	8.8	8.8	9.0	9.3	71	70
3375	59	0.94	9	158	99	125	705	1393	612	2987	8.8	8.8	9.0	10.2	70	72
3400	53	0.99	10	158	97	120	660	1335	604	2911	8.8	8.9	9.5	10.2	72	73
3425	83	0.85	8	158	94	115	712	1403	600	2875	8.8	9.0	9.5	10.2	74	74
3450	76	0.84	7	163	97	104	726	1421	609	3000	8.7	8.9	9.5	11.0	75	74
3475	72	0.86	7	164	98	104	709	1398	611	3000	8.8	8.9	9.5	10.5	77	75
3500	69	0.87	7	159	95	102	671	1348	596	2882	8.8	8.9	9.9	10.3	76	76
3525	59	0.94	9	162	99	107	705	1393	602	2929	8.8	9.0	9.9	10.2	79	78

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -9-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR.	D	ON BIT	HOOKLOOD	SPEED	[X]AMPS	HYDRAULIC	IMPACT	IN	PRESSURE	IN	OUT	IN	OUT	IN	OUT
	[]MIN/FT.	EXONENT	KLB	KLB	RPM	[]FT/LBS	HORSEPOWER	FORCE	GPM	PSI	PPG	PPG	MMHO	MMHO	(F)	(F)
3550	98	0.92	9	162	143	152	671	1348	608	2970	8.8	9.0	9.5	10.0	79	77
3575	89	0.89	7	163	144	208	668	1345	599	2938	8.8	9.0	9.0	9.5	81	77
3600	184	0.73	6	163	146	193	658	1331	597	2919	8.8	9.0	9.0	9.2	82	78
3625	101	0.92	9	164	146	211	698	1385	601	2971	8.8	9.0	9.1	9.0	83	79
3650	67	0.98	9	167	141	212	759	1464	614	3073	8.8	9.0	9.0	9.0	85	82
3675	100	0.93	9	168	146	227	727	1428	612	3049	8.9	9.1	9.0	9.3	84	83
3700	113	0.96	12	164	159	249	741	1433	615	3084	8.9	9.1	9.0	10.0	84	83
3725	115	0.93	11	165	151	324	739	1443	616	3104	8.9	9.0	9.0	10.0	85	84
3750	108	0.97	13	166	148	321	742	1448	619	3124	8.8	9.0	9.2	10.2	85	84
3775	70	1.12	17	168	143	290	695	1325	604	3000	8.8	9.1	9.0	10.0	86	84
3800	73	1.11	15	166	152	280	668	1345	598	2941	8.9	9.0	9.0	9.5	87	84
3825	124	0.98	14	167	159	233	661	1335	598	2956	8.9	9.0	9.0	10.2	87	86
3850	54	1.15	20	174	137	301	328	837	598	3090	8.8	9.0	9.0	9.9	88	86
3875	47	1.16	14	168	120	421	720	1413	578	3073	8.8	9.0	9.0	9.7	88	87
3900	68	1.08	16	170	113	456	744	1444	613	3106	8.8	9.0	9.0	9.8	88	87
3925	451	0.63	14	171	119	414	705	1393	616	3124	8.8	9.0	9.0	9.8	88	87

