| 300 | A | 71 | 58 40 | 087 00 | 0 |
|---|---|---|---|---|---|
|  | UN | SEC | LAT. | LONG. |  |

GRID: 58° 40' N 87° 00' W Unit A, Sec 71
LAT: 58° 30' 02.05" N LONG: 87° 10' 48.55" W

WELL NAME: Aquitaine et al Hudson Walrus A-71
CO-ORDS: 58° 30' 02.05" N 87° 10' 48.55" W

COMPANY: Aquitaine Co. of Canada
CLASS: Exploratory Wildcat
CONTRACTOR: Wodeco II
LOGS RUN: DILL, SBHC CAL, GR, MLL, CAL, CPN, SNP, FDT, DIP, VS, CSS
PROV. Hudson Bay

ELEVATIONS: WD 613' RT 31.5'

| FORMATION TOPS | LOG | S/SEA |
|---|---|---|
| Sea Bottom | 613 | - 586 |
| Long Rapids | 895 | - 863 |
| Williams Island | 1385 | -1353 |
| Murray Island | 1882 | -1850 |
| Moose River | 2346 | -2314 |
| Kwataboahegan & Stooping River | 2506 | -2474 |
| M. Kenogami Mem. | 2760 | -2728 |
| L. Kenogami Mem. | 2800 | -2768 |
| Ekwan River | 3846 | -3814 |

Re-Issued October 9/74

SPUD DATE: Aug 7/69
RIG RELEASE: Oct 18/69
COMPLETION: Sept 15/74
T.D. 3926' Ekwan R
P.B.D.

| CASING RECORD |
|---|
| 30 x 772 |
| 20 x 1120 |
| 13 3/8 x 1975 |
| 9 5/8 x 2960 |

WELL STATUS: ABANDONED
PRODUCING ZONE
I.P.

DRILL STEM TEST RECORD

NO DRILL STEM TESTS RUN

STATUS HISTORY D M Y

CORE RECORD:

1432-47 (Williams Is), 2000-01 (Murray Sd) ✓
2670-84 (Kwatab), 3917-26 (Ekwan R)

PERFORATIONS AND PRODUCTION TESTS

Abandoned, not perforated

ENVIRON
FE 11 1977
PETRO EUM

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.IV

## WEEKLY REPORTS

**AQUITAINE**

# WEEKLY REPORT NO. 1

Week from 17/8 to 24/8 19 69

Last Depth 1120' Footage 338'

WELL WALRUS A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB 31'
Province MANITOBA
Rig WODECO II
Commenced 7.8.69
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 782'<br>860' | PLEISTOCENE | DRIFT | Yellow-brown silty to sandy calcareous plastic clay. Conglomerati elements of metamorphic rocks (quartzite, dolorite, chloritoschist |
| 1120' | DEVONIAN | MOOSE RIVER FORMATION | Red-brown silty to sandy gypsiferous plastic clay.<br>Thin alternating levels of:<br>- red-brown slightly indurated clay,<br>- light beige microcrystalline dolomite,<br>- gypsum and anhydrite,<br>- pink, very fine grained calcareous sandstone |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 36" | 618' | 782' |
| 26" | 782' | 1120' |

### CASING

| Diameter | Shoe |
|---|---|
| 30" | 772' |
| 20" | 1106' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|

### LOGS RUN

| Type | From | To |
|---|---|---|
| Temperature | 744' | 20' |
| 3 runs (total from commencement of drilling). | | |

### SHOWS

NONE

### TESTS

NONE

### REMARKS

NONE

Geologist C. Kmiecluck Date Aug. 24, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 2

Week from 25/8 to 31/8 19 69

Last Depth 1786' Footage 666'

WELL Walrus A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB +31'
Province MANITOBA
Rig WODECO II
Commenced 7.8. 1969
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 1120' | DEVONIAN | Moose River Formation | Red-brown silty to sandy gypsiferous plastic clay with thin alternating levels of:<br>- red brown slightly indurated clay,<br>- gypsum and anhydrite<br>- pink very fine grained calcareous sandstone. |
| 1385' | | Kwataboa-hegaw Formation | Beige to pink porous and vuggy fossiliferous dolomitic limestone. Thin alternating levels of:<br>- pink microcrystalline, saccharoidal, dolomitic limestone,<br>- red brown plastic to slightly indurated clay. Brachiopods. |
| 1710' | | Stooping River Formation | White, beige and light grey dolomitic and chalky limestone. Alternating levels of:<br>- grey bioclastic and oolitic limestone. Brachiopods,<br>- red, orange and brown limestone. Brachiopods, crinoids. |
| 1786' | | | |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 17 1/2" | 1120' | 1333' |
| 12 1/4" | 1333' | 1786' |

### CASING

| Diameter | Shoe |
|---|---|
| 30" | 772' |
| 20" | 1106' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| 1 | 1432' | 1447' | 100% |

### LOGS RUN

| Type | From | To |
|---|---|---|
| | | |

### SHOWS

None

### TESTS

None

### REMARKS

None

Geologist C. Kmiecluck

Date Aug. 24, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 3

Week from 1/9/69 to 7/9/69 19 69

Last Depth 2000' Footage 214'

WELL WALRUS A-71

X 58°30'02"N Y 87°10'51"W

Z -618' ZKB + 31'

Province Federal Waters

Rig WODECO II

Commenced 7.8.69

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 1786'<br>1830' | DEVONIAN | STOOPING RIVER FORMATION | White to beige and light grey slightly dolomitic and chalky limestone with alternating:<br>- grey bioclastic and oolitic limestone - brachiopods,<br>- brown, orange and red limestone - brachiopods - crinoids. |
| 2000' | SILURIAN | KENOGAMI RIVER FORMATION MIDDLE MEMBER | Alternating:<br>- brown to red dolomitized argillite with calcite and anhydrite,<br>- greenish grey and red shale,<br>- greenish grey calcareous shale,<br>( at 1885' - speckled pink to red, pale grey to dark grey-beige bioclastic limestone). |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 15" | 1786' | 2000' |
| 17 1/2" | 1333' | 1996' |
| hole opener | | |

### CASING

| Diameter | Shoe |
|---|---|
| 30" | 772' |
| 20" | 1106' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|

### LOGS RUN

| Type | From | To |
|---|---|---|

### SHOWS

### TESTS

### REMARKS

Geologist C. Kmiecluck

Date Sept. 10, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 4

Week from Sept. 8, to Sept. 14 19 69

Last Depth 2000'

Footage -

WELL WALRUS A-71

X 58°30'02"N Y 87°10'51"W

Z -618' ZKB +31'

Province Federal Waters

Rig Wodeco II

Commenced 7.8.69

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| -- | -- | -- | -------- |

## DRILLING

| Diameter | From | To |
|---|---|---|
| - | -- | - |

## CASING

| Diameter | Shoe |
|---|---|
| - | - |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| - | - | - | - |

## LOGS RUN Sept. 8th

| Type | From | To |
|---|---|---|
| Dual Induction | 1994' | 1108' |
| Sonic | " | " |
| Caliper (ML) | " | " |
| | | Sept. 1 |
| Caliper | 1196' | 1106' |
| Gamma Ray | 4 | " |

## SHOWS

-

## TESTS

-

## REMARKS

Stand-by for weather

Geologist S. Rueff

Date Sept. 16, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 5

Week from Sept. 15 to Sept. 21 19 69

Last Depth 2965'

Footage 956'

WELL WALRUS A-71

X 58°30'02"N Y 87°10'51"W

Z -618' ZKB +31'

Province FEDERAL WATERS

Rig WODECO II

Commenced August 7, 1969

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | | LITHOLOGY |
|---|---|---|---|---|
| 2000'<br>2354' | SILURIAN | KENOGAMI R. | Middle Member | Grey plastic clay, dark grey dolomitic shale and grey to red-brown plastic clay. |
| 2520' | | | Lower Member | Brown plastic clay, pink and grey dolomitic shale, beige-red speckled calcareous dolomite, beige to brown dolomite, anhydrite and compact fine grained calcareous sandstone. |
| 2602' | | EKWAN RIVER | Upper Member | Light brown bioclastic to biohermal limestone, light brown calcareous dolomite and anhydrite. |
| 2670' | | | Attawapiskat Member | Beige to pale brown calcarenitic, bioclastic and biohermal limestone. |
| 2802' | | | Lower Member | Very dark brown fractured bituminous dolomite and bioclastic slightly bituminous limestone |
| 2965' | | SEVERN RIVER | | White to pale beige cryptocrystalline to microcrystalline compact azoic dolomite |

## DRILLING

| Diameter | From | To |
|---|---|---|
| 12 1/4" | 2000' | 2965' |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| 2 | 2000' | 2001' | 100% |
| | (Junk | basket) | |
| 3 | 2670 | 2684' | 100% |

## LOGS RUN

| Type | From | To |
|---|---|---|
| Dual Induction | 2958' | 1975' |

## CASING

| Diameter | Shoe |
|---|---|
| 13 3/8" | 1975' |

## SHOWS

GAS

2563' = 1,9% $C_1/C_2$ = 30

2668' = 0,18% -

2750' = 0,35% $C_1/C_2$ = 4

2785' = 0,22% $C_1/C_2$ = 6

2870' = 0,18% $C_1/C_2$ = 40

2940' = 0,20% -

## TESTS

## REMARKS

Geologist S. Rueff

Date Sept. 21, 1969

AQUITAINE

# WEEKLY REPORT NO. 6

Week from Sept. 22 to Sept. 28 19 69

Last Depth 3349'

Footage 384'

WELL Walrus A-71

X $58^{\circ}30'02''$N Y $87^{\circ}10'51''$W

Z -618' ZKB +31'

Province Federal Waters

Rig Wodeco II

Commenced August 7, 1969

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 2965' | SILURIAN | SEVERN RIVER FORMATION | White to beige cryptocrystalline to microcrystalline, compact and azoic dolomite. |
| 3005' | | | Pink cryptocrystalline to microcrystalline, compact and azoic dolomite. |
| 3030' | | | Pale beige to pale brown microcrystalline, slightly argillaceous dolomitic limestone. |
| 3195' | | | Light beige to light grey microcrystalline limestone.<br>3200 - 3250: Echinoderms, Brachiopods, Bryozoa, Dasycladacae? |
| 3340 | | | Whitish to light beige microcrystalline, compact and azoic dolomitic limestone. |
| 3349' | | | |

## DRILLING

| Diameter | From | To |
|---|---|---|
| 8½ | 2965' | 3349' |
| | | |
| | | |

## CASING

| Diameter | Shoe |
|---|---|
| | |
| 0 5%8" | 2960' |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| | | | |

## LOGS RUN

| Type | From | To |
|---|---|---|
| Laterolog 3 | 2956' | 1975' |
| Gamma Ray | | |
| Sonic | 2959' | 1975' |
| Caliper | - - | - - |
| Gamma-Gamma | 2959' | 2300' |
| Neutron SNP | 2959' | 2300' |

## Gas SHOWS

| | | |
|---|---|---|
| 2345' | 7.5% | $C_1/C_2 = 48$ |
| 3140' | 0.33% | |
| 3160' | 9.5% | $C_1/C_2 = 37$ |

## TESTS

## REMARKS

Geologist C. Kmiecluck S. Rueff

Date Sept. 28, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 7

Week from Sept. 29 to Oct. 5 19 69

Last Depth 3718' Footage 369'

WELL Walrus A-71

X 58°30'02"N Y 87°10'51"W

Z -618' ZKB +31'

Province Federal Waters

Rig Wodeco II

Commenced August 7, 1969

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 3349' | SILURIAN | SEVERN RIVER FORMATION | Whitish to light beige microcrystalline compact and azoic dolomitic limestone. |
| 3515' | | | Light beige microcrystalline compact limestone with alternating levels of: - Mottled, pseudo - oolitic limestone,<br>- Recrystallised limestone, Ostracods, Mollusca, Bryozoa and Spicules. |
| 3675' | | | Beige to light grey microcrystalline compact dolomitic limestone with intercalations of pseudo-brecciated monogenic dolomitic limestone. |
| 3718' | | | |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 8½ | 2965' | 3718' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|

### LOGS RUN

| Type | From | To |
|---|---|---|

### CASING

| Diameter | Shoe |
|---|---|
| 9 5/8" | 2960' |

### Gas SHOWS

2900= 7.0% Trip gas $C_1/C_2=38$

3630=1.25% Trip gas $C_1$

3652=3.8% Trip gas $C_1/C_2=54$

3690=4.5% Trip gas $C_1/C_2=70$

### TESTS

### REMARKS

Geologist C. Kmiecluck

Date October 5, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 8

Week from October 6 to October 12 19 69

Last Depth 3815' Footage 97'

WELL Walrus A-71

X 58°30'02"N Y 87°10'31"W

Z -618' ZKB +31'

Province Federal Waters

Rig Wodeco II

Commenced August 7, 1969

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 3718' | SILURIAN | SEVERN RIVER FORMATION | Beige to light grey microcrystalline compact dolomitic limestone with intercalations of pseudo-brecciated monogenic dolomitic limestone. |
| 3745' | | | Beige microcrystalline compact dolomitic limestone. |
| 3755' | | | Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. |
| 3815' | | | |

## DRILLING

| Diameter | From | To |
|---|---|---|
| 8½" | 2965' | 3815' |

## CASING

| Diameter | Shoe |
|---|---|
| | |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| | | | |

## LOGS RUN

| Type | From | To |
|---|---|---|
| Laterolog 3 | 3723 | 2965' |
| Sonic-Gamma R. | | |
| Cal. | 3725 | 2965' |
| Dipmeter | 3722 | 2965' |

## Gas SHOWS

3730' = 8.75% Trip gas $C_1/C_2$ =68

3772' =5.75% Trip gas $C_1/C_2$ =48

## TESTS

## REMARKS

Geologist C. Kmiecluck and S. Rueff Date Oct. 13, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 9

Week from October 13 to October 19 19 69
Last Depth 3926'
Footage 111'

WELL Walrus A-71
X $58^{\circ}30'02''$N Y $87^{\circ}10'51''$W
Z - 618' ZKB + 31'
Province Federal Waters
Rig Wodeco II
Commenced August 7, 1969
Completed October 15, 1969

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 3815' | SILURIAN | SEVERN RIVER FORMATION | Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. |
| 3830' | | | Grey brown microcrystalline limestone. |
| 3845' | ORDOVICIAN | CHURCHILL RIVER GROUP | Grey blue marls. |
| 3860' | | | Alternating: - whitish light beige to light grey microcrystalline limestone<br>- very dark brown microcrystalline bituminous limestone. |
| 3917' | | | (Core No. 4)<br>Alternating: - light brown slightly bituminous limestone,<br>- beige to light grey mottled bioclastic and calcarenitic limestone. Crinoids, corals, brachiopods and mollusca. |
| 3926' | | | |

## DRILLING

| Diameter | From | To |
|---|---|---|
| 8½ | 2965' | 3917' |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| 4 | 3917' | 3926' | 9'-100% |

## LOGS RUN

| Type | From | To |
|---|---|---|
| Sonic Gamma R.<br>Caliper | 3923' | 3650' |
| Laterolog 3 | 3920' | 3650' |
| Gamma Ray-Neu. | 3924' | 614' |
| Sidewall Coring | 30 shots no recuperation | |

## CASING

| Diameter | Shoe |
|---|---|
| | |

## SHOWS

1) Gas
3857' = 5% trip gas $C_1/C_2$=68
3917' =3.45% trip gas $C_1/C_2$=54

2) Oil
3857'-3917' Traces of pale yellow to greenish fluorescence on mud, cuttings and on solution of cuttings in CHC13.

3917-3926' yellow fluorescence on core No. 4.

## TESTS

## REMARKS

Well abandoned on October 15, 1969 at midnight. Very strong westerly storm breaks anchor lines, choke, kill lines, guide lines, and riser.

Geologist S. Rueff
Date October 21, 69

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.II

## CORE SHEETS

AQUITAINE

| DATE | CORE SHEET | CORE No | WELL NAME |
|---|---|---|---|
| 27 8 1979 | | 1 | WALRUS A 71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 15 Ft in 1 Hr 15 Min | 1432' | 1447 ' | 15 Ft ( 100 %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: CHRISTENSEN Diameter 6 3/4 | D= 1,04 V= 62 WL = 11 cc | M.C. KMIECLUCK |

| Scale 1/2"=1' or 1/24 Depth | Fragments | Calcimetry 1' | Calcimetry 15' |
|---|---|---|---|
| 1432 | 1 | | |
| 1433 | 2 | 92 | 100 |
| 1434 | 3 | 93 | 100 |
| 1435 | 4<br>5 | 97 | 100 |
| 1436 | 5b | 75 | 88 |
| 1437 | 6<br>7 | 97 | 100 |
| 1438 | 8 | 98 | 100 |
| 1439 | 9<br>10 | 55 | 100 |
| 1440 | 11<br>12 | 72 | 100 |
| 1441 | 13 | 57 | 100 |
| 1442 | 14 | 70 | 100 |
| 1443 | 15<br>16 | 66 | 90 |
| 1444 | 17 | 60 | 87 |
| 1445 | 18<br>19 | 53 | 100 |
| 1446 | 20 | 73 | 100 |
| 1447 | 21 | | |

Log

Shows: NIL

Fractures: Some oblique open fractures

Dips: Subhorizontal

Thin Section

Age: DEVONIAN

Formation: KWATABOAHEGAN FORMATION

Apparent Porosity — Type — Grade: 6 % ; 8 %

Laboratory Results: NaCl mg/l — Porosity % — Permeability md — Water Saturation — Oil Saturation — Density

## LITHOLOGY

Calcaire rose-beige grumeleux a passees centimetriques de calcaire plus fin et plus fonce

Quelques joints tapisses par de l'argilite rouge brique ferrugineuse, un joint stylolithique.

Intercalations centimetriques de calcaire organogene (algues et stromatopores ) tres recristallise.

Pink-beige crumbly limestone with centimetric intercalations of finer and darker limestone.

Few bedding planes lined with ferruginous brick-red argillite, one stylolithic bedding plane.

Centimetric intercalations of organogenic limestone (Algae and Stromatoporas ), higly recrystallized.

1438

Calcaire dolomitique rose fonce plus fin a larges plages allongees a contours dechiquetes representant des lits d'algues encroutantes tres recristallisees.

Nombreuses vacuoles et geodes et plages cargneulisees.

Plusieurs niveaux a stromatopores (amphipora branchu ?), receptaculites et favosites.

Finer dark pink dolomitic limestone, with long patches with jogged edges uprepresenting beds of encrusting Algae highly recrystallized.

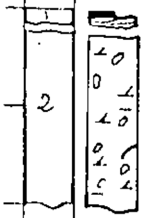
Numerous vesicles, geodes and patches of cellular dolomite.

Several floors with Stromatoporas (branching Amphiporas ), Receptaculites and Favosites.

| AQUITAINE | DATE | CORE SHEET | CORE No | WELL NAME |
|---|---|---|---|---|
| | Sept. 15th 69 | | 2 | Walrus A - 71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 1 Ft / in / Hr 30 Min | 2000 ' | 2001 ' | 1 Foot (100 %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: JUNK BASKET Diameter. 12 ¼ | SEA WATER-DUOVIS SYSTEM | SERGE RUEFF |

| Scale 1"=1' or 1/12<br>Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | Laboratory Results NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | |  | | | | 28 65 85 | + + | SILURIAN | KENOGAMI RIVER | | | * Black intraformationnal shaly calcareous breccia Grey millimetric pebbles of shale.<br>- Grey laminated shale. | | | | | | |
| | 2 | | | | | | | | | Vug | | | | | | | | |
| 2001 | | | | | | 23 54 60 | + | | | | | - Dark grey, slightly greenish shale. | | | | | | |

**AQUITAINE**

| DATE | CORE SHEET | CORE No | WELL NAME |
|---|---|---|---|
| Sept. 17 th 69 | (1 of 2) | 3 | WALRUS A 71 |

CORED: 14 Ft in 2 Hr 30 Min

FROM: 2670 Feet

TO: 2684 Ft

RECOVERED: 14 Ft (100 %)

CORE BARREL: Type: Christensen Diameter 6"¼

MUD: sea water - DUOVIS SYSTEM

GEOLOGIST: SERGE RUEFF

| Scale 1"=1' or 1/12 Depth | Fragments | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | Laboratory Results NaCl mg/l | Porosity % | Permeability mc | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2670 | 1 | | ⇅ | | | | SILURIAN | EKWAN RIVER (LOWER MEMBER) | | | ABSTRACT:Very darck brown fractured microcrystalline bituminous,calcareous dolomiteand dolomite millimetric to centimetric levels of bitumen:<br>Few ghosts and fragments of organisms.<br>Some zones of grey microcrystalline dolomitic limstone and of anhydrite.<br>Porosity:- vugs<br>-intercrystalline porosity:2 - 19%<br>- size of largest pores =2 mm;average size of porese =60 microns<br>Content=salty water; neither gas nor oil show. | | | | | | |
| | 2 | | | | | | | | | | | | | | | | |
| 2671 | 3 | | | | 45 80 97 | + | | | | | Zone of grey microcrystalline dolomitics limstone | | | | | | |
| 2672 | 4 | | | | | | | | | | Very darok brown macrocrystallinr bituminous dolomite millimotric to centimetric levels of bitumen<br>Porosity = 9% Size of largest pore = 400 microns<br>average size of pore = 80 microns | | | | | | |
| | 5 | | | | | | | | | | Several zones of grey macrocrystalline dolomitic limstone. | | | | | | |
| 2673 | | | | | 50 68 74 | + | | | | | | | | | | | |
| 2674 | 6 | | | | | | | | | | Very dark brown macrocrystalline bituminous dolomite; millimetric to centimetric levels of bitumen;<br>Porosity = 9% Size of largest pore = 2 mm<br>Average size of pore =120 microns | | | | | | |
| | 7 | | | | | | | | Vug | | Very dark brown macrocrystalline bituminous dolomite. Anhydrite. Millimetric to centimetric levels of bitumen. Crinoids<br>Porosity = 2% Size of largest pore = 1200 microns<br>Average size of pore = 80 microns | | | | | | |
| 2675 | | | | | 35 65 70 | + | | | | | | | | | | | |
| | 8 | | | | | | | | | | | | | | | | |
| 2676 | | | | | | | | | Vug | | Zone of grey microcrystalline dolomite limstone | | | | | | |
| | | | | | 17 52 65 | + | | | | | Very dark brown macrocrystalline bituminous dolomite.Millimetric to centimetric levels of bitumen<br>Porosity = 19% + very large amount of pores filled with bituminens. Size of largest pore = 40 microns<br>Average size of pore = 40 microns. | | | | | | |
| 2677 | 9 | | | | | | | | Vug | | | | | | | | |

AQUITAINE

| DATE | CORE SHEET ( 2 of 2 ) | CORE No | WELL NAME |
|---|---|---|---|
| | | | |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| Ft in Hr Min | | | ( %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: Diameter: | | |

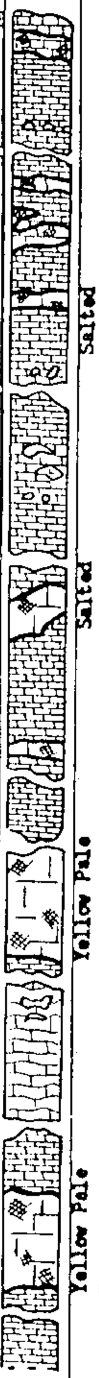
| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2677 | | | | | | | | SILURIAN | EKWAN RIVER (LOWER MEMBER) | | | | | | | | | |
| | | | | | | | | | | Vug<br>Vug | | Several zones of grey microcrystalline dolomitic limstone. | | | | | | |
| 2678 | 9 | | | | | | | | | | | | | | | | | |
| | 10 | | | | | | | | | Vug | | Very dark brown microcrystalline bituminous dolomite.Millimetric to centimetric levels of bitumen.Anhydrite. Ghosts of organisms. porosity = 5% Size of largest pore 300 microns Average size of pores = 40 microns. | | | | | | |
| 2679 | | | | | | 45 59 59 | + | | | Vug | | | | | | | | |
| | 11 | | | | | | | | | | | | | | | | | |
| 2680 | LAB | | | | | 10 26 26 | + | | | Vug | | Very dark brown microcrystalline bituminous dolomite.Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts and fragments of organisms + Algae and Ostrocods. Porosity = 2% Size of largest pore = 400 microns Average size of pores = 40 microns | | | | | | |
| | 12 | | | | | | | | | | | | | | | | | |
| 2681 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Zones of anhydrite | | | | | | |
| 2682 | 13 | | | | | | | | | | | | | | | | | |
| 2683 | LAB | | | | | 65 84 88 | + | | | | | Very dark brown microcrystalline bituminous dolomite.Millimetric to centimetric levels of bitumen.Anhydrite. Ghosts and fragments of fossils<br>Porosity: nihil; all pores filled with bitumen. | | | | | | |
| | 14 | | | | | | | | | | | REMARK :Fragment 14 ; many pieces in the core boxes + i plastic bag + 2 metallic cans. | | | | | | |
| 2684 | | | | | | | | | | | | Well site salinity = 5,6 gr / dm3 | | | | | | |

AQUITAINE

| DATE | CORE SHEET (1 of 2) | CORE No | WELL NAME |
|---|---|---|---|
| Oct- 14th 1969 | | 4 | WALRUS A-71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 9 Ft - in 3 Hr 15 Min | 3917' | 3926' | 9 Ft ( 100 %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: G Christiansen PC 6906 160 347 Diameter: 8 7/16 | DUOVIS SYSTEM - D:1,72 Nacl: 320 | Serge RUEFF |



| Depth (Scale 1"=1' or 1/12) | Fragments | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3917' | 1 | | | | 70 98 100 | x | | | | | ABSTRACT = Alternating<br>-Light brown slightly bituminous limestone.<br>-Beige to light grey mottled slightly dolomitic, bioclastic and calcarenitic Limestone. Traces of anhydrite. Crinoids, corals, brachiopods and mollusca.<br>Porosity Few vugs, some filled with salt. One level with intergranular porosity (-6%)<br>Content Salted water | | | | | | |
| 3918' | 2 | Salted Water | | | | | | | | | Alternating.<br>-Light brown cryptocryst intraformational calcareous breccia with microcryst pebbles. Slightly bituminous. Traces of anhydrite. Brown millimetric straight bands of bitumen.<br>-Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes corals, mollusca. | | | | | | |
| 3919' | 3 | | | | 90 100 100 | x | | | Vug<br>Int grd<br>Vug | Few<br><6%<br>Few | ← centimetric coral<br>← vug filled with salt<br>Light brown cryptocryst to microcryst Limestone. Few large dolomite crystals. Fragments of brachiopodes; Ghosts of organisms | | | | | | |
| 3920' | 4 | Salted Water | NONE | NONE | | | ORDOVICIAN | CHURCHILL RIVER GROUP | | | ← Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes. Corals. Mollusca | | | | | | |
| 3921' | 5<br>6 | Yellow Pale Flourescence | | | 75 94 100 | x | | | | | Light brown cryptocryst Limestone<br>Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes corals, mollusca. | | | | | | |
| 3922' | 7 | | | | | | | | | | ← Centimetric Coral<br>-Beige to light grey cryptocryst to microcryst Limestone with ondulating millimetric levels of bitumen. "Vermiform" aspect. | | | | | | |
| 3923' | 8 | Yellow Pale Flourescence | | | 60 96 100 | x | | | | | Light brown cryptocryst Limestone.<br>Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes, corals, mollusca. | | | | | | |
| 3924' | 9 | | | | | | | | | | Light brown cryptocryst Limestone. | | | | | | |

AQUITAINE

| DATE | CORE SHEET (1 of 2) | CORE No | WELL NAME |
|---|---|---|---|
| Oct-14 th 1969 | | 4 | WALRUS A-71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 9 Ft - in 3 Hr 15 Min | 3917 | 3926 | 9 Ft ( 100 %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: C Christiansen BC 6906 160 347 Diameter 8 7/16 | DUOVIS SYSTEM - D: 1,72 Nacl: 320 | Serge RUEFF |

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | Laboratory Results NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3924'<br>3925'<br>3926' | 9<br>10 |  | Salted Water<br>Yellow Pale Flourescence | NONE | NONE | 65 88 98 | x | ORDOVICIAN | CHURCHILL RIVER GROUP | | | **Alternating**<br>-Light brown cryptocryst to microcryst Limestone with millimetric dark brown straight bands of bitumon;<br>-Beige to light grey cryptocryst to microcryst Limestone with ondulating millimetric bands of bitumen."Vermiform" aspect.<br>Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone.Larges crystals of dolomite.Traces of anhydrite.Frements of brachiopodes,corals,mollusca.<br>Light brown cryptocryst to microcryst Limestone.<br>Salinity on core= 7o gr/dm3 | | | | | | |

**AQUITAINE**

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 28, 1969 | 26 | | 3290' | 3365' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | | 3290 | 3295 | 3300 | 3305 | 3310 | 3315 | 3320 | 3325 | 3330 | 3335 | 3340 | 3345 | 3350 | 3355 | 3360 | 3365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry | 1 min | 70 | 80 | 78 | 78 | 52 | 52 | 63 | 61 | 80 | 82 | 82 | 63 | 85 | 78 | 90 | 85 |
| | | | | | | 3 min | 90 | 85 | 82 | 80 | 54 | 56 | 66 | 68 | 94 | 90 | 83 | 96 | 89 | 85 | 100 | 90 |
| | | | | | | 10 min | 90 | 87 | 82 | 87 | 55 | 59 | 66 | 68 | 98 | 98 | 83 | 98 | 87 | 85 | 100 | 90 |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | | | White chalky limestone. | | | 30 | 80 | 80 | 90 | 80 | 70 | 60 | 45 | 30 | 30 | 40 | 40 | 50 | 60 | 60 | 70 |
| | | | | Pinky beige ferruginous finely bedded limestone. | | | | | | | | | Tr | 5 | 10 | 5 | Tr | Tr | Tr | Tr | Tr | |
| | | | | Light grey and very light beige microcrystalline re-crystallised fossiliferous limestone. | | | 70 | 20 | 20 | 10 | 20 | 30 | 40 | 50 | 60 | 65 | 60 | 60 | 50 | 40 | 40 | 30 |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 29, 1969 | 27 | | 3370' | 3445' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3370 | 3375 | 3380 | 3385 | 3390 | 3395 | 3400 | 3405 | 3410 | 3415 | 3420 | 3425 | 3430 | 3435 | 3440 | 3445 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 87 | 87 | 63 | 82 | 76 | 78 | 95 | 92 | 91 | 69 | 90 | 76 | 81 | | 79 | 59 |
| | | | | | Calcimetry 3 min | 93 | 90 | 66 | 83 | 79 | 80 | 100 | 98 | 94 | 93 | 96 | 80 | 84 | | 83 | 77 |
| | | | | | Calcimetry 15 min | 93 | 90 | 66 | 83 | 79 | 80 | 100 | 98 | 94 | 94 | 96 | 80 | 84 | | 85 | 86 |
| Argillaceous Rocks | Clays | | | Brick-red plastic clay. | | | | | | | | | | | | | 5 | Tr | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | White chalky limestone. | | 70 | 70 | 80 | 80 | 80 | 70 | 70 | 80 | 70 | 70 | 60 | 50 | 60 | 60 | 50 | 30 |
| | ↓ | | | Light beige to whitish microcrystalline recrystallised, | | 30 | 30 | 20 | 20 | 20 | 30 | 30 | 20 | 20 | 15 | 30 | 40 | 40 | 40 | (*)<br>50 | 70 |
| | | | | locally pseudo-oolitic, compact, fossiliferous limestone | | | | | | | | | | | | | | | | | |
| | | | | * From 3440' = dolomitic. | | | | | | | | | | | | | | | | | |
| | | | | Light pink, partly microcrystalline, slightly argilla- | | | | | | | | | | 10 | 15 | 10 | 5 | Tr | Tr | | |
| | Dolomite | | | ceous chalky dolomitic limestone. | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous<br>Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite<br>Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DATE: September 30, 1969
No.: 28
DEPTH From 3450' To 3525'
WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 3450 | 3455 | 3460 | 3465 | 3470 | 3475 | 3480 | 3485 | 3490 | 3495 | 3500 | 3505 | 3510 | 3515 | 3520 | 3525 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry | 57 | 52 | 45 | 50 | 65 | 67 | 90 | 50 | 60 | 53 | 55 | 53 | 63 | 62 | 68 | 65 |
| | | | | Calcimetry | 87 | 86 | 95 | 87 | 100 | 100 | 100 | 68 | 85 | 83 | 84 | 82 | 83 | 84 | 78 | 76 |
| | | | | Calcimetry | 90 | 90 | 100 | 91 | 100 | 100 | 100 | 70 | 90 | 92 | 96 | 94 | 93 | 95 | 79 | 78 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | White chalky limestone. | 10 | 10 | 5 | 5 | 10 | 20 | 20 | 10 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | Tr |
| | | | | Light beige to whitish microcrystalline compact dolomitic limestone. | 90 | 90 | 95 | 95 | 90 | 80 | 80 | 90 | 90 | 95 | 90 | 95 | 95 | 90 | 85 | 90 |
| | | | | Pink crystalline slightly argillaceous dolomitic limestone. | Tr | | | | | | | | | | 5 | Tr | Tr | 5 | 10 | 10 |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | Tr | Tr | Tr | Tr | Tr | | | Tr | Tr | Tr | Tr | Tr | Tr | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

DATE: September 30, 1969

No.: 29

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 3530' To 3605'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 3530 | 3535 | 3540 | 3545 | 3550 | 3555 | 3560 | 3565 | 3570 | 3575 | 3580 | 3585 | 3590 | 3595 | 3600 | 3605 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | 75 | 70 | 60 | 72 | 80 | 77 | 81 | 82 | 72 | 75 | 73 | | 86 | 85 | 88 | 60 |
| | | | | Calcimetry 3 min | 93 | 90 | 73 | 90 | 100 | 96 | 97 | 94 | 80 | 84 | 82 | | 94 | 92 | 98 | 65 |
| | | | | Calcimetry 15 min | 97 | 95 | 77 | 90 | 100 | 96 | 97 | 95 | 90 | 93 | 91 | | 95 | 93 | 98 | 65 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | White chalky limestone. | 5 | 5 | 5 | 5 | 5 | 5 | 30 | 30 | 15 | 20 | 30 | Tr | Tr | Tr | Tr | 20 |
| | | | | Light beige microcrystalline compact dolomitic limestone | 95 | 95 | 95 | 95 | 95 | 95 | 70 | 70 | 85 | 80 | 70 | 70 | 85 | 95 | 95 | 80 |
| | | | | Pink slightly argillaceous dolomitic limestone. | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Mud product (CMC). | | | | | | | | | | | | 30 | 15 | 5 | 5 | Tr |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

DATE: October 4, 1969

No.: 30

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 3610' To 3685'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3610 | 3615 | 3620 | 3625 | 3630 | 3635 | 3640 | 3645 | 3650 | 3655 | 3560 | 3665 | 3570 | 3575 | 3580 | 3685 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 mn. | 68 | 86 | 88 | 76 | 54 | 55 | | 53 | 65 | 72 | 69 | 74 | 66 | 83 | 90 | 86 |
| | | | | | Calcimetry 3 min | 72 | 100 | 100 | 95 | 73 | 65 | | 63 | 68 | 77 | 71 | 78 | 68 | 83 | 100 | 100 |
| | | | | | Calcimetry 15 min | 73 | 100 | 100 | 100 | 75 | 67 | | 65 | 69 | 77 | 71 | 80 | 69 | 83 | 100 | 100 |
| Argillaceous Rocks | Clays | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | White chalky limestone. | | 40 | 10 | 20 | 30 | 10 | 10 | 30 | 30 | 40 | 60 | 60 | 60 | 70 | 80 | 60 | 5 |
| | ↓ | | | Light beige, grey to whitish microcrystalline pseudo- | | 40 | 90 | 80 | 70 | 90 | 60 | 70 | 70 | 60 | 40 | 40 | 40 | 30 | 20 | 40 | 95 |
| | | | | oolitic compact limestone. Fragments of Ostracods. | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | Mud product (CMC). | | 20 | Tr | Tr | | | 30 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | October 5, 1969 | 31 | | 3690' | 3730' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3590 | 3695 | 3700 | 3705 | 3710 | 3715 | 3720 | 3725 | 3730 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 50 | 50 | 50 | 60 | 65 | 65 | 80 | 75 | 52 |
| | | | | | Calcimetry 3 min | 73 | 94 | 83 | 88 | 76 | 73 | 100 | 92 | 90 |
| | | | | | Calcimetry 15 min | 80 | 100 | 100 | 95 | 77 | 78 | 100 | 95 | 100 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | Beige, grey to whitish microcrystalline or recrystallised, crumbly, pseudo-oolitic to pseudo-brecciated, compact, partly dolomitic limestone. Laths of Anhydrite. Microfauna. | | 95 | 95 | 95 | 95 | 100 | 100 | 100 | 100 | 100 |
| | | | | White chalky limestone. | | 5 | 5 | 5 | 5 | Tr | Tr | Tr | Tr | Tr |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| October 11-12, 1969 | 32 | | 3735' | 3810' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3735 | 3740 | 3745 | 3750 | 3755 | 3760 | 3765 | 3770 | 3775 | 3780 | 3785 | 3790 | 3795 | 3800 | 3805 | 3810 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 75 | 72 | 35 | 20 | 25 | 55 | 55 | 80 | 50 | 60 | 65 | 65 | 84 | 70 | 83 | 80 |
| | | | | | Calcimetry 3 min. | 95 | 100 | 43 | 52 | 55 | 78 | 91 | 97 | 78 | 93 | 80 | 83 | 100 | 100 | 100 | 100 |
| | | | | | Calcimetry 15 min. | 100 | 100 | 56 | 75 | 78 | 82 | 92 | 100 | 93 | 100 | 82 | 85 | 100 | 100 | 100 | 100 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | Whitish, light beige and light grey microcrystalline compact slightly dolomitic limestone. | | 100 | 100 | 10 | 20 | 20 | 80 | 95 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | | | Beige microcrystalline compact dolomitic limestone. | | | | 90 | 80 | 80 | 20 | 5 | Tr | Tr | | | | | | | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| October 13-14, 1969 | 33 | | 3815' | 3880' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3815 | 3820 | 3825 | 3830 | 3835 | 3840 | 3845 | 3850 | 3855 | 3860 | 3865 | 3870 | 3875 | 3880 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 mn | 17 | 8 | 20 | | 78 | 75 | 76 | 93 | 90 | | | | 74 | 75 | | |
| | | | | | Calcimetry 3 mn | 19 | 16 | 35 | | 91 | 100 | 90 | 98 | 98 | | | | 88 | 87 | | |
| | | | | | Calcimetry 15 min | 19 | 18 | 50 | | 93 | 100 | 91 | 99 | 100 | | | | 90 | 87 | | |
| Argillaceous Rocks | Clays | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | Grey blue marls | | | | | | | | | | 60 | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Whitish, light beige to light grey microcrystalline | | 100 | 100 | 100 | 65 | 90 | 75 | 65 | 60 | 25 | | | 80 | 85 | 95 | | |
| | ↓ | | | locally calcarenitic to microconglomeratic (intraforma- | | | | | | | | | | | | | | | | | |
| | | | | tional) limestone. | | | | | | | | | | | | | | | | | |
| | | | | Grey brown microcrystalline limestone. | | | | | 30 | 10 | 25 | 35 | 40 | 15 | | | 15 | 5 | Tr | | |
| | | | | Very dark brown microcrystalline locally calcarenitic, | | | | | | | | | | | | | 5 | 10 | 5 | | |
| | Dolomite | | | anhydritic, bituminous limestone. | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | Grey anhydrite. | | | | | | | 5 | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | Cavings. | | | | | | | | | | | | | 100 | 100 | | | | | |
| Fracture | Calcite | White calcite (with oil fluorescence). | | | | | | | | | | | | | | | Tr | Tr | Tr | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| October 14, 1969 | 34 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 3885' | 3926' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DEPTH | 3885 | 3890 | 3895 | 3900 | 3905 | 3910 | 3915 | |
| | | | | Calcimetry 1 min | 85 | 60 | 65 | 55 | 65 | 65 | 65 | |
| | | | | Calcimetry 3 min | 100 | 76 | 78 | 98 | 100 | 96 | 94 | |
| | | | | Calcimetry 15 min | 100 | 77 | 78 | 100 | 100 | 100 | 98 | |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | Very light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. | 95 | 100 | 95 | 100 | 100 | 100 | 100 | 3917' - 3926' = CORE #4. Recovered 9' = 100% |
| | | | | Grey brown microcrystalline limestone. | Tr | | | | | | | |
| | | | | Very dark brown, microcrystalline, locally calcarenitic, anhydritic, bituminous limestone. | 5 | Tr | 5 | Tr | Tr | Tr | Tr | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White calcite (with oil fluorescence). | Tr | Tr | Tr | Tr | Tr | Tr | Tr | |

AQUITAINE

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 16, 1969 | 17 | | 2660' | 2790' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 2660 | 2665 | 2668 | 2670 | | 2715 | 2720 | 2725 | 2730 | 2735 | 2740 | 2750 | 2760 | 2770 | 2780 | 2790 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | 95 | | | | | 45 | 25 | | 35 | 48 | 48 | 65 | 50 | 50 | 37 | 37 |
| | | | | Calcimetry 3 min | 100 | | | | | 74 | 58 | | 75 | 72 | 72 | 82 | 78 | 83 | 67 | 55 |
| | | | | Calcimetry 15 min | 100 | | | | | 74 | 70 | | 92 | 83 | 83 | 87 | 90 | 94 | 85 | 63 |
| Argillaceous Rocks | Clays | | | Pale beige, brown to red-brown plastic clay = CAVINGS? | 25 | 25 | 25 | 25 | | 25 | 25 | 25 | 20 | 20 | 20 | 15 | 15 | 15 | 20 | 35 |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | Greenish grey shale. | | | | | | | | | | | Tr | Tr | Tr | Tr | Tr | Tr |
| | Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Light brown crypto. to microcryst. calcareous dolomite. | 10 | 10 | 10 | 10 | | | | | | | | | | | | |
| | | Inter-gran + | 6-8% | Whitish beige to pale brown calcarenitic, bioclastic to | 55 | 50 | 50 | 50 | 2670' - 2684' = CORE #3. Recovered 14' = 100% | 10 | Tr | | | | | | | | | |
| | | Organ | | biohermal limestone. (Calcimetry at 2630' = 97 - 100 - 100) | | | | | | | | | | | | | | | | |
| | | | | Grey shaly dolomite. | Tr | Tr | Tr | Tr | | | | | | | | | | | | |
| | Dolomite | Intxl + vugs | 5-12% | Very dark brown microcrystalline bituminous dolomite. | | | | | | 55 | 70 | 70 | 75 | 75 | 60 | 50 | 65 | 60 | 40 | 35 |
| | | | | Whitish to pale beige slightly bitumous, microcrystalline | | | | | | | | | | | 10 | 30 | 15 | 20 | 35 | 20 |
| Detritic Rocks | Silt | | | slightly bioclastic limestone. (Calcimetry at 2760' = 95 - 98). | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White, grey and brown anhydrite. | Tr | Tr | Tr | Tr | | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | |
| | Igneous<br>Cement | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | 5 | 5 | 5 | 5 | | 5 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 |
| Fracture | Calcite | | | White calcite. | 5 | 10 | 10 | 10 | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | 5 |
| | Dolomite | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DATE: September 16, 1969
No. 18
DEPTH From 2800' To 2885'
WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2800 | 2810 | 2820 | 2825 | 2830 | 2835 | 2840 | 2845 | 2850 | 2855 | 2860 | 2865 | 2870 | 2875 | 2880 | 2885 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 30 | 14 | 30 | 15 | 12 | | 8 | | 18 | | 15 | | 17 | | 15 | |
| | | | | | Calcimetry 3 min | 45 | 37 | 51 | 30 | 28 | | 24 | | 32 | | 22 | | 31 | | 25 | |
| | | | | | Calcimetry 15 min | 53 | 43 | 64 | 55 | 53 | | 40 | | 58 | | 50 | | 50 | | 56 | |
| Argillaceous Rocks | Clays | | | Pale beige to brown plastic clay = CAVINGS? | | 50 | 50 | 50 | 40 | 35 | 30 | 30 | 30 | 30 | 30 | 20 | 15 | 15 | 15 | 10 | 5 |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Whitish to pale beige microcrystalline slightly bituminous, slightly bioclastic limestone. | | 20 | | | | | | | | | | | | | | | |
| | | Intxl + vugs | 5-12% | Very dark brown microcrystalline bituminous dolomite. | | 30 | | | | | | | | | | | | | | | |
| | | | | Pinky to whitish beige cryptocrystalline dolomite. (Calcimetry = 8 - 27 - 73). | | | 45 | 45 | 55 | 60 | 55 | 15 | 5 | 5 | | | | | | | |
| | Dolomite | Inter-gran. | 1-2% | Whitish to pale grey cryptoxl. dol.(Calci. = 8 - 25 - 93). | | | | | | | 10 | 45 | 40 | 40 | 60 | 75 | 80 | 80 | 75 | 85 | 90 |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White and grey anhydrite. | | Tr | | | | Tr | | | | | | | | | | Tr | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | Tr | 5 | 5 | 5 | 5 | 5 | 10 | 25 | 25 | 10 | 5 | 5 | 5 | 10 | 5 | 5 |
| Fracture | Calcite | | | White calcite. | | Tr | Tr | Tr | | | | | | | | | | | | | |
| | Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH | | WELL NAME |
|---|---|---|---|---|---|
| September 16 & 19, 1969 | 19 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | From<br>2890' | To<br>2920' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2890 | 2895 | 2900 | 2903 | 2906 | 2908 | 2910 | 1912 | 2914 | 2915 | 2916 | 2918 | 2920 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 14 | 37 | 32 | | 12 | | 17 | | | 12 | | | 11 | | | |
| | | | | | Calcimetry 3 min | 27 | 55 | 38 | | 22 | | 30 | | | 29 | | | 26 | | | |
| | | | | | Calcimetry 15 min | 57 | 63 | 72 | | 53 | | 54 | | | 69 | | | 50 | | | |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | Pale beige to brown plastic clay = CAVINGS? | | 5 | 5 | 5 | Tr | Tr | Tr | | | | | | | | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | Inter-gran. | < 1% | Whitish cryptocrystalline to microcrystalline very slightly silicified dolomite. | | 90 | 85 | 90 | 95 | 60 | 65 | 55 | 90 | 100 | 100 | 100 | 100 | 100 | | | |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | 5 | 10 | 5 | 5 | 40 | 35 | 45 | 10 | Tr | Tr | Tr | Tr | Tr | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

DATE: September 19, 1969

No.: 20

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 2922' To 2945'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2922 | 2924 | 2925 | 2926 | 2928 | 2930 | 2932 | 2934 | 2935 | 2936 | 2938 | 2940 | 2942 | 2944 | 2945 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | | | 18 | | | 15 | | | 20 | | | 20 | | | 20 |
| | | | | | Calcimetry 3 min. | | | 24 | | | 25 | | | 50 | | | 50 | | | 32 |
| | | | | | Calcimetry 15 min | | | 34 | | | 45 | | | 62 | | | 72 | | | 57 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | Inter-gran. | <1% | Whitish cryptocrystalline to microcrystalline very slightly silicified dolomite. From 2926' = white to beige | | 95 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | Grey anhyrite. | | | | | | | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | 5 | Tr | Tr | Tr | Tr | Tr | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 19, 1969 | 21 | # CUTTINGS: DESCRIPTION AND PERCENTAGE | 2945' | 2972' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2946 | 2948 | 2950 | 2952 | 2954 | 2955 | 2956 | 2958 | 2960 | 2962 | 2964 | 2965 | 2966 | 2968 | 2970 | 2972 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | | | 13 | | | | 15 | | 17 | | 25 | | | 15 | | |
| | | | | | Calcimetry 3 min | | | 27 | | | | 40 | | 40 | | 60 | | | 35 | | |
| | | | | | Calcimetry 15 min | | | 53 | | | | 85 | | 90 | | 100 | | | 78 | | |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | Inter-gran. | < 1% | Whitish to pale beige cryptocrystalline to microcrystalline very slightly silicified dolomite. | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | Grey anhydrite. | | Tr | | | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | | | | | | | Tr | | | Tr | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 19 & 24,'69 | 22 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 2974' | 3045' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 2974 | | 2985 | 2990 | 2995 | 3000 | 3005 | 3010 | 3015 | 3020 | 3025 | 3030 | 3035 | 3040 | 3045 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | | | 12 | | 15 | 20 | | 17 | 15 | 18 | 20 | 20 | 15 | 15 | 18 | |
| | | | | Calcimetry 3 min | | | 29 | | 40 | 50 | | 39 | 40 | 45 | 45 | 45 | 35 | 35 | 40 | |
| | | | | Calcimetry 15 min | | | 57 | | 75 | 100 | | 94 | 100 | 92 | 92 | 90 | 73 | 78 | 78 | |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | Whitish to beige cryptocryst. to microcryst. very slightly silicified dolomite. | 100 | | 10 | 60 | 85 | 90 | 95 | 100 | 95 | 65 | 55 | 30 | 20 | 25 | 15 | |
| | | | | Pinky white, pink and slightly brown, locally yellowish micxl to crpxl, compact and azoic dolomite. (Calcimetry at 3020' = 22 - 51 - 91). | | | | | | | Tr | Tr | 5 | 35 | 45 | 65 | 75 | 75 | 70 | |
| | | | | Pale beige, pale grey to pale brown micxl. slightly arg. dolomitic limestone. (Calcimetry at 3035'= 45-76-88). | | 9 5/8" CASING SHOE AT 2960' | | | | | | | | | | 5 | 5 | Tr | 15 | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | Grey anhydrite. | Tr | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | Cement. | | | 85 | 40 | 15 | 10 | 5 | Tr | Tr | Tr | Tr | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings (from the mud circuit). | | | 5 | Tr | Tr | Tr | Tr | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | September 25-26, '69 | 23 | | 3050' | 3125' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | | 3050 | 3055 | 3060 | 3065 | 3070 | 3075 | 3080 | 3085 | 3090 | 3096 | 3100 | 3105 | 3110 | 3115 | 3120 | 3125 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry | 1 min | 30 | 18 | 22 | 35 | 35 | 35 | 34 | 20 | 25 | 25 | 15 | 25 | 30 | 30 | 28 | 40 |
| | | | | | | 3 min | 60 | 42 | 56 | 70 | 77 | 63 | 70 | 47 | 57 | 57 | 35 | 57 | 65 | 72 | 63 | 78 |
| | | | | | | 15 min | 98 | 74 | 86 | 83 | 100 | 95 | 98 | 90 | 100 | 100 | 64 | 94 | 100 | 100 | 82 | 90 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | ** | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | White chalky limestone. | | | | | | | | | | | Tr | | Tr | Tr | Tr | Tr | | |
| | | Inter-gran + Inter-cryst. | < 6% | Pale beige, pale grey and pale brown microcrystalline slightly argillaceous dolomitic limestone. * | | | 10 | 30 | 30 | 25 | 60 | 70 | 70 | 60 | 80 | | 75 | 90 | 90 | 90 | 100 | 100 |
| | | | | Pinky white to pinky brown and yellowish microcrystalline to crystalline compact and azoic dolomite. | | | 70 | 60 | 60 | 65 | 30 | 20 | 20 | 35 | 20 | | 15 | 10 | 10 | 10 | Tr | Tr |
| | | | | Whitish to pale beige cryptocrystalline to microcrystalline compact and azoic dolomite. | | | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | Tr | | 5 | Tr | | | | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | | | | | | | | | | | 100 | 5 | Tr | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | | |

* Few fragments of organisms: Algae (?), Pteropods.

** From 3070' to 3100': grains of glauconite in every facies.

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 26, 1969 | 24 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 3130' | 3205' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | | 3130 | 3135 | 3140 | 3145 | 3150 | 3155 | 3160 | 3165 | 3170 | 3175 | 3180 | 3185 | 3190 | 3195 | 3200 | 3205 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry | 1 min | 33 | 45 | 52 | 55 | 30 | 45 | 55 | 25 | 30 | 30 | 40 | 29 | 44 | 55 | 65 | 72 |
| | | | | | 3 min | 65 | 78 | 65 | 70 | 72 | 72 | 55 | 57 | 54 | 60 | 72 | 58 | 77 | 64 | 80 | 92 |
| | | | | | 15 min | 83 | 100 | 92 | 100 | 98 | 90 | 58 | 100 | 64 | 65 | 90 | 76 | 100 | 80 | 83 | 98 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | White chalky limestone. | | Tr | Tr | Tr | Tr | Tr | Tr | | Tr | | | | | Tr | Tr | 10 | 10 |
| | | | | Pale beige to pale brown microcrystalline slightly argillaceous dolomitic limestone. | | 85 | 75 | 70 | 75 | 95 | 100 | 100 | 100 | 95 | 95 | 95 | 90 | 95 | 100 | 90 | 90 |
| | | | | Pinky white to pinky brown and yellowish microcrystalline to crystalline compact and azoic dolomite. | | 15 | 25 | 30 | 25 | 5 | Tr | | Tr | 5 | 5 | 5 | 10 | 5 | Tr | Tr | Tr |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White chert. | | | | | | | Tr | Tr | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 27, 1969 | 25 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 3210' | 3285' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3210 | 3215 | 3220 | 3225 | 3230 | 3235 | 3240 | 3245 | 3250 | 3255 | 3260 | 3265 | 3270 | 3275 | 3280 | 3285 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 73 | 80 | 60 | 75 | 72 | 65 | 92 | 80 | 73 | 95 | 67 | 60 | 83 | 70 | 54 | 65 |
| | | | | | Calcimetry 3 min | 92 | 100 | 77 | 86 | 93 | 74 | 100 | 91 | 86 | 100 | 75 | 80 | 92 | 75 | 58 | 80 |
| | | | | | Calcimetry 15 min | 94 | 100 | 80 | 90 | 97 | 75 | 100 | 95 | 67 | 100 | 75 | 80 | 92 | 75 | 60 | 82 |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | White chalky limestone. | | 15 | 20 | 15 | 10 | 10 | 20 | 10 | 10 | 20 | 10 | 10 | Tr | 10 | 20 | 20 | 30 |
| | | | | White, slightly grey to beige microcrystalline spathic | | 85 | 80 | 85 | 90 | 90 | 80 | 90 | 90 | 80 | 90 | 90 | 100 | 90 | 80 | 80 | 70 |
| | | | | partly dolomitic limestone. | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | August 27-28, 1969 | 7 | | 1510' | 1550' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1510 | 1515 | 1520 | 1530 | 1540 | 1550 | 1560 | 1570 | 1580 | 1590 | 1600 | 1610 | 1620 | 1630 | 1640 | 1650 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 98 | | 96 | 83 | 73 | 58 | 85 | 40 | 56 | 45 | 50 | 47 | 63 | 64 | 53 | 22 |
| | | | | | Calcimetry 3 min | 100 | | 98 | 94 | 83 | 73 | 100 | 44 | 60 | 48 | 54 | 50 | 64 | 65 | 59 | 30 |
| | | | | | Calcimetry 15 min | | | 98 | 96 | 85 | 73 | 100 | 45 | 61 | 48 | 54 | 50 | 64 | 65 | 59 | 32 |
| Argillaceous Rocks | Clays | | | Red-brown plastic to slightly indurated clay. | | 5 | 5 | 10 | 10 | 10 | 10 | 15 | 35 | | | | | | | | |
| | | | | Brick-red silty argillites. | | | | | | | | | | 30 | 35 | 35 | 35 | 30 | 30 | 40 | 60 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Pinky beige locally vuggy crumbly limestone. | | 85 | 90 | 85 | 75 | 75 | 70 | 70 | 45 | | | | | | | | |
| | | | | Pinky grey saccharoidal microcrystalline dolomitic | | 10 | 5 | 5 | 15 | 15 | 20 | 15 | 20 | | | | | | | | |
| | | | | limestone. | | | | | | | | | | | | | | | | | |
| | | | | Pink bioclastic limestone. | | | | | | | | | | 20 | 20 | 10 | 10 | 25 | (1)<br>25 | (2)<br>25 | 15 |
| | Dolomite | | | Pale beige pelletoidal dolomitic limestone. | | | | | | | | | | 20 | 20 | 30 | 30 | 20 | 20 | 10 | 5 |
| | | | | Dark pink slightly sandy crumbly limestone. | | | | | | | | | | 20 | 20 | 20 | 20 | 15 | 15 | 15 | 10 |
| Detritic Rocks | Silt | | | Soft silt with red clayey cement. | | | | | | | | | | 10 | 5 | 5 | 5 | 10 | 10 | 10 | 5 |
| | | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | | | | | | | | | | Tr | Tr | Tr | Tr | | Tr | Tr | 5 |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | (1) = Amphipora? | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | (2) = 1 small Brachiopod (Atrypa?) | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cement. | | | | | | | | | | Tr | Tr | Tr | Tr | Tr | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| AQUITAINE | DATE<br>August 28-29, 1969 | No.<br>8 | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH<br>From 1660' To 1780' | WELL NAME<br>WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | | 1660 | 1670 | 1680 | 1690 | 1700 | 1710 | 1720 | 1730 | 1740 | 1750 | 1760 | 1770 | 1780 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calcimetry | 1 mn | 40 | | 51 | 58 | 40 | 40 | 50 | 60 | 40 | 22 | 35 | 50 | 85 | | | |
| | | | | | | 3 mn | 53 | | 55 | 70 | 47 | 48 | 64 | 83 | 51 | 35 | 48 | 58 | 88 | | | |
| | | | | | | 15 mn. | 53 | | 57 | 73 | 49 | 51 | 67 | 85 | 53 | 37 | 56 | 62 | 89 | | | |
| Argillaceous Rocks | Clays | | | Brick-red silty argillites. | | | 60 | 60 | 50 | 50 | 40 | 30 | 40 | 20 | 20 | 30 | 20 | 15 | 10 | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Pink bioclastic limestone. | | | 15 | 15 | 10 | 10 | 10 | 10 | 10 | 40 | 40 | 20 | 10 | 10 | 5 | | | |
| | | | | Pale beige pelletoidal dolomitic limestone. | | | 5 | 5 | 5 | 5 | | | | 20 | 10 | 10 | | 70 | 80 | | | |
| | | | | Dark pink slightly sandy crumbly limestone. | | | 15 | 15 | 30 | 30 | 40 | 40 | 30 | 10 | 10 | | | | | | | |
| | | | | White to pale beige microcrystalline micro-oolitic lms. | | | Tr | | 5 | 5 | 5 | 10 | 15 | 10 | 20 | 40 | 30 | 5 | 5 | | | |
| | | | | Beige to grey chalky and argillaceous crumbly limestone. | | | | | | | | | | | | | 40 | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | | | 5 | 5 | Tr | Tr | 5 | 5 | 5 | | Tr | Tr | | | | | | |
| | Gypsum | | | Gypsum. | | | | | Tr | Tr | Tr | 5 | Tr | | Tr | Tr | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DATE: September 7, 1969
No. 9
DEPTH From 1790' To 1830'
WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1790 | 1800 | 1805 | 1810 | 1815 | 1820 | 1825 | 1830 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 67 | 72 | 90 | 63 | 85 | 75 | 65 | 79 |
| | | | | | Calcimetry 3 min | 67 | 80 | 95 | 70 | 90 | 78 | 70 | 82 |
| | | | | | Calcimetry 15 min | 67 | 82 | 98 | 74 | 92 | 79 | 73 | 83 |
| Argillaceous Rocks | Clays → Marls | | | Brick-red silty argillites. | | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | | | Grey finely bedded argillites. Brachiopods. | | | | | Tr | | | | |
| Carbonate | Limestone → Dolomite | | | Pink bioclastic limestone. | | 10 | 10 | 10 | 15 | 15 | 15 | 15 | 15 |
| | | | | Pale beige pelletoidal dolomitic limestone. | | 20 | 20 | 10 | 20 | 10 | | | 10 |
| | | | | Dark pink slightly sandy crumbly limestone. | | 15 | 15 | 15 | 5 | | 5 | 5 | 5 |
| | | | | White to pale beige microcrystalline micro-oolitic lms. | | | | | | 5 | 20 | 20 | 5 |
| | | Inter-<br>gran +<br>Organ | 12% | Pale beige to grey chalky and argillaceous, locally bioclastic limestone. | | 40 | 40 | 40 | 40 | 55 | 40 | 40 | 50 |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White and pink-violet anhydrite. | | Tr | Tr | 10 | 5 | Tr | 5 | 5 | Tr |
| | | | | Gypsum. | | Tr | Tr | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH | | WELL NAME |
|---|---|---|---|---|---|
| September 7, 1969 | 10 | | From 1840' | To 1920' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1840 | 1845 | 1850 | 1855 | 1860 | 1865 | 1870 | 1875 | 1886 | 1890 | 1894 | 1900 | 1905 | 1910 | 1915 | 1920 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calcimetry 1 min | 78 | 62 | 80 | 80 | 85 | 72 | 75 | 73 | | | | | | | | |
| | | | | | Calcimetry 3 min | 80 | 68 | 83 | 86 | 88 | 74 | 76 | 74 | | | | | | | | |
| | | | | | Calcimetry 15 min | 82 | 68 | 84 | 88 | 69 | 75 | 77 | 75 | | | | | | | | |
| Argillaceous Rocks | Clays | | | Brick-red silty plastic clay. | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | | | |
| | | | | Brown calcareous argillites. Cellular dolomite. | | Tr | 5 | Tr | 5 | 20 | 15 | 10 | 10 | 10 | 30 | 50 | 30 | 15 | 20 | 10 | 5 |
| | | | | Orange to red plastic to indurated argillites. | | Tr | 5 | 5 | 15 | | | | | | 10 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | Inter-gran | 8% | Pink slightly sandy bioclastic limestone. | | 20 | 15 | 5 | | | | | | | | | | | | | |
| | | Organ | 15% | Grey bioclastic, locally oolitic limestone. | | 20 | 20 | 20 | 10 | 30 | (1)<br>50 | 30 | (1)<br>30 | 30 | 20 | | | | 5 | (1)<br>5 | |
| | | | | Grey microcrystalline limestone. | | 10 | | 10 | | | 10 | | | | | | | | | | |
| | | | | Grey soft argillaceous limestone. | | 10 | | | 10 | | | 5 | 5 | | | | | | | | |
| | | Inter-gran + | 12% | Red-orange to brown limestone. Cellular dolomite. Small | | (1)<br>30 | (1)<br>40 | (1)<br>40 | (2)<br>40 | 30 | 15 | (1)<br>40 | (1)<br>35 | 20 | 10 | | 10 | (3)<br>25 | 5 | 5 | 5 |
| | Dolomite | Organ | | Brachiopods. * | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | Pink siltstone and sandstone. | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | * Greenish grey argillaceous limestone. | | | | | | | | | 5 | 30 | 20 | 40 | 60 | 60 | 70 | 80 | 90 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White to pinky anhydrite. | | Tr | 5 | 10 | 10 | 10 | | 5 | 5 | Tr | | Tr | Tr | | Tr | Tr | Tr |
| | Gypsum | | | Gypsum. | | | | Tr | | | | | | Tr | | Tr | Tr | | | | Tr |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | Cement. | | Tr | Tr | Tr | | | | | | | | | | | | | |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | (1) = Brachiopods. | | | | | | | | | | | | | | | | | |
| | Dolomite<br>Anhydrite | | | (2) = Crinoids. | | | | | | | | | | | | | | | | | |
| | Quartz | | | (3) = Amphipora? | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 7, 1969 | 11 | | 1925' | 2000' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | | 1925 | 1930 | 1935 | 1940 | 1945 | 1950 | 1955 | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 60 | 63 | 40 | 62 | 53 | 58 | 63 | 60 | 56 | 55 | 55 | 50 | 53 | 77 | 75 | 75 |
| | | | | | Calcimetry 3 min | 62 | 67 | 45 | 65 | 60 | 60 | 72 | 62 | 59 | 58 | 57 | 51 | 57 | 78 | 75 | 77 |
| | | | | | Calcimetry 15 min | 62 | 68 | 45 | 65 | 60 | 62 | 73 | 65 | 60 | 60 | 59 | 53 | 60 | 78 | 77 | 80 |
| Argillaceous Rocks | Clays → Marls | | | Red to brown hard argillites. Cellular dolomite. | | 10 | 5 | 15 | 15 | 15 | 20 | 20 | 15 | 15 | 15 | 15 | 10 | 10 | 10 | 15 | 10 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | Greenish grey soft argillaceous limestone. | | 80 | 70 | 70 | 80 | 70 | 65 | 65 | 70 | 70 | 70 | 70 | 80 | 80 | 60 | 30 | 20 |
| | | | | Pinky red microcrystalline limestone. | | 5 | 10 | 15 | 5 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 10 | 10 | 20 | 20 | 10 |
| | | | | Grey bioclastic limestone. | | 5 | 5 | | | | | | | | | | | | | | |
| | | | | Pale grey to pink bioclastic limestone and grey beige pelletoidal limestone (calcilutite). | | | | | | | | | | | | | | | 10 | 35 | 60 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | Anhydrite. | | | Tr | | | | | | Tr | | Tr | | | | | | |
| | Gypsum | | | Gypsum. | | | Tr | Tr | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | | 10 | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 15, 1969 | 12 | 2010' | 2160' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2090 | 2100 | 2110 | 2120 | 2130 | 2140 | 2150 | 2160 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 20 | 24 | 12 | 42 | 35 | 8 | 8 | | 10 | 7 | 9 | 5 | 4 | 7 | 5 | 4 |
| | | | | | Calcimetry 3 min | 23 | 25 | 18 | 65 | 50 | 12 | 12 | | 13 | 9 | 12 | 6 | 5 | 9 | 5 | 5 |
| | | | | | Calcimetry 15 min | 23 | 25 | 18 | 75 | 55 | 12 | 13 | | 14 | 10 | 13 | 6 | 5 | 9 | 5 | 6 |
| Argillaceous Rocks | Clays | | | Grey plastic clay. | | | | 100 | Tr | Tr | Tr | 5 | 100 | 85 | 95 | 95 | 100 | 100 | 100 | 100 | 100 |
| | | | | Pale grey dolomitic shale. | | | 5 | | 5 | Tr | | | | | | | | | | | |
| | ↓ | Organ. | 6–12% | Dark grey to brown slightly dolomitic shale. Corals | | | | | 45 | 55 | 50 | 35 | | 5 | 5 | 5 | Tr | Tr | Tr | Tr | Tr |
| | | | | and some silicified organisms. (Calcimetry = 40 - 53 - 56). | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | Cavings = red plastic clay, pink to red limestone, pale grey plastic | | 45 | 35 | Tr | Tr | Tr | Tr | | | | | | Tr | Tr | Tr | Tr | Tr |
| | Igneous | | | clay. | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | Cement. | | 55 | 60 | | 40 | 45 | 50 | 60 | | 10 | | | Tr | Tr | Tr | Tr | Tr |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | White calcite. | | | | | 10 | Tr | | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

DATE: September 15, 1969

No.: 13

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 2170' To 2320'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2170 | 2180 | 2190 | 2200 | 2210 | 2220 | 2230 | 2240 | 2250 | 2260 | 2270 | 2280 | 2290 | 2300 | 2310 | 2320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 6 | 10 | | | 5 | 3 | 4 | 10 | 6 | 7 | 6 | 5 | 5 | 5 | 5 | 4 |
| | | | | | Calcimetry 3 min | 7 | 12 | | | 5 | 4 | 5 | 10 | 6 | 8 | 7 | 6 | 5 | 5 | 5 | 5 |
| | | | | | Calcimetry 15 min | 7 | | | | 5 | 4 | 5 | 10 | 6 | 8 | 7 | 6 | 5 | 5 | 5 | 5 |
| Argillaceous Rocks | Clays ↓ Marls | | | Grey plastic clay. | | 100 | 100 | 100 | 100 | | | | | | | | | | | | |
| | | | | Beige to pale brown plastic clay with grey patches. | | | | | | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | |
| | | | | Brown plastic clay. | | | | | | | | | | | | 100 | 100 | 100 | 100 | 100 | 100 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 16, 1969 | 14 | | 2330' | 2440' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2330 | 2340 | 2350 | 2360 | 2365 | 2370 | 2375 | 2380 | 2385 | 2390 | 2395 | 2400 | 2410 | 2420 | 2430 | 2440 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 3 | 6 | 7 | 21 | | 16 | | 22 | | 20 | | 20 | 8 | 8 | 5 | |
| | | | | | Calcimetry 3 min | 4 | 6 | 8 | 25 | | 22 | | 52 | | 30 | | 37 | 20 | 18 | 10 | |
| | | | | | Calcimetry 15 min | 4 | 6 | 8 | 27 | | 24 | | 67 | | 32 | | 42 | 23 | 25 | 13 | |
| Argillaceous Rocks | Clays | | | Brown to red-brown plastic clay. | | 100 | 100 | 100 | 100 | 95 | 80 | 65 | 60 | 60 | 55 | 60 | 60 | 65 | 70 | 100 | 85 |
| | Marls | | | Pink and grey dolomitic shale. (Calcimetry at 2380' = 35 - 60 - 80). | | | | | | | | 10 | 15 | 20 | 30 | 25 | 30 | 30 | 30 | Tr | 5 |
| Carbonate | Limestone | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | Beige to light brown cryptocrystalline dolomite. (Calcimetry at 2380' = 20 - 55 - 83). | | | | | | | | | 10 | 15 | 5 | 10 | 5 | Tr | Tr | Tr | Tr |
| Detritic Rocks | Silt → Conglomerate | | | Beige to light grey and red-brown very fine to fine grained compact calcareous sandstone. (Calcimetry at 2380' = 45 - 48 - 48). | | | | | Tr | 5 | 20 | 25 | 15 | 5 | 10 | 5 | 5 | 5 | Tr | Tr | Tr |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White to brown anhydrite. | | | | | | | | | | | | | | | | | 10 |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 16, 1969 | 15 | | 2450' | 2560' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 | 2510 | 2520 | 2530 | 2535 | 2540 | 2545 | 2550 | 2560 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | 8 | 8 | 7 | 8 | 8 | 3 | 5 | 18 | 45 | | 45 | | 65 | 30 | | |
| | | | | Calcimetry 3 min | 20 | 14 | 10 | 12 | 12 | 5 | 6 | 35 | 93 | | 80 | | 98 | 60 | | |
| | | | | Calcimetry 15 min | 25 | 15 | 13 | 15 | 14 | 5 | 10 | 54 | 100 | | 98 | | 100 | 75 | | |
| Argillaceous Rocks | Clays | | | Brown to red-brown plastic clay. | 95 | 70 | 90 | 60 | 65 | 40 | 50 | 10 | 25 | 25 | 20 | 10 | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | Pink and grey dolomitic shale. | Tr | 5 | Tr | 5 | 5 | 5 | Tr | Tr | Tr | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | Inter-cryst + organ | < 6% | Light brown microcrystalline to crystalline bioclastic | | | | | | | | | 75 | 75 | 80 | 90 | 100 | | | |
| | | | | to biohermal limestone. (Calcimetry at 2560'= 60 - 92 - 100) | | | | | | | | | | | | | | | | |
| | | | | Light brown cryptocrystalline to microcrystalline cal- | | | | | | | | | | | | | | 90 | | |
| | | | | careous dolomite. (Calcimetry at 2560' = 30 - 65 - 76). | | | | | | | | | | | | | | | | |
| | | | < 6% | Beige, red speckled, locally porous, calcareous dolomite. | | | | | | | | 30 | Tr | Tr | Tr | | | | | |
| | Dolomite | | | (Calcimetry at 2520' = 35 - 77 - 100). * | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | - | - | Beige to light grey and red-brown very fine to fine | Tr | Tr | Tr | 5 | Tr | 5 | Tr | Tr | Tr | | | | | | | |
| | | | | grained calcareous sandstone. | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White, light to dark grey and brown anhydrite. | 5 | 20 | 5 | 20 | 25 | 50 | 50 | 60 | Tr | Tr | Tr | Tr | Tr | 10 | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | Pyrite, | | | Tr | Tr | | | | | | | | | | Tr | | |
| | Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite | | | * Beige to light brown cryptocrystalline dolomite. | Tr | 5 | 5 | 10 | 5 | Tr | Tr | Tr | Tr | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 16, 1969 | 16 | | 2575' | 2655' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2575 | 2580 | 2585 | 2590 | 2595 | 2600 | 2605 | 2610 | 2615 | 2620 | 2625 | 2630 | 2635 | 2645 | 2650 | 2655 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 23 | 23 | 48 | 42 | 34 | 42 | 34 | 35 | 48 | 57 | | | 80 | | 55 | 68 |
| | | | | | Calcimetry 3 min | 35 | 30 | 55 | 53 | 40 | 50 | 40 | 38 | 51 | 62 | | | 87 | | 62 | 70 |
| | | | | | Calcimetry 15 min | 42 | 30 | 57 | 54 | 42 | 54 | 42 | 40 | 54 | 65 | | | 87 | | 65 | 70 |
| Argillaceous Rocks | Clays → Marls | | | Pale beige, brown to red-brown plastic clay. | | 50 | 25 | 20 | 50 | 40 | 35 | 35 | 35 | 25 | 35 | 20 | 25 | 25 | 25 | 25 | 25 |
| Carbonate | Limestone → Dolomite | | | Light brown cryptocryst. to microcryst. calc. dolomite. | | 10 | 60 | 60 | 30 | 25 | 35 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 10 | 10 |
| | | | | Light brown microcryst. to cryst. biocl. to bioherm. lms. | | 10 | Tr | | | | | | | | | | | | | | |
| | | | | Grey shaly dolomite. (Calcimetry at 2600'= 25 - 65 - 75). | | | | | Tr | 15 | 15 | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | | Inter-gran.+ Organ. | 6-8% | Beige to pale brown calcarenitic, bioclastic to biohermal limestone. (Calcimetry at 2610' = 76 - 90 - 94 ; at 2630' = 97 - 100 - 100). | | | | | | | | 35 | 55 | 55 | 45 | 60 | 65 | 65 | 65 | 60 | 55 |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White, grey and brown anhydrite. | | 10 | 5 | 5 | 10 | 5 | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | Pyrite. | | Tr | Tr | | | | Tr | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | 20 | 10 | 15 | 10 | 15 | 10 | 5 | Tr | 5 | 5 | 10 | Tr | Tr | 5 | Tr | Tr |
| Fracture | Calcite | | | White calcite. | | | | | | | | | | 5 | 5 | Tr | Tr | Tr | Tr | 5 | 10 |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.I

## CUTTINGS, DESCRIPTION AND PERCENTAGE

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH | WELL NAME |
|---|---|---|---|---|---|
| | August 22, 1969 | 1 | | From 800' To 950' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | | 13 | | 10 | | | 14 | | 11 | | 10 | | 10 | | 6 | |
| | | | | | Calcimetry 3 min. | | 16 | | 12 | | | 19 | | 14 | | 13 | | 17 | | 8 | |
| | | | | | Calcimetry 15 min. | | 17 | | 12 | | | | | | | | | | | | |
| Argillaceous Rocks | Clays → Marls | - | - | Red-brown finely silty to sandy plastic clay. | | 10 | 20 | 55 | 90 | 90 | 90 | 95 | 90 | 80 | 80 | 80 | 80 | 80 | 75 | 80 | 80 |
| Carbonate | Limestone → Dolomite | - | - | Light brown microcrystalline limestone. | | Tr | Tr | Tr | | | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | | Tr | |
| Detritic Rocks | Silt → Conglomerate | - | - | White to pinky-brown, slightly argillaceous, very fine to fine sand. | | Tr | Tr | | | | | 5 | 10 | 15 | 15 | 15 | 15 | 10 | 15 | 15 | 15 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | White fibrous gypsum | | | Tr | | | Tr | | Tr | Tr | 5 | 5 | 5 | 5 | 10 | 10 | 5 | 5 |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous | | | Igneous and metamorphic rocks. Green rocks and white quartzite. | | | | | | 5 | 5 | Tr | Tr | | Tr | Tr | Tr | | | Tr | Tr |
| | Cement<br>Mud<br>Cavings | | | Cement. | | 90 | 80 | 45 | 10 | 5 | - | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | | DATE | | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|---|---|
| | | August 22, 1969 | | 2 | | 960' | 1110' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 960 | 970 | 980 | 990 | 1000 | 1010 | 1020 | 1030 | 1040 | 1050 | 1060 | 1070 | 1080 | 1090 | 1100 | 1110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 9 | | 13 | | 15 | | 14 | | 15 | | 39 | | 30 | | 25 | |
| | | | | | Calcimetry 3 min | 12 | | 16 | | 20 | | 17 | | 18 | | 43 | | 37 | | 33 | |
| | | | | | Calcimetry 15 min | 12 | | 17 | | 22 | | 21 | | 22 | | 47 | | 42 | | 44 | |
| Argillaceous Rocks | Clays | - | - | Red-brown finely silty to sandy plastic clay. | | 85 | 85 | 80 | 80 | 85 | 80 | 80 | 75 | 75 | 80 | 85 | 80 | 70 | 90 | 85 | 80 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | - | - | Light brown microcrystalline limestone. | | | | Tr | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | - | - | Light brown hard microcrystalline dolomite. | | | | | | | | | | | | | Tr | 10 | Tr | Tr | |
| Detritic Rocks | Silt | - | - | Red-brown, locally cemented, very fine to fine sand. | | 10 | 10 | 15 | 10 | 10 | 15 | 15 | 20 | 15 | 15 | 10 | 10 | 10 | 5 | 10 | 10 |
| | | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White microcrystalline anhydrite | | | | | | | | | | | | | Tr | | | | |
| | Gypsum | | | White fibrous gypsum. | | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 5 | 5 | 10 |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| August 23, 1969 | 3 | | 1120' | 1210' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | | 1120 | 1130 | 1140 | 1150 | 1160 | 1165 | 1170 | 1175 | 1180 | 1185 | 1190 | 1195 | 1200 | 1205 | 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry | 1 min | 26 | | | 15 | 16 | | 17 | | 25 | | 25 | | 27 | | 24 |
| | | | | | 3 min | 37 | | | 20 | 19 | | 21 | | 27 | | 27 | | 35 | | 29 |
| | | | | | 15 min | 37 | | | 24 | 24 | | 23 | | | | | | 35 | | 32 |
| Argillaceous Rocks | Clays ↓ Marls | - | - | Red-brown finely silty to sandy plastic clay. | | 80 | Tr | 10 | 45 | 60 | 60 | 80 | 90 | 80 | 80 | 85 | 80 | 80 | 80 | 80 |
| Carbonate | Limestone ↓ Dolomite | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt ↓ Conglomerate | - | - | Red-brown, locally cemented, very fine to fine sand. | | 10 | Tr | Tr | 5 | 5 | 5 | Tr | Tr | 10 | 5 | 5 | 10 | 10 | 10 | 10 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | White fibrous gypsum. | | 10 | Tr | Tr | 10 | 15 | 15 | 10 | 10 | 10 | 15 | 10 | 10 | 10 | 10 | 10 |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | Cement. | | | 100 | 90 | 40 | 20 | 20 | 10 | Tr | Tr | Tr | Tr | | | | Tr |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| August 26, 1969 | 4 | # CUTTINGS: DESCRIPTION AND PERCENTAGE | 1215' | 1290' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1215 | 1220 | 1225 | 1230 | 1235 | 1240 | 1245 | 1250 | 1255 | 1260 | 1265 | 1270 | 1275 | 1280 | 1285 | 1290 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | | 28 | | 29 | | 28 | | 38 | | 35 | | 33 | | 23 | | 26 |
| | | | | | Calcimetry 3 min | | 35 | | 34 | | 35 | | 40 | | 40 | | 38 | | 28 | | 32 |
| | | | | | Calcimetry 15 min | | 37 | | 37 | | 38 | | 45 | | 45 | | 42 | | 30 | | 35 |
| Argillaceous Rocks | Clays → Marls | - | - | Red-brown finely silty to sandy plastic calcareous clay. | | 80 | 80 | 80 | 75 | 80 | 80 | 70 | 70 | 75 | 80 | 75 | 80 | 80 | 80 | 80 | 80 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt → Conglomerate | - | - | White, pink to light red-brown, very fine, locally cemented, sand. | | 10 | 10 | 10 | 15 | 10 | 10 | 20 | 20 | 20 | 15 | 10 | 10 | 15 | 10 | 15 | 15 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | | | | | | Tr+ | 5 | 5 | Tr+ | | | 5 | | | | | |
| | Gypsum | | | Fibrous gypsum + bi-pyramidal elongated crystals of gypsum. | | 10 | 10 | 10 | 10 | 10 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 5 | 10 | 5 | 5 |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic<br>Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | Cement. | | Tr | Tr | 5 | Tr | Tr | | | Tr | Tr | | | | | | | Tr |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| August 26, 1969 | 5 | | 1300' | 1375' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1300 | 1305 | 1310 | 1315 | 1320 | 1325 | 1330 | 1335 | 1340 | 1345 | 1350 | 1355 | 1360 | 1365 | 1370 | 1375 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 30 | | 27 | | 30 | | 33 | | 30 | | 30 | | 37 | | 22 | |
| | | | | | Calcimetry 3 min | 36 | | 33 | | 36 | | 40 | | 37 | | 37 | | 45 | | 35 | |
| | | | | | Calcimetry 15 min | 39 | | 35 | | 43 | | 46 | | 43 | | 40 | | 53 | | 43 | |
| Argillaceous Rocks | Clays | - | - | Red-brown finely silty to sandy plastic calcareous clay. | | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 75 | 75 | 80 | 75 | 75 | 75 | 75 | 75 |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | - | - | Grey chalky (?) limestone. | | | | | | | | | Tr | Tr | Tr | | Tr | | Tr | Tr | Tr |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | White to pink very fine, locally cemented sand. | | 5 | 10 | 10 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | | 15 | 10 | 10 | 15 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 10 | 10 | 10 | 10 | 15 |
| | Gypsum | | | Fibrous gypsum. | | | | | | | | | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | Tr |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | Cement. | | | | | | | | | Tr | Tr | Tr | Tr | | | | | |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DATE: August 26-27, 1969

No.: 6

DEPTH: From 1380' To 1500'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 1330 | 1390 | 1400 | 1410 | 1420 | 1430 | 1432 | | 1450 | 1460 | 1470 | 1480 | 1485 | 1490 | 1495 | 1500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | 57 | 40 | 43 | 45 | 53 | 55 | | | 83 | 78 | 85 | 100 | | 97 | | 95 |
| | | | | Calcimetry 3 min | 47 | 50 | 53 | 55 | 65 | 73 | | | 94 | 88 | 100 | | | 98 | | 95 |
| | | | | Calcimetry 15 min | 54 | 56 | 53 | 62 | 77 | 81 | | | 100 | 95 | | | | 98 | | |
| Argillaceous Rocks | Clays | - | - | Red-brown (brick), slightly silty, very calcareous | 75 | 75 | 70 | 65 | 70 | 50 | 20 | 1432' - 1447' = CORE #1. Recovered 15' = 100% | | | | | | | | |
| | | | | plastic clay. | | | | | | | | | | | | | | | | |
| | ↓ | | | Red-brown plastic to slightly indurated clay. | | | | | | | | | 5 | 10 | 5 | Tr | Tr | 5 | 5 | 5 |
| | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | - | - | White to pale grey chalky limestone. | Tr | Tr | | | | | | | | | | | | | | |
| | | Inter-gran + | 8% | Pinky beige soft bioclastic limestone. Traces of | | | | | 5 | 25 | 60 | | 85 | 80 | 80 | 95 | 95 | 95 | 90 | 90 |
| | | Organ. | | cellular dolomite. | | | | | | | | | | | | | | | | |
| | | | | Pink slightly sandy limestone. | | | | | Tr | 10 | 15 | | | | | | | | | |
| | ↓ | | | Light beige bioclastic dolomitic limestone. | | | | | | Tr | Tr | | | | | | | | | |
| | Dolomite | | | Pinky grey saccharoidal microxl. dolomitic limestone. | | | | | | | | | 10 | 10 | 15 | 5 | 5 | Tr | 5 | 5 |
| Detritic Rocks | Silt | | | Calcareous very fine grained silt and sandstone. | 10 | 10 | 10 | 10 | 10 | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | 15 | 15 | 20 | 25 | 15 | 15 | 5 | | | | | | | | | |
| | Gypsum | | | White fibrous translucid gypsum. | Tr | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

AQUITAINE ET AL. HUDSON WALRUS A-71

## N. GAS SHOWS

GEOSERVICES NORTH AMERICA LTD.

ROOM 305 - EXAMINER BLDG.
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# REPORT ON GAS SHOWS ON WALRUS A71

## I. CHARACTERISTICS OF DETECTION SYSTEM

- Densimud.
- Stirring Degasser GZ11 constant level 40 l/mn.
- 1st Drying by $Cl_2Ca$.
- Monoflex 30 ft.
- Flow in Monoflex 40 l/h.
- 2nd Drying by $Cl_2Ca$.
- Sampling Assembly.
- Blanchette LAFOND.
- GD11 # 2220.
- GAL21 #3379 in parallel with GD11; continuous recording of gas from 772' to T.D. 3926'.
- Calibration of GAL21 - every day with drilling with 1% $C_1$; lag time due to Monoflex and drying + $Co_2$ absorbant containers : 2 mns. at 40 l/h.

Note: All depths are lagged.

## II. GAS SHOWS RECORDED

772' - 2,500' No gas recorded (Note: traces of $N_2$ while drilling cement after casing).

2502' First apparition of gas on Detectors (0.18% of $C_1$).

2563' First gas show with $C_1$ : 1.5%

$C_2$ : 0.05%

$C_1/C_2 = 30$

Traces of $H_2$
Recycled twice during circulation

| | |
|---|---|
| 2567' | Trip Gas - after new bit with $C_1$ 0.6% then back ground of 0.12% average. |
| 2614' | Gas show (0.18% $C_1$). |
| 2614' - 2665' | Back ground of 0.12% average. |
| 2667' | Gas show 0.17% $C_1$<br>0.027% $C_2$ $C_1/C_2 = 18$ |
| 2670' | After round trip Trip Gas with 0.50% $C_1$ and 0.027% $C_2$. |
| 2685' - 2800' | Back ground of 0.15% $C_1$ average and 0.025% $C_2$.<br>Note: Viscosity of mud 40. Allows reading of $C_2$ in this interval continuously. |
| 2750' | Kick Gas 0.35% $C_1$ and 0.06% $C_2$. |
| 2775' | Gas show for 10' 0.22% $C_1$ and 0.04% $C_2$. |
| 2800' - 2900' | Mud weight increased; less quantity of gas recorded (less than 0.02% $C_1$ at 2,850'). |
| 2902' | Trip Gas with 1.4% $C_1$ and 0.035% $C_2$ $C_1/C_2 = 40$<br>Recycled once (0.35% $C_1$). |
| 2960' | Casing 9"5/8.<br>After casing no gas show until 3070'. |
| 3070' | Sudden apparition of gas and constant reading of 0.38% $C_1$ during 20 feet. $C_1/C_2 = 48$ |
| 3095' | Mud weight increased to 1.75 when start drilling. After lag time, flow of 25 bbls of salt water reduces weight to 1.57. Trip gas of 5.8% $C_1$ and 0.12 $C_2$; recycled twice.<br>After Trip gas weight stabilizes at 1.68. |
| 3140' | Trip gas due to pipe connection of 0.35% $C_1$ |

Report on Gas Shows on Walrus A71 (cont'd)

| | |
|---|---|
| 3160' | Trip gas 6% $C_1$ and 0.16% $C_2$ $C_1/C_2 = 37$ |
| 3200' - 3510' | Mud weight put to 1.70 - 1.72 and increased to 1.78-1.82 after 3510 to 3580'.<br>No hydrocarbon gas recorded. However, continuous show of $N_2$ due to chemicals added in mud. |
| 3580' | Mud weight reduced to 1.70;<br>flow of water and gas recorded;<br>7% $C_1$ and 0.13% $C_2$. |
| 3580' - 3926' (total depth of Walrus A71) | No real shows have been recorded. But every round trip has been followed by a flow of salt water reducing mud weight and allowing records of Trip gas. Also after connections and stop circulation for well surveys.<br>Those Trip gases between 7.5% $C_1$ and 0.11% $C_2$ at 3730', and 1% $C_1$ with 0.07% $C_2$ at 3635'. |

## III. ABSTRACT

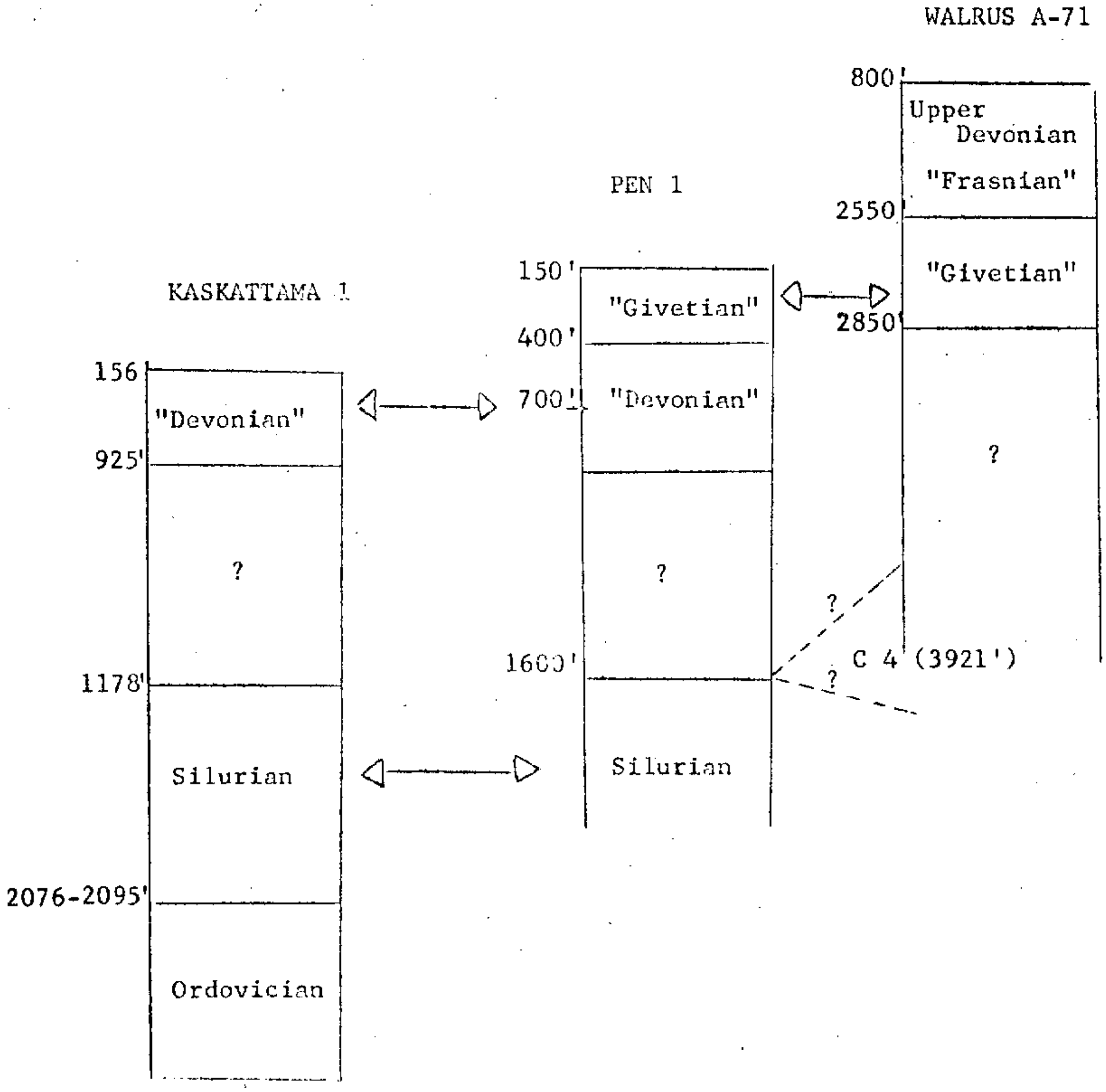
First show at 2563' 1.5% $C_1$ 0.05% $C_2$ $C_1/C_2 = 30$

Then shows at:

| | |
|---|---|
| 2614' | (0.18% $C_1$) |
| 2667' | (0.17% $C_1$) |
| 2775' | (0.22% $C_1$) lasting 10 mn. $C_2 = 0.04\%$ |
| 3070' | After casing 9"5/8 - 0.38% $C_1$ for 20 feet. |
| After 3070' | Trip gas recorded after each trip.<br>Average back ground of gas less than 0.1% $C_1$ |

Géoservices North America Ltd.
J.P. GERARD.

According to these data, we propose the palynological interpretation of the possible stratigraphical relations between the three wells WALRUS A-71, PEN 1 and KASKATTAMA 1. (see hereafter the figure).



## A-3 - Palynological comments

If relations can be established between PEN 1 and KASKATTAMA 1 in "Silurian" and "Devonian" for the studied samples, it is not possible to make palynological comparisons between KASKATTAMA 1 and WALRUS A-71. It seems that in "Devonian" PEN 1 plays the role of hinge between WALRUS A-71 and KASKATTAMA 1.

For the Devonian sequence, it is assured that WALRUS A-71 is very much more complete and PEN 1 a little more complete than KASKATTAMA 1 in the upper part.

In the James Bay the comparable Devonian with WALRUS A-71 (2800-2850') and PEN 1 (150-400') is placed in the Maria Island Formation and in the Kwataboahegan Formation, these two formations being near of the Moose River Formation of more or less evaporitic and reefal tendancy in the sequence observed in WALRUS A-71.

The Silurian sequence can be palynologically characterized (see PEN 1 and KASKATTAMA 1) but is not determined with assurance in WALRUS A-71 at this time.

The Ordovician cannot be determined in WALRUS A-71, nor in PEN 1 from samples in our possession, until 1670').

For the definitive palynological study of WALRUS A-71 it will be necessary to complete with analysis of numerous other intermediate or complementary cuttings samples and of the whole cores numbers 2 and 4 of WALRUS A-71. All reference wells of Canada (particularly Hudson Bay) will be of great interest for local and precise stratigraphy and correlations in the future.

## B/ EXTRACTED MICROFAUNAS FROM WALRUS A-71 (J. LE FEVRE)

1°) - The only well established results are those obtained from the core n° 3 : the Conodonts and other associated elements allow

./...

to attribute an Emsian to Frasnian dating to this core (5/5).

It is to be noted that be same age was attributed to the interval between 93 and 399' of KASKATTAMA 1. Nevertheless the most characteristic forms occuring in this interval have not been found, up to now, in the core n° 3 of WALRUS A-71 whose age meight be not exactly equivalent.

2°) - Up to now, the following intervals investigated on cuttings are : 2715-2750', 2810-2850', 3500-3580'

. between 2715 and 2850' : the Ostracods and Tentaculita are of Devonian age. In this first step we tend to attribute them a post-lower Devonian age ; anyhow no Silurian fauna was found in this interval (2/5 : cuttings).

. between 3500 and 3580' : no fauna were found.

3°) - A very small fragment from the core n° 4 was processed : no result was obtained.

## / III - FACIES ANALYSIS / (J. BOUROULLEC)

1°) - We have stablished that the "Dasycladacea" algal microfacies characterized in KASKATTAMA well 1 (2317'-2900') in field samples of the Bad Cache Rapids Group of Southampton Island ( CN 741 - 742 - 744 - 745 - 747) have not been still encountered in WALRUS bore I.

2°) - The high depositional energy level between 3921' - 3922' in core 4 of WALRUS indicates a reefoïd breccia facies (5/5) probably in the intertidal zone taking account of the context (3/5).

## /IV - HYDROCARBON PRODUCING CAPACITY /

(Geochemistry : P. ARTRU - Palynology : G. PENIGUEL).

./...

1 - 950' - 1400' and 2000 - 2500'

Cuttings do not look representative between 1450 - 2000' and analyses are in course.

Quantity of organic matter : very low (5/5).

Quality : medium to low (5/5).

Maturity : probably very low (2/5).

Hydrocarbon producing capacity for these intervals is very low (5/5).

2 - 2550 - 2800'

Quantity of organic matter

Medium to high (particularly in core 3) (5/5).

Quality : medium (5/5).

Maturity : low (4/5) more detailed studies are in course to obtain more accurate conclusions.

Hydrocarbon producing capacity

Would be rather good (association of reservoir and source rocks) if a sufficient maturation would be reached in others parts of the basin. In WALRUS Area the depth of buring (taking account of the regional trend of maturity) is too low.

3 - 2800 - 3500'

Quantity of organic matter : very low (scattered better levels) as for 3450') (5/5).

Analyses of the fraction of organic matter which is soluble in chloroform give a high proportion of satured hydrocarbon.

Hydrocarbon producing capacity : low

./...

4 - Core Number 4

Quantity : very low (concordant result with the microfacies interpretation).

Available sampling is not sufficient for detailed studies.

5 - Conclusions on the hydrocarbon producing capacity for the 2800 - 3500' interval

The low hydrocarbon producing capacity of that interval result from the low quantities of organic matter.

Up to now, quality of that organic matter is not actually known.

Two analyses of the soluble (in chloroform) fractions of that organic matter (J. CONNAN) give a fairly high proportion of saturated hydrocarbon.

There are two assumptions which are both favorable.

a) - the organic matter had reached a good maturity in these levels (1/5).

b) - there are little show of good quality oil in the interval, coming from inderlying levels (2/5).

Any how, the composition of that soluble fraction is quite different from that obtained from core number 3.

More accurate conclusions will be sent to Aquitaine as soon as data from core number 4 and cuttings between 3580' and 3921' will be available.

Occurence of thin clay beds and anhydrite above core number 4 could explained the lack of shows in the carbonated formation under 3800'. The shows in the bottom of WALRUS well (?) are coming from underlying reservoir or ~~source~~-rocks in that assumption.

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Re: WALRUS A-71 - CANADA - Cuttings between 800' and 1110'.

## RESULTS OF THE PALYNOPLANCTOLOGICAL ANALYSES.

## STRATIGRAPHY.

- 800'-850': presence of a few Acritarchs, Spors, Leiospheres and Chitinozoa, the most significant or most common forms being:

  - Polyedrixium sp. (Hy 45)
  - Veryhachium trispinosum (Hy 4)
  - Spaerochitino brevispinosa
  - Cyathochitina cylindrica.

  Presumed age: Middle to Upper Devonian.

- 900'-950': presence of a few Acritarchs, occasional Spors, "Tasmanacées". The most important types are of the Acritarch group. These are:

  - Duvernaysphaera stellata (Hy 247)
  - Horologinella horologium (Hy 56)

  Presumed age: 24 - 29 Hy*: Givetian to Famennian.

- 1000'-1050': presence of a few Algae, occasional Spors and Acritarchs including:

  - Polyedrixium sp. (Hy 45)
  - Triangulina sp. (Hy 24)

  Presumed age: 20 - 27 Hy: Devonian.

- 1100'-1110': presence of Algae, a few Acritarchs, "Tasmanacées", Leiospheres, Spors and Chitinozoa. Of the Acritarchs the following were identified:

  - Duvernaysphaera stellata (Hy 247)

* Units in the general scale of Acritarchs.

From the Spors:

- Ancryospora langii (Sr 86).

Presumed age: 23 - 32 Hy
7 - 11 Sr** Couvinian to Famennian.

The overall interpretations made on these 4 samples are:

Giventian to Famennian for the 2 upper levels

Couvinian to Famennian for the 2 lower levels.

However, the former attribution of Core #1 (1439' 6") to the Upper Devonian leads logically to the grouping of the whole of the material studied (core + cuttings (800' to 1439' 6")) into the same stratigraphic interval: Upper Devonian.

## ORGANIC ENVIRONMENT (PA/C-H)

The residual organic matter recovered after acid treatment on the cuttings is slight. It was, however, of good quality (C.O.M.: colloid organic matter) in the sample 1100' - 1110', and there were oil traces in the upper sample (800' - 850').

## PALEOGEOGRAPHY.

We should like to emphasize especially the presence of Chitinozoa at two levels (800' - 850' and 1100' - 1110'), which indicate a "relatively open marine environment". Up till now, we had not come across this group of micro-organism in the Devonian studied in Canada (Kaskattama #1 - samples from the field survey of Rueff-Artru - Nelson samples).

Besides, the predominance of the Acritarchs, the small ratio of Spors, the type of organic matter encountered (C.O.M.) lead to the same conclusion, indicating a marine environment with a slight continental influence.

G. PENIGUEL - C. POUMOT.

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** Units in the general scale of Spors.

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Groupe GEOLOGIE

Re: WALRUS A-71 - Core #1 (1439' 6")

## 1. RESULTS OF THE PALYNOPLANCTOLOGICAL ANALYSES (G. PENIGUEL).

We must state, first of all, that the sample received was not suited to this technique because of its lithology (limestone) and its colour (dark pink). Indeed, without exception, only argillaceous rocks (clays, marls, silts, argillaceous limestones) pale grey to black in colour are recommended for the extraction of organic microfossils (Chitinozoa, Acritarchs, Spors, Scolecodonts) in sufficient quantities.

In the present case, few Acritarchs, which are very difficult to identify because of their transparency and their torn membranes, could be identified. They seem to belong to the same morphographic type, Hy 45, and would therefore be classified in the Polyedrixium generus. If this determination is correct, the age to be attributed to the sample analysed would be Devonian, the stratigraphic distribution of this type being limited, as far as we know, to the base of the Devonian and the Middle Famennian (Units 20 - 27 Hy on our general scale of Acritarchs).

Only a small amount of organic matter was extracted after passing the sample through acids (HCl, HF); the quality of this organic matter seems interesting. In fact it is almost entirely colloid organic matter (COM), the category which we consider, at the moment, as the best from the point of view of hydrocarbons. Tracheids, wood vessels which indicate a terrigenous origin, are rare.

In the absence of the usual material necessary to evaluate the degree of coalification (smooth Spors, "Tasmanacées"), it is difficult to evaluate the maturation. However, the extreme transparency of the Acritarchs does not seem to reflect a highly advanced stage. Also, we were surprised at the presence of occasional oily droplets exuding from a few organic particles. They may only be related to microscopic Algae, as we have sometimes observed.

These conclusions, as much from the point of view of stratigraphy as from that of organic matter, remain very hypothetical as they are based on isolated observations and need to be confirmed by a study of the over- and underlying levels.

## 2. MICROFACIES (M. TIXIER).

Microsparite, partly dolomitised, in which Amphipora can be seen. The presence of these organisms would seem to indicate a back-reef type of depositional environment for this sediment.

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## Re: WALRUS A-71 - Core #1 (1439' 6") - Second Sample.

## RESULTS OF THE PALYNOPLANCTOLOGICAL ANALYSES.

### STRATIGRAPHY

Organic microfossils slightly more numerous and varied than in the first sample, but material which is still difficult to identify because of its state of preservation (torn, very transparent). The groups represented are: Acritarchs s.s., "Tasmanacées", Leiospheres and Spors. Of the Acritarchs we note particularly the presence of Polyedrixium sp. (Hy 45 S.N.P.A.), and of the Spors, the presence of Geminospora lemurata (Sr 129 S.N.P.A.). The relative stratigraphic distribution generally accepted for these two forms does in fact limit the possible stratigraphic interval to the Upper Devonian.

With regard to the samples from the Rueff - Artru survey, studied for palynology, we shall make comparisons with CN 286 and CN 288 where the two types mentioned above are both present.

### ORGANIC ENVIRONMENT

Comparable to that described for the first sample of the core.

### PALEOGEOGRAPHY

The presence of "Tasmanacées" and of Spors might indicate an environment close to fields of algae in very shallow water and with slight continental influence.

G. PENIGUEL.

Three Silurian fossil lots from the Aquitaine Hudson Walrus A-71 Well (58°30'02.29"N, 87°10'48.75"W; NTS 44L). Study requested by S. Rueff, Aquitaine Company of Canada Ltd.

The relevant parts of any manuscript prepared for publication that paraphrase or quote from this report should be referred to the Paleontology Section, Calgary, for possible revision.

| Stratigraphy | Fauna and Age | GSC Loc. No. |
|---|---|---|
| Core #4, 3,917' | Rhegmaphyllum sp. nov.<br>Age: Late Llandoverian or Wenlockian | C-4310 |
| Core #4, 3,918' | Mesofavosites sp. nov.<br>Rhegmaphyllum sp. nov.<br>Age: Late Llandoverian or, slightly less likely, Wenlockian. | C-4311 |
| Core #4, 3,921-22' | Rhegmaphyllum sp. nov.<br>Age: Late Llandoverian or Wenlockian. | C-4312 |

## Comments

The known range of Mesofavosites is Uppermost Ordovician (Porkuni Stage of Estonia) to Ludlovian of Eurasia; that of Rhegmaphyllum is Late Llandoverian to Wenlockian of Eurasia and possibly Ludlovian of northern Europe. Thus the faunas could be of any age from Late Llandoverian to Ludlovian. However figures of indubitable Ludlovian specimens of Rhegmaphyllum have not, I believe, ever been published. Furthermore the Mesofavosites has strongly crenulate intercorallite walls and therefore most resembles early species.

I conclude that the age of this faunule is late Llandoverian or, slightly less likely, Wenlockian.

Alan Pedder

A. E. H. Pedder

Paleontology Section,
Institute of Sedimentary and Petroleum Geology,
Calgary, December 15, 1969.

AQUITAINE ET AL. HUDSON WALRUS A-71

# L. STRATIGRAPHY

# TABLE OF LITHOSTRATIGRAPHICAL UNITS

| | DEPTHS | THICKNESS |
|---|---|---|
| **FIRST HYPOTHESIS** | | |
| - Nomenclature according to Aquitaine 1968 lithostratigraphy | | |
| Sea Bottom | 618' | |
| Drift | 618 - 895' | 277' |
| Moose River Formation | 895 -1385' | 490' |
| Kwataboahegan Formation | 1385 -1500' | 115' |
| Stooping River Formation | 1500 -1882' | 382' |
| Kenogami River Formation equivalent | | |
| Middle Member | 1882 -2346' | 464' |
| Lower Member equivalent | 2346 -3846' | 1500' |
| Ekwan River Formation | | |
| Upper Member | 3846 -3926' | 80' |
| Total Depth | 3926' | |
| **SECOND HYPOTHESIS** | | |
| - Nomenclature according to the G.S.C. 1967 (Operation Winisk) lithostratigraphy | | |
| Sea Bottom | 618' | |
| Drift | 618 - 895' | 277' |
| Long Rapids Formation equivalent | 895 -1385' | 490' |
| Williams Island Formation equivalent | 1385 -1882' | 497' |
| Murray Island Formation equivalent | 1882 -2346' | 464' |
| Moose River Formation equivalent | 2346 -2506' | 160' |
| Kwataboahegan Formation equivalent + Stooping River Formation equivalent | 2506 -2760' | 254' |
| Kenogami River Formation equivalent | | |
| Middle Member equivalent | 2760 -2800' | 40' |
| Lower Member equivalent | 2800 -3846' | 1046' |
| Ekwan River Formation equivalent | 3846 -3926' | 80' |
| Total Depth | 3926' | |

# TABLE OF CHRONOSTRATIGRAPHICAL UNITS

| | DEPTHS | | THICKNESS |
|---|---|---|---|
| Pleistocene | 618 | - 895' | 277' |
| "Upper Devonian" | 895 | -1855' | 960' |
| "Frasnian" | 1855 | -2715'(?) | 860' |
| "Upper Givetian" | 2715(?) | -2850' | 135' |
| ? | 2850 | -3846' | 996' |
| "Lower to Middle Devonian" (Palynology)<br>or "Silurian"(Conodonts and Corals) | 3846 | -3926' | 80' |

* * * *

## SUMMARISED LITHOLOGICAL DESCRIPTION

| | |
|---|---|
| 618 - 895' | Yellow to red-brown, silty to sandy, locally calcareous, plastic clay.<br>Intercalations of white to brown fine sand.<br>Pebbles of quartzite, green rocks and limestone.<br>White fibrous gypsum. |
| 895 -1385' | Red-brown silty to sandy, locally calcareous, plastic clay.<br>Intercalations of white, pink to red-brown sand and calcareous sandstone.<br>Few levels of white anhydrite. White fibrous gypsum. |
| 1385 -1500' | Pinky beige, partly dolomitic, bioclastic limestone with thin alternating levels of:<br>-pink, sandy, locally crumbly limestone;<br>-red-brown plastic clay;<br>-white anhydrite. |
| 1500 -1712' | Alternating:<br>-red silty argillites;<br>-white to beige microcrystalline micro-oolitic limestone;<br>-pink bioclastic limestone;<br>-beige to grey partly chalky and argillaceous crumbly limestone;<br>-grey microcrystalline saccharoidal dolomitic limestone;<br>-beige pelletoidal dolomitic limestone;<br>-pink slightly sandy crumbly limestone. |
| 1712 -1882' | Alternating:<br>-beige to grey chalky and argillaceous locally bioclastic limestone;<br>-pink, partly sandy bioclastic limestone;<br>-red to brown limestone with cellular dolomite. Brachiopods;<br>-white, beige to grey microcrystalline oolitic limestone. |
| 1882 -1981' | Greenish-grey shale (or shaly limestone) with intercalations of brown to red argillites. |
| 1981 -2038' | Alternating:<br>-red to brown argillites;<br>-grey to brown dolomitic shale. Isolated corals;<br>-beige, pink to grey, partly pelletoidal bioclastic limestone. |
| 2038 -2346' | Grey, beige to brown plastic clay. Few intercalations of shale. |

| | |
|---|---|
| 2346 -2350' | Beige to brown, fine grained calcareous sandstone. |
| 2350 -2408' | Alternating:<br>-beige to brown cryptocrystalline dolomite;<br>-pink and grey dolomitic shale. |
| 2408 -2506' | Halite.<br>Few alternating levels of:<br>-white to brown anhydrite,<br>-pink and grey dolomitic shale,<br>-beige and brown cryptocrystalline dolomite. |
| 2506 -2594' | Brown, cryptocrystalline to crystalline, partly argillaceous, partly dolomitic bioclastic to biohermal limestone.<br>Few levels of beige, red speckled calcareous dolomite and of anhydrite. |
| 2594 -2664' | Beige to brown calcarenitic, bioclastic to biohermal limestone. |
| 2664 -2732' | Brown microcrystalline bituminous dolomite. |
| 2732 -2760' | White to beige microcrystalline slightly bituminous limestone. |
| 2760 -2800' | Greenish-grey shale. Few levels of white to beige microcrystalline slightly bituminous limestone. |
| 2800 -2970' | Pink, beige to grey cryptocrystalline to microcrystalline dolomite. |
| 2970 -3172' | Alternating:<br>-white, pink to beige, cryptocrystalline to microcrystalline slightly silicified, compact and azoic dolomite;<br>-beige, grey to brown microcrystalline slightly argillaceous dolomitic limestone. |
| 3172 -3288' | White microcrystalline spathic partly dolomitic limestone. Intercalations of beige to brown microcrystalline, slightly argillaceous dolomitic limestone. |
| 3288 -3400' | White, beige to grey microcrystalline, recrystallised, locally pseudo-oolitic, compact fossiliferous limestone. |
| 3400 -3571' | Alternating:<br>-shale;<br>-white to beige microcrystalline, recrystallised, locally pseudo-oolitic, compact slightly dolomitic limestone;<br>-pink, microcrystalline to crystalline, partly chalky, slightly argillaceous dolomitic limestone. |
| 3571 -3777' | White, beige to grey, microcrystalline, partly crumbly pseudo-oolitic to pseudo-brecciated, dolomitic limestone. |

| | |
|---|---|
| 3777 -3846' | Alternating:<br>-white, beige to grey microcrystalline, partly calcarenitic to microconglomeratic limestone;<br>-brown microcrystalline dolomite. |
| 3846 -3855' | Grey-blue marls. |
| 3855 -3926' | Alternating:<br>-beige to grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone;<br>-dark brown microcrystalline, locally calcarenitic, slightly anhydritic, bituminous limestone. |

* * * *

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.L

## PRELIMINARY LABORATORY RESULTS

# PRELIMINARY RESULTS ON WALRUS A-71

## (Hudson Bay Offshore Well)

BY

THE GEOLOGICAL DEPARTMENT
OF THE
RESEARCH CENTRE OF PAU
SOCIETE NATIONALE DES PETROLES D'AQUITAINE

November 7, 1969.

R/GEO n° 717-69
Ref. Ph.A/jmp

# / MAIN RESULTS /

1 - Paleontological data on WALRUS A-71 indicate a middle to upper Devonian age until 2850'.

2 - A medium to rather good hydrocarbon producing capacity characterizes the 2500' - 2850' interval but the maturity of organic matter appears to be too low for commercial oil production in the WALRUS area.

## / I - INTRODUCTION /

Preliminary results are presented separately for each technique; a coefficient of certitude is added to each result; the maximum coefficient (5/5) indicates that the result has a strong probability to be proved. Lower coefficients indicate that more detailed studies seem necessary to confirm the preliminary results.

Cuttings under 3580' were not available and we had only a little piece from core number 4.

## / II - PALEONTOLOGICAL DATATIONS ON WALRUS A-71 AND PEN 1 /

### A/ PALYNOLOGY -

(G. PENIGUEL with the collaboration of MC. GELLIBERT (Scolecodonts), C. POUMOT (Chitinozoa).

### A-1 - Palynological stratigraphy

The stratigraphical results obtained in Palynology, up to now, are founded on the study of numerous cuttings and some cores,

for WALRUS A-71 :

- majority of cuttings from 800' to 3550'
- cores number 1, 3 and 4 (fragment).

for PEN 1 :

- cuttings from 150' to 700'
- cores from 1390' to 1670'.

The palynoplanktological material extracted is composed of Chitinozoa, Acritarchs, Spores, Scolecodonts and Tasmanacea generally various and well preserved.

./...

## 1 - Main palynological results

/ WALRUS A-71 /

800 - 2850' : "Middle to upper Devonian" (5/5)

2950 - 3550' : Indeterminate (very poor in microfossils and only Tasmanacea without stratigraphical signification).

C.4 (≃ 3921'): "Silurian to lower Devonian" (3/5) (founded only on Chitinozoa Stratigraphical reference : North Africa).

/ PEN 1 /

150 - 400' : "Middle to upper Devonian" (5/5)

700' : "Devonian" (3/5) - (microfossils rare).

1300 - 1400' : Indeterminate (very poor in microfossils and only Tasmanacea without stratigraphical signification).

1600 - 1670' : "Silurian" (5/5).

## 2 - Detailed possible palynological and stratigraphical carving

(Chronostratigraphy according to our general S.N.P.A. palynoplanktological scales).

/ WALRUS A-71 /

800 - 1855' : "Upper Devonian" (4/5)

1905 - 2550' : "Frasnian" (4/5)

C.3 (2670 - 2684'): "Frasnian" (2/5) (Attribution connected with a type of spore only present in the core basket n° 3).

2715 - 2850' : "Upper Givetian" (4/5)

2950 - 3550' : Indeterminate.

C.4 (≃ 3921') : "Upper Silurian to lower Devonian" (3/5)

./...

### / PEN 1 /

150 - 300' : "Givetian to Frasnian" (4/5)
350 - 400' : "Upper Givetian" (4/5)
700' : "Devonian" (3/5)
1390 - 1490' : Indeterminate
1600 - 1670' : "Silurian" (5/5) - "Upper Silurian" (2/5)
(North Africa stratigraphical reference)

### A-2 - Relations between WALRUS A-71, PEN 1, KASKATTAMA 1 and others Canadian wells and sections samples.

For these comparisons we have utilized all Canadian references in our possession.

### / DEVONIAN /

WALRUS A-71 (2800 - 2850') = PEN 1 (150 - 400') = JABB LAKE 1 (200 - 210') = CAMPBELL LAKE 1 (912 - 960') =

= Mission RUEFF-ARTRU (CM 286 à 288) = Powell Creek section (NWT) (120 - 190')

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PEN 1 (700') = KASKATTAMA 1 (C.14 = 925')

---

### / SILURIAN /

PEN 1 (1650 - 1670')

KASKATTAMA 1
(C.28 (1294 - 1315')
(C.30 (1335 - 1354')

---

./...

AQUITAINE ET AL HUDSON WALRUS A-71

RE-ENTRY

8710-A11-4-2RE

WELL FILE COPY

East Coast ☐

Hudson Bay – Hudson Strait ☒

West Coast ☐

COPY SENT TO E. C. OFFICE

CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES

RESOURCE MANAGEMENT AND CONSERVATION BRANCH

OPERATIONS AND CONSERVATION DIVISION

# Offshore Drilling Notice

This Notice is submitted in compliance with Section 52 of the "Canada Oil and Gas Land Regulations". Its approval constitutes the requisite authority to commence drilling operations under Section 4 of the "Canada Oil and Gas Drilling and Production Regulations".

## Well Information

Well Name in full: AQUITAINE ET AL WALRUS A-71

Operator: Aquitaine Company of Canada Ltd. Exploratory Licence No. 2168

Contractor: Sea and Land Drilling Contractors Inc. Permit or Lease No. W1427

Drilling Rig or Unit: Pentagone 82 Estimated Well Cost: $2,840,000

Location: Unit A Section 71 Grid Area: 58°40' - 87°00'

Coordinates: Lat. 58° 30' 02.05"N. Long. 87° 10' 48.55"W.

Elevation: RT/KB 77' Water Depth: 587'

Approx. ~~Spud Date:~~ REENTRY DATE: Summer 1974 Estimated Time on Location: 17 days

Anticipated Total Depth: 3,972'/K.B.

Potentially Productive Intervals:

| Age | Name | ~~Lithology~~ FLUID | Top | Thickness |
|---|---|---|---|---|
| Devonian | - | Water Bearing Formation | 1,486' | 30' |
| Devonian | - | Water Bearing Formation | 2,586' | 20' |
| Middle Devonian | Kenogami | Water Bearing Formation | 2,846' | 375' |
| Lower Silurian | Severn River | Water Bearing Formation | 3,490' | 526' |
| Lower Silurian | Severn River | Water Bearing Formation | 3,903' | 69' |

Casing and Cement ~~Program~~ RECORD:

| Name of String: | O.D | Weight/Ft. | Grade | Setting Depth below seafloor | Cement ~~Program~~ |
|---|---|---|---|---|---|
| Conductor | 30" | 1" wall | - | 154' | Class G 1,000 sx |
| Conductor casing | 20" | .625" wall | - | 488' | Class G 1,250 sx |
| Surface casing | 13-3/8" | 61# | J55 | 1,357' | Class G 1,170 sx |
| Intermediate casing | 9-5/8" | 41# | N80 | 2,342' | Class G 936 sx |

B.O.P. Equipment: 1 stack 21-1/4" x 2,000

1 stack 13-5/8" x 10,000

AAPG Well Classification:

- New-field wildcat ☐
- New-pool wildcat ☒
- Shallow-pool test ☐
- Deeper-pool test ☐
- Outpost well ☐
- Development well ☐

Other Information: Due to severe weather conditions in 1969, the well was not plugged back to surface. The "WODECO II" stack was left on bottom. The Semi-submersible P-82 will attempt to plug the well according to the program outlined in File III, "Drilling Programs" included in the official presentation of our "Summer 74 Hudson Bay Campaing" (Ottawa, May 22, 1974).

Signed: G. Kuhn de Chizelle Title: Drilling Superintendent

Date: May 31, 1974 Company: Aquitaine Company of Canada Ltd.

## Notes

Five copies of this Notice and tentative survey plan should be submitted for each well. Other requirements and procedures are given in the information circular "Offshore Exploratory Drilling".

All Notices should be addressed to the Director, Resource Management and Conservation Branch, Department of Energy, Mines and Resources, Ottawa. One copy will be returned to the Company.

RESOURCE MANAGEMENT AND CONSERVATION BRANCH

APPROVED

JUN 18 1974

DEPARTMENT OF ENERGY, MINES AND RESOURCES

Approval

OPERATIONS AND CONSERVATION DIVISION

Drilling Authority #21 Project No. 8710-A11-4-2RE

# OFFSHORE WELL BULLETIN

This bulletin is issued by the Resource Management and Conservation Branch, Department of Energy, Mines and Resources, Ottawa, K1A OE4.

Well Name: Aquitaine et al Walrus A-71

Drilling Authority EMR#: 21

Unique Well Indentifier: 300A715840087000

Operating Company: Aquitaine Company Of Canada Limited

Contracting Company: Sea And Land Drilling Contractors Inc.

Drilling Unit: Pentagone 82

Vicinity: Hudson Bay

Tentative Coordinates: Latitude 58 30 02.05 N; 87 10 48.55W
Longitude 87 10 48.55 W

Approximate Elevations: RT: 77' WD: 587'

Other Information: Abandonment of Walrus A-71 well which was suspended in 1969

Date:

Chief,
Operations and Conservation Division.

East Coast ☐
Hudson Bay – ~~Hudson Strait~~ ☒
West Coast ☐

CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES

RESOURCE MANAGEMENT AND CONSERVATION BRANCH
OPERATIONS AND CONSERVATION DIVISION

# Offshore Well Abandonment Program

This program is submitted in triplicate with respect to Sections 15 and 19 of the Canada Oil and Gas Drilling and Production Regulations. All depths referenced to Rotary Table (RT) elevation at Mean Local Low Water (MLLW)

## Well Data

Well Name in Full: **AQUITAINE ET AL WALRUS A-71** Grid Area: **58°40'; 87°00'**
Drilling Authority: **# 21** Field/Pool: **Wildcat - Eastern Hudson Bay**
Permit or Lease No. **W 1427** Elevations: RT: **77'** Sea floor: ~~663'~~ 586'
Final Coordinates: Lat. **58°30'02.05" N** Long **87°10'48.55"W**
**1st Anchor Dropped:** Date ~~Spudded~~: **Sept. 3/74 @ 00:00 A.M** Date Drilling Terminated: **N/A**
Date Rig Released: **Sept. 18/74 @ 2:30 P.M** Total Depth:

Casing Record: (Additional space on back of form, if needed)

| O.D. | Weight: | Grade: | Depth Set: S.F. | Cement and Additives: |
|---|---|---|---|---|
| 30" | 1" Wall | - | 154' | Class G 1,000 sx + 3% $CaCl_2$ |
| 20" | .625" Wall | - | 488' | Class G 1,250 sx + 4% $CaCl_2$ |
| 13-3/8" | 61# | J-55 | 1,357' | Class G 1,170 sx |
| 9-5/8" | 41# | N-80 | 2,342' | Class G 936 sx |

Permeable Intervals: (Additional space on back of form, if needed).

| Interval: | Age/Name: | Oil, Gas and Water Encountered: | Test No. |
|---|---|---|---|
| 1,440' - 1,470' | Devonian | None | None |
| 2,540' - 2,560' | Devonian | $CaCl_2$ Water w/Dissolved Methane | None |
| 2,800' - 3,175' | Not Identified<br>Scattered Porosity | $CaCl_2$ Water w/Dissolved Methane | (See back of form) |

Perforation, Stimulation, Testing and Evaluation Programs: job details to be given on the back of the form.

## Plugging Program

Oral approval of the following program was obtained by (person) **G. Kuhn de Chizelle** of (company) **Aquitaine Company of Canada Ltd.** from (person) **F. Lepine** in the Operations and Conservation Division by means of **Radio** at ........ hrs. on **September 14** 19**74**

| Plug No. | Interval: | Type of Plug: | Cement and Additives: | Felt? | Date and Hour Run: |
|---|---|---|---|---|---|
| I | 782' - 651' | Cement | 100 sx Class B + 3% $CaCl_2$ | Felt and drilled from 651' to 678' | Sept. 14/74 @ 9:45 P.M. |

Additional information, including any variations to the original program dictated by on-the-job considerations, to be given on the back of the form.

## Certification

I certify that the abandonment or suspension program was carried out in full in accordance with good offshore oil and gas field practices.

Signed ........................ P. Eng. Title: **Drilling Superintendent**
Date **January 8, 1975** Company: **Aquitaine Company of Canada Ltd.**

Acknowledgement

OPERATIONS AND CONSERVATION DIVISION
APR 4 1975

OPERATIONS AND CONSERVATION DIVISION

Acknowledgement of this completed form in no way absolves the permittee or lessee of record at the time of drilling from responsibility for an abandonment or suspension program should it prove to be inadequate.

*See Reverse Side*

## Additional Information

Casing and Cementing Record:

Permeable Intervals:

| | | | |
|---|---|---|---|
| **3,444' - 3,770'** | **Not Identified** | **Scattered porosity - water bearing according to logs.** | **None** |
| **3,857' - 3,926'** | **Not Identified** | **Scattered porosity - water bearing according to logs. Fluorescence** | **None** |

Perforation, Stimulation, Testing and Evaluation Jobs:

Equipment [redacted] and/or remaining at sea floor:

Wellhead (surface cement plug extends to 15' below seafloor), abandoned Wodeco II anchors and cables, and 1 P-82 anchor.

Other Information:
(To include variations to the original, orally approved program dictated by on-the-job considerations).

## I. SUMMARY

### (A) History

This well was drilled in the Hudson Bay between August 7, 1969 and October 16, 1969. The Operator was Aquitaine Company of Canada, based in Calgary, acting on behalf of the so called "Hudson Bay Group", comprising of:

- Aquitaine Company of Canada Ltd.
- Atlantic Richfield Canada Ltd.
- Camerina Oil and Gas Ltd.
- Elf Oil Exploration and Production (Canada) Ltd.
- Petrofina Canada Ltd.
- Sun Oil Company Ltd.

The selected drilling unit was the drilling barge "Wodeco II", owned and operated by Western Offshore Drilling and Exploration Co.

Due to a severe storm during the last days of operation, the well was temporarily abandoned, with no drill pipe in the hole and no cement plug or bridge plug. The well was closed merely by a 16-3/4" 5000 BOP stack which was left on the wellhead with the blind rams closed.

### (B) Purpose

The purpose of the 1974 operation was to safely plug the well with cement, and recover as much of the subsea equipment (that was abandoned on the sea floor in 1969) as possible. The Operator was still Aquitaine Company of Canada, acting on behalf of a modified "Hudson Bay Group", comprising of:

- Aquitaine Company of Canada Ltd.
- Atlantic Richfield Canada Ltd.
- Elf Oil Exploration and Production Canada Ltd.
- Petrofina Canada Ltd.
- Sogepet Ltd.

The selected drilling unit was the semi-submersible "Pentagone 82" (P-82), owned and operated by Sea and Land Drilling Contractors Inc., as subsidiary of the Forex-Neptune group.

The P-82 was towed from the Aquit et al Narwhal South O-58 location, by the Tidewater "Supreme Tide" tug supply vessel to this new location.

## (C) Summary of Plugging Operation

This operation was completed in four steps:

a) localization and anchoring
b) cleaning of the top of the old Wodeco II stack
c) plugging Walrus A-71 by re-entry through the old stack
d) dismantling of stacks and retrieving anchors

### Timing

Timing, concerning the P-82, was as follows:

a) Sept. 3 at 00:00 A.M. to Sept. 7 at 9:00 A.M. = 105 hrs
b) Sept. 7 at 09:00 A.M. to Sept. 10 at 8:00 P.M. = 83 hrs
c) Sept. 10 at 08:00 P.M. to Sept. 16 at 2:00 A.M. = 126 hrs
d) Sept. 16 at 02:00 A.M. to Sept. 18 at 2:30 P.M. = 60½ hrs

Total = 374½ hrs

or 15 days 14½ hours from the time the first anchor was dropped on the Walrus A-71 location up to the start of moving the P-82 to the next drilling location.

During this period: (1) we were waiting on weather from

Sept. 3 at 9:00 P.M. to Sept. 5 at 9:00 A.M. = 36 hrs
Sept. 13 at 0:00 A.M. to Sept. 13 at 9:00 A.M. = 9 hrs
Sept. 16 at 9:30 P.M. to Sept. 17 at noon = 14½ hrs

Total = 59½ hrs

or 2 days 11½ hours (15.9%).

(2) the 6 divers went under saturation from Sept. 6 at 11:00 P.M. to Sept. 16 at 2:00 A.M. = 219 hrs. (De-compression was over on Sept. 19, around noon).

(3) the total working time spent by all divers during the 11 wet dives outside the bell, was 32:04 hours.

## (D) Results

a) A plug of cement (100 sx of neat cement, Class B, with 3% $CaCl_2$ - slurry weight 16.5 lb/gal) was set from 782' to 651'/P-82 KB. The plug was felt and drilled from 651' to 678'. Actual length of the plug is 104' inside the 9-5/8" casing (P-82 KB/mud line - 663').

b) Subsea equipment lost in 1969 and recovered in 1974 was as follows: 200' of choke line, entire kill line (570'), 150' of riser (3-1/2 joints) plus lower riser package, 16-3/4" 5,000 BOP stack.

c) On the last dive, a videotape recording of the wellhead was recorded, giving evidence that the Walrus A-71 well was plugged.

The P-82 was then towed to the next drilling location, namely "Aquit et al Polar Bear C-11".

## II. LOCALIZATION AND ANCHORING

### (A) Walrus Wellhead Search with Federal 6

The supply vessel, the Federal 6, used for this operation, was equipped with the following equipment:

a) Navigation Equipment

1 - cesium controlled Decca Lambda Receiver system
1 - SPC - DCS-200 Satellite Navigator

b) Research Equipment

1 - E.G. & G. MKIB Side Scan Sonar, with recorder, tow fish and 600 meters of cable.
1 - Atlas DESO 10 Dual Frequency Survey Echo Sounder
1 - Helle pinger receiver
1 - Helle command module (call buoy)

c) Marking

1 - set of locator buoys and mud anchors

From the 1973 survey of the well, we knew that the pingers on bottom were still working well, but that there was very little chance to call the buoy to the surface. We also knew that the buoy dropped in 1973, was in the vicinity of the well, but was not tied up to the BOP's.

### Chronology of Events - August 23rd to September 7th

Preliminary work on the side scan and echo sounding equipment had taken place between the 23rd and the 26th, while Federal 6 was docked.

All equipment was in good order by the time the vessel left the port at 01:20 hours on August 27th.

Calibration of the Decca at Broad River (Red Station) was unsuccessful, as the Trisponder ranging system was inoperative (damaged during installation). It was then decided to proceed to the P-82 on the Narwhal location, and calibrate the Lambda, by setting the same readings on the equipment as had been observed by the Shell seismic boat on a previous occasion. The Federal 6 arrived at the P-82 by 18:00 hours on August 28th, and set sail to Walrus, arriving at 04:00 hours, August 29th.

A very calm sea made the survey easy. Echoes of the wellhead were obtained quite quickly after 3 N.S. runs with the SSS, and were confirmed by using the Echo sounder.

The 1971 buoy was called back to the surface without any success. The buoy placed in 1973 was recovered 1,000' from the wellhead. A buoy pattern was laid and the Federal 6 stood by until the P-82 arrived, on September 2nd, around midnight.

Anchors were laid down during the night, but by 07:00, on September 3rd, it appeared that the P-82 had shifted as much as 1,000' from the location. Some of the anchors had to be re-laid in order to place the rig close to the buoy, placed by the Federal 6 on a sounding survey that had been carried out in the morning. Unfortunately, the weather deteriorated during the night, and the next day was spent waiting on the weather. All the anchors were finally set on September 5th, at 17:10 hours, and rig position was confirmed both by the Federal 6 and the buoy.

We knew, at that time, that the P-82 was in a circle of less than 100' radius from the wellhead.

### (B) Walrus Wellhead Search with P-82

Two observation dives, at atmospheric pressure, were done with the diving bell, on September 5th:

Observation Dive No. 1 - from 7:00 P.M. to 8:45 P.M.

Three echoes were localized with a side scanning sonar attached to the bell. According to this preliminary survey, the rig was crabbed 30' ahead by pulling on anchor lines.

Observation Dive No. 2 - from 11:00 P.M. to 0:25 A.M.

September 6th - no echo on the side scanning sonar. Visibility was less than 6' on September 6th.

The antenna of the Helle pinger was attached to the bell as a back-up system for the side scanning sonar.

Observation Dive No. 3 - from 5:35 A.M. to 7:45 A.M.

An echo was localized 60' away, on both localization units. As the bell had been run without a guide line, the diver master tried to move it with the help of two propellers attached to the bell. Unfortunately, a nylon rope was sucked into one propeller and caused severe damage. The second propeller allowed only a rotating motion of the bell.

As a result of this dive, the rig was crabbed for the second time by 30'.

All P-82 anchors were then tested to 100 tons, and 2 anchors (E2 and E1) were re-positioned to give some latitude for further crabbing of the Unit, if required by the next observation dives. The P-82 subsea T.V. camera was then lowered.

Observation Dive No. 4 - from 8:30 P.M. to 9:30 P.M.

A strong echo was localized 40' eastward from the P-82. The rig was crabbed for the third time (60' backwards, in order to have the bell positioned 20' away from the wellhead).

The P-82 subsea T.V. was lowered for the second time. Two bottles of breathing gas, which had been lost in 1969, could be seen on the monitor.

As it was certain at this point, that the P-82 was almost on the vertical of the wellhead, it was decided to put 6 divers under saturation.

Observation Dive No. 5 - from 7:45 A.M. to 9:27 A.M.

September 7th - at 9:00 A.M., the bell, while being lowered slowly, almost hit the bent portion of the Wodeco II riser, 20' away from the stack.

It was decided not to move the rig before a cable from the P-82 cellar deck could be attached to the Wodeco II stack. Final crabbing of the P-82 was done after this line was secured (saturation dive No. 1), by checking its verticality from the surface.

## Observations on this Search

It took five observation dives and 50 hours rig time, after the rig was anchored on the approximate location, before the wellhead could be located exactly.

- This was mainly due to the very poor visibility (about 6') in the water close to the mud line. The T.V. camera bulb light of the P-82, could hardly be seen, and was sometimes invisible from the bell at the bottom.

- The side scanning sonar would pick up several echoes (wellhead, riser, breathing gas bottles...) with a poor directional accuracy.

- The parobolic pinger antenna had a much better directional accuracy.

- It was difficult to know the correct bearing of the bell itself, and henceforth, to assume the bearing of the wellhead in respect to the P-82 moon pool axis. A compass cannot give any indication in the metallic bell; a portable gyrocompass would have been useful, but was not available.

Sea current can displace the bell *guide lines, and the bell orientation* on the surface is different from that on the bottom. Accurate bearing of the bell versus the bearing of the rig could only be checked when the T.V. camera light was visible, but at that time we had to assume the true bearing of the light, which was mounted on a pan tilt system. The major work done during the observation dives was; to turn the bell and the T.V. camera light with the same alignment, bring the T.V. camera back to the surface, check it's orientation, lower the camera again, check for change of orientation if any, check the bearing and distance of echo(es) in the bell (which required rotation of the bell with it's propeller, at which times, the T.V. camera very often could not be seen anymore through available scuttles...). We had no way of measuring the angle of rotation of the bell except by estimating the time required for said rotation.

In addition to these difficulties, divers and drillers are not always qualified IFR navigators. This explains the high number of observation dives.

## III. DIVING PROCEDURES

### (A) Crew

Diving Contractor - Comex
Manager - 1
Assistant Manager - 1
Doctor - 1
Electrician - 1
Mechanic - 1
Chief Caisson Master - 1
Caisson Master - 2
Divers (surface and alternate) - 5
Divers (under saturation) - 6

Total = 19 people

- Personnel was disciplined and experienced.

- The recovery of the Tenneco stack, by the Pelican, on the Leif well in 1973, was done by basically the same Comex crew.

- A doctor, specialized in diving accidents, was on board during the entire operation. He was an experienced diver and could be sent in saturation. His services were never required, but his presence was a big asset for the morale of the divers under saturation, who were concerned with the remoteness of the Walrus A-71 well.

- Two teams of 3 divers each would dive alternately. The 6 divers, who were under saturation for 9 days and 3 hours, plus 3-1/2 days for decompression, were never replaced, although we had back-up teams.

- During any dive, a bell man would remain in the bell, and one or two divers would go out, depending on the work to be done.

- Generally speaking, no limit in time was imposed on the dives; when the job was completed, the divers returned to surface. On a few occasions, dives had to be prematurely stopped due to the necessity of preparing new equipment on the surface, after failure of a hose, wrench etc. However, after two to three hours of work outside the bell, the divers started to tire. It would not have been safe to ask them to work much longer.

### (B) Equipment

1 - self propelled diving bell with winch.
2 - 6' diameter decompression chambers.
1 - 4' diameter decompression chamber.
2 - gas regeneration units.

1 - control cabin.
1 - gas mixing and analysis cabin.
1 - portable T.V. camera with monitor and videotape recorder.
- complete sets of individual equipment: electrical dry suits
  hot water wet suits
1 - communication system with helium unscrambler.
1 - gas recovery unit.
1 - side scanning sonar.
1 - undersea hydraulic power pack.
- miscellaneous equipment (cutting gear, impact wrench, torch, explosives).

- No serious problem was experienced with the above equipment. The main problems were leaks on the oxygen hose of the torch, and one of the two propellers of the bell was damage during observation dive No. 3.

- Only the hot water suits were used, and they were very effective in keeping the divers uniformly warm. Only once did a diver have to stop working because he felt cold after two hours work outside the bell.

- Some improvements can be made in the equipment:

  - the portable T.V. camera (35 lbs. in water) and it's ombilic are too heavy for handy use by one diver.

  - communications between surface and divers (in or outside the bell) were recorded during only one dive (No. 7). This recording should have been done every dive for this type of work.

  - if the divers were warm with their hot water suits, it was not the case of the bellman. The possibility of warming the atmosphere within the bell should be studied more carefully.

### (C) Diving Parameters

Water depth = 587' to mudline (179 m).
Working level = from 500' to 587'.
Pressure of saturation = 508' water (155 m)
except for Dives No. 6 and No. 7 = 545' (166 m).
Sea water temperature = 29°F (-1.5°C).
Temperature in decompression chamber = 88 to 91°F (31 to 33°C).
Temperature in bell during dive = 68 to 81°F (20 to 27°C).
Temperature of hot water supply on surface = 128 to 132°F (53 to 56°C).
Temperature of hot water in the bell = 108 to 112°F (42 to 44°C).
Hot water flow = 22 liters (11 liters per diver).
Temperature of breathing gases = 104°F (40°C).
Average consumption of Heliox gas per diver while working outside the bell = 108 m$^3$/hr/diver.

D) Timing

| Dive No. | Date | Time (from unlatching to latching bell on chamber) | Time spent by Divers in the bell | Time bell was unlatched from chamber | Time spent at working pressure level | Time spent by divers outside the bell. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Team A | Team B |
| 1 | Sept 7/8 | 22:15 - 03:30 | 5:35 | 5:15 | 3:58 | 1:55 + 0:30 = 2:25 | - |
| 2 | Sept. 8 | 13:57 - 18:37 | 5:03 | 4:40 | 3:34 | - | 2:33 + 0:39 = 3:12 |
| 3 | Sept 8/9 | 23:31 - 03:15 | 4:15 | 3:44 | 2:56 | 1:57 + 1:45 = 3:42 | - |
| 4 | Sept. 9 | 19:52 - 23:50 | 4:16 | 3:58 | 2:56 | - | 2:13 + 1:10 = 3:23 |
| 5 | Sept 10 | 11:58 - 15:25 | 4:38 | 3:27 | 3:21 | 1:43 + 0 = 1:43 | - |
| 6 | Sept 11 | 02:55 - 07:40 | 5:10 | 4:45 | 4:33 | - | 3:03 + 2:13 = 5:16 |
| 7 | Sept 11 | 11:02 - 16:40 | 5:42 | 5:38 | 4:51 | 3:25 + 3:35 = 7:00 | - |
| 8 | Sept 13 | 13:37 - 12:40 | 2:22 | 2:03 | 1:03 | - | 0:52 + 0 = 0:52 |
| 9 | Sept 13 | 21:25 - 00:35 | 3:55 | 3:10 | 1:53 | 1:15 + 0 = 1:15 | - |
| 10 | Sept 15 | 06:15 - 09:04 | 2:59 | 2:49 | 1:51 | - | 1:00 + 0:54 = 1:54 |
| 11 | Sept 15/16 | 23:18 - 01:12 | 2:14 | 1:54 | 1:06 | 0:40 + 0:42 = 1:22 | - |
| | TOTAL: | | 46:09 | 41:23 | 32:02 | 17:27 | 14:37 |
| | | | | | | 32:04 | |
| | Average per Dive: | | 4:12 | 3:45 | 2:55 | 1:36/diver<br>(20 dives outside bell) | |

Longest dive = 3:35

Time spent by divers under complete saturation = 219:00

Average time spent by each diver outside the bell = 5:21

D) Timing

| Dive No. | Date | Time (from unlatching to latching bell on chamber) | Time spent by Divers in the bell | Time bell was unlatched from chamber | Time spent at working pressure level | Time spent by divers outside the bell. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Team A | Team B |
| 1 | Sept 7/8 | 22:15 - 03:30 | 5:35 | 5:15 | 3:58 | 1:55 + 0:30 = 2:25 | - |
| 2 | Sept. 8 | 13:57 - 18:37 | 5:03 | 4:40 | 3:34 | - | 2:33 + 0:39 = 3:12 |
| 3 | Sept 8/9 | 23:31 - 03:15 | 4:15 | 3:44 | 2:56 | 1:57 + 1:45 = 3:42 | - |
| 4 | Sept. 9 | 19:52 - 23:50 | 4:16 | 3:58 | 2:56 | - | 2:13 + 1:10 = 3:23 |
| 5 | Sept 10 | 11:58 - 15:25 | 4:38 | 3:27 | 3:21 | 1:43 + 0 = 1:43 | - |
| 6 | Sept 11 | 02:55 - 07:40 | 5:10 | 4:45 | 4:33 | - | 3:03 + 2:13 = 5:16 |
| 7 | Sept 11 | 11:02 - 16:40 | 5:42 | 5:38 | 4:51 | 3:25 + 3:35 = 7:00 | - |
| 8 | Sept 13 | 13:37 - 12:40 | 2:22 | 2:03 | 1:03 | - | 0:52 + 0 = 0:52 |
| 9 | Sept 13 | 21:25 - 00:35 | 3:55 | 3:10 | 1:53 | 1:15 + 0 = 1:15 | - |
| 10 | Sept 15 | 06:15 - 09:04 | 2:59 | 2:49 | 1:51 | - | 1:00 + 0:54 = 1:54 |
| 11 | Sept 15/16 | 23:18 - 01:12 | 2:14 | 1:54 | 1:06 | 0:40 + 0:42 = 1:22 | - |
| | TOTAL: | | 46:09 | 41:23 | 32:02 | 17:27 | 14:37 |
| | | | | | | 32:04 | |
| | Average per Dive: | | 4:12 | 3:45 | 2:55 | 1:36/diver<br>(20 dives outside bell) | |
| | | | | | | Longest dive = 3:35 | |

Time spent by divers under complete saturation = 219:00

Average time spent by each diver outside the bell = 5:21

## IV. CLEANING TOP OF WALRUS A-71 STACK

### Status of Stack and Riser (See Annex I)

Before cleaning = Drawing A
After cleaning = Drawing B

**DIVE NO. 1** - September 7, Team A (Guichard, "Bellman", Tomasi,Devergie)

Before each dive, a work program was transmitted and discussed with the diving team involved. For Dive No. 1, the program was as follows:

a) check efficiency of hot water suits - adjustment of hot water flow temperature.

b) connect a nylon rope between bell and stack (to be used by divers as a guide line).

c) run a steel line from surface (from one of the P-82 constant tension winches) to the stack.

d) measure verticality of the stack.

e) check position of rod indicator of Wodeco II upper H4.

f) unscrew primary release hose of Wodeco II upper H4.

g) connect a jumper hose, equipped with a valve, on the primary release.

h) unscrew primary and secondary lock of Wodeco II upper H4.

i) attach P-82 hydraulic secondary hose bundle (3 hoses numbered 1, 2 and 3) to the stack.

j) connect P-82 hose No. 1 to the primary release of the upper H4 (all jumper and hose extremities are fitted with 5,000 psi push pull connectors). Pressure to be applied on hose No. 1, from the P-82.

k) check position of rod indicator of upper H4, after actuation of this function.

l) unscrew Wodeco II hoses on choke and kill line connectors.

m) install jumper hoses in lieu of above hoses.

The above program was quite ambitious for a first dive. We simply did not want to take the risk of leaving divers without any preparation or instruction. The same philosophy was applied to all further dives.

These instructions differed slightly from our previous plans, where we planned to use explosives to cut the riser around the flex joint. This modification was made for obvious safety reasons.

Job done: a), b), c), d), e), f), h), i).

Surface No. 1 - P-82 program during Dive No. 1

a) run guide line No. 4 (constant tension winch) and pull at 4,000 lbs. when attached to Wodeco II stack.

b) run secondary hydraulic hose bundle.

Results of Dive No. 1 and Surface No. 1

- the hot water suits were very efficient.
- there was now a direct connection between the P-82 and the Wodeco II stack.
- the Wodeco II stack was perfectly vertical (measurement of verticality was done with a bulb level strong enough to support the water pressure). This point was important. If the stack had been tilted, we could not envisage a re-entry in the old well later on.
- the upper H4 connector was closed.
- a diver had worked outside the bell 1:55 hours, and the others were no longer apprehensive about working in the cold water at such depths.

Surface 1/2 - work done on surface between Dive No. 1 and Dive No. 2.

The P-82 was moved 15' eastward, by pulling the unit on it's anchors until the cable, attached to the stack, was perfectly vertical. At that point, the center line of the moonpool was directly above the Wodeco II wellhead. The P-82 T.V. camera was then lowered on two guide lines, run with counterweight. The T.V. inspection did not bring any new element to our knowledge, of the wellhead status. Drill pipe was then lowered above the Wodeco II stack, with 2 slings of 2" diameter, attached to the extremity.

**DIVE NO. 2** - September 8, Team B (Burseaux, Riehm, Straub)

Our main objective was to prepare for the hydraulic disconnection of the Wodeco II lower Riser package. The program was as follows:

a) connect a jumper hose, equipped with a valve, on the primary release of the Wodeco II upper H4 (Dive No. 1 (g)).

b) disconnect Wodeco II hoses on choke and kill line connectors (Dive No. 1 (1)).

c) install jumper hoses in lieu of above hoses (Dive No. 1 (m)).

d) with a rod, check for the presence or absence of ice in the primary lock orifice of the upper H4.

e) connect the 3 hoses of the P-82 secondary bundle.

- hose No. 1 on H4 primary release jumper
- hose No. 2 on choke line connector jumper
- hose No. 3 on kill line connector jumper.

(Pressure to be applied on 3 hoses from the P-82).

f) check position of upper H4 rod indicator.

g) close valves on jumpers of choke and kill line connectors.

h) unlatch push pull connections on the 3 jumpers (pull the P-82 hose bundle to surface).

i) install special sling around top of bent riser.

j) unscrew shackle of the flex joint guidearm.

k) open doors at the top of the four Wodeco II guide posts.

Job done: - a), b), c), d), and i).

- operation e) could not be done because of a differential pressure existing on both sides of push pull connection, (hydrostatic pressure due to hydraulic fluid on one side, from KB elevation, and hydrostatic pressure due to sea water on the open ended side). As a consequence, operations f), g), and h), which were subject to the success of operation e), could not be done.

- operation i) (install 2 x 1-1/4" slings around the riser) was rather tiring for both divers, due to the required size of the slings, and operations j) and k) were cancelled to give Team B a rest.

Surface No. 2 - P-82 program during Dive No. 2

a) apply pressure on the 3 hoses of the secondary bundle, after diving operation e).

b) after diving operation h), pull the above bundle to surface.

None of this could be done due to the failure of diving operation e).

Results of Dive No. 2

- there was apparently no ice in the hydraulic system of the Wodeco II stack, which was in good shape. We only had difficulties with the small threads of the different hoses attached to the stack, as they were not of the type and size indicated by different suppliers. We were obliged to send crossover connections from the surface so the jumpers could be connected. This was done with the help of the constant tension guide line.

Surface 2/3 - work done on surface between Dive No. 2 and Dive No. 3.

- Nil.

DIVE NO. 3 - September 8, Team A

The purpose of this dive was to perform everything that could not be done during Dive No. 2. The program was as follows:

a) connect the 3 hoses of the P-82 secondary bundle (Dive No. 2 (e)).

b) check position of upper H4 rod indicator (Dive No. 2 (f)).

c) close valves on jumper chokes and kill line connectors (Dive No. 2 (g)).

d) unlatch push pull connections on the 3 jumpers (Dive No. 2 (h)).

e) unscrew shackle of the flex joint guide arm (Dive No. 2 (j)).

f) open doors at the top of the four Wodeco II guide posts (Dive No. 2 (k)).

Job done: - a), b), c), d), e) and f) partially. Only 1 door could be opened with a plain wrench, and the Wodeco II guide line No. 1 was cut, with a wire line cutter, at the top of the corresponding guide post.

Surface No. 3 - P-82 program during Dive No. 3.

a) apply pressure on the 3 hoses of the secondary bundle after diving operation a).

b) pull the above bundle to surface after diving operation d).

Job done: a) and b).

Result of Dive No. 3

- by observing the motion of the indicator rod, divers could check the opening of the upper H4 while pressure was applied from surface. We had confirmation that the Wodeco II hydraulic system was working perfectly. We knew then that the whole operation was feasible, and that it was just a matter of time and effort.

Surface 3/4 - September 9, work done on surface between Dive No. 3 and Dive No. 4.

- pulled out T.V. camera.
- pulled the Wodeco II riser, flex joint and H4 male stub to surface with drill pipe and slings.

  Although pressure was applied on the choke and kill line connectors, they did not work. As the sling was wrapped around a riser joint only, (the riser was of a non-integrated type), choke and kill lines slipped through the guide funnels and were not brought to surface.

  Equipment recovered = 150' riser (3-1/2 joints)
  flex joint and guide frame
  upper H4 male stub
  2 guide funnels

  The top joint of the riser was severely bent (150°) and broken several feet below the bend. The breakage was apparently old, with a portion that tore off during the pulling operation.

- run T.V. camera.
- run hydraulic subsea power unit with impact wrench.
- run drill pipe with special slings on top of Wodeco II stack for future recovery of C and K lines.

## DIVE NO. 4 - September 9, Team B

The main purpose of this dive was to prepare for the recovery of the choke and kill line. The program was as follows:

a) open doors of 3 Wodeco II guideposts with impact wrench.

b) secure 2 slings around choke and kill line.

c) secure 2 wire lines (3 tons breaking strength, attached to extremities above slings) to Wodeco II stack.

d) check situation of Hydril packing unit (open or closed) with a stem.

e) unlatch P-82 guide lines No. 2 and No. 3, used for running the P-82 T.V. camera, from the counterweights, and fix them to the Wodeco II guide posts No. 2 and No. 3.

f) close door above guide posts.

g) install hose No. 1 of the P-82 secondary bundle, on the closing part of the Wodeco II lower H4.

h) disconnect Wodeco II hoses from closing and opening parts of the blind rams.

Job done: - a), b), c), d), g) and h).

- operation e) could not be done for the simple reason that the P-82 T.V. camera and projector had to be pulled out, and divers (without any light) felt it unsafe to work in the dark.

- the 2 slings used in operation b), were of different lengths to enable us to feel the disconnection of each choke and kill line in sequence from the surface. The 2 wire lines were used to secure the above slings tightly on the C and K line while pulling with drill pipes.

### Surface No. 4

- Pulled and ran T.V. camera.

### Result of Dive No. 4

- Inspection of the inside of the Hydril was inconclusive as it was full of compacted sediment. We knew then that -

  a) the mud had settled in the riser and we would probably find the same conditions in the well bore.

b) the blind rams were securely closed - no leak had prevented the sedimentation from occuring.

- Choke and kill lines did not move in their connectors.

Surface 4/5 - September 5

- attempted to pull (30 tons) choke and kill lines to surface, with no success. The wirelines broke as scheduled, and the slings remained tightly secured.

DIVE NO. 5 - September 10, Team A

The main purpose of this dive was to cut choke and kill lines with a torch. The program was as follows:

a) attach a nylon rope around C and K lines, and guide posts.

b) check situation of Hydril packing unit (open or closed) with a heavy steel bar.

c) cut C and K lines with a torch (less 1 - 2 inches on each cut), 1' above the RLO safety joints.

Job done: a), b) and c).

The nylon rope was used as a safety measure in case a line was completely cut during operation c), in which case it might hit a diver, due to stress stored in the line.

Surface No. 5

Ran and pulled oxygen hydrogen hoses for the torch.

Result of Dive No. 5

- the hydril was completely opened.

- although the oxygen hose exploded twice, due to pressure, and had to be repaired with the divers waiting on bottom, the cutting operation itself was quickly done (10 min. per line). None of the lines broke due to stress at the completion of cutting. The cut was neat and an overshot could have been used, if required, for possible reconnection of the stubs, without any milling on the outside circumference.

Surface 5/6 - September 10

- pulled T.V. camera.

- pulled choke and kill lines to surface (overpull 60,000 lbs) and cut above on the rig floor.

- equipment recovered = choke line - about 200'
  kill line - totality (570')
  1 goose neck
  3 guide funnels
  1 marker buoy with cable and counterweight (one of the buoys dropped in 1974 for marking the location).

The two lines were severely twisted and bent. The cutting operation on surface took quite a while as the stress stored in these lines was very high. The bottom of the lines was plugged with barite sedimentation.

- ran T.V. camera and checked if the stack was damaged while pulling the choke line with it's goose neck. It was okay.

- ran a home made square guide frame, with the 4 P-82 guide lines attached, (one at each corner) on the drill pipe.

- ran T.V. camera on two constant tension lines with counterweight. From this point the cleaning operation was over, and everything was ready to start the plugging operation.

## V. PLUGGING OF WALRUS A-71

DIVE NO. 6 - September 11, Team B

The main purpose of this dive was to connect the guide line and the hydraulic hoses, on the blind ram and upper H4. The program was as follows:

a) install the four P-82 guide lines on the four Wodeco II guide posts.

b) connect the closing port of the Wodeco II upper H4 hose No. 1 (P-82 secondary bundle).

c) connect the opening port of the Wodeco II blind ram to hole No. 2 (P-82 secondary bundle).

d) disconnect Wodeco II hoses from primary lock, secondary lock and the primary release of the lower H4.

e) connect jumper hose with valve to primary and secondary release of the lower H4.

f) disconnect opening and closing port of the Wodeco II hydril.

Job done: - a) - 3 lines out of four were installed.
b) - was done, but hose No. 1 was found broken at the end of the dive. The reason for the break is unknown.
c) and f) - yes.
d) and e) - no.

- We wanted to have the hydril connections ready in case of a leak at the 20-3/4 x 16-3/4 stack adaptor, so we could check on the origin of the leak later on, while testing above adaptor.

Surface No. 6

a) Run P-82 secondary bundle.

Result of Dive No. 6

Due to possible mishandling of the P-82 T.V. camera on bottom, or due to divers inadvertently breaking hose connections, operations b) and d) were failures. As the T.V. camera was run on provisionary guide lines, and on the wrong side of the Wodeco II stack (due to space difficulties in the P-82 moonpool) the divers' work could not be checked out by supervisory personnel on the surface.

It was decided to perform a special dive, with the Comex portable T.V. camera, to inspect the job done during Dive No. 6, and to repair all broken connections.

Surface 6/7

- retrieve "home made" square guide frame, used to run the four P-82 guide lines.

- run P-82 T.V. camera on two P-82 guide lines.

DIVE NO. 7 - September 11, Team A

This dive was run as a control of Dive No. 6. The program was as follows:

a) complete inspection of the Wodeco II stack, with Comex portable T.V. camera.

b) connect closing port of the Wodeco II upper H4 to hose No. 1 (P-82 secondary bundle) (Dive No. 6 (b)).

c) repair all broken connections installed during Dive No. 6.

Job done: a), b), and c).

Surface No. 7

No work.

Result of Dive No. 7

At the end of this dive, the situation regarding the hydraulic hoses connected, was a follows:

- upper H4: primary locking port connected to P-82 secondary bundle.
- Hydril: all Wodeco II hoses disconnected.
- Blind rams: open port connected to P-82 secondary bundle.
- Lower H4: all Wodeco II hoses disconnected.

This dive was the lengthiest and the most tiring one for both the divers and the surface personnel, as no program could be set in advance and we had to improvise on a step by step basis, in order to repair the connections. The weight of the "portable" camera demanded a lot of effort from the divers. It was during this dive that a record was set by a diver working 3:35 consecutive hours outside the bell.

It was decided to perform a special dive, with the Comex portable T.V. camera, to inspect the job done during Dive No. 6, and to repair all broken connections.

Surface 6/7

- retrieve "home made" square guide frame, used to run the four P-82 guide lines.

- run P-82 T.V. camera on two P-82 guide lines.

DIVE NO. 7 - September 11, Team A

This dive was run as a control of Dive No. 6. The program was as follows:

a) complete inspection of the Wodeco II stack, with Comex portable T.V. camera.

b) connect closing port of the Wodeco II upper H4 to hose No. 1 (P-82 secondary bundle) (Dive No. 6 (b)).

c) repair all broken connections installed during Dive No. 6.

Job done: a), b), and c).

Surface No. 7

No work.

Result of Dive No. 7

At the end of this dive, the situation regarding the hydraulic hoses connected, was a follows:

- upper H4: primary locking port connected to P-82 secondary bundle.
- Hydril: all Wodeco II hoses disconnected.
- Blind rams: open port connected to P-82 secondary bundle.
- Lower H4: all Wodeco II hoses disconnected.

This dive was the lengthiest and the most tiring one for both the divers and the surface personnel, as no program could be set in advance and we had to improvise on a step by step basis, in order to repair the connections. The weight of the "portable" camera demanded a lot of effort from the divers. It was during this dive that a record was set by a diver working 3:35 consecutive hours outside the bell.

Surface 7/8 - September 12

- retrieve P-82 T.V. camera.

- connect 20-3/4 x 16-3/4 adaptor to P-82 20-3/4 stack on spider beams (see drawing of this adaptor in Annex).

- run stack, adaptor and riser to the top of the Wodeco II stack.

- connect 20-3/4 x 16-3/4 adaptor to 16-3/4 Wodeco II stack (applying pressure to Wodeco II upper E4 through the secondary bundle = okay).

- pick up test - overpull 60,000 lbs - okay.

- connect 20-3/4 choke line and test it at 1,750 psi - okay.

- run 5" open-ended drill pipe to the top of the Wodeco II blind ram (644-1/2'). (After localization of the 20-3/4 stack pipe ram at 627-1/2').

- close 20-3/4 stack pipe rams.

- Test the P-82/Wodeco II adaptor by pumping water through the drill pipe.
  See pressure diagram in Annex and drawing of subsea equipment at that time.
  We increased the pressure in stages of 250 psi. Pressure was holding at 1,250 psi, but we had a sudden drop of pressure from 1,600 psi to zero within a second.
  We then pumped, at a rate of 3 bbl/min., without having any pressure build-up indication on the chart.
  All the surface lines were then successfully re-tested, including the 20-3/4 stack choke line.
  We had to admit that we had a leak in the subsea equipment, as we had no return in the annulus 5" DP X riser.
  We were expecting a leak at a certain point, as we were in fact testing the Wodeco II shaffer blind rams from the top, but the pressure should have remained at the value of the existing pressure below these blind rams, or, if the well was dead, the pressure should have increased while we were squeezing water into the well bore. However, none of this happened.
  It was then decided to have the divers make a inspection of the subsea equipment and localize a possible leak to the sea. (The P-82 T.V. camera could not be lowered enough due to the height of the superposed stacks (2), and the adaptor, to enable any check for leaks below the adaptor.)
  Unfortunately, the weather was deteriorating, and we had to wait for an improvement before the bell could be launched.

## DIVE NO. 8 - September 13, Team B

The main purpose of this dive was to check the origin of the leak in the subsea BOP equipment. The program was as follows:

a) check position of Wodeco II upper H4 rod indicator.

b) connect primary and secondary releases of the Wodeco II lower H4 to the P-82 secondary bundle.

c) check leak while pumping water through drill pipe on surface.

Job done: a), b), and c).

### Surface No. 8

Pump water during diving operation c) - okay.
(See pressure chart.)

### Result of Dive No. 8

- the Wodeco II upper H4 was in closed position.

- the divers could clearly see a leak through the "tell tale" hole of the Wodeco II lower H4. No other leak was noticed. As a conclusion, there was no pressure at the top of the Walrus A-71 well and we did not need to connect hoses on the Wodeco II Hydril to localize the leak.

### Surface 8/9

As a safety measure, in case the well was plugged close to the mud line only, the riser was filled with heavy mud before opening the Wodeco II blind rams, and the Dowell cementing unit was kept ready for an emergency cementing job.

The level of fluid in the riser could not be seen anymore (11 bbls lost in 8 min.).

The open-ended drill pipes were pulled out and run with a sub having a flat bottom section, so we could not puncture any sediment plug with a pin drill pipe section, while lowering pipe below the blind rams.

Pressure was then applied on the opening port of the Shaffer blind ram. Vibrations could be felt on the surface drill pipe, indicating that the rams were opening, but it was impossible to lower the drill pipe below the rams.

An impression block was run, and showed that only 1 ram was open - the second half was still in a closed position, with no junk on it.

As we could not drill just one half ram, without damaging the milling tool or the 16-3/4 stack, it was decided to close the blind ram again.

**DIVE NO. 9** - September 13, Team A

The purpose of this dive was to connect hose to the closing port of the blind rams. The program was as follows:

a) connect one hose of the P-82 secondary bundle to the closing port of the Wodeco II Shaffer blind ram.

b) check status of the lower H4 leak.

c) disconnect the nylon rope between the bell guide line and the Wodeco II stack, and attach it between the bell guide line and the Walrus A-71 temporary guide base.

Job done: b) and c).

Surface No. 9

The diver found that the hose attached to the opening port of the Shaffer blind ram was broken. We changed our program accordingly, and connected the hose, reserved for the closing port, directly to the opening port. Pressure was then applied from surface, and the diver could check the return of hydraulic fluid by the closing port. The drill pipes were then lowered without any problem, through the opened blind rams.

There was no fluid coming out of the lower H4 "tell tale" hole.

Surface 9/10 - September 14

- the drill pipe could not be lowered below the depth of the lower H4 - AX ring.
- an impression block was run and showed an unidentified piece of junk resting on the wellhead.
- the 1969 abandonment did not mention any junk left in the hole.
- a milling tool was run (OD 9") and the junk was drilled for 5' with high intermittent torque, from 651' to 657'.
- we had to reduce the outside diameter of the milling tool to avoid cutting the 9-5/8 casing. We pulled the 9" tool out of the hole and ran a new impression block. A similar print was found. The new 8-1/2 OD milling tool was run and drilling resumed without any return, due to the leak in the Wodeco II stack.

The same high intermittent torque was noted but it had a tendency to decrease. At 782' (2:45 hours later) we realized that by plain rotation, without any circulation, we had no more penetration.

As soon as we re-established the circulation, we drilled ahead. The deduction was that we were milling a piece of junk taken in a plug of salt. In fact, half of the time we were milling the junk, and half of the time we were pushing the piece of junk down through the salt plug. The decision was taken to stop this operation, set a pill of heavy mud, and ask authorization from the Department of Energy, Mines and Resources, to cement the well as it was. We were, in fact, concerned that we could drill the whole surface plug and run into a pressure problem from the high pressure Calcium Chloride water formation without having any equipment holding pressure on the mud line.

This hypothesis was valid, as we discovered that the well had been flowing, presumably in 1969, through one of the BOP leaks.

Verbal authorization to plug the well was granted immediately by Mr. F. Lepine of EMR. The solution of setting a bridge plug prior to a cement job was envisaged, but put aside, as there was a possibility of setting it prematurely in the old Wodeco II stack, (we wanted to keep the Wodeco II stack during the cement job, as it was our only possibility to be guided into the well bore) or in the 9-5/8 casing (no scraper available on board).

The cement job was done with the Dowell unit - 100 sacks of neat cement Class B with 3% Calcium Chloride mixed with sea water that had been preheated to 50°F. The slurry weight was very high - 16.5 lbs/gal. The plug was set with open-ended drill pipe and displaced with 10 bbls sea water. Drill pipes were then pulled to 660' for the backwash, and the operation was repeated 15' above the BOP stack, to wash down the BOP's. During this entire operation, we did not have any return. The cement plug was set at 11:15 P.M., September 14, 1974.

Drill pipes were laid down while "waiting on cement". The cement then felt at 650', which was at the level of the lower Wodeco II pipe ram. It was decided to pressurize the "open" function of the Wodeco II lower H4, and send a diver to check if everything was ready to pull the entire stack assembly back to the surface.

**DIVE NO. 10** - September 15, Team B

The purpose of this dive was to inspect the stack assembly, and to record on videotape. The program was as follows:

a) check position of lower H4 rod indicator.

b) record a videotape of the Wodeco II stack with the Comex portable T.V.

c) clean the surrounding area, and make sure that no slings or old Wodeco II Koomey hose could prevent the pulling out, to surface, of the subsea equipment.

Job done: a), b) and c).

### Surface No. 10

No work.

### Result of Dive No. 10

- the Wodeco II stack was ready to be pulled out.

- during the final diving inspection, divers noticed a leak at the lower portion of the neck of the flange, on the kill line, close to the Wodeco II Shaffer BOP. However, there was no leak at the "tell tale" of the lower H4.

  Almost simultaneously the surface crew mentioned that the level of fluid in the annulus DP riser, had been uplifted.

  One explanation could be that the well had been, or was flowing, after drilling the salt plug too far ahead; or, since barite mud had been replaced by water during the backwash, after the cement job, the level was higher in the annulus riser/DP and the hydrostatic equilibrium was still not reached in this annulus: muddy water was still flowing out of the leak, which had been undetected until Dive No. 10.

### Surface 10/11

In order to be safe, in case the well started flowing, it was decided to drill some 30' of cement (20' inside the 9-5/8 casing), before retrieving the stack, so it would have been possible to set a cement retainer inside the 9-5/8 casing and to try to squeeze cement.

A milling tool was run, and cement was felt again at 650', at 9:45 A.M., September 15 (total WOC: 10:00 hours). Drilling the cement from 650' to 678' took 3:15 hours. Cement was very hard, and possibly a new junk fish was taken in the cement, as we experienced some high torque at the beginning of the milling (some junk could have been driven out of the Shaffer ram housing during the backwash).

Cement was so hard that obviously the well could not have been flowing after the cement job, and it was decided to pull out all of the subsea assembly.

This operation took 9 hours; from 2:00 P.M. to 11:00 P.M., September 15, until spider beams could be installed between the adaptor and the 16-3/4 stack, after removing the 20-3/4 riser package (see photo in Annex). The total weight of subsea equipment was 390,000 lbs, at the disconnection.

**DIVE NO. 11** - September 16, Team A

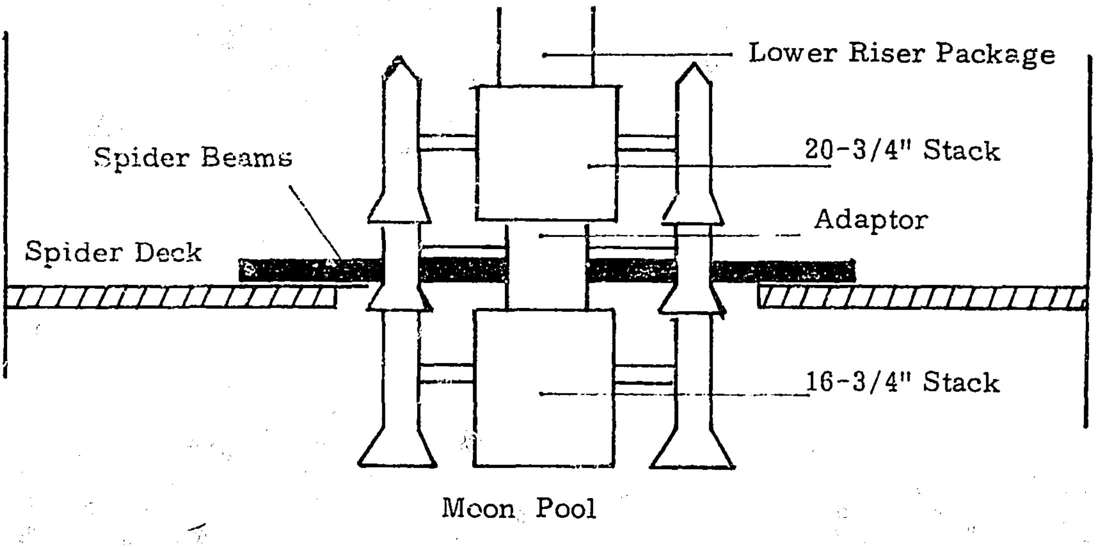
The program was as follows:

Check the Walrus A-71 wellhead and obtain a videotape recording, giving evidence that the well was not flowing.

This dive did not present any difficulties, and was the last one. Had a leak been noticed, divers would have opened doors on top of the guide base guideposts, fixed two P-82 guidelines, and we would have run a cement retainer on drill pipe with a "home made" guide frame.

At 2:00 A.M., September 16, the Walrus A-71 was plugged, and we started the final phase of the operation: dismantling BOP stack and moving on to the next drilling location. At the same time, the six divers went into decompression.

## VI. DISMANTLING OF STACKS AND RETRIEVING ANCHORS



### (A) Observation on the Equipment Recovered

1. Wodeco II choke and kill line stubs had to be removed so we could place the spider beams under the guide frame of the adaptor. While disconnecting the kill line, at the cameron clamp, under the connector, the entire piece of kill line, with 2 fail safe valves, fell into the sea. In other words, this piece of equipment was completely broken between the horizontal fail safe and the Shaffer.

2. Around the broken section of the kill line was an important reddish deposit, 2" thick, which was sent to the SNPA Research Center for analysis. Results of the analysis are given in the Annex.

Presence of this deposit at the leak, indicated that the well had been flow at a certain time between October 1969 and September 1974. As the steel support plate of the kill line connector (1" thick) was bent upward by 5°, and admitting that such a bend was done when the riser and C and K lines were broken during the 1969 final storm, one has to admit that the leak occured at that time. No one can assume how long the well had been flowing. Analysis of sea water samples taken during the Summer of 1970, from around the wellhead, with a submarine, indicated no foreign minerals. It can be assumed that the well was not flowing at that time.

According to our knowledge of well flowing calcium chloride water, under abnormal pressure, in South Algeria, such wells were plugged by salt deposits within a few days of the blow out.

No calculations can be made to determine the time required, as we do not have a sample of this water taken under such conditions, and we do not know the permeability of the water bearing formation.

3. All BOP equipment was painted with P-3 Vetcotype paint and the outside appearance was perfect. No rusty spot could be detected.

4. After dismantling equipment, all hydraulic functions were tested - all were in good working condition. Only the lower pipe ram could not be closed completely due to the presence of hard cement set during the final plug in 1974.

5. The lower H4 was in perfect condition, and the AX ring was not damaged at all. However, on the final videotape recording of the wellhead, the top of the 16-3/4 housing showed some trace of washed out drills. This could explain the first leak noticed by the diver through the "tell tale" hole of the lower H4.