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -10-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOAD KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
3950	80	1.10	23	168	103	447	702	1390	610	3089	8.8	9.0	9.0	9.8	87	85
3975	194	0.83	16	169	111	441	691	1375	605	3061	8.8	9.0	9.0	9.7	87	86
4000	239	0.67	7	170	119	416	695	1380	605	3078	8.8	9.0	9.0	9.7	97	86
4025	50	1.32	30	171	106	449	734	1431	605	3085	8.8	9.0	9.0	9.7	88	86
4050	93	1.11	25	171	109	452	734	1431	586	3074	8.8	9.0	9.0	9.6	89	89
4075	236	0.88	25	172	117	528	734	1431	617	3100	8.8	9.0	9.0	9.5	89	90
4100	44	1.46	34	171	122	524	716	1408	613	3163	8.8	9.0	9.0	9.4	90	90
4125	28	1.62	35	177	118	449	651	1321	608	3109	8.8	9.0	9.0	9.3	91	90
4150	144	1.00	23	175	108	483	688	1371	594	2991	8.8	9.0	9.0	9.4	91	90
4175	96	1.19	33	177	106	481	712	1403	601	3037	8.8	9.0	9.0	9.4	92	90
4200	47	1.42	33	178	121	478	705	1393	612	3132	8.8	9.0	9.7	9.4	91	90
4225	108	1.11	28	176	110	440	759	1464	613	3131	8.8	9.0	9.7	9.4	91	91
4250	66	1.29	30	175	119	439	661	1335	600	3125	8.8	9.0	9.7	9.4	90	90
4275	44	1.31	24	175	118	474	651	1321	594	2981	8.8	9.0	9.7	9.3	91	90
4300	54	1.33	29	175	115	496	688	1371	596	2999	8.8	9.0	9.7	9.3	92	90
4325	56	1.40	34	176	124	491	685	1387	604	3074	8.8	9.0	9.7	9.4	92	91

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -11-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOO KLB	SPEED RPM	[X]AMPS]FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
4350	38	1.50	36	179	129	363	681	1362	604	3063	8.8	9.0	9.7	9.3	94	93
4375	44	1.43	31	183	123	470	705	1393	609	3130	8.8	9.0	9.7	10.3	95	94
4400	55	1.35	30	184	118	423	661	1335	605	3103	8.8	9.0	9.7	11.3	96	98
4425	45	1.43	31	178	122	402	709	1398	600	3063	9.1	9.0	9.7	11.0	98	98
4450	42	1.42	31	179	118	375	666	1357	595	3033	9.1	9.1	9.7	11.3	99	100
4475	53	1.36	32	180	123	373	715	1423	605	3118	9.1	9.2	10.5	11.0	99	100
4500	47	1.40	34	186	122	349	711	1418	598	3054	9.2	9.2	10.7	11.3	100	100
4525	54	1.37	34	180	123	357	738	1458	605	3137	9.2	9.2	10.7	12.0	99	100
4550	65	1.33	37	183	121	374	660	1354	598	3070	9.2	9.2	10.1	13.0	100	100
4575	55	1.37	38	184	114	344	664	1359	586	3032	9.2	9.3	11.1	13.0	100	98
4600	56	1.39	38	184	125	377	705	1415	598	3157	9.2	9.2	12.1	14.1	100	98
4625	56	1.41	39	185	127	379	654	1345	589	3102	9.2	9.3	11.1	13.0	mud cooler - 42 @ SURFACE	
4650	43	1.45	38	185	122	358	643	1330	584	3052	9.2	9.3	11.5	13.0	42	54
4675	130	1.06	29	185	120	326	647	1335	581	3043	9.2	9.2	12.0	13.0	43	56
4700	85	1.22	34	198	124	337	647	1335	586	3064	9.2	9.2	12.2	14.6	43	56
4725	21	1.68	39	189	128	358	647	1372	592	3121	9.2	9.3	12.2	14.0	43	53