We are unable to explain in what sequence the two BOP leaks were developed, and why the divers could see only the minor lower H4 leak at first, and only later the leak on the kill line, which was by far the bigger one.

6. Following equipment was recovered and shipped back to the original supplier for re-conditioning:

Hydril: 16-3/4" 5,000 MSP bag type blow out preventer

Shaffer: 2 - double 16-3/4" 5,000 LWS blow out preventer
1 - flanged spool 16-3/4 x 16-3/4 5,000
2 - 5,000 psi 3" hydraulic fail safe

Vetco: 2 - 16-3/4" 5,000 psi H4 connector
1 - lower BOP guide frame
1 - middle BOP guide frame
4 - guide post
3 - 20" BTM riser connector

The following equipment could not be re-conditioned (obsolete, or too severely damaged):

1 - Vetco type F-NR Multiball flexjoint
2 - Choke and kill line connectors
[illegible] - Choke, kill and riser pipe
1 - Koomey pod.

7. No attempt was made to recover the wellhead equipment left on bottom, in order to avoid damaging the cement plug and the length of the ribbed section of the 20" casing, which would have obliged us to drill more of the cement plug before we could try to cut the 20" and 13-3/8" casings.

8. We planned on an initial program to attempt to squeeze cement through the choke and/or kill line, and if this was not successful, to plug the well by re-entry operation.

Due to the leaks found on the Wodeco II BOP, it would have been impossible to squeeze cement in the well with the first procedure.

It must be noted, also, that the choke and kill line RLO safety joint could only be unscrewed with a lot of difficulty. Divers could never have done this job under the sea.

### (B) Dismantling of the Subsea Equipment

After picking up the riser lower package, the P-82 20-3/4 stack was disconnected from the 20-3/4 x 16-3/4 adaptor, and stored in the same reverse way it was connected to the adaptor and run during the Surface No. 7/8.

The adaptor and Wodeco II stack were then lifted, the spider beams retracted, and put aside in the moonpool, resting on heavy timber beams, close to the P-82 20-3/4 and 13-5/8 stacks.

The upper H4, Hydril, 2 Shaffer BOP, and the lower H4 were then unbolted and disconnected piece by piece, so the P-82 Manitowoc crane could lift the different components through the hatch, covering the BOP storage area, and lay them down on the pipe rack. This operation had to be done before the P-82 could be towed to the next location for safety reasons. Fortunately, the weather was deteriorating: the anchors could not be lifted, but dismantling was not hampered.

Once on the deck, all Wodeco II hydraulic functions were tested. Total dismantling of the BOP equipment took 34:00 hours, from September 16 at 2:00 A.M., to September 17 at noon. In fact, we can estimate that only a total of 21 hours were lost due to the fact of bringing the Wodeco II stack to surface.

### (C) Retrieving Anchors

A Side Scan Sonar and bathymetric survey were done during the summer, 1973, with a seismic boat (M/V Theta with Kenting).

The main purpose was:

- relocation of the wellhead.
- checking of the two call buoys (one was called on surface but did not work).
- mapping of junk and anchor cable left by the Wodeco II around the wellhead.

Heading of the P-82 and it's mooring pattern were then selected according to the above mapping work, in order to minimize the risk of mixing the mooring lines.

However, while pulling anchor with the tug supply "Giant Tide", two pennant lines were broken; one 30,000 lb. anchor (E1) was lost, one P-82 mooring line (D2) was severely damaged and has to be replaced, a second P-82 mooring line was damaged (.232 meters close to anchor) and has to be cut.

The pennant lines were possibly broken due to bad weather, but loss of the anchor and damage to the mooring lines were definitely attributable to interferences with abandoned Wodeco II anchors and cables.

The first anchor, C1, was lifted September 16, at noon. Operations were suspended between September 16 at 9:30 P.M. and September 17 at noon, due to bad weather. The last anchor, A1, was racked at 2:30 P.M., September 18. Total time required for retrieving anchors was 50-1/2 hours (including 14-1/2 hours WOW), the time lost being mainly attributable to the two broken pennant lines.

The semi-submersible was then towed on the next drilling location, "Aquit et al Polar Bear C-11".

## ANNEX

## ANNEX I

## PERSONNEL INVOLVED IN THE PLUGGING OPERATION, ON BOARD THE P-82

### Aquitaine Company of Canada Ltd.

G. Kuhn de Chizelle - Drilling Superintendent
D. Filc - Drilling Foreman
A. Jourdan - Drilling Engineer

### Comex

G. Baurens - Comex Team Leader
A. Azzaz - Assistant Team Leader
F. Belaich - Doctor
A. Martin - Chief Caisson Master
Siffredi - Caisson Master
Bossu - Caisson Master
Bracciotti - Mechanic
Trovalet - Electrician

Team "A"

Guichard - Diver
Tomasi - Diver
Devergie - Diver

Team "B"

Burseaux - Diver
Riehm - Diver
Straub - Diver

Surface: De Resseguier - Diver
Godey - Diver
Vossier - Diver
Dupont - Diver
Regincos - Diver

### Sea and Land Drilling Contractors

Ch. Warkir - Tool Pusher
Fouilloux - Assistant Tool Pusher
Van Bouvelen - Driller
Lorthioir - Driller

### Dowell Canada

D. Evans - Service Engineer

### Vetco

B. Burdick - Engineer (ex-Vetco service engineer on board the Wodeco II in 1969)

### Department of Energy, Mines and Resources' Representative

F. Lepine - Drilling Engineer

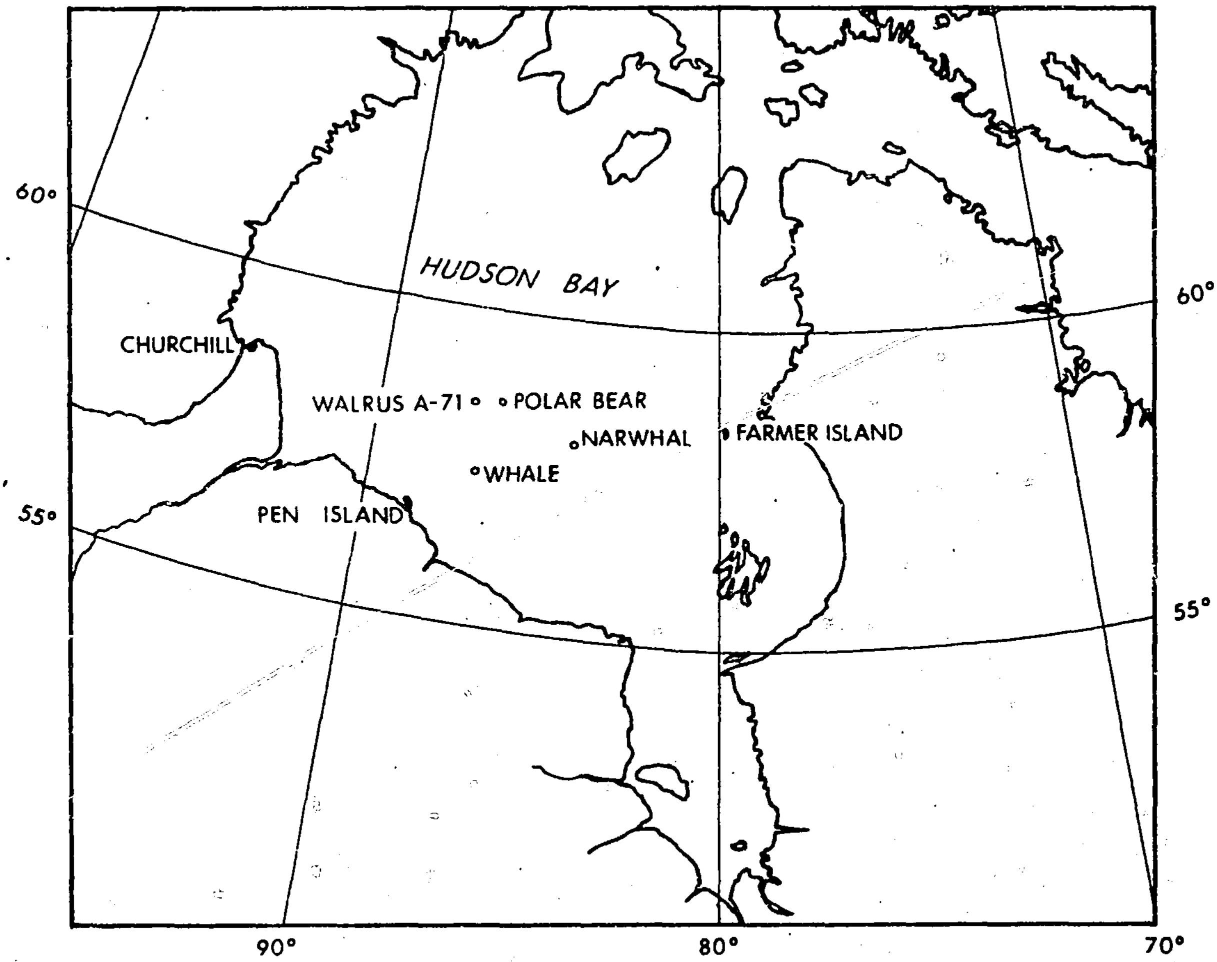
### Partner's Representative

R. Johnstone - Atlantic Richfield Canada Ltd.

AQUITAINE
COMPANY OF CANADA LTD

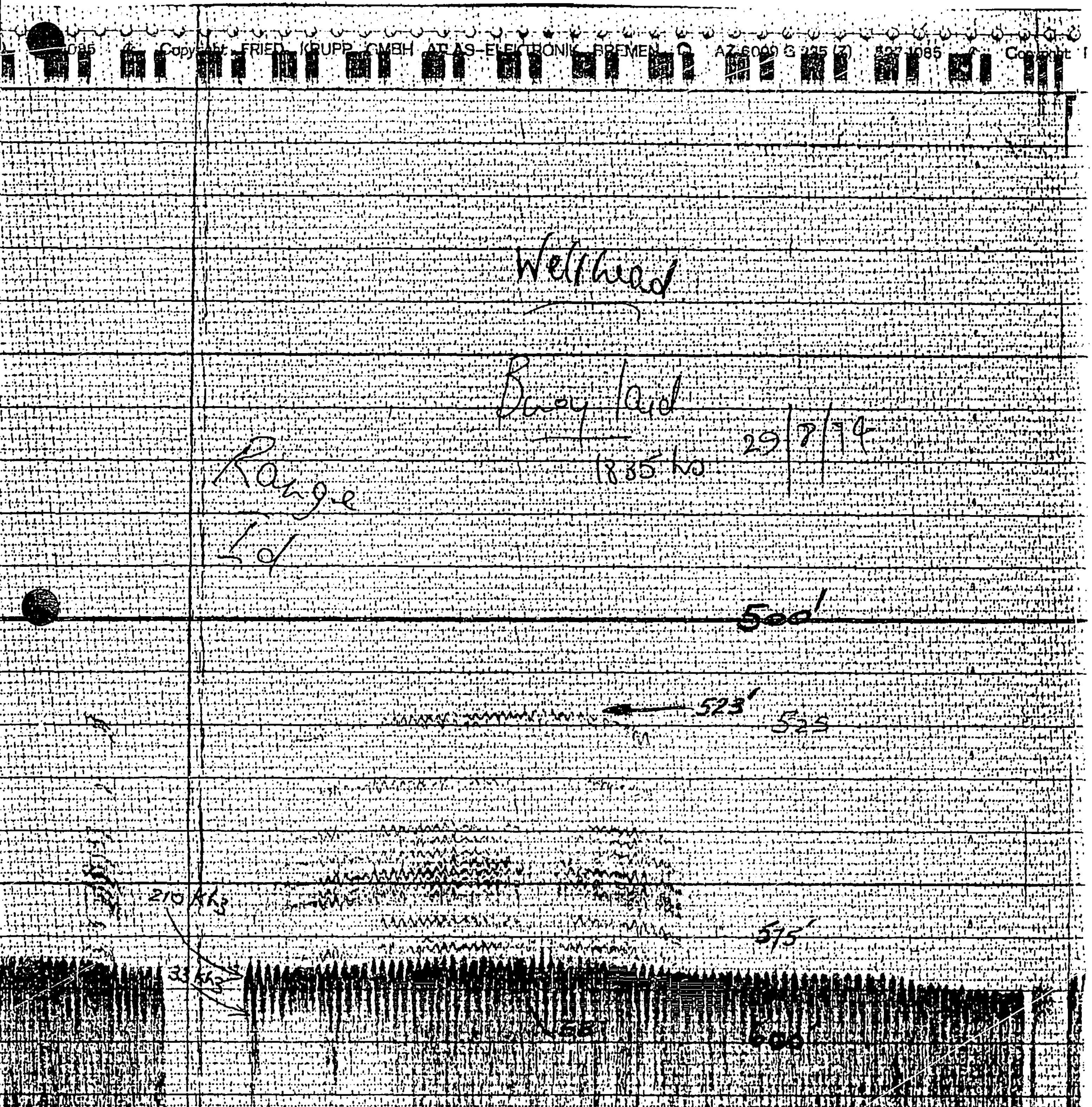
# SUMMER 1974 HUDSON BAY CAMPAIGN

PROGRAM: 2 WELLS TO DRILL (POLAR BEAR AND NARWHAL OR WHALE) PLUS 1 WELL TO PLUG (WALRUS A-71)



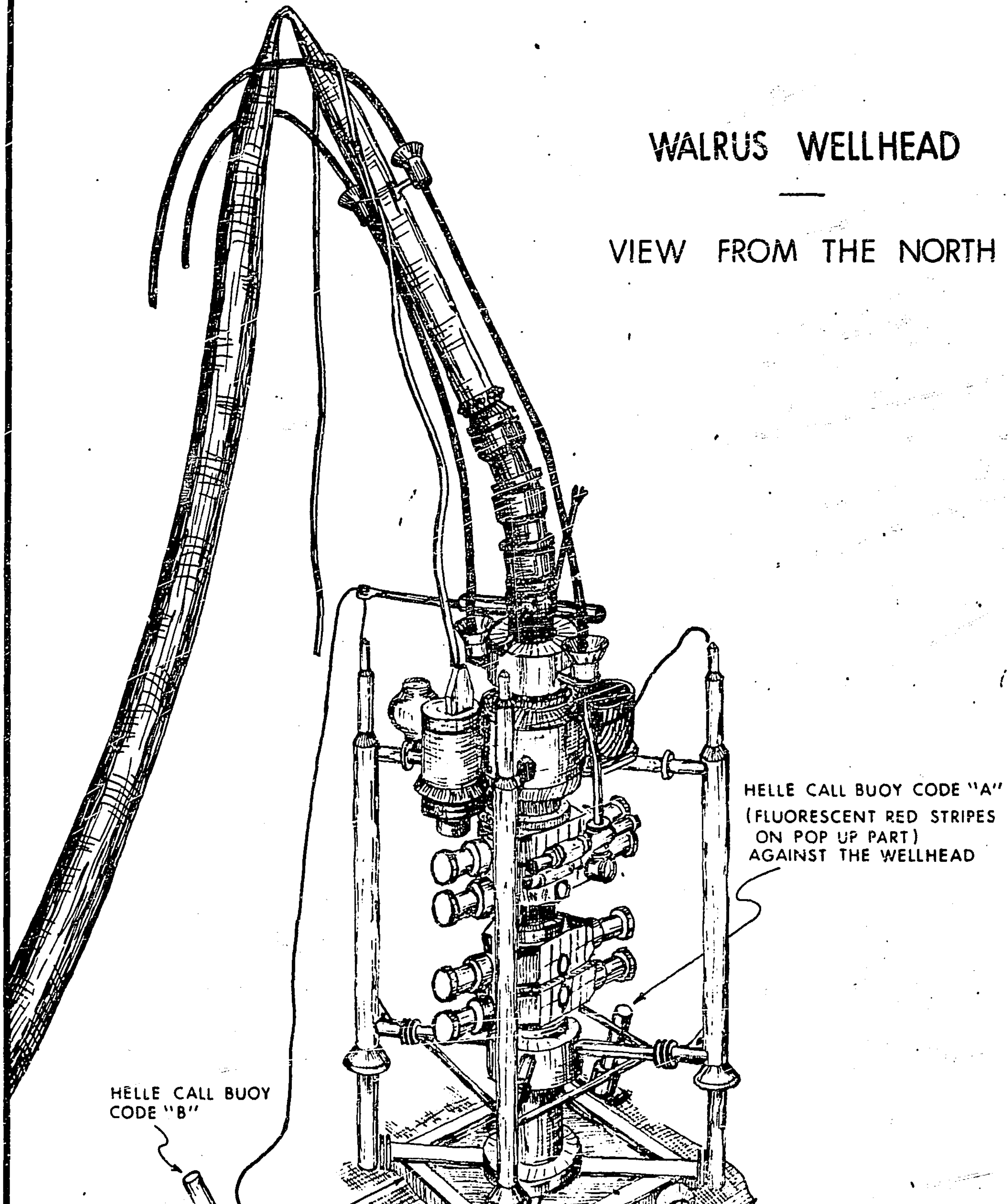
|  | LAT. | LONG. | IN STATUTE MILES |  |
|---|---|---|---|---|
|  |  |  | NEAREST DISTANCE TO SHORE | DISTANCE TO CHURCHILL |
| POLAR BEAR | 58°30'04.352N | 86°47'18.489"W | 138 TO PEN ISLAND | 274 |
| WALRUS A-71 | 58°30'02"N | 87°11'51"W | 131 TO PEN ISLAND | 260 |
| NARWHAL | 58°07'59.758" N | 84°08'02.963" W | 189 TO PEN ISLAND<br>170 TO SHORE<br>131 TO FARMER ISLAND | 370 |
| PEN ISLAND | 56°46'25"N | 88°47'25"W | —— | 234 |
| WHALE | 57°28'49"N | 87°09'00"W | 81 TO PEN ISLAND<br>75 TO SHORE | 276 |

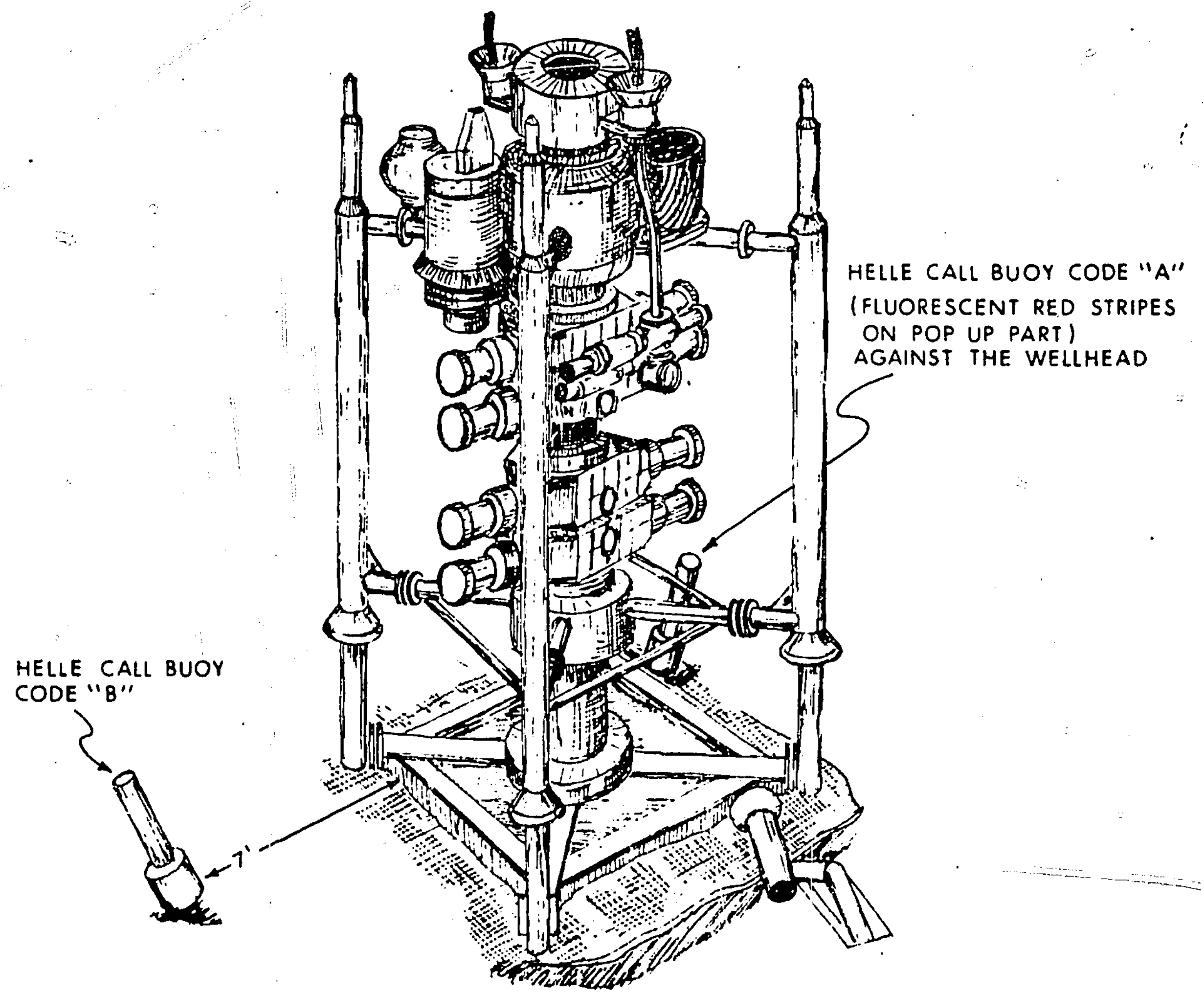
# WALRUS A71 : ECHO OF WELLHEAD

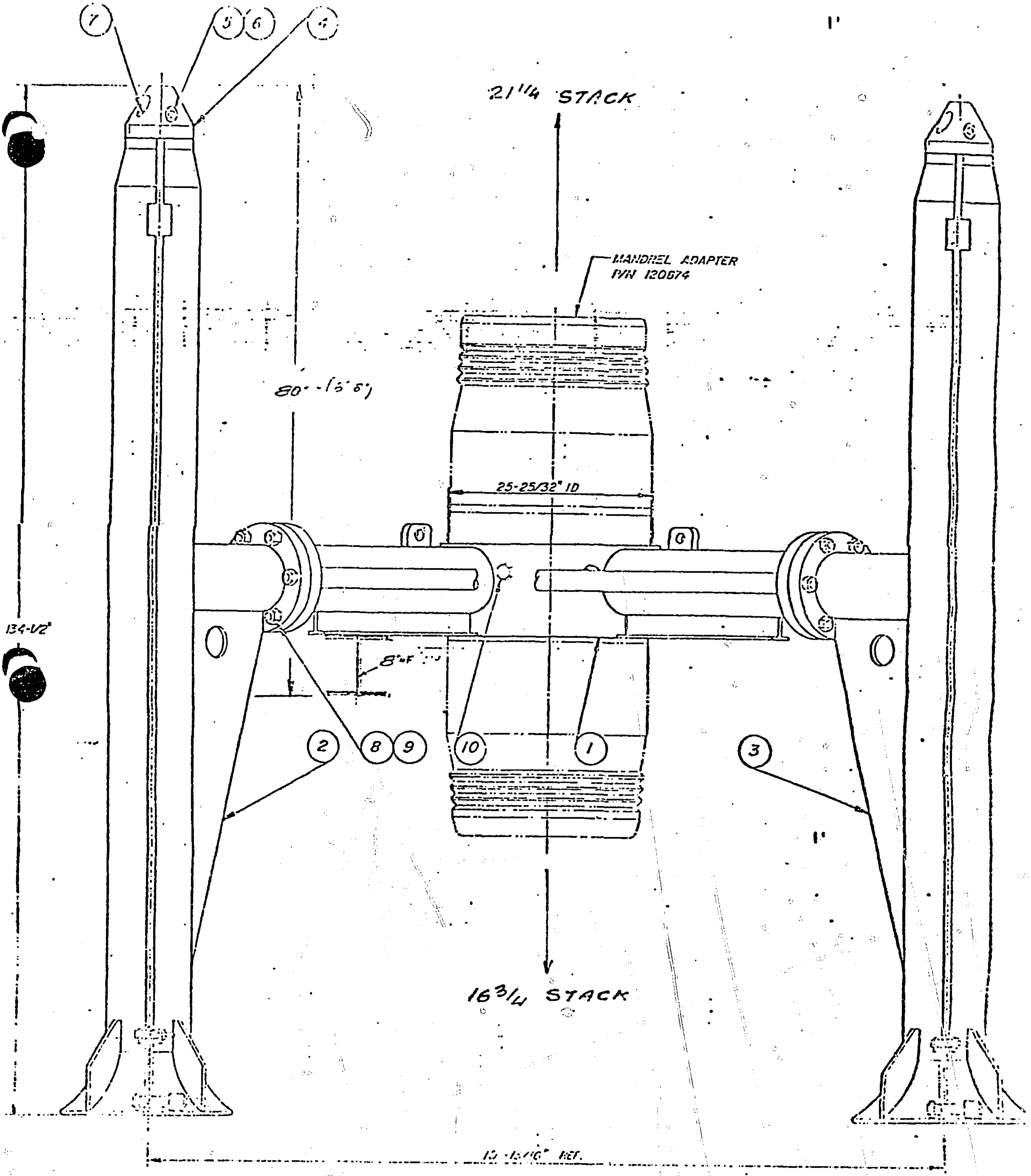


# WALRUS WELLHEAD

## VIEW FROM THE NORTH

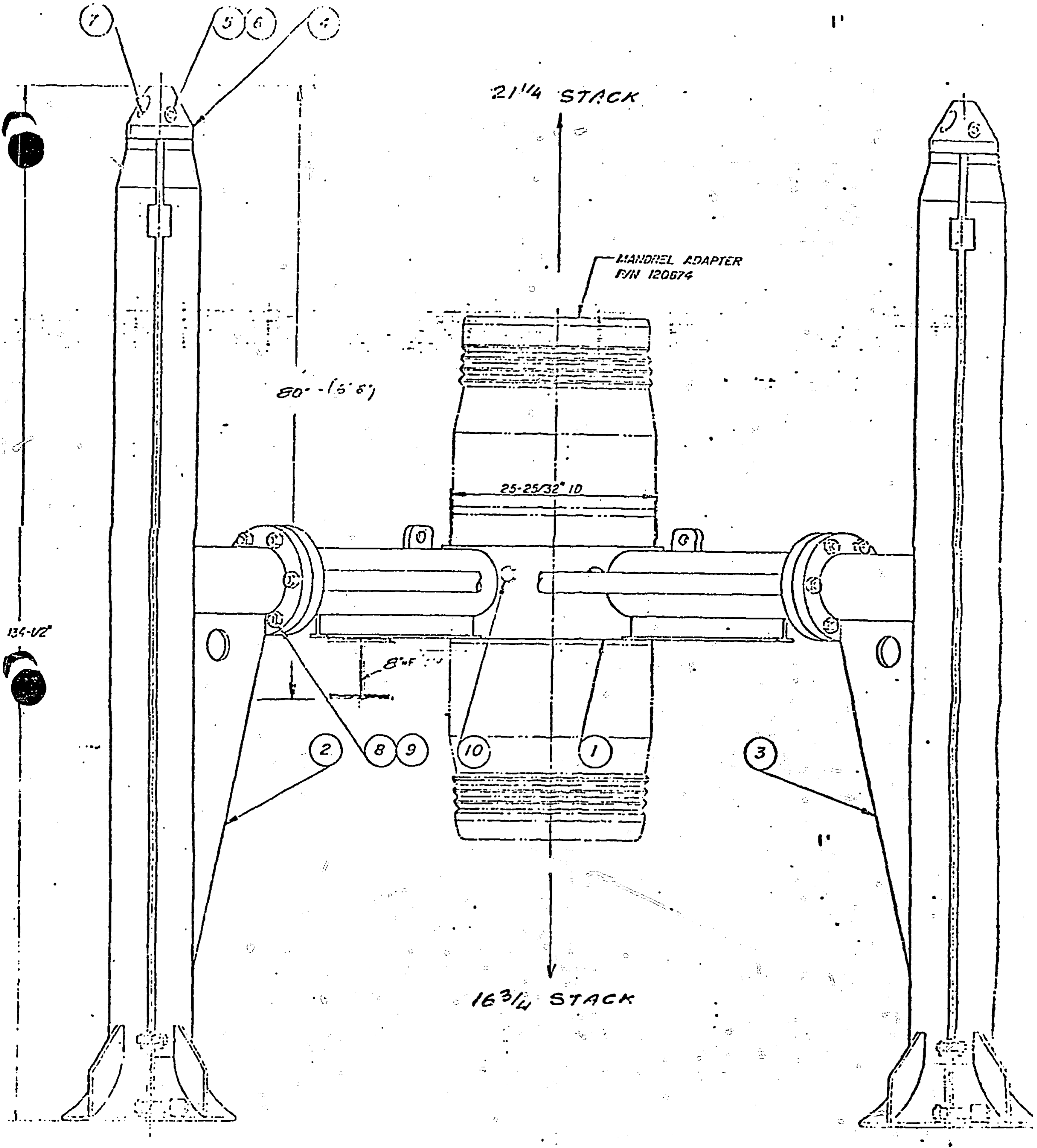



HELLE CALL BUOY CODE "A"
(FLUORESCENT RED STRIPES ON POP UP PART)
AGAINST THE WELLHEAD
HELLE CALL BUOY CODE "B"
7'



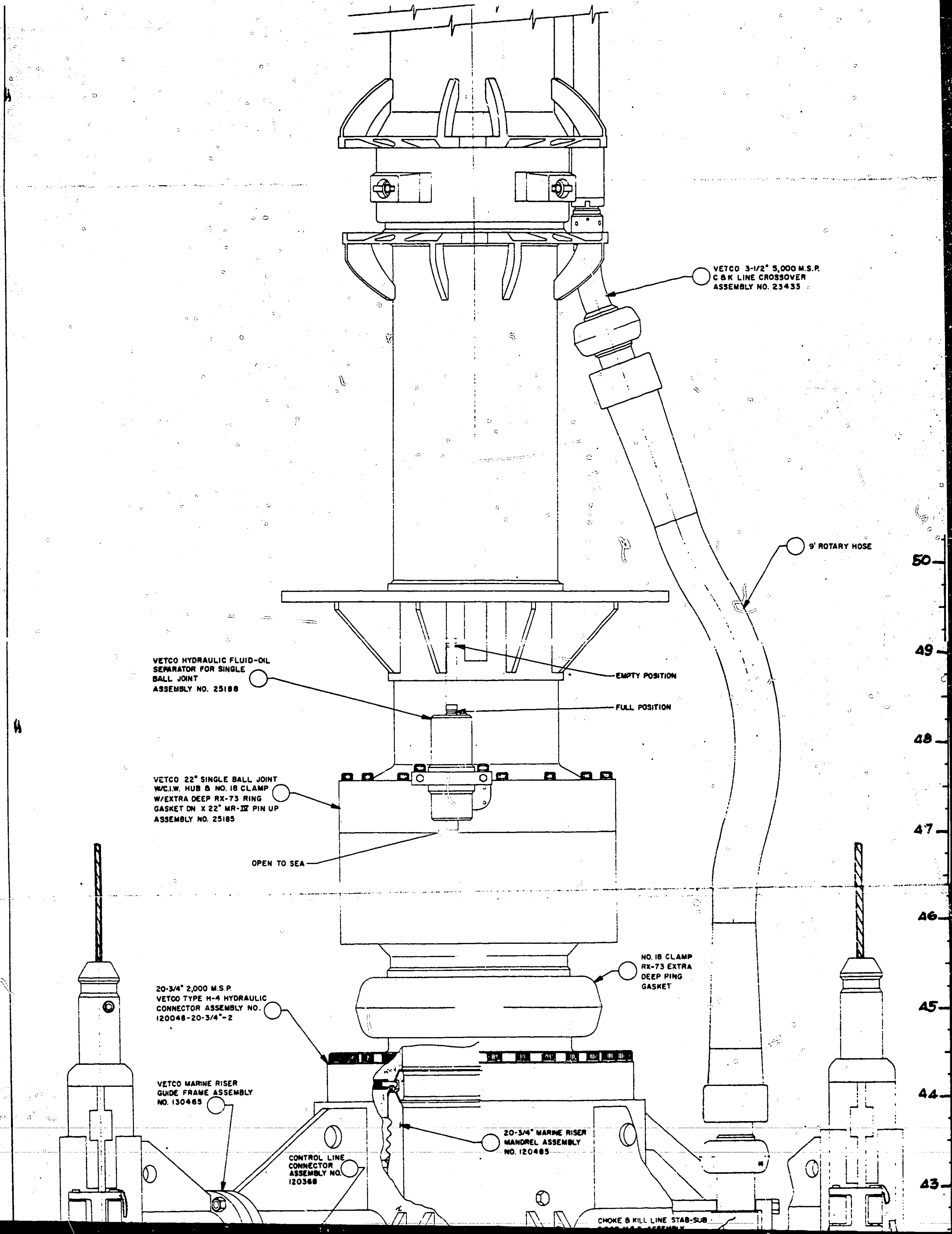
VETCO ASSEMBLY No 130664

# ADAPTOR 21 1/4 x 16 3/4



VETCO ASSEMBLY No 130664

# ADAPTOR 21¼ x 16¾


VETCO 3-1/2" 5,000 M.S.P. C & K LINE CROSSOVER ASSEMBLY NO. 23433
9' ROTARY HOSE
VETCO HYDRAULIC FLUID-OIL SEPARATOR FOR SINGLE BALL JOINT ASSEMBLY NO. 25188
EMPTY POSITION
FULL POSITION
VETCO 22° SINGLE BALL JOINT W/C.I.W. HUB & NO. 18 CLAMP W/EXTRA DEEP RX-73 RING GASKET DN. X 22" MR-III PIN UP ASSEMBLY NO. 25185
OPEN TO SEA
NO. 18 CLAMP RX-73 EXTRA DEEP RING GASKET
20-3/4" 2,000 M.S.P. VETCO TYPE H-4 HYDRAULIC CONNECTOR ASSEMBLY NO. 120048-20-3/4"-2
VETCO MARINE RISER GUIDE FRAME ASSEMBLY NO. 130465
20-3/4" MARINE RISER MANDREL ASSEMBLY NO. 120485
CONTROL LINE CONNECTOR ASSEMBLY NO. 120368
CHOKE & KILL LINE STAB-SUB
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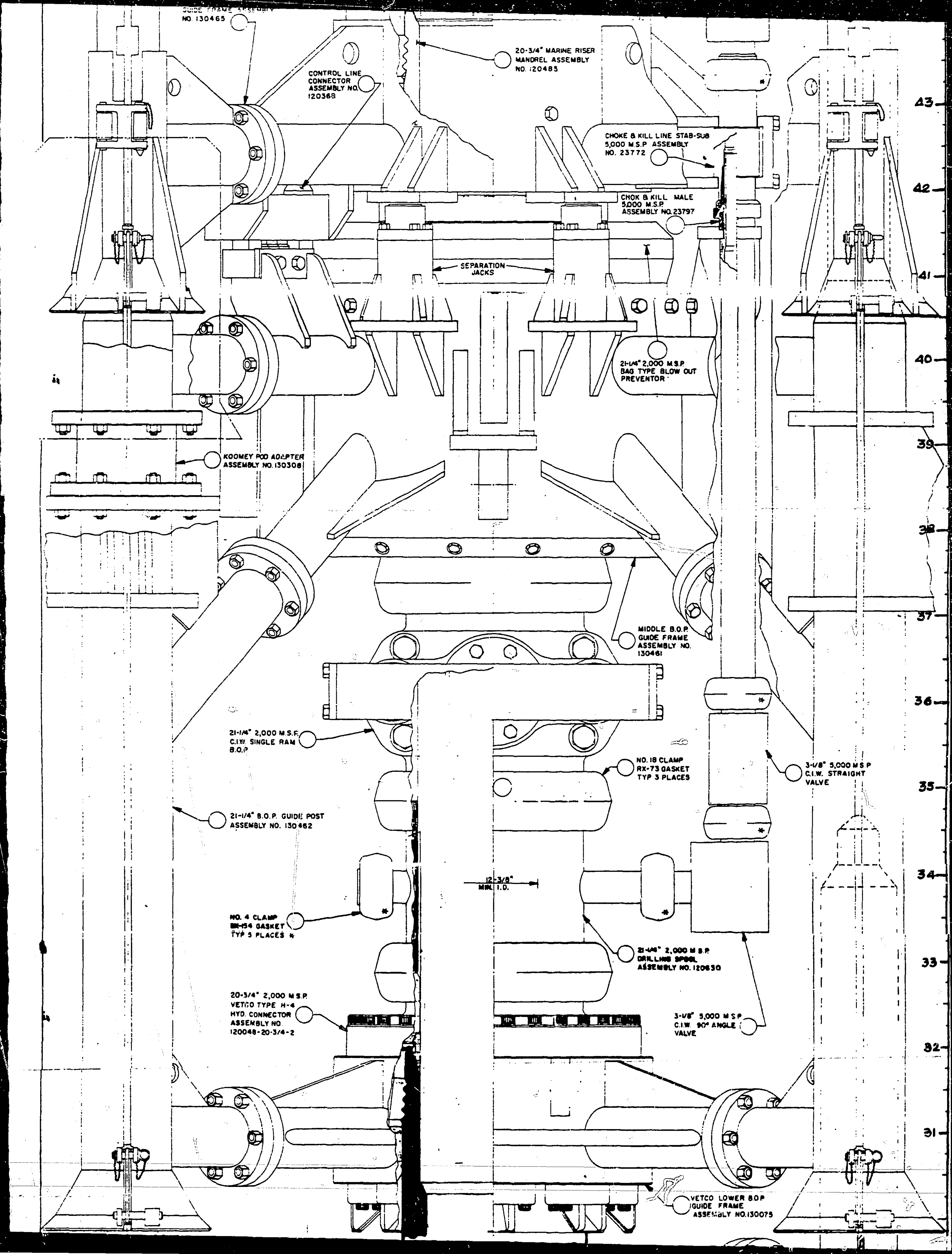
GUIDE FRAME ASSEMBLY
NO. 130465
20-3/4" MARINE RISER
MANDREL ASSEMBLY
NO. 120485
CONTROL LINE
CONNECTOR
ASSEMBLY NO.
120368
CHOKE & KILL LINE STAB-SUB
5,000 M.S.P. ASSEMBLY
NO. 23772
CHOK & KILL MALE
5,000 M.S.P.
ASSEMBLY NO. 23797
SEPARATION
JACKS
21-1/4" 2,000 M.S.P.
BAG TYPE BLOW OUT
PREVENTOR
KOOMEY POD ADAPTER
ASSEMBLY NO. 130308
MIDDLE B.O.P.
GUIDE FRAME
ASSEMBLY NO.
130461
21-1/4" 2,000 M.S.P.
C.I.W. SINGLE RAM
B.O.P.
NO. 18 CLAMP
RX-73 GASKET
TYP 3 PLACES
3-1/8" 5,000 M.S.P.
C.I.W. STRAIGHT
VALVE
21-1/4" B.O.P. GUIDE POST
ASSEMBLY NO. 130462
12-3/8"
MIN. I.D.
NO. 4 CLAMP
BX-154 GASKET
TYP 5 PLACES *
21-1/4" 2,000 M.S.P.
DRILLING SPOOL
ASSEMBLY NO. 120630
20-3/4" 2,000 M.S.P.
VETCO TYPE H-4
HYD. CONNECTOR
ASSEMBLY NO.
120048-20-3/4-2
3-1/8" 5,000 M.S.P.
C.I.W. 90° ANGLE
VALVE
VETCO LOWER B.O.P.
GUIDE FRAME
ASSEMBLY NO. 130075
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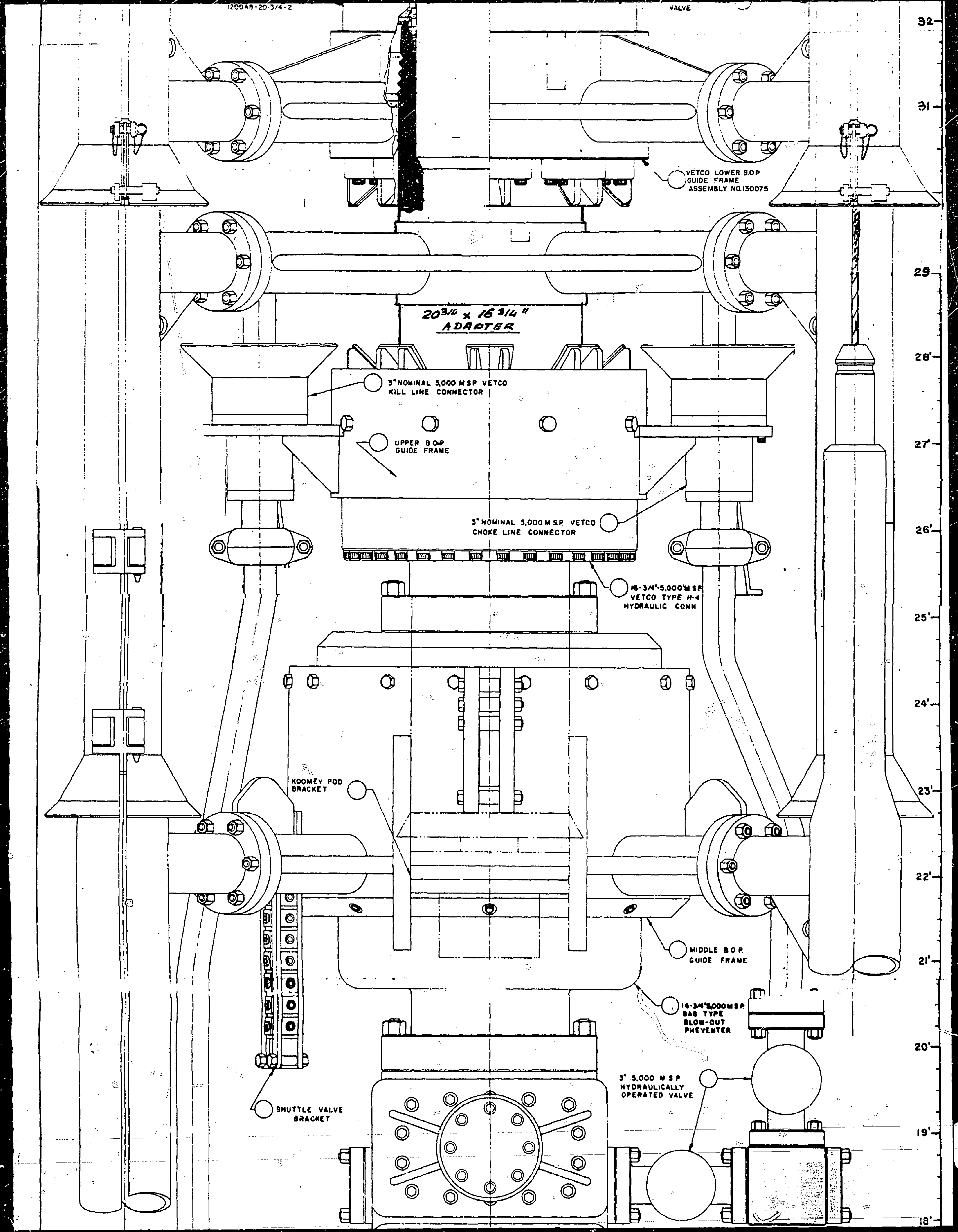
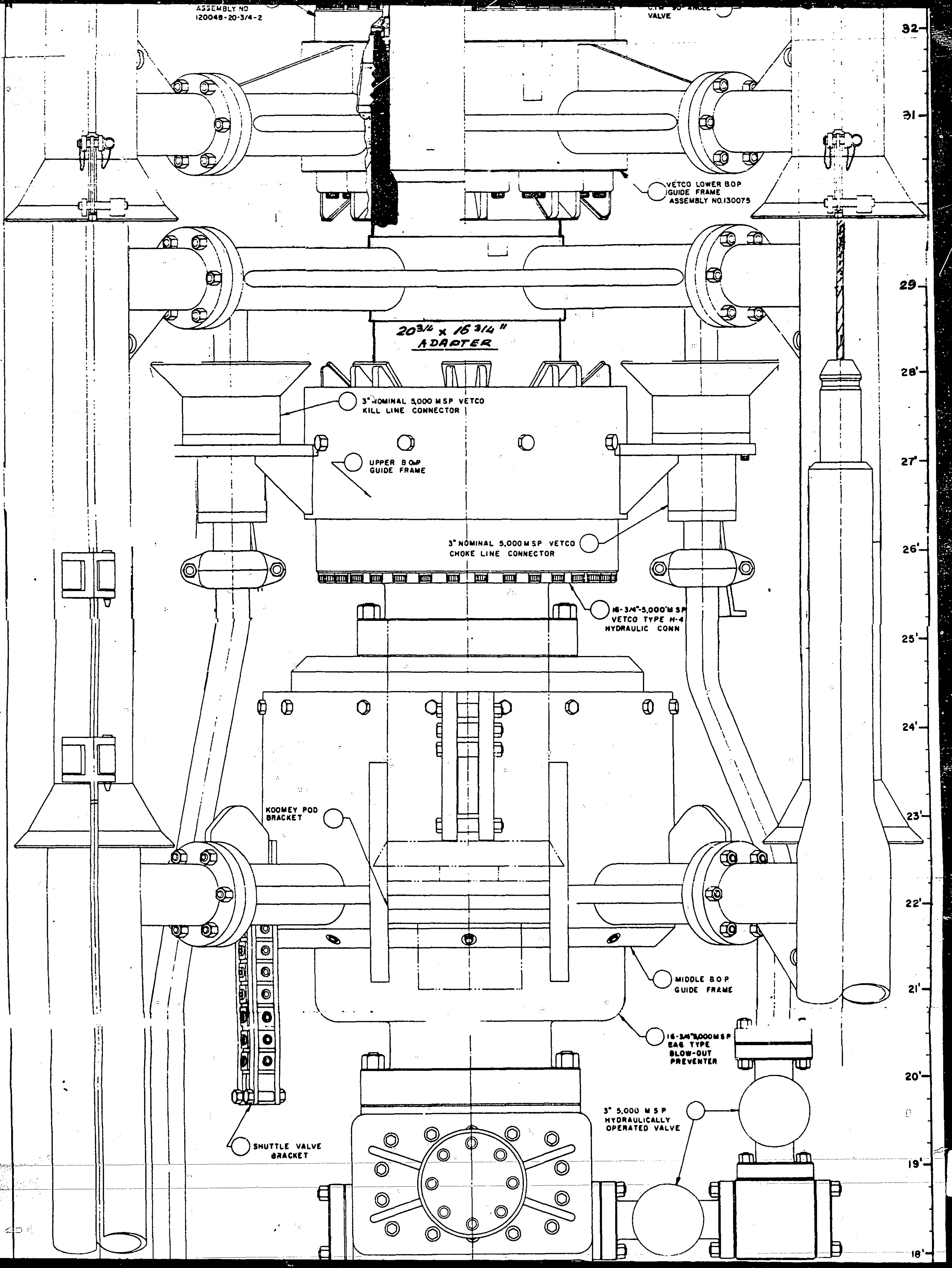
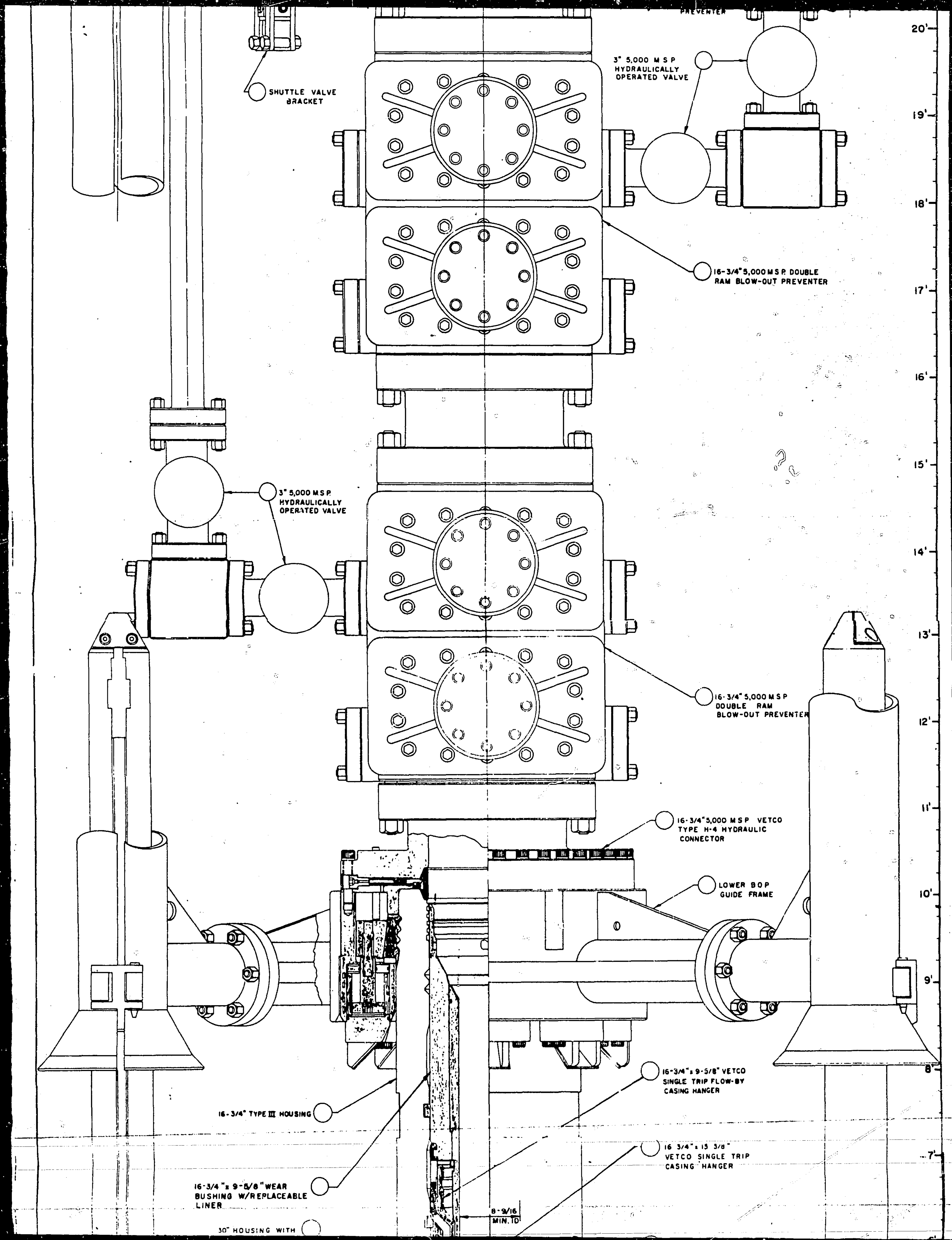
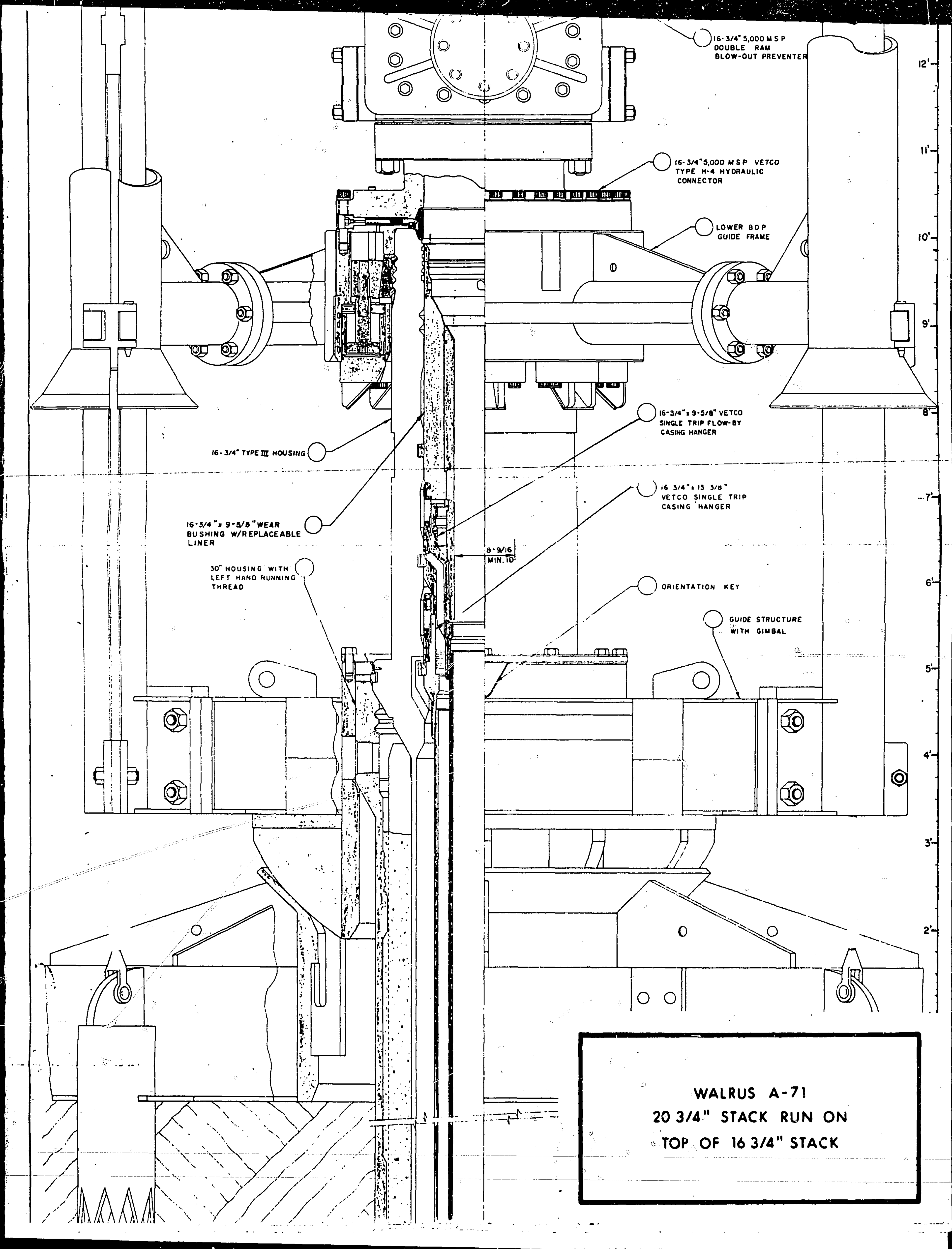
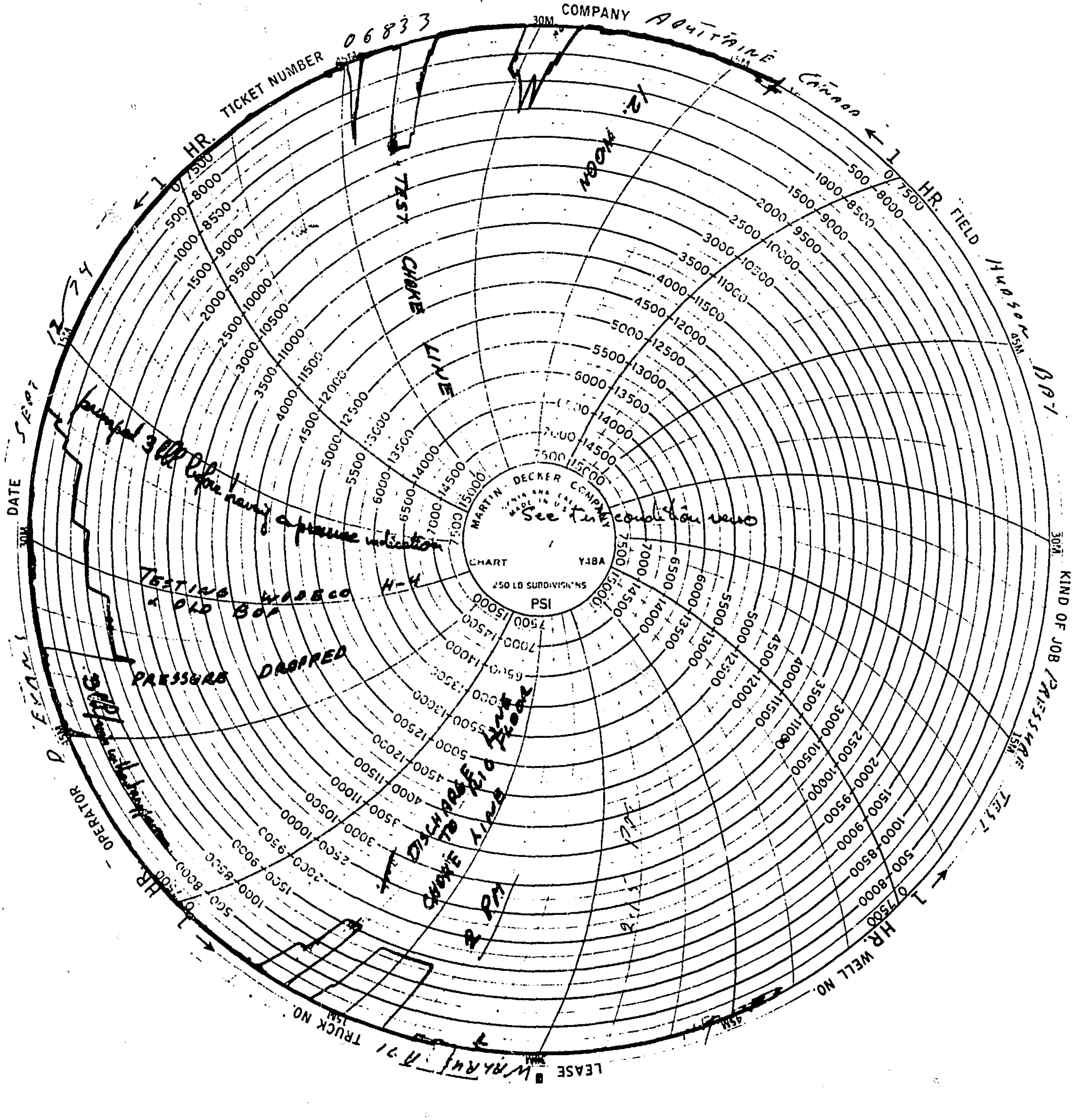

120048-20-3/4-2
VALVE
VETCO LOWER B.O.P. GUIDE FRAME ASSEMBLY NO.130075
20 3/4 x 16 3/4" ADAPTER
3" NOMINAL 5,000 M.S.P. VETCO KILL LINE CONNECTOR
UPPER B.O.P. GUIDE FRAME
3" NOMINAL 5,000 M.S.P. VETCO CHOKE LINE CONNECTOR
16-3/4"-5,000'M.S.P. VETCO TYPE H-4 HYDRAULIC CONN
KOOMEY POD BRACKET
MIDDLE B.O.P. GUIDE FRAME
16-3/4" 5,000 M.S.P. BAG TYPE BLOW-OUT PREVENTER
3" 5,000 M.S.P. HYDRAULICALLY OPERATED VALVE
SHUTTLE VALVE BRACKET
32
31
29
28'
27'
26'
25'
24'
23'
22'
21'
20'
19'
18'


ASSEMBLY NO
120048-20-3/4-2
C.I.W 90 ANGLE
VALVE
32'
31'
VETCO LOWER B.O.P.
GUIDE FRAME
ASSEMBLY NO.130075
29
$20^{3/4}$ x $16^{3/4}$"
ADAPTER
28'
3" NOMINAL 5,000 M S P VETCO
KILL LINE CONNECTOR
UPPER B.O.P.
GUIDE FRAME
27'
3" NOMINAL 5,000 M S P VETCO
CHOKE LINE CONNECTOR
26'
16-3/4"-5,000 M S P
VETCO TYPE H-4
HYDRAULIC CONN
25'
24'
KOOMEY POD
BRACKET
23'
22'
MIDDLE B.O.P.
GUIDE FRAME
21'
16-3/4" 5,000 M S P
BAG TYPE
BLOW-OUT
PREVENTER
20'
3" 5,000 M S P
HYDRAULICALLY
OPERATED VALVE
SHUTTLE VALVE
BRACKET
19'
18'


PREVENTER
SHUTTLE VALVE BRACKET
3" 5,000 M S P HYDRAULICALLY OPERATED VALVE
16-3/4" 5,000 M S P. DOUBLE RAM BLOW-OUT PREVENTER
3" 5,000 M S P. HYDRAULICALLY OPERATED VALVE
16-3/4" 5,000 M S P DOUBLE RAM BLOW-OUT PREVENTER
16-3/4" 5,000 M S P VETCO TYPE H-4 HYDRAULIC CONNECTOR
LOWER B O P GUIDE FRAME
16-3/4" x 9-5/8" VETCO SINGLE TRIP FLOW-BY CASING HANGER
16-3/4" TYPE III HOUSING
16 3/4" x 13 3/8" VETCO SINGLE TRIP CASING HANGER
16-3/4" x 9-5/8" WEAR BUSHING W/REPLACEABLE LINER
8-9/16 MIN. ID
30" HOUSING WITH
20'
19'
18'
17'
16'
15'
14'
13'
12'
11'
10'
9'
8'
7'



WALRUS A-71
20 3/4" STACK RUN ON
TOP OF 16 3/4" STACK



COMPANY Aquitaine Canada

TICKET NUMBER 06833

DATE Sept 12 74

FIELD Hudson Bay

KIND OF JOB Pressure Test

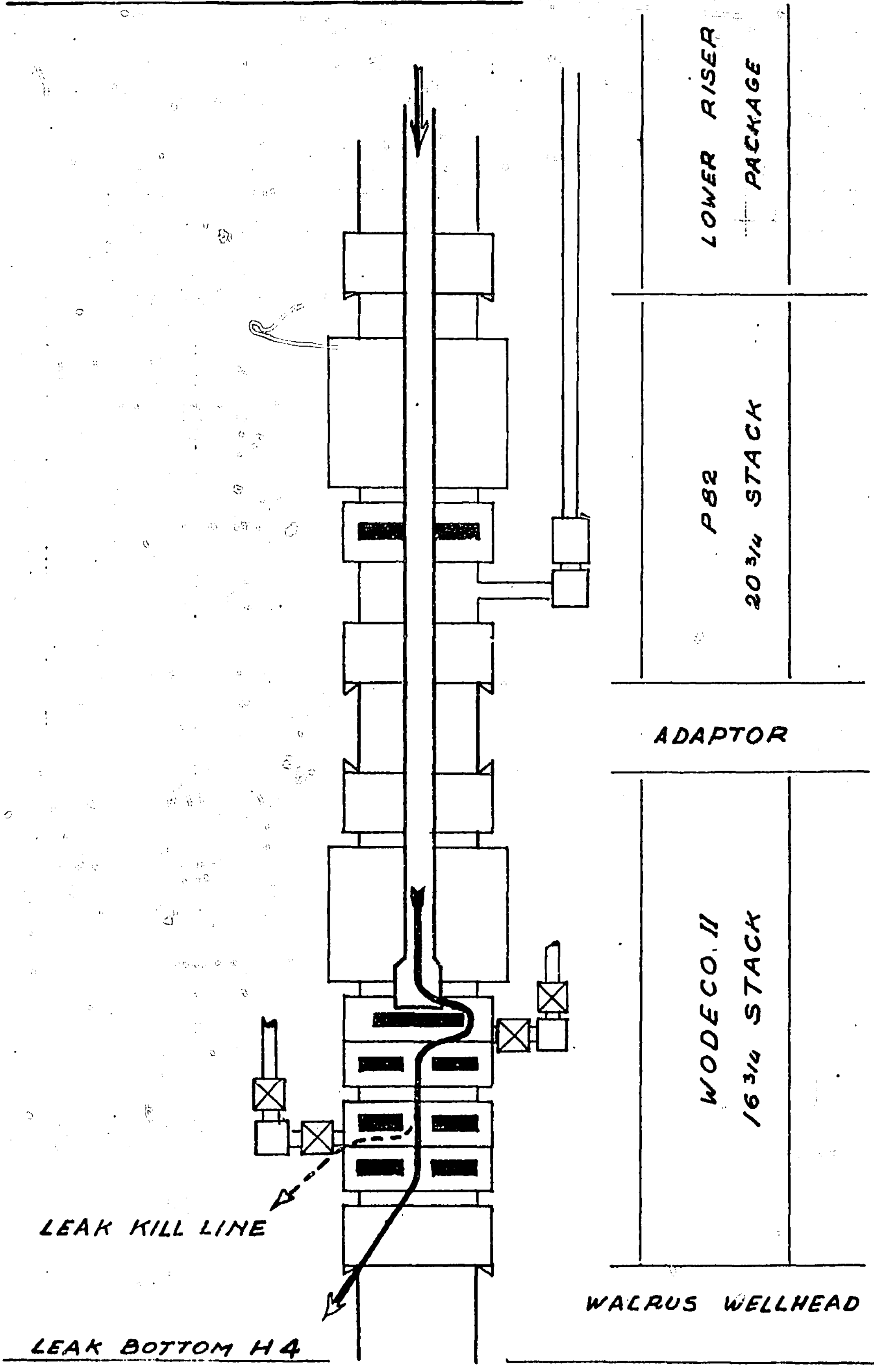
LEASE Walrus A-71

TRUCK NO.

WELL NO.

OPERATOR - D. Evans

## ADAPTOR PRESSURE TEST



# CEMENTING SERVICE REPORT

[illegible] PRINTED IN U.S.A.

| | | | |
|---|---|---|---|
| [illegible] 19-05-897 | [illegible] | [illegible] Edmonton 05 | [illegible] Sept.14/74 |

| | |
|---|---|
| WELL NAME AND NO. Walrus A-71 | LOCATION-POOL-FIELD |
| FORMATION | SERVICE ENGINEER D. Evans |
| COUNTY [illegible]son Bay | STATE Manitoba |

NAME Aquitaine Co. of Canada Ltd.
AND 540 -- 5th Ave. S.W.
ADDRESS Calgary, Alberta
T2P 0M4 ZIP CODE

SPECIAL INSTRUCTIONS
Run cement plug from 782' to 670' using 100 sacks of Class B cement.

PRESSURE LIMIT PSI | BUMP PLUG TO PSI MIN
☐ ROTATE RPM | ☐ RECIPROCATE FT | ☐ CENTRALIZERS NO

RIG NAME: Pentagon #82

## WELL DATA

| | | CASING | A | B | C | D |
|---|---|---|---|---|---|---|
| HOLE SIZE 12¼ | | | | | | |
| DEPTH 2959' | | SIZE-WEIGHT | 9-5/8 | | | |
| ☒ ROT | ☐ CABLE | LENGTH | | | | |
| BHST | | GRADE | | | | |
| BHLT | | THREAD | | | | |
| BHCT | | CAPACITY | | | | |

MUD: TYPE WT. VISC.

| SHOE FLOAT | | | STAGE TOOL | | |
|---|---|---|---|---|---|
| | TYPE | | | TYPE | |
| | DEPTH | | | DEPTH | |
| | TYPE | Baker | | TYPE | |
| | DEPTH | | | DEPTH | |

| ☐ TBG ☒ D.P. | HEAD & PLUGS | SQUEEZE JOB |
|---|---|---|
| SIZE 5" | ☐ DOUBLE | TOOL TYPE |
| WEIGHT 19.5 | ☐ SINGLE | TOOL DEPTH |
| GRADE | ☐ SWAGE | TAIL PIPE: IN. FT. |
| THREAD | ☐ KNOCKOFF | PERF INTERVAL FT. |
| ☐ NEW ☒ USED | TOP ☐ R ☐ W | TO |
| DEPTH | BOT ☐ R ☐ W | TO |
| CAPACITY | OTHER | TO |

| JOB SCHEDULED FOR | ARRIVED ON LOCATION | LEFT LOCATION |
|---|---|---|
| TIME: DATE: | TIME: DATE: | TIME: DATE: |

| TIME | PRESSURE TBG. OR D.P. | PRESSURE CASING | VOLUME PUMPED | INJECT. RATE | SERVICE LOG DETAIL |
|---|---|---|---|---|---|
| | | | | | Held pre-job safety meeting. |
| 0200 | 300 | | | | Pump water down drill pipe to establish circulation. |
| 0210 | 200 | | 10 | | Start water ahead of plug. |
| 0[illegible]4 | 175 | | | | Start to mix cement. |
| 0220 | 200 | | 30 | | End mix. |
| 0224 | 200 | | | | Start to displace cement plug with water. |
| 0230 | 0 | | 46 | | End displacement. |

REMARKS

| SYSTEM CODE | NO. OF SACKS | YIELD CU.FT/SK | COMPOSITION OF CEMENTING SYSTEMS | SLURRY MIXED VOL. | SLURRY MIXED WT. |
|---|---|---|---|---|---|
| I. | 100 | 1 | Oilwell Class B | 100 cu.ft. | 15.6 |
| II. | | | | | |
| III. | | | | | |

| | | |
|---|---|---|
| REA[illegible]N FLUID WT. | SACKS MIXED 100 PUMPED 100 | PRESSURE MAX: 300 MIN: 10 |
| ☐ HESITATION SQ. ☐ RUNNING SQ. | CIRCULATION LOST ☐ YES ☒ NO | CEMENT CIRCULATED TO SURF. ☐ YES ☒ NO |
| BREAKDOWN PSI FINAL PSI | | CEMENT LEFT IN PIPE: FT. |
| WASHED THRU ☐ YES ☐ NO TO FT | MEASURED ☒ DISPLACEMENT ☐ WIRELINE | ☐ AS PLANNED ☐ UNAVOIDABLE |
| TYPE OF WELL ☐ OIL ☐ STORAGE ☐ BRINE/WATER ☐ GAS ☐ INJECTION ☐ WILDCAT | CUSTOMER REPRESENTATIVE | DOES CUSTOMER CONSIDER SERVICE: ☐ SATISFACTORY ☐ UNSATISFACTORY ☐ UNKOWN |

# PHOTOS OF EQUIPMENT RECOVERED IN P-82 MOONPOOL

I. Recovery of Choke and Kill Lines

(Photo taken through the moon pool)

II. Disconnection of the Assembly of Stacks

- upper half = P-82 20-3/4 stack (lower H4)
- middle = 16-3/4 x 20-3/4 adaptor
- bottom = Wodeco 16-3/4 stack (upper H4)

III. Hydraulic Hoses Connected by Divers on the Upper H4 of the Wodeco 16-3/4 Stack

(Photo taken from the P-82 cellar deck)

IV. Aspect of Wodeco II Choke Line Cut with a Torch by Divers

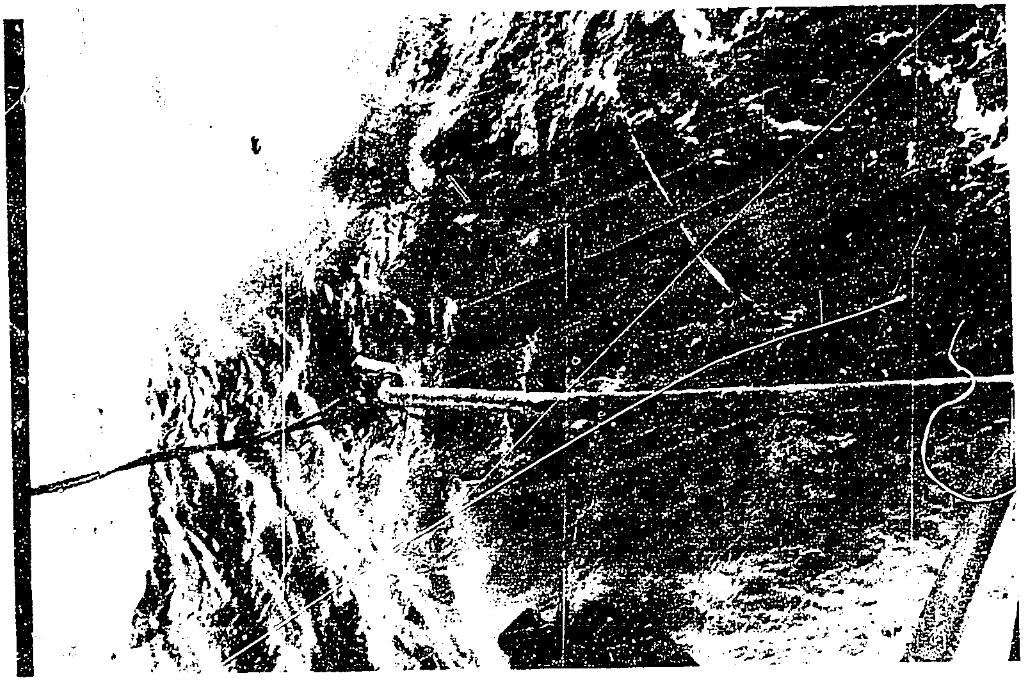
- upper half = P-82 20-3/4 stack (lower H4)
- lower half = 16-3/4 x 20-3/4 adaptor

V. Recovered Wodeco II Riser

Note how the left joint is bent. The bend was at the top of all the junk abandoned by the Wodeco II. The extremity (right side of the bend) was cut in the P-82 moonpool during the recovery process.

VI. Outlet of the Broken Choke Line on the Upper Wodeco BOP Shaffer

Note aspect of deposit on the left side of the outlet.



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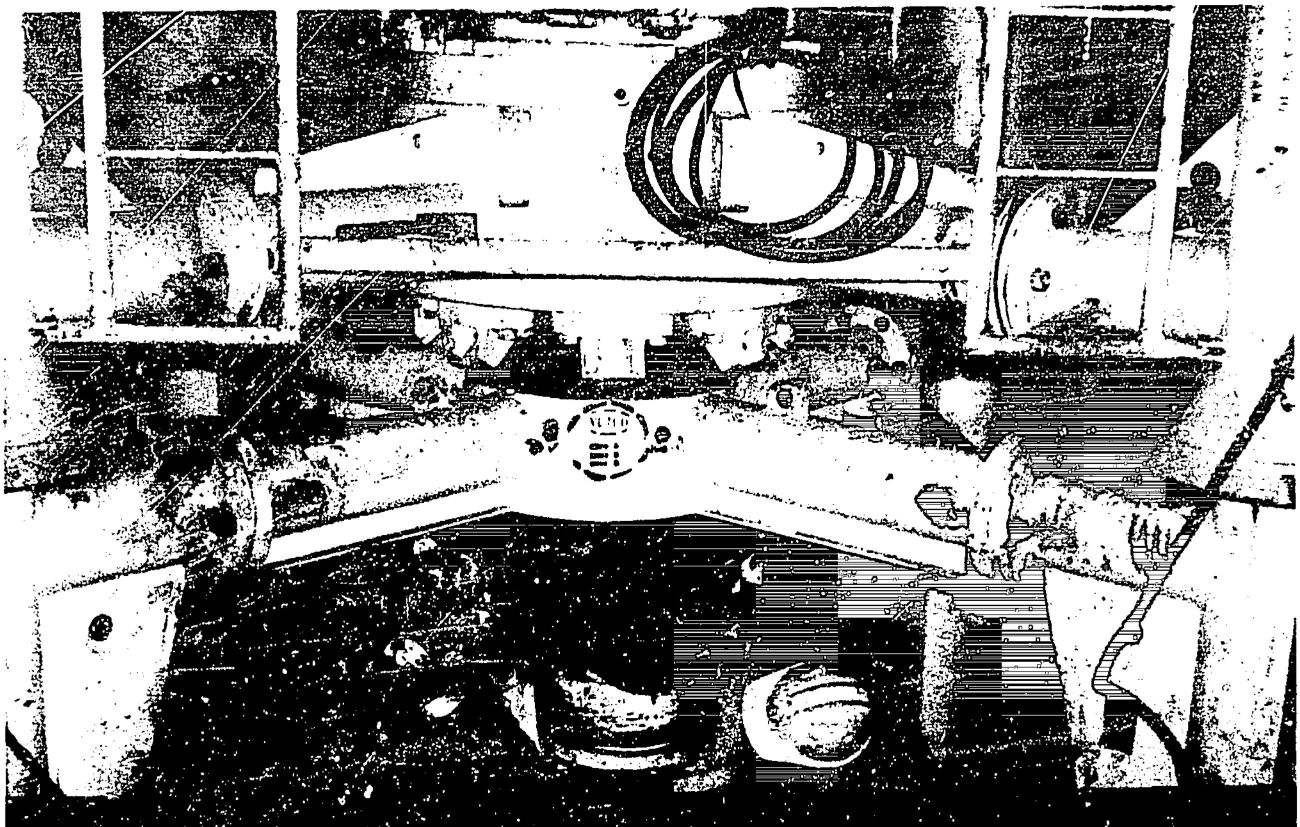
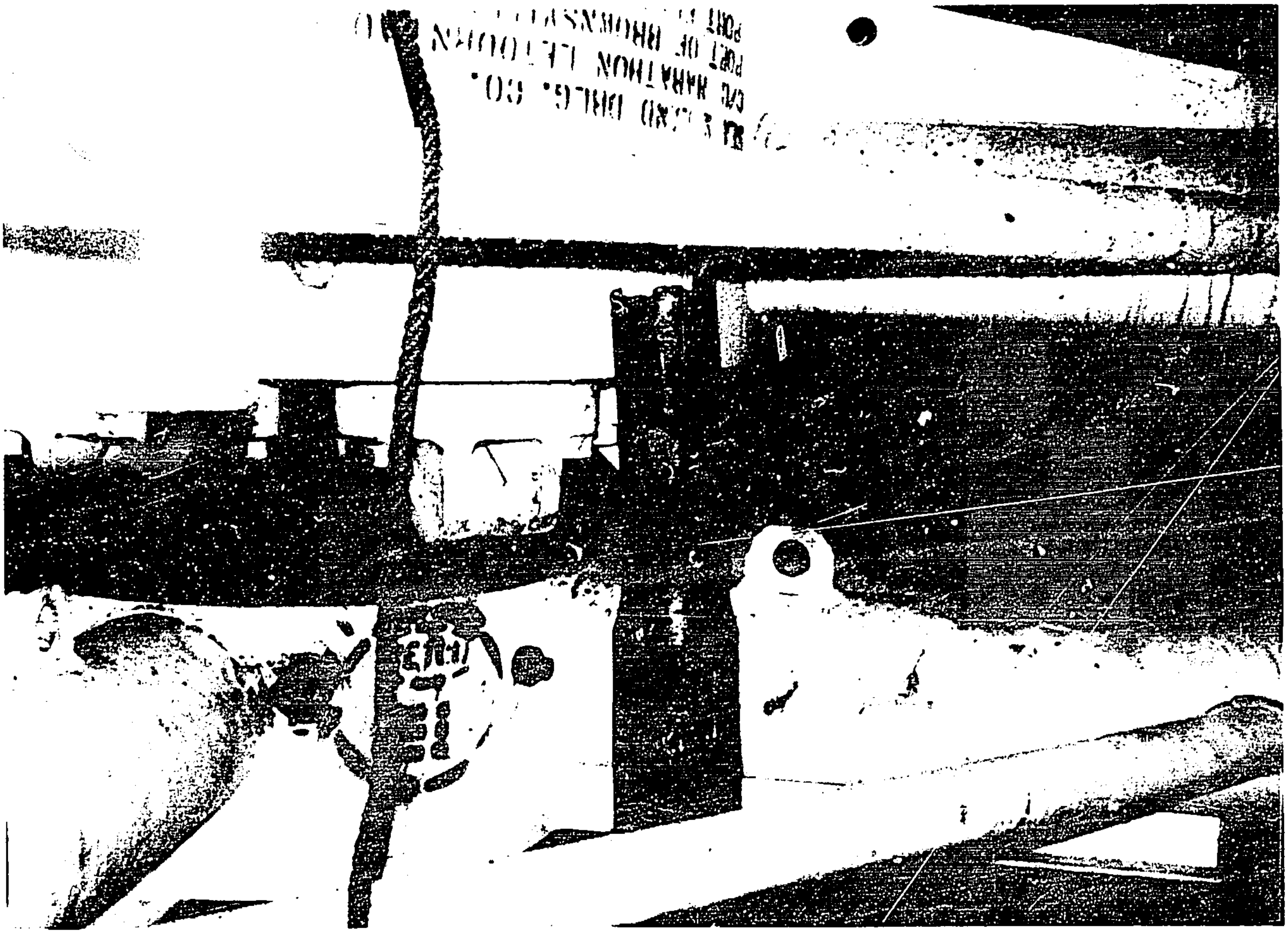


II

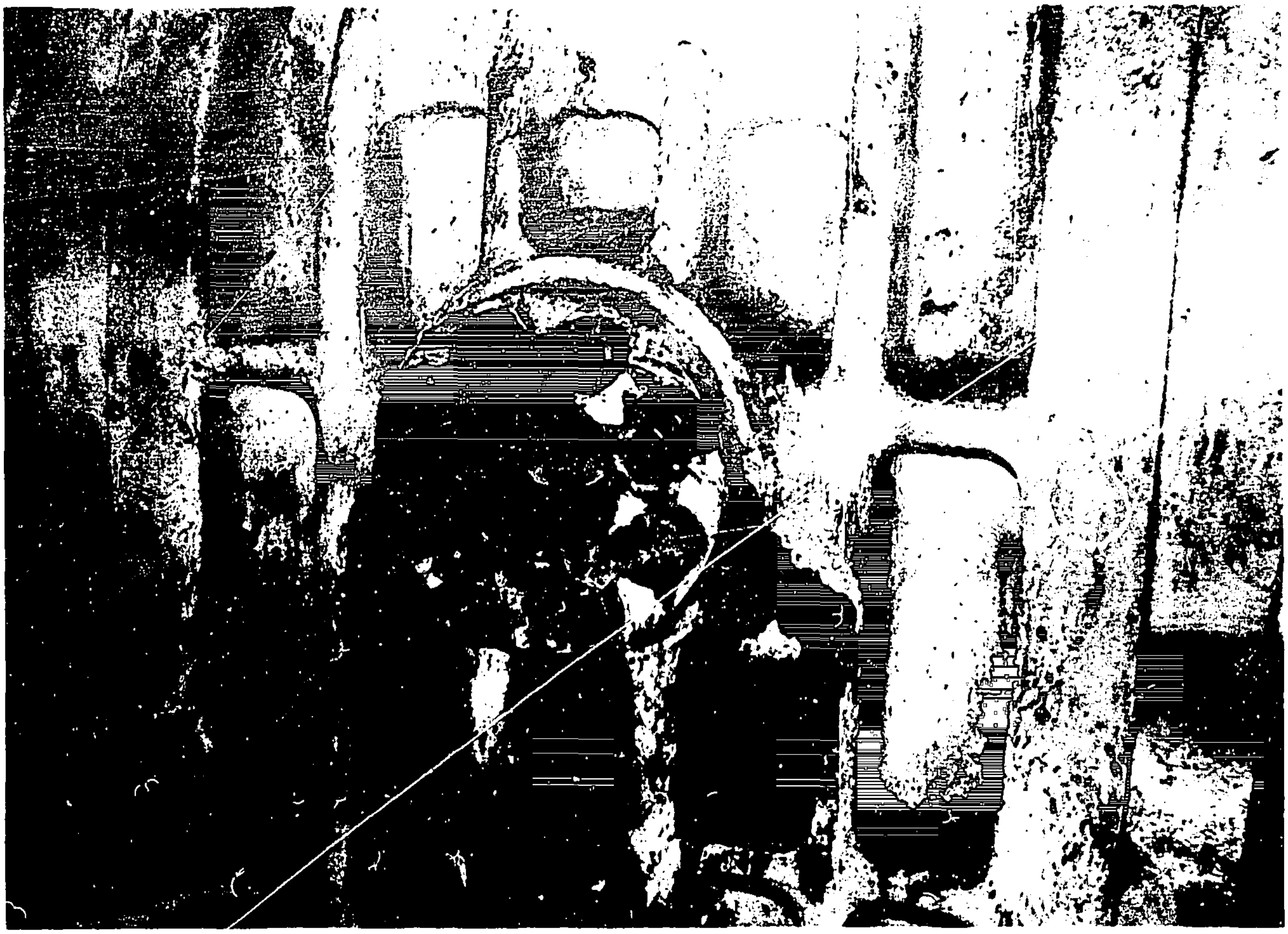
III



IV

V

VI



AQUITAINE COMPANY
OF CANADA LTD.

## ANALYSIS OF DEPOSIT

| DESCRIPTION | PERCENTAGE |
|---|---|
| Loss on ignition | 16.97 |
| $SO_4$ | 53.30 |
| Ca | 22.90 |
| $Fe_2 O_3$ | 3.70 |
| $Si O_2$ | 0.70 |
| Cl | 0.80 |
| $CO_2$ | 0.73 |
| Mg | Traces |
| K | Traces |
| Na | Traces |

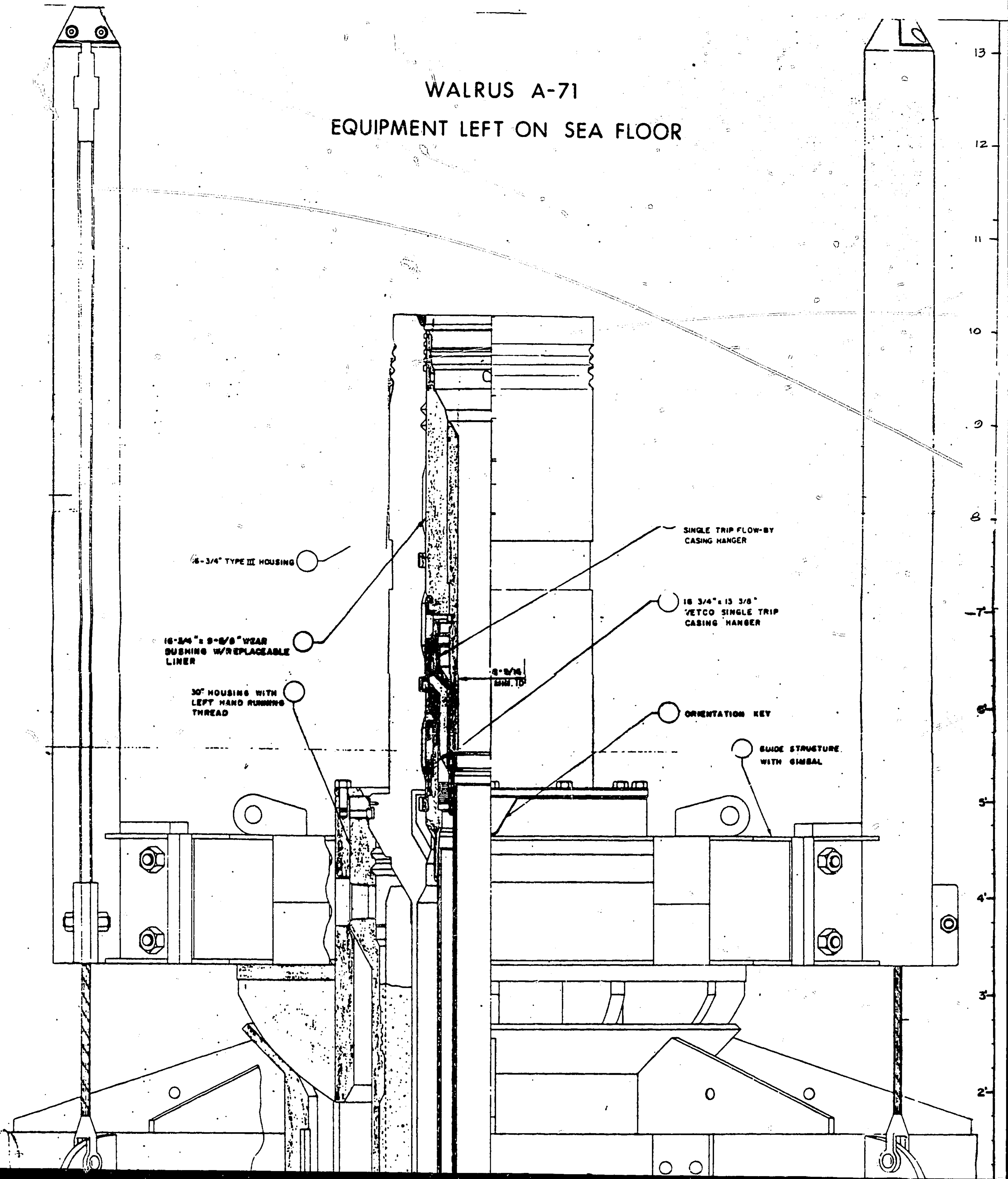
### Composition of Deposit

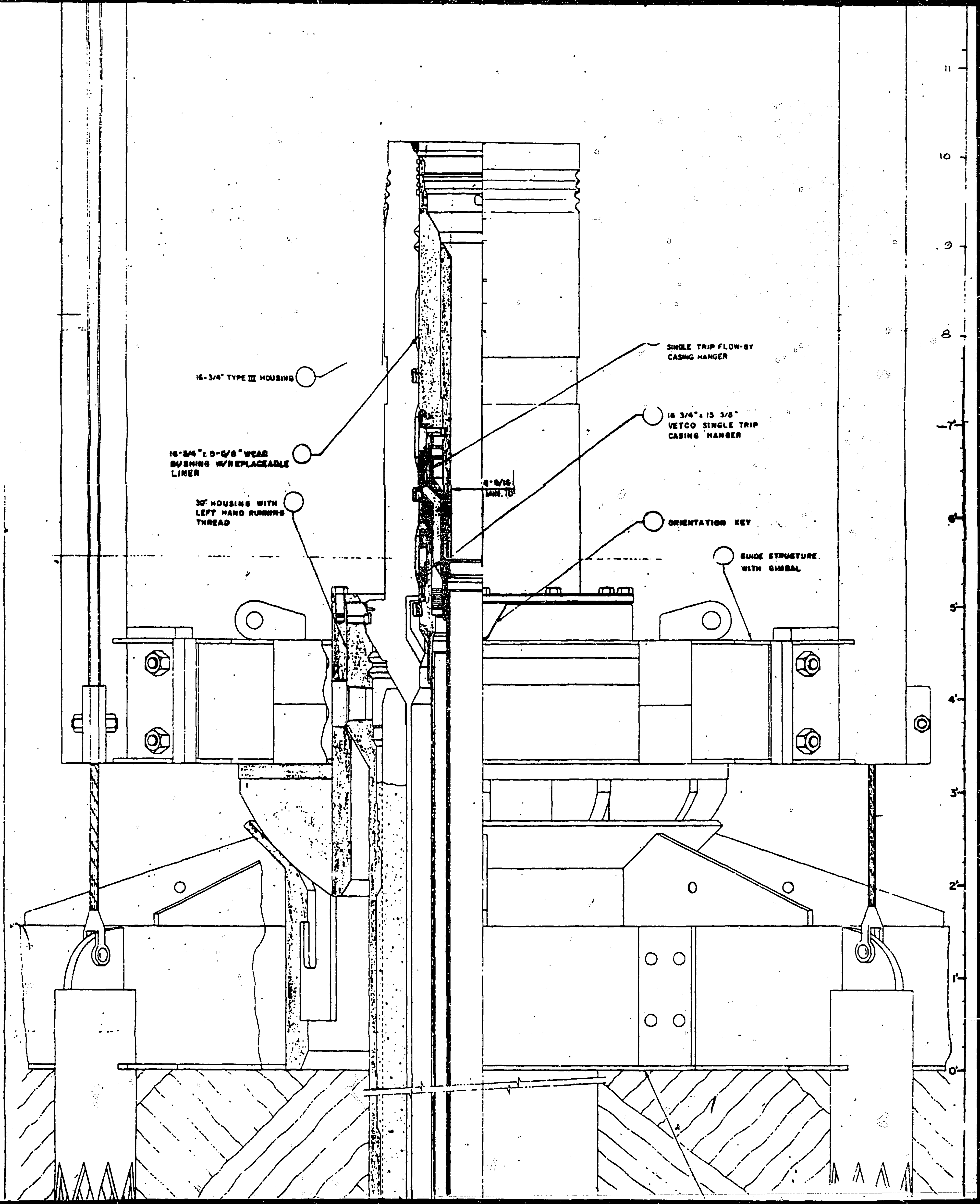
| | |
|---|---|
| $SO_4$ Ca - hydrated | 92.47% |
| $CO_3$ Ca | 1.66% |
| $Si O_2$ | 0.70% |
| $Fe_2 O_3$ | 3.70% |
| $Cl^-$ (linked to Mg-K-Na) | 0.80% |

### Conclusions

- Deposit is mainly Calcium Sulfate.
- The formation Calcium Chloride water reacts with the sulfates contained in the sea water and calcium sulfate precipitates.

# WALRUS A-71
## EQUIPMENT LEFT ON SEA FLOOR




16-3/4" TYPE III HOUSING
16-3/4" x 9-5/8" WEAR BUSHING W/REPLACEABLE LINER
30" HOUSING WITH LEFT HAND RUNNING THREAD
SINGLE TRIP FLOW-BY CASING HANGER
16 3/4" x 13 3/8" VETCO SINGLE TRIP CASING HANGER
8-9/16 MIN. ID
ORIENTATION KEY
GUIDE STRUCTURE WITH GIMBAL
11
10
9
8
7'
6'
5'
4'
3'
2'
1'
0'

# CEMENTING SERVICE REPORT

041-406-H PRINTED IN U.S.A.

TREATMENT NUMBER 19-05-897

PAGE

SERVICE STATION Edmonton 05

DATE Sept.14/74

WELL NAME AND NO. Walrus A-71

LOCATION-POOL-FIELD

FORMATION

SERVICE ENGINEER D. Evans

COUNTY [illegible]son Bay

STATE Manitoba

NAME AND ADDRESS
Aquitaine Co. of Canada Ltd.
540 -- 5th Ave. S.W.
Calgary, Alberta
T2P 0M4 ZIP CODE

SPECIAL INSTRUCTIONS
Run cement plug from 782' to 670' using 100 sacks of Class B cement.

PRESSURE LIMIT PSI | BUMP PLUG TO PSI MIN

☐ ROTATE RPM | ☐ RECIPROCATE FT | ☐ CENTRALIZERS NO

RIG NAME: Pentagon #82

## WELL DATA

| | | CASING | A | B | C | D |
|---|---|---|---|---|---|---|
| HOLE SIZE | 12¼ | SIZE-WEIGHT | 9-5/8 | | | |
| DEPTH | 2959' | LENGTH | | | | |
| ☒ ROT | ☐ CABLE | GRADE | | | | |
| BHST | | THREAD | | | | |
| BHLT | | CAPACITY | | | | |
| BHCT | | | | | | |

MUD: TYPE WT. VISC.

| SHOE / FLOAT | | STAGE TOOL | |
|---|---|---|---|
| TYPE | | TYPE | |
| DEPTH | | DEPTH | |
| TYPE | Baker | TYPE | |
| DEPTH | | DEPTH | |

| ☐ TBG ☒ D.P. | | HEAD & PLUGS | SQUEEZE JOB | | |
|---|---|---|---|---|---|
| SIZE | 5" | ☐ DOUBLE | TOOL TYPE | | |
| WEIGHT | 19.5 | ☐ SINGLE | TOOL DEPTH | | |
| GRADE | | ☐ SWAGE | TAIL PIPE: | IN. | FT. |
| THREAD | | ☐ KNOCKOFF | PERF INTERVAL | | FT. |
| ☐ NEW | ☒ USED | TOP ☐ R ☐ W | | TO | |
| DEPTH | | BOT ☐ R ☐ W | | TO | |
| CAPACITY | | OTHER | | TO | |

JOB SCHEDULED FOR TIME: DATE:

ARRIVED ON LOCATION TIME: DATE:

LEFT LOCATION TIME: DATE:

| TIME | PRESSURE TBG. OR D.P. | PRESSURE CASING | VOLUME PUMPED | INJECT. RATE | SERVICE LOG DETAIL |
|---|---|---|---|---|---|
| | | | | | Held pre-job safety meeting. |
| 0200 | 300 | | | | Pump water down drill pipe to establish circulation. |
| 0210 | 200 | | 10 | | Start water ahead of plug. |
| [illegible]4 | 175 | | | | Start to mix cement. |
| 0220 | 200 | | 30 | | End mix. |
| 0224 | 200 | | | | Start to displace cement plug with water. |
| 0230 | 0 | | 46 | | End displacement. |

REMARKS

| SYSTEM CODE | NO. OF SACKS | YIELD CU.FT/SK | COMPOSITION OF CEMENTING SYSTEMS | SLURRY MIXED VOL. | SLURRY MIXED WT. |
|---|---|---|---|---|---|
| I. | 100 | 1 | Oilwell Class B | 100 cu.ft. | |
| II. | | | | | 15.6 |
| III. | | | | | |

BREA[illegible]N FLUID WT.

☐ HESITATION SQ. ☐ RUNNING SQ.

BREAKDOWN PSI | FINAL PSI

WASHED THRU ☐ YES ☐ NO | TO FT

TYPE OF WELL ☐ OIL ☐ STORAGE ☐ BRINE/WATER ☐ GAS ☐ INJECTION ☐ WILDCAT

SACKS MIXED 100 PUMPED 100

CIRCULATION LOST ☐ YES ☒ NO

MEASURED ☒ DISPLACEMENT ☐ WIRELINE

CUSTOMER REPRESENTATIVE

PRESSURE MAX: 300 MIN: 10

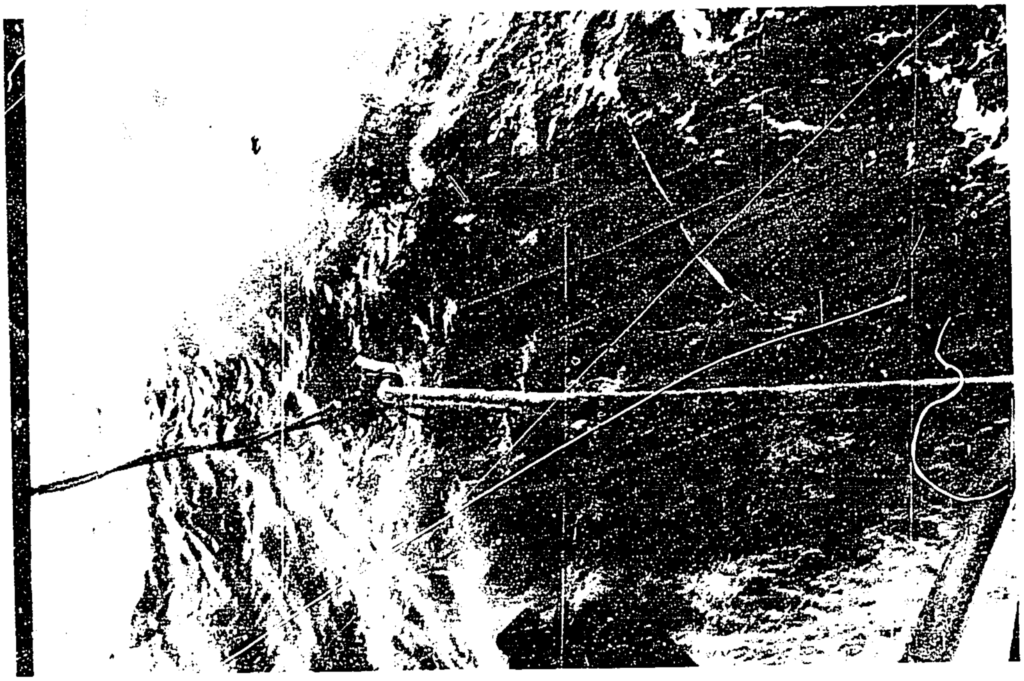
CEMENT CIRCULATED TO SURF. ☐ YES ☒ NO

CEMENT LEFT IN PIPE: FT.

☐ AS PLANNED ☐ UNAVOIDABLE

DOES CUSTOMER CONSIDER SERVICE:

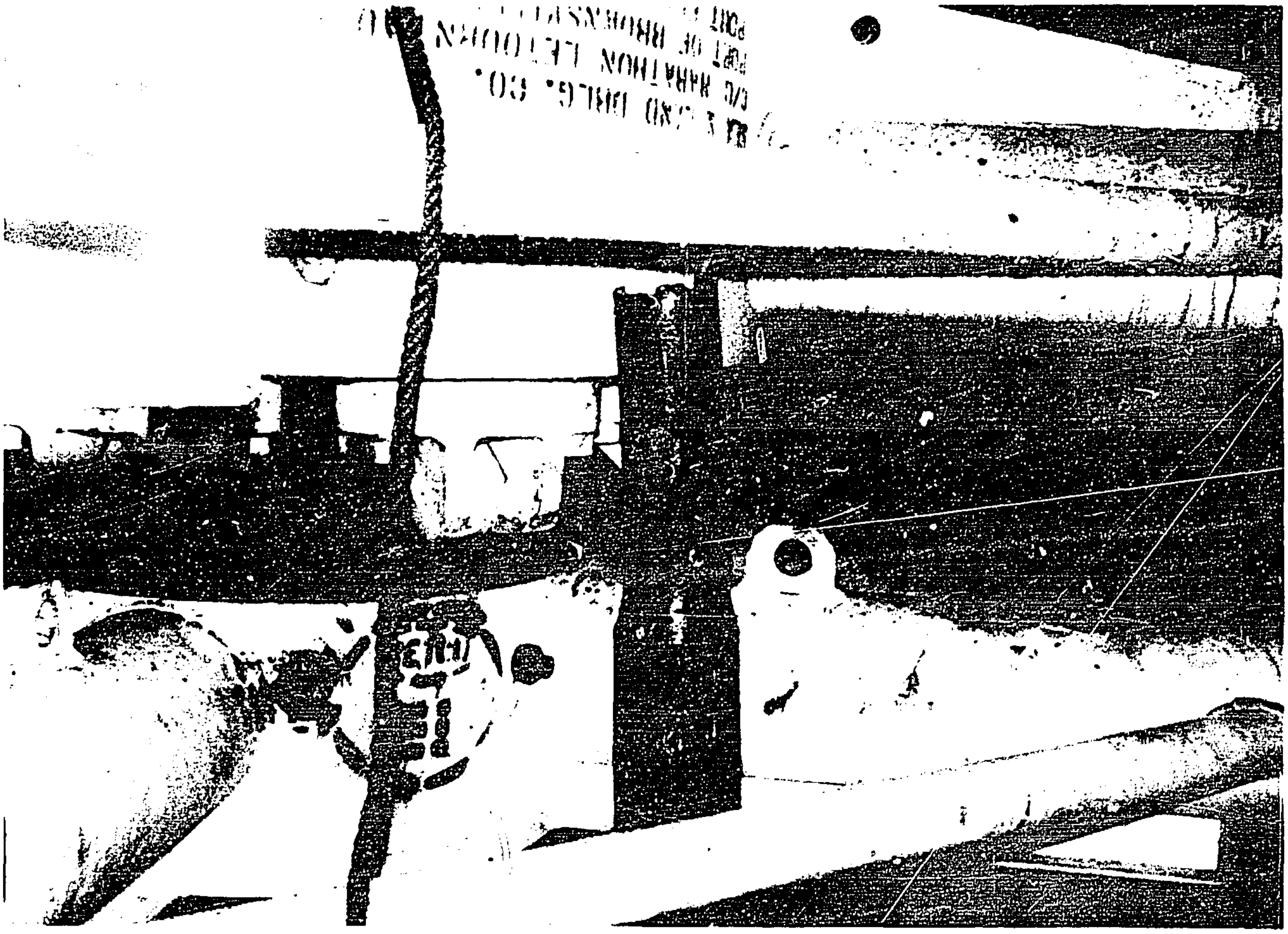
☐ SATISFACTORY ☐ UNSATISFACTORY ☐ UNKOWN



I

II

III



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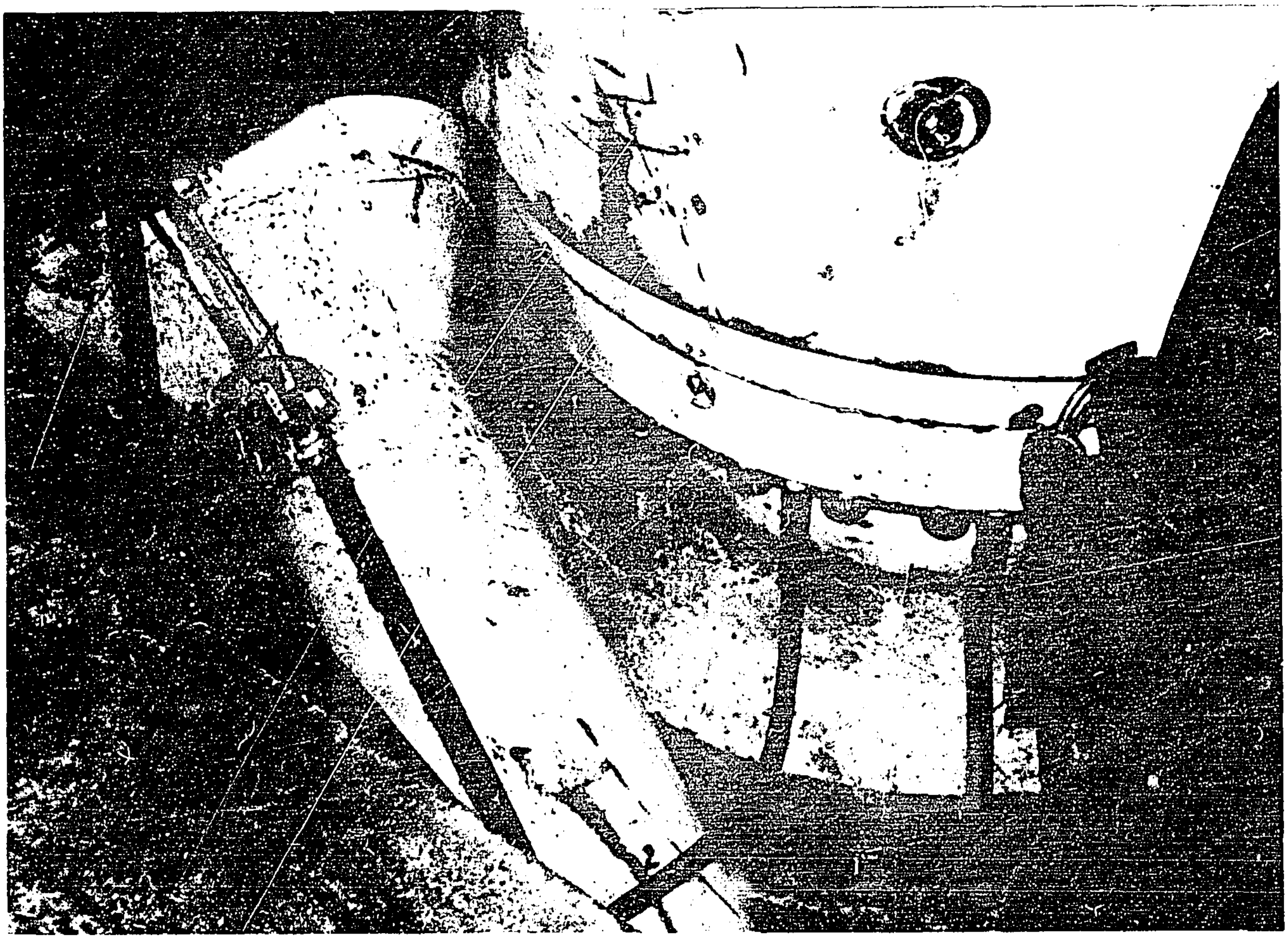

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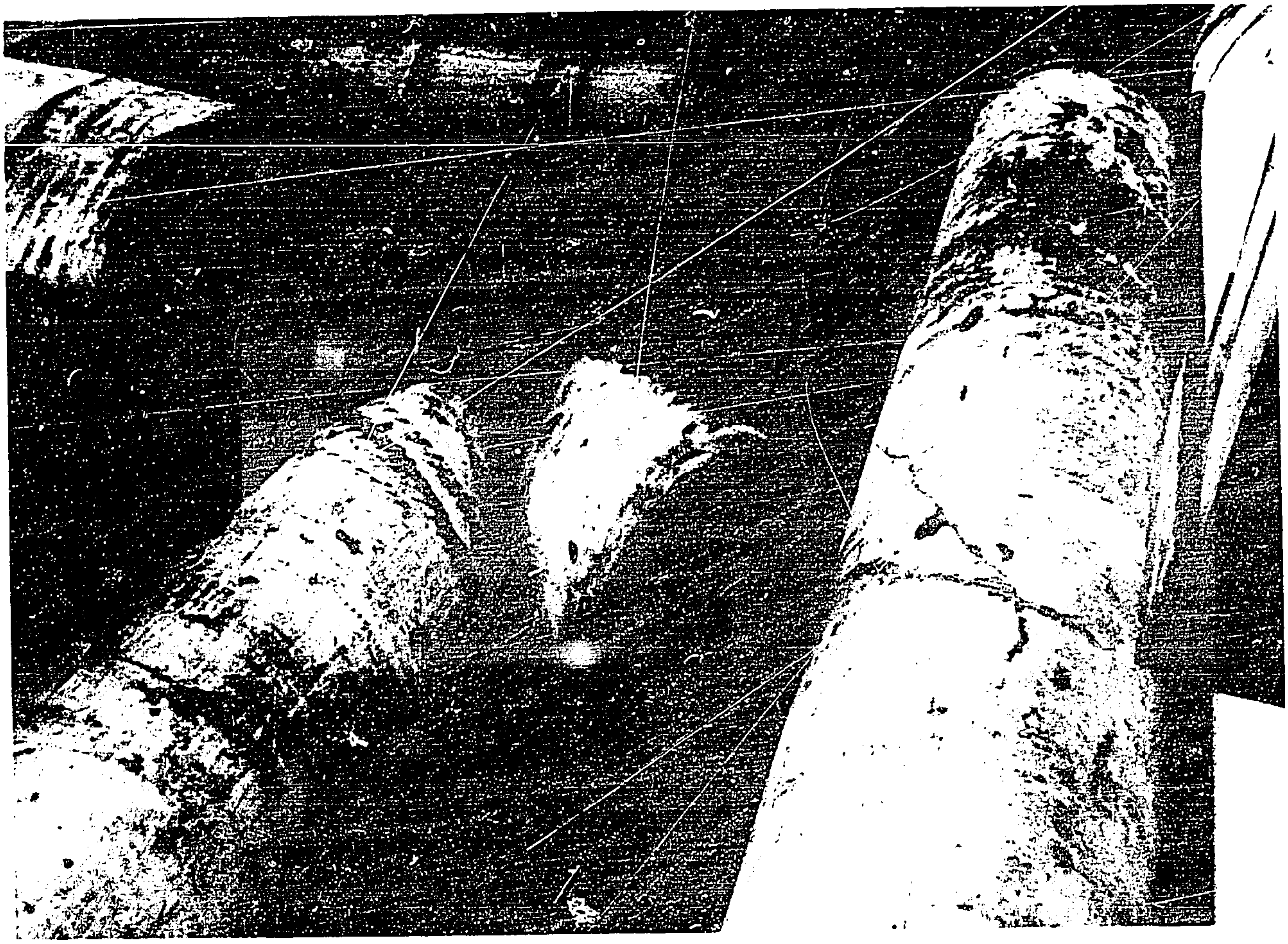

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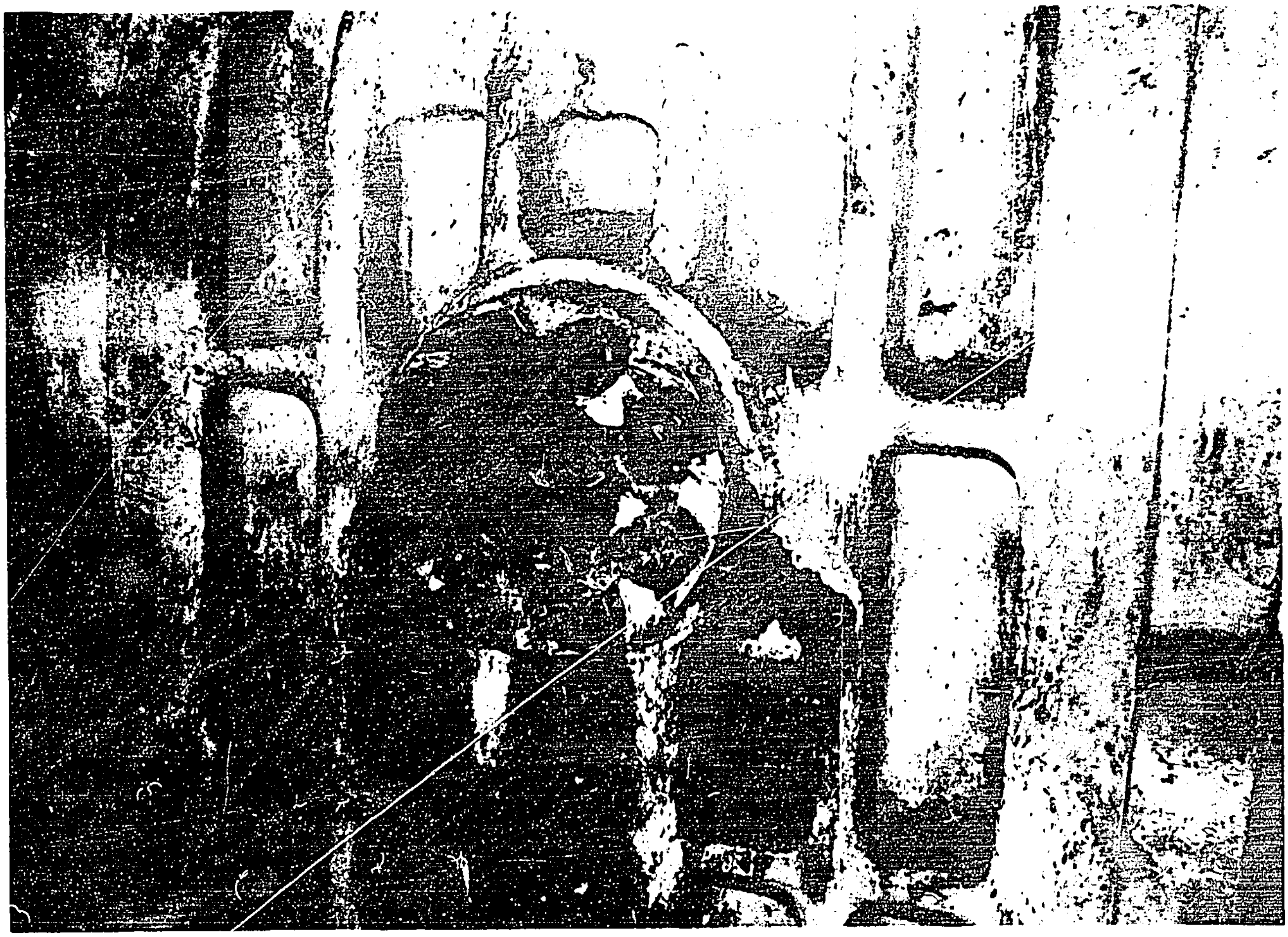


# AQUITAINE ET AL HUDSON WALRUS A-71

8710-A11-2-1

Copy for well file

CANADA

~~East Coast~~
Hudson Bay
~~West Coast~~

DEPARTMENT OF ENERGY, MINES AND RESOURCES
RESOURCE ADMINISTRATION DIVISION

# Offshore Drilling Notice

**(Excluding the Arctic)**

This Notice is submitted in compliance with Section 52 of the "Canada Oil and Gas Land Regulations". Its approval constitutes the requisite authority to commence drilling operations under Section 4 of the "Canada Oil and Gas Drilling and Production Regulations".

**Well Information**

Well Name in full: AQUITAINE ET AL HUDSON WALRUS A-71

Operator: AQUITAINE COMPANY OF CANADA LTD. Exploratory Licence No. 104

Contractor: WESTERN OFFSHORE DRILLING AND EXPLORATION CO. Water Permit or Lease No. W 1427

Drilling Rig or Unit: Western Offshore No. II Estimated Well Cost: $5,200,000

Location: Unit A Section 71 Grid Area: 58°40' - 87°00'

Coordinates: Lat. 58°30'02" 470 N Long. 87°10'51" 835 W

Elevation: RT/KB 33/34 feet Water Depth: 600 feet approximately

Approx. Spud Date: August 1, 1969 Estimated Time on Location: 45 days

Anticipated Total Depth: 6,000 feet subsea more or less

Potentially Productive Intervals:

| Age | Name | Lithology | Top | Thickness |
|---|---|---|---|---|
| Unknown | Unknown | Unknown | Unknown | Unknown |

Casing and Cement Program:

| Name of String | O.D. | Weight/Ft. | Grade | (Subsea) Depth Set | Sacks Cement (87.5 lbs. each) |
|---|---|---|---|---|---|
| Conductor Pipe | 30" | 320 lbs. | A53B | 750 ft. | 660 |
| Surface String | 20" | 131 lbs. | X52 | 1,100 ft. | 1,382 |
| Second String | 13"3/8 | 61 lbs. | J55 | 2,500 ft. | 1,782 |
| Third String | 9"5/8 | 40 lbs. | N80 | 5,600 ft. | 1,005 |
| Reserve String | 7" | 29 lbs. | N80 | Unknown | 400 |

B.O.P. Equipment: B.O.P. stack all 16 3/4 inch 5,000 PSI, from top: Hydril, Shaffer complete shut off, 3 1/2 inch drill pipe rams, 5 inch drill pipe rams, 5 inch drill pipe rams.

Well Supervisor: Pierre ALLIBAUD Title: Operations Superintendent

Address: c/o Aquitaine Company of Canada Ltd., 1300 Calgary House, 550 Sixth Avenue, S.W., Calgary 1, Alberta Phone 263-3916

AAPG Well Classification:

- New-field wildcat ☒
- New-pool wildcat ☐
- Shallow-pool test ☐
- Deeper-pool test ☐
- Outpost well ☐

Other Information:

Field Office: P. Allibaud, Aquitaine Company of Canada Ltd.,
c/o Western Offshore Drilling and Exploration Co.
P.O. Box 178, Churchill, Manitoba
Phone: Telex:

Signed: Title: Hudson Bay District Manager

Date: June 3 1969 Company: Aquitaine Company of Canada Ltd.

**Notes**

1. This Notice and a location plan should be submitted in triplicate for each well.
2. All Notices should be addressed to the Chief, Resource Administration Division, Department of Energy, Mines and Resources, Ottawa. One copy will be returned to the Company.
3. Certain other Government agencies must be informed of this operation prior to its commencement and of any significant changes to it. The Resource Administration Division may be contacted for advice in this regard.

APPROVED
JUN 12 1969
Resource Administration Division

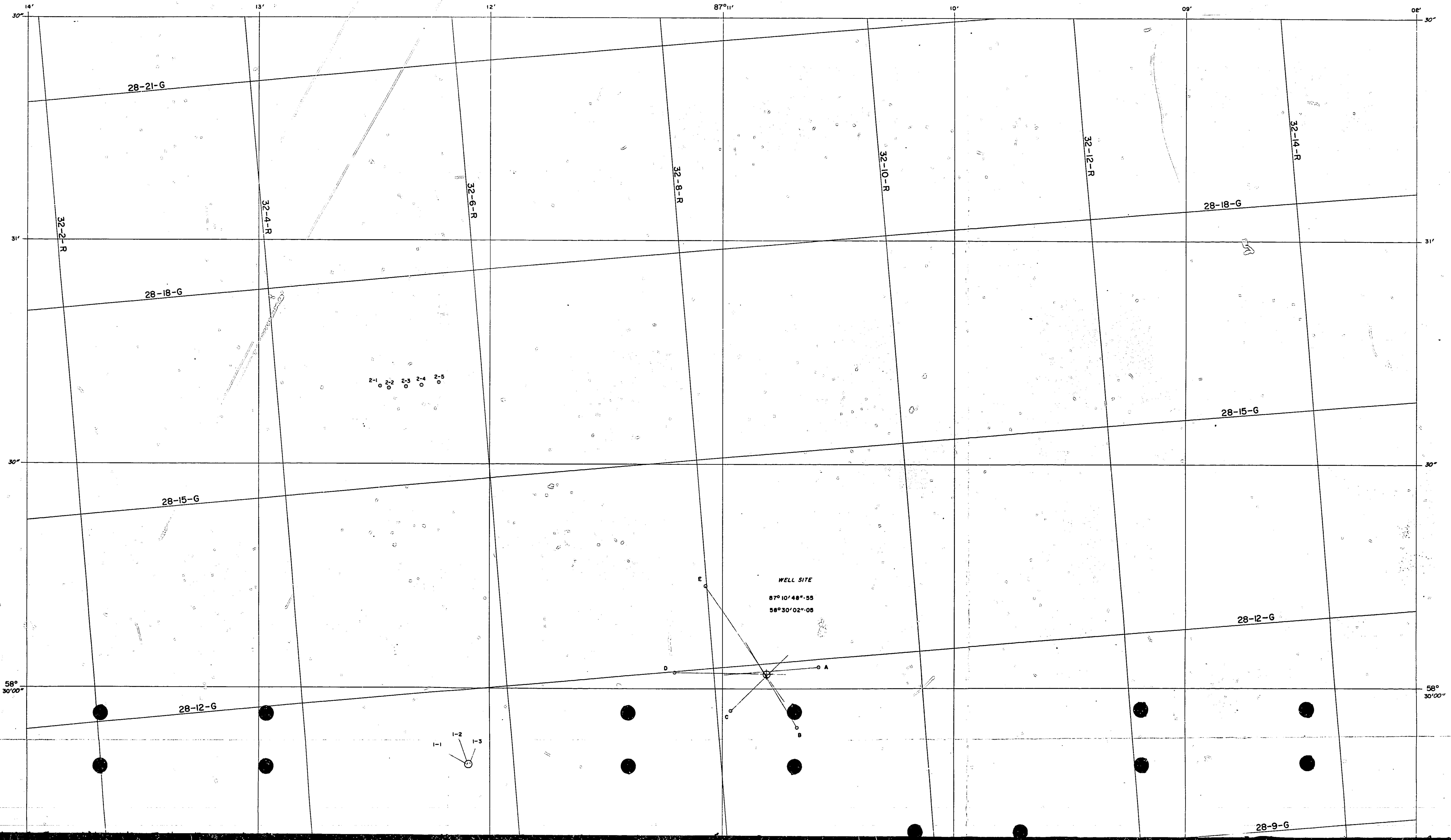
M.B.

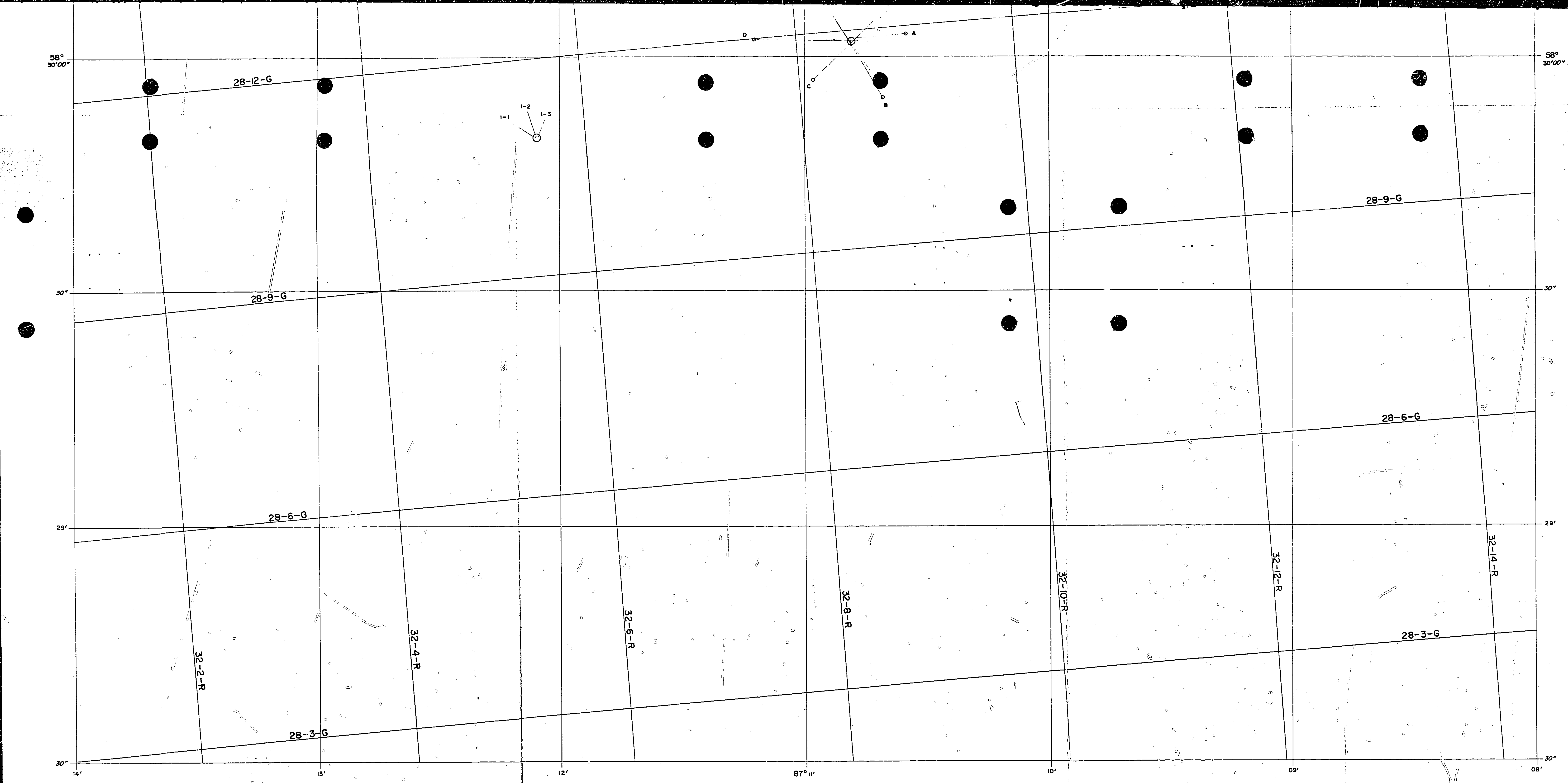
Approval
CHIEF, RESOURCE ADMINISTRATION DIVISION

File No. 971-278 Project No. 278-HB-11-69-1

DRILLING AUTHORITY EMR# 21

1 of

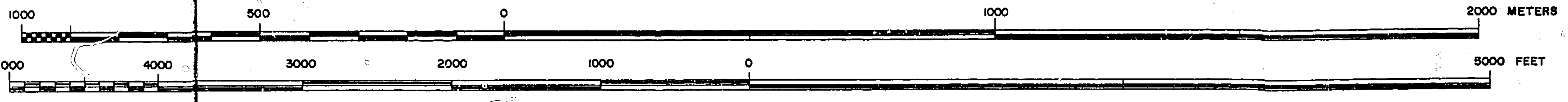

14'
13'
12'
87°11'
10'
09'
08'
30"
31'
30"
58°
30'00"
28-21-G
28-18-G
28-15-G
28-12-G
28-9-G
32-2-R
32-4-R
32-6-R
32-8-R
32-10-R
32-12-R
32-14-R
2-1
2-2
2-3
2-4
2-5
WELL SITE
87°10'48".55
58°30'02".08
A
B
C
D
E
1-1
1-2
1-3



# DECCA LAMBDA PLOTTING SHEET

SCALE 1:10,000

POLYCONIC PROJECTION



AQUITAINE COMPANY OF CANADA
HUDSON BAY
WELL SITE # 1

2 of 2

CANADA

East Coast ☐
Hudson Bay – Hudson Strait ☒
West Coast ☐

DEPARTMENT OF ENERGY, MINES AND RESOURCES
RESOURCE ADMINISTRATION DIVISION

# Offshore Well Abandonment Program

(Excluding Arctic)

This program is submitted in triplicate with respect to Sections 15 and 19 of the Canada Oil and Gas Drilling and Production Regulations. All depths referenced to ~~Rotary Table (RT)~~ Kelly Bushing KB elevation at Mean Local Low Water (MLLW)

## Well Data

Well Name in Full: AQUITAINE ET AL HUDSON WALRUS A-71 Grid Area: 58°40'-87°00

Drilling Authority: EMR # 21 Field/Pool: Exploratory

Permit or Lease No. W 1427 Elevations: RT: 31 Sea floor: 587'

Final Coordinates: Lat. 58°30' 02.05"N Long 87°10'48.55"W

Date Spudded: August 7, 1969 Date Drilling Terminated: October 14, 1969

Date Rig Released: October 18, 1969 Total Depth: 3926'

Casing Record: (Additional space on back of form, if needed)

| O.D. | Weight: | Grade: | Depth Set: | Cement and Additives: |
|---|---|---|---|---|
| 30" | 1" wall | - | 772' KB | Class G 1000 US sacks W/3% $CaCl_2$ |
| 20" | 0.625 | - | 1106' | Class G 1250 US sacks W/4% $CaCl_2$ |
| 13 3/8" | 61 # | J-55 | 1975' | Class G 1170 US sacks |
| 9 5/8" | 41 # | N-80 | 2960' | Class G 936 US sacks |

Permeable Intervals: (Additional space on back of form, if needed).

| Interval: | Age/Name: | Oil, Gas and Water Encountered: | Test No. |
|---|---|---|---|
| 1440-1470 | Devonian | None | None |
| 2540-2560 | Devonian | $CaCl_2$ water with dissolved methane | None |
| 2800-3175 | Not identified | Scattered porosity - $CaCl_2$ water with dissolved methane | None (see back of form) |

Perforation, Stimulation, Testing and Evaluation Programs: job details to be given on the back of the form.

## Plugging Program

Oral approval of the following program was obtained by (person) .................... of (company) .................... from (person) .................... in the Resource Administration Division by means of .................... at .......... hrs. on .......... 19....

Plug No. Interval: Type of Plug: Cement and Additives: Felt? Date and Hour Run:

Due to very severe weather conditions, the connection between the drilling vessel and the well was lost on October 16, 1969. Because of severe damage to the equipment and the necessity to leave the Bay before the Straits were closed by ice, it was impossible to resume operations and plug the well in a conventional manner. The BOP equipped with blind rams and the choke and kill lines have been closed. (See attached report for additional details on the status of the well).

Additional information, including any variations to the original program dictated by on-the-job considerations, to be given on the back of the form.

## Certification

I certify that the abandonment or suspension program was carried out in full in accordance with good offshore oil and gas field practices:

Signed P. Chaloupy P. Eng. Title: Production Manager

Date January 2nd, 1970 Company: Aquitaine Company of Canada Ltd

## Acknowledgement

M. Bell 16.1.70

RESOURCE ADMINISTRATION DIVISION

Receipt of this completed form in no way absolves the permittee of record at the time of drilling from responsibility for an abandonment or suspension program should it prove to be inadequate.

See Reverse Side

## Additional Information

Casing and Cementing Record:

Permeable Intervals:

| | | | |
|---|---|---|---|
| 3444-3770 | Not identified | Scattered porosity - water bearing according to logs. | None |
| 3857-3926 | Not identified | Scattered porosity - water bearing according to logs -fluorescence. | None |

Perforation, Stimulation, Testing and Evaluation Jobs:

Other Information:
(To include variations to the original, orally approved program dictated by on-the-job considerations).

Report No. MP1 TTU 1970

One fossil lot from the Aquitaine Hudson Walrus A-71 well (58°30'0.29"N, 87°10'48.75"W). core #4; submitted by S. Rueff, Aquitaine Company of Canada Ltd. (NTS-44L).

"The relevant parts of any manuscript prepared for publication that paraphrase or quote from this report should be referred to the Palaeontology Section, Ottawa, for possible revision."

## Identifications

Footage: 3917'-3922' GSC loc. no. C-4319

Conodonts:

Ozarkodina sp. (a fragmentary specimen, resembling O. adiutricis Walliser)

Panderodus sp.
Trichonodella spp.

Remarks: All seven conodonts recovered are fragmentary. A single specimen resembles Ozarkodina adiutricis Walliser, but is not sufficiently complete to allow any definite assignment. O. adiutricis is an index species of the Neospathognathodus celloni assemblage zone, of lower Upper Llandovery age (C1-C3).

Wt. of sample dissolved = 1400 g.

Uyeno
T.T. Uyeno

Geological Survey of Canada,
Western Paleontology Section,
Ottawa, January 8, 1970.

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# Well Report

# AQUITAINE ET AL. HUDSON WALRUS A-71

AQUITAINE COMPANY OF CANADA LTD.

Calgary, Alberta.

December, 1969.

CONSERVATION ENGINEER
Resource Administration Div.
JAN 26 1970
OTTAWA, CANADA
DEPT. OF ENERGY, MINES & RESOURCES

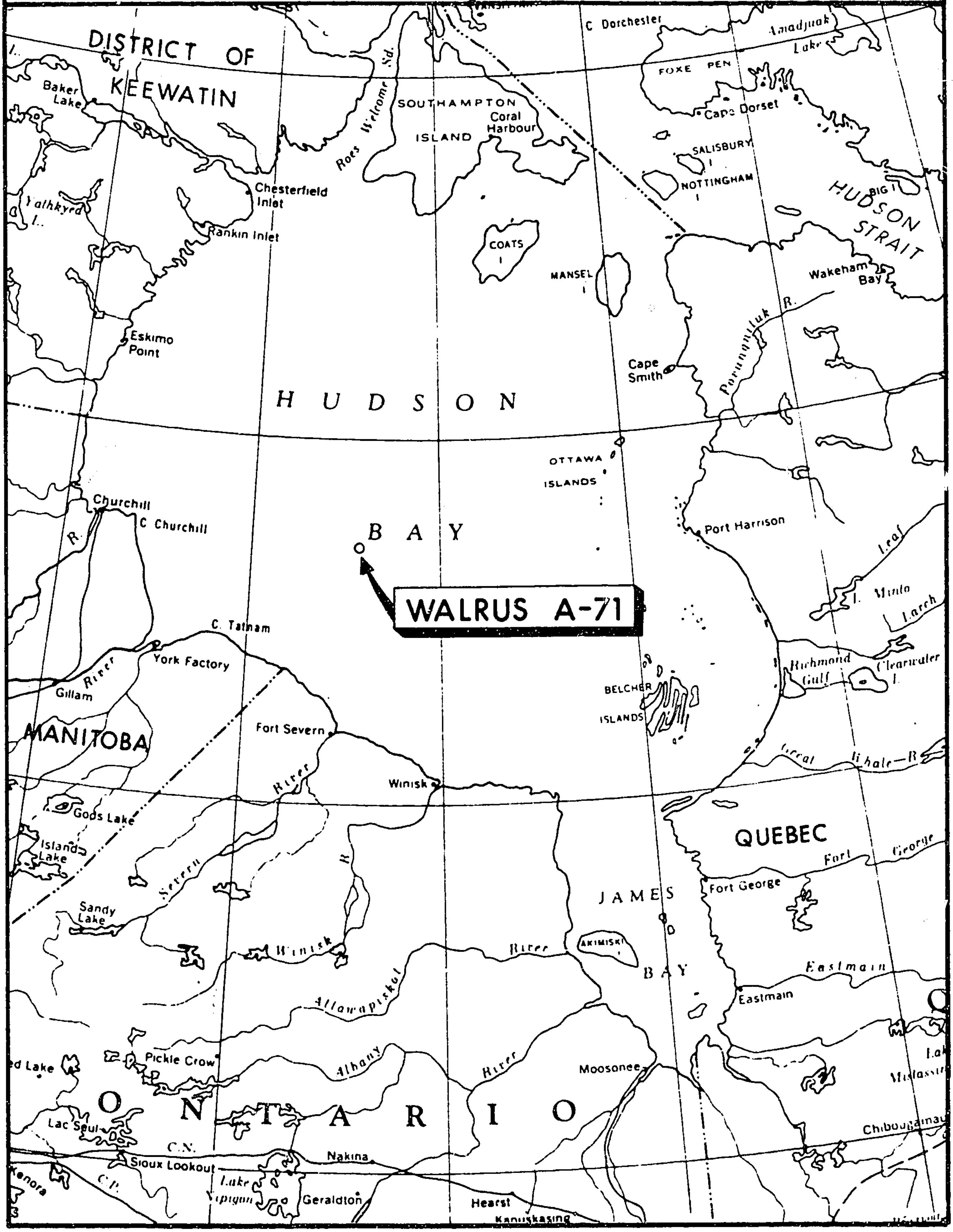
**AQUITAINE CO.**
**OF CANADA LTD.**

LOCATION MAP

SCALE :
1" = 125 Mile or 1: 7,920,000

WELL REPORT

## AQUITAINE ET AL
## HUDSON WALRUS A-71



AQUITAINE

# DRILLING TICKET

WELL NAME
**WALRUS A-71**

RIG
WODECO II

GEOLOGIST
S.EUEPP/C.KNIECLUCK

STRATIGRAPHER
Research Centre, Pau

Brought up to date on
December 15, 1969

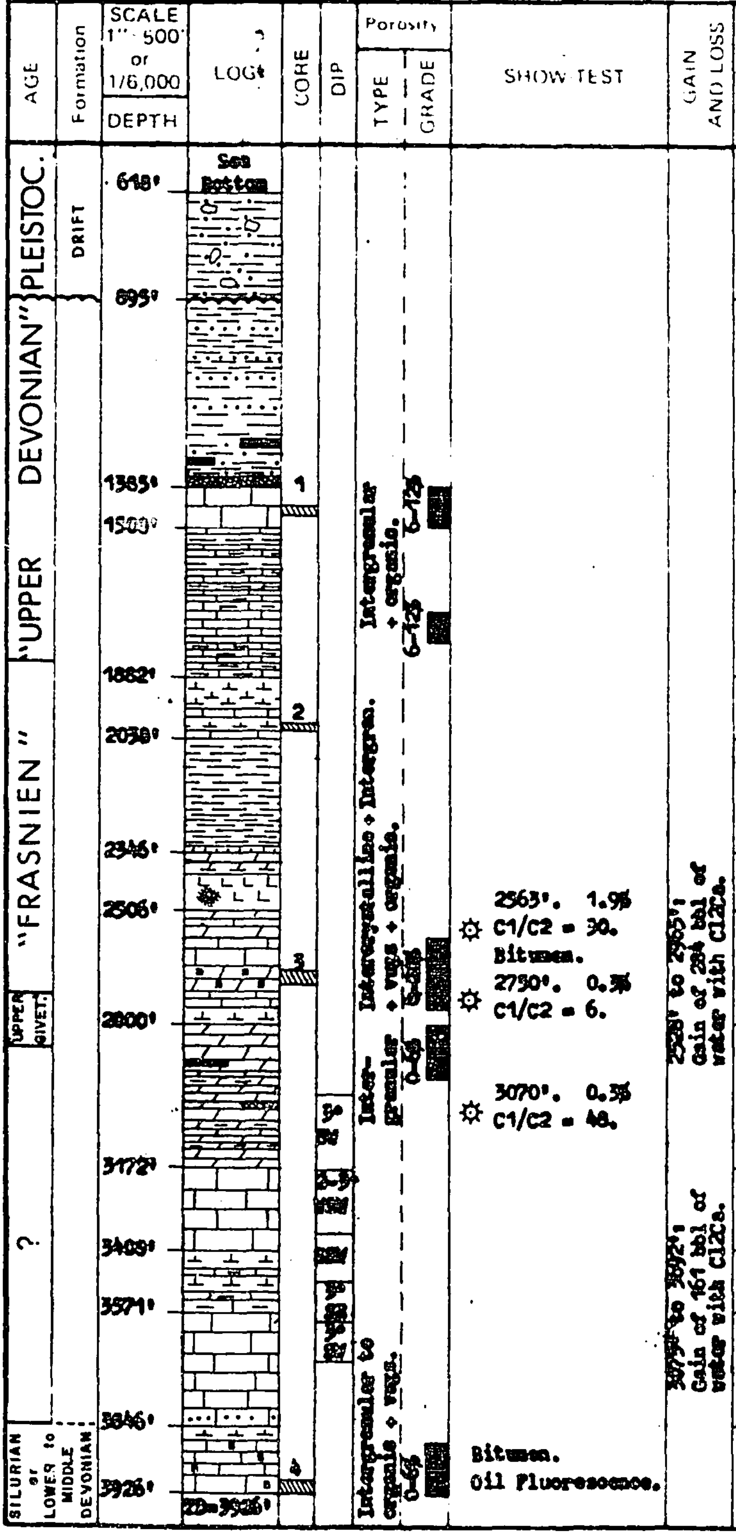
COORDINATES
X 58° 30' 02.05"N
Y 87° 10' 40.55"W
Z - 648'
Z KB + 31'

PROVINCE
HUDSON BAY
FEDERAL WATERS

TIMING
Commenced : Aug. 7, '69
Temporary Halt :
Resumption of Drilling :
Temporary Halt :
Resumption of Drilling :
Completed Oct. 18, '69

CASING
ø 30" at 772'
ø 20" at 1120'
ø 13 3/8" at 1975'
ø 9 5/8" at 2960'
ø - at -

| LOGS | |
|---|---|
| Dual Ind + LL8 + SP: | 1108-2958' |
| Sonic BHC + Caliper: | 1108-3923' |
| Gamma Ray: | 590-3923' |
| MLL + Caliper: | 1040-1998' |
| Laterolog 3: | 1975-3920' |
| Gamma Ray-Neutron: | 614-3924' |
| Neutron(SNP) + FDT: | 2300-2959' |
| Dipmeter: | 2965-3722' |
| Velocity Survey: | 2980-3790' |



LITHOLOGY

Yellow to red brown silty to sandy plastic clay.
Pebbles of Precambrian and Palaeozoic rocks.

Red brown silty to sandy plastic clay to plastic calcareous clay.
Intercalations of white to red very fine to fine locally cemented sand.
White fibrous gypsum.
Alternating red brown plastic clay and white anhydrite.

Pink bioclastic partly dolomitic limestone.

Alternating:
- red silty argillites;
- beige, grey to pink argillaceous limestone;
- white to beige micro-oolitic to pelletoidal, partly bioclastic, partly dolomitic limestone
- pink crumbly limestone.

Alternating:
- greenish grey shale;
- red argillites;
- bioclastic limestone.

Grey, beige to brown, plastic clay.

Dolomitic shale and dolomite.
Halite. Few intercalations of anhydrite.
Light brown bioclastic to biohermal limestone and light brown dolomite.
Dark brown bituminous dolomite.
Beige slightly bituminous bioclastic limestone and dolomite.
Greenish grey shale.

Beige to grey cryptocrystalline to microcrystalline, compact and azoic dolomite with intercalations of anhydrite and of argillaceous dolomite.

White to light grey microcrystalline, partly pseudo-oolitic, partly fossiliferous compact limestone.

Alternating:
- shale;
- beige dolomitic limestone;
- pink argillaceous dolomitic limestone.

Beige, microcrystalline, pseudo-oolitic to pseudo-brecciated compact limestone.

Beige calcarenitic to microconglomeratic limestone.

Grey blue marls.
Alternating:
- beige microcrystalline, locally calcarenitic to microconglomeratic limestone;
- brown micxl. anhy. bit. limestone.

# 1. GENERAL

AQUITAINE ET AL. HUDSON WALRUS A-71

# 1. GENERAL

AQUITAINE ET AL. HUDSON WALRUS A-71

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| ANNEX 4.Q.II | Core Sheets |
| ANNEX 4.Q.III | Daily Report - Geology - Shows |
| ANNEX 4.Q.IV | Weekly Reports. |

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- COMPOSITE LOG
- GAS LOG
- INTERPRETATIVE LOG
- PENETRATION RATE (Speedograph Geoservices) - **Neutron Log**
  - **Sonic Log**
- TIME ANALYSIS
- DRILLING LOG

# LIST OF SEPARATE PLATES

- DUAL INDUCTION + LATEROLOG 8 + S.P.: 1108' - 2958'
- SONIC B.H.C. + CALIPER : 1108' - 3923'
- GAMMA RAY : 590' - 1998'
- MICROLATEROLOG + MICROCALIPER : 1040' - 1998'
- LATEROLOG 3 (Field Scale) : 1975' - 3920'
- LATEROLOG 3 (Modified Scale) : 1975' - 3920'
- GAMMA RAY - NEUTRON : 614' - 3924'
- NEUTRON (S.N.P.) + F.D.T. : 2300' - 2959'
- DIPMETER : 2965' - 3722'
- VELOCITY SURVEY : 2980' - 3700'

# SEPARATE ANNEX

\- Core Analysis Report for
AQUITAINE COMPANY OF CANADA LTD.
Aquitaine et Al. Hudson Walrus A-71
Wildcat
Hudson Bay

CORE LABORATORIES - CANADA LTD.

# AQUITAINE ET AL. HUDSON WALRUS A-71

## B. PROGNOSIS AND PROGRAMME

# INDEX

# INDEX (contd.)

## I GENERAL DATA

Well name : Aquitaine et Al Hudson Walrus A71

Location : 58° 30'02" 470 N    87° 10' 51" 835 W

Permit : W 1427 in Hudson Bay (Canada)

Elevation KB : 34 ft.

Water depth : Approximately 600 ft.

Distance from
Nearest shore: Approximately 140 statute miles.

Distance from
Churchill : Approximately 270 statute miles.

Rig : Wodeco II -

Operator : Western Offshore Drilling and Exploration Co.

Closest well : Sogepet Aquitaine Kaskattama Prov # 1.
57° 04' 18 N   90° 10' 29 W.
drilled by Big Indian Drilling Co. Ltd.

Hole sizes : 36" - 26" - 17½" - 12¼" - 8½".

## II PROGNOSIS

Basement depth is unknown to Operator, and contractor should be prepared to drill to 10,000 feet. Also contractor should be aware of the possibility of encountering basement at a much shallower depth and could be requested to drill a second well. The following prognosis contemplates three alternates with total depth of 3,300 - 5,800 - 8,600 feet subsea. The Drilling Program has been prepared contemplating a 8,600 feet test below sea level in order to formulate a safe basis.

# PROGNOSIS

| AGE | FORMATION | FACIES | SUBSEA DEPTH | | | THICKNESS | | |
|---|---|---|---|---|---|---|---|---|
| | | | Hypothesis | | | Hypothesis | | |
| | | | "A" | "B" | "C" | "A" | "B" | "C" |
| - | - | Water | | | | 600' | 600' | 600' |
| | | | 600' | 600' | 600' | | | |
| Pleistocene | - | Drift and tillite | | | | 100' | 100' | 100' |
| | | | 700' | 700' | 700' | | | |
| Cretaceous | Mattagami River | Clay and sand | | | | 200' | 200' | 200' |
| | | | 900' | 900' | 900' | | | |
| Upper Devonian | Moose River | Limestone, shale and evaporite | | | | 200' | 200' | 400' |
| | | | 1,100' | 1,100' | 1,300' | | | |
| Middle Devonian | Kwataboahegan | Limestone | | | | 400' | 400' | 400' |
| | | | 1,500' | 1,500' | 1,700' | | | |
| Lower Devonian | Sextant and/or Stooping River | Arkose and/or limestone, dolomite and shale | | | | 300' | 300' | 300' |
| | | | 1,800' | 1,800' | 2,000' | | | |
| Upper Silurian to Lower Devonian | Kenogami River | Dolomite, shale, sandstone & evaporite | | | | 400' | 400' | 600' |
| | | | 2,200' | 2,200' | 2,600' | | | |
| Middle Silurian | Ekwan River, Attawapiskat and Severn River | Limestone & dolomite | | | | 400' | 400' | 2,300' |
| | | | 2,600' | 2,600' | 4,900' | | | |
| Upper Ordovician | Churchill River Group | Limestone, shale and evaporite | | | | 200' | 600' | 750' |
| | | | 2,800' | 3,200' | 5,650' | | | |
| Middle Ordovician | Bad Cache Rapids Group | Limestone | | | | 400' | 1,550 | 1,550' |
| | | | 3,200' | 4,750' | 7,200' | | | |
| | Winnipeg Sand | Sand | | | | 100' | 100' | 150' |
| | | | 3,300' | 4,850' | 7,350' | | | |
| Upper Cambrian | - | Sandy dolomite and sand | | | | - | 800' | 1,000' |
| | | | | 5,650' | 8,350' | | | |
| | | Sand | | | | - | 150' | 250' |
| | | | 3,300' T.D. | 5,800' T.D. | 8,600' T.D. | | | |
| Precambrian | - | Granite, gneiss, metasedimentary or sedimentary rocks | | | | | | |

Hypothesis "A": 20,000 ft/second refraction marker on top of the Ordovician. Reduced section of Ordovician, no Cambrian.
Hypothesis "B": 20,000 ft/second refraction marker on top of the Ordovician. Thick section of Ordovician and of Cambrian.
Hypothesis "C": 20,000 ft/second refraction marker on top of the Silurian carbonates. Thick section of Ordovician and of Cambria

## III SUMMARY OF DRILLING PROGRAMME.

### 1. Objective of the well.

The objective of the well is to evaluate all prospective reservoirs down to basement.

### 2. Informations on expected difficulties.

The main problem is the lack of information regarding the stratigraphic column. The well will be the first offshore well drilled in HUDSON BAY.

Following difficulties are expected:

a. Climatological and Oceanographic conditions.
b. The thickness of drift at the bottom of the sea is unknown. Boulders may cause a problem.
c. Gas productive zones may be encountered, even very close to the bottom of the drift.
d. Salt and Anhydrite may be encountered from the bottom of the drift.
e. Possible mud loss.
f. Calcium Chloride salt water in the Ordovician.

### 3. Drilling and Casing Programme.

The idea backing this programme is to be able to drill three different zones where we could encounter difficulties (drilling and hole conditions, gas) and to be in a position to cover such a zone with a reasonable size casing for a good continuation of the operations.

Basement shall be penetrated at least 40 feet.

a. 36" surface hole to 150 feet below mud line.
(750' below sea level).
Drilling with 26" bit and 26" SMITH hole opener, with sea water mud without returns.
30" x 1" VETCO conductor pipe, with VETCO Type "ATD" Squnch Joint will be run and cemented with special VETCO equipment. Amount of cement approximately 100,000 lbs.
Class G- S.G. 1.85

Underwater Wellhead system with complete 16 3/4" x 5,000 BOP STACK and 20" Riser must be installed before the 26" Phase, because we could encounter gas in the Shales Sand and Evaporites below the 30" casing.

b. 26" hole above devonian reservoirs or to 500' below mud line (1,100' below sea level) whatever is the least. Drilling with 15" bit and hydraulic hole opener SERVCO to open to 26", and sea water mud. (Minimum bore of BOP STACK is 16 3/4" ). Before entering the devonian reservoirs, the well stability must be checked and the BOP STACK will be removed.

Surface/String 20" OD x .625" wall, range III, with "STD"/Squnch joints will be run and cemented with approximately 150,000 lbs cement class G- S.G. 1.85.

The BOP STACK will be installed and tested. (Minimum bore through wellhead housing = 15 5/6").

c. 17½" hole in upper Silurian (1,900' below mud line, 2,500' below sea level. Drilling 12¼" the" after Electric Logs, opening to 17½" with a hydraulic hole opener. We will use sea water mud with DUOVIS/system.

13 3/8" casing - J.55 - 67 lbs/ft - API threads - range III will be run and cemented with about 160,000 lbs of cement type G Slurry S.G. 1.85 with retarder if needed, in the upper Silurian, before entering Silurian reservoirs.

d. 12¼" hole in the upper Ordivician (5,000' below mud line, 5,600' below sea level). Same type of mud. 9 5/8" casing N 80 - 40 lbs/ft Buttress threads Range III will be run and cemented with about 120,000 lbs of cement type G. Slurry S.G. 1.85 with retarder if needed, in the upper Ordivician before entering Ordovician reservoirs.

e. 8½" hole to total depth (8,000' below mud line, 8,600' below sea level). Same type of mud. One string of 7" casing, 29 lbs/ft. N 80. Buttress threads range III will be kept in stock as reserve string in case of unexpected drilling difficulties and drilling to 6" or for testing.

f. Detailed recommandations of operator are given in the attached plate "Drilling programme". Operator may request use of turbodrilling. Time being important, drilling shall be at a fast rate and without loss of time. Therefore, rig, drilling vessel and all equipment shall be maintained in top conditions.

g. Penetration rate recording device shall be operative at all times.

## 4. Mud Programme.

600' - 750' :

This interval will be drilled without returns. Sea water mud must be used. Funnel Viscosity will be in excess of 100 secs/qt. Further additions of caustic soda will be made to insure maximum yield of the prehydrated Magcogel system brought with the ship.

750' - 1100' :

This section is expected to consist of clays, sand, shale and evaporites. Formations here are expected to be more consolidated, thus, lower Viscosities will be required to keep the hole open.
A funnel Viscosity about 60-80 secs/qt will be used. If possible, Magcogel should be prehydrated in fresh water, and then treated with Spersene prior to addition to active system.

1100'-2500' :

The DUOVIS system will be used from this point to total depth.

Mud up procedure:

See Magocobar complete summary of drilling programme dated May/13/1969. This procedure outlines quantities required using fresh sea water as a base. If the mud system in tanks from previous section is not seriously contaminated with solids, it can be used as the base for the system. The DUOVIS products would then be added only as new mud is required in the system.

1- Mix prehydrated bentonite slurry with sea water to obtain a bentonite concentration of 6-10 lbs/bbl.
2- Add 1-1½ lbs/bbl. Duovis slowly through Hopper.
3- Add 0.2 lbs/bbl. Chrome Alum. for each lb of DUOVIS. Add through Chemical barrel at same time as DUOVIS.
4- Adjust PH to 9.0 - 10.0 with Caustic Soda. (Do not add Caustic Soda and Chrome Alum. at same time).
5- Add 0.1 lb/bbl. Dowicide B through chemical barrel.

Estimated properties after mud up:

Density 8.7 lbs/gal, Funnel Viscosity 40-45 secs/qt. PH 9-10. Fluid loss 25cc/30 min. or less.

Drilling cement:

While drilling cement with the DUOVIS system, PH shall be kept below 10.8. This can be accomplished with the use of SAPP and Bicarbonate of soda as necessary.

2500' - 5600':

If solids have seriously accumulated in mud system during previous interval, mud system should be dumped. Mud up similar to preceding interval.
If mud system is okay, cement may be drilled out using old system. PH should not be allowed above 10.5. This can be controlled with minor SAPP additions. Properties will be similar to preceding interval except fluid loss controlled below 15 cc.

5600' - total depth:

All properties and additions similar to preceding interval except: Fluid loss controlled to 10 cc.

A mud service engineer of Magcobar will be in charge of the mud problems, but Contractor's tool pusher shall be able to take charge of the mud if necessary. If and when necessary a second mud engineer shall be called in by Operator. Operator and Contractor will keep an eye on mud products stocks and keep the mud in good condition according to the Drilling Programme plate. The mud laboratory supplied by Contractor shall be heated and complete with regular equipment and all equipment needed to measure the characteristics of the mud and to make the following API tests of drilling fluid:

(i) Density or mud weight tests.
(ii) Viscosity and gel properties (Marsh funnel and Fann Viscometer Model 34).
(iii) Filtration and wall building tests.
(iv) Sand content determination.
(v) Determination of solid and liquid content - oil content of emulsion mud.
(vi) pH determination (Pocket pH meter and papers)
(vii) Filtrate analysis:

- Alkalinity determination
- Lime content determination
- Salt concentration (chloride test)
- Preservative concentration
- Tests for hardness and calcium concentration
- Estimation of calcium by oxalate
- Versenate test for hardness
- Estimate of sulphate by Barium Chloride

(viii) Equipment for pilot testing (mixer, scale, etc...)

Recommandations of operator are contained in the column "mud" of the plate "Drilling Programme".

## IV CORING PROGRAMME.

Coring only after setting the 20" casing, limited to 10 ft or 3 hours whatever is the least. Coring will be requested by the well site geologist.

The minimum forecasted programme is:

One 10ft core below 1,100ft subsea.
One 10ft core every 1,000ft
One 10ft core in the basement at the end of the drilling.
(However basement shall be penetrated at least 40ft.)

If we enter a significant reservoir, one 10ft core shall be taken at the top.

If there are shows in the reservoir, and if the hole is in good condition and if coring is easy enough, a second 30ft core shall be taken.

Continuous coring in reservoirs is not expected, except if it appears clearly that coring would not affect the possibility to drill a second well.

Sidewall coring device shall be available on board for checking the stratigraphic column after logging in the case of poor recovery of samples.

## V TESTING PROGRAMME.

Tests could be conducted in Devonian, Silurian, Ordovician and Cambrian.

All significant reservoirs shall be tested before running casingwith the Schlumberger formation interval tester (FIT), equiped with a 5.5 to 11 gallon container and two Amerada gauges-The Schlumberger FIT shall be on board the drilling vessel.

Drill Stem Tests will be performed, weather and time permitting, at the end of the well, through casing perforations with a casing packer, with the Halliburton equipment described in the Halliburton Schedule C stated May 12th, 1969 and with an OTIS subsea test tree (SSTT).

If necessary we shall be able to test immediately after setting the 13 3/8 or 9 5/8 casing and plug the perforations before drilling ahead.

The complete equipment to perform these drill stem tests shall be on board, including the OTIS SSTT. Also several sets of bridge plugs and squeese packers for each size of casing must be available on board. The sizes requested are 13 3/8", 9 5/8" and 7".

The first test shall have a flow limited to the volume below packer, plus the interval volume of the drill collars. If gaz flow is suspected, the flow shall be shut off immediately.

In a case of oil discovery, if the remaining time before leaving the Bay is too short for any hope of drilling a useful second well, but still long enough for testing, we might consider a production test, using separators on board the drilling vessel and a storage tank on a supply boat. Contractor shall be in a position to perform such a test on short notice, having the schedule of equipments and the schedule of transportation ready.

SAFETY must be the first preocupation. Before commencing tests we must be sure the equipment is in perfect condition and the weather forecast studied carefully.

The tests shall be conducted with the help of specialists from Aquitaine, Western Offshore, Halliburton and Otis, in accordance with Halliburton instructions dated March 21st, 1969 and in accordance with the procedure recommanded by Otis for use on the Wodeco II.

## VI LOGGING PROGRAMME.

### 1. General

The Schlumberger logging unit on board the drilling vessel shall be used. All fishing tools for Schlumberger equipment shall be on board the vessel. Helpers shall be furnished by the drilling contractor.

### 2. Geological logging.

Every log shall be run using a Wave Motion Compensator. The logging programme is the same for the different drilling phases 17½", 12¼", 8½", and 7".

For the 17½" phase, logs will be run in 12¼" hole, before opening to 17½", and the gamma ray shall be run being 20" casing up to the sea bottom.

Sea water Mud.

- SP + Dual Induction + Laterolog 8
- Microlog + Microlaterolog + Microcaliper
- Gamma Ray + Sidewall Neutron Porosity (SNP)
- Compensated Density + Sonic (At, amplitude, wave forms) Bore Hole Compensated
- Temperature Log
- Three arms focused, digital dipmeter
- Sidewall Coring, if requested.

Salty Mud.

- SP + Laterolog 3
- Microlaterolog + Microcaliper
- Gamma Ray + SNP
- Compensated density + Sonic BHC (At, amplitude, wave forms)
- Temperature Log
- Three arms focused, digital dipmeter
- Sidewall Coring, if requested

SP must be significant. Run an SP without current if necessary.

Barite Mud.

As for : Salty mud.

Oil Mud.

- Dual Induction + Laterolog 8
- Gamma Ray + SNP
- Compensated density + Sonic BHC (At, amplitude, wave forms)
- Temperature log
- Three arms focused, digital dipmeter
- Sidewall Coring, if requested.

Remarks.

- HP, salinity and resistivity of mud and mud filtrate shall be measured before logging.
- In low porosity reservoirs, logging of the Sonic BHC amplitude curve.
- Dual Induction requested with 3 curves with logarithmic scale.
- Microlog and Microlaterolog requested with logarithmic scale.

## 3. Other operations with Schlumberger instruments.

### Geophysical Logging.

Sonic BHC.

### Testing Operations.

- Hyper-jet shaped charge carrier gun
- Fit with 5.5 to 11 gallons container with 2 Amerada gauges.

### Drilling Operations.

- Temperature log in the casing.
- Perforating depth control log (GRN and CCL)
- Back-off equipment.
- Cutting drill pipe equipment.
- Customer instrument service by Schlumberger for the:
  - Free Point Indicator of Dialog
  - Casing Shooting of Dialog.

## 4. Ordering the crew and equipment.

Contractor and geologist shall be in close contact with Schlumberger and arrange for having crew and equipment available on time. The instruments for drilling operations (temperature, GRN, CCL, Back off, Cutting drill pipe, Free point indicator, Casing shooting) and the crew shall be in Churchill by July 15, 1969.

The other instruments shall be ordered on due time from the Schlumberger office in Edmonton and transported from Edmonton to Churchill by charter aircraft.

## VII VELOCITY SURVEY.

In order to preserve the safety of drilling, the velocity survey will be shot at the end of the drilling just before the last casing is run.

Operator's Geophysicist shall keep close contact with both the well site geologist and Century Geophysical in order to provide Century Geophysical with as much notice as possible, such as eight days advance notice. In any case the survey can not take place earlier than three days after the crew is called from Edmonton.

A possible schedule is as following:

Day # 1 Crew travels from Edmonton to Churchill.

Day # 2 One supply boat picks up at Churchill the crew (two Century operators) the Aquitaine Geophysicist, the equipment and the special boxes with the explosives and the caps. As the equipment does not weight more than 1,000 pounds, if necessary it might be transported by helicopter together with the crew. Caps and explosives shall be transported by boat.

Day # 3 Operators check the radio transmission of the time break between the drilling boat and the shooting boat. (at least a half day check).

Day # 4 Velocity survey. The depths of the recording points shall be determined by reference to the Bore Hole Compensated Sonic. The number of points will depend on the results of the Sonic and on the total depth of the well. We expect about 20 shots. This operation should be completed within four hours, if we do not meet with any trouble. However, we must be prepared for a possible twelve hour run.

The seismograph shall be of GULF type or, if the hole is in good condition, of SNPA clamp type.

According to operator's and contractor's experience, it is expected that arrivals from casing, of high frequency, can be filtered.

If ever the quality of the velocity survey, due to the presence of casing, were not good enough to solve the problems of markers identification, we would, in the second well, shoot a velocity survey before running 13 3/8" casing.

In case the well is late on schdule, the velocity survey shall be completed on October 15th, what ever is the depth of the well.

## VIII MUD LOGGING PROGRAMME.

### 1. During drilling and coring.

Following parameters shall be recorded:

- Penetration rate (mn/ft) with a continuous two scales speedograph.
- Total content of gaz in the mud with a continuous gaz detector fitted with a continuous degasser.
- $C_1$, $C_2$, $C_3$, $C_4$, $IC_5$, $NC_5$, H, N, $CO_2$ content with a continuous chromatograph.
- Mud density with a continuous recorder.
- Oil and gas content of selected samples of cuttings, core and mud with a vacuum device once a day.
- Limestone and dolomite content with a manocalcimeter on every 10ft cuttings samples or every foot core samples.

Cuttings shall be taken at 10ft interval minimum. for the first 2,100 ft, and at 5ft interval minimum below this depth.
Cuttings and cores shall be described for facies, sand content porosity and shows. Thin sections on selected cuttings and core chips will be made at request of the geologist. Every sample shall be observed under UV microscope before washing.

In reservoirs, core samples, 3 inch long, shall be canned in core barrel mud on every 10 feet.

Results shall be reported on following documents:

- Daily geological report
- Composite log (penetration rate - facies ratio - lithological column - calcimetry - porosity - shows.)
- Gas and mud density log.
- Core description.
- Logging report.

### 2. During testing.

During testing operations, the geologist shall log the complete testing sequence, sample non contamined fluids in special cells or bottles, and make a summary analysis of fluids recovered for salinity, resistivity, density, shows and a gaz chromatography.

Results shall be reported on a Testing Report..

A summary of the sampling and analysis programme to be performed on site is given hereunder.

## Wellsite sampling and study of the fluids during the tests.

### I FIT:

The totality of the recovered fluid will be sampled with the Schlumberger special devices. These samples will be shipped to Chemical and Geological Laboratories via Aquitaine.

### II CONVENTIONAL TEST:

### 1) Sampling of the reference mud.

3 different samples of 0,5 l.
1st sample: beginning of the last circulation before the test.
2nd sample: middle of the last circulation before the test.
3rd sample: end of the last circulation before the test.
Determine chloride, resistivity and weight on these three samples.

### 2) Survey of the gas during the test.

Plug the aerial conduct (unplug from the degasser) to the testing floor choke manifold to send the gaseous mixture to the detector and to the chromatograph.

### 3) Sampling of the fluids during the test at the testing floor choke manifold.

a) Equipment.

1.1 Bottles: aluminium bottles of the Gerzat type. volume: 0,5 l. Maximum service pressure: 150 bars. Before sampling, these bottles shall be under vacuum.

1.2 Cells: cells in stainless steel for sampling under very high pressure. These cells will be under nitrogene pressure of 50 to 100 bars before use. Volume: 0,5 l. Their pressure service is 500 bars.

b) Sampling.

The sampling on the testing floor choke manifold will be done using a reduction, two Kerotest valves, and ½" T.

4) Sampling of the water plug in the drill pipes after the test.

a) Equipment.

- special tubes closed by ball or a veterinary needle to take the samples.
- special bottles of 1/9 gallon to put the samples in.

b) Sampling.

- As soon as the fluid appears, during the unscrewing of the drill pipe, screw again, and lower down this pipe in the well.

- Fill the pipe with water to bring the liquid up to the tool joint.

- If there is oil, sample.

- In the event of a water plug with a gas emulsion screw on top of the drill pipe a special device to sample the gas.

- After the top of the water plug, take a sample at every stand.

- Take at least five samples of the fluid recovered between the Hydrospring and the DCIPV.

Remark: It is not advisable to sample the water during the inverse circulation: (Mixing of the effluent, risk of the mud to be polluted.

c) Summary analysis of the formation water and of the water plug on the well site.

The following analysis will be carried out: -

1° - Smell: To note if a special odor (hydracarbones, hydrogene sulfide) is given off.
2° - Density: With an aerometic densimeter in glass of the AFNOR type, with graduated measure in density.
3° - Resistivity: With an aparatus of the KOHLRAUSH bridge type (cell with platinum electrodes).
4° - Hp: With the standardized papers.
5° - Salinity: Chloride content, expressed in sodium chloride. MOHR method will be used.

6° - Content in free carbonate dioxide: The Bureau of Mines method will be used.
7° - Presentation of the Results: All the results will be transmitted on a diagram:

- Abscissa: volumes discharged since the starting of the test.
- Ordinates: density, "salinity", resistivity, Hp., free $CO_2$

The five less polluted samples for which the values are on stabilized portions of the above mentioned diagrams, will be sent to S.N.P.A. laboratories for complete analysis. On one of these samples, $CO_2$ carbonates $H_2S$ sulphide, metalic ions will be stabilized as soon as possible.

5) Sampling of the mud after the return of the circulation.

3 different samples of 1/9 of a gallon.

1st sample: beginning of the first cycle of circulation.
2nd sample: middle of the first cycle of circulation.
3rd sample: end of the first cycle of circulation.

Determine chloride, resistivity and weight on these three samples.

## IX CEMENTING SERVICES.

The cementing equipment HT 400 on board will be used and serviced by Halliburton operator.

Waiting time on cement will be at least 12 hours for the surface casing, 24 hours for other casings.
Basic oil well cement API class G will be used.

## X TURBODRILLING SERVICES.

In 8½" phase, if formation are hard and suitable for diamond bits and if the well is in a good condition, we will use the turbodrills Neyrpic for faster drilling. Also the turbodrills will be use in case of side tracking.

Characteristics: 2 turbodrills 7¼" 165
1 turbodrill 7¼" 50

## XI FISHING SERVICES.

Fishing tools for all tubular goods used by Contractor, milling tools, washover pipes and directional drilling tools to be used with turbodrill must be on board. List of tools are given in Schedule C of the contract with Western Offshore.

# DRILLING REPORT

AQUITAINE

1 WELL Polar Bear

RIG P-82

2 No : 23

DATE 14/10/74

PENETRATION

PHASES

| Cross out which ever not applicable | DEPTH ft | DEPTH ins. | PENET. ft | PENET. ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 4,826 | | 4 | | 5 | |
| Drilled ~~cored~~ | 5,074 | | 248 | | 24 | 00 |
| EACH BIT | 6 4,826 | | 7 248 | | 8 24 | 00 |
| Drilled ~~cored~~ | 5,074 | | | | | |
| Drilled-cored | | | | | | |
| Drilled-ccred | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Reed | 12¼ | S62 | #11<br>713196 | 3/14 | 293'/<br>28:30 | 75/<br>80,000 | 45 | 550 | 2300 |

MUD

CHARACTERISTICS

19
W<sup></sup>t mini 10.2 Wt maxi 10.6 V mini 35 V maxi 41

F 72 VA 10.5 Vp 6 Yv 9

Gel 0 4 10 10 S% 0.25 pH 10.5

Pf 0.2 Lc ______ Solid. 4.5% NaCL 264000

~~LOSSES and~~ GAINS

| 20 | this day bbls | cumul bbls |
|---|---|---|
| Mud | | |
| Ca-Cl$_2$ | 240 | 2020 |

PRODUCTS ADDED / ON BOARD

| 21 | |
|---|---|
| 96 sx | Magcogel |
| 16 sx | Caustic Soda |
| 6 sx | Kelsan XC |
| 6 sx | Drispac |

| | |
|---|---|
| Potable Water: | 366 T |
| Drilling Water: | 585 T |
| Fuel: | 494 T |
| Turbo Fuel: | 567 gal + 13 drums |
| Cement: | 93 T |
| Barite: | 121 T |

STRING

Water

22 ELEMENTS Same as yesterday.

| 23 WEIGHT (in mud) | D.C. | D.P. | W.M.D. |
|---|---|---|---|
| | 100000 | 84000 | 264000 |

24 FORMATION Type . Stage Bad Cache

25 CORES

26 DEVIATION

NOTES

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 0:00 | 24:00 | 24:00 | Drilling. |
| | | | 8:00 A.M. STATUS: Drilling at 5,161' (4 - 5'/hr). |
| | | | REMARKS: Giant Tide has retrieved the 2 piggy back anchors on D1 and D2. |

28 TIME ANALYSIS

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. |
| 2 - D 24:00 | 10 - W.C. |
| 3 - Red | 11 - Casing |
| 4 - D.T. | 12 - Circ |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. |
| | 17 - Vac |

29 PROGRAMME Drilling and Logging

30 PEOPLE ON BOARD : 64

31 WEATHER

| | |
|---|---|
| Wind/Kn | 20/22 |
| Direction | NNW |
| Waves /ft | 4' |
| Slip jt. | 0.5' |
| Current | |
| Swells/ft | 5' |
| Direction | N |
| Temperature | 25 - 32 |

32 Support Vessels

Giant Tide

406

OM 102

e. Drill pipe rubber protectors.

Drill pipe rubber protectors (one per joint) shall be used inside casing. It is important that the Kelly sub saver always be in good condition.

f. Grease, Thread Lock.

(i) Coupling will be welded to the pipe on rack, according to Operator practices.

(ii) Thread lock will be used for the first three joints, including the pin thread of the float collar.

(iii) Grease: For 20" - 13 3/8" - Good API Grease
For 9 5/8" - 7" - Good API Silica Grease.