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -12-

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
FT.	[X] FT/HR.	D	ON BIT	HOOKLOOD	SPEED	[X]AMPS	HYDRAULIC	IMPACT	IN	PRESSURE	IN	OUT	IN	OUT	IN	OUT
	[] MIN/FT.	EXONENT	KLB	KLB	RPM	[] FT/LBS	HORSEPOWER	FORCE	GPM	PSI	PPG	PPG	MMHO	MMHO	(F)	(F)
4750	34	1.55	38	166	126	345	724	1415	592	3110	9.2	9.2	13.3	18.5	91	62
4775	143	1.03	36	273	120	233	709	1396	585	3087	9.2	9.2	13.3	18.6	86	64
4800	151	1.09	35	206	130	223	739	1435	581	3064	9.2	9.2	13.3	17.8	74	64
4825	111	1.06	25	203	129	203	713	1401	583	3079	9.2	9.2	13.3	17.9	69	61
4850	119	1.08	30	217	126	216	691	1372	581	3086	9.2	9.2	13.3	17.8	70	57
4875	103	1.12	30	208	124	206	694	1377	576	3053	9.2	9.2	13.3	18.4	70	56
4900	111	1.17	36	205	126	216	709	1396	578	3076	9.2	9.2	13.3	18.3	64	54
4925	120	1.14	33	192	133	222	666	1339	576	3080	9.2	9.2	13.3	18.2	58	53
4950	128	1.15	37	198	134	229	662	1334	569	3030	9.2	9.2	13.3	17.8	55	52
4975	136	1.16	39	204	139	235	575	1384	575	3095	9.4	9.5	13.3	17.7	50	54
5000	126	1.18	39	201	140	241	694	1384	576	3099	9.4	9.5	13.3	18.2	47	56
5025	115	1.17	35	205	141	225	666	1346	572	3071	9.4	9.5	13.3	18.0	46	57
5050	115	1.19	38	209	141	232	683	1369	566	3031	9.4	9.5	13.3	18.0	45	58
5075	99	1.21	37	210	137	219	676	1360	570	3082	9.4	9.5	13.3	17.7	47	60
5100	99	1.20	36	192	137	215	645	1317	562	3013	9.4	9.5	13.3	17.5	52	61
5125	104	1.22	39	207	137	212	716	1413	566	3051	9.4	9.5	13.3	17.3	56	62

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -13-

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
FT.	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
5150	113	1.22	43	207	130	216	701	1393	566	3051	9.4	9.5	13.3	17.7	59	64
5175	99	1.26	42	199	135	218	638	1308	568	3086	9.4	9.5	13.3	17.5	61	65
5200	101	1.25	42	201	134	224	628	1294	559	3014	9.4	9.5	13.3	17.5	65	66
5225	99	1.24	39	217	138	222	694	1384	574	3171	9.4	9.5	13.3	17.4	66	67
5250	94	1.22	36	194	137	203	687	1374	574	3157	9.4	9.5	13.3	17.5	68	70
5275	109	1.19	37	218	140	202	728	1428	573	3139	9.4	9.5	13.3	17.6	69	71
5300	72	1.31	37	219	142	188	658	1336	573	3137	9.4	9.5	13.3	17.1	70	72
5325	72	1.34	40	220	138	223	673	1355	568	3079	9.4	9.6	13.3	16.4	72	71
5350	65	1.34	39	217	132	203	697	1388	570	3154	9.4	9.6	13.3	16.2	74	73
5375	56	1.30	31	217	130	293	652	1328	560	3088	9.4	9.6	13.3	15.8	77	74
5400	60	1.25	29	207	128	202	739	1443	566	3078	9.4	9.6	13.3	15.7	79	76
5425	55	1.27	27	199	138	200	694	1384	572	3139	9.4	9.6	13.3	15.6	81	77
5450	54	1.28	26	200	147	208	687	1374	572	3139	9.4	9.6	13.3	15.3	83	78
5475	54	1.30	28	215	143	205	691	1379	565	3090	9.4	9.6	13.3	15.6	84	80
5500	59	1.29	29	207	145	205	638	1308	566	3091	9.4	9.6	13.3	14.8	85	81
5525	80	1.31	41	210	130	221	705	1398	564	3105	9.4	9.6	13.3	15.1	85	83