## XIII DIVING SERVICES.

Complete diving equipment will be on board with the qualified personnel for servicing and inspecting of subsea equipment by 600' water depth.

Six divers shall be on board.

## XIV UNDERWATER WELLHEAD.

Contractor must supply:

- One complete BOP stack 16 3/4" serial 5,000 API.
- Casing suspensions (complete) for the drilling program with all running and pulling tools.
- Landing base and guiding system.
- Remote control system. Closing time should not exceed 30 s. for ram type BOP and 60 s. for bag type BOP.
- Hydraulic connectors for riser, choke and kill lines and well head body.
- One complete riser 20" (slip and flex joints) choke and kill line 5,000 psi W.P. for 600' of water.
- One complete spare riser 20" as above for 300' of water.
- Vessel position indicator. (Simco)
- All necessary tools for handling, running, pulling, testing etc... all the above equipment.
- Two sets of underwater television in good working condition must be on board, with spare parts.
- All necessary service men should be on board.

## XV POSITIONING AND SURVEY SERVICES.

This operation should last less than 4 days and be conducted with the help of Computing Devices of Canada Ltd. The survey boat shall carry the complete Decca transmitter and personnel, an Hydrodist, ten surface buoys, four subsea floats, and six pingers.

The coordinate of the well are:

| | | | |
|---|---|---|---|
| Decca Red : | 32 | 8 | 39 |
| Decca Green: | 28 | 11 | 91 |

| | | |
|---|---|---|
| UTM | X: | 489 447 |
| | Y: | 6 484 260 |

| | | |
|---|---|---|
| Geographical | Latitude : | 58° 30' 02" 470 |
| | Longitude: | 87° 10' 51" 835 |

### 1. Finding the well site:

After checking the route by ice reconnaissance flight if necessary, the survey vessel should leave Churchill in the evening in order to be ready to calibrate close to the Red (Broad River) station by dawn - then the boat shall proceed to the Green (Shagamu River) station for calibrating.

From the green station, after ice reconnaissance flight if necessary, the survey vessel shall sail to the drilling site, dropping along the route as many buoys as necessary to materialize the fix in case of trouble with radio-transmission.

Before reaching the well site, the survey vessel shall check if there has been no loss of lane by finding a characteristic feature of the bottom of the sea on the seismic line 58-10. (A set of three undersea buoys made of gas kegs and dropped in 1968 might also be a usefull checkpoint if it can be found again). See CGG report of special work, party 401-11-05 - Plate 2.
On the well site the survey vessel shall drop a buoy, then come back on seismic line 58-10 in order to make sure there has been no loss of lanes, then come back to the well site for positioning the vessel.

### 2. Positioning of the vessel.

The procedure to be followed is outlined in the memorandum "proposed method of positioning Drilling vessel on well location" dated June 10th, 1969 by Computing Devices of Canada Ltd.

### 3. Survey of the rig.

The procedure is outlines in the above referred memorandum. Survey shall take place between 10.00 hours and 14.00 hours local time. as soon as the well is spudded Survey Vessel shall check on line 58-10 on the way back to Churchill.

### 4. Droping subsea pingers.

During the Decca operations, the survey boat shall drop four subsea pingers, with batteries and at a depth suitable for 3 years life on the following seismic points.

| | | Coordinates. | |
|---|---|---|---|
| D2800 on line 86-30 | Long. | 86° 29' 55" 77 | Red 39-17-14 |
| | Lat. | 56° 44' 46" 60 | Green 9-20-18 |
| D1172 on line 86-30 | Long. | 86° 30' 02" 72 | Red 38-22-85 |
| | Lat. | 59° 39' 18" 97 | Green 40-23-80 |
| D5447 on line 58-30c | Long. | 89° 41' 37" 391 | Red 18-8-60 |
| | Lat. | 58° 30' 04" 095 | Green 32-33-65 |
| D4900 on line 89-45 | Long. | 89° 44' 38" 70 | Red 17-20-31 |
| | Lat. | 57° 58' 29" 97 | Green 28-17-88 |

If for any reason dropping pingers could not be done before spudding, this should be done at the end of the first well.

## XVI WEATHER FORECAST SERVICES.

a. Contractor will use the Weather Forecasting Services of the Meteorological Branch of the Canadian Department of Transport, supplemented by such additional services as may be arranged by Operator.

b. Contractor shall arrange and provide the advisory services to designate the date by which the Drilling Vessel and Support Vessels must leave the last location in Hudson Bay so as to effect safe passage through Hudson Strait and the Strait of Labrador.

c. Contractor shall operate the following instruments: Barometer, Psychometer, Thermometer for air and water, Anemometer.

## XVII OCENAGRAPHIC SERVICES.

c. Contractor shall operate continuously a recording wave meter buoy."Data Well" according to manufacturer's procedure.

d. Contractor shall operate a current meter, every 6 hours. Readings shall be at least at the three following depths: sea level, half water depth and sea bottom or as many as necessary for a good study depending on local conditions.

## XVIII SUPPORT BASE.

Contractor shall operate a support base at Churchill, Manitoba. The support base shall be used for:

Land transportation
Air transportation
Water transportation and dock site
Stock Point (if necessary)
Supply
Radio, Telex, Telephone, etc...
Hospital

N.B. Churchill is not a usual customs clearance point in Canada except for grain boats.

## XIX TRANSPORT SERVICE.

Contractor shall operate all transportation related to the Drilling Vessel, including:

a. Moving the Drilling Vessel to and from location.
b. Moving the Drilling Vessel from one location to another.
c. Carrying means of locating, including a Decca Lambda transmitter furnished by Operator.
d. All weather, 24 hour emergency vessel for personnel.
e. Normal transportation of personnel, equipment and consumables.
f. Occasional transportation of personnel and equipment.
g. Tanks for testing the well.

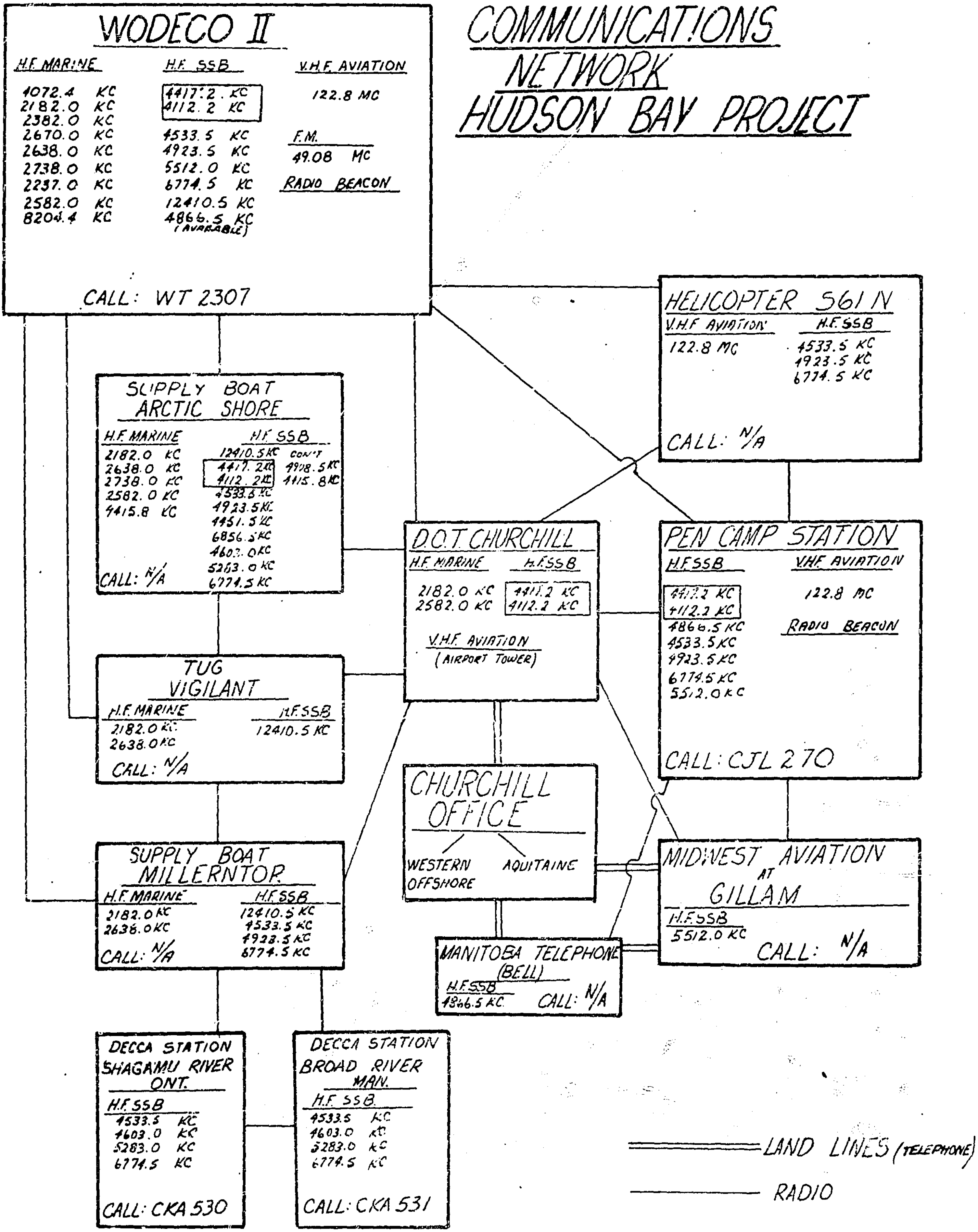
Following means of transportation will be used.

1 tug during the moving of the barge only
2 supply boats
1 helicopter S61 N

## XX RADIO SERVICES.

The Radiocommunication network is illustrated in the attached diagram.

# COMMUNICATIONS NETWORK HUDSON BAY PROJECT



1. Single Side Band radiotelephone.

A 24 hours a day radiotelephone service shall be operated between the Churdhill offices, the Drilling Vessel and the Pen Camp, using the radio frequencies of the Department of Transport at Churchill (4417.2 KC and 4112.2 KC).

2. Other long distance radio communications.

Marine and Single Side Band frequencies, as per the attached diagram, shall be installed on board the four vessels, the helicopter, at the Pen Camp, at the two Decca shore stations.
Such a networt shall enables any one of the stations to contact directly or indirectly any other station, Churchill and Gillam.

3. Aviation radio.

Pen Camp, Drilling vessel, Churchill, helicopter and planes, shall be equipped with radios having aviation frequencies normally used.

4. Radio beacons.

Radio beacons shall be installed on board the drilling vessel and at Pen Camp.

5. Talkies walkies.

Four talkies walkies in good working conditions should be on board the drilling vessel.

## XXI TELETYPE SERVICE.

A teletype connected to the international network shall be provided at Churchill.

## XXII EMERGENCY SERVICES.

Contractor shall be in a position to contact Search and Rescue Service, surgeons, firemen, police at any time.

Operator will provide a Doctor assigned to the operation.

Facilities for surgery will be provided on board the Drilling Vessel.

Supply boats can be used for emergency, all weather, all time transportation.

Helicopter will be available at Churchill for emergency transportation.

The tug will be at all time on stand by close to the drilling vessel to assure the safety of the drilling vessel and of its personnel.

## XXIII ABANDONMENT PROGRAMME.

A) Approval of Partners and of Conservation Engineer shall be secured before to begin abandonment.

B) Cement plugs.

What ever the results of the well, at the end of the drilling, after coring, logging and testing, we shall set several cement plugs in the hole to isolate open hole reservoirs and previously perforated intervals.

On the absence of any reservoirs in the open hole or behind the perforations, a minimum pluging program will be as follows. ONE plug at the shoe of the last casing string and ONE in the upper part of the well, the top of which must be 100 feet below the ocean floor. These cement plugs will be a minimum of 300 feet each.

C) Removal or Protection of Wellhead.

1- If the well is dry we shall cut the casings all together with explosives about 30 feet below the ocean floor and remove the subsea equipment.

2- In the event we have a producing well, we shall install a corrosion cap on the top of the well head in place of the BOP stack and leave the protected well head on the ocean floor. We shall also place TWO long life pingers on the well head.

## XXIV LABORATORY SERVICES IN CALGARY.

### 1. Analysis on fluid:

sampled during FIT or conventional tests, to be carried out by Chemical and Geological Laboratories, Calgary.

a. On water:

- Benzene content.
- Na and K, Ca, Mg, $SO_4$, Cl, $CO_3$, $HCO_3$ and OH content.
- Iron, $H_2S$ content.
- Total solid content.
- Resistivity, pH and Specific gravity.

b. On gas:

- Composition in Helium, Hydrogen sulfide, Carbon dioxide, Oxygen, Nitrogen, Methane, Ethane, Propane, Isobutane, N-butane, Isopentane, N-Pentane, Hexanes, Heptanes +
- Specific Gravity.
- Vapor pressure.

c. On oil:

- Water and sediment content.
- Total sulfur content.
- Salt content.
- Viscosities.
- Analysis per distillation

### 2. Analysis on cores:

To be carried out by Core-Laboratories Canada Ltd, Calgary

- permeability to air (horizon al max and 90°, vertical)
- porosity
- density
- visual examination
- core-gamma correlation.

### 3. Slabing cores:

To be carried out by Core-Laboratories Canada Ltd.

Dispatching:
- ½ coreslab to The Institute of Sedimentary and Petroleum Geology 3303, 33 St. N.W. Calgary.
- ¼ core slab to Aquitaine Company of Canada Ltd. Calgary House, 550-6th Ave. S.W. Calgary.
- ¼ core slab to Atlantic Richfield Company 650 - Guinness House, Calgary.

## XXV CONFIDENTIALITY.

The progress and the results of the well shall be kept confidential. The well name shall be coded on reports and samples.

Radio, telex and phone reports shall be coded.

Written reports shall be sealed under two envelopes, only the inner one being stamped "Confidential".

Reports shall be kept in safe closets in each office.

No press release of any kind shall be made without the consent of operator and partners.

## XXVI SAFETY RULES.

### a. Canadian regulations.

Contractors shall at any time comply with canadian regulations.
The following agencies are concerned:

- Ressource administration division of the Department of Energy, Mines and Resources.
- Aids to negivation division of the Department of Transport.
- The appropriate maritime commander.
- The Department of fisheries.
- The National Research Council, Space Research Facilities Branch, General Superintendant Churchill Research Range: J.H. BRANDY, Fort Churchill, Manitoba
- Canadian Hydrographic service.
- Meteorological Branch of the Department of Transport
- Canadian Wildlife Service of the Department of Indian Affairs and Northern Development.
- Ships Machinery Inspection Division of the Department of Transport.
- Department of National Revenue, Customs and Excise.
- Department of Manpower and Immigration
- Radio regulation division of the Department of Transport.
- etc...

Copies of the regulations respecting the drilling and production of oil and gas shall be posted by the Contractor and given to tool pushers, drillers and derrick men. The list of the personnel to whom the document have been given shall be sent back with their signatures to Operator.

b. Offshore safe practice.

Contractors shall follow at all times rules of safe practice in offshore operations as described in main reference books, namely:

(i) The "Manual of safe practice of offshore operations" of the offshore operator committee (US).

(ii) Accident prevention manual (AAODC, 1968-US)

(iii) Recommendations de Sécurité pour les travaux en mer (comité des techniciens de la chambre syndicale de la Recherche et de la Production du Pétrole et du Gaz naturel - France).

c. Aquitaine Safety Rules.

Special attention should be given to shows, gain or losses, change in penetration rate, maintenance of safety stock, barytes and other mud products.

Contractor must always ensure that all the safety equipment (including mud products) are in good condition and that the personnel at the rig site are perfectly familiar with the safety rules and procedure to be followed in case of emergency.

A periodic check should be carried out to ascertain by means of training exercises that the personnel are familiar with the instructions.

A copy of the following Aquitaine safety rules will be given to Contractor's tool-pushers, drillers and derrickmen. The list of the personnel to whom the documents have been given shall be sent back with their signatures to Operator.

# SAFETY RULES

TO BE APPLIED IF THE WELL IS KICKING.

EITHER WHILE DRILLING, CORING, CIRCULATING, OR MAKING TRIP.

As soon as the well shows signs of kicking either by gain or loss of mud in pit, the Driller should send someone to warn the Tool-pushers (CONTRACTOR and OPERATOR) and at the same time carry out the following operations:

## A - In case of gains

### While drilling, coring or circulating

1. As soon as there are gains of 1 to 2 bbl, stop drilling (if drilling or coring) and lift Kelly above table. (Do not set slips)
2. Reduce circulation rate and close hydril. Slowly circulate and move string up and down.
3. Regulate back-pressure of choke to eliminate any gain (start with low back-pressure because of risk of losses).

### While making round trip.

1. Immediately the least amount of gain is noticed, stop trip.
2. If possible make up an inside blowout preventer.
3. Make up Kelly with discharge open.
4. Close hydril and discharge, slowly circulate and move string up and down if in open hole, do not move string if in casing.
5. Regulate back-pressure of choke in order to eliminate any gain (start with a low back-pressure to reduce risk of losses).

IMPORTANT:

The Driller must take the above precautionary measures in every case and then check the reasons for gain.

He must not try to find the reasons before taking these precautions.

## B - In case of losses

Slight losses (2bbl/15 min.)

While drilling, coring or circulating.

1. Stop drilling (if drilling or coring).
2. Reduce circulating rate.
3. Control losses at this reduced rate.

While going into the hole.

1. Stop trip.
2. Watch well for 15 min.
3. If well stable or if losses are about the same, slowly resume trip circulating at the same time.
4. If losses are greater, refer below.

Greater losses (more than 2bbl/1 min. or total loss.)

While drilling, coring or circulating.

1. Stop drilling.
2. Lift Kelly above table while continuing to circulate.
3. Close hydril.
4. Reduce circulating rate to about 80 GPM.
5. Allow mud to flow from control pit (if any) down annular space at the rate of 25 GPM. In absence of pit use mixing pump.

While going into the hole.

1. Stop trip.
2. Screw on an inside blowout preventer.
3. Made up Kelly or control head.
4. Pump 80 GPM down the string.
5. Allow mud to flow from control pit (if any) at the rate of 25 GPM. In absence of pit use mixing pump.

NOTE:

When there is a total loss while coming out of the hole, pump down a volume of water or mud equal to the volume of metal plus 25%.

d. Case of loss of control of the well.

If all safety procedures have been inefficient and if the control of the well is lost, following operations shall be attempted under instruction of senior representatives of Operator and Contractor.

1- To save the personnel (the tug shall be in stand by close to the drilling vessel at any time.)

2- To remove the drilling vessel from location.

3- To arrange for drilling a relief well if possible before the bay is ice bounded.

4- If the well can not be controlled before freezing of the Bay, to contact the Conservation Engineer for deciding what next step shall be taken, i.e.:

    a. leave the relief well wellhead with a corosion cap and two pingers.

    b. light the blowing-out well.

    c. come again next summer.

AQUITAINE ET AL. HUDSON WALRUS A-71

## C. WELL SUMMARY

# WELL REPORT

## AQUITAINE ET AL HUDSON WALRUS A-71

Lat. 58° 30' 02.05" N
Long. 87° 10' 48.55" W

| | | | |
|---|---|---|---|
| Sea floor: | 587' below sea level | K.B. Elevation: | 31' above sea level |
| Spudded : | August 7th, 1969. | Rig released : | October 18th, 1969. |

Total Depth: 3926'

Drilling Contractor: Western Offshore Drilling and Exploration Co.

FORM NO. 511-1

AQUITAINE COMPANY OF CANADA LIMITED

# SUMMARY OF WELL DATA

Well Name: AQUITAINE ET AL HUDSON WALRUS A-71 Location: Hudson Bay

Co-ordinates: Lat. 58° 30' 02.05" N Long. 87° 10' 48.55" W

Producing Horizon (s) Exploratory

Elevations: Ground 587' below sea level Kelly Bushing 31' above sea level

Spud Date August 7th, 1969 Rig Release date October 18th, 1969

Completed drilling date October 14th, 1969 Total Depth 3926' Hole Size 8½

Surface Casing: Size 30" Set at 772 K.B. Cement Class G 1000 US sacks

~~Production~~ Casing: (note if intermediate)

Size 20" Set at 1106' K.B. Cement Class G 1250 US sacks

~~Liner~~ Size 13 3/8" Set at 1975' K.B. Cement Class G 1170 US sacks
9 5/8" 2960' Class G 936 US sacks

Cement Plugs: (abandonment, lost circ. or plugback)

See summary of well data attachment

Mud Type Gel & Water to 1992' - Duovis system to 3926'

Logs: (abbreviate type of log)

| TYPE | RUN No. | DEPTH LOGGED | DATE |
|---|---|---|---|
| See attached | "Logging Data" | | |
| | | | |
| | | | |
| | | | |

Coring No. of cores cut 4 Total cored interval 1432-1442 2000-2002
2670-2684 3917-3926

Type & Size of core 1-3-4 cored with diamond No.2 was cored with junk basket.

D.S.T.'s No. of successful tests: Nil No. of misrun tests Nil

Drilling Contractor: Western Offshore Drilling and Exploration Co. Rig No. 2

Wellsite Supervision by:

# AQUITAINE ET AL HUDSON WALRUS A-71

## LOGGING DATA

"Depth from K.B."

| Type | Company | Interval | Date |
|---|---|---|---|
| Temperature | Schlumberger | 744 - 20' | Aug. 10. 1969 |
| Temperature | Schlumberger | 744 - 20 | Aug. 11. 1969 |
| Temperature | Schlumberger | 744 - 20 | Aug. 21. 1969 |
| Dual Induction & Lat. 8 | Schlumberger | 1994 - 1108 | Sept. 7. 1969 |
| Sonic BHC + Caliper | Schlumberger | 1994 - 1108 | Sept. 7. 1969 |
| Caliper & M.L.L. | Schlumberger | 1998 - 1040 | Sept. 7. 1969 |
| SP | Schlumberger | 1994 - 1108 | Sept. 7. 1969 |
| Caliper | Schlumberger | 1996 - 1106 | Sept. 11. 1969 |
| Gamma Ray | Schlumberger | 1998 - 590 | Sept. 11. 1969 |
| Dual Induction | Schlumberger | 2958 - 1975 | Sept. 19. 1969 |
| SP | Schlumberger | 2958 - 1975 | Sept. 19. 1969 |
| Sonic BHC + Caliper | Schlumberger | 2959 - 1975 | Sept. 23. 1969 |
| Laterolog 3 | Schlumberger | 2956 - 1975 | Sept. 23. 1969 |
| Gamma Ray | Schlumberger | 2959 - 1860 | Sept. 23. 1969 |
| Neutron (SNP) | Schlumberger | 2959 - 2300 | Sept. 23. 1969 |
| Gamma G (FDT) | Schlumberger | 2959 - 2300 | Sept. 23. 1969 |
| Laterolog 3 | Schlumberger | 3723 - 2965 | Oct. 11. 1969 |
| Sonic BHC + Gamma Ray + Caliper | Schlumberger | 3725 - 2960 | Oct. 11. 1969 |
| Dipmeter | Schlumberger | 3722 - 2965 | Oct. 11. 1969 |
| Velocity Survey | Century | 3700 & 2980 | Oct. 11. 1969 |
| Sonic BHC + Gamma Ray + Caliper | Schlumberger | 3923 - 3650 | Oct. 15. 1969 |
| Laterolog 3 | Schlumberger | 3920 - 3650 | Oct. 15. 1969 |
| Gamma Ray - Neutron | Schlumberger | 3924 - 614 | Oct. 15. 1969 |
| Sidewall Coring. (30 shots from 3924 to 2960' No recovery). | Schlumberger | - | Oct. 15. 1969 |

# 2. DRILLING

AQUITAINE ET AL. HUDSON WALRUS A-71

# 2. DRILLING

## AQUITAINE ET AL. HUDSON WALRUS A-71

### D. DRILLING DATA

# AQUITAINE ET AL HUDSON A-71

## DRILLING DATA

(a) Drilling Contractor: Western Offshore Drilling
and Exploration Co.
6045 East Slauson Avenue
Los Angeles, California 90022

(b) Drilling Barge: Western Offshore No II
Principal characteristics:

Length Overall: 280' - 0"
Ream Molded : 68' - 0"
Depth Molded : 23' - 4"
Design Draft : 16' - 8"
Displacement at design draft : 7284.33 L.T.
Normal load draft (operating) : 12' - 8½"
Normal load displacement (operating): 5270 L.T.
Light Ship Weight : 2160.18 L.T.
Light Ship L.G.G. : 0.20 FWD of
Light Ship V.C.G. : 31.07'

**Drilling plant**

Make: National
Type: 1320 DE

Motors: Dual electric motor drive with two Westinghouse 371 motors, 1000 HP intermittent

(c) Mast:

Make : L.C. Moore 140' x 30' x 30' welded
Capacity: 952,000 #
Dynamic Looding: I) 55 knots wind with 15,000 feet of 5" drill pipe racked 10° angle of heel 10 sec period.
3° angle pitch 7 sec period
5 feet leave 8 sec period.

II) 55 knots wing with no pipe racked 10 sec period 30° angle of heel. 6° pitch 7 sec period 7 feet leave 16 sec period.

(d) Pumps:

2 makes : National G-1000 c 7 3/4 x 16"
Driven by: Single electric drive with Westinghouse 371 A motor.
Continuous dydraulic horsepower 850.

(e) Blowout preventer equipment
Make:

1) wellhead Vetco sybsea system
2) blowout preventer stock, Vetco assembly
   1 16 3/4 5000// Hydril 6 K
   2 16 3/4 5000// BX Shaffer double LWS
3) Marine riser system 20" OD Vetco

AQUITAINE ET AL. HUDSON WALRUS A-71

## E. DAILY PROGRESS REPORT

# DAILY PROGRESS REPORT

## AQUITAINE ET AL HUDSON WALRUS A-71

Progress report for 24 hour period ending at 2300 hrs on date shown.

1969

| | |
|---|---|
| August 5 | On location and run anchor No. 1, 5, 8. Repair reel anchoring system. |
| August 6 | Repair Pengo winch, run anchor No. 6, Wait on Decca, Run anchors No. 4,3,2,7 And reset anchors No. 4, 5, 3. |
| August 7 | Finish anchoring up. Run TV. Check sea floor, OK. Water depth 617.53' from KB. Land temporary guide base, made up 26" bit and 36" H.O., prepare to drill without returns (sea water). |
| August 8 | Drill 36" hole to 781'; circulate with sea water and fill hole with mud. Ran deviation survey 1°, trip out of hole, rig to run csg, run 30" casing, shoe at 772.50'. Run TV, cement with 1000 US sacks of class G cement. |
| August 9 | W.O.C., pull out landing string, pick up B.O.P. stack and test all functions, run and lock stack, check B.O.P. stack with 130.000 pull, OK, run riser, try to close connector without success, hydraulic system froze, check water temperature at sea floor, 28° F. |

2/...

1969

August 10

Changed emulsified fluid in Koomey accumulator for anti-freeze. Pump, top sea water and heated sea water into hole to thaw out hydraulic system, no success, waiting on equipment.

August 11

Circulating hot water in well-head, Temperature inside of stack increased from 28° to 31°., unable to raise temperature higher. Pulled & thawed red pod., filled accumulator and hoses with antifreeze. Run red pod but could not latch. Pulled pipe to 744. Run temperature survey, inside B.O.B. -34°, above BOP -32°, run drill pipe to top of hydrill, run kill line to 740', circulating through B.O.P.

August 12

Circulating warm water (100°F) through BOP stack. Repair hose connections to red pod, ran and tried to latch red pod without success.

August 13

Ran and latched red pod. 30" adapter leaking, latched riser connection. Tried to open hydrill, pull out of hole with tubing, run in with 5" drill pipe through hydrill. OK. Pull out and run in with hole opener, H.O. would not pass through hydrill. Pull out & run in with 5" drill pipe to 621' and circulate 136° sea water, pull green pod and work on accumulator.

1969

August 14

Work on green pod, ran pod but could not latch, pull red pod. Fill accumulator with diesel, run and latched red pod but BOP not functional, fill accumulator with water and soluble oil, pull red pod, found broken hose connection. Pump in 10 barrels of hot water 120° F every 15 minutes.

August 15

Waiting on weather and materials, continue filling BOP with hot water every 30 minutes.

August 16

Pulled drill pipe and riser, flushed and cleaned accumulator, repair green pod.

August 17

Release 30" hydraulic latch and close pipe rams on drill pipe and raise BOP stack 10'. Lower stack. Mix anti-freeze for Koomey system. Ran green pod. Pump into stack hot gel mud (205° F). Try to unlatch 30" adapter, close 5" drill pipe rams and pull stack. Remove H-4 connector and repair. Flush hydraulic lines with anti-freeze solution. Functional test OK.

August 18

Try to pressure test B.O.P., AX ring in lower H-4 connector leaking. Repair and install H-4 connector, test negative. Pull H-4 connector. Waiting on parts.

August 19

Move BOP to key slot, repair red pod and test BOP, test OK. Install new parts in H-4 connector. Waiting on weather.

4/...

| 1969 | |
|---|---|
| August 20<br>781' | Run and land BOP stack, unable to run riser because of bad weather. Install H-4 connector and test choke and kill lines to 5000 psi. OK. Wait on weather, moved BOP onto moon beams, ran and land BOP, open pipe rams and pull drill pipe. |
| August 21<br>781' | Pull riser, run and connect riser, run temperature survey. B.H.T. 43° F. Drilling cement. |
| August 22<br>1040' | Drilling 26" hole. Bit bailed up, trip out at 954', trip in, drilling. |
| August 23<br>1120' | Drilling 26" hole to 1120', circulate, trip out and prepare to run casing, running 20". |
| August 24<br>1120' | Finish running 20" casing with shoe at 1106', cement W 1250 US sacks of class G cement. C.I.P. at 05:30 hrs, back out running tool. Stand by for bad weather. Change rams in B.O.P. Test 3½" pipe rams with 5000 psi OK. |
| August 25<br>1120' | Pull BOP on moom pool beams, hook up pod hoses and running tool. Run BOP and test latch with 1000 psi, OK. Run riser and hook up flow line and fill up line. Run kill line & choke line. Test BOP & system with 5000 psi, OK. Test 20" casing with 500 psi, OK. Make up 12¼ bit and 17½" underreamer. |

1969

August 26
1432'

Trip in, found top of cement at 1072'. Drill out cement and shoe with sea water. Drilling from 1120' with mud. Survey at 1432 0°.30 Trip out, pick up 3-9" Drill collars, trip in with 12¼" bit. Cir. for core No. 1. Trip out.

August 27
1575'

Trip out, make up core barrel, trip in, circulate. Core from 1432' to 1442' and cir., trip out. Trip in with 12¼" bit and ream 8 7/16" hole. Drilling, wait on weather, try to drill, (too rough to make connection) Wait on weather.

August 28
1667'

Wait on weather (17½hrs), try to drill but too much torque on riser, wait on weather (1½ hrs), drill, wait on weather (1½ hrs).

August 29
1786'

Drilling, stand by for bad weather (19½ hrs). Repair flow line.

August 30

Trip out laying down drill pipe, hang drill collars in hole on bore protector. Release and pull green pod. Release riser and pick up and hold with rucker lines. Waiting on weather.

August 31

Ride out storm. Pull kill line & choke line and repair block guide. No. 2 & 3. Guide lines broke.

6/...

1969

Sept. 6

Waiting out storm. (6 hrs) Run choke and kill lines run bore protector and prepare to drill. Run in hole with Bowen 12" junk basket, made one foot of hole with junk basket, trip out. Recovered 3 hole opener cones, trip in, open hole 1546' to 1601'.

Sept. 7

Opening hole, tight hole while making connections. Circulate and condition mud, raise viscosity, opening hole, short trip to condition hole, circulate, survey at 2000' 3/4°, trip out, prepare to log.

Sept. 8

Run Schlumberger, dual induction log, micro log, gamma ray log. Trip in hole with 15" bit and 17½" hole opener, pack swivel, open hole to 1992' start trip out of hole.

Sept. 9

Finish trip out of hole, left 2 cones off hole opener in hole, trip in with Bowen junk basket, made one foot of hole. Trip out, recovered 2 cones, trip in and open hole, trip out to check H.O. left one cone in hole. Dress H.O.; trip in and opening hole. Start out of hole at 6:30 p.m. because of storm warnings. Secure rig for storm.

Sept. 10

Pull marine riser - stand by for storm.

8/...

1969

Sept. 11

Stand by for storm (9 hrs). Re-orient flex joint, run riser and prepare to run Schlumberger, run caliper log (windy and rough sea).

Sept. 12

Finish running caliper log, run gamma ray, stand by for storm. (21 hrs)

Sept. 13

Stand by for storm. (12 hrs) start preparations to drill at 1200' (noon). Trip in with 17½ H.O., open hole from 1850' to 1992', pull out of hole and break down drilling tools. Run kill line.

Sept. 14

Latch in kill line and test with 5000 psi OK., Retrieve ware bushing. Prepare to run casing. Run 13 3/8" casing, shoe at 1975.70', cement with 110.000 lbs of class G cement, bump plug with 1200 psi, C.I.P. at 2:15 p.m. back off running tool and test seal with 500 psi OK. Trip out, run choke line and stopped at 450', found shaked in funnel, finnish running choke line and try to stab in.

Sept. 15
2355'

Try to make up choke line, tool joint broke high, pull out and tighten all tool joints. Service latch sub. Run in hole with choke line and latch in OK. Test line with 5000 psi OK. Trip in with drilling assembly, found top of cement at 1905', clean out to 1965' and pressure test casing with 500 psi OK. Drill out float at 1935' and shoe at 1975', found junk at 2000', trip out run globe basket and recovered one cone. Trip in with 12¼" bit, Drilling.

1969

Sept. 16
2670'

Drilling, had a gas show at 2557'. Slow down pumps to 300 G.P.M. and circulating to check for flow. Gaining 10 BBLS per hour, mix weight material to 12.2 p.p.g. pull to shoe, check flow for 15 mins. Run back to bottom. Run survey at 2567' 1°. Trip to change bit, install safety valve on Kelly, circulating (gained 80 BBLS)

Sept. 17
2896'

Circulating, pull out to shoe check for flow (15 mins) pull out of hole & break down tools, make up core barrel. Trip in, circulate, cut core No. 3 from 2670' to 2684', trip out (recovered 14'). Trip in with drilling assembly, ream core hole.

Sept. 18
2910'

Drill, circulate & check for flow. Trip out to 13 3/8 shoe and check for flow. Trip to bottom, circulate and build mud weight. Trip out and lay down 9 7 3/4" drill collars. Pick up 9 joints of pipe, trip in and circulate and build mud weight (Vis 40-Wt 10.9) (gained 195 BBLS).

Sept. 19
2965'

Drilling and circulating while building mud weight. Circulate and build mud weight (storm warning) trip out; Rig Schlumberger and run dual induction log. Secure rig for storm.
Note: Prior to trip out, pump in 80 BBLS of 15 p.p.g. mud.

Sept. 20

Pull choke line and lay down slip joint and marine riser waiting out storm.

10/...

1969

| | |
|---|---|
| Sept. 21 | Wait out storm (7½ hrs), run flex joint and marine riser, run kill and choke lines and test to 5000 psi OK. Pick up 5" drill pipe. Install cementing head and circulate. |
| Sept. 22 | Circulate and build mud weight (Wt. 13.4). Trip in with drilling assembly, circulate, off load casing from supply ship. Condition mud for log. Trip out of hole. |
| Sept. 23 | Rig Schlumberger, run sonic, gamma ray and IES electric logs. Run side wall neutron. Trip in with drilling assembly. Condition mud for casing. Trip out and rig to run casing. Run 9 5/8" casing with shoe at 2959.70 mix 9360 US sacks of cement. C.I.P. at 11:15 a.m. test casing with 2500 psi. |
| Sept. 24<br>3014' | Lay down 14 Sts of 9 5/8" casing, made up torque tool with 3 6¼" drill collars. Trip in with test tool, test BOP, with 3000 psi OK. Test casing hanger with 2500 psi OK. Make up 8½" bit and drilling assembly, trip in, drill out float at 2882' and shoe at 2959', drilling. |
| Sept. 25<br>3102' | Drill to 3093', circulate out samples, circulate and mix weight material. (Gaining volume(25 BBLS) in pits and some gas in mud). Close in well for 2 hrs, pump in heavy mud. Survey. Trip to change bits. Drilling mud Wt. 14.6 - Vis. 63. |

1969

| | |
|---|---|
| Sept. 26<br>3188' | Drill to 3160'. Circulate bottoms up. Trip for new bit and pick up 3 drill collars. Drilling, build mud weight. Trip to change bits. (gained 70 BBLS) |
| Sept. 27<br>3275' | Drill to 3259', circulate and condition mud. Trip to change bits and install junk subs in drilling assembly. Drilling. (drilling mud is stabelized no gains or losses). |
| Sept. 28<br>3349' | Drill to 3306', trip to change bits. Drilling no gains in mud pit. Wt. 14.6 - Vis. 67. |
| Sept. 29<br>3405' | Drilling, repair Kelly spinner, drilling, work on track in derrick (rough sea). Check bumper subs for wash out, OK. Circulate and work on tracking system. Trip to change bits at 3306'. Drilling. |
| Sept. 30<br>3556' | Drill to 3480, trip to change bits, drilling no gains in mud system. Wt. 15.2 - Vis. 60. |
| Oct. 1<br>3579' | Drilling, repair flow line. (rough seas 6° roll) Trip out to bottom of 9 5/8" casing, circulate and condition mud and wait on weather (18½ hrs). |

12/...

1969

| | |
|---|---|
| Oct. 2 | Standing by for rough seas. Start trip out, seas to rough unable to finish trip out. Standing by because of rough weather. Circulating, try to pull out of hole. Seas too rough. (wait on weather 24 hrs). |
| Oct. 3<br>3597' | Standing by, rough seas (13 hrs), finish trip out at 1:00 p.m.. Install Gray safety valve 18 stand from bottom, trip in, circulate, drilling. |
| Oct. 4<br>3650' | Drill to 3630', trip for bit and remove Gray valve from drill string, drilling, survey, drilling. Trip |
| Oct. 5<br>3718' | Finish trip for new bit. Drilling, trip to change bits at 3692', drilling. |
| Oct. 6 | Drilling until 2:30 a.m., circulate (rough seas, 5 to 9° roll). Waiting on weather (21½ hrs). |
| Oct. 7 | Displace 80 BBLS of heavy mud in hole, hung or 17 2/3 stands of drill pipe and drilling assembly and Gray valve, bottom at 2903'. Lay down drill pipe, pull choke & kill lines, slip joint and marine riser. Stand by for storm. (24 hrs). |

13/...

1969

| | |
|---|---|
| Oct. 8 | Standing by, rough weather. (24 hrs). |
| Oct. 9 | Running riser, fish diving bell out of water. Guide line fouled around BOP. unable to stab riser, trying to unfoul guide line with divers. Lay down riser, fish for guide funnel, move funnel to side and rebuild guide arms. Running marine riser. |
| Oct. 10 | Stab riser in BOP, hook up slip joint and flow line, run kill line & choke line and test to 5000 psi, OK. Displace sea water in riser with mud. unable to stab in hanging tool. Trip out, screw into hang off tool. unable to pull loose. Pull up and remove hang off tool. Pull out & run back to bottom. Circulate at 3729' and build up mud weight. Trip out and spot 50 BBLS of heavy mud at 9 5/8" casing shoe. Trip. |
| Oct. 11<br>3753' | Finish trip out. Rig Schlumberger. Run sonic log. Continuous dipmeter and velocity survey. Rig down Schlumberger, trip in (rough seas) drilling. |
| Oct. 12<br>3817' | Drill to 3770, trip to change drilling assembly and bit. Trip in with diamond bit. Drilling. |
| Oct. 13 | Drilling to 3856'. Waiting on weather (7½ hrs) Rough seas, 5° - 10° roll. |

14/...

1969

Oct. 14

Waiting on weather 1½ hrs. Trip to change bits, drilling to 3917', trip out and make up core barrel, trip in, circulate, core to 3926', trip out and recovered 9' of core.

Oct. 15

Start trip in hole, rough seas, wait on weather (12 hrs) trip out, rig Schlumberger, run Sonic, gamma ray, neutron logs and side wall cores. Waiting out storm wind 55 mph roll 5° - 16°.

Oct. 16

Pull electric log up in riser and close blind arms. No. 7 anchor line broke letting barge swing off hole breaking off riser, kill line and choke line. Hydraulic lines pulled into, guide line broke. Lost No. 8 anchor. barge rolling 7°-22°. Blocks tore out tracking system. Cut no. 2-5-6 anchors so barge would head into storm. Cut no. 3-4 anchors, barge swinging on No. 1 anchor (38 stands of drill pipe is in derrick).

Oct. 17

Holding barge into weather with no. 1 anchor line and tug Vigilant. Cut anchor line no. 1, moving barge from location with tug Vigilant. Wind 50/60 knots.

Oct. 18

Tug Vigilant holding drilling barge into weather, supply ships Millerntor and Artic Shore standing by. Transfer 35 people from drilling barge to Millerntor. Secure drilling barge for towing. Transfer 6 people to Artic Shore. Start tow to Halifax.

HUDSON BAY
WALRUS A-71

Flowing water and gas shows during the 12½" and 8½" drilling phases

| Date | Depth | Mud | Operations | Flowing water | | | GAS SHOWS | |
|---|---|---|---|---|---|---|---|---|
| | | | | Volume | MUD | | | |
| | | | | | Cl g/l content | Na g/l content | C 1% | C 2% |
| 12½" Phase | | | | | | | | |
| 16.09.69 | 2528 | 1.12 | Drilling | 5 à 10 bbl/h | 47 | 50 | - | - |
| 16.09.69 | 2567 | 1.22 | Drilling | 10 bbl/h (80 bbl) | 50 | 50 | 1.5 | 0.05 |
| 17.09.69 | 2858-2890 | 1.25 | Drilling | 5 bbl/h (19 bbl) | 50 | 50 | 0.15 | - |
| 18.09.69 | 2903 | 1.34 | Drilling | 20 bbl/h (195 bbl) | 50 | 218 | 0.10 | - |
| 19.09.69 | 2965 | 1.36 | Drilling | 2 à 5 bbl/h (20 bbl) | 50 | 280 | 1.4 | 0.035 |
| 22.09.69 | 2965 | 1.70 | Circulate after 50 hrs. w/ on storm | (5-10 bbl/h) (60 bbl) | 50 | 264 | 0.1 | - |
| 8½" Phase | | | | | | | | |
| 25.09.69 | 3073 | 1.75 | Drilling | 5-10 bbl/h (36 bbl) | 100 | 210 | 0.4 | - |
| 26.09.69 | 3095 | 1.78 | Drilling | 10 bbl/h (70 bbl) | 150 | 315 | 5.8 | 0.12 |
| 27.09.69 | 3140 | 1.80 | Connection | - | - | - | 0.35 | - |
| 27.09.69 | 3162 | 1.78 | Resuming drilling | - | - | - | 6.00 | 0.16 |
| 03.10.69 | 3580 | 1.75 | Resuming drilling after 56 hrs w/strom | 5/10 bbl/h | 136 | 315 | 7.00 | 0.13 |
| 04.10.69 | 3630 | 1.75 | Resuming drilling | (5 à 10 bbl) | 180 | 315 | 1.00 | 0.07 |
| 05.10.69 | 3650 | 1.76 | Resuming drilling | (5 à 10 bbl) | 160 | 315 | 3.80 | 0.07 |
| 05.10.69 | 3692 | 1.76 | Resuming drilling | (5 à 10 bbl) | 160 | 315 | 4.00 | 0.06 |

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 2.E

## DAILY DRILLING REPORT

# DRILLING REPORT
A.C.C.

1 WELL Hudson Walrus A-71
RIG Wodeco II

2 Drilling
No. 1
DATE Aug. 6

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19
$W^t$ mini ____ $W^t$ maxi ____ V mini ____ V maxi ____
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22
ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | $W^t$ M.D. |
|---|---|---|---|
| | | | |

NOTES

24
FORMATION ____
Type . Stage

25
CORES ____

26
DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 4:2300 | 14:30 | 15:30 | Moving and positionning. |
| Aug 5:1430 | 22:30 | 8:00 | Run anchors 1, 5, 8. |
| Aug 5:2230 | 23:00 | 0:30 | Repair reel anchoring system. |

28
TIME ANALYSIS
1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. ____
17 - Vac ____

29
PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-7

RIG Wodeco II

2 No. 2

DATE Aug 7,'69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

## MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

## STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION ______

Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 5: 2300 | 0:00 | 1:00 | Repair Pengo winch. |
| Aug 6: 000 | 3:15 | 3:15 | Run anchor no. 6. |
| Aug 6: 315 | 6:00 | 2:45 | Wait or Decca. |
| Aug 6: 600 | 23:00 | 17:00 | Run anchors 4, 3,2, 7 |
| | | | Reset anchors 4, 5, 3. |
| | | | |
| | | | August 7: 9:00 a.m. Pulling T.V. Preparing to run |
| | | | base plate. Location approved by A.C.C. Bottom O.K. |
| | | | by T.V. |

28 TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. ______
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71

RIG Wodeco II

2 No. 3

DATE Aug 8,'69

PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| TOTAL Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 6:23:00 | 23:00 | 24:00 | Anchoring up. Run T.V. Check sea bottom O.K. Water depth 617.53' from RKB. Landed temporary guide base. Made up 26" bit. 36" hole opener. Drilling without mud return. |
| | | | RKB: 31.53' above sea level. |

28 TIME ANALYSIS

1 - R.U.D. ______

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Aband ______

15 - Rep ______

16 - W.T. ______

17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71

RIG Wodeco II

2 No. 4

DATE Aug 9

## PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| TOTAL Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

## MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

## STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 7:23:00 | 23:00 | 24:00 | Drilling 36" hole to 781'. Circulate and fill hole with mud. Deviation survey 1°. Trip out of hole. Run 30" casing shoe at 772.50'. Run T.V. Cementing and displacing. WOC. |

28

TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. cp. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. ______
17 - Vac ______

29

PROGRAMME ______

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71
RIG Wodeco II

2 No. 5
DATE Aug. 10

**PENETRATION**

PHASES

| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

**MUD**

CHARACTERISTICS

19
Wt mini ____ Wt maxi ____ V mini ____ V maxi ____
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

**STRING**

22
ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

**NOTES**

24
FORMATION ____
Type . Stage

25
CORES ____

26
DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 8:23:00 | 23:00 | 24:00 | WOC. Pull out landing string. Pick up B.O.P. stack. Tested all functions. Run and lock stack. Make pick up test 130,000 lbs. Run riser. Try to close connector without success. Hydraulic system froze up. Water temperature on sea bottom 28°F. |

28
TIME ANALYSIS
1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. ____
17 - Vac ____

29
PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71

RIG Wodeco II

2 No. 6

DATE Aug. 11

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| **TOTAL**<br>Drilled-cored | 3 | | 4 | | 5 | |
| **EACH BIT** | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 9:23:00 | 23:00 | 24:00 | Changed emulsified fluid in Koomey accumulator for anti-freeze. Pumped top sea water and heated water into the hole. Waiting on equipment. |

28 TIME ANALYSIS

1 - R.U.D. ______

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Abano ______

15 - Rep ______

16 - W.T. ______

17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71

RIG Wodeco II

2 No. 7

DATE Aug. 12

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | ∅ | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

## MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

## STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION ______
Type . Stage

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 10:2300 | 23:00 | 24:00 | Circulating hot water in well-head. Temperature inside the stack increased to 31°F. Trying to increase heating capacity. Cutting and shooting specialists will be in Churchill tomorrow, August 13. |
| | | | Pulled and thawed red pod. Filled accumulator and hoses with anti-freeze. Run red pod and attempt to latch without success. |
| | | | Pulled pipe to 744' and run Schlumberger temperature survey. Temperature above BOP 32°F, inside BOP 34°F. Run 5" DP stopped at Hydril. Run kill line to 740'. Circulating surface 38°F water through BOP. |

28 TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. ______
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71

RIG Wodeco II

2 No. 8

DATE Aug. 13

## PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| TOTAL Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

## MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

## STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug11:23:00 | 23:00 | 24:00 | Circulating warm water (100°F) in the well head. Slight improvement. Waiting on shooting and cutting specialists and equipment. |
| | | | Repaired hose connections to red pod. Ran and tried to latch red pod without success. |

28 TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. ______
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Hudson Walrus A-71

RIG Wodeco II

2 No. 9

DATE Aug. 14

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | W.M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

27 TIME LOG

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| Aug 12:2300 | 23:00 | 24:00 | Ran and latched red pod. 30" adapter leaking on open side. All other functions O.K. Latched riser connection. Tried to open hydril. Pulled tubing. Ran 5" DP through BOP O.K. Ran HO stopped at hydril. Reran 5" DP to 621'. Circulating 136°F sea water at 10 bbls/30 minutes. Pulled green pod and repair work on accumulator. |

28 TIME ANALYSIS

1 - R.U.D. ______

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Aband ______

15 - Rep ______

16 - W.T. ______

17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
2 No. 10
RIG WO II
DATE 8.15.69

PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| TOTAL | 3 | | 4 781 | 00 | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

| LOSSES and GAINS | | |
|---|---|---|
| 20 | this day | cumul |
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION ______
Type . Stage

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 23.00 | 24.00 | Pull D.P. out of hole |
| | | | Pull riser loose and lay down same |
| | | | Flush and clean Koomey tanks |
| | | | Repair green Pod |

28 TIME ANALYSIS

| | |
|---|---|
| | 9 - Mis. op. ______ |
| 1 - R.U.D. ______ | 10 - W.C. ______ |
| 2 - D. ______ | 11 - Casing ______ |
| 3 - Red ______ | 12 - Circ ______ |
| 4 - D.T. ______ | 13 - Fishing ______ |
| 5 - H.O. ______ | 14 - Aband ______ |
| 6 - Cor ______ | 15 - Rep ______ |
| 7 - C.T. ______ | 16 - W.T. 24.00 |
| 8 - Test ______ | 17 - Vac ______ |

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
2 No. 11
RIG WO II
DATE 8.16.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 | | 4 781 | 00 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19
Wt mini ____ Wt maxi ____ V mini ____ V maxi ____
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21
46 sax Caustic
12 sax CMC

STRING

22
ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24
FORMATION Type . Stage ____

25
CORES ____

26
DEVIATION ____

| 27 TIME LOG FROM | TO | ELAPSED TIME |
|---|---|---|
| 23.00 | 23.00 | 24.00 |

Mixed anti freeze for Koomey. Ran green Pod out O.K.Ran 5" DP to 621'. Pumped hot gel mud 205° in BOP. 20 S.P.M. Try to unlatch 30" adaptor. 30" adaptor unlatched. 5" pipe rams operated O.K. Close 5" rams on DP and pull stack. Change 5" ram blocks. Remove top H4 connector from stack and repairing same. Flush hyd. lines to BOP. Function test BOP.

28
TIME ANALYSIS
1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 24.00
17 - Vac ____

29
PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
RIG WO II

2 No. 12
DATE 8.17.69

**PENETRATION**

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 781 | 00 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

**MUD**

CHARACTERISTICS

19
Wt mini ____ Wt maxi ____ V mini ____ V maxi ____
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

**STRING**

22
ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

**NOTES**

24
FORMATION ____
Type . Stage

25
CORES ____

26
DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 23.00 | 24.00 | Try to pressure test BOP. Ax ring on bottom H4 connector leaking. Repair and install top H4 connector. Function test H4 N.G. Tear out H4 wait on parts. Mix anti freeze for Koomey. Move BOP to moon pool beams. Change ax ring Test 5" rams. to 5000 PSI 15 min. O.K. Test hydril 3500 PSI 15 min. O.K. Test blind rams 5000 PSI 15 min. O.K. Function test choke and kill valves O.K. |

28
TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 24.00
17 - Vac ____

29
PROGRAMME ____

406

# DRILLING REPORT

## A.C.C.

1 WELL Walrus A-71

2 No. 13

RIG WO II

DATE 8.19.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 781 | 00 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | |
|---|---|
| Spersene | 100 sax |
| Lime | 20 sax |
| Caustic | 30 sax |

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 23.00 | 24.00 | Move BOP to key slot and secure.- Wait on parts for H4 connector. Mix mud. Repair red pod and test. Installing new parts for H4. |

28 TIME ANALYSIS

1 - R.U.D. ______

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Aband ______

15 - Rep ______

16 - W.T. 24.00

17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
2 No. 14
RIG WO II
DATE 8.20.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 781 | 00 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION ______
Type . Stage

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 23.00 | 24.00 | Installed H4 connector. Tested Kill and choke lines and stab ins. to 5000 PSI 15 min. O.K. |
| 04.00 | 18.00 | 14.00 | Wait on weather |
| 18.00 | 23.00 | 5.00 | Moved BOP on beams. Latched 30" adaptor. Ran BOP and landed. Open pipe rams. Pull DP with 30" adaptor in the unlocked position |

28 TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. 24.00
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
RIG WO II
2 No. 15
DATE 8.21.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 781 | 00 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

BITS / PARAMETERS

| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 15 | OSCJ | JK538 | 5/8 | | 20,000 | 80 | | 750 |
| SERVCO | 26 | 15B | UNDER | REAMER | | | | | |

MUD

CHARACTERISTICS

19 SEA WATER

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS 15" bit - 26" HO - 3.9" DCs - B-Sub-3 7/3/4 DC - B-Sub - 3 7/3/4/Dc XO = 324.90

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | 38 | | 80 |

NOTES

24 FORMATION Type . Stage Cement

25 CORES

26 DEVIATION

27

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | | | Ran riser tried to latch without success. Pull riser. |
| | | | Remove guide funnel on flex 2T. Run riser and latch O.K. |
| | 17.00 | 18.00 | Run kill line and test to 5000 PSI. Make up drilling |
| | | | assembly. |
| | 22.15 | 5.15 | Run to top of cement at 748' |
| 22.15 | 23.00 | 0.45 | Drill out CMT |

28 TIME ANALYSIS

| | |
|---|---|
| | 9 - Mis. op. 23.15 |
| 1 - R.U.D. | 10 - W.C. |
| 2 - D. | 11 - Casing |
| 3 - Red 0.45 | 12 - Circ |
| 4 - D.T. | 13 - Fishing |
| 5 - H.O. | 14 - Aband |
| 6 - Co | 15 - Rep |
| 7 - C.T. | 16 - W.T. |
| 8 - Test | 17 - Vac |

29 PROGRAMME Drilling

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 16

DATE 8.22.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| **TOTAL**<br>Drilled ~~cored~~ | 3<br>259 | 00 | 4<br>1040 | 00 | 5<br>13 | 00 |
| **EACH BIT** | 6 | | 7<br>781 | 00 | 8 | |
| Drilled-cored | 259 | 00 | 1040 | 00 | 13 | 00 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | | OSCJ | 2K538 | 3 3/4 | | 20,000 | 80 | 900 | 800 |
| SERVCO | | 26" B15 | UNDER REAMER | | | | | | |

MUD

CHARACTERISTICS

19

W! mini 68 Wt maxi 72 V mini 58 V maxi 60

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

| 20 LOSSES and GAINS | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

21 PRODUCTS ADDED

| | |
|---|---|
| Magcogel | 90 sax |
| Spersene | 23 sax |
| Sodium Phosphate | 30 sax |

STRING

22 ELEMENTS 15" bit-26" HO-XO-39" DCs XO B-sub- 3 7/3/4DC - B-Sub - 3 7/3/4DC = 324.95

| 23 WEIGHT (in mud) | D.C. | D.P. | W! M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage Clay

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 00.30 | 01.30 | Drill out CMT 763' to 781' |
| 00.30 | 01.00 | 00.30 | Drill |
| 01.00 | 04.00 | 03.00 | Work on DWKS |
| 04.00 | 04.30 | 00.30 | Ream 784' to 804' |
| 04.30 | 12.30 | 08.00 | Drilling |
| 12.30 | 13.00 | 00.30 | Repack swivel |
| 13.00 | 14.00 | 01.00 | Trying to unball bit |
| 14.00 | | | Pull out clean bit and no change sets. Make up 20" running tool. |
| | 18.30 | 04.30 | Run in ream 748' to 792' |
| 18.30 | 23.00 | 04.30 | Drilling F/ 953' to 1040' |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1 - R.U.D. | | 9 - Mis. op. | |
| 2 - D. | 13.00 | 10 - W.C. | |
| 3 - Red | 02.00 | 11 - Casing | |
| 4 - D.T. | 04.30 | 12 - Circ | |
| 5 - H.O. | | 13 - Fishing | |
| 6 - Cor | | 14 - Aband | |
| 7 - C.T. | | 15 - Rep | 03.30 |
| 8 - Test | | 16 - W.T. | |
| | | 17 - Vac | |

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 17

DATE 8.23.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 80 | 00 | 4 1120 | 00 | 5 | |
| EACH BIT | 6 | | 7 1120 | | 8 | |
| Drilled-cored | 339 | 00 | 781 | | 19 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | | OSCJ | 2K538 | 3 3/4 | | 25,000 | 80 | 900 | 800 |
| SERVCO | | 26" | UNDER REAMER | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

## MUD

CHARACTERISTICS

19

Wt mini 69 Wt maxi 70 V mini 50 V maxi 55

F. ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

Magcobar 40 sax

Calcium Chloride15 sax

## STRING

22 ELEMENTS 15" bit-26" HO-3.9" DCs-B-sub-3 7/3/4 DC - B-Sub - 3 7/3/4 DCs XO = 324.95

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage Clay

25 CORES

26 DEVIATION 1120' 2°

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 03.30 | 04.30 | Drilling to 1120' |
| 03.30 | 06.30 | 03.00 | Pull to shoe and ream each joint to bottom |
| 06.30 | 07.00 | 00.30 | Circulate |
| 07.00 | 07.30 | 00.30 | Survey |
| 07.30 | 09.30 | 02.00 | Trip out. Pull kill line. Pull riser. |
| | 18.00 | 08.30 | Pull BOP Stack |
| 18.00 | | | Run to bottom with 26" bit. Spot 125 brl |
| | 22.00 | 04.00 | Mud and pull out. |
| 22.00 | 23.00 | 01.00 | Rig to run 20" CSG |

28

TIME ANALYSIS

1 - R.U.D. ____

2 - D. 04.30

3 - Rec 03.00

4 - D.T. 06.00

5 - H.O. ____

6 - Cor ____

7 - C.T. ____

8 - Test ____

9 - Mis. op. 11.00

10 - W.C. ____

11 - Casing ____

12 - Circ ____

13 - Fishing ____

14 - Aband ____

15 - Rep ____

16 - W.T. ____

17 - Vac ____

29 PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 18

DATE 8.24.69

PENETRATION

## PHASES

| Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 | | 4 1120 | 00 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

## CHARACTERISTICS

19

W<sup></sup>t mini ____ Wt maxi ____ V mini ____ V maxi ____

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

## LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

## PRODUCTS ADDED

21

| | |
|---|---|
| Magcogel 170 sax | |

STRING

22 ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ____

25 CORES ____

26 DEVIATION ____

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 04.00 | 05.00 | Run 20" casing - Shoe at 1106' |
| 04.00 | 05.30 | 01.30 | Cement 20" CSG with 1250 sax Class G. Cement CIP c 0530 |
| 05.30 | 07.00 | 01.30 | Tear out Howco back out running tool. |
| 07.00 | 23.00 | 16.00 | Stand by for weather. Install 3 1/2" rams. 5000 PSI 15 min. O.K. Repair cement shipping lines. |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ 08.00
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 16.00
17 - Vac ____

29 PROGRAMME ____

406

# DRILLING REPORT
A.C.C.

1 WELL Walrus A-71
RIG WO II
2 No. 19
DATE 8.25.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 1120 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

BITS / PARAMETERS

| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | | OSC-3J | KK 267 | 3 1/2" | | | | | |
| SERVCO | | 17 1/2" | | | HOLE OPENER MODEL B 11 | | | | |

MUD

CHARACTERISTICS 19

Wt mini ____ Wt maxi ____ V mini ____ V maxi ____
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS 20

| | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED 21

| | | | |
|---|---|---|---|
| Spersene | 60 sax | Kelzan | 18 sax |
| Chrome Alum. | 4 sax | Magcogel | 15 sax |
| Defoamer | 18 can | | |
| Dowicide B | 1 can | | |
| Caustic | 10 sax | | |

STRING

22 ELEMENTS 12 1/4 bit - 17 1/2 HO - 3.9"DCs-B-sub- 3 7/3/4 DCS - B-Sub - 3 7/3/4 DCS xo = 321.61

23 WEIGHT (in mud) D.C. ____ D.P. ____ Wt M.D. ____

NOTES

24 FORMATION Type . Stage ____
25 CORES ____
26 DEVIATION ____

27 TIME LOG

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | | | Pull BOP on moon pool beams. Hook up pod hoses make |
| 23.00 | | | up running tool functional test BOP. |
| | 03.00 | 04.00 | |
| | 07.00 | 04.00 | Run BOP and test latch to 1000 PSI O.K. |
| 07.00 | | | Rig and run riser hook up flow line and |
| | 13.00 | 06.00 | Fill up line |
| 13.00 | 15.00 | 02.00 | Run kill line |
| 15.00 | 18.00 | 03.00 | Run choke line |
| 18.00 | | | Test kill and choke and manifold to 5000 PSI 15 min. O.K |
| | | | Check auto choke |
| | 20.30 | 02.30 | Test 20" CSG to 500 PSI 15 min. O.K. |
| 20.30 | 23.00 | 02.30 | Lay down 26" bit make up D.A. Slip drilling line. |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing 24.00
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. ____
17 - Vac ____

29 PROGRAMME Drilling

# DRILLING REPORT

## A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 20

DATE 8.26.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| **TOTAL** | 3 | | 4 1432 | 00 | 5 14 | 45 |
| Drilled-cored | 312 | | 1120 | | | |
| **EACH BIT** | 6 | | 7 1333 | | 8 | |
| Drilled-cored | 213 | | 1120 | | 11 | 30 |
| Drilled-cored | | | 1432 | | 3 | 45 |
| Drilled~~-cored~~ XXXX | 09 | | 1333 | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| SERVCO | 17 1/2 | UNDER | REAMER B11 | 3 1/2" | 1130<br>213 | 25,000 | 90 | 880, | 1800 |
| HTC | 12 1/4 | OSC3J | KK267 | | | | | | |
| HTC | 12 1/4 | OSC3AJ | KK265 | 1/2" | 99/345 | 35,000 | 150 | 600 | 1250 |

MUD

CHARACTERISTICS

19

wt mini 1.09 wt maxi 1.11 v mini 48 v maxi 51

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

| 21 | | |
|---|---|---|
| Spersene | 36 sax | |
| Salt | 50 sax | |
| Magcobar | 135 sax | |
| Caustic | 5 sax | |
| CMC | 4 sax | |

STRING

22 ELEMENTS 12 1/4 bit-69"DCs=B-sub-3 7/3/4 DC - B-Sub -3 7/3/4 DCS - XO = 409.27

| 23 WEIGHT (in mud) | D.C. | D.P. | W! M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION 1432' 0°30'

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 24.00 | 01.00 | Run in to CMT @ 1072' |
| 24.00 | 01.00 | 01.00 | Drill out CMT and shoe with sea water |
| 01.00 | 12.30 | 11.30 | Drilling F/ 1120 with mud |
| 12.30 | 13.00 | 00.30 | Circulate and survey (NG) |
| 13.00 | 17.30 | 04.30 | Trip out lay down 17 1/2" reamer. Change bits. |
| | | | Run in hole. Picked up 39" DCs. |
| 17.30 | 20.45 | 03.15 | Drilling 12 1/4" hole |
| 20.45 | 22.00 | 01.00 | Circulate for core #1 |
| 22.00 | 23.00 | 01.00 | Dry pipe survey pulling out of hole. |

28 TIME ANALYSIS

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. |
| 2 - D. 14.45 | 10 - W.C. |
| 3 - Red | 11 - Casing |
| 4 - D.T. 05.15 | 12 - Circ 01.45 |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor 02.15 | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. |
| | 17 - Vac |

29 PROGRAMME Drilling

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 21

DATE 8.27.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| **TOTAL** | 3 | | 4 1575 | | 5 7 | 00 |
| Drilled-cored | 143 | | 1432 | | | |
| **EACH BIT** | 6 | | 7 1442 | | 8 | |
| Drilled-cored | 10 | | 1432 | | 1 | 15 |
| Drilled-cored | | | 1575 | | | |
| Drilled-~~cored~~ | 133 | | 1442 | | 5 | 45 |
| Drilled-cored | | | | | | |

| BITS Make (9) | Ø (10) | Type (11) | No. (12) | Nozzles (13) | Cumul (14) | PARAMETERS Weight (15) | R.P.M. (16) | Flow Rate (17) | Mud Pressure (18) |
|---|---|---|---|---|---|---|---|---|---|
| CHRIS. | 8 7/16 | Diamond 100-347 | EC 6906 | | 10/1.15H | 20,000 | 25 | 400 | 650 |
| HTC | 12 1/4 | DSC1G | JV900 | 1/2" | 133/5.45H | 30,000 | 100 | 600 | 1100 |

## MUD

### CHARACTERISTICS

19

Wt mini 1.11 Wt maxi 1.15 V mini 45 V maxi 55

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

### LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

### PRODUCTS ADDED

21

| | |
|---|---|
| Spersene | 20 sax |
| Caustic | 20 sax |
| Dowicide B | 1 can |
| CMC | 15 sax |

## STRING

22 ELEMENTS 12 1/4bit-6/9"DCs-2-B-subs-XO = 222.92

23 WEIGHT (in mud) D.C. ____ D.P. ____ Wt M.D. ____

## NOTES

24 FORMATION Type . Stage Limestone

25 CORES Recovered 14' core

26 DEVIATION ____

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 95.00 | 06.00 | Trip out make up CB. Run in |
| 05.00 | 05.15 | 00.15 | Circulate and drop ball |
| 05.15 | 16.30 | 01.15 | Coring 1432' to 1442' |
| 06.30 | 07.00 | 00.30 | Circulate |
| 07.00 | 12.00 | 05.00 | Trip out with core BBL service same. Trip in with 12 1/4 bit. |
| 12.00 | 13.00 | 01.00 | Ream 8 7/16" hole |
| 13.00 | 14.00 | 01.00 | Drill |
| 14.00 | 15.45 | 01.45 | Wait on weather. High Seas. |
| 15.45 | 20.30 | 04.45 | Drill |
| 20.30 | 23.00 | 02.30 | Wait on weather. Too rough to make conn. |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1 - R.U.D. | | 9 - Mis. op. | |
| 2 - D. | 05.45 | 10 - W.C. | |
| 3 - Red | 01.00 | 11 - Casing | |
| 4 - D.T. | | 12 - Circ | |
| 5 - H.O. | | 13 - Fishing | |
| 6 - Cor | 01.15 | 14 - Aband | |
| 7 - C.T. | 11.45 | 15 - Rep | |
| 8 - Test | | 16 - W.T. | 04.15 |
| | | 17 - Vac | |

29 PROGRAMME Drilling

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
RIG WO II

2 No. 22
DATE 8.28.69

PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3<br>92 | | 4<br>1667<br>1575 | | 5<br>3 | 30 |
| EACH BIT Drilled-cored | 6<br>92 | | 7<br>1667<br>1575 | | 8<br>3 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | $12\frac{1}{4}$ | OSC-16 | 2U-900 | 1/2" | 10 1/4 | 30,000 | 80 | 600 | 1100 |

MUD

CHARACTERISTICS

19
Wt mini 1.13 Wt maxi 1.15 V mini 44 V maxi 52
F 13.6 VA 22 Vp 16 Yv 10
Gel 0 3 10 12 S% 1.5 pH 9
Pf .2 Lc 1120 Solid 8 NaCL 63000
CALCIUM

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

| 21 | | |
|---|---|---|
| Magcobar | 850 sax | ) |
| Spersene | 37 sax | )TO RESERVE |
| Salt | 76 sax | ) |

STRING

22 ELEMENTS $12\frac{1}{4}$ bit - 6.9"DCs - 2 B-subs XO = 222.92

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage Clay and Limestone

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 16.30 | 17.30 | Wait on weather |
| 16.30 | 17.00 | 00.30 | Try to drill to much torque on riser. |
| 17.00 | 18.30 | 01.30 | Wait on weather |
| 18.30 | 21.30 | 03.00 | Drill |
| 21.30 | 23.00 | 01.30 | Wait on weather |

28 TIME ANALYSIS

1 - R.U.D.
2 - D. 03.30
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T. 20.30
17 - Var

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 23

DATE 8.29.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3<br>119 | | 4 1786<br>1667 | | 5 4 | 45 | | | | | | | | | | |
| EACH BIT<br>~~Drilled-cored~~ | 6<br>344 | | 7 1786<br>1442 | | 8 14 | 00 | 9<br>HTC | 10<br>$12\frac{1}{4}$ | 11<br>OSC-16 | 12<br>2U.900 | 13<br>1/2 | 14 | 15<br>30,000 | 16<br>80 | 17<br>600 | 18<br>1100 |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.15 Wt maxi 1.17 V mini 44 V maxi 55

F 1.312 VA 27 Vp 18 Yv 18

Gel 0 6 10 25 S% 2 pH 10.1

Pf 3 Lc Solid 93 NaCL 63000

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

Caustic 10 sax

STRING

22 ELEMENTS $12\frac{1}{4}$ bit-6.9"DCs - 2 B-subs XO = 222.92

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 03.45 | 04.45 | Drill |
| 03.45 | 23.00 | 19.15 | Stand by for weather |

28 TIME ANALYSIS

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. |
| 2 - D. 04.45 | 10 - W.C. |
| 3 - Red | 11 - Casing |
| 4 - D.T. | 12 - Circ |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. 19.15 |
| | 17 - Vac |

29 PROGRAMME Waiting on weather

406

# DRILLING REPORT

## A.C.C.

1 WELL Walrus A-71
RIG WO II

2 No. 24
DATE 8.30.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 1786 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 1786 | | 8 | |
| Drilled-cored | 344 | | 1442 | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | $12\frac{1}{4}$ | OSC-16 | 2U-900 | 1/2" | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19
Wt 1.15 Wt 1.15 V 40 V 42
F mini 18.0 VA maxi 20 Vp mini 14 Yv maxi 12
Gel 0 1 10 10 S% 1 pH 9.0
Pf .3 Lc 1200 Solid 9 NaCL 85,000

| 20 LOSSES and GAINS | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

21 PRODUCTS ADDED

STRING

22 ELEMENTS IN HOLE 2
23 STDS - XO - 2 B-subs - 6.9"DCs - XO $12\frac{1}{4}$ bit = 473.35

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23.00 | 23.00 | 24.00 | Pull up laying dn. drill pipe. Hang DCs. in hole on bore Pro. with bore Pro. retrieving tool. Release and pull green pod. Release riser. Pick up and hold with rucker lines. Wait on weather. |
| | | | Wind 45 to 50 m.p.h.<br>Swells 15' to 27' |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1 - R.U.D. | | 9 - Mis. op. | |
| 2 - D. | | 10 - W.C. | |
| 3 - Red | | 11 - Casing | |
| 4 - D.T. | | 12 - Circ | |
| 5 - H.O. | | 13 - Fishing | |
| 6 - Cor | | 14 - Aband | |
| 7 - C.T. | | 15 - Rep | |
| 8 - Test | | 16 - W.T. | 24.00 |
| | | 17 - Vac | |

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

2 No. 25

RIG WO II

DATE 8-31-69

PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 1786 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 1786 | | 8 | |
| Drilled-cored | 344 | | 1442 | | 14 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

BITS / PARAMETERS

| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 12¼" | OSC-1G | JC 900 | ½ | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS 2 2/3 STDS DP-XO-2B Subs - 6-9" DCS - 12¼" Bit
Bit at 1081'

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23:00 | 23:00 | 24 | Ride out storm |
| | | | No. 1 and No. 2 guide line broken |

28 TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. 24
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 26

DATE 9-1-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 1786 | | 5 | |
| EACH BIT | 6 | | 7 1786 | | 8 | |
| Drilled-cored | 344 | | 1442 | | 15 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 12¼ | OSC-1G | JV 900 | ½" | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

| 20 LOSSES and GAINS | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

21 PRODUCTS ADDED

STRING

22 ELEMENTS 2 2/3 STDS DP-XO-2B-Subs-XO 6=9" DCS-XO - 12¼" Bit = 473.35
Bit at 1081

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 23:00 | 23:00 | 24 | Wait on weather |
| | | | Pull choke and kill line |
| | | | Repair block guide |

28 TIME ANALYSIS

1 - R.U.D. ______

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Aband ______

15 - Rep ______

16 - W.T. 24

17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 27

DATE 9-2-69

PENETRATION

| PHASES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| TOTAL Drilled-cored | 3 | | 4 1786 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

NOTES

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | | | Tried to stroke slip joint open |
| | | | Could not slip joint dented |
| 23:00 | | | from hitting side of moon pool |
| | | | in storm |
| | | | Lay down slip joint & riser |
| | | | Guide arms on flex joint broken |
| | | | off |
| | | | Stab in BOP with D.P. Screw into |
| | | | Bore protector Pet tool. Move barge |
| | | | to align with BOP released from |
| | | | bore protector pulling out with |
| | 23:00 | 24 | drill assembly |

28 TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. 24
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. ______
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WC II

2 No. 28

DATE 9-3-69

## PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| **TOTAL** Drilled-cored | 3 | | 4 1786 | | 5 | |
| **EACH BIT** | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

## MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

| LOSSES and GAINS | | |
|---|---|---|
| 20 | this day | cumul |
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

## STRING

22

ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | | | Lay down 9" DC's |
| | | | Run & stab in hole with O.E. 5" D.P. |
| 23:00 | | | Run to 1156' Mix and pump in 188 sx |
| | | | cement with 2% calcium chloride CIP 4:00 a.m. |
| | | | Pull out of hole |
| | | | Lay down 7 3/4" DCS out of derrick |
| | | | Run stab in & pull BOP stack |
| | | | Install 1 & 2 guide lines & green POD |
| | | | Run land and test BOP O.K. |
| | | | Unload slip jt. & flex jt. F/Arctic Shore |
| | | | Running riser |
| | 23:00 | 24 | Welding new Pad eyes on slip jt. |

28 **TIME ANALYSIS**

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. 24
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. ______
17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71
RIG WO II

2 No. 29
DATE 9-4-69

## PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| **TOTAL** Drilled-cored | 3 | | 4 1786 | | 5 | |
| **EACH BIT** | 6 | | 7 1515 | | 8 | |
| Ream ~~Drilled-cored~~ | 182 | | 1333 | | 5 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 SERVCO<br>HTC | 10 26"<br>15" | 11 Under<br>OSC-J | 12 Reamer<br>No.2 RR | 13 3/4 | 14 | 15 10,000 to 15,000 | 16 80 | 17 640 | 18 500 |

## MUD

CHARACTERISTICS

19
Wt mini 1.15 Wt maxi 1.18 V mini 45 V maxi 50
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

| | |
|---|---|
| 21 Magcobar 20 sx | to dry pipe |

## STRING

22 ELEMENTS 15" Bit - 17½" H.O. 6 - 73/4 DCS - B Sub = 223.28

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage ____

25 CORES ____

26 DEVIATION ____

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24:00 | | | Picked up slip joint lower and land |
| | | | Riser cut off pad eyes on slip jt. |
| | 07:00 | 7 | and reweld hool up flow line |
| 07:00 | 14:00 | 7 | Run kill & choke lines & test to 5000 psi |
| 14:00 | 17:00 | | Pick up drill assembly run to top cmt. |
| | | 3 | at 1297' |
| 17:00 | 18:00 | | Change over to mud clean out cmt |
| | | 1 | to 1333' very soft |
| 18:00 | 18:30 | ½ | Work on flow line |
| 18:30 | 24:00 | | Open 12½ hole to 17½" |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red 5½
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. 18½
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. ____
17 - Vac ____

29 PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 31

DATE 9-6-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 1786 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 1601 | | 8 | |
| Reamed ~~Drilled-cored~~ | 75 | | 1526 | | 1 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | Rov | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 15" | OSC-3J | KF 885 | 20/32 | | 20,000 to 30,000 | 100 | 640 | 800 |
| | | | | | | | | | |
| Bowen | | 12" Junk Basket | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.19 Wt maxi 1.19 V mini 42 V maxi 46

F 48.5 VA ____ Vp 13 Yv 13

Gel 0 5 10 14 S% 1 pH 11.0

Pf 1.0 Lc 33,500 Solid 9 NaCl 2200

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | |
|---|---|
| Magcobar | 20 sx |

STRING

22 ELEMENTS 15" Bit - Bit sub - 12 - 7 3/4 OCS - 12¼ Stab - B. Sub - XO = 402.01

23 WEIGHT (in mud) D.C. ____ D.P. ____ W. M.D. ____

NOTES

24 FORMATION Type . Stage Lime

25 CORES ____

26 DEVIATION ____

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 24:00 | 10:30 | 10½ | Wait on weather |
| 10:30 | | | Hook up Kill & Choke Hoses |
| | 14:00 | 3½ | Hang slip joint. Hook up flow line |
| 14:00 | | | Run in retreive drill assembly |
| | | | Make up Bowen 12" Junk Basket and |
| | 18:00 | 4 | run in to 1786' |
| 18:00 | 18:45 | 3/4 | Make 1' hole with Junk Basket |
| 18:45 | | | Pull out , recovered all 3 cutters |
| | | | Make up 15" pick up 6 more - 7 3/4 DCS |
| | 22:30 | 3 3/4 | Run in to 1526' |
| 22:30 | 24:00 | 1½ | Open 12¼" hole to 15" |

406

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. 3/4
3 - Red 1½
4 - D.T. 7 3/4
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. 3
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 10½
17 - Vac ____

29 PROGRAMME ____

# DRILLING REPORT

## A.C.C.

1 WELL WA-71

RIG WO II

2 No. 32

DATE 9-7-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| **TOTAL**<br>Drilled-cored | 3 214 | | 4 1786<br>2000 | | 5 8 | 30 |
| **EACH BIT**<br>Drilled~~-cored~~ | 6 134 | | 7 1786<br>1920 | | 8 5 | 30 |
| Drilled-cored | | | 1920 | | | |
| Drilled-cored | 80 | | 2000 | | 3 | 00 |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 HTC | 10 15 | 11 OSC 3J | 12 KF 885 | 13 5/8 | 14 209/630 | 15 42000 | 16 90 | 17 920 | 18 1600 |
| HTC | 15 | OSC 3J | KF 932 | 5/8 | 80/300 | 42000 | 110 | 920 | 1600 |

MUD

CHARACTERISTICS

19

| | | | |
|---|---|---|---|
| Wt mini 1.19 | Wt maxi 1.23 | V mini 45 | V maxi 58 |
| F 48 | VA | Vp | Yv |
| Gel 0 | 10 | S% | pH 11 |
| Pf | Lc | Solid | NaCL |

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | | | |
|---|---|---|---|
| Salt Gel | 25 sx | CMC | 13 sx |
| Duovis | 14 sx | Magcobar | 50 sx |
| Chrome Alum | 4 sx | Spersene | 1 sk |
| Dowicide B | 20 lbs. | | |
| Gel | 56 sx | | |

STRING

22 ELEMENTS 15" Bit, Bit sub, 12 - 7 3/4" D.C., Stab, B. Sub - 402

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION 2000' - 0°45'

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24:00 | 03:30 | 3½ | Open 12¼" to 15"  1601 to 1786' |
| 03:30 | 06:00 | 2½ | Drilling |
| 06:00 | 07:00 | 1 | Tight hole. Work pipe, Circ. |
| 07:00 | 08:00 | 1 | Drilling |
| 08:00 | 12:15 | 4¼ | Tight Hole, Circulate, build vis. lower W.L. |
| 12:15 | 14:15 | 2 | Drilling |
| 14:15 | 17:00 | 2 3/4 | Trip to chg. bit |
| 17:00 | 20:00 | 3 | Drilling |
| 20:00 | | | Circ. short trip, survey, pull and |
| | 24:00 | 4 | rig loggers |

TIME ANALYSIS 28

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. 4 3/4 |
| 2 - D. 8½ | 10 - W.C. |
| 3 - Red 3½ | 11 - Casing |
| 4 - D.T. 4 3/4 | 12 - Circ 2½ |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. |
| | 17 - Vac |

PROGRAMME 29 log and open hole

406

# DRILLING REPORT
A.C.C.

1 WELL WA-71
RIG WO II
2 No. 33
DATE 9-8-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 2000 | | 5 | |
| EACH BIT<br>Reamed<br>~~Drilled-cored~~ | 6 692 | | 7 1992<br>1300 | | 8 5 | 15 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 SERVCO | 10 17½ | 11 Under | 12 Reamer | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 15" | OSC J | JK 538 | 5/8 | | 10,000 | 80 | 940 | 1000 |

MUD

CHARACTERISTICS 19

Wt mini 1.12 Wt maxi 1.12 V mini 49 V maxi 58

F 20.4 VA 23.5 Vp .4 Yv 13

Gel 0 4 10 16 S% .5 pH 9.5

Pf .2 Lc 1,040 Solid 5 NaCL 15000

LOSSES and GAINS 20

| | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED 21

| | | | |
|---|---|---|---|
| DUOVIS | 16 sx | DOWCIDE B | 80 lbs. |
| CAUSTIC | 6 sx | MAGCOBAR | 20 sx |
| CHROME ALUM | 4 sx | | |
| MAGCOGEL | 84 sx | | |
| SALT | 10 sx | | |

STRING

22 ELEMENTS 15" Bit - 17½" H.O. 3 - 7 3/4 DCS - B. Sub-XO to 5" D.P.

23 WEIGHT (in mud) D.C. D.P. Wt M.D.

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | | | Ran Schlumberger |
| | | | Induction Laterolog |
| 24:00 | 15:00 | 15 | Sonic log, Micro log & Gamma Ray |
| 15:00 | | | Pick up 17½" H.O. & 15" Bit Run to |
| | 16:30 | 1½ | 1300' |
| 16:30 | 17:00 | ½ | Circ. and cond. mud |
| 17:00 | 21:00 | 4 | Open 15" hole to 17½" |
| 21:00 | 21:15 | ¼ | Repack swivel |
| 21:15 | 22:30 | 1¼ | Open hole to 1992' |
| 22:30 | 24:00 | 1½ | Pull out of hole |
| | | | Lost two cutters off 17½" H.O. |

28 TIME ANALYSIS

| | |
|---|---|
| | 9 - Mis. op. 15 |
| 1 - R.U.D. | 10 - W.C. |
| 2 - D. | 11 - Casing |
| 3 - Red 5¼ | 12 - Circ 0.30 |
| 4 - D.T. 1½ | 13 - Fishing 1½ |
| 5 - H.O. | 14 - Aband |
| 6 - Cor | 15 - Rep 0.15 |
| 7 - C.T. | 16 - W.T. |
| 8 - Test | 17 - Vac |

29 PROGRAMME

406

# DRILLING REPORT

**A.C.C.**

1 WELL WA-71

RIG WO II

2 No. 34

DATE 9-9-69

PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>~~Drilled-cored~~<br>open hole | 3<br>89 | | 4<br>1394<br>1483 | | 5<br>5 | 45 |
| EACH BIT<br>open hole<br>~~Drilled-cored~~ | 6<br>89 | | 7<br>1394<br>1483 | | 8<br>5 | 45 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Servco | | H.O. | | | | 0/5 | 50 | 990 | 1200 |

MUD

CHARACTERISTICS

19

Wt mini 1.12 Wt maxi 1.12 V mini 49 V maxi 49

F 20.4 VA ___ Vp ___ Yv ___

Gel 0 4 10 16 S% .5 pH 9.5

Pf .2 Lc ___ Solid 5 NaCL ___

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | |
|---|---|
| Duovis | - 6 sx |
| Chromealum | 2 sx |
| Weight | 30 sx |

STRING

22 ELEMENTS 15" Bit, Bit sub, X over, 17½ H.O., x over, x over 3 - 7 3/4" D.C.'s, B-Sub, X-over to 5" D.P.

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ___

25 CORES ___

26 DEVIATION 2000' - 3/4°

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 1:00 | 1 | Lay down H.O. make up junk basket |
| 1:00 | 1:30 | ½ | Run in hole |
| 1:30 | 3:30 | 2 | Drill 1' with junk basket |
| 3:30 | 7:00 | 3½ | P. O. Retrieved cones. Make up drill set-up |
| 7:00 | 10:30 | 3½ | Open 15" hole to 17½" |
| 10:30 | 2:00 | 3½ | Pull out dress H.O. - 1 cone gone. Run in |
| 2:00 | 4:15 | 2¼ | Open hole |
| 4:15 | 6:30 | 2¼ | Pull out. Laying down D.P. & D.C. (Storm warning) |
| 6:30 | 12:00 | 5½ | Pull kill & choke lines. Lay down |
| | | | slip jt. & riser pipe. |

28 TIME ANALYSIS

1 - R.U.D. ___
2 - D. ___
3 - Red ___
4 - D.T. ___
5 - H.O. 9½
6 - Cor ___
7 - C.T. ___
8 - Test ___
9 - Mis. op. ___
10 - W.C. ___
11 - Casing ___
12 - Circ ___
13 - Fishing 7
14 - Aband ___
15 - Rep ___
16 - W.T. 7 3/4
17 - Vac ___

29 PROGRAMME Standing by due to high winds and rough seas.

406

# DRILLING REPORT
## A.C.C.

1 WELL WA-71
RIG WO II

2 No. 35
DATE 9-10-69

PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| TOTAL Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19
Wt mini 1.12 Wt maxi 1.12 V mini 49 V maxi 49
F 20.4 VA Vp Yv
Gel 0 4 10 16 S% .5 pH 9.5
Pf .2 Lc Solid 5 NaCL

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21
Duvis - 11 sx
Chromealum 1 sk
Dowcide 1 can
Caustic 4 sx

STRING

22
ELEMENTS 15" bit, Sub, Sub, 17½", H.O., Sub, Sub, 3 - 7 3/4" D.C's B-Sub, Sub, to 5" D.P.

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24
FORMATION Type . Stage Limestone

25
CORES

26
DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24:00 | 1:30 | 1½ | Lay down riser & tie down equipment |
| 1:30 | 24:00 | 22½ | Wait out weather - high winds & seas |

28
TIME ANALYSIS
1 - R.U.D.
2 - D.
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T. 24
17 - Vac

29
PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71
RIG WO II

2 No. 36
DATE 9-11-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19
Wt mini 1.12 Wt maxi 1.12 V mini 49 V maxi 49
F 20.4 VA ____ Vp ____ Yv ____
Gel 0 4 10 16 S% .5 pH 9.5
Pf .2 Lc ____ Solid 5 NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ____

25 CORES ____

26 DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 1:00 | 13 | Stand by - high winds & rough seas |
| 1:00 | | 8½ | Pick up flex jt. & run riser pipe |
| | 9:30 | | Stop in H-4 with guide arm missing |
| 9:30 | 12:00 | 2½ | from flex jt. |
| | | | Run Caliper log with Schlumberger |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. 230
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 2130
17 - Vac ____

29 PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

2 No. 37

RIG WO II

DATE 9-12-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 2000 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini ____ Wt maxi ____ V mini ____ V maxi ____

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ____

25 CORES ____

26 DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 2:00 | 2 | Run Schlumberger Gamma Ray log |
| 2:00 | 12:00 | 22 | Stand by - high winds and rough seas |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. 2
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 22
17 - Vac ____

29 PROGRAMME ____

406

# DRILLING REPORT

**A.C.C.**

1 WELL WA-71

RIG WO II

2 No. 38

DATE 9-13-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 2000 | | 5 | |
| EACH BIT<br>Reamed<br>~~Drilled-cored~~ | 6 142 | | 7 1992<br>1850 | | 8 2 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| SERVCO | 17½ | Under | Reamer | 2 5/8 | | | | | |
| HTC | 15" | OSC | IK 538 | 1 3/4 | | 5000 | 70 | 990 | 1200 |

MUD

CHARACTERISTICS

19

Wt mini 1.15 Wt maxi 1.15 V mini 42 V maxi 42

F 19.2 VA Vp Yv

Gel 0 2 10 8 S% 1 pH 9.5

Pf .1 Lc 1,720 Solid 6 NaCL 19500

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | |
|---|---|
| MAGCOBAR 20 sx | Dry job |

STRING

22 ELEMENTS 15"bit - 17½" H.O. - 17 3/4 D.C. - 2 - 7 3/4" B-Subs X 0

| 23 WEIGHT (in mud) | D.C. | D.P. | W.M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 2400 | 1200 | 12 | Stand by for weather |
| 1200 | 1300 | 1 | Hook up flow line |
| 1300 | 1715 | 4¼ | Pick up 17½" H.O. Run in to 1850' |
| 1715 | 1945 | 2½ | Open hole 1850 to 1992' |
| | | | Open hole 1992 to 2000' without pump O.K. |
| 1945 | 2115 | 1½ | Pull out of hole. Break down all |
| | | | tools |
| 2115 | 2400 | 2 3/4 | Run kill line |

28 TIME ANALYSIS

1 - R.U.D.