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -14-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOO KLB	SPEED RPM	[X] AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
5550	63	1.38	41	208	130	209	669	1350	571	3153	9.4	9.6	13.3	15.0	87	84
5575	58	1.39	40	209	131	217	658	1336	568	3144	9.4	9.6	13.3	15.2	86	83
5600	56	1.44	45	204	124	226	694	1384	572	3248	9.4	9.6	13.3	14.6	86	85
5625	63	1.39	44	213	125	222	666	1346	571	3195	9.4	9.5	13.3	14.4	87	86
5650	70	1.37	44	217	127	235	662	1341	566	3168	9.4	9.5	13.3	14.4	88	87
5675	92	1.28	45	201	123	227	645	1317	563	3209	9.4	9.6	13.3	14.4	89	87
5700	66	1.36	42	202	126	195	652	1327	562	3144	9.4	9.6	13.3	14.0	89	89
5725	102	1.23	42	205	124	215	655	1331	565	3154	9.4	9.6	13.3	13.7	90	91
5750	95	1.24	41	200	124	204	648	1322	564	3125	9.4	9.6	13.3	14.0	92	91
5775	77	1.30	40	207	125	206	655	1331	561	3177	9.5	9.6	13.3	13.7	93	92
5800	87	1.26	40	201	125	204	655	1338	562	3229	9.5	9.6	13.3	13.6	93	92
5825	70	1.30	39	219	123	198	634	1310	551	3184	9.5	9.6	13.3	13.6	95	92
5850	81	1.30	45	205	122	216	655	1338	560	3128	9.4	9.6	13.3	13.5	96	93
5875	74	1.33	46	208	121	214	645	1320	561	3025	9.4	9.6	13.3	13.9	96	93
5900	67	1.37	47	210	124	202	690	1381	564	3114	9.4	9.6	13.3	13.7	97	93
5925	74	1.35	47	224	123	205	687	1376	560	3028	9.4	9.6	13.3	13.1	98	93

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -15-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS []FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
5950	63	1.39	45	215	122	196	690	1381	571	3122	9.4	9.6	13.3	13.2	98	93
5975	49	1.49	46	203	129	191	673	1357	566	3079	9.4	9.6	13.3	12.3	97	92
6000	56	1.46	47	214	131	207	695	1387	570	3102	9.4	9.6	13.3	12.4	96	91
6025	24	1.45	29	232	111	161	602	1282	568	3023	9.5	9.7	13.3	9.6	101	84
6050	30	1.48	38	240	106	161	614	1309	564	2949	9.5	9.6	13.3	9.2	89	85
6075	40	1.48	45	236	110	187	628	1328	566	2986	9.5	9.6	13.3	9.2	91	86
6100	44	1.44	47	243	103	198	611	1305	566	2980	9.5	9.6	13.3	9.2	93	87
6125	46	1.44	48	242	102	219	611	1305	565	2989	9.5	9.6	13.3	9.1	94	87
6150	42	1.46	49	226	101	217	618	1314	565	2994	9.5	9.6	13.3	8.9	90	89
6175	46	1.45	49	228	102	219	592	1277	565	2987	9.5	9.6	13.3	9.0	92	89
6200	44	1.45	49	229	103	218	598	1286	561	2954	9.5	9.6	13.3	9.0	92	90
6225	45	1.49	50	225	110	224	618	1314	566	2985	9.5	9.6	13.3	9.1	92	90
6250	44	1.51	49	224	120	228	634	1337	569	2948	9.6	9.7	13.3	9.1	94	91
6275	47	1.49	49	226	121	211	614	1304	575	2995	9.5	9.7	13.3	9.2	95	92
6300	45	1.51	49	231	120	199	614	1304	566	2973	9.5	9.7	13.3	8.9	97	93
6325	43	1.52	49	232	118	197	621	1314	568	2997	9.5	9.7	13.3	9.1	97	93

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -16-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS]FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
6350	45	1.51	49	239	118	199	624	1318	570	3036	9.5	9.7	13.3	8.9	99	94
6375	53	1.46	49	218	118	195	611	1300	568	3020	9.5	9.7	13.3	11.5	101	96
6400	52	1.46	49	233	120	198	618	1309	567	3020	9.5	9.7	13.3	11.4	101	97
6425	42	1.54	52	230	114	192	608	1295	569	3044	9.5	9.7	13.3	11.2	101	97
6450	54	1.48	52	231	121	208	601	1286	566	3022	9.5	9.7	13.3	11.1	102	97
6475	33	1.55	42	226	130	184	648	1351	574	3087	9.5	9.7	13.3	11.0	103	98
6500	31	1.53	38	227	135	183	628	1323	573	3066	9.5	9.7	13.3	11.0	104	99
6525	34	1.51	39	223	132	185	638	1337	571	3051	9.5	9.7	13.3	10.6	106	100
6550	32	1.51	37	223	133	175	621	1314	576	3089	9.5	9.7	13.3	10.8	106	103
6575	34	1.51	39	224	132	181	621	1314	570	3054	9.5	9.7	13.3	10.7	107	101
6600	40	1.48	39	222	136	187	624	1318	571	3057	9.5	9.7	13.3	10.6	108	102
6625	44	1.46	40	222	136	181	614	1304	569	3047	9.5	9.7	13.3	10.4	108	103
6650	41	1.47	40	222	132	178	608	1295	567	3031	9.5	9.7	13.3	9.9	109	105
6675	44	1.47	43	223	125	196	604	1290	563	3001	9.5	9.7	13.3	10.1	110	105
6700	42	1.49	44	229	125	177	611	1300	568	3052	9.5	9.7	13.3	9.9	111	100
6725	45	1.50	45	224	104	187	654	1365	574	3109	9.6	9.6	13.3	10.1	111	99

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -17-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
6750	40	1.52	47	224	122	194	605	1295	570	3065	9.8	9.6	13.3	9.9	95	96
6775	35	1.57	48	231	130	186	624	1323	564	3010	9.8	9.6	13.3	9.8	95	100
6800	36	1.57	47	232	130	187	614	1309	567	3055	9.8	9.6	13.3	10.1	95	100
6825	40	1.50	46	240	118	189	614	1309	566	3055	9.6	9.6	13.3	9.8	96	100
6850	37	1.50	46	238	113	192	627	1331	566	3030	9.7	9.8	13.3	9.7	96	101
6875	41	1.48	47	239	115	195	624	1327	565	3016	9.7	9.8	13.3	9.8	96	100
6900	40	1.48	46	236	116	195	630	1336	568	3033	9.7	9.8	13.3	9.2	96	101
6925	34	1.52	46	237	114	190	627	1331	569	3024	9.7	9.8	13.3	9.3	96	101
6950	38	1.51	47	251	118	204	630	1336	567	3008	9.7	9.8	13.3	9.0	96	101
6975	36	1.51	46	240	118	196	630	1336	568	3017	9.7	9.8	13.3	8.7	96	100
7000	34	1.54	48	233	115	190	630	1336	569	3008	9.7	9.8	13.3	8.7	95	100
7025	53	1.41	48	236	115	195	630	1336	566	2970	9.7	9.8	13.3	8.7	95	100
7050	29	1.59	47	221	116	186	627	1331	569	2964	9.5	9.6	13.3	7.9	89	99
7075	39	1.48	47	243	110	205	651	1356	578	3043	9.5	9.5	13.3	7.9	90	99
7100	34	1.54	47	240	115	203	634	1332	571	2970	9.5	9.5	13.3	8.2	89	100
7125	38	1.53	46	240	119	208	641	1342	565	2915	9.5	9.5	13.3	8.2	89	101

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -18-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS []FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
7150	51	1.45	46	247	120	205	418	1309	574	3004	9.5	9.5	13.3	8.5	91	103
7175	42	1.51	46	248	122	206	614	1304	568	2963	9.5	9.5	13.3	8.2	96	103
7200	55	1.44	47	246	123	208	638	1337	576	3043	9.5	9.5	13.3	8.3	96	103
7225	45	1.47	45	243	124	199	638	1337	574	3045	9.5	9.5	13.3	8.3	97	104
7250	45	1.47	45	243	124	206	638	1337	573	3047	9.5	9.5	13.3	8.1	98	104
7275	42	1.49	44	235	125	205	621	1314	575	3060	9.5	9.5	13.3	8.2	99	106
7300	43	1.48	42	236	128	198	628	1323	572	3020	9.5	9.5	13.3	8.1	101	106
7325	43	1.48	43	249	124	200	618	1309	569	3020	9.5	9.5	13.3	8.1	101	106
7350	47	1.45	44	235	120	196	598	1281	568	3012	9.5	9.5	13.3	7.8	102	107
7375	56	1.39	44	247	115	196	618	1309	566	3019	9.5	9.5	13.3	7.9	103	108
7400	47	1.44	43	241	120	194	598	1281	563	3029	9.5	9.5	13.3	8.2	103	108
7425	43	1.47	43	249	123	212	598	1294	561	3008	9.8	9.6	13.3	8.3	106	112
7450	23	1.39	26	247	121	179	591	1285	555	2996	9.8	9.8	13.3	7.5	107	111
7475	14	1.56	30	236	120	163	637	1350	549	2987	9.8	9.8	13.3	7.8	111	109
7500	27	1.50	35	247	99	146	548	1221	556	3049	9.8	9.8	13.3	7.5	105	111
7525	31	1.48	44	253	105	161	617	1326	545	2980	9.9	9.8	13.3	8.2	105	111