2 - D.

3 - Red

4 - D.T.

5 - H.O. 8¼

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op.

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T.

17 - Vac

29 PROGRAMME Run kill line

Run 13 3/8 CSG

# DRILLING REPORT

A.C.C.

1 WELL WA-71
RIG WO II

2 No. 39
DATE 9-14-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19
Wt mini 1.15
Wt maxi 1.15
V mini 42
V maxi 42
F 19.2
VA
Vp
Yv
Gel 0 2
10 8
S% 1
pH 9.5
Pf .1
Lc
Solid 6
NaCL

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22
ELEMENTS

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24
FORMATION Type Stage Limestone

25
CORES

26
DEVIATION 2000' - 3/4°

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 3:30 | 3½ | Run kill line - test with 5000 Psi. O.K. |
| 3:30 | 4:30 | 1 | Retrieved wear bushing |
| 4:30 | 12:00 | ½ | Rig & run 13 3/8" casing. Shoe at 1975.70' |
| 12:30 | 2:15 | 1 3/4 | Circulate |
| 2:15 | 3:00 | 3/4 | Cement Csg. with 1170 sx class "G" cement |
| 3:00 | 3:30 | ½ | Pressure test seal (O.K.) 500 psi. |
| 3:30 | 4:00 | ½ | Circulate by kill line - Cement on top csg range |
| 4:00 | 12:00 | 8 | Pull out and lay down tools |
| | | | Run choke line - stopped at 450' - shackel |
| | | | Laying in funnel - fish out shackel - try to |
| | | | stab in safety jt. - jts. breaking on choke |

Line - pull out tightening jts.

28
TIME ANALYSIS

1 - R.U.D.
2 - D.
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T.
17 - Vac

29
PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71
RIG WO II
2 No. 40
DATE 9-15-63

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3<br>355 | | 4<br>2000<br>2355 | | 5<br>5 | 45 |
| EACH BIT<br>Drilled-cored | 6<br>355 | | 7<br>2000<br>2355 | | 8<br>5 | 45 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9<br>HTC | 10<br>13¾ | 11<br>OSC.1.G | 12<br>9 | 13<br>2X15/32 | 14 | 15<br>32 | 16<br>100 | 17<br>600 | 18<br>1600 |
| | | J | | 1 7/16 | | | | | |

## MUD

### CHARACTERISTICS

19
wt mini 1.10 wt maxi 1.10 v mini 47 v maxi 47
F 19.2 VA ______ Vp ______ Yv ______
Gel 0 4 10 22 S% 5 pH 9.5
Pf 2 Lc ______ Solid 6 NaCL 2000

### LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

### PRODUCTS ADDED

21

| | | | |
|---|---|---|---|
| Weight | 50 sx | C. Alum | 2 sx |
| Caustic | 9 sx | | |
| Gel | 14 sx | | |
| Duovis | 22 sx | | |

## STRING

22 ELEMENTS 12¼" bit - Subs - 9 X 7 3/4 D.C. - B. Subs - 3 X 7 3/4 D.C. -B.Subs xover to 5" D.P.

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | 42,000 | 34,000 | 98000 |

## NOTES

24 FORMATION Type . Stage Clay

25 CORES

26 DEVIATION 2000 - 3/4°

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24:00 | 9:00 | 9:00 | Release - Trip and stab in choke line - Test 5000 psi |
| 9:00 | 13:45 | 4:45 | Make up drill assembly top element at 1905 |
| | | | Clean cement to 1965 pressure test 500 psi O.K. |
| | | | Clean cement to shoe at 1975 - clean hole at 2000' |
| | | | Circulate - trip out |
| 13:45 | 16:15 | 2:30 | Lay down junk basket - fishing - pick up j. basket |
| | | | Retrieved cone |
| 16:15 | 18:30 | 2:15 | Trip for drilling |
| 18:30 | 24:00 | 5:30 | Drilling |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| | | 9 - Mis. op. | |
| 1 - R.U.D. | | 10 - W.C. | |
| 2 - D. | 5.30 | 11 - Casing | 13.45 |
| 3 - Red | | 12 - Circ | |
| 4 - D.T. | 2.15 | 13 - Fishing | 2.30 |
| 5 - H.O. | | 14 - Aband | |
| 6 - Cor | | 15 - Rep | |
| 7 - C.T. | | 16 - W.T. | |
| 8 - Test | | 17 - Vac | |

29 PROGRAMME Drilling
Depth 2565'

# DRILLING REPORT
A.C.C.

1 WELL WA-71

RIG WO II

2 No. 41

DATE 9-16-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 2355 | | 5 13 | 00 |
| Drilled-cored | 315 | | 2670 | | | |
| EACH BIT | 6 | | 7 2355 | | 8 | |
| Drilled-cored | 212 | | 2567 | | 8 | 00 |
| Drilled-cored | | | 2567 | | | |
| Drilled-cored | 103 | | 2670 | | 5 | 00 |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Hughes | 12¼ | OSCIGJ | JV 883 | 2X 15/32<br>1X 7/16 | 567<br>13 3/4 | 35-40 | 100 | 600 | 1600 |
| H.T.C. | 12¼ | OSC-J | JN 571 | 2X 15/32<br>1X 7/16 | 103<br>5 | 35-40 | 100 | 600 | 1600 |

MUD

CHARACTERISTICS

19

Wt 1.22 mini Wt 1.21 maxi V 41 mini V 41 maxi

F 16.8 VA ____ Vp 14 Yv 16

Gel 0 2 10 9 S% 1½ pH 9.5

Pf .05 Lc 47000 Solid 10 NaCL 50000

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | 80 | |
| Water | | |

PRODUCTS ADDED

21

| | |
|---|---|
| Duouis | 16 sx |
| Caustic | 4 sx |
| Chrome A | 3 sx |
| Wate | 320 sx |
| Dowcide | 80 lbs. |

STRING

22 ELEMENTS 12¼ Bit, Bit sub, 9 - 7 3/4 D.C., S-Sub, 3-7 3/4 D.C., B-Sub, X-over to 5" D.P.

23 WEIGHT (in mud) D.C. ____ D.P. ____ W.M.D. ____

24 FORMATION Type . Stage ____

25 CORES No. 2-2000 to 2001
Recovered 100%

26 DEVIATION No.5 2567 - 1°

NOTES

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 8:00 | 8 | Drilling |
| 8:00 | 1:30 | 5½ | Circulate |
| 1:30 | 2:00 | ½ | Short trip to shoe |
| 2:00 | 3:00 | 1 | Circulate |
| 3:00 | 5:30 | 2½ | Trip for bit change |
| 5:30 | 10:30 | 5 | Drilling |
| 10:30 | 12:00 | 1½ | Circulate for core bbl. |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. 13
3 - Red ____
4 - D.T. 2½
5 - H.O. ____
6 - Cor 1½
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ 7
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. ____
17 - Vac ____

29 PROGRAMME Drilling

406

# DRILLING REPORT

**A.C.C.**

1 WELL WA-71

RIG WO II

2 No. 41

DATE 9-16-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3<br>315 | | 4 2355<br>2670 | | 5<br>13 | 00 | | | | | | | | | | |
| EACH BIT | 6 | | 7<br>2355 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 212 | | 2567 | | 8 | 00 | Hughes | 12¼ | OSCIGJ | JV 883 | 2X$\frac{15}{32}$<br>1X $\frac{7}{16}$ | ~~567~~<br>13 3/4 | 35-40 | 100 | 600 | 1600 |
| Drilled-cored | | | 2567 | | | | H.T.C. | 12¼ | OSC-J | JN 571 | 2X$\frac{15}{32}$ | 103 | 35-40 | 100 | 600 | 1600 |
| Drilled-cored | 103 | | 2670 | | 5 | 00 | | | | | 1X$\frac{7}{16}$ | 5 | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

W! 1.22 Wt 1.21 V 41 V 41

mini F 16.8 maxi VA ___ mini Vp 14 maxi Yv 16

Gel 0 2 10 9 S% 1½ pH 9.5

Pf .05 Lc 47000 Solid 10 NaCL 50000

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | 80 | |
| Water | | |

PRODUCTS ADDED

| 21 | | |
|---|---|---|
| Duouis | 16 sx | |
| Caustic | 4 sx | |
| Chrome A | 3 sx | |
| Wate | 320 sx | |
| Dowcide | 80 lbs. | |

STRING

22 ELEMENTS 12¼ Bit, Bit sub, 9 - 7 3/4 D.C., S-Sub, 3-7 3/4 D.C., B-Sub, X-over to 5" D.P.

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES No. 2-2000 to 2001
Recovered 100%

26 DEVIATION No.5 2567 - 1°

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 8:00 | 8 | Drilling |
| 8:00 | 1:30 | 5½ | Circulate |
| 1:30 | 2:00 | ½ | Short trip to shoe |
| 2:00 | 3:00 | 1 | Circulate |
| 3:00 | 5:30 | 2½ | Trip for bit change |
| 5:30 | 10:30 | 5 | Drilling |
| 10:30 | 12:00 | 1½ | Circulate for core bbl. |

28 TIME ANALYSIS

1 - R.U.D. ___
2 - D. 13
3 - Red ___
4 - D.T. 2½
5 - H.O. ___
6 - Cor 1½
7 - C.T. ___
8 - Test ___
9 - Mis. op. ___
10 - W.C. ___
11 - Casing ___
12 - Circ 7
13 - Fishing ___
14 - Aband ___
15 - Rep ___
16 - W.T. ___
17 - Vac ___

29 PROGRAMME Drilling

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

2 No. 42

RIG WO II

DATE 9-17-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. | BITS<br>Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS<br>Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL | 3<br>226 | | 4<br>2670 | | 5<br>14 | | | | | | | | | | | |
| Drilled-cored | | | 2896 | | | | | | | | | | | | | |
| EACH BIT | 6 | | 7<br>2670 | | 8<br>2 | 3/4 | 9<br>Christensen | 10<br>18 7/16 | 11<br>Diamond | 12<br>RR No. 1 | 13 | 14<br>14/23 | 15<br>20,000 | 16<br>25 | 17<br>350 | 18<br>650 |
| Drilled-cored | 14 | | 2684 | | | | | | | | | | | | | |
| Drilled-cored | | | 2684 | | | | | | | | | | | | | |
| Drilled-cored | 219 | | 2903 | | 10 | 3/4 | H.T.C. | 12¼ | OSCI-J | 10 | 2 15/32 | 212/ 10 3/4 | 32,000/ 42,000 | 100 | 600 | 1700 |
| Drilled-cored | | | | | | | | | | | 1 7/16 | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.22 Wt maxi 1.26 V mini 41 V maxi 44

F 16.8 VA ___ Vp 14 Yv 16

Gel 0 2 10 9 S% 1½ pH 9

Pf .05 Lc 50000 Solid 10 NaCl 47000

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

Defomer 3 cans

Kelzan XC 200 lbs.

Chrom Alum 1 sk

STRING

22 ELEMENTS 12¼ Bit, Bit sub, 9 - 73/4" D.C. B-Sub, 3-73/4" D.C. B-Sub X-over to 5" D.P.

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ___

25 CORES from 2670 to 2684
Cut 14' Recovered 14'

26 DEVIATION ___

27 TIME LOG

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 12:30 | ½ | Circulate |
| 12:30 | 5:00 | 4½ | Trip to core |
| 5:00 | 5:30 | ½ | Circulate |
| 5:30 | 8:15 | 2 3/4 | Cut Core No. 3 |
| 8:15 | | | Trip to service Core Bbl. & make up drill |
| | 12:45 | 4½ | assembly |
| 12:45 | 1:15 | ½ | Open Core Hole f/8 7/16 to 12¼ |
| 1:15 | 12:00 | 10 3/4 | Drilling |

28 TIME ANALYSIS

1 - R.U.D. ___
2 - D. 10 3/4
3 - Red ___
4 - D.T. ___
5 - H.O. ___
6 - Cor 2 3/4
7 - C.T. 10½
8 - Test ___
9 - Mis. op. ___
10 - W.C. ___
11 - Casing ___
12 - Circ ___
13 - Fishing ___
14 - Aband ___
15 - Rep ___
16 - W.T. ___
17 - Vac ___

29 PROGRAMME Condition mud
Drill ahead

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

2 No. 43

RIG WO II

DATE 9.18.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| **TOTAL** | 3 | | 4 2896 | | 5 | |
| Drilled-cored | 14 | | 2910 | | 2 | 15 |
| **EACH BIT** | 6 | | 7 2896 | | 8 | |
| Drilled-cored | 7 | | 2903 | | 0 | 30 |
| Drilled-cored | | | 2903 | | | |
| Drilled-cored | | | 2910 | | | 45 |
| Drilled-cored | 7 | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 12¼ | OSC1GJ | IU 886 | 2X 15/32<br>1X 16/32 | 219/1115 | 41.000 | 100 | 600 | 1700 |
| HTC | 12¼ | OSC J | JP 168 | " | 7/145 | 10/25 | 100 | 520 | 1800 |

MUD

CHARACTERISTICS

19

Wt mini 1.33 Wt maxi 1.35 V mini 37 V maxi 42

F 19 VA 22 Vp 16 Yv 12

Gel 0 3 10 8 S% 1. pH 8.2

Pf .05 Le 50,000 Solid 16 NaCL 218000

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

MAGCOBAR 900 sx

DEFOAMER 4 cans

STRING

22 ELEMENTS Bit - 3 DC - 1 Bumper - DP

| 23 WEIGHT (in mud) | D.C. | D.P. | W.M.D. |
|---|---|---|---|
| | | | 85000 |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 0000 | 0030 | 0.30 | Drill |
| 0030 | 0430 | 4.00 | Mix mud - circulate |
| 430 | 0530 | 1.00 | Pull to 13 3/8 shoe - check for flow. Run in |
| 530 | 1515 | 9.45 | Circulate - mix mud |
| 1515 | 1830 | 3.15 | Pull out - check flow at show - lay down 7 3/4 DC |
| | | | Change bit - run in hole |
| 1830 | 1900 | 0.30 | Circulate |
| 1900 | 2045 | 1.45 | Drill |
| 2045 | 2400 | 3.15 | Circulate - build up mud wt. |

28

TIME ANALYSIS

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. |
| 2 - D. 2.15 | 10 - W.C. |
| 3 - Red | 11 - Casing |
| 4 - D.T. 3.15 | 12 - Circ 18.30 |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. |
| | 17 - Vac |

29 PROGRAMME Drill to 3030

Csg 9 5/8"

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 44

DATE

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3<br>55 | | 4<br>2910<br>2965 | | 5<br>11 | 00 |

| | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EACH BIT | 6 | | 7<br>2910 | | 8 | | 9 | 10 | 11 | 12 | 13<br>2 X | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 55 | | 2965 | | 11 | 00 | HTC | 12¼ | OSC J | JP 168 | 15/16 | | | 100 | 520 | 1800 |
| Drilled-cored | | | | | | | | | | | 1X7/16 | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.33 Wt maxi 1.36 V mini 41 V maxi 46

F 17.6 VA 27 Vp 20 Yv 14

Gel 0 3 10 10 S% 1.25 pH 8

Pf .05 Lc 50. Solid 20 NaCL 280.5

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | 20 bbls | 314 |

PRODUCTS ADDED

21

| | |
|---|---|
| MAGCOBAR | 650 sx |
| KELZAN | 8 drums |
| SALT GEL | 6 sx |

STRING

22 ELEMENTS

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 85,000 |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12 | 11 | 11 | Drilling - 15' circul. each 10' |
| 11 | 13 | 2 | Circul.-Built up wt. |
| 13 | 14:30 | 1:30 | Pull out bit |
| 14:30 | 18:00 | 3:30 | Rig up Schlumberger - logging - Dual Induct. log |
| 18:00 | 19:00 | 1:00 | Tear out Schlumberger. Rig to secure |
| 19:00 | 24:00 | 5 | Run 1158' O.E.D.P. Make up 2 Gray valves |
| | | | and Vetco hang off tool with 17' pup on top |
| | | | Back out of pup and lay down D.P. after |
| | | | landing on seat protector. Spotted 80 |
| | | | bbls. of 1.80 mud at 1775' and lay down kill line |

TIME ANALYSIS 28

1 - R.U.D.

2 - D.

3 - Red

4 - D.T.

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op. 4.30

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T. 8.30

17 - Vac

29 PROGRAMME Waiting on weather

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

2 No. 45

RIG WO II

DATE 9-20-69

PENETRATION

| PHASES | | | | | | | BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| TOTAL<br>Drilled-cored | 3 | | 4 | | 5 | | | | | | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.35 Wt maxi 1.36 V mini 46 V maxi 46

F 17.6 VA ______ Vp 20 Yv 14

Gel 0 3 10 10 S% 1½ pH 8.0

Pf .05 Lc 280500 Solid 20 NaCl 50,000

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS 12 1/3 Stds D.P. & two Gray valves below BOP

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | | 8 | Lay down kill line, choke line, D.C's & Riser |
| | 8:00 | | |
| 8:00 | 12:00 | 16 | Secure equipment & waiting out storm |

28 TIME ANALYSIS

1 - R.U.D. ______

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Aband ______

15 - Rep ______

16 - W.T. 24

17 - Vac ______

29 PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WOII

2 No. 46

DATE 9-21-69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 2965 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

## MUD

CHARACTERISTICS

19

Wt 1.36 Wt 1.70 V 44 V 48

mini maxi mini maxi

F 17.6 VA ____ Vp 20 Yv 14

Gel 0 3 10 10 S% 1½ pH 8.0

Pf .05 Lc 280,500 Solid 20 NaCl 500,00

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

MAGCOBAR

Weight - 300 sx

## STRING

22 ELEMENTS

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 12:00 | 7:30 | 7½ | Wait out storm |
| 7:30 | | 12 | Run riser, kill line, choke line |
| | 7:30 | | Test with 5000 psi O.K. |
| 7:30 | 8:30 | 1 | Displaced salt water in riser with mud |
| 8:30 | 9:30 | 1 | Pick up 5" D.P. |
| 9:30 | 12:00 | 2½ | Circulate |

28 TIME ANALYSIS

1 - R.U.D.
2 - D.
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
3 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T. 24
17 - Vac

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 47

DATE 9-22-69

## PENETRATION

### PHASES

| Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 | | 4 2965 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

### BITS / PARAMETERS

| Make | Ø | Type | No | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | Circ | Mix | Mud | | |
| HTC | 12¼ | OSC | JP 168 | our | | | | 300 | 1000 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

## MUD

### CHARACTERISTICS

19

Wt 1.45 Wt 1.70 V 42 V 54

mini maxi mini maxi

F 22.4 VA 42.5 Vp 33 Yv 19

Gel 0 4 10 13 S% 1 pH 9.2

Pf 1 Lc 50 Solid 26 NaCL 264.

### LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | 60 bbls. | |

### PRODUCTS ADDED

21

| | |
|---|---|
| MAGCOBAR 2800 sx | DUOUIS 6 sx |
| CAUSTIC 4 sx | |
| SALT GEL 10 sx | |
| CUROM ALUM 100 | |
| DOWICIDE B 100 | |

## STRING

22 ELEMENTS 12¼" bit - 3 7 3/4 DCS - B Sub -XO 5" DP

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 2400 | 0630 | 6½ | Mix mud |
| 0630 | 0730 | 1 | Pull out breal on hanging tools |
| 0730 | 0930 | 2 | Run in 12¼ bit to 2965' |
| 0930 | | | Circ well flowing |
| | 2200 | 12½ | Building up mud wt. |
| 2200 | | | Pull to shoe well 15 min. O.K. |
| | 2400 | 2 | Pull out of hole |

28 TIME ANALYSIS

1 - R.U.D.

2 - D.

3 - Red

4 - D.T.

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op. 2.00

10 - W.C.

11 - Casing

12 - Circ 19.30

13 - Fishing

14 - Aband

15 - Rep

16 - W.T. 9.30

17 - Vac

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 48

DATE 9-23-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 2965 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt 1.71 Wt 1.73 V 52 V 54

mini F 22.4 maxi VA 43 mini Vp 33 maxi Yv 20

Gel 0 4 10 14 S% 1 pH 9

Pf .1 Lc 50. Solid 27 NaCL 264

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION 2964' - 1°

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | 1130 | 1130 | Schlumberger operations |
| 1130 | 1515 | 345 | Trip in hole - Circul. pull out |
| 1515 | 1630 | 115 | Pull out wear bushing |
| 1630 | 2230 | 600 | Run 9 5/8" casing - landing shoe at 2959.70 |
| 2230 | 2400 | 130 | Circul. |
| | | | Displaced with 25 bbls. sea water |
| | | | Mix class G cement 88.000 lbs. denside |
| | | | 15.7 Displaced with 217 bbls. mud |
| | | | Pressure on top 2500 psi O.K. Release |

TIME ANALYSIS 28

1 - R.U.D.

2 - D.

3 - Red

4 - D.T.

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op. 1130

10 - W.C.

11 - Casing 1230

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T.

17 - Vac

PROGRAMME 29 W/cement

Test BOP stack

Drilling

406

# DRILLING REPORT

A.C.C.

1 WELL WA 71

RIG WO II

2 No. 49

DATE 9-24-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3014 | | 5 | |
| Drilled-cored | 49 | " | 2965 | | 4 | - |
| EACH BIT | 6 | | 7 3014 | | 8 | |
| Drilled-~~cored~~ | 49 | | 2965 | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HIC | 8½ | OSC-J16 | KE 055 | 3/8 | | 30,000 | 90 | 390 | 1900 |

MUD

CHARACTERISTICS

19

Wt mini 1.34 Wt maxi 1.35 V mini 44 V maxi 46

F 34.2 VA 27 Vp 18 Yv 18

Gel 0 5 10 14 S% 1 pH 9.6

Pf 2 Lc 190 Solid 18 NaCL 100

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | | |
|---|---|---|
| DUOUIS | 15 sx | DOWICIDE B 50 |
| SALT GEL | 26 sx | |
| MACGOGEL | 26 sx | |
| CHROM ALUM | 2 sx | |
| CAUSTIC | 10 sx | |

STRING

22 ELEMENTS 8½" bit 15-6" DCS-SO 2 B SUBS = 471.02

23 WEIGHT (in mud) D.C. D.P. Wt M.D.

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | | | Displace cmt CIP 0030 |
| | | | Set CSG Hanger Seal & Test (NG) |
| 2400 | 0530 | 5½ | Pull & lay down running string |
| 0530 | 0730 | | Break service breaks & lay down |
| | | 2 | 7 3/4 B Subs & DCS |
| 0730 | 0830 | 1 | Run in torque CSG Hanger Seal Pull out |
| 0830 | | | Run in with test tool test 5" Rams to 3000 |
| | 1130 | 3 | Hydrill to 2000 Csg hanger seal to 2500 O.K. |
| 1130 | 1200 | ½ | Pull out |
| 1200 | 1700 | 5 | Pick up drill assembly run to float at 2877 |
| 1700 | 1900 | 2 | Drill float |
| 1900 | 2000 | 1 | Drill out cmt & shoe at 2959' |
| 2000 | 2400 | 4 | Drilling |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| | | 9 - Mis. op. | |
| 1 - R.U.D. | | 10 - W.C. | |
| 2 - D. | 4 | 11 - Casing | 20 |
| 3 - Red | | 12 - Circ | |
| 4 - D.T. | | 13 - Fishing | |
| 5 - H.O. | | 14 - Aband | |
| 6 - Cor | | 15 - Rep | |
| 7 - C.T. | | 16 - W.T. | |
| 8 - Test | | 17 - Vac | |

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL WA-71

RIG WO II

2 No. 50

DATE 9-25-69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3<br>88 | | 4<br>3102<br>3014 | | 5<br>7 | 30 | | | | | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-~~cored~~ | 79 | | 3014 | | 6 | | HTC | 8½ | OSC 16 | KE 055 | 3/8 | 128/10 | 30,000 | 90 | 390 | 1900 |
| Drilled-cored | | | 3092 | | | | | | | | | | | | | |
| Drilled-cored | 9 | | 3102 | | 1 | 30 | HTC | 8½ | OSC 16 | KE 057 | 7/16 | | 35,000 | 90 | 470 | 1800 |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.73 Wt maxi 1.75 V mini 62 V maxi 64

F 21.4 VA 42 Vp 28 Yv 30

Gel 0 6 10 20 S% 1 pH 9.2

Pf .1 Lc 100. Solid 27 NaCL 210

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | 40 bbls | 414 |

PRODUCTS ADDED

| 21 | |
|---|---|
| MAGCOBAR | 900 sx |
| DUOUIS | 10 sx |

STRING

22 ELEMENTS 8½" bit 15 6" DCS-XD - 2 B Subs = 471.02

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 100 lbs. |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION 3093 0° 30' No. 7

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 2400 | 0600 | 6 | Drill |
| 0600 | 1500 | 9 | Circ & Build mud wt. |
| 1500 | 1700 | 2 | Shut well in for pressure 300 psi |
| 1700 | 1800 | 1 | Spot heave mud in hole |
| 1800 | 1830 | ½ | Survey |
| 1830 | 2230 | 4 | Trip for bit change |
| 2230 | 2400 | 1½ | Drill |

28 TIME ANALYSIS

1 - R.U.D.

2 - D. 7½

3 - Red

4 - D.T. 4

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op. ½

10 - W.C.

11 - Casing

12 - Circ 12

13 - Fishing

14 - Aband

15 - Rep

16 - W.T.

17 - Vac

29 PROGRAMME Drill ahead

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 51

DATE 9.26.69

PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3188 | | 5 | |
| Drilled-cored | 86 | | 3102 | | 14 | 00 |
| EACH BIT | 6 | | 7 3160 | | 8 | |
| Drilled-cored | 58 | | 3102 | | 7 | 15 |
| Drilled-cored | | | 3188 | | | |
| Drilled-cored | | | 3160 | | 6 | 45 |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 13 |
| HTC | 8 1/2 | OSC-16 | KE 057 | 7/16 | 8 115/67 | 35,000 | 100 | 430 | 1800 |
| HTC | 8 1/2 | OWV | KB 014 | 7/14 | 641/28 | 35,000 | 90 | 240 | 1100 |

MUD

CHARACTERISTICS

19

Wt 1.75 Wt 1.78 V 58 V 65

F mini 15.8 VA maxi 56 Vp mini 38 Yv maxi 36

Gel 0 5 10 15 S% 1 pH 8.0

Pf .1 Lc 150 Solid 28 NaCL 315

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | | | |
|---|---|---|---|
| Macgobar | 1500 sax | Salt Gel | 10 sax |
| CMC Reg | 14 sax | | |
| Caustic | 8 sax | | |
| Chrom Alum. | 1 sax | | |
| Duovis | 2 sax | | |

STRING

22 ELEMENTS 8 1/2" bit - 18.6" DCs - XO 2 B-subs

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | 40,000 | | 96,000 |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27 TIME LOG

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 07.15 | 07.15 | Drill |
| 07.15 | 07.45 | 00.30 | Circulate |
| 07.45 | 11.45 | 04.00 | Trip to change bits |
| 11.45 | 18.30 | 06.45 | Drill |
| 18.30 | 22.00 | 03.30 | Circulate and build mud wt. |
| 22.00 | 24.00 | 02.00 | Trip out change bits |

28 TIME ANALYSIS

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. |
| 2 - D. 14.00 | 10 - W.C. |
| 3 - Red | 11 - Casing |
| 4 - D.T. 04.00 | 12 - Circ 04.00 |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. |
| | 17 - Vac |

29 PROGRAMME Drill ahead.

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 52

DATE 9.27.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable W | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| **TOTAL** Drilled-cored | 3<br>87 | | 4<br>3275<br>3188 | | 5<br>17 | 45 |
| **EACH BIT** Drilled-cored | 6<br>71 | | 7<br>3259<br>3188 | | 8<br>12 | - |
| Drilled-cored<br>Drilled-cored | 16 | | 3275<br>3259 | | 5 | 45 |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 8 1/2 | #15<br>OSC-J | KE058 | 7/16 | 71/12.00 | 40,000 | 80 | 440 | 2400 |
| HTC | 8 1/2 | #16<br>V7R | LP210 | JETS<br>OUT | | 50,000 | 80 | 430 | 1600 |

## MUD

### CHARACTERISTICS

19

Wt mini 1.78 Wt maxi 1.80 V mini 60 V maxi 62

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

### LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

### PRODUCTS ADDED

| 21 | | | |
|---|---|---|---|
| weight | 300 sax | CMC | 5 sax |
| salt | 22 sax | | |
| salt gel | 12 sax | | |
| Spersene | 14 sax | | |
| Caustic | 10 sax | | |

## STRING

22 ELEMENTS 8 1/2 bit - junk sub - 36"DCs - Stab - 126" DCs - 2 B-subs - 36" DCs = 567.33

23 WEIGHT (in mud) D.C. ____ D.P. ____ Wt M.D. 98,000

## NOTES

24 FORMATION Type . Stage Lime

25 CORES ____

26 DEVIATION ____

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 01.00 | 01.00 | Trip in hole with bit #75 |
| 01.00 | 13.00 | 12.00 | Drilling |
| 13.00 | 14.00 | 01.00 | Circulate and cond. mud |
| 14.00 | | | Trip out change bits. Pick up junk sub. |
| | 18.15 | 04.15 | Stab. Run in |
| 18.15 | 24.00 | 05.45 | Drilling |

28 TIME ANALYSIS

1 - R.U.D. ____

2 - D. 17.45

3 - Red ____

4 - D.T. 05.15

5 - H.O. ____

6 - Cor ____

7 - C.T. ____

8 - Test ____

9 - Mis. op. ____

10 - W.C ____

11 - Casing ____

12 - Circ 01.00

13 - Fishing ____

14 - Aband ____

15 - Rep ____

16 - W.T. ____

17 - Vac ____

29 PROGRAMME Drill ahead.

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

2 No. 53

RIG WO II

DATE 9.28.69

## PENETRATION

| PHASES | | | | | | | BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| TOTAL<br>Drilled-cored | 3<br>74 | | 4 3349<br>3275 | | 5<br>21 | - | | | | | | | | | | |
| EACH BIT | 6 | | 7<br>3306 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 31 | | 3275 | | 8 | 30 | HTC | 8 1/2 | WTR | LP 210 | OUT | 47 | 40,000 | 80 | 430 | 1600 |
| Drilled-cored | | | 3349 | | | | | | | | | | | | | |
| Drilled-cored | 43 | | 3306 | | 12 | 30 | HTC | 8 1/2 | OWV | KB040 | 13/32 | | 35,000 | 100 | 430 | 2000 |
| Drilled-cored | | | | | | | | | | | | | | | | |

## MUD

### CHARACTERISTICS

19

Wt 1.75 Wt 1.77 V 65 V 70

F mini 14.8 VA maxi 59 Vp mini 43 Yv maxi 32

Gel 0 5 10 18 S% pH

Pf .2 Lc 98 Solid 30 NaCL 264

### LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

### PRODUCTS ADDED

21

| | |
|---|---|
| CMC | 15 sax |
| Spersene | 30 sax |
| Magcobar | 230 sax |
| Caustic Soda | 5 sax |

## STRING

22 ELEMENTS 8 1/2 bit - 36" DCs - Stab - 12.6" DCs - 2 B-subs - 36" DCs

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 100,000 |

## NOTES

24 FORMATION Type . Stage Limestone

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 08.30 | 08.30 | Drilling |
| 08.30 | 11.30 | 03.00 | Trip to change bits |
| 11.30 | 24.00 | 12.30 | Drilling |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1 - R.U.D. | | 9 - Mis. op. | |
| 2 - D. | 21.00 | 10 - W.C. | |
| 3 - Red | | 11 - Casing | |
| 4 - D.T. | 03.00 | 12 - Circ | |
| 5 - H.O. | | 13 - Fishing | |
| 6 - Cor | | 14 - Aband | |
| 7 - C.T. | | 15 - Rep | |
| 8 - Test | | 16 - W.T. | |
| | | 17 - Vac | |

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 54

DATE 9.29.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3<br>56 | | 4<br>3405<br>3340 | | 5<br>11 | 15 |

| EACH BIT | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. | Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | | 7<br>3370 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 21 | | 3349 | | 6 | 15 | HTC | 8 1/2 | OWV J | KB 040 | 9/16 | 64'/18.45 | 35,000 | 100 | 430 | 2000 |
| Drilled-cored | | | 3405 | | 5 | - | HTC | 8 1/2 | OSC - 16 | KE 056 | 7/16 | | 40,000 | 80 | 435 | 2200 |
| Drilled-cored | | | 3370 | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

## MUD

### CHARACTERISTICS

19

Wt 1.73 Wt 1.76 V 65 V 70

F mini 18 VA maxi 61 Vp mini 44 Yv maxi 34

Gel 0 4 10 16 S% 1 pH 8.8

Pf .1 Lc 88. Solid 30 NaCL 234

### LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

### PRODUCTS ADDED

21

| | |
|---|---|
| Spersene | 20 sax |
| CMC | 9 sax |
| Magcobar | 200 sax |
| Dowicide B | 50 sax |
| Caustic Soda | 10 sax |

## STRING

22 ELEMENTS 8 1/2" bit - 36" DCs - stab - 15.6" DCs - 2 B-subs - 36" DCs = 647.59

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 104,000 |

## NOTES

24 FORMATION Type . Stage Limestone

25 CORES

26 DEVIATION 3370' - 1° - 8

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 01.15 | 01.15 | Drill |
| 01.15 | 12.00 | 00.45 | Repair line on Kelly Spinner |
| 02.00 | 07.00 | 05.00 | Drilling |
| 07.00 | 13.30 | C | Circulate barge rolling 5° and 6° |
| | | 06.30 | Work on tract for block guide |
| 13.30 | | | Trip to change bits. Pick up 36" Dcs |
| | 19.00 | 05.30 | Move drill line |
| 19.00 | 24.00 | 05.00 | Drilling |
| | | | At 8.00 T.D. 3470' |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| | | 9 - Mis. op. | 00.15 |
| 1 - R.U.D. | | 10 - W.C. | |
| 2 - D. | 11.15 | 11 - Casing | |
| 3 - Red | | 12 - Circ | |
| 4 - D.T. | 06.00 | 13 - Fishing | |
| 5 - H.O. | | 14 - Aband | |
| 6 - Cor | | 15 - Rep | 06.30 |
| 7 - C.T. | | 16 - W.T. | |
| 8 - Test | | 17 - Vac | |

29 PROGRAMME Drill ahead

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 55

DATE 9.30.60

PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3556 | | 5 | |
| Drilled-cored | 151 | | 3405 | | 20 | 45 |

| EACH BIT | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | | 7 3480 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 75 | | 3405 | | 10 | - | HTC | 8 $\frac{1}{2}$ | OSC - 16 | KE 056 | 7/16 | 110'/15 | 40,000 | 100 | 435 | 2200 |
| Drilled-cored | | | 3556 | | | | | | | | | | | | | |
| Drilled-cored | | | 3480 | | 10 | 45 | HTC | 8 $\frac{1}{2}$ | OSC - 16 | KE 060 | 7/16 | | 40,000 | 100 | 435 | 2200 |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt 180 Wt 183 V 58 V 60

F mini 26.0 VA maxi 51 Vp mini 38 Yv maxi 26

Gel 0 3 10 12 S% 5 pH 9.0

Pf .2 Lc 24 Solid 31 NaCL 247

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | N | N |
| Water | | |

PRODUCTS ADDED

21

| | | | |
|---|---|---|---|
| Magcobar | 650 sax | Defoamer | 16 cans |
| Spersene | 11 sax | | |
| CMC | 17 sax | | |
| Caustic | 19 sax | | |
| Dowicide | 1 ctn | | |

STRING

22 ELEMENTS 8 1/2" bit - 36" DCs - stab - 15.6" DCs - 2 B-subs - 36"DCs = 647.59

| 23 WEIGHT (in mud) | D.C. | D.P. | W!M.D. |
|---|---|---|---|
| | | | 104,000 |

NOTES

24 FORMATION Type . Stage Limestone

25 CORES

26 DEVIATION

27 TIME LOG

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 10.00 | 10.00 | Drilling |
| 10.00 | 13.15 | 03.15 | Trip to change bits |
| 13.15 | 24.00 | 10.45 | Drilling |

28 TIME ANALYSIS

1 - R.U.D.

2 - D. 20.45

3 - Red

4 - D.T. 03.15

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op.

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T.

17 - Vac

29 PROGRAMME Drill ahead

406

# DRILLING REPORT
## A.C.C.

1 WELL Walrus A-71
RIG WO II
2 No. 56
DATE 10.1.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 23 | | 4 3579<br>3556 | | 5 4 | 30 |
| EACH BIT Drilled-cored | 6 23 | | 7 3579<br>3556 | | 8 4 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 HTC | 10 8 1/2 | 11 OSC - 16 | 12 KE 060 | 13 7/16 | 14 99'/15.15 | 15 40,000 | 16 100 | 17 435 | 18 2200 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

MUD

CHARACTERISTICS

19
Wt 1.75 Wt 1.77 V 58 V 62
F mini 72.8 VA maxi 55 Vp mini 41 Yv maxi 28
Gel 0 3 10 14 S% 4 pH 9.2
Pf .1 Lc 76 Solid 30 NaCL 248

| 20 LOSSES and GAINS | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

21 PRODUCTS ADDED

| | |
|---|---|
| CMC | 40 sax |
| Spersene | 10 sax |

STRING

22 ELEMENTS 8 1/2" bit - 36" DCS - stab - 15.6" DCS - 2 B-subs - 36" DCS = 647.59

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 105.000 |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 04.30 | 04.30 | Drilling |
| 04.30 | 05.30 | 01.00 | Repair flow line. Barge rolling up to 10° |
| 05.30 | | | Pull up into CSG and circulate |
| | 24.00 | 18.30 | Wait on weather |
| | | | |
| | | | Repacked and serviced 2 7 3/4 subs. |

28 TIME ANALYSIS
1 - R.U.D.
2 - D. 04.30
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep 01.00
16 - W.T. 18.30
17 - Vac

29 PROGRAMME Trip to change bits soon as weather permits.

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
2 No. 57
RIG WO II
DATE 10.2.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 3579 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 8 1/2 | OSC-16 | KE 060 | 7/16 | 99/15. | 15 | | | |

## MUD

CHARACTERISTICS

19

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Wt mini | 1.74 | Wt maxi | 1.76 | V mini | 60 | V maxi | 62 |
| F | 13.6 | VA | 51 | Vp | 39 | Yv | 24 |
| Gel 0 | 3 | 10 | 12 | S% | 4 | pH | 8.8 |
| Pf | .1 | Lc | 84 | Solid | 30 | NaCL | 280 |

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21 Magcobar 500 sax

## STRING

22 ELEMENTS 8 1/2" bit - 36" DCS - stab - 15.6"DCS - 2 B-subs - 36" DCS = 647.59

23 WEIGHT (in mud) D.C. D.P. Wt M.D.

## NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 06.00 | 06.00 | Stand by rough sea |
| 06.00 | 06.30 | 00.30 | Try to pull out. Too rough 3 std's |
| 06.30 | 21.00 | 14.30 | Stand by |
| 21.00 | 21.30 | 00.30 | Try to pull out too rough 1 std's |
| 21.30 | 24.00 | 02.30 | Stand by |

28 TIME ANALYSIS

1 - R.U.D.
2 - D.
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T. 24.00
17 - Vac

29 PROGRAMME Trip to change bits soon as weather permits.

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
RIG WO II
2 No. 58
DATE 10.3.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| **TOTAL** | 3 | | 4 3597 | 00 | 5 | |
| Drilled-cored | 18 | 00 | 3579 | 00 | 3 | 00 |
| **EACH BIT** | 6 | | 7 3597 | 00 | 8 | |
| Drilled-cored | 18 | | 3579 | 00 | 3 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| HTC | 8 1/2 | OSC1G | #20<br>KE 059 | | | 40,000 | 90/120 | | 20,000 |

MUD

CHARACTERISTICS

19
Wt mini 172 Wt maxi 175 V mini 52 V maxi
F 20 VA 35 Vp 30 Yv 10
Gel 0 2 10 11 S% pH
Pf 05 Lc 136 Solid NaCL 315

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | 40 bbls | |
| Water | | |

PRODUCTS ADDED

| 21 | |
|---|---|
| CMC | 25 sax |
| Magcobar | 800 sax |

STRING

22 ELEMENTS 8 1/2" bit, bit sub, 3.6 1/4" DC, stab, 15 6 1/4" DC, stab, 2 BS, 3 6 1/4" DC
5"

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage Same

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 13.00 | 13.00 | Stand by for weather |
| 13.00 | 21.00 | 08.00 | Trip and circulate time |
| 21.00 | 24.00 | 03.00 | Drilling |

28 TIME ANALYSIS

| | |
|---|---|
| | 9 - Mis. op. |
| 1 - R.U.D. | 10 - W.C. |
| 2 - D. 03.00 | 11 - Casing |
| 3 - Red | 12 - Circ |
| 4 - D.T. | 13 - Fishing |
| 5 - H.O. | 14 - Aband |
| 6 - Cor | 15 - Rep |
| 7 - C.T. | 16 - W.T. 13.00 |
| 8 - Test | 17 - Vac |

29 PROGRAMME Drilling

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
RIG WO II
2 No. 59
DATE 10.4.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3<br>53 | 00 | 4<br>3650<br>3597 | | 5<br>10 | 30 | | | | | | | | | | |
| EACH BIT | 6 | | 7<br>3597 | | 8 | | 9 | 10 | 11 | 12<br>#20 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 33 | | 3630 | | 9 | 30 | HTC | $8\frac{1}{2}$ | OSC1G | KE054 | 7/16 | 51'/12.30 | 40,000 | 100 | 435 | 1900 |
| Drilled-cored | 20 | | 3650 | | | | | | | | | | | | | |
| Drilled-cored | | | | | 9 | 00 | HTC | $8\frac{1}{2}$ | X55 | LP471 | 7/16 | 20/9.00 | 40,000 | 50/60 | 435 | 1900 |
| Drilled-cored | | | | | | | HTC | $8\frac{1}{2}$ | OWV | | | | | | | |

MUD

CHARACTERISTICS

19
wt mini 1.74 wt maxi 176 V mini 58 V maxi 62
F 12.4 VA Vp Yv
Gel 0 3 10 12 S% .5 pH 8.7
Pf .3 Lc 180 Solid 29 NaCL 315

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

| 21 | | | |
|---|---|---|---|
| CMC REG | 14 sax | Magcobar | 800 sax |
| CMC Hivis | 8 sax | | |
| Caustic | 20 sax | | |
| Duovis | 4 sax | | |
| Chrome Alum. | 1 sax | | |

STRING

22 ELEMENTS Bit, same assembly

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 110,000 |

NOTES

24 FORMATION Type . Stage Same

25 CORES

26 DEVIATION 3/4° at 36.50 no. 9

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 09.30 | 09.30 | Drilling |
| 09.30 | 12.00 | 02.30 | Trip |
| 12.00 | 21.00 | 09.00 | Drilling |
| 21.00 | 21.15 | 00.15 | SS |
| 21.15 | 24.00 | 02.45 | Trip |

28 TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1 - R.U.D. | | 9 - Mis. op. | |
| 2 - D. | 18.30 | 10 - W.C. | |
| 3 - Red | | 11 - Casing | |
| 4 - D.T. | 05.15 | 12 - Circ | |
| 5 - H.O. | | 13 - Fishing | |
| 6 - Cor | | 14 - Aband | |
| 7 - C.T. | | 15 - Rep | |
| 8 - Test | | 16 - W.T. | |
| | | 17 - Vac | |

29 PROGRAMME D.A.

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 60

DATE 10.5.69

PENETRATION

**PHASES**

| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 68 | | 4 3718<br>3650 | | 5 18 | |

| | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EACH BIT | 6 | | 7 3650 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 42 | | 3692 | | 11 | 30 | HTC | $8\frac{1}{2}$ | OWV | KB036 | 7/16 | 42/11.30 | 40000 | 100 | 430 | 2000 |
| Drilled-cored | 26 | | 3718 | | 6 | 30 | HTC | $8\frac{1}{2}$ | OSC1g | KE054 | 7/16 | | 40000 | 100 | 430 | 2000 |
| Drilled-cored | | | | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

**CHARACTERISTICS**

19

wt 174 wt 176 V 58 V 60

mini F 17.2 maxi VA 53 mini Vp 42 maxi Yv 22

Gel 0 3 10 14 S% 5 pH 8.3

Pf .1 Lc 160 Solid 29 NaCL 315

**LOSSES and GAINS**

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

**PRODUCTS ADDED**

21

| | |
|---|---|
| Spersene | 10 sax |
| CMC reg | 10 sax |
| Dowicide B | 50 lb |
| Magcobar | 200 sax |

STRING

22 ELEMENTS bit, bit sub, 3 6 1/4" DC, stab, 15 61/4" DC, stab, 2 BS, 3 6 1/4" DC

| 23 WEIGHT (in mud) | D.C. | D.P. | W.M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

**27 TIME LOG**

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 01.45 | 01.45 | Trip in hole |
| 01.45 | 13.15 | 11.30 | Drilling |
| 13.15 | 17.30 | 04.30 | Trip for bit. |
| 17.30 | 24.00 | 06.30 | Drilling |
| | | | Stop drilling 2.30 at 3729' FTS |

**28 TIME ANALYSIS**

1 - R.U.D.

2 - D. 18.00

3 - Red

4 - D.T. 06.00

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op.

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T.

17 - Vac

**29 PROGRAMME** Wait on weather and D.A.

406

# DRILLING REPORT
## A.C.C.

1 WELL Walrus A-71
RIG WO II
2 No. 61
DATE 10.6.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 11 | | 4 3718<br>3729 | | 5 2 | 30 |
| EACH BIT Drilled-cored | 6 11 | | 7 3729<br>3718 | | 8 2 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 HTC | 10 8 $\frac{1}{2}$ | 11 OSC1G | 12 KE054 | 13 7/16 | 14 37.9.00 | 15 40,000 | 16 100 | 17 390 | 18 2000 |

MUD

CHARACTERISTICS

19
Wt mini 1.75 Wt maxi 1.76 V mini 58 V maxi 62
F 18.4 VA 52 Vp 44 Yv 22
Gel 0 3 10 11 S% 5 pH 8.5
Pf .1 Lc 170 Solid 30 NaCL 365

| 20 LOSSES and GAINS | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

21 PRODUCTS ADDED

| | |
|---|---|
| Duovis | 2 sax |
| Chrome Alum. | 1 sax |
| Weight mat. | 400 sax |

STRING

22 ELEMENTS Same as gray valve. 1 stand below hanger tool.

23 WEIGHT (in mud) D.C. D.P. Wt M.D.

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 02.30 | 02.30 | Drilling |
| 02.30 | 20.30 | 18.00 | Stand by for weather |
| 20.30 | 24.00 | 03.30 | Lay down DP, hang off |

28 TIME ANALYSIS

| | |
|---|---|
| 1 - R.U.D. | 9 - Mis. op. |
| 2 - D. 02.30 | 10 - W.C. |
| 3 - Red | 11 - Casing |
| 4 - D.T. | 12 - Circ |
| 5 - H.O. | 13 - Fishing |
| 6 - Cor | 14 - Aband |
| 7 - C.T. | 15 - Rep |
| 8 - Test | 16 - W.T. 21.30 |
| | 17 - Vac |

29 PROGRAMME

406

# DRILLING REPORT

**A.C.C.**

1 WELL Walrus A-71

RIG WO II

2 No. 62

DATE 10.7.69

PENETRATION

| PHASES | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | | | | | | |
| TOTAL | 3 | | 4 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pi ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

27

| TIME LOG FROM | TIME LOG TO | ELAPSED TIME | |
|---|---|---|---|
| 24.00 | 02.45 | 02.45 | Landed DP with hang off pod on bore protector. Closed DP rams and blind rams. |
| 02.45 | 07.45 | 5.00 | Wait on weather |
| 07.45 | 19.00 | 11.15 | Pulled Kill and Choke lines, riser and flex joint. |
| 1900 | 24.00 | 05.00 | Wait on weather |

28

TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. 24.00
17 - Vac ______

29

PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 63

DATE 10.8.69

PENETRATION

| PHASES | | | | | | |
|---|---|---|---|---|---|---|
| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
| **TOTAL** Drilled-cored | 3 | | 4 3729 | | 5 | |
| **EACH BIT** | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

W<sup></sup>t mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

| LOSSES and GAINS | | |
|---|---|---|
| 20 | this day | cumul |
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION ______
Type . Stage

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG | | ELAPSED | |
|---|---|---|---|
| FROM | TO | TIME | |
| 00.00 | 24.00 | 24.00 | Stand by for weather |
| | | | 21.00 started to run riser |

28

TIME ANALYSIS

1 - R.U.D. ______
2 - D. ______
3 - Red ______
4 - D.T. ______
5 - H.O. ______
6 - Cor ______
7 - C.T. ______
8 - Test ______
9 - Mis. op. ______
10 - W.C. ______
11 - Casing ______
12 - Circ ______
13 - Fishing ______
14 - Aband ______
15 - Rep ______
16 - W.T. 24.00
17 - Vac ______

29

PROGRAMME ______

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 64

DATE 10.9.6

**PENETRATION**

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 3729 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS: Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS: Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

**MUD**

CHARACTERISTICS

19

Wt mini ____ Wt maxi ____ V mini ____ V maxi ____

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

**STRING**

22 ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

**NOTES**

24 FORMATION Type . Stage ____

25 CORES ____

26 DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 24.00 | | Wait on weather |
| 00.00 | 06.00 | 06.00 | Run riser |
| 06.00 | 12.00 | 06.00 | Work with fouled guide line & riser |
| 12.00 | 14.30 | 02.30 | Lay down riser |
| 14.30 | 21.30 | 07.00 | Try to free guide line & build new guide arm |
| 21.30 | 24.00 | 02.30 | Rerun riser |

28

TIME ANALYSIS

1 - R.U.D. ____

2 - D. ____

3 - Red ____

4 - D.T. ____

5 - H.O. ____

6 - Cor ____

7 - C.T. ____

8 - Test ____

9 - Mis. op. ____

10 - W.C. ____

11 - Casing ____

12 - Circ ____

13 - Fishing ____

14 - Aband ____

15 - Rep ____

16 - W.T. 24.00

17 - Vac ____

29

PROGRAMME ____

406

# DRILLING REPORT

**A.C.C.**

1 WELL Walrus A-71
RIG WO II

2 No. 65
DATE 10.10.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 3729 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt 1.70 Wt 1.72 V 68 V 70

F mini 14.4 VA maxi 61 Vp mini 48 Yv maxi 26

Gel 0 4 10 17 S% 5 pH 8.5

Pf 2 Lc 140 Solid 29 NaCL 315

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | | | |
|---|---|---|---|
| Caustic | 13 sax | Magcobar | 900 sax |
| Defoamer | 7 cans | | |
| Duovis | 6 sax | | |
| Chrome Alum. | 1 sax | | |

STRING

22 ELEMENTS

23 WEIGHT (in mud) D.C. D.P. Wt M.D.

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27

| TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 09.00 | 09.00 | Stab riser. Run Kill and Choke test 5000 Psi |
| 09.00 | 10.00 | 01.00 | Disp. sea water in riser |
| 10.00 | 15.15 | 05.15 | Pick up DP screw into hang tool and work through BOP |
| 15.15 | 17.45 | 02.45 | Pull up and remove hanging tool & pull bit to above BOP |
| | | | and run to bottom. |
| 17.45 | 22.45 | 05.00 | Circulate and cond. mud for logs. |
| 22.45 | 24.00 | 01.15 | Pull out. Spot heavy mud at 9 5/8 shoe. |
| | | | |
| | | | |
| | | | LOGGING 12 HR YET |

28 TIME ANALYSIS

1 - R.U.D.
2 - D.
3 - Red
4 - D.T.
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op.
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T. 24.00
17 - Vac

29 PROGRAMME

Finish logs and velocity

406

# DRILLING REPORT

**A.C.C.**

1 WELL Walrus A-71
RIG WO II
2 No. 66
DATE 10.11.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3735 | | 5 4 | 30 |
| Drilled-cored | 24 | | 3729 | | | |
| EACH BIT | 6 | | 7 3753 | | 8 4 | 30 |
| Drilled-cored | 24 | | 3729 | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| ATC | 8 1/2 | OSC1G | KE053 | 7/16 | 24'/4.30 | 40,000 | 100 | 430 | 2000 |

MUD

**CHARACTERISTICS**

19
Wt 1.77 Wt 1.75 V 58 V 62
F mini 19.2 VA maxi 50 Vp mini 39 Yv maxi 22
Gel 0 3 10 12 S% 5 pH 8.7
Pf .7 Lc 200 Solid 28 NaCL 315

**LOSSES and GAINS**

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

**PRODUCTS ADDED**

| 21 | |
|---|---|
| CMC | 14 sax |
| Spersene | 14 sax |
| Caustic | 7 sax |

STRING

22 ELEMENTS Same as before.

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | 114,000 |

NOTES

24 FORMATION Type . Stage
25 CORES
26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 01.00 | 01.00 | Trip out |
| 01.00 | 16.00 | 15.00 | Schlumberger - Lateral log (from 1) Gammaray micro |
| | | | Dip meters to 9.45. Velocity survey to 16.00 |
| 16.00 | 19.30 | 03.30 | Run Drilling Assembly |
| 19.30 | 24.00 | 04.30 | Drilling |

Situation at 00.00 stop at 3770' Going in the hole with diamond bit.

28 TIME ANALYSIS
1 - R.U.D.
2 - D. 04.30
3 - Red
4 - D.T. 03.30
5 - H.O.
6 - Cor
7 - C.T.
8 - Test
9 - Mis. op. 16.00
10 - W.C.
11 - Casing
12 - Circ
13 - Fishing
14 - Aband
15 - Rep
16 - W.T.
17 - Vac

29 PROGRAMME D.A.

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 67

DATE 10.12.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. | BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3817 | | 5 | | | | | | | | | | | |
| Drilled-cored | 64 | | 3753 | | 18 | 15 | | | | | | | | | | |
| EACH BIT | 6 | | 7 3753 | | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Drilled-cored | 17 | | 3770 | | 4 | | HTC | 8 1/2 | OSC1G | KE053 | 7/16 | 41/8.45 | 35/40000 | 100 | 430 | 2000 |
| Drilled-cored | | | | | 14 | 15 | CHRIST | 8 7/16 | DIAMOND | GC6933 | | | 22/28000 | 120 | 300 | 1200 |
| Drilled-cored | 47 | | 3817 | | | | | | | | | | | | | |
| Drilled-cored | | | | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt 1.73 Wt maxi 1.74 V mini 60 V maxi

F 19.2 VA Vp 39 Yv

Gel 0 3 10 12 S% 5 pH 8.7

Pf Lc 200 Solid 28 NaCL 315

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | | | |
|---|---|---|---|
| Barite | 600 sax | Spersene | 14 sax |
| Defoamer | 13 cans | | |
| Caustic | 5 sax | | |
| Chrome Alum | 15 sax | | |
| CMC | 14 sax | | |

STRING

22 ELEMENTS 8 7/16 ram 9 6 1/4" DC, stab, 6 6 1/4", stab, BS, 3 6 1/4 DC BS DP

23 WEIGHT (in mud) D.C. D.P. Wt M.D.

NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 04.00 | 04.00 | Drilling |
| 04.00 | 09.45 | 05.45 | Trip to change set up |
| 09.45 | 24.00 | 14.15 | Drilling |

28 TIME ANALYSIS

1 - R.U.D.

2 - D. 18.15

3 - Red

4 - D.T. 05.45

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op.

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T.

17 - Vac

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 68

DATE 10.13.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3857 | | 5 | |
| Drilled-cored | 40 | | 3817 | | 16 | 30 |
| EACH BIT | 6 | | 7 3857 | | 8 | |
| Drilled-cored | 40 | | 3817 | | 16 | 30 |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| CHRIST | 8 7/16 | DIAMOND | GC6933 | | 87/31.15 | 28,000 | 50 | 370 | 1200 |

## MUD

CHARACTERISTICS

19

Wt mini 1.74 Wt maxi 1.75 V mini 70 V maxi

F 14.2 VA 50 Vp 39 Yv 22

Gel 0 3 10 12 S% 5 pH 8.7

Pf 2 Lc 200 Solid 28 NaCL 395

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

| | |
|---|---|
| Barite | 450 sax |
| CMC Reg | 10 sax |
| Spersene | 10 sax |
| Dowicide | 1 dr |

## STRING

22 ELEMENTS 8 7/16" bit, 3 6 1/4" DC, stab, 6 6 1/4" DC, stab, BS, 3 6 1/4" DC, BS

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | 42,000 | | 108,000 |

## NOTES

24 FORMATION Type . Stage

25 CORES

26 DEVIATION

27 TIME LOG

| FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 16.30 | 16.30 | Drilling |
| 16.30 | 24.00 | 07.30 | Wait on weather. 5° to 10° roll |
| | | | Now drilling at 3865' with OSC1G 6 1/hr. 08.00 3874' |

28 TIME ANALYSIS

1 - R.U.D.

2 - D. 16.30

3 - Red

4 - D.T.

5 - H.O.

6 - Cor

7 - C.T.

8 - Test

9 - Mis. op.

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T. 17.30

17 - Vac

29 PROGRAMME

D.A.

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

2 No. 69

RIG WO II

DATE 10.14.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3857 | | 5 | |
| Drilled-cored | 69 | | 3926 | | 11 | 45 |

| EACH BIT | 6 PENET. ft | ins. | 7 DEPTH ft. | ins. | 8 TIME h. | min. | 9 Make | 10 Ø | 11 Type | 12 No. | 13 Nozzles | 14 Cumul | 15 Weight | 16 R.P.M. | 17 Flow Rate | 18 Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3857 | | | | | | | | | | | | | |
| Drilled-cored | 60 | | 3917 | | 8 | 30 | HUGHES | 8 $\frac{1}{2}$ | OSC1G | KE 052 | 7/16 | 60/8n$\frac{1}{2}$ | 35/40000 | 160 | 350 | 2000 |
| Drilled-cored | 9 | | | | | | | | | | | | | | | |
| Drilled-cored | | | 3917 | | 3 | 15 | CHRIST | 8 $\frac{7}{16}$ | DIAMOND | GC6906 | - | | 21000 | 80 | 370 | 1300 |
| Drilled-cored | | | 3926 | | | | | | | | | | | | | |

MUD

CHARACTERISTICS

19

Wt mini 1.72 Wt maxi 1.72 V mini 58 V maxi 65

F 26 VA 45.5 Vp 37 Yv 17

Gel 0 .9 10 10 S% 3 pH 8.7

Pf .2 Lc 220 Solid 36 NaCL 315

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

| 21 | | |
|---|---|---|
| Barite | 250 | |
| Duovis | 3 | |
| Caustic | 0 | |
| Chrome Alum. | 2 | |

STRING

22 ELEMENTS 30' CB, stab, 9 6 1/4" DC, stab, 2 BS

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage

25 CORES #4 9' 100% REC

26 DEVIATION

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 01.30 | 01.30 | Circulate and stand by for weather |
| 01.30 | 05.30 | 04.00 | Trip change bit. |
| 05.30 | 14.00 | 08.30 | Drilling |
| 14.00 | 17.45 | 03.45 | Trip to pick C.B. |
| 17.45 | 21.00 | 03.15 | Coring |
| 21.00 | 24.00 | 03.00 | Trip out and service C.B. |
| | | | |
| | | | |
| | | | Stop at 01.00. New stand by for rough weather with |
| | | | DC and 7 stands in hole. |

28 TIME ANALYSIS

1 - R.U.D.

2 - D. 08.30

3 - Red

4 - D.T. 10.45

5 - H.O.

6 - Cor 03.15

7 - C.T.

8 - Test

9 - Mis. op.

10 - W.C.

11 - Casing

12 - Circ

13 - Fishing

14 - Aband

15 - Rep

16 - W.T. 01.30

17 - Vac

29 PROGRAMME

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 70

DATE 10.15.69

## PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 | 3026 | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

## MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

## STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

## NOTES

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| 00.00 | 01.00 | 01.00 | Run bit 7 stds and drilling assembly |
| 01.00 | 12.30 | 11.30 | Stand by for weather |
| 12.30 | 15.00 | 02.30 | Pull out D.P. and lay down D.C. |
| 15.00 | 22.00 | 07.00 | Run logs. * |
| 22.00 | 24.00 | 02.00 | Pull loggers to riser and close blind rams. |
| | | | * Sonic - laterolog 3, Gammray Neutron, Side wall coring. |

TIME ANALYSIS 28

| | | | |
|---|---|---|---|
| 1 - R.U.D. | | 9 - Mis. op. | 09.00 |
| 2 - D. | | 10 - W.C. | |
| 3 - Red | | 11 - Casing | |
| 4 - D.T. | 03.30 | 12 - Circ | |
| 5 - H.O. | | 13 - Fishing | |
| 6 - Cor | | 14 - Aband | |
| 7 - C.T. | | 15 - Rep | |
| 8 - Test | | 16 - W.T. | 11.30 |
| | | 17 - Vac | |

PROGRAMME 29

Stand by for weather

405

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71
RIG WO II

2 No. 71
DATE 10.16.69

PENETRATION

PHASES

| Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL Drilled-cored | 3 | | 4 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS | | | | | | PARAMETERS | | | |
|---|---|---|---|---|---|---|---|---|---|
| Make | Ø | Type | No. | Nozzles | Cumul | Weight | R.P.M. | Flow Rate | Mud Pressure |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19
Wt mini ____ Wt maxi ____ V mini ____ V maxi ____
F ____ VA ____ Vp ____ Yv ____
Gel 0 ____ 10 ____ S% ____ pH ____
Pf ____ Lc ____ Solid ____ NaCL ____

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION Type . Stage ____

25 CORES ____

26 DEVIATION ____

27

| TIME LOG FROM | TO | ELAPSED TIME | ABANDONMENT |
|---|---|---|---|
| | | 02.00 | Rough weather - anchor line #7 broke |
| | | 03.05 | WSW wind HO/50 Knots - roll 22°. Pitch 6° to 8°. HeaveHo |
| | | | Clamp and cable of rucker broken - Lost riser, Kill and |
| | | | Choke lines. |
| | | 03.10 | Anchor line #8 broke |
| | | 04.00 | No tension on anchor line #5 |
| | | 06.30 | Tug trying to get a line on the barge |
| | | 12.45 | Tug hooked on the barge |
| | | 13.30 | Cut line #2 |
| | | 15.35 | Cut line #6 - tension again on line #5 |
| | | 16.30 | Cut line #5 |
| | | 22.20 | Wind NW 60 to 70 knots - cut anchor line #3 and 4 |

28

TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband ____
15 - Rep ____
16 - W.T. 24.00
17 - Vac ____

29

PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

2 No. 72

RIG WO II

DATE 10.17.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | ins. | DEPTH ft. | ins. | TIME h. | min. |
|---|---|---|---|---|---|---|
| TOTAL<br>Drilled-cored | 3 | | 4 3926 | | 5 | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS 19

Wt mini ____ Wt maxi ____ V mini ____ V maxi ____

F ____ VA ____ Vp ____ Yv ____

Gel 0 ____ 10 ____ S% ____ pH ____

Pf ____ Lc ____ Solid ____ NaCL ____

| LOSSES and GAINS 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED 21

STRING

22 ELEMENTS ____

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

NOTES

24 FORMATION ____ Type . Stage

25 CORES ____

26 DEVIATION ____

| 27 TIME LOG FROM | TO | ELAPSED TIME | ABANDONMENT |
|---|---|---|---|
| | | | Hold WO II into weather with no. 1 anchorage line and tug Vigilant. Millerntor standing by. Arctic Shore Returned to WO II at 15.00 hours. |
| | | 15.15 | Cut anchor line no. 1, Vigilant holding WO II into weather. Move from location 2 at 4 miles. |
| | | 22.15 | Leave location cap 340° |

28 TIME ANALYSIS

1 - R.U.D. ____
2 - D. ____
3 - Red ____
4 - D.T. ____
5 - H.O. ____
6 - Cor ____
7 - C.T. ____
8 - Test ____
9 - Mis. op. ____
10 - W.C. ____
11 - Casing ____
12 - Circ ____
13 - Fishing ____
14 - Aband 24.00
15 - Rep ____
16 - W.T. ____
17 - Vac ____

29 PROGRAMME ____

406

# DRILLING REPORT

A.C.C.

1 WELL Walrus A-71

RIG WO II

2 No. 73

DATE 10.18.69

PENETRATION

| PHASES<br>Cross out which ever not applicable | PENET. ft. | PENET. ins. | DEPTH ft. | DEPTH ins. | TIME h. | TIME min. |
|---|---|---|---|---|---|---|
| TOTAL | 3 | | 4 3926 | | 5 | |
| Drilled-cored | | | | | | |
| EACH BIT | 6 | | 7 | | 8 | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |
| Drilled-cored | | | | | | |

| BITS<br>Make | Ø | Type | No. | Nozzles | Cumul | PARAMETERS<br>Weight | R.P.M. | Flow Rate | Mud Pressure |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

MUD

CHARACTERISTICS

19

Wt mini ______ Wt maxi ______ V mini ______ V maxi ______

F ______ VA ______ Vp ______ Yv ______

Gel 0 ______ 10 ______ S% ______ pH ______

Pf ______ Lc ______ Solid ______ NaCL ______

LOSSES and GAINS

| 20 | this day | cumul |
|---|---|---|
| Mud | | |
| Water | | |

PRODUCTS ADDED

21

STRING

22 ELEMENTS ______

| 23 WEIGHT (in mud) | D.C. | D.P. | Wt M.D. |
|---|---|---|---|
| | | | |

24 FORMATION Type . Stage ______

25 CORES ______

26 DEVIATION ______

NOTES

| 27 TIME LOG FROM | TO | ELAPSED TIME | |
|---|---|---|---|
| | | | Vigilant holding WO II into weather. Millerntor and |
| | | | Arctic Shore standing by. |
| | | 08.30 | Millerntor took 35 personnel off WO II. Secured WO II |
| | | | for tow. |
| | | 12.00 | Start tow for Halifax |
| | | 15.00 | Arctic Shore took 6 personnel off WO II |
| | | | |
| | | | Vigilant and WO II underway for Halifax. |
| | | | |
| | | | At 08.00 hrs. 10.19.69 Vigilant and WO II made 50 miles |

28 TIME ANALYSIS

1 - R.U.D. 12.00

2 - D. ______

3 - Red ______

4 - D.T. ______

5 - H.O. ______

6 - Cor ______

7 - C.T. ______

8 - Test ______

9 - Mis. op. ______

10 - W.C. ______

11 - Casing ______

12 - Circ ______

13 - Fishing ______

14 - Aband 12.00

15 - Rep ______

16 - W.T. ______

17 - Vac ______

29 PROGRAMME ______

406

AQUITAINE ET AL. HUDSON WALRUS A-71

## F. DEVIATION SURVEY

# AQUITAINE ET AL HUDSON WALRUS A-71

## DEVIATION SURVEYS

781' - 1°

1120' - 2°

1432' - 0°30

2000' - 0°45

2567' - 1°

3093' - 0°30

3370' - 1°

3650' - 0°45

# AQUITAINE ET AL. HUDSON WALRUS A-71

## G. BIT RECORD

## AQUITAINE ET AL HUDSON WALRUS A-71

## BIT RECORD

28 Drilling bits were used + 1 diamond bit.

- Phase 26" + 36" hole opener.
  - 1 26" bit Performance: 163 feet
- Phase 15" + 26" hole opener
  - 1 15" bit Performance: 339 feet
- Phase 12¼" or 15" + 17½" hole opener
  - 4 12¼" bits
  - 4 15" bits Performance: 880 feet
- Phase 12¼"
  - 4 12¼" bits Performance: 965 feet
- Phase 8½"
  - 14 8½" bits
  - 1 diamond bit Performance: 961 feet.

## AQUITAINE ET AL HUDSON WALRUS A-71

### BIT RECORD

### Size 8½"

| No. | Type | Chokes | Interval | Footage | Time | Parameters | | | | Mud Characteristics | | | Wearing | | | Formation | Average Pene-tration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Weight (1000 lbs) | RPM | Mud Rate | Pressure (PSI) | d. | V. | F. | Diameter | Tooth | Bearings | | |
| KE 055 | OSCIG J | 3x3/8 | 2965 - 3093 | 128 | 10:00 | 30 | 90 | 390 | 1,900 | 1.35 | 45 | 34.2 | o | 100% | 2.1.3 | Dolomite | 12.8 |
| KE 057 | OSCIG J | 3x7/16 | 3093 - 3160 | 67 | 8:45 | 35 | 100 | 430 | 1,800 | 1.75 | 62 | 21.4 | o | 70% | 2.1.1 | Calcareous Dolomite | 7.6 |
| KE 014 | OWV J | - | 3160 - 3188 | 28 | 6:45 | 35 | 90 | 290 | 1,100 | 1.78 | 65 | 15.8 | o | 30% | 1.0.0 | Calcareous Dolomite | 4.1 |
| KE 058 | OSCIG J | | 3188 - 3259 | 71 | 12:00 | 40 | 80 | 440 | 2,400 | 1.80 | 62 | 20.4 | o | 50% | 1.2.1 | Limestone | 5.9 |
| LP 210 | W 7 R | Sans | 3259 - 3306 | 47 | 14:15 | 40 | 80 | 430 | 1,600 | 1.78 | 68 | 14.8 | o | 40% | 1.1.1 | Limestone | 3.3 |
| KB 040 | OWV J | 3x3/4 | 3306 - 3370 | 64 | 18:45 | 35 | 100 | 430 | 2,000 | 1.78 | 68 | 14.8 | o | 28% | 3.3.3 | Limestone | 3.3 |
| KE 056 | OSCIG J | 3x7/16 | 3370 - 3480 | 110 | 15:00 | 40 | 100 | 435 | 2,200 | 1.82 | 58 | 26 | o | 100% | 2.3.2 | Chalky Limestone | 7.3 |
| KE 060 | OSCIG J | 3x7/16 | 3480 - 3579 | 99 | 15:15 | 40 | 100 | 435 | 2,200 | 1.77 | 60 | 12.8 | o | 100% | 1.3.2 | Calcareous Dolomite | 6.4 |
| KE 059 | OSCIG J | 3x7/16 | 3579 - 3630 | 51 | 12:30 | 40 | 100 | 435 | 1,900 | 1.76 | 60 | 12.4 | o | 100% | 2.2.2 | Dolomitic Limestone | 4.1 |
| LP 471 | X 55 R | 3x7/16 | 3630 - 3650 | 20 | 9:00 | 40 | 50/100 | 435 | 1,900 | 1.75 | 62 | 12.6 | o | o | o.o.o | Partly Chalky Limestone | 2.2 |
| KB 036 | OWV J | 2x3/8 - 1x7/16 | 3650 - 3692 | 42 | 11:30 | 40 | 100 | 430 | 1,900 | 1.75 | 60 | 17.2 | o | 30% | o.o.o | Partly Chalky Limestone | 3.6 |
| KE 054 | OSCIG J | 2x3/8 - 1x7/16 | 3692 - 3729 | 37 | 9:00 | 40 | 100 | 445 | 2,000 | 1.76 | 62 | 18.4 | o | | | Limestone | 4.1 |
| KE 053 | OSCIG J | 3x7/16 | 3729 - 3770 | 41 | 8:45 | 40 | 100 | 430 | 2,000 | 1.75 | 60 | 19.2 | 1 | 100% | | | 4.7 |
| EC 6933 | MD 19 V | Christensen | 3770 - 3857 | 87 | 31:15 | 28 | 120/50 | 300/320 | 1,200 | 1.75 | 70 | 19.2 | | | | | 2.8 |
| KE 052 | OSCIG J | 3x7/16 | 3857 - 3917 | 60 | 8:30 | 40 | 100 | 350 | 2,000 | 1.75 | 60 | 16 | | | | | 7.0 |
| 6906 | Core bit | Christensen | 3917 - 3926 | 9 | 3:15 | 21 | 80 | 270 | 1,300 | 1.74 | 60 | 16 | | | | | 2.75 |

AQUITAINE ET AL. HUDSON WALRUS A-71

## H. MUD SUMMARY

# AQUITAINE ET AL HUDSON WALRUS A-71

## MUD SUMMARY

The mud used was:

a) In the phase 36" only sea water, hole filled with gel before coring.

b) In the phase 26" bentonite CMC mud.

c) Since the phase 17½" Duovis system.
During the phase 17½" we had important gain of calcium chloride water which obliged to increase the density between 1,73 - 1,80 SG since 3528 feet.
The consumption of baryte increased and unfortunately the penetration decreased.
But even with the mixing of salt in the mud, we never lost good characteristics, and neither lost time.
The Duovis system was very well adapted.

The total of the noticeable gain was 524 barrels. The last one the 3rd of October at 3579' was 40 barrels of water with calcium chloride SG: 1.40 after a stand-by weather. After,that, we had only 3 small slugs from the bottom after stand-by, and then nothing.