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR.	D	ON BIT	HOOKLOAD	SPEED	[X]AMPS	HYDRAULIC	IMPACT	IN	PRESSURE	IN	OUT	PPG	PPG	MMHO	MMHO
	FT.	[] MIN/FT.	EXPOSITION	KLB	KLB	RPM	[] FT/LBS	HORSEPOWER	FORCE	GPM	PSI				(F)	(F)
7925	5	1.45	18	207	71	120	53	"	287	1017	10.8	10.8	13.0	14.1	70	81
7900	5	1.43	17	204	70	113	57	"	294	966	10.8	10.8	12.5	14.3	66	77
7875	38	1.00	14	200	71	171	49	"	277	802	10.8	10.8	13.3	14.4	65	78
7850	24	1.01	12	199	72	162	50	"	287	829	10.8	10.8	13.1	14.3	63	77
7825	12	1.04	9	202	69	127	55	"	285	832	10.8	10.8	12.7	13.4	72	75
7800	25	0.85	6	211	63	117	52	"	277	811	10.8	10.8	13.4	9.3	69	79
7775	32	0.78	6	206	61	135	50	"	289	820	10.8	10.8	13.3	10.7	66	78
7750	25	0.88	7	209	68	121	69	CORING	308	961	10.8	10.8	13.8	11.5	68	78
7725	126	0.94	28	207	106	129	206	622	432	2498	10.8	10.8	14.3	11.4	68	81
7700	7	1.46	21	205	67	114	57	"	302	1074	10.5	10.5	14.1	13.2	73	81
7675	4	1.53	17	210	68	102	62	"	301	1081	10.5	10.5	14.2	13.6	72	81
7650	4	1.52	18	216	63	96	60	"	296	1187	10.5	10.5	14.8	13.9	75	84
7625	4	1.63	21	200	72	118	61	"	290	1150	10.5	10.5	14.8	13.2	75	83
7600	4	1.57	19	202	67	97	58	CORING	302	CORE	10.5	10.5	13.9	12.8	68	80
7575	23	1.17	20	200	68	108	596	1250	489	2997	10.5	10.6	13.0	12.0	72	78
7550	33	1.48	40	250	105	160	617	1300	575	2975	10.0	10.0	13.3	10.5	105	112

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -20-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS [] FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
7950	6	1.39	17	208	69	127	59	CORING	291	974	10.8	10.8	13.0	14.5	73	82
7975	6	1.39	18	210	66	134	55	"	286	961	10.8	10.8	14.0	14.8	74	84
8000	7	1.36	17	212	74	137	57	"	293	1002	10.8	10.8	14.0	14.8	67	80
8025	6	1.40	17	212	72	121	65	"	295	1020	10.8	10.8	11.6	14.5	71	82
8050	6	1.40	18	215	65	136	56	"	285	973	10.8	10.8	12.5	13.6	76	76
8075	4	1.49	18	226	74	114	54	"	286	990	10.8	10.8	13.2	14.1	73	83
8100	15	1.20	18	216	67	136	55	"	293	1003	10.8	10.8	13.7	13.7	74	84
8125	13	1.24	18	215	73	146	63	"	287	974	10.8	10.8	14.2	13.9	76	85
8150	10	1.30	17	213	75	142	46	"	282	967	10.8	10.8	13.5	13.7	74	80
8175	12	1.26	18	214	71	153	45	"	271	940	10.8	10.8	14.3	14.2	72	83
8200	10	1.31	18	215	73	143	47	"	271	931	10.8	10.8	15.1	14.8	75	85
8225	6	1.42	19	214	70	137	55	"	283	985	10.8	10.8	13.4	14.6	69	82
8250	6	1.50	22	214	74	140	51	"	286	1052	10.8	10.8	14.3	14.3	75	85
8275	7	1.47	22	216	74	139	53	"	279	1019	10.8	10.8	14.4	14.1	76	86
8300	8	1.30	15	234	72	157	61	"	299	1059	10.8	10.8	12.6	14.6	69	83
8325	5	1.45	18	222	72	135	57	"	289	1032	10.8	10.8	13.7	14.2	73	84

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -21-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS]FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
8350	8	1.42	21	222	74	150	55	CORING	288	988	10.8	10.8	13.3	13.8	75	85
8375	6	1.40	18	226	71	145	253	753	310	1253	10.8	10.8	10.8	12.7	66	74
8400	18	1.00	10	217	67	157	63	325	311	1344	10.8	10.8	11.2	13.6	61	77
8425	6	1.26	12	214	69	130	58	308	304	1214	10.8	10.8	8.1	14.3	61	67
8450	28	0.82	8	215	51	148	58	308	292	1255	10.8	10.8	7.8	12.6	77	73
8475	17	0.96	9	217	54	135	57	302	290	1239	10.8	10.8	7.9	13.7	61	77
8500	11	1.08	11	215	55	128	66	CORING	298	1269	10.8	10.8	7.6	13.5	69	77
8525	5	1.24	10	215	68	127	69	CORING	308	1318	10.8	10.8	7.7	13.9	74	86
8550	11	1.17	13	247	64	152	304	807	314	1314	10.8	10.8	6.1	13.0	79	79
8575	27	1.21	23	234	89	136	278	761	376	2438	10.8	10.8	6.4	13.2	64	82
8600	44	1.11	24	221	89	161	290	782	377	2460	10.8	10.8	6.1	13.0	68	83
8625	46	1.13	26	227	90	172	290	782	381	2508	10.8	10.8	6.4	13.2	72	86
8650	22	1.32	27	227	92	141	380	937	403	2755	10.8	10.8	6.5	12.6	76	89
8675	16	1.47	33	220	84	131	358	901	411	2819	10.8	10.8	6.7	12.7	80	93
8700	10	1.60	34	240	82	116	348	884	406	2749	10.8	10.8	6.9	13.4	84	96
8725	19	1.42	33	234	83	127	377	936	404	2718	10.8	10.8	7.0	13.1	86	97