## MUD CHARACTERISTICS

### Phases 36"

WT : 1,04
V min. : 50 V max. : 80

### Phase 26" 787 - 1120' : 339' in 17 hrs. 30'.

WT min. : 9 WT max. : 14.2
V. min. : 52 V. max. : 62
F. : 30
Va. : 29
Vp. : 18
YV : 22
gel 0 min. : 8
10 min. : 40
pH : 9
pF : 0.3

### Phase 17½" 1120' - 2000' : 880' in 37 hrs. 15'.

WT min. : 9.3 WT max. : 10.4
V min. : 42 V. max. : 55
F. : 14 - 20
Va. : 24 - 28
Vp. : 18 - 24
YV : 12 - 4
gel 0 min. : 2 - 5
10 min. : 10 - 15
pH : 8.5 - 10
pF : 0.3 - 1

### Phase 12¼" 2000' - 2965' : 965' in 42 hrs. 30'

WT min. : 9.2 WT max. : 14.4
V. min. : 42 V. max. : 54
F. : 17 - 22
Va. : 22 - 43
Vp. : 14 - 33
YV : 16 - 20
gel 0 min. : 3 - [illegible]
10 min. : 8 - 14
pH : 9
pF : 0.1

Phase 8½"  2965' - 3926' : 961' in 190 hrs. 30'

WT min. : 11.2  WT max. : 14.7
V. min. : 45  V. max. : 65
F. : 20
Va. : 35 - 60
Vp. : 16 - 45
YV : 18 - 30
gel 0 min. : 3 - 5
10 min. : 15
pH : 9
pF : 0.1

## MUD & CHEMICALS USED FOR OPERATIONS

### 36" hole

| | | |
|---|---|---|
| Magcogel | 111,900 lbs | Drilling hrs. 14 |
| Caustic Soda | 1,000 lbs | |
| | | Cost: 4,521.80 $C |

### 26" hole

| | | |
|---|---|---|
| Magcogel | 18,000 lbs | Drilling hrs. 17½ |
| Caustic Soda | 3,800 lbs | |
| C.M.C. | 600 lbs | |
| Spersene | 6,150 lbs | |
| Lime | 1,000 lbs | |
| Salt Gel | 7,200 lbs | |
| SAPP | 3,000 lbs | |
| Magcobar | 4,000 lbs | |
| | | Cost: 9,438.92 $C |

### 17½" hole

| | | |
|---|---|---|
| Magcogel | 17,000 lbs | Drilling hrs. 37½ |
| Salt | 14,200 lbs | |
| Nut Plug | 2,500 lbs | |
| Caustic Soda | 2,250 lbs | |
| C.M.C. | 1,450 lbs | |
| Spersene | 7,650 lbs | |
| Mica | 600 lbs | |
| Salt Gel | 2,000 lbs | |
| De foamer | 900 lbs | |
| Magcobar | 151,000 lbs | |
| Ducvis | 118 lbs | |
| Chrome Alum. | 1,100 lbs | |
| Dowcide "B" | 300 lbs | |
| | | Cost: 19,171.70 $C |

## 12¼" hole

| | | |
|---|---|---|
| Magcogel | 1,400 lbs | Drilling hrs. 42½ |
| Magcobar | 502,000 lbs | |
| Caustic Soda | 850 lbs | |
| Bicarbonate of Soda | 600 lbs | |
| Salt Gel | 1,200 lbs | |
| Duovis | 88 lbs | |
| Dowcide "B" | 200 lbs | |
| De foamer | 350 lbs | |
| Kelzan XC | 24 lbs | |

Cost: 31,986.77 $C

## 8½" hole

| | | |
|---|---|---|
| Magcogel | 16,600 lbs | Drilling hrs. 190½ |
| Spersene | 10,200 lbs | |
| Caustic Soda | 7,400 lbs | |
| C.M.C. | 10,500 lbs | |
| Magcobar | 943,000 lbs | |
| Salt Gel | 10,480 lbs | |
| Duovis | 156 lbs | |
| Chrome Alum. | 4,800 lbs | |
| Dowcide "B" | 800 lbs | |
| Salt | 5,200 lbs | |
| De foamer | 1,800 lbs | |

Cost: 75,797.52 $C

| | | |
|---|---|---|
| Total cost of | 36" | 4,521.80 |
| | 26" | 9,438.92 |
| | 17½" | 19,171.70 |
| | 12¼" | 31,986.77 |
| | 8½" | 75,797.52 |
| | | 140,916.71 $C. |

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 2.H

## MUD TABLES

| PARAMETERS | | | | | | CHARACTERISTICS (mini) (maxi) | | | | | CONSUMPTION | | QT IN LBS or U.S. GAL COST IN CAN $ | | | | | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE Aug. | DEPTH BIT | Ft Drilled CIR Hr | FORMATION STAGE | GPM. PUMP PRESSURE | HOLE DRILLED VOL. LOSSES BBL | W V F | VA Vp YV | GEL 0 GEL 10 RES TY | PH PF Na Cl | Liq CONT FUEL% S D | PROD. CIRC VOL | WATER BBL | Magcogel Qty Cost | Caustic Soda Q C | CMC Q C | Spersene Q C | Lime Q C | Salt Gel Q C | SAPP Q C | Magcobar Q C | Duovis Q C | Chrome Alum. Q C | [illegible] Q C | Total Daily Cost | TYPE OF MUD TYPE OF TREATMENT |
| 7 | 618<br>640 | 29:00 | | 1000 | | 9.05<br>50/80 | no returns | | 9.5 | | | | 460 | 50<br>Original | | Prehydrated bentonite Slurry | | | | | | | | 1667.00 | **PHASE 36"** |
| | | 3:30 | | 350 | | | | | | | | | 1792.30 | 84.70 | | | | | | | | | | | Spud in August 79 |
| 8 | 781 | 114:00 | | 1000 | | Sea Water | | | No returns | | | | 693 | 10 | | | | | | | | | | | 600 bbl prehydrated gel mud for initial mud. |
| | | 10:30 | | 350 | | | | | | | | | 2570.40 | 84.70 | | | | | | | | | | 2654.80 | System changed to sea water. |
| | | | | | | | | | | | | | | | | | | | | | | | | | For remainder of 36" hole with 50 bbl slugs of gel slurry every single down |
| | | | | | | | | | | | | | | | | | | | | | | | | | Total mud on 36" hole = 900 bbl |
| | | | | | | | | Total | 36" | | | | 1119 | 20 | | | | | | | | | | | Run 30" casing |
| | | | | | | | | | | | | | 4352.40 | 169.40 | | | | | | | | | | 4521.80 | shoe at 772.5 feet |
| 9 | 781 | | BOP stack up not operational | | | | | | | | | | | | | | | | | | | | | | **PHASE 26"** |
| to | | | Failed marine riser + stack | | | | | | Pressure tested BOP | | | | | | Leak | in seal | in bottom connector | | | | | | | | |
| 17 | | | Caustic soda used as heating | | | device on 15th to | | try to unlatch | BOP | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 46<br>389.60 | 12<br>501.96 | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | 30 | | 100 | 20 | | | | | | | 370.78 | |
| | | | | | | | | | | | | | | 259.10 | | 1346.00 | 46.40 | | | | | | | 1646.50 | |
| 23 | 1140 | 259:30 | | 900 | | 1.08 | 29<br>16 | 6/42 | 11.5<br>1.5 | 94 | | | | | | 25 | | 90 | 30 | | | | | | |
| | | 15:00 | | 800 | | 52<br>32 | 22 | | 22,275 | 5% | | | | | | 310.04 | | 403.00 | 790.80 | | | | | 1503.64 | |
| 25 | 1120 | 330:00 | | 900 | | 110 | 22<br>12 | 3/16 | 9.0<br>0.3 | 92 | | | | | | | | | | 40 | | | | | |
| . | | 19:00 | | 800 | | 52<br>30 | 20 | | 28,500 | 5% | | | | | | | | | | 92.00 | | | | 92.00 | |
| 24 | 1120 | | | | | | | | | | | | 180 | | | | | | | | | | | | Set casing 20" at 1106' |
| | | | | | | | | | | | | | 702.00 | | | | | | | | | | | 702.00 | |
| | | | | | | | | Total | 26" | | | | 180 | 76 | 12 | 125 | 20 | 90 | 30 | 40 | | | | | |
| | | | | | | | | | | | | | 702.00 | 610.72 | 21.96 | 1634.06 | 46.40 | 403.00 | 790.80 | 92.00 | | | | 4917.12 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | Note: Mud engineer service to Aug. 1st 390.00 $C. |
| | | | | | | | | | | | | | | | | | | | | | | | | | Mud engineer service to Sept. 1st, 2,325.00 $C. |
| RECAP. | | | | Total LOSSES<br>Cum LOSSES | | CONSUMPTION | | | Qty.<br>COST $ C | | | | | | | | | | | | | | | Total COST<br>9438.92 | DEPTH From 618 To 1120 |

A. C. C **DRILLING MUD TABLE**

WELL WALRUS A-71 RIG [illegible] XI CONTRACTOR [illegible]

FORTNIGHT From Aug 7 To Aug 24

| PARAMETERS | | | | | | CHARACTERISTICS (mini) (maxi) | | | | | CONSUMPTION QT IN LBS or U.S. GAL COST IN CAN $ | | | | | | | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE Aug. | DEPTH BIT | Ft Drilled CIR Hr | FORMATION STATE | GPM PUMP PRESSURE | HOLE DRILLED VOL LOSSES BBL | W V F | VA Vp YV | GEL 0 GEL 10 RESTY Calcium | PH PF Na Cl | Liq CONT FUEL% S D | PROD. CIRC VOL | Salt WATER BBL | Magcogel Qty Cost | Caustic Soda Q C | CMC Q C | Spersene Q C | Lime Q C | Salt Gel Q C | Defoamer Q C | Magcobar Q C | Duovis Q C | Chrome Alum. Q C | [illegible] Q C | Total Daily Cost | TYPE OF MUD TYPE OF TREATMENT |
| 25 | | | | | | | | | | | | | 15 | 10 | | 60 | | | 18 | | 18 | 4 | 1 | | PHASE 17 1/2" |
| | | | | | | | | | | | | | 58.5 | 84.70 | | 408.80 | | | 1020.96 | | 2429.72 | 249.68 | 126.25 | 4776.61 | With Duovis System |
| 26 | 1452 | 34:12 | | 590 | | 1.14<br>50 | 24<br>14 | 6/30 | 8.5<br>0.1 | 93 | | 50 | | 5 | 4 | 35 | | | | 80 | | | | | |
| | | 33:45 | | 1850 | | 14 | 20 | | 93000 | 1% | | 204.00 | | 42.35 | 93.72 | 471.80 | | | | 184.00 | | | | 1095.87 | |
| 27 | 1575 | 143:00 | | 600 | | 112 | 27<br>10 | | 10.0<br>0.5 | 93% | | | | 10 | 15 | 20 | | | | | | | | | |
| | | 7:00 | | 1100 | | 55<br>10 | 14 | | 63000 | 1% | | | | 84.70 | 725.45 | 269.60 | | | | | | | | 1080.75 | |
| 28 | 1667 | 92:00 | | 600 | | 115 | 25<br>18 | 2/12 | 8.0<br>0.1 | 91% | | 76 | | | | 37 | | | | 1550 | | | | | |
| | | 5:30 | | 1100 | | 56<br>14.2 | 14 | | 63000 | 3% | | 310.08 | | | | 500.76 | | | | 3105.00 | | | | 3915.84 | |
| 29 | 1786 | 119:00 | | 600 | | 1.16<br>44 | 24<br>18 | 2/16 | 10.0<br>0.5 | 90% | | | | 10 | | | | | | | | | | | |
| | | 4:45 | | 1100 | | 17.2 | 12 | | 85000 | 1% | | | | 84.70 | | | | | | | | | | 84.70 | |
| 30 | 1786 | | | | | 115 | 20<br>14 | 1/10 | 9<br>0.5 | 93% | | | | | | | | | | | | | | | Waiting on weather |
| | | | | | | 42<br>18 | 12 | | 85000 | 7% | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | Lime | Pet Plug | | | | | Idem |
| Sept. 1 | | | | | | | | | | | | 6 | 20 | | | | | | 12 | 50 | | | | | Washed over board during storm |
| 2 | | | | | | | | | | | | 24.48 | 78.00 | | | | | | 71.04 | 325.00 | | | | 498.52 | Idem |
| 3 | | | | | | | | | | | | | | | | | | | | run to | 1156' | plugged hole with | | | 188 [illegible] |
| 4 | | | | | | 1.27<br>56 | 28<br>24 | 6/28 | 11<br>1.1 | 90 | | | | | | | | | | | | | | | Drilled out cement and |
| | | | | | | 60 | 8 | | 28,000 | 2% | | | | | | | | | | | | | | | underreaming hole |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | Open 12 1/4" hole to 17 1/2" |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | 125<br>45 | 19.5<br>13 | 5/14 | 11.0<br>1.0 | 91% | | | | | | | | | | 20 | | | | | |
| 7 | | | | | | 48 | 15 | 2200 | 35,500 | 1% | | | | | | | | | | 46.00 | | | | 46.00 | |
| 7 | 2023 | 214 | | 920 | | 127<br>58 | 28<br>24 | 6/28 | 10.0<br>1.1 | 90% | | 10 | 56 | | 10 | 1 | | 25 | | 40 | 14 | 3 | 1 | | Thick filter cake caused |
| | | 8:30 | | 1600 | | 60 | 8 | 2,280 | 28,000 | 1% | | 40.80 | 218.40 | | 84.30 | 13.48 | | 117.48 | | 92.00 | 1697.50 | 187.26 | 126.25 | 3177.55 | by high Filtration |
| 8 | 2000 | | | 940 | | 112<br>49 | 23.5<br>14 | 4/16 | 9.5<br>0.2 | 95% | | | 64 | 6 | | | | | | | 15 | 3 | | | Logs Schlumberger<br>Hole good |
| | | | | 1000 | | 20.4 | 13 | 1,040 | 15,000 | 1/2% | | | 327.60 | 50.82 | | | | | | | 2168.64 | 187.26 | | 2734.32 | Mixing 700 bbl Duovis |
| 9 | | | | 950 | | 112<br>44 | 20<br>13 | 3/14 | 9.5<br>0.1 | 92% | | | | 11 | | | | | | | 11 | 1 | 1 | | Displaced mud system |
| | | | | 1200 | | 20.8 | 14 | 1,480 | 15,500 | 1½% | | | | 33.83 | | | | | | | 1490.94 | 63.42 | 126.25 | 1713.49 | 250 bbl of mud loss when |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | Riser pulled |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | Waiting on weather |
| 13 | | | | 550 | | 115<br>42 | 22.5<br>16 | 3/10 | 9.5<br>nil | 94%<br>nil | | | | | | | | | | 20 | | | | | Open hole |
| | | | | 1200 | | 19.2 | 13 | 9080 | 20,000 | 7% | | | | | | | | | | 46.00 | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | Run and cemented |
| | | | | | | | | | | | Pet Plug | | | | | | Lime | | | | | | | | 13 3/8" casing at 1975' |
| | | | | | | TOTAL | 17 1/2" | | | | 50 | 142 | 175 | 45 | 29 | 153 | 12 | 25 | 18 | 1510 | 51 | 11 | 3 | | |
| | | | | | | | | | | | 325.00 | 579.36 | 682.50 | 301.15 | 104.47 | 2054.44 | 71.04 | 117.50 | 1020.96 | 3475.00 | 7986.86 | 687.62 | 318.75 | 19171.70 | |

| RECAP | Total LOSSES<br>Cum LOSSES | CONSUMPTION Qty<br>COST $ C | Total COST | DEPTH From 1130' To 2083' |
|---|---|---|---|---|

A C C **DRILLING MUD TABLE**

WELL WALRUS A-71 RIG NEDDRILL II CONTRACTOR [illegible]

FORTNIGHT From Aug. 25 To Sept. 14

2

| PARAMETERS | | | | | | CHARACTERISTICS (mini) (maxi) | | | | | CONSUMPTION | QT IN LBS or U.S. GAL COST IN CAN $ | | | | | | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE<br>Sept. | DEPTH BIT | Ft Drilled CIR Hr | FORMATION STAGE | GPM PUMP PRESSURE | HOLE DRILLED VOL LOSSES BBL | W<br>V<br>F | VA<br>Vp<br>YV | GEL 0<br>GEL 10<br>RESTY | PH<br>PF<br>Na Cl | Liq CONT<br>FUEL%<br>S D | PROD<br>CIRC VOL | WATER<br>BBL | Magcogel<br>Qty Cost | Magcobar<br>Q C | Spersene<br>Q C | Caustic Soda<br>Q C | Bic. of Soda<br>Q C | Salt Gel<br>Q C | Duovis<br>Q C | Chrome Alum.<br>Q C | [illegible]<br>Q C | Defoamer<br>Q C | Kelzan XC<br>Q C | Total Daily Cost | TYPE OF MUD<br>TYPE OF TREATMENT<br>PHASE 12 ¼" |
| 15 | 2985 | 355:00 | | 680 | | 1,10<br>67 | 22,5<br>16 | 3/10 | 9,5<br>0,1 | 9% | | | 14 | 50 | | 9 | | | 22 | 2 | | | | | Drilling<br>Duovis system |
| | | 5:45 | | 1600 | | 19,2 | 15 | 1080 | 20000 | 1% | | | 56,60 | 228,00 | | 76,25 | | | 2981,86 | 124,84 | | | | 3467,55 | |
| 16 | 2670 | 315:00 | | 600 | | 1,22 | 22<br>14 | 2/9 | 9,5<br>0,1 | 90 | | | | 320 | | 4 | | | 15 | 3 | 1 | | | | Chloride are much higher in system, also viscosity dropped - indication point to |
| | | 15:00 | | 1600 | | 60<br>16,8 | 16 | 50000 | 42000 | 1% | | | | 1459,20 | | 33,88 | | | 168,64 | 187,26 | 126,25 | | | 3975,20 | |
| 17 | 2996 | 2,4:00 | | 600 | | 1,26<br>44 | 22 | 2/9 | 9 | 20 | | | | | | | | | | 1 | | 3 | 4 | | Salt water<br>Weight material added to raise weight |
| | | 13:30 | | 1600 | | 16,8 | 19<br>15 | 50000 | 0,1<br>47000 | 1,55 | | | | | | | | | | 62,42 | | 170,16 | 542,00 | 774,58 | |
| 18 | 2910 | 14:00 | | 600 | | 1,35<br>42 | 22<br>16 | 3/8 | 8,2<br>0,05 | 8% | | | | 900 | | | | | | | | 4 | 8 | | |
| | | 2:15 | | 1700 | | 19 | 12 | 50000 | 107000 | 1% | | | | 4104,00 | | | | | | | | 226,88 | 1084,00 | 5414,88 | |
| 19 | 2555 | 55:00 | | 520 | | 1,36<br>46 | 27<br>20 | 3/10 | 8<br>0,05 | 20 | | | | 650 | | | | 6 | | | | | | | |
| | | 11:00 | | 1600 | | 17,6 | 14 | 50000 | 220000 | 1% | | | | 2964,00 | | | | 28,20 | | | | | | 2992,20 | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | Waiting on weather |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | 1,70<br>44 - 48 | 27<br>20 | 3/10 | 8<br>0,05 | 8% | | | | 300 | | | 6 | | | | | | | | |
| | | | | | | 17,6 | 14 | | | 1% | | | | 1368,00 | | | 81,12 | | | | | | | 1449,12 | |
| 22 | | | | | | 1,70 | 37,5<br>20 | 4/12 | 9,2<br>0,1 | 8% | | | | 2800 | | 4 | | 10 | 6 | 2 | 1 | | | | |
| | | | | | | 45<br>20,8 | 19 | 50000 | 264000 | 1% | | | | 12768 | | 33,88 | | 47,00 | 813,24 | 124,84 | 126,25 | | | 13913,21 | |
| 23 | | | | | | 1,73<br>56 | 43<br>35 | 4/14 | 9<br>0,1 | 8% | | | | | | | | | | | | | | | Schlumberger logs<br>Run 9 5/8 casing, shoe at 2959 |
| | | | | | | 22,6 | 23 | 50000 | 264000 | 1% | | | | | | | | | | | | | | | |

| RECAP | Total LOSSES<br>Cum LOSSES | CONSUMPTION<br>PHASE 12 ¼" | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Qty. | | | 14 | [illegible] | | 17 | 6 | 16 | 44 | 8 | 2 | 7 | 12 | Total COST |
| | | | COST $ C | | | 56,60 | [illegible]1,20 | | 118,99 | 81,12 | 75,20 | 5563,75 | 499,36 | 252,50 | 397,04 | 1626,00 | 31986,77 |

DEPTH From 2000 To 2963

A. C. C **DRILLING MUD TABLE**

WELL [illegible] RIG [illegible] CONTRACTOR [illegible]

FORTNIGHT From Sept 15 To Sept 23

| PARAMETERS | | | | | | CHARACTERISTICS (mini) (maxi) | | | | | CONSUMPTION QT IN LBS or U.S. GAL COST IN CAN $ | | | | | | | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE Sept. | DEPTH BIT | Ft Drilled CIR Hr | FORMATION STAGE | GPM PUMP PRESSURE | HOLE DRILLED VOL LOSSES BBL | W V F | VA Vp YV | GEL 0 GEL 10 RESTY | PH PF NaCl | Liq CONT FUEL% SD | PROD CIRC VOL | WATER BBL | Magcogel Qty Cost | Spersene Q C | Caustic Q C | CMC Q C | Magcobar Q C | Salt Gel Q C | Dowvis Q C | Chrome Alum. Q C | Bactericide "D" Q C | Defoamer Q C | Soda Q C | Total Daily Cost | TYPE OF MUD TYPE OF TREATMENT PHASE 8 1/2" |
| 24 | 3314 | 49:00 | | 390 | | 1.55<br>46 | 27<br>18 | 3/14 | 9.5<br>0.2 | 82%<br>oil | | | 26 | | | | | 26 | 15 | 2 | 1 | | | | Lower weight to 1.30 - 1,55<br>Dowvis system |
| | | 4:00 | | 1900 | | 34.2 | 18 | | 159000 | 1% | | | 101.40 | | | | | 122.20 | 2828.50 | 124.84 | 126.25 | | | 2507.79 | |
| 25 | 3402 | 80:00 | | 470 | | 1.70<br>48 | 38<br>29 | 3/14 | 2.5<br>0.03 | 73% | | | | | | | 1700. | | 10 | | | | | | Build up weight to 1.70 |
| | | 7:30 | | 1670 | | 38 | 10 | | 315000 | 1% | | | | | | | 7722.00 | | 1355.40 | | | | | 9107.40 | |
| 26 | 3488 | 85:00 | | 430 | | 170 | 51<br>38 | 3/14 | 9<br>0.2 | 65 | | | | | 8 | 14 | 1200 | 10 | 2 | 1 | | | | | Maintain system |
| | | 14:00 | | 1800 | | 60<br>26.4 | 26 | | 315000 | 3% | | | | | 67.76 | 676.02 | 5472.00 | 47.00 | 271.08 | 62.42 | | | | 6590.28 | |
| 27 | 3525 | 87:00 | | 430 | | 1.80<br>60 | 51<br>38 | 3/14 | 9<br>0.2 | 69 | | | | 14 | 10 | 5 | 300 | 12 | | | | | | | Idem |
| | | 17:45 | | 1600 | | 20.4 | 26 | | 315000 | 1% | | | | 189.72 | 84.70 | 242.15 | 1368.00 | 56.40 | | | | | | 1939.97 | |
| 28 | 3549 | 24:00 | | 430 | | 176 | 59<br>43 | 5/13 | 9<br>0.2 | 70% | | | | 20 | 5 | 15 | 230 | | | | | | 22 | | Idem |
| | | 21:00 | | 2000 | | 70<br>14.8 | 32 | | 264000 | 1% | | | | 269.60 | 92.35 | 724.45 | 1042.05 | | | | | | 89.76 | 2176.96 | |
| 29 | 3495 | 23:00 | | 430 | | 1.75 | 61<br>44 | 4/16 | 4.8<br>0.1 | 70% | | | | 29 | 10 | 17 | 200 | | | | | | | | |
| | | 11:00 | | 2000 | | 79<br>14.8 | 34 | | 254000 | 2% | | | | 390.92 | 84.70 | 835.31 | 912.00 | | | | | | | 2210.53 | |
| 30 | 3556 | 131:00 | | 435 | | 1.75 | 61<br>45 | 4/16 | 9.2<br>0.2 | 68% | | | | 11 | 10 | 9 | 650 | | | | 1 | 16 | | | Build needed volume |
| | | 20:45 | | 2200 | | 72<br>24.2 | 30 | | 247000 | 5% | | | | 148.28 | 84.70 | 435.87 | 2964.00 | | | | 126.25 | 896.00 | | 4655.10 | |
| Oct.<br>1 | 3579 | 23:00 | | 455 | | 1.77 | 55<br>41 | 3/14 | 9.2<br>0.2 | 70%<br>0 | | | | 10 | | 30 | | | | | | | | | Maintain weight |
| | | 4:30 | | 2200 | | 62<br>12.8 | 28 | | 269000 | 4% | | | | 135 | | 1452.00 | | | | | | | | 1567.00 | |
| 2 | 3579 | | | | | 176<br>6.2 | 51<br>39 | 3/12 | 8.8<br>0.1 | 70% | | | | | | | 500 | | | | | | | | Waiting on weather<br>Circulating |
| | | | | | | 13.6 | 24 | | 282000 | 4% | | | | | | | 2280.00 | | | | | | | 2280.00 | |
| 3 | 3597 | 13:00 | | 390 | | 1.72<br>52 | 55<br>39 | 2/12 | 8.2<br>0.05 | 71% | | | | | | 2 | 1050 | | | | | | | | Maintain wt . water loss |
| | | 4:00 | | 1900 | | 200 | 10 | | 315000 | 4 | | | | | | 97.00 | 4788.00 | | | | | | | 4885.00 | |
| 4 | 3650 | 53:00 | | 495 | | 1.74 | 48<br>30 | 3/12 | 8.5<br>0.5 | 71% | | | | | 20 | 20 | 800 | | 4 | 1 | | | | | Dowvis system |
| | | 18:30 | | 1900 | | 5.2<br>12.4 | 20 | | 315000 | 4 | | | | | 69.00 | 960.00 | 3648.00 | | 542.00 | 62.42 | | | | 5389.00 | |
| 5 | 3710 | 66:00 | | 450 | | 1.75<br>60 | 53<br>42 | 3/14 | 8.3<br>0.2 | 71% | | | | 10 | | 10 | 200 | | | | | | | | |
| | | 18:00 | | 2050 | | 17.2 | 22 | | 315000 | 4 | | | | 135.00 | | 485.00 | 912.00 | | | | | | | 1532.00 | |
| 6 | 3729 | 17:00 | | 390 | | 1.76<br>59 | 52<br>41 | 3/11 | 8.5<br>0.1 | 70% | | | | | | | 400 | | 2 | 1 | | | | | |
| | | 2:30 | | 200 | | 18.4 | 22 | | 315000 | 5 | | | | | | | 1824.00 | | 271.00 | 62.42 | | | | 2157.00 | |
| 7<br>/<br>9 | 3729 | | | Waiting on | | Weather | | | | | | | 40 | 15 | | 10 | | 45 | | | | | 10 | | Chemical lost in storm |
| | | | | | | | | | | | | | 156.00 | 202.30 | | 485.00 | | 211.50 | | | | | 40.60 | 1096.00 | |
| 10 | 3729 | | | | | 1.70<br>70 | 61<br>48 | 4/17 | 8.5<br>0.2 | 71% | | | | | 13 | | 900 | | 6 | 1 | | 7 | | | |
| | | | | | | 14.4 | 26 | | 315000 | 5% | | | | | 0.11 | | 4104.09 | | 813.24 | 62.42 | | 392.04 | | 5482.00 | |
| 11 | | | | | | 1.72<br>60 | 64.5<br>48 | 3/12 | 8.8<br>0.2 | 72% | | | | 14 | 7 | 14 | | | | | | | | | Maintain Wt . W.L. |
| | | | | | | 19.2 | 38 | | 315000 | 5% | | | | 187.52 | 9.29 | 678.02 | | | | | | | | 925.00 | |
| 12 | 3817 | 54:00 | | 450 | | 170 | 64<br>48 | 4/15 | 9<br>0.2 | 73 | | | | 14 | 5 | 14 | 500 | | | 1 | | 13 | | | Diamond bit in hole<br>Maintain WT |
| | | 14:12 | | 2000 | | 62<br>18.8 | 32 | | 315000 | 5 | | | | 187.52 | 2.35 | 678.02 | 2736.00 | | | 62.42 | | 737.36 | | 4443.67 | |
| 13 | 3857 | 40:00 | | 390 | | 1.74<br>63 | 43.5<br>37 | 3/12 | 6.8<br>0.2 | 74<br>0 | | | | 10 | | 10 | 450 | | | | 1 | | | | |
| | | 16:30 | | 1200 | | 19.0 | 25 | | 315000 | 5.5 | | | | 134.80 | | 463.00 | 2052.00 | | | | 135.25 | | | 2798.09 | |

RECAP

Total LOSSES

Cum LOSSES

CONSUMPTION { Qty / COST $ C

Total COST

DEPTH From 2965 To 3857

# A.C.C DRILLING MUD TABLE

WELL [illegible] RIG [illegible] CONTRACTOR [illegible]

FORTNIGHT From Sept. 24 To Oct. 13

| PARAMETERS | | | | | | CHARACTERISTICS (mini) (maxi) | | | | | CONSUMPTION | | QT IN LBS or U.S. GAL COST IN CAN $ | | | | | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | DEPTH BIT | Ft Drilled CIR Hr | FORMATION STAGE | GPM PUMP PRESSURE | HOLE DRILLED VOL LOSSES BBL | W<br>V<br>F | VA<br>Vp<br>YV | GEL 0<br>GEL 10<br>RES TY | PH<br>PF<br>Na Cl | Liq CONT<br>FUEL%<br>S D | PROD.<br>CIRC VOL | WATER<br>BBL | Magcogel<br>Qty Cost | Spersene<br>Q C | Caustic<br>Q C | CMC<br>Q C | Magcobar<br>Q C | Salt Gel<br>Q C | Duovis<br>Q C | [illegible]<br>Q C | Bactericide<br>Q C | Salt<br>Q C | Defoamer<br>Q C | Total Daily Cost | TYPE OF MUD<br>TYPE OF TREATMENT<br>PHASE 8½" |
| Oct. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 3926 | 69,06 | | 350 | | 172<br>65 | 45,5<br>37 | 3/10 | 9<br>0,2 | 746 | | | | 15 | | | 250 | | 3 | 1 | 1 | | | | Drilling and Coring |
| | | 11,45 | | 2000 | | 25 | 17 | | 315,000 | 3 | | | | 202,30 | | | 1140,00 | | 506,62 | 62,42 | 135,25 | | | 3957,00 | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | Waiting on weather |
| 16 | | | | | | | | | | | | | 100 | 42 | 60 | 50 | | 50 | 56 | 40 | 4 | 20 | | | Chemical lost in storm<br>15 and 16 |
| | | | | | | | | | | | | | 590,00 | 566,96 | 502,20 | 8421,50 | | 255,00 | 4879,44 | 2496,80 | 505,00 | 81,65 | | 18883,20 | |

| RECAP | Total LOSSES<br>Cum LOSSES | CONSUMPTION<br>PHASE 8½" | | | | | | | | | | | | | Total COST | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Qty. | | | 166 | 204 | 146 | 210 | 9430 | 131 | 78 | 48 | 6 | 22 | 56 | DEPTH From 3857 To 3926 |
| | | COST $ C | | | 647,40 | 2748,12 | 1255,16 | 10635,34 | 45560,40 | 572,10 | 10571,85 | 3596,16 | 1010,00 | 212,16 | 2020,40 | 79787,52 |

A. C. C **DRILLING MUD TABLE**

WELL [illegible] A-71 RIG WODECO II CONTRACTOR WODECO

FORTNIGHT From Oct 14 To Oct 16

| PARAMETERS | | | | | | CHARACTERISTICS (mini) (maxi) | | | | | CONSUMPTION | | QT IN LBS or U.S. GAL COST IN CAN $ | | | | | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | DEPTH BIT | Ft Drilled CIR Hr | FORMATION STAGE | GPM PUMP PRESSURE | HOLE DRILLED VOL LOSSES BBL | W V F | VA Vp YV | GEL 0 GEL 10 RESTY | PH PF Na Cl | Liq CONT FUEL% SD | PROD. CIRC VOL | WATER BBL | Magcogel Qty Cost | Spersene Q C | [illegible] Q C | CMC Q C | Magcobar Q C | Salt Gel Q C | Duovis Q C | Chrome Lign Q C | Bactericide "B" Q C | Salt Q C | Defoamer Q C | Total Daily Cost | TYPE OF MUD TYPE OF TREATMENT PHASE 8½" |
| Oct. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 5926 | 69:00 | | 350 | | 172<br>65 | 45.5<br>57 | 3/10 | 9<br>0.2 | 7/6 | | | | 15 | | | 250 | | 3 | 1 | 1 | | | | Drilling and Coring |
| | | 11:45 | | 2000 | | 25 | 17 | | 215,000 | 3 | | | | 202.30 | | | 1140.00 | | 366.62 | 62.42 | 126.25 | | | 1937.00 | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | Waiting on weather |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | 100 | 42 | 60 | 50 | | 50 | 36 | 40 | 4 | 20 | | | Chemical lost in storm |
| | | | | | | | | | | | | | 390.00 | 566.16 | 508.20 | 2421.50 | | 235.00 | 4379.44 | 2496.80 | 505.00 | 21.60 | | 11883.20 | 15 and 16 |

| RECA | Total LOSSES<br>Cum LOSSES | CONSUMPTION PHASE 8½" | Qty. | | | 164 | 204 | 148 | 210 | 9430 | 151 | 78 | 48 | 6 | 52 | 36 | Total COST | DEPTH From 5079 To 5926 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | COST $ C | | | 647.40 | 2748.12 | 1233.16 | 10655.34 | 43800.8 | 572.10 | 10571.88 | 2996.16 | 1010.00 | 212.16 | 2030.40 | 75797.32 | |

ACC **DRILLING MUD TABLE**

WELL WALRUS A-71 RIG NODECO II CONTRACTOR NODECO

FORTNIGHT From Oct 14 To Oct 16

AQUITAINE ET AL. HUDSON WALRUS A-71

## I. TIME ANALYSIS REPORT

# AQUITAINE ET AL HUDSON WALRUS A-71

## TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1. | Rigging up and down | 27.30 hrs | 1.60% |
| 2. | Drilling | 301.45 hrs | 17.30% |
| 3. | Redrilling (mainly for checking hole) | 2.00 hrs | 0.20% |
| 4. | Drilling trips | 111.45 hrs | 6.50% |
| 5. | Hole opening | 34.15 hrs | 2.10% |
| 6. | Coring | 7.15 hrs | 0.40% |
| 7. | Coring trips | 27.00 hrs | 1.54% |
| 8. | Testing | Nil | - |
| 9. | Miscellaneous Operations (Logging) | 66.45 hrs | 3.82% |
| 10. | Well completion | Nil | - |
| 11. | Casing | 161.45 hrs | 9.25% |
| 12. | Circulation | 57.30 hrs | 3.40% |
| 13. | Fishing job | 9.30 hrs | 0.54% |
| 14. | Abandon | 36.00 hrs | 2.05% |
| 15. | Repairs (231 hrs with frozen BOP stack). | 283.00 hrs | 16.18% |
| 16. | Waiting time (storm condition) | 626.00 hrs | 35.12% |

## AQUITAINE ET AL HUDSON WALRUS A-71

## TIME ANALYSIS

1) Rigging up and down.
This consumed 1,60% of time, for anchoring at the beginning; unfortunately at the end of the operation a storm forbade us to remove the anchors.

2) Drilling.
Drilling 301.45 hours or 17,30% of the total time.
Average drilling rate 3308/302 = 10,28 feet/hour on all diameter.
But very often the weather did not permit to drill very efficiently.
Also the heavy mud cut the penetration.

3) Re-drilling.
0,20% mainly for checking the hole.

4) Drilling trips.
111.45 hours for 29 bits.
But the duration of drilling trips was very variable from 1:30 hour to 6 or 8 hours and sometimes it was definitely impossible to make the trip because the weather was so bad and the reaction of the boat, mostly the roll did not permit any disconnection of movement.

5) Hole opening.
34.15 hours or 2,10% of total time with hydraulic hole opener, because we were obliged to drill in a diameter bigger than the opening of the 16 3/4" stack.

6) Coring.
7:15 hours or 0,40% of total time for 3 cores with the diamond core barrel. The core No. 2 was taken with the junk basket when we retrieved a hole opener cone which was loss.

7) Coring trips.
27:00 hours or 1,54%, time mostly due to the very difficult trip conditions those days.

8) Testing.
None and fairly impossible in the actual condition of Hudson Bay and drilling vessel.

9) Miscellaneous operations.
66:45 hours or 3,82% of total time for electrical surveys, velocity survey and 8 deviations surveys.

10) Well completion.
None.

11) Casing.
161:45 hours, 9,25% of total time for casings 30", 20", 13 3/8", 9 5/8", with special marine equipment.

12) Circulation.
57:30 hours or 3,40% of the time, the main reason being the stabilization of the hole due to high pressure calcium chloride water.

13) Fishing job.
9:30 hours, 0.54% of total time for removing hole opener cone loss during 17½" phase.

14) Abandon.
36 hours or 2.05% of total time. Time spent to prepare and secure the boats for towing during a very bad weather and trying to plug the well, remove anchor and finally clear the well, lay down drill, drill collars and equipment.

15) Repairs.
283 hours representing 16,18% of the total time. 52 hours for several mechanical reasons, the other 231 hours to repair the hydraulic system of the submarine stack which was frozen.

16) Waiting time.
626 hours representing 35,12% of the total time due to the very difficult oceanic conditions in Hudson Bay. This time included the hours spent to repair the damages caused by the storms or the rough seas.

# 3. ENGINEERING

AQUITAINE ET AL. HUDSON WALRUS A-71

## 3. ENGINEERING

AQUITAINE ET AL. HUDSON WALRUS A-71

# J. CASING REPORTS

# RUNNING AND CEMENTING

Surface Casing
~~Intermediate Casing~~ O.D. 30"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date August 8th, 1969.

K.B. Elevation 618 K.B.-Csg. Flge. Total Depth (Driller) 781

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36 | | | Casing in Hole | | |
| Depth | 781 | | | Depth Set | | |

Mud: Type Sea Water Wt. Visc. W.L.

B.O.P.'s

## RUNNING

Power Tongs Rig tongs Torque: Low torque squnch casing Max. Nom. Min.

Time pipe started 3:00 p.m. Time on Bottom 8:00 p.m. Time Circulated 1:45 min.

Fill-up Points Every other joint Btm. by Csg. 772 Ft. up from K.B.

Remarks Top of casing is 613' below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement 1000 US sacks, at 3% C12 Ca.

Ht. to be Cemented Surface (Sea floor)

Water ahead Cir. seawater bbls. Mix Times: Start 9:45 Finish 10:10 Slurry Wt. 15.7

Calc. Disp. 38 BBLS bbls. Est. Disp. Time 20 Mins. Start 10:10 Finish 10:30

Max. Pumping Press. 150 Bump. Press No plug Bumped by No plug No. Times Bumped

Cement Returns: Yes/No. Remarks Cement returns at sea floor.

## LANDING

Time Landed 8:00 Date August 8th, 1969 Init. Wt. of Cem. String (less blocks) 49,290

Wt. Landed in Slips Make of Bowl Nom. Size Series

Slip & Seal Assembly Remarks Cement returns were observed at sea floor with a T.V. camera.

Agent of Operator

FORM NO. 155

# AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

Surface Casing
~~Intermediate Casing~~ O.D. 30"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date August. 8. 1969.

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 310 | | 3 | Std Squnch Joint | | | 4 | 772 | 159.49 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Nil Type Length

Collar: Make Nil Type Length

Landing Joint (when used) Length (Land with 5" drill pipe)

Overall Length of Casing String 159.49

Feet up from K.B. (Subtract) KB to of well head 613.01

Setting Depth: By Driller 772 By Tally

Shoe Joint: Overall 159.49 (Subtract)

Float Collar Landed: By Driller Nil By Tally 772.50

**CENTRALIZERS**

Make Nil

Number

Positions

**SCRATCHERS**

Make Nil

Number

Positions

No. of Collars Welded

Remarks:

Agent of Operator

# ENGINEERING PIPE TALLY SHEET

**WELL NAME** WALRUS A-71 **DATE** August. 8. 1969

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 41 | 25 | | | | | | | | |
| 41 | 59 | | | | | | | | |
| 41 | 67 | | | | | | | | |
| 34 | 98 | | | | | | | | |
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| | | | | | | | | | |
| 159. | 49 | | | | | | | | |

**TUBING/CASING**

**O.D.** 30"

**Wt.** 310

**Grade** -

**Range** 3

**Thread** Squnch Joint Std

**Collar** -

**Make** Vetco

| | SUMMARY | |
|---|---|---|
| Col. 1 | 159. | 49 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 159. | 49 |

**Tallied by:**

_____ Tot. Jts. on location

_____ Jts. out (Incl. Ldg. Jt.)

4 Jts. perm. in hole

**Remarks:**

Agent of Operator _____

# RUNNING AND CEMENTING

~~Surface Casing~~
Intermediate Casing O.D. 20"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date August 23rd, 1969.

K.B. Elevation 618 K.B.-Csg. Flge. Total Depth (Driller) 1120

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36" | 26 | | Casing in Hole | 30" | |
| Depth | 781 | 1120 | | Depth Set | 772 | |

Mud: Type Gel & Water Wt. 11.3 Visc. 50/55 W.L.

B.O.P.'s 1 16 3/4" 5000// Hydril GK. 16 3/4" 5000// BX Shaffer

## RUNNING

Power Tongs Rig tongs Torque: Max. Low torque std Nom. squnch casing Min.

Time pipe started 10:00 p.m. Time on Bottom 4:00 a.m. Time Circulated none

Fill-up Points Every third joint Btm. by Csg. 1106 Ft. up from K.B.

Remarks Top of casing is 613' below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement 1250 US sacks with 4% Ca2 Cl

Ht. to be Cemented Surface (sea floor)

Water ahead None bbls. Mix Times: Start 4;00 Finish 4:40 Slurry Wt. 15.6

Calc. Disp. 163 bbls. Est. Disp. Time 20 Mins. Start 4:40 Finish 5:10

Max. Pumping Press. 400 Bump. Press 400 Bumped by Cementer No. Times Bumped

Cement Returns: Yes/No. Remarks Cement returns observed at sea floor with T.V. camera

## LANDING

Time Landed 4:00 a.m. Date August 23.1969 Init. Wt. of Cem. String (less blocks)

Wellhead housing 16 3/4" 5000 psi.

Wt. Landed in Slips Make of Bowl Nom. Size Series

Slip & Seal Assembly Remarks

Agent of Operator

FORM NO. 155

# AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 20"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date September. 24. 1969

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.625 | | 3 | Squnch | St. | Vetco | 13 | 1106' | 490.87 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Baker Type Guide Shoe Length 1.90

Collar: Make Baker Type Float Collar Length -

Landing Joint (when used) Length

Overall Length of Casing String 492.77

Feet up from K.B. (Subtract) KB to well head 613.25

Setting Depth: By Driller By Tally

Shoe Joint: Overall (Subtract)

Float Collar Landed: By Driller By Tally 1,106.02

CENTRALIZERS

Make Nil

Number

Positions

SCRATCHERS

Make Nil

Number

Positions

No. of Collars Welded

Remarks:

Agent of Operator

# ENGINEERING PIPE TALLY SHEET

WELL NAME WALRUS A-71 DATE August. 24. 1969.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 33 | 00 | | | | | | | | |
| 33 | 61 | | | | | | | | |
| 39 | 44 | | | | | | | | |
| 42 | 28 | | | | | | | | |
| 39 | 59 | | | | | | | | |
| 35 | 66 | | | | | | | | |
| 41 | 35 | | | | | | | | |
| 41 | 10 | | | | | | | | |
| 42 | 27 | | | | | | | | |
| 39 | 72 | | | | | | | | |
| 37 | 97 | | | | | | | | |
| 39 | 18 | | | | | | | | |
| 21 | 60 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 492 | 77 | | | | | | | | |

TUBING/CASING

O.D. 20"

Wt. -

Grade 0.625 //

Range 3

Thread Squnch Joint Std

Collar -

Make -

| | SUMMARY | |
|---|---|---|
| Col. 1 | 492 | 77 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 492 | 77 |

Tallied by:

_____ Tot. Jts. on location

_____ Jts. out (Incl. Ldg. Jt.)

13 Jts. perm. in hole

Remarks:

Agent of Operator _____

# RUNNING AND CEMENTING

~~Surface Casing~~
Intermediate Casing O.D. 13 3/8"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date September 14,1969.

K.B. Elevation 618 K.B.-Csg. Flge. 613 Total Depth (Driller) 1992

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36 | 26 | 17½ | Casing in Hole | 30" | 20 |
| Depth | 781 | 1120 | 1992 | Depth Set | 772 | 1106 |

Mud: Type Duovis System Wt. 9.6 Visc. 42 W.L. 19

B.O.P.'s 1 16 3/4" Hydril GK, 2 16 3/4" 5000## BX Shaffer double LWS - Vetco well head assembly & 20" OD marine riser system.

## RUNNING

Power Tongs Hydraulic B.S. Torque: Max. 5000 Nom. Min.

Time pipe started 7:00 a.m. Time on Bottom 12:00 noon Time Circulated ½ hr.

Fill-up Points Automatic fill up Btm. by Csg. 1975 Ft. up from K.B.

Remarks Top of casing is 613' below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement, 1170 US sacks.

Ht. to be Cemented To sea floor

Water ahead 20 bbls. Mix Times: Start 2:15 Finish 2:55 Slurry Wt. 15.6

Calc. Disp. 210 bbls. Est. Disp. Time 2:55 Mins. Start 2:55 Finish 3:25

Max. Pumping Press. 500 Bump. Press 1200 Bumped by Halliburton No. Times Bumped 1

Cement Returns: Yes/No. Remarks Cement to sea floor

## LANDING

Time Landed 12:30 Date September 14.1969 Init. Wt. of Cem. String (less blocks)

Wt. Landed in Slips 83.000 Make of Bowl Vetco sub sea housing 5000## Nom. Size Series

Slip & Seal Assembly Vetco single trip by Remarks

Agent of Operator

FORM NO. 155

## AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 13 3/8"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date September.14.1969

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 61 | J-55 | 3 | 8Rd | Short | | 37 | 1975.70 | 1,353.80 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Halliburton Type Down set guide shoe Length 1.22

Collar: Make Halliburton Type Float Collar Length 1.52

Landing Joint (when used) Length Pump and casing hanger 6.16

Overall Length of Casing String 1,362.70

Feet up from K.B. (Subtract) KB to well head 613.00

Setting Depth: By Driller ________ By Tally 1,975.70

Shoe Joint: Overall ________ (Subtract) 39.93

Float Collar Landed: By Driller ________ By Tally 1,935.77

| CENTRALIZERS | | SCRATCHERS | |
|---|---|---|---|
| Make | Halliburton | Make | |
| Number | 3 | Number | |
| Positions | 1- 1965', 1- 1938', 1- 1062' | Positions | |

No. of Collars Welded Halliburton weld a shoe and collar joint.

Remarks:

Agent of Operator

# ENGINEERING PIPE TALLY SHEET

WELL NAME WALRUS A-71 DATE September. 14. 1969

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 22 | shoe | | 38 | 84 | | | | |
| 38 | 71 | | | 37 | 94 | | | | |
| 1 | 52 | collar | | 37 | 40 | | | | |
| 35 | 96 | | | 36 | 35 | | | | |
| 39 | 52 | | | 37 | 00 | | | | |
| 38 | 95 | | | 36 | 87 | | | | |
| 37 | 50 | | | 34 | 06 | | | | |
| 38 | 85 | | | 34 | 96 | | | | |
| 40 | 95 | | | 35 | 05 | | | | |
| 37 | 05 | | | 37 | 42 | | | | |
| 37 | 64 | | | 37 | 95 | | | | |
| 37 | 46 | | | 38 | 20 | | | | |
| 38 | 90 | | | 38 | 73 | | | | |
| 38 | 90 | | | 33 | 91 | | | | |
| 37 | 42 | | | 38 | 10 | | | | |
| 36 | 87 | | | 39 | 31 | | | | |
| 36 | 95 | | | 39 | 07 | | | | |
| 38 | 97 | | | 35 | 88 | | | | |
| 38 | 92 | | | 6 | 16 | Pup & Casing Hanger | | | |
| 38 | 05 | | | | | | | | |
| 689 | 50 | | | 673 | 20 | | | | |

**TUBING/CASING**

O.D. 13 3/8"

Wt. 61

Grade J-55

Range 3

Thread API 8Rd

Collar Short

Make -

| | SUMMARY | |
|---|---|---|
| Col. 1 | 689 | 50 |
| 2 | | |
| 3 | 673 | 20 |
| 4 | | |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 1,362 | 70 |

Tallied by:

_____ Tot. Jts. on location

_____ Jts. out (Incl. Ldg. Jt.)

37 Jts. perm. in hole

Remarks:

Agent of Operator _____

# RUNNING AND CEMENTING

~~Surface Casing~~
Intermediate Casing O.D. 9 5/8"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date September 23.1969

K.B. Elevation 618 K.B.-Csg. Flge. 612 Total Depth (Driller) 2965

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36" | 26" | 17½" 12¼" | Casing in Hole | 30" | 20" 13 3/8" |
| Depth | 781 | 1120 | 1992 2965 | Depth Set | 772 | 1106 1975 |

Mud: Type Duovis System Wt. 13.7 Visc. 52 W.L. 22.4

B.O.P.'s 1 16 3/4" 5000// Hydril GK, 2 16 3/4" 5000// BX Shaffer double LWS

## RUNNING

Power Tongs Hydraulic Torque: Max. 4350 Nom. Min.

Time pipe started 4:30 p.m. Time on Bottom 10:30 p.m. Time Circulated 45 min.

Fill-up Points Every joint Btm. by Csg. 2960 Ft. up from K.B.

Remarks Top of casing is 612 below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement, 936 US sacks

Ht. to be Cemented 650'

Water ahead 25 bbls. Mix Times: Start 11:30 p.m. Finish 12:15 a.m. Slurry Wt. 15.6

Calc. Disp. 218 bbls. Est. Disp. Time 30 Mins. Start 12:15 a.m. Finish 12:45 a.m.

Max. Pumping Press. 650 Bump. Press 1400 Bumped by No. Times Bumped

Cement Returns: Yes/No. Remarks Cement on running tool when retrieved.

## LANDING

Time Landed 10:30 p.m. Date September 23.1969 Init. Wt. of Cem. String (less blocks) 118.000

Wt. Landed in Slips 93000 Make of Bowl Vetco sub sea housing Nom. Size Series

Slip & Seal Assembly Vetco single trip by Remarks

Agent of Operator

FORM NO. 155

# AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 9 5/8"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date September. 23. 1969

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 40 | N-80 | 3 | Buttress | Long | | 57 | 2,959.70 | 2,342.58 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Halliburton Type Jet guide shoe Length 1.32

Collar: Make Halliburton Type Float collar Length 1.80

Landing Joint (when used) Length Casing Hanger 1.50

Overall Length of Casing String 2,347.20

Feet up from K.B. (Subtract) KB to well head 612.50

Setting Depth: By Driller 2,959.70 By Tally 2,959.70

Shoe Joint: Overall 79.37 (Subtract) 79.37

Float Collar Landed: By Driller 2,880.33 By Tally 2,880.33

**CENTRALIZERS**

Make Halliburton

Number 3

Positions 1 on first, second, third joint.

**SCRATCHERS**

Make

Number

Positions

No. of Collars Welded Halliburton well A on first two joints.

Remarks:

Agent of Operator

AQUITAINE COMPANY OF CANADA LIMITED

FORM NO. 5116

# ENGINEERING PIPE TALLY SHEET

**WELL NAME** WALRUS A-71 **DATE** September 23 1969

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 32 | shoe | | 46 | 02 | 44 | 19 | | |
| 38 | 14 | | | 44 | 72 | 45 | 38 | | |
| 39 | 91 | | | 45 | 49 | 46 | 27 | | |
| 1 | 80 | float | | 41 | 70 | 44 | 40 | | |
| 44 | 82 | | | 46 | 26 | 43 | 16 | | |
| 39 | 18 | | | 39 | 63 | 43 | 21 | | |
| 36 | 44 | | | 38 | 57 | 42 | 52 | | |
| 36 | 35 | | | 38 | 44 | 44 | 06 | | |
| 45 | 10 | | | 39 | 00 | 43 | 64 | | |
| 38 | 81 | | | 37 | 12 | 45 | 81 | | |
| 37 | 86 | | | 39 | 68 | 32 | 92 | | |
| 39 | 34 | | | 46 | 96 | 32 | 84 | | |
| 39 | 65 | | | 45 | 00 | 38 | 84 | | |
| 45 | 85 | | | 40 | 18 | 38 | 56 | | |
| 46 | 26 | | | 40 | 69 | 38 | 82 | | |
| 45 | 46 | | | 42 | 87 | 38 | 73 | | |
| 43 | 49 | | | 40 | 16 | 38 | 69 | | |
| 45 | 92 | | | 43 | 04 | 38 | 27 | | |
| 46 | 15 | | | 43 | 60 | 4 | 50 | Rup Joint | |
| 45 | 08 | | | 44 | 83 | 1 | 50 | Hanger | |
| 756 | 93 | | | 843 | 96 | 746 | 31 | | |

**TUBING/CASING**

**O.D.** 9 5/8"

**Wt.** 40

**Grade** N 80

**Range** 3

**Thread** Buttress

**Collar** Long

**Make** ______

| | SUMMARY | |
|---|---|---|
| Col. 1 | 756 | 93 |
| 2 | | |
| 3 | 843 | 96 |
| 4 | 746 | 31 |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 2,347 | 20 |

**Tallied by:**

______ **Tot. Jts. on location**

______ **Jts. out (Incl. Ldg. Jt.)**

______ **Jts. perm. in hole**

**Remarks:**

**Agent of Operator** ______

# 4. GEOLOGICAL

AQUITAINE ET AL. HUDSON WALRUS A-71

# 4. GEOLOGICAL

# AQUITAINE ET AL. HUDSON WALRUS A-71

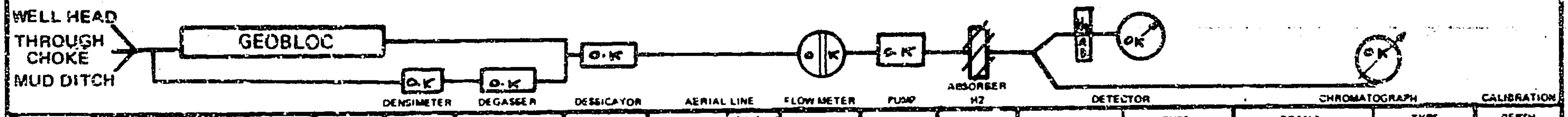
## L. STRATIGRAPHY

# GAS LOG

| AQUITAINE | SCALE | | SHEET No. | WELL NAME |
|---|---|---|---|---|
| | 2"=100' or 1:600 | | 1 to 4 | WALRUS A 71 |

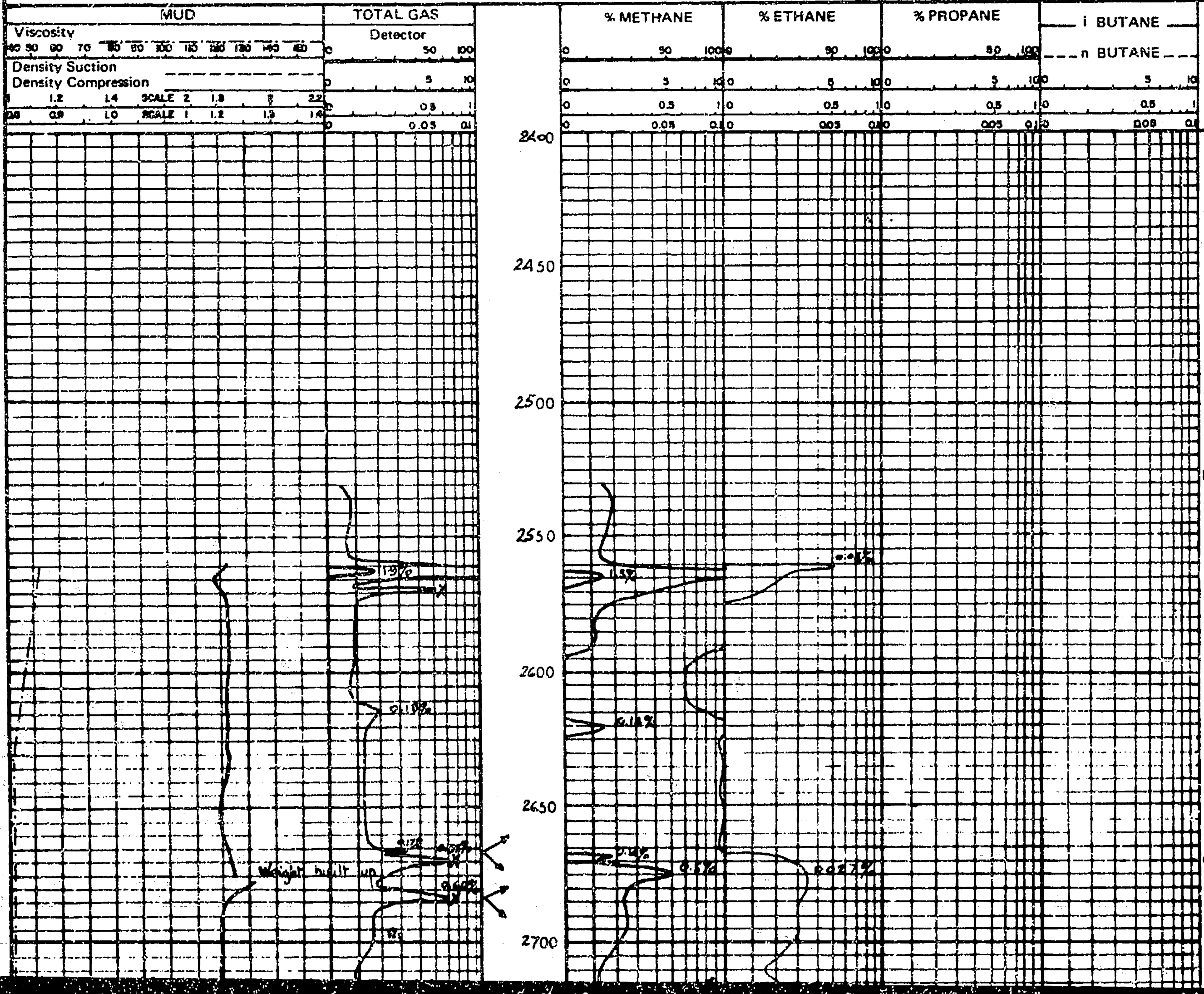
| OPERATOR | PERMIT OR LEASE | TIMING | CASING | TOTAL DEPTH |
|---|---|---|---|---|
| AQUITAINE CO. of CANADA LTD | W 1427 | COMMENCED = AUG. 8, 69 | ø 30" at 772' | 3926' |
| CONTRACTOR | PROVINCE | TEMPORARY HALT = | ø 20" at 1120' | GEOLOGICAL FORMATION AT SPUDDING LEVEL |
| WESTERN OFFSHORE DRILLING & EXPLORATION CO | FEDERAL WATERS HUDSON BAY CANADA | RESUMPTION OF DRILLING = | ø 13" 3/8 at 1975' | PLEISTOCENE DRIFT |
| RIG | CO-ORDINATES | TEMPORARY HALT = | ø 9" 5/8 at 2960' | GEOLOGICAL FORMATION AT BOTTOM HOLE |
| WODECO II | X= 58°30'02.29" N<br>Y= 87°10'48.75" W | RESUMPTION OF DRILLING = | ø at | . |
| BROUGHT UP TO DATE ON | Z= -618' | | | GEOLOGISTS |
| OCT 15, 69 | ZKB= +31' | COMPLETED = OCT. 18, 69 | | Serge RUEFF & Casimir KMIECLUCK |

## CHARACTERISTICS OF THE INSTALLATION FOR GAS DETENTION



| DENSIMETER SUCTION | ELEVATION | SAMPLER WASHER | DENSIMETER | DEGASSER | | MUD FLOW | TYPE | TYPE | LENGTH | FLOW IN | TYPE | TYPE | BRAND | TYPE | BRAND | TYPE | DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Geoservices | GZ11<br>40 l/mn | Cl₂Ca | monoflex | 30ft | 40 l/h | Vibr. | Catalys | Geoservices | nº 2220<br>GD11 | Geoservices | nº 3579<br>Gal2i | every Day |

X GAS KICK AFTER A ROUND TRIP OR A DUMMY TRIP
⊗ GAS KICK WHILE CALCULATING AT THE CASING SHOE
● GAS KICK AFTER MAKING A CONNECTION
CHANGE THE BIT
GAS KICK FROM PULLING OFF BOTTOM
⊙ GAS KICK AFTER PUMPS HAVE BEEN STOPPED
R₁, R₂ GAS KICK DUE TO RECIRCULATING GAS (R 1 = First Recirc, R 2 = Second Recirc)
TRIP IN TO CONDITION HOLE OR DUMMY TRIP



OBSERVATIONS
Real gas percentage
Ratios C1/C2 C1/C3
Direction of pumping halt
Nature and duration of gas kick

Traces of N₂

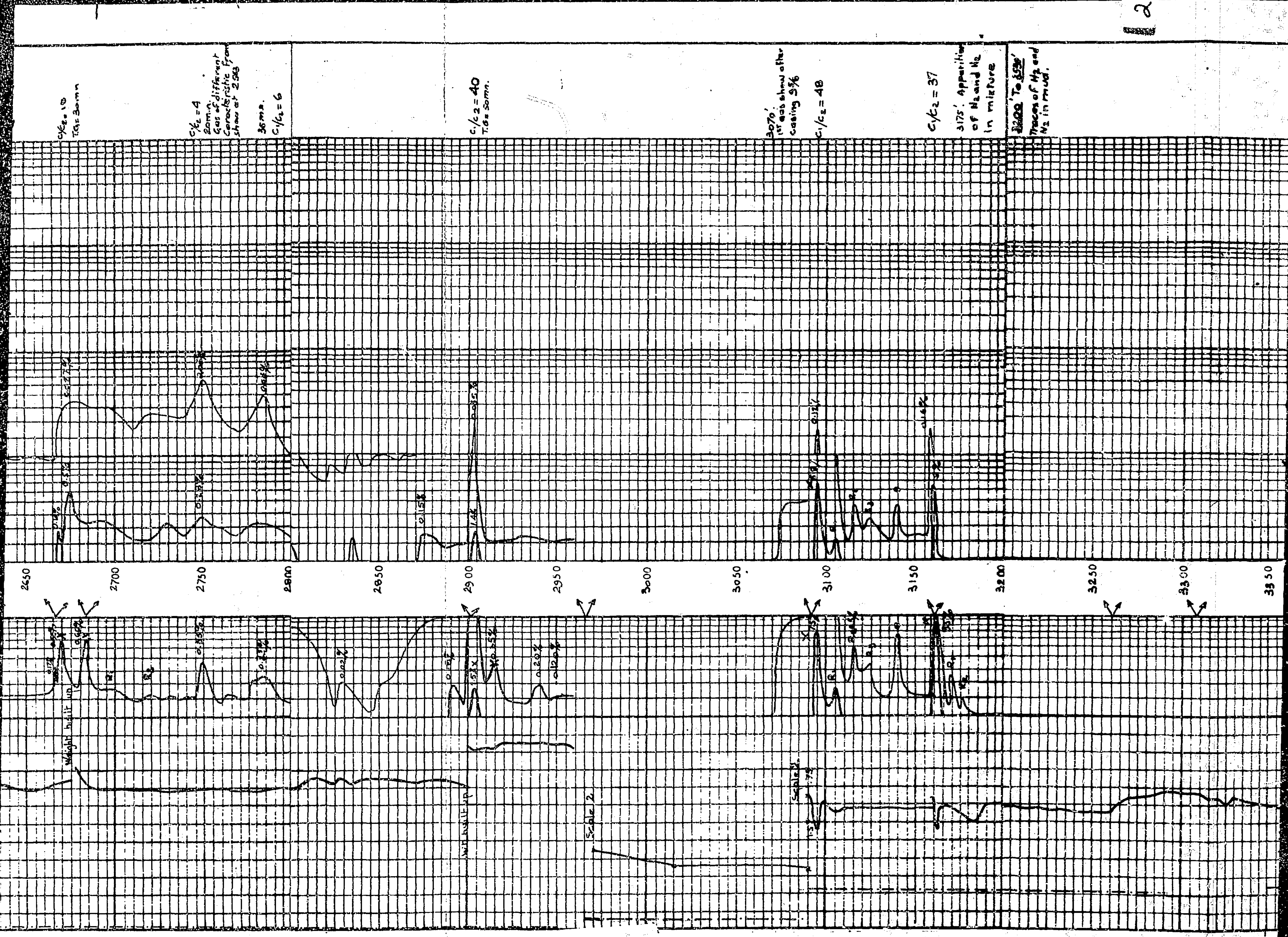
Note:
From 2500' to 2567': Densimud bypassed (Clay)

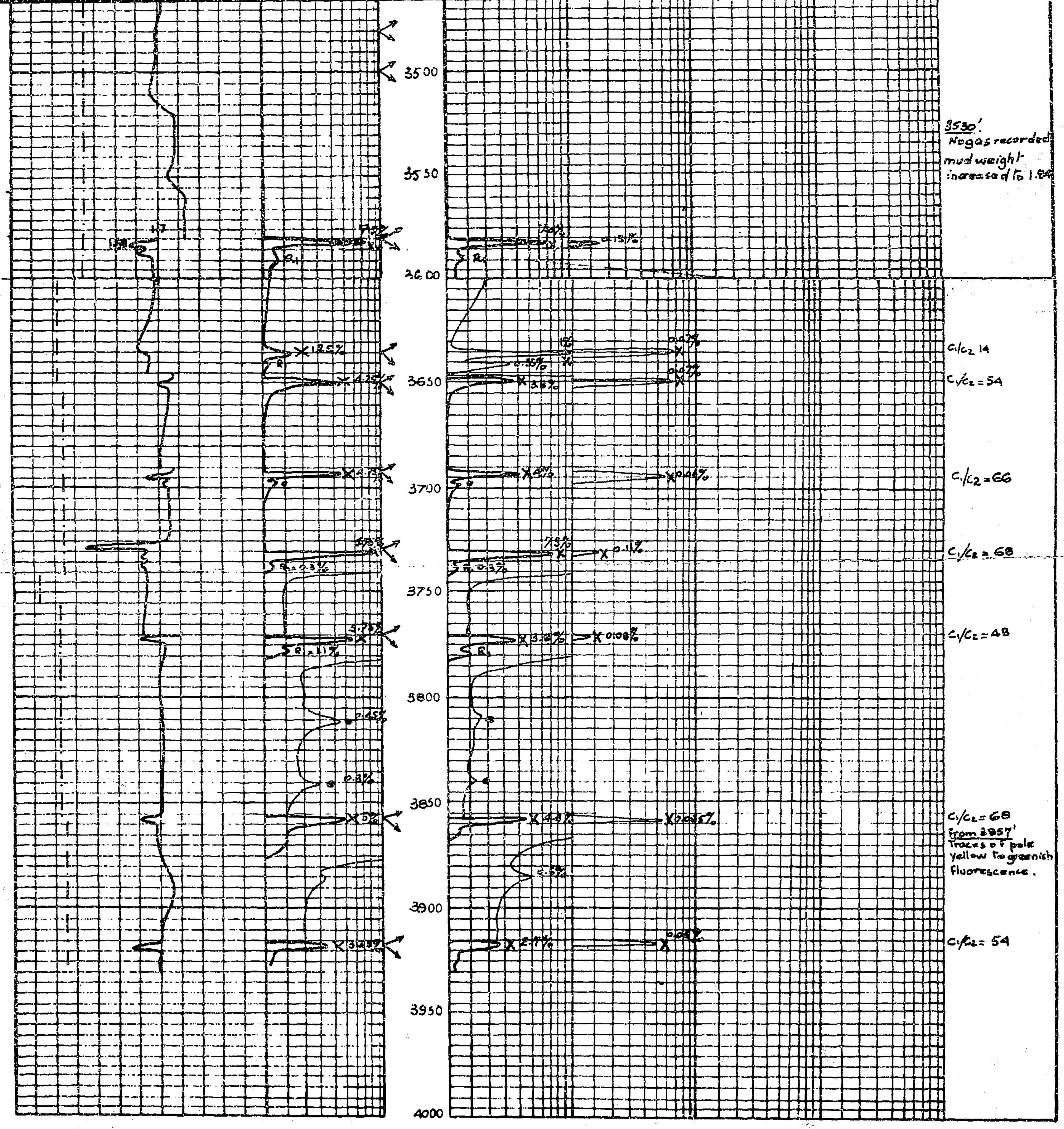
C1/C2 = 30
22 mn
Remark:
Gas of Maillonaed 1st Foust type
Traces of N₂

10 mn

C1/C2 = 10
T.G. = 30 mn

1 of


2 of
C1/C2 = 10
T.G = 30mn
C1/C2 = 4
20mn.
Gas of different caracteristic from show at 2583'
36mn.
C1/C2 = 6
C1/C2 = 40
T.G = 50mn.
3070'. 1st gas show after casing 9 5/8
C1/C2 = 48
C1/C2 = 37
3175'. Apparition of H2 and N2 in mixture
3200' To 3550' Traces of H2 and N2 in mud.
2650
2700
2750
2800
2850
2900
2950
3000
3050
3100
3150
3200
3250
3300
3350
Weight built up
Wt built up
Scale 2
Scale 1
0.5%
0.12%
0.15%
0.20%
1.4%



3530'
No gas recorded
mud weight
increased to 1.84

$C_1/C_2$ 14

$C_1/C_2 = 54$

$C_1/C_2 = 66$

$C_1/C_2 = 68$

$C_1/C_2 = 48$

$C_1/C_2 = 68$
from 3857'
Traces of pale
yellow to greenish
fluorescence.

$C_1/C_2 = 54$

3 of 3

## TABLE OF LITHOSTRATIGRAPHICAL UNITS

### FIRST HYPOTHESIS

- Nomenclature according to Aquitaine 1968 lithostratigraphy

| | DEPTHS | THICKNESS |
|---|---|---|
| Sea Bottom | 618' | |
| Drift | 618 - 895' | 277' |
| Moose River Formation | 895 -1385' | 490' |
| Kwataboahegan Formation | 1385 -1500' | 115' |
| Stooping River Formation | 1500 -1882' | 382' |
| Kenogami River Formation equivalent | | |
| Middle Member | 1882 -2346' | 464' |
| Lower Member equivalent | 2346 -3846' | 1500' |
| Ekwan River Formation | | |
| Upper Member | 3846 -3926' | 80' |
| Total Depth | 3926' | |

### SECOND HYPOTHESIS

- Nomenclature according to the G.S.C. 1967 (Operation Winisk) lithostratigraphy

| | | |
|---|---|---|
| Sea Bottom | 618' | |
| Drift | 618 - 895' | 277' |
| Long Rapids Formation equivalent | 895 -1385' | 490' |
| Williams Island Formation equivalent | 1385 -1882' | 497' |
| Murray Island Formation equivalent | 1882 -2346' | 464' |
| Moose River Formation equivalent | 2346 -2506' | 160' |
| Kwataboahegan Formation equivalent | | - |
| + Stooping River Formation equivalent | 2506 -2760' | 254' |
| Kenogami River Formation equivalent | | |
| Middle Member equivalent | 2760 -2800' | 40' |
| Lower Member equivalent | 2800 -3846' | 1046' |
| Ekwan River Formation equivalent | 3846 -3926' | 80' |
| Total Depth | 3926' | |

# TABLE OF CHRONOSTRATIGRAPHICAL UNITS

| | DEPTHS | | THICKNESS |
|---|---|---|---|
| Pleistocene | 618 | - 895' | 277' |
| "Upper Devonian" | 895 | -1855' | 960' |
| "Frasnian" | 1855 | -2715'(?) | 860' |
| "Upper Givetian" | 2715(?) | -2850' | 135' |
| ? | 2850 | -3846' | 996' |
| "Lower to Middle Devonian" (Palynology) or "Silurian"(Conodonts and Corals) | 3846 | -3926' | 80' |

* * * *

# SUMMARISED LITHOLOGICAL DESCRIPTION

| | |
|---|---|
| 618 - 895' | Yellow to red-brown, silty to sandy, locally calcareous, plastic clay.<br>Intercalations of white to brown fine sand.<br>Pebbles of quartzite, green rocks and limestone.<br>White fibrous gypsum. |
| 895 -1385' | Red-brown silty to sandy, locally calcareous, plastic clay.<br>Intercalations of white, pink to red-brown sand and calcareous sandstone.<br>Few levels of white anhydrite. White fibrous gypsum. |
| 1385 -1500' | Pinky beige, partly dolomitic, bioclastic limestone with thin alternating levels of:<br>-pink, sandy, locally crumbly limestone;<br>-red-brown plastic clay;<br>-white anhydrite. |
| 1500 -1712' | Alternating:<br>-red silty argillites;<br>-white to beige microcrystalline micro-oolitic limestone;<br>-pink bioclastic limestone;<br>-beige to grey partly chalky and argillaceous crumbly limestone;<br>-grey microcrystalline saccharoidal dolomitic limestone;<br>-beige pelletoidal dolomitic limestone;<br>-pink slightly sandy crumbly limestone. |
| 1712 -1882' | Alternating:<br>-beige to grey chalky and argillaceous locally bioclastic limestone;<br>-pink, partly sandy bioclastic limestone;<br>-red to brown limestone with cellular dolomite. Brachiopods;<br>-white, beige to grey microcrystalline oolitic limestone. |
| 1882 -1981' | Greenish-grey shale (or shaly limestone) with intercalations of brown to red argillites. |
| 1981 -2038' | Alternating:<br>-red to brown argillites;<br>-grey to brown dolomitic shale. Isolated corals;<br>-beige, pink to grey, partly pelletoidal bioclastic limestone. |
| 2038 -2346' | Grey, beige to brown plastic clay. Few intercalations of shale. |

| | |
|---|---|
| 2346 -2350' | Beige to brown, fine grained calcareous sandstone. |
| 2350 -2408' | Alternating:<br>-beige to brown cryptocrystalline dolomite;<br>-pink and grey dolomitic shale. |
| 2408 -2506' | Halite.<br>Few alternating levels of:<br>-white to brown anhydrite,<br>-pink and grey dolomitic shale,<br>-beige and brown cryptocrystalline dolomite. |
| 2506 -2594' | Brown, cryptocrystalline to crystalline, partly argillaceous, partly dolomitic bioclastic to biohermal limestone.<br>Few levels of beige, red speckled calcareous dolomite and of anhydrite. |
| 2594 -2664' | Beige to brown calcarenitic, bioclastic to biohermal limestone. |
| 2664 -2732' | Brown microcrystalline bituminous dolomite. |
| 2732 -2760' | White to beige microcrystalline slightly bituminous limestone. |
| 2760 -2800' | Greenish-grey shale. Few levels of white to beige microcrystalline slightly bituminous limestone. |
| 2800 -2970' | Pink, beige to grey cryptocrystalline to microcrystalline dolomite. |
| 2970 -3172' | Alternating:<br>-white, pink to beige, cryptocrystalline to microcrystalline slightly silicified, compact and azoic dolomite;<br>-beige, grey to brown microcrystalline slightly argillaceous dolomitic limestone. |
| 3172 -3288' | White microcrystalline spathic partly dolomitic limestone. Intercalations of beige to brown microcrystalline, slightly argillaceous dolomitic limestone. |
| 3288 -3400' | White, beige to grey microcrystalline, recrystallised, locally pseudo-oolitic, compact fossiliferous limestone. |
| 3400 -3571' | Alternating:<br>-shale;<br>-white to beige microcrystalline, recrystallised, locally pseudo-oolitic, compact slightly dolomitic limestone;<br>-pink, microcrystalline to crystalline, partly chalky, slightly argillaceous dolomitic limestone. |
| 3571 -3777' | White, beige to grey, microcrystalline, partly crumbly pseudo-oolitic to pseudo-brecciated, dolomitic limestone. |

| | |
|---|---|
| 3777 -3846' | Alternating:<br>-white, beige to grey microcrystalline, partly calcarenitic to microconglomeratic limestone;<br>-brown microcrystalline dolomite. |
| 3846 -3855' | Grey-blue marls. |
| 3855 -3926' | Alternating:<br>-beige to grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone;<br>-dark brown microcrystalline, locally calcarenitic, slightly anhydritic, bituminous limestone. |

* * * *

AQUITAINE ET AL. HUDSON WALRUS A-71

## ANNEX 4.L

## PRELIMINARY LABORATORY RESULTS

# PRELIMINARY RESULTS ON WALRUS A-71

## (Hudson Bay Offshore Well)

BY

THE GEOLOGICAL DEPARTMENT
OF THE
RESEARCH CENTRE OF PAU
SOCIETE NATIONALE DES PETROLES D'AQUITAINE

November 7, 1969.

R/GEO n° 717-69
Ref. Ph.A/jmp

# / MAIN RESULTS /

1 - Paleontological data on WALRUS A-71 indicate a middle to upper Devonian age until 2850'.

2 - A medium to rather good hydrocarbon producing capacity characterizes the 2500' - 2850' interval but the maturity of organic matter appears to be too low for commercial oil production in the WALRUS area.

## / I - INTRODUCTION /

Preliminary results are presented separately for each technique; a coefficient of certitude is added to each result; the maximum coefficient (5/5) indicates that the result has a strong probability to be proved. Lower coefficients indicate that more detailed studies seem necessary to confirm the preliminary results.

Cuttings under 3580' were not available and we had only a little piece from core number 4.

## / II - PALEONTOLOGICAL DATATIONS ON WALRUS A-71 AND PEN 1 /

### A/ PALYNOLOGY -

(G. PENIGUEL with the collaboration of MC. GELLIBERT (Scolecodonts), C. POUMOT (Chitinozoa).

### A-1 - Palynological stratigraphy

The stratigraphical results obtained in Palynology, up to now, are founded on the study of numerous cuttings and some cores,

for WALRUS A-71 :

- majority of cuttings from 800' to 3550'
- cores number 1, 3 and 4 (fragment).

for PEN 1 :

- cuttings from 150' to 700'
- cores from 1390' to 1670'.

The palynoplanktological material extracted is composed of Chitinozoa, Acritarchs, Spores, Scolecodonts and Tasmanacea generally various and well preserved.

./...

## 1 - Main palynological results

**/ WALRUS A-71 /**

800 - 2850' : "Middle to upper Devonian" (5/5)

2950 - 3550' : Indeterminate (very poor in microfossils and only Tasmanacea without stratigraphical signification).

C.4 (≃ 3921') : "Silurian to lower Devonian" (3/5) (founded only on Chitinozoa Stratigraphical reference : North Africa).

**/ PEN 1 /**

150 - 400' : "Middle to upper Devonian" (5/5)

700' : "Devonian" (3/5) - (microfossils rare).

1300 - 1490' : Indeterminate (very poor in microfossils and only Tasmanacea without stratigraphical signification).

1600 - 1670' : "Silurian" (5/5).

## 2 - Detailed possible palynological and stratigraphical carving

(Chronostratigraphy according to our general S.N.P.A. palynoplanktological scales).

**/ WALRUS A-71 /**

800 - 1855' : "Upper Devonian" (4/5)

1905 - 2550' : "Frasnian" (4/5)

C.3 (2670 - 2684') : "Frasnian" (2/5) (Attribution connected with a type of spore only present in the core basket n° 3).

2715 - 2850' : "Upper Givetian" (4/5)

2950 - 3550' : Indeterminate.

C.4 (≃ 3921') : "Upper Silurian to lower Devonian" (3/5)

./...

**/ PEN 1 /**

150 - 300' : "Givetian to Frasnian" (4/5)
350 - 400' : "Upper Givetian" (4/5)
700' : "Devonian" (3/5)
1390 - 1490' : Indeterminate
1600 - 1670' : "Silurian" (5/5) - "Upper Silurian" (2/5)
(North Africa stratigraphical reference)

## A-2 - Relations between WALRUS A-71, PEN 1, KASKATTAMA 1 and others Canadian wells and sections samples.

For these comparisons we have utilized all Canadian references in our possession.

**/ DEVONIAN /**

WALRUS A-71 (2800 - 2850') = PEN 1 (150 - 400') = JABB LAKE 1 (200 - 210') = CAMPBELL LAKE 1 (912 - 960') =
= Mission RUEFF-ARTRU (CN 286 & 288) = Powell Creek section (NWT) (120 - 190')

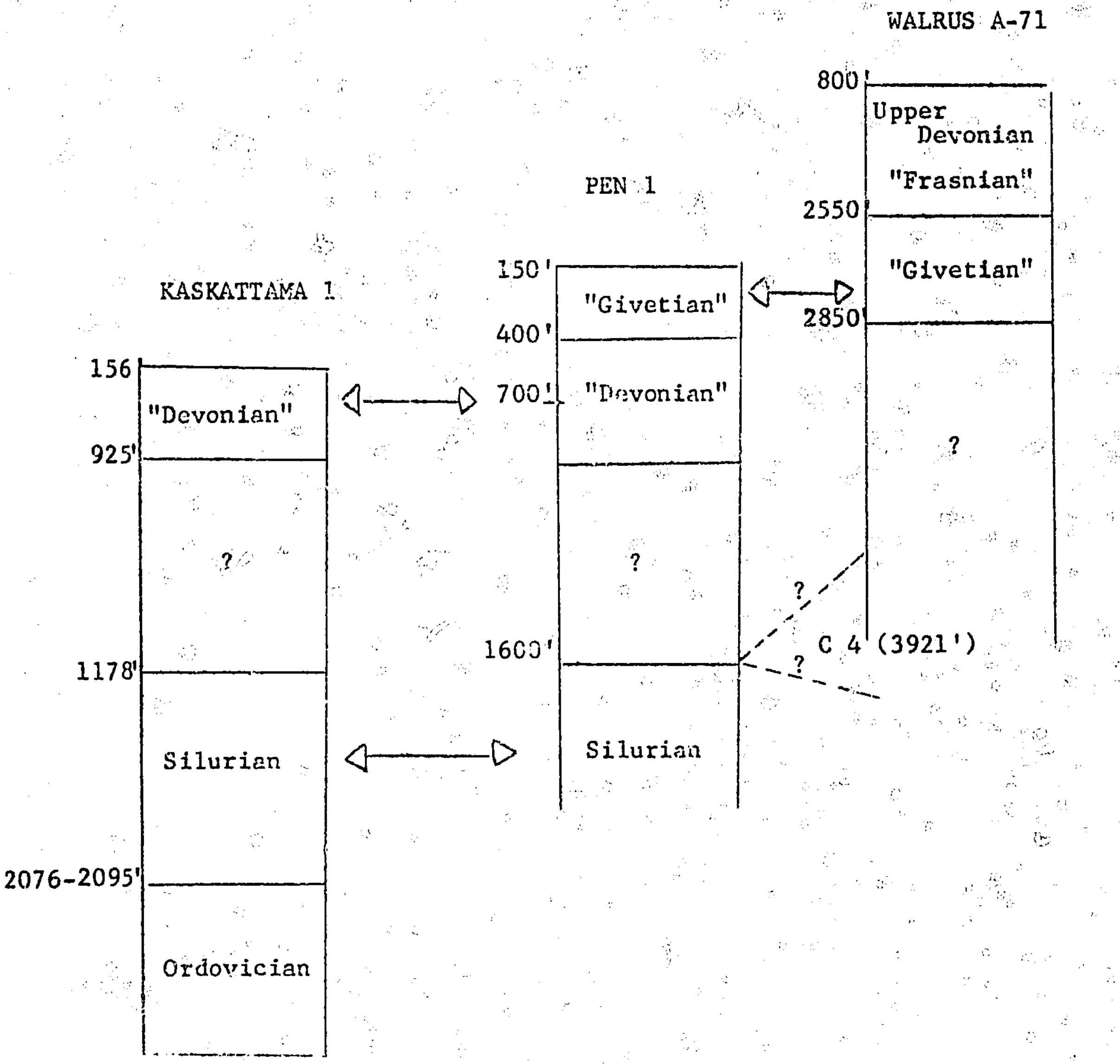
PEN 1 (700') = KASKATTAMA 1 (C.14 = 925')

**/ SILURIAN /**

PEN 1 (1650 - 1670')
KASKATTAMA 1
(C.28 (1294 - 1315')
(C.30 (1335 - 1354')

./...

According to these data, we propose the palynological interpretation of the possible stratigraphical relations between the three wells WALRUS A-71, PEN 1 and KASKATTAMA 1. (see hereafter the figure).



## A-3 - Palynological comments

If relations can be established between PEN 1 and KASKATTAMA 1 in "Silurian" and "Devonian" for the studied samples, it is not possible to make palynological comparisons between KASKATTAMA 1 and WALRUS A-71. It seems that in "Devonian" PEN 1 plays the role of hinge between WALRUS A-71 and KASKATTAMA 1.

For the Devonian sequence, it is assured that WALRUS A-71 is very much more complete and PEN 1 a little more complete than KASKATTAMA 1 in the upper part.

In the James Bay the comparable Devonian with WALRUS A-71 (2800-2850') and PEN 1 (150-400') is placed in the Maria Island Formation and in the Kwataboahegan Formation, these two formations being near of the Moose River Formation of more or less evaporitic and reefal tendancy in the sequence observed in WALRUS A-71.

The Silurian sequence can be palynologically characterized (see PEN 1 and KASKATTAMA 1) but is not determined with assurance in WALRUS A-71 at this time.

The Ordovician cannot be determined in WALRUS A-71, nor in PEN 1 from samples in our possession, until 1670').

For the definitive palynological study of WALRUS A-71 it will be necessary to complete with analysis of numerous other intermediate or complementary cuttings samples and of the whole cores numbers 2 and 4 of WALRUS A-71. All reference wells of Canada (particularly Hudson Bay) will be of great interest for local and precise stratigraphy and correlations in the future.

## B/ ~~EX~~TRACTED MICROFAUNAS FROM WALRUS A-71 (J. LE FEVRE)

1°) - The only well established results are those obtained from the core n° 3 : the Conodonts and other associated elements allow

./...

to attribute an Emsian to Frasnian dating to this core (5/5).

It is to be noted that be same age was attributed to the interval between 93 and 399' of KASKATTAMA 1. Nevertheless the most characteristic forms occuring in this interval have not been found, up to now, in the core n° 3 of WALRUS A-71 whose age meight be not exactly equivalent.

2°) - Up to now, the following intervals investigated on cuttings are : 2715-2750', 2810-2850', 3500-3580'

. between 2715 and 2850' : the Ostracods and Tentaculita are of Devonian age. In this first step we tend to attribute them a post-lower Devonian age ; anyhow no Silurian fauna was found in this interval (2/5 : cuttings).

. between 3500 and 3580' : no fauna were found.

3°) - A very small fragment from the core n° 4 was processed : no result was obtained.

## / III - FACIES ANALYSIS / (J. BOUROULLEC)

1°) - We have stablished that the "Dasycladacea" algal microfacies characterized in KASKATTAMA well 1 (2317'-2900') in field samples of the Bad Cache Rapids Group of Southampton Island ( CN 741 - 742 - 744 - 745 - 747) have not been still encountered in WALRUS bore I.

2°) - The high depositional energy level between 3921' - 3922' in core 4 of WALRUS indicates a reefoïd breccia facies (5/5) probably in the intertidal zone taking account of the context (3/5).

## /IV - HYDROCARBON PRODUCING CAPACITY /

(Geochemistry : P. ARTRU - Palynology : G. PENIGUEL).

./...

1 - 950 - 1400' and 2000 - 2500'

Cuttings do not look representative between 1450 - 2000' and analyses are in course.

Quantity of organic matter : very low (5/5).

Quality : medium to low (5/5).

Maturity : probably very low (2/5).

Hydrocarbon producing capacity for these intervals is very low (5/5).

2 - 2550 - 2800'

Quantity of organic matter

Medium to high (particularly in core 3) (5/5).

Quality : medium (5/5).

Maturity : low (4/5) more detailed studies are in course to obtain more accurate conclusions.

Hydrocarbon producing capacity

Would be rather good (association of reservoir and source rocks) if a sufficient maturation would be reached in others parts of the basin. In WALRUS Area the depth of buring (taking account of the regional trend of maturity) is too low.

3 - 2800 - 3500'

Quantity of organic matter : very low (scattered better levels) as for 3450') (5/5).

Analyses of the fraction of organic matter which is soluble in chloroform give a high proportion of satured hydrocarbon.

Hydrocarbon producing capacity : low

./...

## 4 - Core Number 4

Quantity : very low (concordant result with the microfacies interpretation).

Available sampling is not sufficient for detailed studies.

## 5 - Conclusions on the hydrocarbon producing capacity for the 2800 - 3500' interval

The low hydrocarbon producing capacity of that interval result from the low quantities of organic matter.

Up to now, quality of that organic matter is not actually known.

Two analyses of the soluble (in chloroform) fractions of that organic matter (J. CONNAN) give a fairly high proportion of saturated hydrocarbon.

There are two assumptions which are both favorable.

a) - the organic matter had reached a good maturity in these levels (1/5).

b) - there are little show of good quality oil in the interval, coming from inderlying levels (2/5).

Any how, the composition of that soluble fraction is quite different from that obtained from core number 3.

More accurate conclusions will be sent to Aquitaine as soon as data from core number 4 and cuttings between 3580' and 3921' will be available.

Occurence of thin clay beds and anhydrite above core number 4 could explained the lack of shows in the carbonated formation under 3800'. The shows in the bottom of WALRUS well (?) are coming from underlying reservoir or ~~source~~-rocks in that assumption.

CENTRE DE RECHERCHES - PAU
Groupe GEOLOGIE

Confidential

Re: WALRUS A-71 - CANADA - Cuttings between 800' and 1110'.

## RESULTS OF THE PALYNOPLANCTOLOGICAL ANALYSES.

### STRATIGRAPHY.

- 800'-850': presence of a few Acritarchs, Spors, Leiospheres and Chitinozoa, the most significant or most common forms being:

  - Polyedrixium sp. (Hy 45)
  - Veryhachium trispinosum (Hy 4)
  - Spaerochitino brevispinosa
  - Cyathochitina cylindrica.

  Presumed age: Middle to Upper Devonian.

- 900'-950': presence of a few Acritarchs, occasional Spors, "Tasmanacées". The most important types are of the Acritarch group. These are:

  - Duvernaysphaera stellata (Hy 247)
  - Horologinella horologium (Hy 56)

  Presumed age: 24 - 29 Hy*: Givetian to Famennian.

- 1000'-1050': presence of a few Algae, occasional Spors and Acritarchs including:

  - Polyedrixium sp. (Hy 45)
  - Triangulina sp. (Hy 24)

  Presumed age: 20 - 27 Hy: Devonian.

- 1100'-1110': presence of Algae, a few Acritarchs, "Tasmanacées", Leiospheres, Spors and Chitinozoa. Of the Acritarchs the following were identified:

  - Duvernaysphaera stellata (Hy 247)

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* Units in the general scale of Acritarchs.

From the Spors:

- Ancryospora langii (Sr 86).

Presumed age: 23 - 32 Hy
7 - 11 Sr** Couvinian to Famennian.

The overall interpretations made on these 4 samples are:

Giventian to Famennian for the 2 upper levels

Couvinian to Famennian for the 2 lower levels.

However, the former attribution of Core #1 (1439' 6") to the Upper Devonian leads logically to the grouping of the whole of the material studied (core + cuttings (800' to 1439' 6")) into the same stratigraphic interval: Upper Devonian.

## ORGANIC ENVIRONMENT (PA/C-H)

The residual organic matter recovered after acid treatment on the cuttings is slight. It was, however, of good quality (C.O.M.: colloid organic matter) in the sample 1100' - 1110', and there were oil traces in the upper sample (800' - 850').

## PALEOGEOGRAPHY.

We should like to emphasize especially the presence of Chitinozoa at two levels (800' - 850' and 1100' - 1110'), which indicate a "relatively open marine environment". Up till now, we had not come across this group of micro-organism in the Devonian studied in Canada (Kaskattama #1 - samples from the field survey of Rueff-Artru - Nelson samples).

Besides, the predominance of the Acritarchs, the small ratio of Spors, the type of organic matter encountered (C.O.M.) lead to the same conclusion, indicating a marine environment with a slight continental influence.

G. PENIGUEL - C. POUMOT.

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** Units in the general scale of Spors.

CENTRE DE RECHERCHES - PAU
Groupe GEOLOGIE

Re: WALRUS A-71 - Core #1 (1439' 6")

## 1. RESULTS OF THE PALYNOPLANCTOLOGICAL ANALYSES (G. PENIGUEL).

We must state, first of all, that the sample received was not suited to this technique because of its lithology (limestone) and its colour (dark pink). Indeed, without exception, only argillaceous rocks (clays, marls, silts, argillaceous limestones) pale grey to black in colour are recommended for the extraction of organic microfossils (Chitinozoa, Acritarchs, Spors, Scolecodonts) in sufficient quantities.

In the present case, few Acritarchs, which are very difficult to identify because of their transparency and their torn membranes, could be identified. They seem to belong to the same morphographic type, Hy 45, and would therefore be classified in the Polyedrixium generus. If this determination is correct, the age to be attributed to the sample analysed would be Devonian, the stratigraphic distribution of this type being limited, as far as we know, to the base of the Devonian and the Middle Famennian (Units 20 - 27 Hy on our general scale of Acritarchs).

Only a small amount of organic matter was extracted after passing the sample through acids (HCl, HF); the quality of this organic matter seems interesting. In fact it is almost entirely colloid organic matter (COM), the category which we consider, at the moment, as the best from the point of view of hydrocarbons. Tracheids, wood vessels which indicate a terrigenous origin, are rare.

In the absence of the usual material necessary to evaluate the degree of coalification (smooth Spors, "Tasmanacées"), it is difficult to evaluate the maturation. However, the extreme transparency of the Acritarchs does not seem to reflect a highly advanced stage. Also, we were surprised at the presence of occasional oily droplets exuding from a few organic particles. They may only be related to microscopic Algae, as we have sometimes observed.

These conclusions, as much from the point of view of stratigraphy as from that of organic matter, remain very hypothetical as they are based on isolated observations and need to be confirmed by a study of the over- and underlying levels.

## 2. MICROFACIES (M. TIXIER).

Microsparite, partly dolomitised, in which Amphipora can be seen. The presence of these organisms would seem to indicate a back-reef type of depositional environment for this sediment.

CENTRE DE RECHERCHES - PAU
Groupe GEOLOGIE

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## Re: WALRUS A-71 - Core #1 (1439' 6") - Second Sample.