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

DEPTH	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR.	D	ON BIT	HOOKLOAD	SPEED	[X]AMPS	HYDRAULIC	IMPACT	IN	FORCE	GPM	PSI	PPG	PPG	IN	OUT	MMHO	MMHO
	[MIN/FT.	EXPOSITION	KLB	KLB	RPM	[] FT/LBS	HORSEPOWER	FORCE	IN	IN	IN	IN	IN	IN	IN	IN	(F)	(F)
9125	12	1.59	40	255	65	142	315	780	348	2565	10.8	10.8	10.8	5.3	11.1	85	94	
9100	10	1.56	34	254	66	131	315	780	351	2550	10.8	10.8	10.8	5.4	11.2	78	89	
9075	11	1.65	40	249	75	153	211	633	345	2047	10.8	10.8	10.8	5.4	11.2	87	95	
9050	11	1.66	40	244	78	166	230	671	347	2066	10.8	10.8	10.8	5.4	10.7	88	95	
9025	16	1.55	40	249	75	229	217	645	347	2070	10.8	10.8	10.8	5.1	11.0	86	92	
9000	13	1.61	40	249	76	174	223	656	353	2126	10.8	10.8	10.8	5.0	11.8	88	93	
8975	10	1.69	40	247	77	129	224	659	353	2136	10.8	10.8	10.8	5.5	11.5	87	94	
8950	11	1.59	40	261	78	131	240	690	356	2179	10.8	10.8	10.8	5.7	11.9	108	95	
8925	10	1.68	40	247	83	196	392	815	392	2542	10.8	10.8	10.8	5.0	11.7	105	94	
8900	9	1.69	39	244	79	130	338	866	401	2623	10.8	10.8	10.8	6.3	12.5	104	97	
8875	15	1.57	39	248	85	130	304	807	391	2538	10.8	10.8	10.8	6.5	12.3	109	100	
8850	15	1.58	39	249	84	128	311	819	404	2721	10.8	10.8	10.8	6.5	12.6	88	100	
8825	60	1.14	28	241	80	140	362	906	410	2790	10.8	10.8	10.8	6.6	13.0	91	100	
8800	40	1.24	35	242	79	135	361	906	409	2780	10.8	10.8	10.8	6.5	13.0	90	100	
8775	13	1.55	36	235	84	139	369	919	413	2820	10.8	10.8	10.8	7.0	13.0	89	109	
8750	6	1.78	36	234	85	115	474	1086	415	2848	10.8	10.8	10.8	7.0	13.3	87	100	

NL BAROID LOGGING SYSTEMS

25 Foot Drilling Reports

OPERATOR: TENNECO

WELL: PHOENIX NO. 1

LOCATION: BEAUFORT SEA, AK

PAGE -23-

DEPTH FT.	DRILL RATE	MODIFIED	WEIGHT	MAXIMUM	ROTARY	TORQUE	BIT	JET	FLOW	STANDPIPE	DENSITY	DENSITY	CONDUCTIVITY	CONDUCTIVITY	TEMP.	TEMP.
	[X] FT/HR. [] MIN/FT.	D EXONENT	ON BIT KLB	HOOKLOOD KLB	SPEED RPM	[X]AMPS]FT/LBS	HYDRAULIC HORSEPOWER	IMPACT FORCE	IN GPM	PRESSURE PSI	IN PPG	OUT PPG	IN MMHO	OUT MMHO	IN (F)	OUT (F)
9150	11	1.61	40	248	67	145	210	789	351	2588	10.8	10.8	5.6	11.1	90	98
9175	12	1.58	38	247	63	147	128	423	295	1897	10.4	10.5	4.2	9.9	71	78
9200	8	1.77	40	261	62	116	111	384	259	1480	10.4	10.5	4.2	9.8	71	79
9225	8	1.75	40	240	60	183	174	518	282	1759	10.4	10.5	4.5	9.6	72	80
9250	9	1.73	40	241	59	192	172	515	288	1739	10.4	10.4	4.8	9.7	76	83
9275	9	1.75	41	246	62	183	191	551	285	1743	10.4	10.4	4.8	9.9	78	83
9300	7	1.82	40	254	60	187	174	518	293	1834	10.4	10.4	4.2	8.2	77	83
9325	10	1.71	41	257	59	184	187	544	294	1805	10.4	10.4	4.7	7.4	76	82
9350	13	1.54	37	263	58	169	187	544	292	1816	10.4	10.4	4.3	6.4	70	79
9375	9	1.74	41	263	59	191	189	548	296	1842	10.4	10.4	4.1	5.7	73	81
9400	7	1.81	41	248	63	195	183	537	296	1829	10.4	10.4	4.0	5.3	74	82
9425	8	1.78	41	260	59	186	165	501	287	1754	10.4	10.4	4.0	5.2	75	82
9450	6	1.86	41	258	64	193	178	526	287	1740	10.4	10.4	4.0	5.0	74	92
9475	6	1.87	42	262	64	187	165	501	285	1759	10.4	10.4	4.4	4.9	77	85
9500	7	1.66	33	269	59	161	169	508	286	1757	10.4	10.4	3.7	5.8	66	80
9525	6	1.85	40	267	61	162	170	511	287	1731	10.4	10.4	3.6	5.7	78	83