## RESULTS OF THE PALYNOPLANCTOLOGICAL ANALYSES.

### STRATIGRAPHY

Organic microfossils slightly more numerous and varied than in the first sample, but material which is still difficult to identify because of its state of preservation (torn, very transparent). The groups represented are: Acritarchs s.s., "Tasmanacées", Leiospheres and Spors. Of the Acritarchs we note particularly the presence of Polyedrixium sp. (Hy 45 S.N.P.A.), and of the Spors, the presence of Geminospora lemurata (Sr 129 S.N.P.A.). The relative stratigraphic distribution generally accepted for these two forms does in fact limit the possible stratigraphic interval to the Upper Devonian.

With regard to the samples from the Rueff - Artru survey, studied for palynology, we shall make comparisons with CN 286 and CN 288 where the two types mentioned above are both present.

### ORGANIC ENVIRONMENT

Comparable to that described for the first sample of the core.

### PALEOGEOGRAPHY

The presence of "Tasmanacées" and of Spors might indicate an environment close to fields of algae in very shallow water and with slight continental influence.

G. PENIGUEL.

Report No. SR 14 AEHP 69

Three Silurian fossil lots from the Aquitaine Hudson Walrus A-71 Well (58°30'02.29"N, 87°10'48.75"W; NTS 44L). Study requested by S. Rueff, Aquitaine Company of Canada Ltd.

The relevant parts of any manuscript prepared for publication that paraphrase or quote from this report should be referred to the Paleontology Section, Calgary, for possible revision.

| Stratigraphy | Fauna and Age | GSC Loc. No. |
|---|---|---|
| Core #4, 3,917' | Rhegmaphyllum sp. nov.<br>Age: Late Llandoverian or Wenlockian | C-4310 |
| Core #4, 3,918' | Mesofavosites sp. nov.<br>Rhegmaphyllum sp. nov.<br>Age: Late Llandoverian or, slightly less likely, Wenlockian. | C-4311 |
| Core #4, 3,921-22' | Rhegmaphyllum sp. nov.<br>Age: Late Llandoverian or Wenlockian. | C-4312 |

## Comments

The known range of Mesofavosites is Uppermost Ordovician (Porkuni Stage of Estonia) to Ludlovian of Eurasia; that of Rhegmaphyllum is Late Llandoverian to Wenlockian of Eurasia and possibly Ludlovian of northern Europe. Thus the faunas could be of any age from Late Llandoverian to Ludlovian. However figures of indubitable Ludlovian specimens of Rhegmaphyllum have not, I believe, ever been published. Furthermore the Mesofavosites has strongly crenulate intercorallite walls and therefore most resembles early species.

I conclude that the age of this faunule is late Llandoverian or, slightly less likely, Wenlockian.

Alan Pedder

A. E. H. Pedder

Paleontology Section,
Institute of Sedimentary and Petroleum Geology,
Calgary, December 15, 1969.

# AQUITAINE ET AL. HUDSON WALRUS A-71

## M. RESERVOIR STUDY

S. N. P. A.
D. E. P.

# DIVISION PRODUCTION

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DEPARTEMENT RESERVOIR GISEMENT
X.R./ fr / R.G. - n° 69.282

Pau, le 13 octobre 1969

## HUDSON BAY

## WALRUS 1

## Reservoir study of the EKVAN River and SEVERN River Formations

### Log interpretation from 1,975' to 2,950'

Using the data from the logs, the petrophysics measurements of a core, and the first observations during the drilling of Walrus 1, we here characterized the reservoir of the Ekvan River and the Severn River Formations.

Succintly we shall recall the stratigraphic and lithologic sequence from 1,980' to 2,950' :

- 1,980'/2,400' (420') Kenogami Formation (middle member) - clay and shale - caprock.
- 2,400'/2,508' (108') Kenogami Formation ( lower member) - saliferous Formation with three thin beds of the anhydrite and a shaly bed - caprock.
- 2,508'/2,800' (292') Ekvan River Formation - carbonate formation (reefal in part) which is a principal target of the well. This reservoir is slightly to fairly porous and is saturated by the salt water (high calcium chloride content) as shown by a standard log interpretation.
- 2,800'/2,950' (150') Severn River formation - carbonate formations slightly porous, saturated with salt water as the preceding one.

..../...

The Ekvan and Severn river formations have been studied together as a single reservoir (Porosity, water formation, saturation). The data which have been used for this study are the following :

- Dual induction laterologs 8 and 3.
- Density, Sonic, and Neutron (SNP) logs.
- Gamma ray, caliper.
- 1 core from 2,670' to 2,684'.
- a flow of salt water ($CaCl_2$) during the drilling between 2,528' and 2,567' (80 bbls) and chiefly from 2,555' to 2,567'.

* * *

## I - Porosity

We roughly can sum up the porosity profile as follows :

- 2,508'/2,610' (102') : porosity value : 4 to 5 % with four beds at 10 % or more
- 2,610'/2,760' (150') : 10/12 % with two beds at 20 %
- 2,760'/2,800' ( 40') : shaly beds
- 2,800'/2,950' (150') : 2 to 4 % with a bed at 10 %.

TOTAL Pore volume = H Ø = 26' or 7.92 m

We estimated the porosity value from the neutron log data for 25 zones of the reservoir (⟶ appendix). This log directly indicates the porosity value for the limestone formation. In the case of the dolomite formations it is necessary to perform a correction to take into account the matrix effect. This correction is - 4 % on the porosity value in the range 15/20 %, - 3 % around 10 % and - 1 % for the low porosity.

In order to determine the percentage of limestone and dolomite of each bed, we performed the Neutron/density cross plot (fig 1). Assuming the limit points are representative of each mineral, we can outline on this graph the equal percentage line of limestone and dolomite. Knowing the lithologic nature of each formation, we can adjust the Neutron porosity to take into account the matrix effect.

...

## 2 - Water formation

During the drilling from 2,520' to 2,567' a salt water flow ($CaCl_2$) has been observed. The precise nature will be known later, but in the first step we can assume that the resistivity value is close to that of the mud. That is to say, 0.04 $\Omega$/m B.H.T. According to the Neutron log we can place the water inflow at 2,520', 2,548' or 2,555'.

## 3 - Water saturation

Below the level of the salt water inflow, we can assume that the formations are aquifer. To observe variations of water saturation at the top of the reservoir, we performed the resistivity/porosity cross plot (fig 2 and 3).

The resistivity value has been picked on the laterolog 3 and the porosity value on the Neutron log - first by not accounting for the matrix effect, secondly by accounting for it. In each case we outlined the mean line passing through all the points. If this line represents the 100 % water saturation line it is easy to draw the Sw = 50 % and Sw = 25 % line.

The slight dispersion of the points around the Sw = 100 % line, especially in the case where we took into account the neutron matrix effect, indicates that the water saturation is nearly constant inside the reservoir.

The dispersion is due chiefly to two facts :

- each log integrates a different volume in a heterogeneous formation at the scale of their spacings.
- in the low porosity range the porosity values are less dependable.

Thus at the reservoir top we do not detect zones which could be appreciably saturated by hydrocarbons.

## 4 - Remarks about the Resistivity logs

In salty mud and in large diameter (from 13" to 15") the resistivity measurements must be corrected to take into account of the strong mud conductive effect. This correction will be all the more important, as the formation resistivity increases. We can give a few examples :

a) Induction log (Deep investigation)
for a 13" diameter if $R_t < 5\ \Omega/m$ the correction is $<$ 10 %
if $R_t \simeq 13\ \Omega/m$ correction $>$ 25
if $R_t > 30\ \Omega/m$ the measurement is inaccurate because the signal of hole effect is greater than that of the formation,

...

for a 15" diameter if $R_t > 10\,\Omega/m$ the measurement is inaccurate.

b) Latérolog 8

if $d > 13"$ and $R_t > 30$ to $50\,\Omega/m$ the measurement is inaccurate.

c) Latérolog 3

it is the best tool in this case. The hole effect correction is about ± 10 % according to the $R_t$ value.

Then in the low resistivity range, the induction (Deep investigation) and the laterolog 8 indicate the correct value of the resistivity. We remark that opposite the core at 2,670' (average porosity = 12 %) we read a resistivity value of about $3/5\,\Omega/m$. Theoretically it should be : $Ro = F\ Rw - 0.04 \times 60 = 2.4\,\Omega/m$. As the resistivity value in the reservoir can exceed $10/20\,\Omega/m$, the induction and laterolog 8 cannot be used to calculate the water saturation throughout the reservoir. Thus the laterolog 3 is the only tool at our service. Unfortunately when we compare the readings of this tool and those of the induction laterolog 8 in the low resistivity range, we observe that there is a very large difference between these logs. Nevertheless the laterolog 3 has been used assuming these values must be corrected by a factor. This assumption does not prevent the observation of saturation variation. We performed too a porosity resistivity cross plot from the induction without knowing if this resistivity tool was corrected for the hole effect (fig 4).

## 5 - Evaporite Formations

Above the reservoir, we can observe the different evaporite formations thanks to the logs :

Salt : $\Delta t = 67\,\mu s$ $d = 2.1$ porosity and $\gamma$ ray → 0

Anhydrite : $\Delta t = 50\,\mu s$ $d = 2.95$ " " → 0

Even if these values are not obtained with accuracy from the logs, nevertheless they are close.

X.REVERDY

Dest.

DEP 1
Div.Amérique 1
Div.Production 1
P.G.
Dpt Opérations

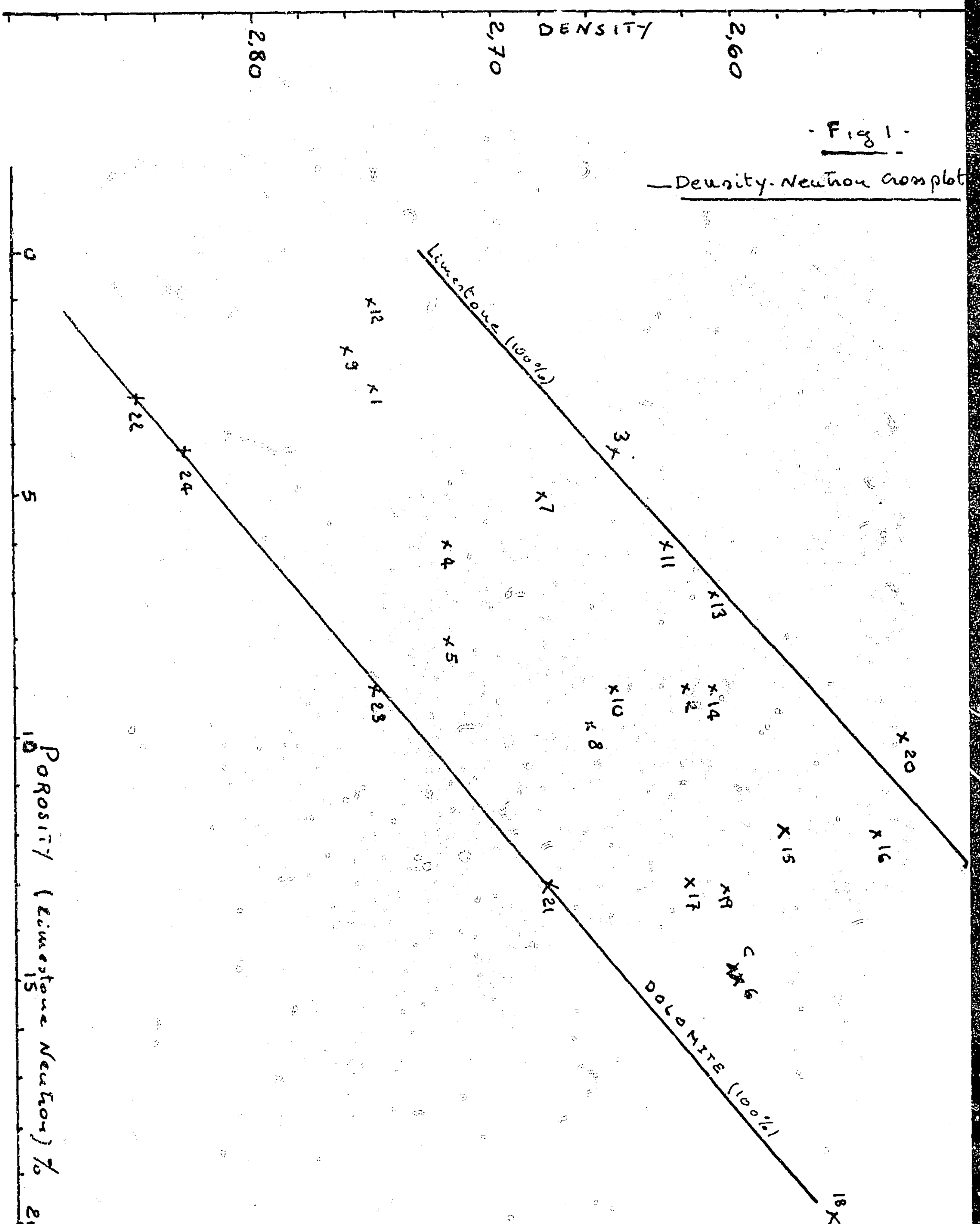
BCB Amérique 1
A.C.C.

# APPENDIX

| N° | Depth ft | Resistivity Ω/m |  | Porosity % Neutron-limestone | Porosity % . Neutron . . true porosity . | Density gm/cc |
|---|---|---|---|---|---|---|
|  |  | L3 | Induction (Deep) |  |  |  |
| 1 | 2,514 | 70 | 40/50 | 2.75 | 2 | 2.75 ? |
| 2 | 2,520 | 1.3 | 25 | 9 | 8 | 2.62 |
| 3 | 2,523 | 13 | 40 | 4.1 | 4.1 | 2.75 |
| 4 | 2,528 - 2,532 | 4.5 | 35 | 6 | 5 | 2.72 |
| 5 | 2,550 | 1.5 | 8 | 8 | 6.5 | 2.72 |
| 6 | 2,558 | 0.7 | 6 | 15 | 12 | 2.60 |
| 7 | 2,564 - 2,572 | 3/4 | 15 | 4/6 | 3.5/5.5 | 2.68 |
| 8 | 2,577 | 1.1 | 10.5 | 9.75 | 8.5 | 2.66 |
| 9 | 2,580 | 6 | 25 | 2 | 2 | 2.76 |
| 10 | 2,586 | 1.2 | 15 | 9 | 7.5 | 2.65 |
| 11 | 2,593 | 2 | 12 | 6 | 6 | 2.63 |
| 12 | 2,600 | 9 | 25 | 1 | 1 | 2.75 |
| 13 | 2,610 - 2,618 | 0.9 | 7 | 7 | 7 | 2.61 |
| 14 | 2,620 - 2,630 | 0.9 | 8 | 9 | 8.5 | 2.61 |
| 15 | 2,640 - 2,646 | 0.5 | 4.5 | 12 | 11 | 2.58 |
| 16 | 2,652 - 2,658 | 0.5 | 4 | 12 | 12 | 2.55 ? |
| 17 | 2,666 - 2,670 | 0.6 | 5 | 13 | 11 | 2.62 |
| 18 | 2,682 - 2,686 | 0.35 | 3 | 20 | 15.5 | 2.56 |
| 0 | 2,672 - 2,680 | 0.5 | 3/5 | 15 | 13 | 2.60 |
| 19 | 2,704 - 2,715 | 0.55 | 5 | 13 | 11 | 2.60 |
| 20 | 2,722 | 0.8 | 7 | 10 | 10 | 2.53 |
| 21 | 2,748 - 2,752 | 0.8 | 10 | 13 | 9.5 | 2.68 |
| 22 | 2,810 - 2,814 | 4.5 | 40 ? | 3 | 2 | 2.85 |
| 23 | 2,850 - 2,856 | 2 | 30 | 9 | 6 | 2.75 |
| 24 | 2,890 - 2,900 | 10 | 40 ? | 4 | 2.5 | 2.83 |

- Fig 1 -

— Density - Neutron Crossplot



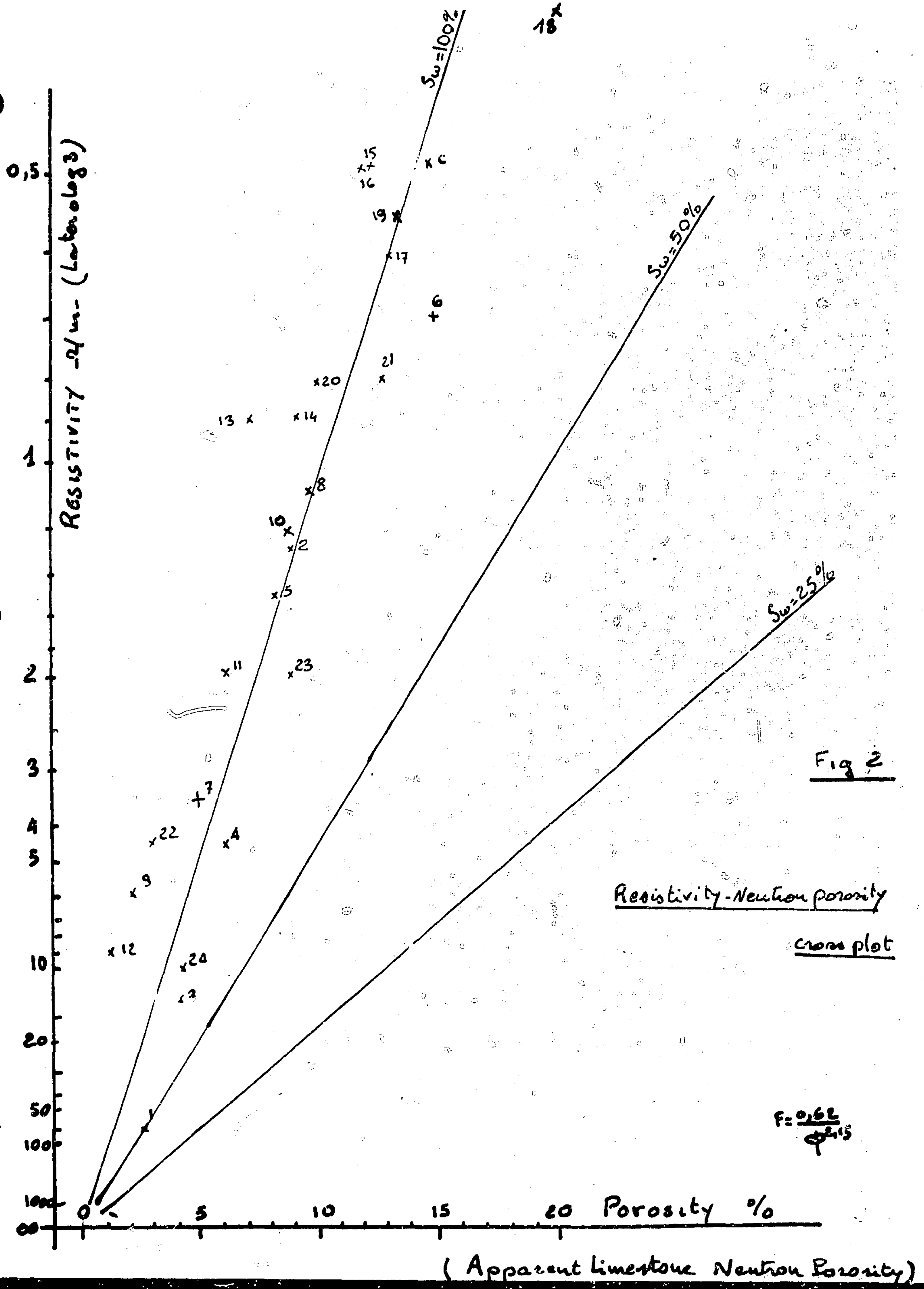


Fig 2

Resistivity-Neutron porosity cross plot

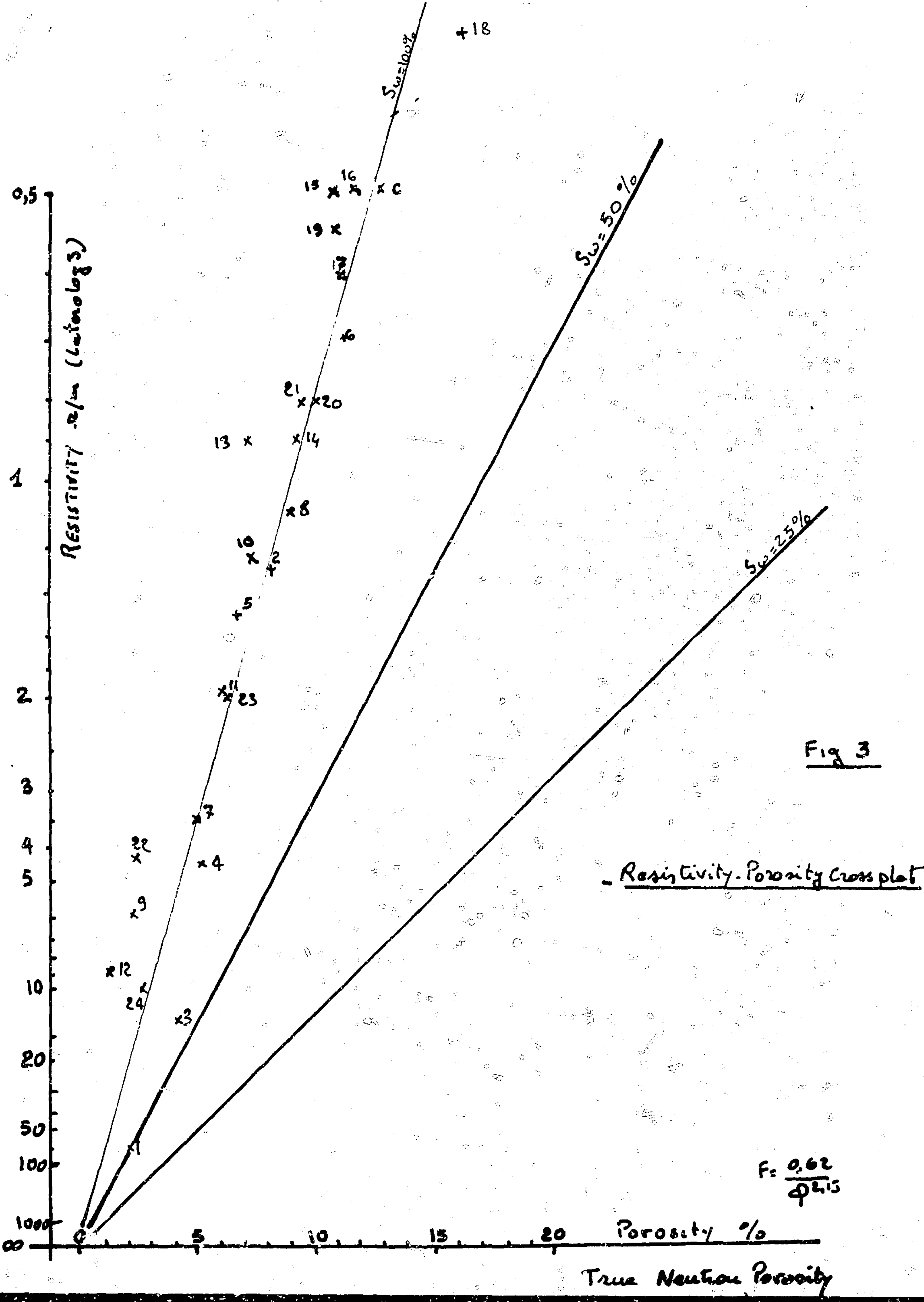


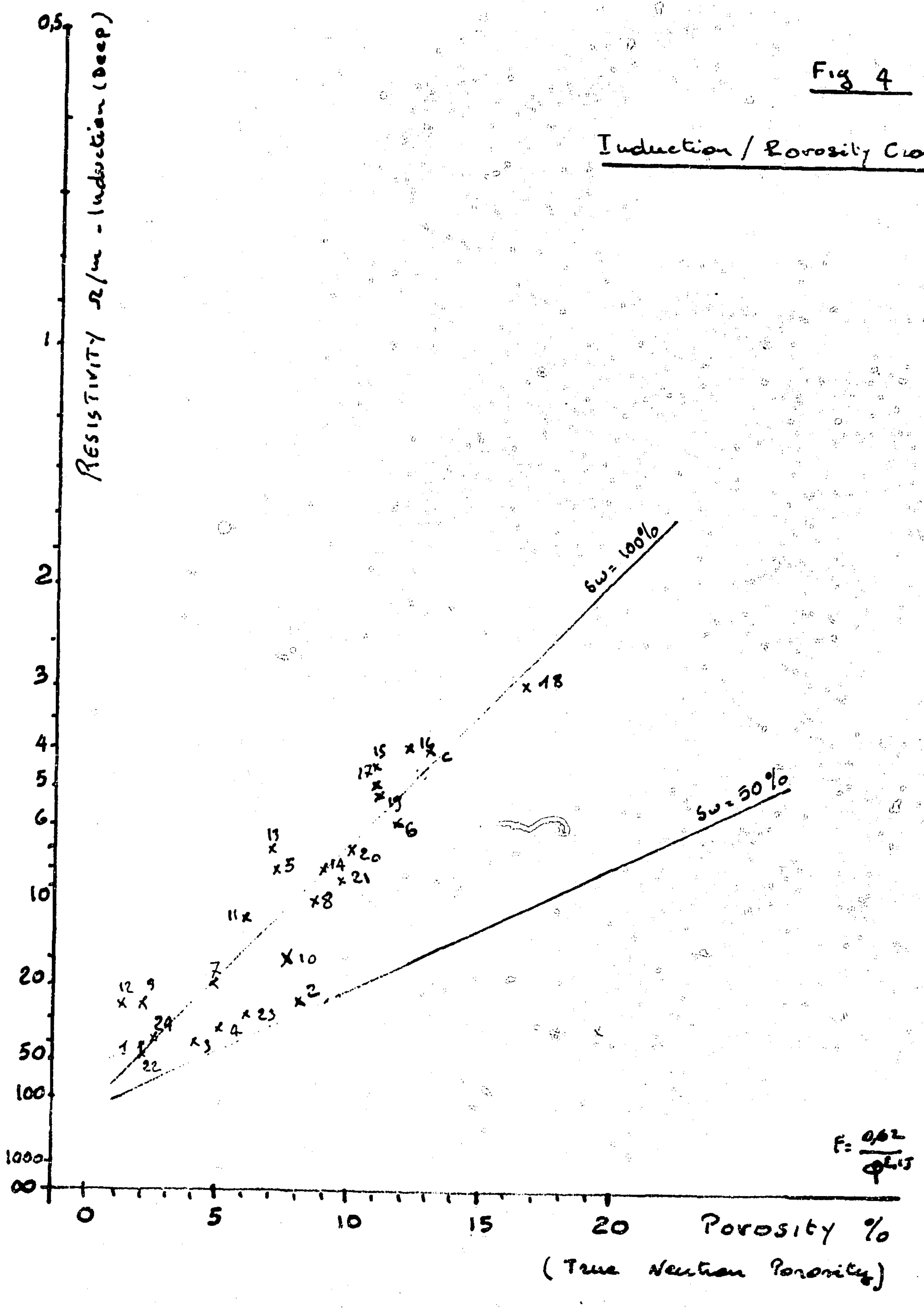
Fig 3

Resistivity-Porosity crossplot

$F = \frac{0,62}{\phi^{2,15}}$

## Fig 4

## Induction / Porosity Crossplot



DEPARTEMENT RESERVOIR GISEMENT
X.R./ fr / R.G. - n° 69.298

Pau, le 29 octobre 1969

# HUDSON BAY

## WALRUS

(report n°2)

### Reservoir study from 2,965' to 3,925'

In order to characterize the Walrus reservoir between 2,965 to 3,925', we have at our disposition the following data :

- Laterolog 3 (n° 3 and n° 4)
- Sonic caliper (n° 3 and n° 4)
- Gamma ray Neutron (n° 1)
- A fragment of the bottom hole core
- During the drilling a salt water inflow (25 bbls) has been observed at about 3,070'.

* * *

We shall recall the lithologic sequence : from 2,965' to 3,925', the formations are carbonate and there is a reservoir continuity with the formation which has been studied previously. No shaly caprock can be observed in these formations except for a few thin beds.

If there is a caprock, it would be constituted by compact carbonate beds. The matrix porosity is low (0 - 5 %) with a few thin beds at 10 % - locally the formation can be fractured.

In order to study the water saturation we performed a resistivity sonic and a resistivity porosity cross plot on 13 beds (appendix I) of the reservoir.

These beds were :

- not shaly according to the gamma ray
- porous or slightly porous. The compact beds (no porosity) (i.e. those whose the Neutron counts were higher than 3,300 API units) were not taken into account.

...

On the resistivity Sonic cross plot (fig.1), two factors can explain the dispersion of the points : the lithology and water saturation. We sought to eliminate the lithologic effect. Using a Sonic Neutron cross plot (fig.2) we were able to estimate the dolomite and limestone percentages, assuming the limit points are representative of limestone and dolomite.

So the Sonic interval transit time can be used to calculate the porosity value, taking into account the lithologic effect.

The porosity/Resistivity cross plot (fig.3) shows that the water saturation is roughly constant in this reservoir. As at about 3,070' we observed a salt water inflow, we can conclude that this reservoir is aquifer.

Remarks

1 - We can calculate the formation water resistivity.

$R_w$ = 0,007 $\Omega$/m BHT

(Porosity 9 % - F = 100 - Ro = 0,7 $\Omega$/m).

It is the same value (i.e.too low) as previously found.

The laterolog 3 readings are homogeneous from run 2 to run 3 and 4. The quantitative value of these runs is not solved.

2 - On the Sonic/Resistivity cross plot we can outline the dolomite and limestone lines. From this figure, we find again roughly the same percentages of dolomite and limestone and the same matrix transit-times as from the Sonic/Neutron correlation.

$\Delta$t (limestone) = 50 µs

$\Delta$t (Dolomite) = 42 µs

3 - The Neutron log allows us to discern the compact beds because of its detailed scale in the low porosity range. Above 3,300 API units the formations are compact. We can notice the principal ones :

3,172/3,400 - 3,590/3,610 - 3,630/3,675 - 3,775/3,640.

4 - At 3,825', we observe a radioactive and not shaly bed ( > 100 API units).

...

5 - Results of the core measurement (first sample of the bottom hole core)

Porosity : 3.4 %

Grain density : 2.74

Oil shows : no show by visual examination or by **washing with** the carbon tetrachloride.

X. REVERDY

3 figures + 1appendix

DEST.

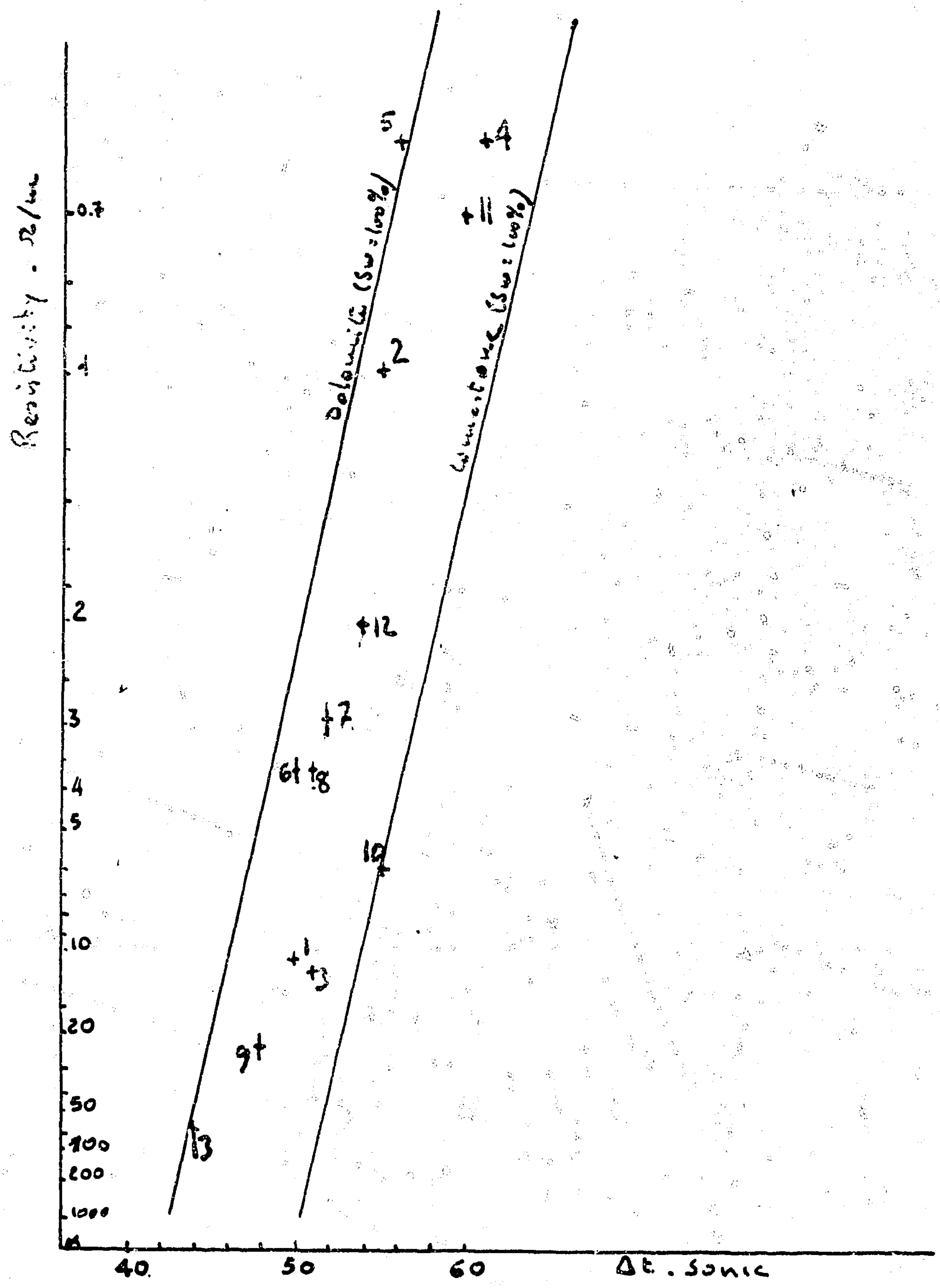
| | |
|---|---|
| DEP | 1 |
| Div. Amérique | 1 |
| Div.Production | 1 |
| R.G. | |
| BED Amérique | 1 |
| A.C.C. | |

# APPENDIX I

| N° | Depth | Rt $\Omega$/m | Neutron* (Div) | $\Delta t$ $\mu s/ft$ | Limestone % | Dolomite % | Porosity % |
|---|---|---|---|---|---|---|---|
| 1 | 3,020/3,026 | 11 | 7 | 50 | 50 | 50 | 3 |
| 2 | 3,138 | 1 | 3 | 55 | 75 | 25 | 5 |
| 3 | 3,300 | 13 | 12 | 51 | 100 | 0 | 1 |
| 4 | 3,466 | 0.6 | 1 | 61 | 75 | 25 | 9 |
| 5 | 3,490/3,500 | 0.6 | 0 | 56 | 25 | 75 | 8.5 |
| 6 | 3,700/3,715 | 3/5 | 2.5 | 50 | 0 | 100 | 5.5 |
| 7 | 3,720/3,728 | 2/4 | 2.5 | 52 | 25 | 75 | 5.5 |
| 8 | 3,750 | 3/5 | 4 | 51 | 30 | 70 | 4.5 |
| 9 | 3,790 | 20/30 | 11 | 48 | 50 | 50 | 1.5 |
| 10 | 3,860/3,868 | 6 | 4.5 | 55 | 100 | 0 | 3.5 |
| 11 | 3,880 | 0.7 | 0 | 60 | 75 | 25 | 8.5 |
| 12 | 3,900/3,910 | 2.1 | 1 | 54 | 0 | 100 | 8 |
| 13 | 3,685 | 70 | 12 | 44 | 20 | 80 | 1 |

* 0 Division = 1,800 API units

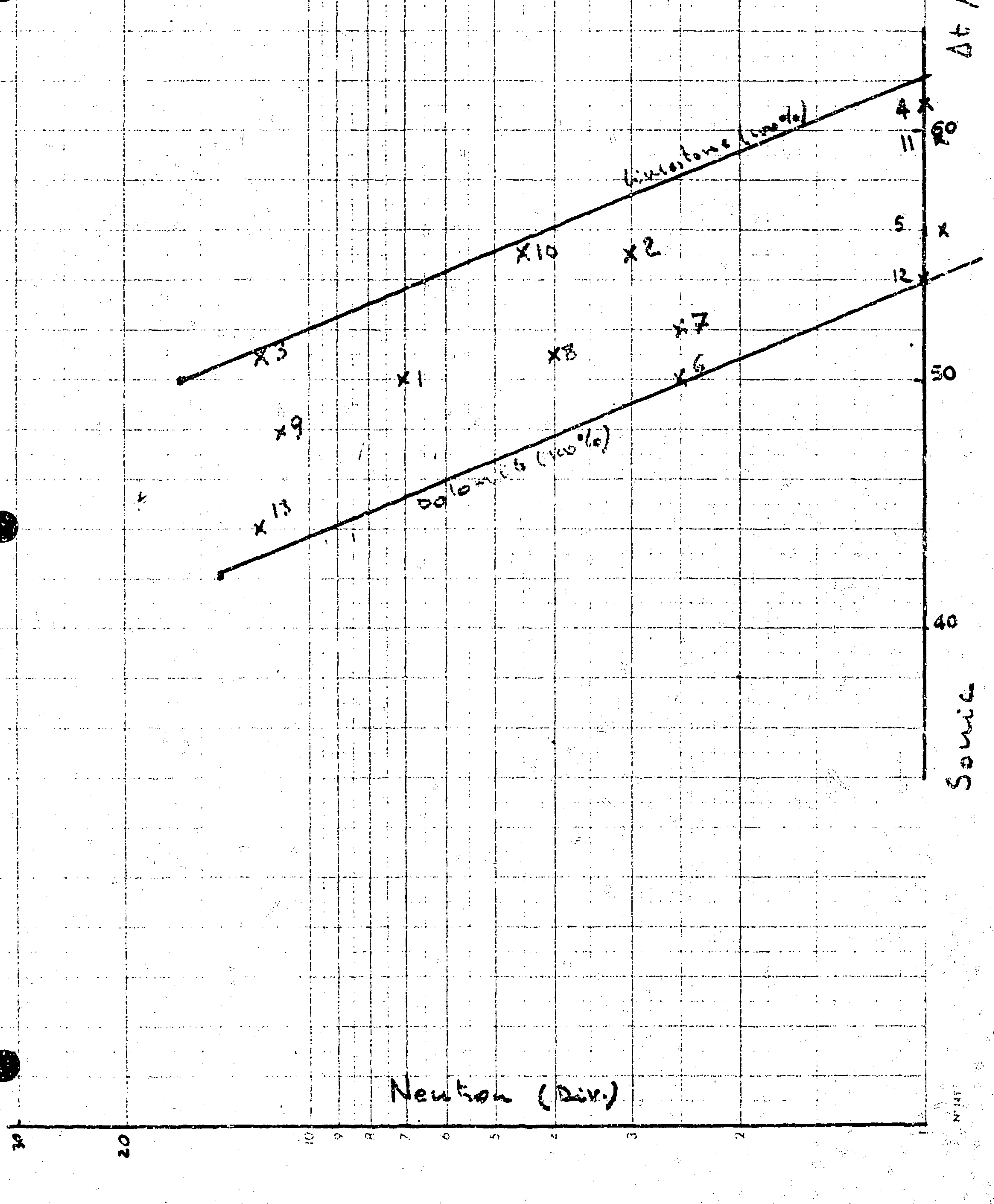
20 Divisions = 4,200 " "

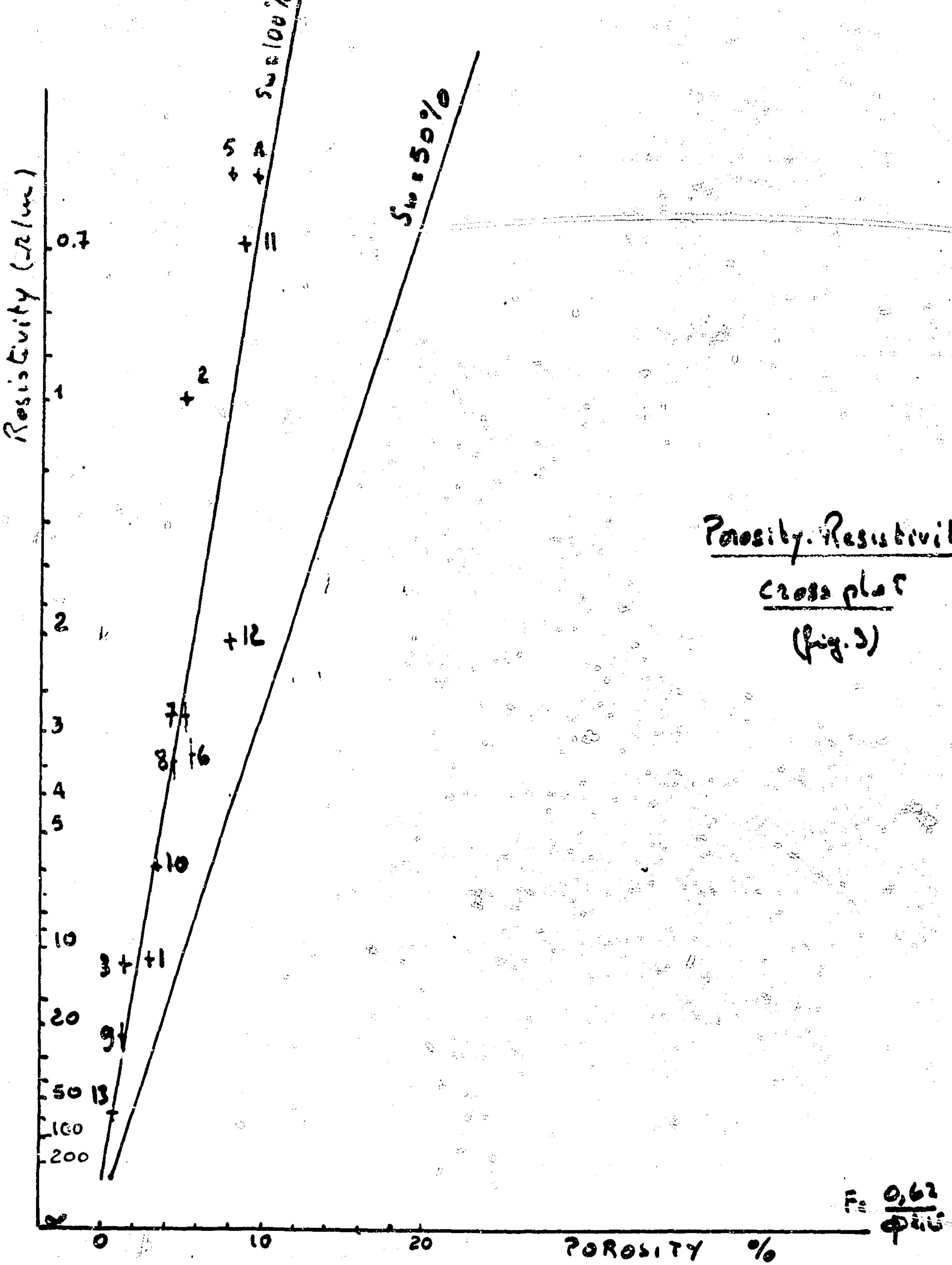


Sonic - Resistivity crossplot - fig 1

# Sonic-Neutron Crossplot

(fig. 2)





Porosity. Resistivity cross plot (fig. 3)

$F = \frac{0,62}{\phi^{2.15}}$

## AQUITAINE ET AL. HUDSON WALRUS A-71

## N. GAS SHOWS

GEOSERVICES NORTH AMERICA LTD.

ROOM 305 - EXAMINER BLDG.
805 FIFTH ST. S.W. CALGARY 2, ALTA.

GEOCHEMICAL PROSPECTING
GEOCHEMICAL WELL LOGGING
GEOLOGICAL WELL SITE SERVICES

TELEPHONES: 269-6019
269-5576
CABLE: GEONAM
CALGARY

# REPORT ON GAS SHOWS ON WALRUS A71

## I. CHARACTERISTICS OF DETECTION SYSTEM

- Densimud.
- Stirring Degasser GZ11 constant level 40 l/mn.
- 1st Drying by $Cl_2Ca$.
- Monoflex 30 ft.
- Flow in Monoflex 40 l/h.
- 2nd Drying by $Cl_2Ca$.
- Sampling Assembly.
- Blanchette LAFOND.
- GD11 # 2220.
- GAL21 #3379 in parallel with GD11; continuous recording of gas from 772' to T.D. 3926'.
- Calibration of GAL21 - every day with drilling with 1% $C_1$; lag time due to Monoflex and drying + $Co_2$ absorbant containers : 2 mns. at 40 l/h.

Note: All depths are lagged.

## II. GAS SHOWS RECORDED

772' - 2,500' No gas recorded (Note: traces of $N_2$ while drilling cement after casing).

2502' First apparition of gas on Detectors (0.18% of $C_1$).

2563' First gas show with $C_1$ : 1.5%

$C_2$ : 0.05%

$C_1/C_2 = 30$

Traces of $H_2$

Recycled twice during circulation

Report on Gas Shows on Walrus A71 (cont'd)

| | |
|---|---|
| 2567' | Trip Gas - after new bit with $C_1$ 0.6% then back ground of 0.12% average. |
| 2614' | Gas show (0.18% $C_1$). |
| 2614' - 2665' | Back ground of 0.12% average. |
| 2667' | Gas show 0.17% $C_1$<br>0.027% $C_2$ $C_1/C_2$ = 18 |
| 2670' | After round trip Trip Gas with 0.50% $C_1$ and 0.027% $C_2$. |
| 2685' - 2800' | Back ground of 0.15% $C_1$ average and 0.025% $C_2$.<br>Note: Viscosity of mud 40. Allows reading of $C_2$ in this interval continuously. |
| 2750' | Kick Gas 0.35% $C_1$ and 0.06% $C_2$. |
| 2775' | Gas show for 10' 0.22% $C_1$ and 0.04% $C_2$. |
| 2800' - 2900' | Mud weight increased; less quantity of gas recorded (less than 0.02% $C_1$ at 2,850'). |
| 2902' | Trip Gas with 1.4% $C_1$ and 0.035% $C_2$ $C_1/C_2$ = 40<br>Recycled once (0.35% $C_1$). |
| 2960' | Casing 9"5/8.<br>After casing no gas show until 3070'. |
| 3070' | Sudden apparition of gas and constant reading of 0.38% $C_1$ during 20 feet. $C_1/C_2$ = 48 |
| 3095' | Mud weight increased to 1.75 when start drilling. After lag time, flow of 25 bbls of salt water reduces weight to 1.57. Trip gas of 5.8% $C_1$ and 0.12 $C_2$; recycled twice.<br>After Trip gas weight stabilizes at 1.68. |
| 3140' | Trip gas due to pipe connection of 0.35% $C_1$ |

## Report on Gas Shows on Walrus A71 (cont'd)

| | |
|---|---|
| 3160' | Trip gas 6% $C_1$ and 0.16% $C_2$ $C_1/C_2 = 37$ |
| 3200' - 3510' | Mud weight put to 1.70 - 1.72 and increased to 1.78-1.82 after 3510 to 3580'.<br>No hydrocarbon gas recorded. However, continuous show of $N_2$ due to chemicals added in mud. |
| 3580' | Mud weight reduced to 1.70;<br>flow of water and gas recorded;<br>7% $C_1$ and 0.13% $C_2$. |
| 3580' - 3926' (total depth of Walrus A71) | No real shows have been recorded. But every round trip has been followed by a flow of salt water reducing mud weight and allowing records of Trip gas. Also after connections and stop circulation for well surveys.<br>Those Trip gases between 7.5% $C_1$ and 0.11% $C_2$ at 3730', and 1% $C_1$ with 0.07% $C_2$ at 3635'. |

## III. ABSTRACT

First show at 2563' 1.5% $C_1$ 0.05% $C_2$ $C_1/C_2 = 30$

Then shows at:

| | |
|---|---|
| 2614' | (0.18% $C_1$) |
| 2667' | (0.17% $C_1$) |
| 2775' | (0.22% $C_1$) lasting 10 mn. $C_2 = 0.04\%$ |
| 3070' | After casing 9"5/8 - 0.38% $C_1$ for 20 feet. |
| After 3070' | Trip gas recorded after each trip.<br>Average back ground of gas less than 0.1% $C_1$ |

Géoservices North America Ltd.
J.P. GERARD.

AQUITAINE ET AL. HUDSON WALRUS A-71

## O. FLUID ANALYSIS

AQUITAINE COMPANY OF CANADA LTD.
1300 CALGARY HOUSE • 550 6TH AVENUE S.W.
PHONE: 263 3916 • AREA CODE: 403 • TELEX: 038-2349 PETRAKI CGY • CABLES: PETRAKI CALGARY
CALGARY, ALBERTA, CANADA

## WALRUS A-71

## Details of the Samples

| | |
|---|---|
| SAMPLE NO. 1 | Sample of mud contained in the core barrel of Core No. 3. |
| SAMPLE NO. 2 | Sample of mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 2568' - beginning of the kick. |
| SAMPLE NO. 3 | Same as sample No. 2 but: - middle of the kick. |
| SAMPLE NO. 4 | Same as sample No. 2 but: - end of the kick. |
| SAMPLE NO. 5 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 2906'. |
| SAMPLE NO. 6 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 3092'. Circulation had been off for 5 hours. Gas kick recorded on the well site:<br>- Duration: 30 minutes,<br>- Total gas: 7.5%,<br>- $C_1$: 5.8%<br>- $C_2$: 0.12%<br>- $C_1/C_2$ = 48.<br>- Density of mud dropped from 1.75 to 1.57. |
| SAMPLE NO. 7 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 3160'. Gas kick recorded on the well site:<br>- Total gas: 10%<br>- $C_1$: 6%<br>- $C_2$: 0.18%<br>- $C_1/C_2$ = 33. |

/...2

| | |
|---|---|
| SAMPLE NO. 8 | Sample of gas sampled in a metallic bottle installed on the gas detection circuit of the geological cabin - before the detector - during a gas kick after a trip for new bit at 2568'. |
| SAMPLE NO. 13 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for controlling the hole at 2974'. Circulation had been off for 72 hours. |

* * * * *

C.G.L. 64

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

**OPERATOR:** AQUITAINE COMPANY OF CANADA LTD. **REPORT NUMBER:** E69-11245

**DATE SAMPLED:** --- **DATE RECEIVED:** Oct. 3, 1969 **DATE REPORTED:** Oct. 15, 1969

Kind of Sample: Gas Samples in Glass Bottles - Item A on P.O. #A-2442.

| Sample Number: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 13 |
|---|---|---|---|---|---|---|---|---|
| Oxygen | 20.91 | 18.94 | 19.58 | 20.06 | 15.15 | 19.43 | 17.37 | 17.68 |
| Nitrogen | 78.59 | 80.66 | 80.29 | 79.85 | 83.83 | 79.40 | 77.11 | 81.32 |
| Carbon dioxide | 0.01 | 0.01 | Trace | 0.01 | Trace | Trace | 0.01 | Trace |
| Hydrogen sulfide | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Helium | 0.10 | 0.01 | 0 | Trace | 0.03 | 0.01 | 0.05 | 0.01 |
| Hydrogen | Trace | 0.02 | 0.01 | Trace | 0.09 | 0.17 | 0.01 | 0.01 |
| Methane | 0.26 | 0.35 | 0.12 | 0.08 | 0.89 | 0.95 | 5.35 | 0.96 |
| Ethane | 0.03 | 0.01 | 0 | Trace | 0.01 | 0.03 | 0.10 | 0.02 |
| Propane | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nitrogen oxide | 0.10 | Trace | Trace | Trace | Trace | Trace | Trace | Trace |

The compositions are reported as percent by volume.

The trace components are less than 0.005%.

On Sample No. 1 the nitrogen oxide was verified by mass spectrometer.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.**

Date Reported: October 14, 1969 Laboratory Report Number: E69-11265

AQUITAINE COMPANY OF CANADA LTD.

Kind of Sample: Water Field: Hudson's Bay

Date Received: October 3, 1969

Drilling Fluid and Gas Samples.

General Memorandum regarding Nitrogen Compounds.

The presence of amine compounds was verified in most of the samples examined, especially samples 1 to 5 in the series. Nitrates were also noted in these first five samples as a brown vapor on igniting the evaporated solids. The samples contained an oxidizing agent or agents which would account for the release of the brown $N_2O_3$ vapor from nitrates.

This oxidizing power of the fluids probably accounts, in part, for the presence of nitrous oxide in the gas. Nitrates are present along with amines and this leads reasonably to the formation of ammonium nitrate. Heating ammonium nitrate is the well-known method used to generate nitrous oxide in teaching elementary chemistry. An oxidizing environment should allow the reaction to proceed at a lower temperature, eg. a bottom hole temperature of 150°F. or somewhat higher.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

Date Reported: October 15, 1969    Laboratory Report Number: E69-11246

AQUITAINE COMPANY OF CANADA LTD.

Kind of Sample: Gas    Sample in Metallic Bottle
Date Received: October 3, 1969    Item B on P.O. #A-2442

Sample #8.

| | % (by volume) |
|---|---|
| Oxygen | 20.31 |
| Nitrogen | 79.15 |
| Carbon dioxide | 0.02 |
| Hydrogen sulfide | 0 |
| Helium | 0 |
| Hydrogen | 0 |
| Methane | 0.52 |
| Ethane | Trace |
| Propane | 0 |

Sample was received under a pressure of 3 psig.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-1

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #1

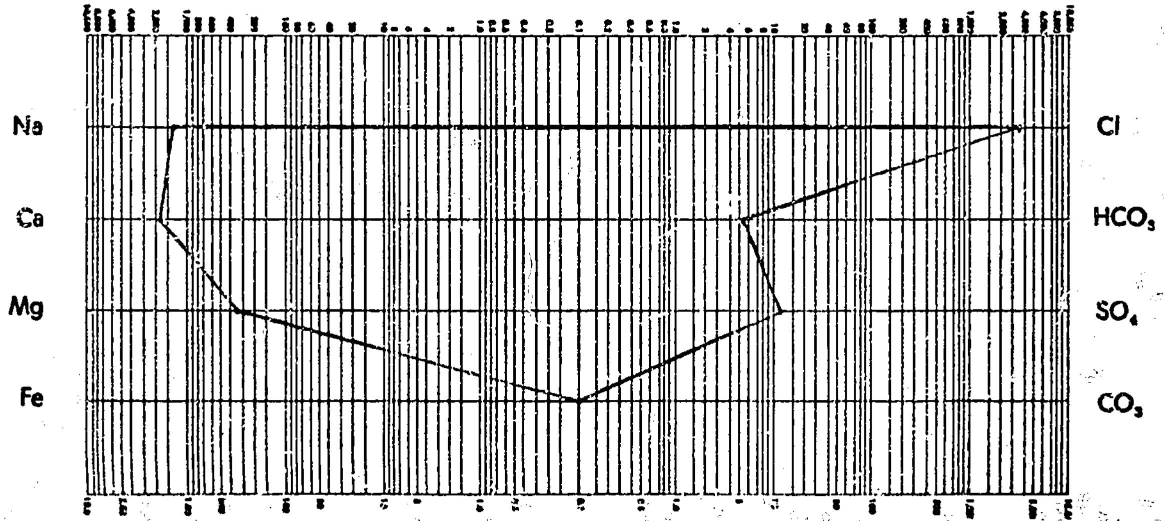
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 34187 | | 36116 | 4180 | | | | | 593 | 128200 | | | | 325 | | |
| Meq./L | 1487.15 | | 1802.19 | 343.56 | | | | | 12.33 | 3615.24 | | | | 5.33 | | |
| Meq. % | 20.47 | | 24.80 | 4.73 | | | | | 0.17 | 49.76 | | | | 0.07 | | |

Total Solids Mg/L: By Evaporation 256,480 Fe much Specific Graviry 1.153 @60°F Observed pH 7.4 @ 75 °

Calculated 203,601 After Ignition 188,760 $H_2S$ nil Refractive Index 1.3724 @25°C Resistivity 0.062 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-1

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #1

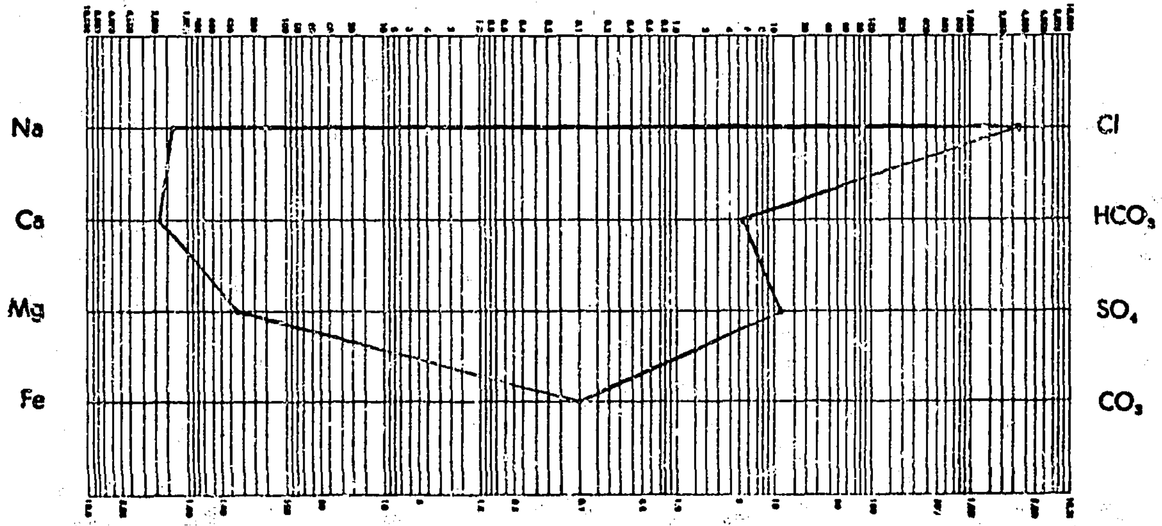
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 34187 | | 36116 | 4180 | | | | | 593 | 128200 | | | | 325 | | |
| Meq./L | 1487.15 | | 1802.19 | 343.56 | | | | | 12.33 | 3615.24 | | | | 5.33 | | |
| Meq. % | 20.47 | | 24.80 | 4.73 | | | | | 0.17 | 49.76 | | | | 0.07 | | |

Total Solids Mg/L: By Evaporation 256,480 Fe much Specific Gravity 1.153 @60°F Observed pH 7.4 @ 75 °

Calculated 203,601 After Ignition 188,760 $H_2S$ nil Refractive Index 1.3724 @25°C Resistivity 0.062 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** **WATER ANALYSIS** Lab No. E69-11265-2

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #2

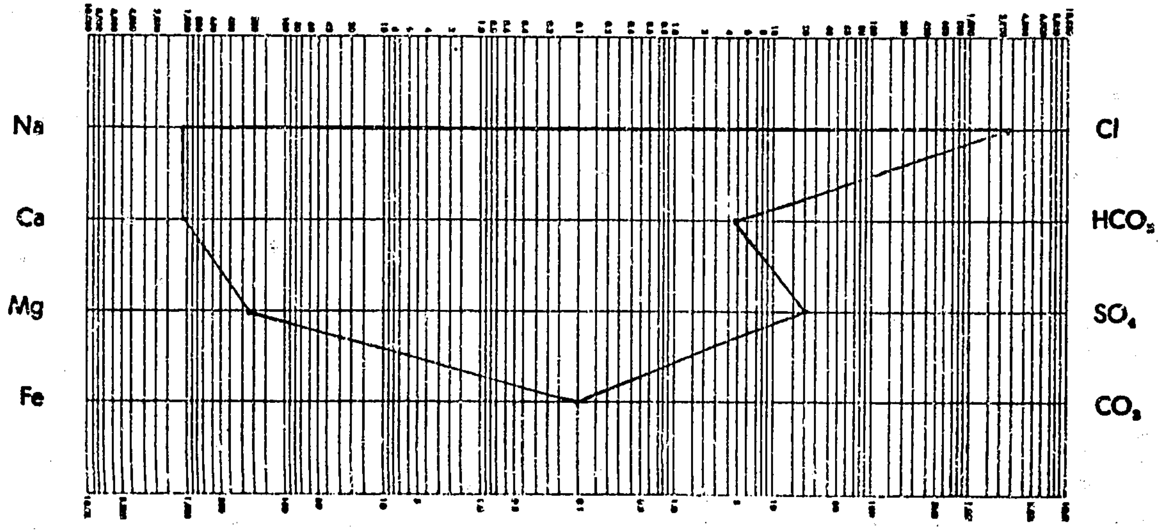
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 28194 | | 25786 | 3086 | | | | | 1000 | 97200 | | | | 303 | | |
| Meq./L | 1226.42 | | 1286.71 | 253.68 | | | | | 20.80 | 2741.04 | | | | 4.97 | | |
| Meq. % | 22.16 | | 23.25 | 4.58 | | | | | 0.38 | 49.53 | | | | 0.09 | | |

Total Solids Mg/L: By Evaporation 180,960 Fe much Specific Gravity 1.123 @60°F Observed pH 7.4 @ 79°

Calculated 155,569 After Ignition 144,240 $H_2S$ nil Refractive Index 1.3636 @25°C Resistivity 0.072 ohm meters @ 68°

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-3

Received: Oct. 3, 1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA

Sample #3

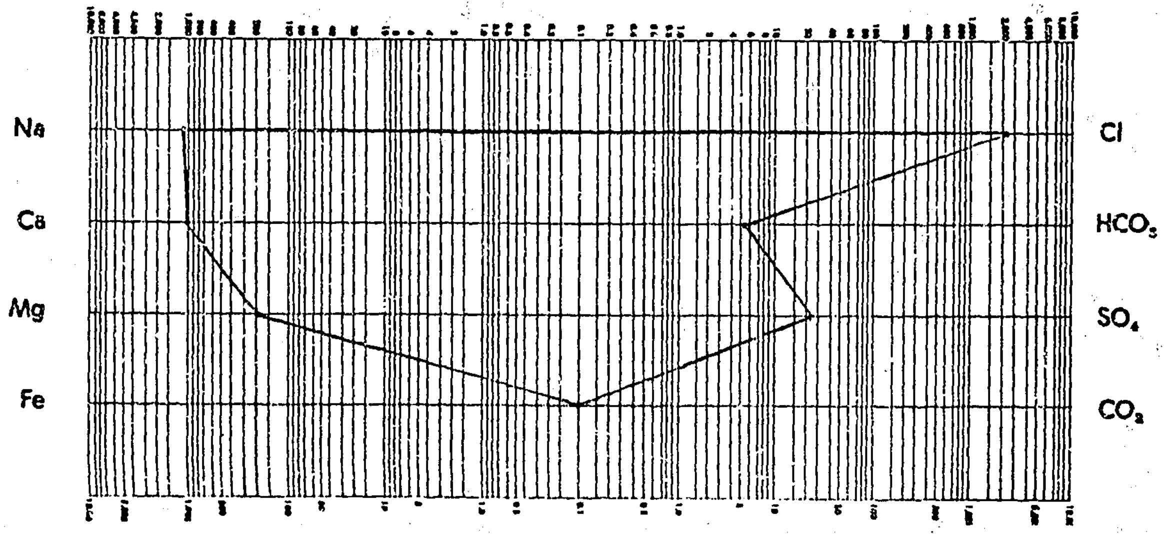
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 28156 | | 20380 | 2357 | | | | | 1189 | 85300 | | | | 325 | | |
| Meq./L | 1224.80 | | 1016.98 | 193.75 | | | | | 24.74 | 2405.46 | | | | 5.33 | | |
| Meq. % | 25.14 | | 20.88 | 3.98 | | | | | 0.51 | 49.38 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 166,680 Fe much Specific Gravity 1.108 @60°F Observed pH 7.4 @ 80°F

Calculated 137,707 After Ignition 134,980 $H_2S$ nil Refractive Index 1.3598 @25°C Resistivity 0.075 ohm meters @ 68°F

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** **WATER ANALYSIS** Lab No. E69-11265-4

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #4

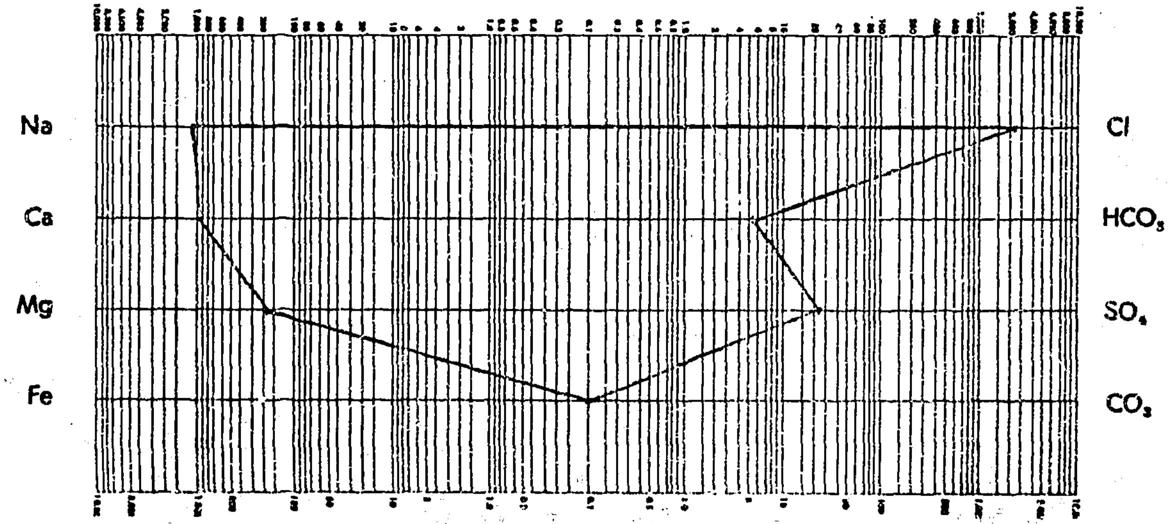
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 28291 | | 19059 | 2309 | | | | | 1235 | 83000 | | | | 317 | | |
| Meq./L | 1230.67 | | 951.05 | 189.76 | | | | | 25.68 | 2340.60 | | | | 5.20 | | |
| Meq. % | 25.95 | | 20.05 | 4.00 | | | | | 0.54 | 49.35 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 164,340 Fe present Specific Gravity 1.105 @60°F Observed pH 7.4 @ 80°F

Calculated 134,211 After Ignition 134,000 $H_2S$ nil Refractive Index 1.3592 @25°C Resistivity 0.079 ohm meters @ 68°F

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-5

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA

Sample #5

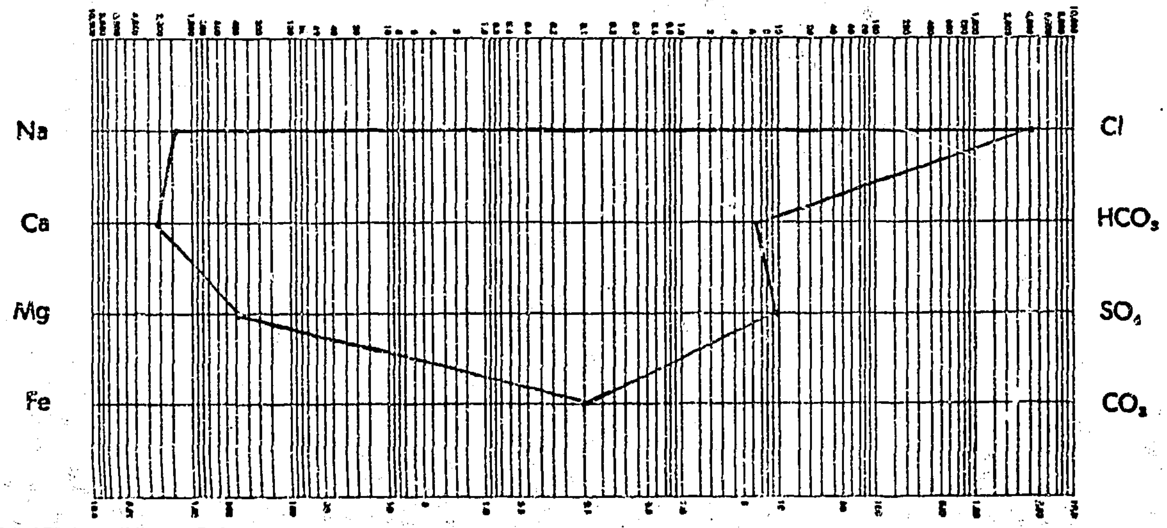
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 33914 | | 45085 | 4763 | | | | | 477 | 145400 | | | | 383 | | |
| Meq./L | 1475.25 | | 2249.74 | 391.50 | | | | | 9.93 | 4100.28 | | | | 6.28 | | |
| Meq. % | 17.92 | | 27.33 | 4.76 | | | | | 0.12 | 49.80 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 294,500 Fe present Specific Gravity 1.178 @60°F Observed pH 7.2 @ 79 °

Calculated 230,022 After Ignition 221,700 $H_2S$ nil Refractive Index 1.3793 @25°C Resistivity 0.060 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 50% light greenish yellow water and 50% mud.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E6[illegible]-11265-6

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #6

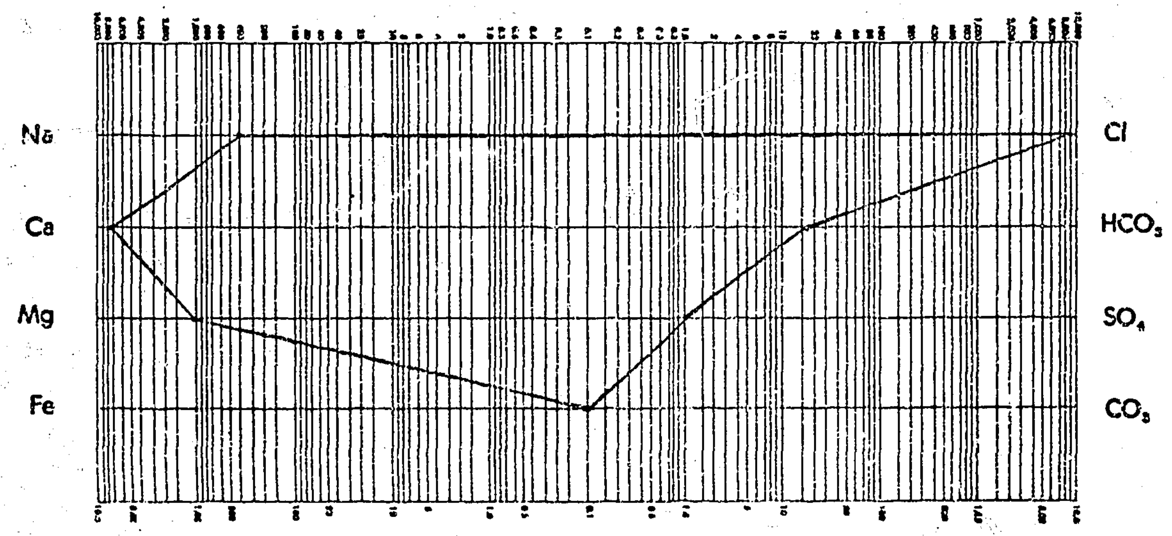
(Signed)

| | Na | K | Ca | Mg | | | | | SO$_4$ | Cl | | | CO$_3$ | HCO$_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9362 | | 151672 | 13802 | | | | | 51 | 322,400 | | | | 1066 | | |
| Meq./L | 407.26 | | 7568.41 | 1134.56 | | | | | 1.07 | 9091.68 | | | | 17.48 | | |
| Meq. % | 2.24 | | 41.54 | 6.23 | | | | | 0.01 | 49.90 | | | | 0.10 | | |

Total Solids Mg/L: By Evaporation 763,020 Fe present Specific Gravity 1.367 @60°F Observed pH 5.8 @ 80

Calculated 498,353 After Ignition 450,660 H$_2$S nil Refractive Index Note 1 @25°C Resistivity 0.088 ohm meters @ 68

Pattern Unit Meq./L



Remarks and Conclusions: Sample consisted of yellow coloured water with a thin layer of mud. The value for the evaporated total solids is high due to the calcium chloride being in a hydrated form ($CaCl_2.2H_2O$) at the evaporation temperature.

Note 1:

The value of the refractive index was too high to be read by conventional refractometer.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-7

Received: Oct. 3, 1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: **Hudson's Bay**

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #7.

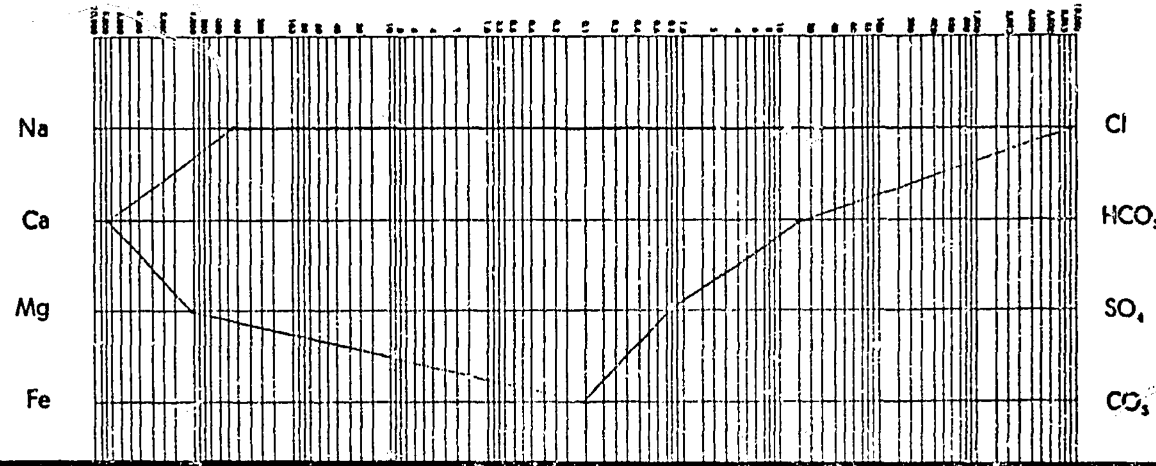
(Signed)

| | Na | K | Ca | Mg | | | | | SO₄ | Cl | | | CO₃ | HCO₃ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 10,019 | | 155,035 | 13,997 | | | | | 41 | 330,000 | | | | 960 | | |
| Meq./L | 435.82 | | 7736.24 | 1150.54 | | | | | 0.86 | 9306.00 | | | | 15.74 | | |
| Meq. % | 2.34 | | 41.49 | 6.17 | | | | | --- | 49.91 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 706,580 Fe Much Specific Gravity 1.372 @60°F Observed pH 5.4 @ 60

Calculated 510,052 After Ignition 477,280 $H_2S$ Nil Refractive Index Note 1 @25°C Resistivity 0.090 ohm meters @ 68

Pattern Unit Meq./L



*Remarks and Conclusions*

Sample consisted of approximately 90% yellow colored water and 10% mud. The value for the evaporated total solids is high due to the calcium chloride being in a hydrated form ($CaCl_2 . 2H_2O$) at the evaporation temperature.

NOTE 1: The value of the refractive index was too high to be read by conventional refractometers.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-12

Received: Oct. 3, 1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #13.

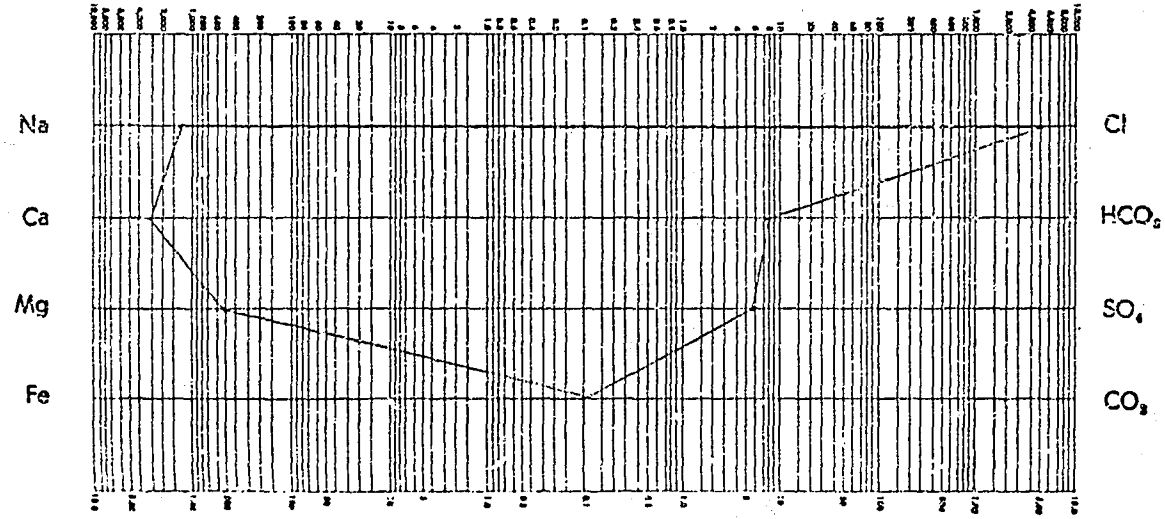
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 32,162 | | 63,023 | 6,367 | | | | | 284 | 179,200 | | | | 481 | | |
| Meq./L | 1399.06 | | 3144.85 | 523.33 | | | | | 5.91 | 5053.44 | | | | 7.89 | | |
| Meq. % | 13.80 | | 31.03 | 5.16 | | | | | 0.06 | 49.86 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 391,900 Fe Present Specific Gravity Insufficient Sample @60°F Observed pH 6.9 @ 81

Calculated 281,517 After Ignition 263,260 $H_2S$ Nil Refractive Index 1.3883 @25°C Resistivity 0.058 ohm meters @ 68

Pattern Unit Meq./L



Remarks and Conclusions

Sample as received contained approximately 6C muddy water and 40% mud. Analysis determined on colorless water recovered from the sample.

AQUITAINE COMPANY OF CANADA LTD.
2000 AQUITAINE TOWER · 540-5TH AVENUE S.W.
PHONE:263-3916 · AREA CODE:403 · TELEX:038-2349 PETRAKI CGY · CABLES:PETRAKI CALGARY
CALGARY 1, ALBERTA, CANADA

## WALRUS A-71

### Details of the samples

| | |
|---|---|
| SAMPLES No. 14 and 15: | Samples of gas sampled in a metallic bottle installed on the gas detection circuit of the geological cabin before the detector - during a gas kick from circulation at 3729', prior to logging, on October 10, 1969.<br>Gas kick recorded on the well site:<br>$C_1 = 6\%$<br>$C_2 = 0.075\%$<br>Traces N2 and H2. |
| SAMPLES No. 16, 17 and 18: | Samples of formation water and mud shale shaker - sampled during a gas kick from circulation at 3729', prior to logging - on October 10, 1969. Gas kick recorded on the well site:<br>$C_1 = 6\%$<br>$C_2 = 0.075\%$ |
| SAMPLED No. 19: | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick from circulation at 3580', on October 3, 1969. |
| SAMPLES No. 20 and 21: | Samples of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick from circulation at 3729', after logging and velocity survey, on October 11, 1969. Gas kick recorded on the well site:<br>$C_1 = 7.5\%$<br>$C_2 = 0.11\%$ |

*****

C.G.L. 64

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

**OPERATOR:** AQUITAINE COMPANY OF CANADA LTD. **REPORT NUMBER:** E69-11377

**DATE SAMPLED:** --- **DATE RECEIVED:** Oct. 27,1969 **DATE REPORTED:** Oct. 31, 1969

Kind of Sample: Gas Samples in Metallic Bottles- Item B on P.O. #A 2503.

| Sample No.: | 14 | 15 |
|---|---|---|
| Oxygen | 15.67 | 16.61 |
| Nitrogen | 79.61 | 77.47 |
| Carbon dioxide | 0.01 | 0.02 |
| Hydrogen sulfide | 0.00 | 0.00 |
| Helium | 0.05 | 0.04 |
| Hydrogen | 0.01 | Trace |
| Methane | 4.58 | 5.77 |
| Ethane | 0.07 | 0.09 |
| Propane | 0.00 | 0.00 |

The compositions are reported as percent by volume.

C.G.L. 64

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

**OPERATOR:** AQUITAINE COMPANY OF CANADA LTD. **REPORT NUMBER:** E69-11376

**DATE SAMPLED:** --- **DATE RECEIVED:** Oct. 27,1969 **DATE REPORTED:** Oct. 31, 1969

Kind of Sample: Gas Samples in Glass Bottles - Item A on P.O. #A 2503

| Sample No.: | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|
| Oxygen | 11.24 | 8.74 | 16.23 | 20.49 | 21.12 | 20.27 |
| Nitrogen | 75.70 | 78.68 | 83.39 | 79.47 | 78.67 | 77.67 |
| Carbon dioxide | 0.00 | 0.00 | 0.00 | 0.00 | Trace | 0.02 |
| Hydrogen sulfide | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Helium | 0.13 | 0.13 | 0.10 | 0.01 | Trace | 0.02 |
| Hydrogen | 0.04 | 0.07 | 0.04 | Trace | Trace | 0.02 |
| Methane | 12.65 | 12.15 | 0.24 | 0.03 | 0.21 | 1.96 |
| Ethane | 0.24 | 0.23 | Trace | Trace | Trace | 0.04 |
| Propane | Trace | Trace | 0.00 | 0.00 | Trace | 0.00 |

The compositions are reported as percent by volume.

The trace components are less than 0.005%.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-1

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #16

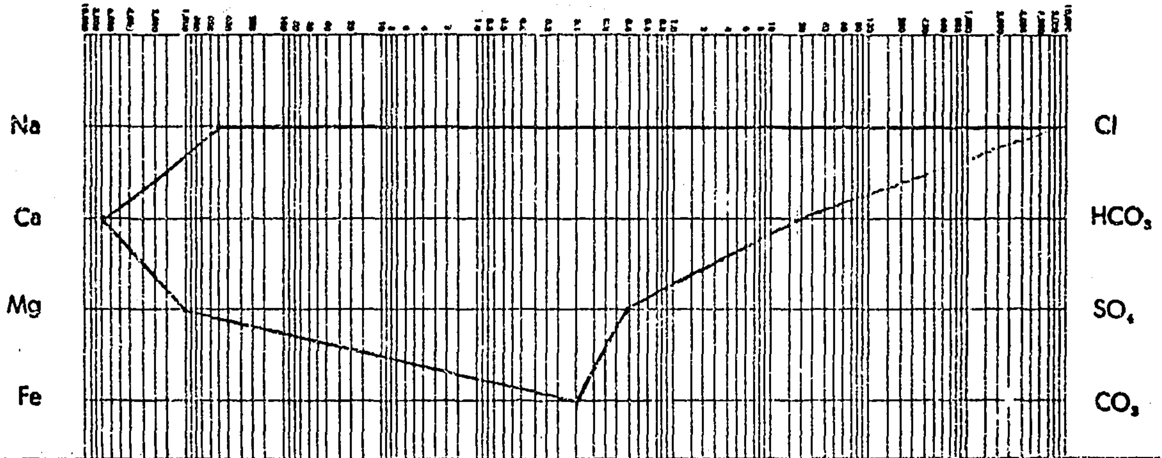
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 11947 | | 139499 | 12830 | | | | | 19 | 302000 | | | | 1134 | | |
| Meq./L | 519.71 | | 6961.02 | 1054.66 | | | | | 0.39 | 8516.40 | | | | 18.60 | | |
| Meq. % | 3.04 | | 40.78 | 6.18 | | | | | --- | 49.89 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 684,840 Fe present Specific Gravity 1.346 @60°F Observed pH 6.7 @ 74 °

Calculated 467,429 After Ignition 426,220 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.082 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 80% light brow coloured water and 20% mud. Organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-2

Received: Oct. 27, 1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #17

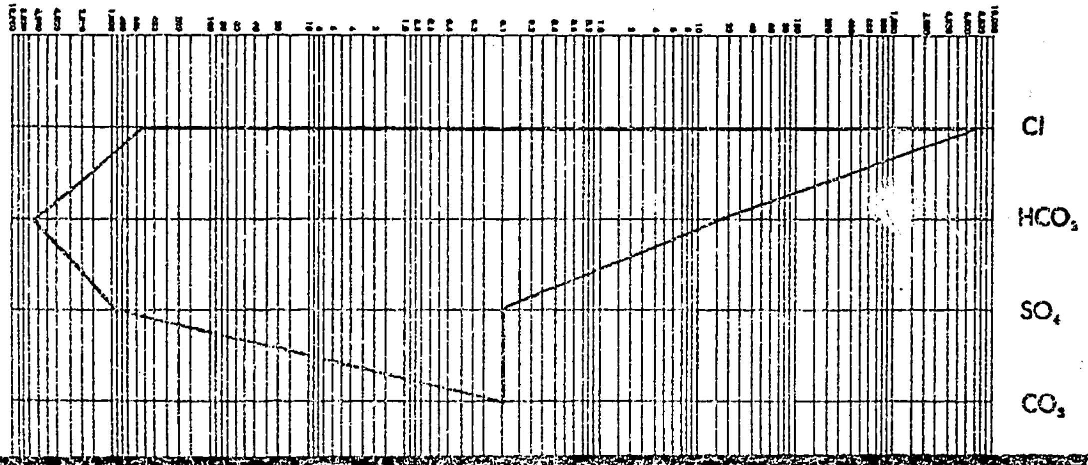
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 12880 | | 133093 | 11275 | | | | | 4 | 287600 | | | | 1100 | | |
| Meq./L | 560.29 | | 6641.34 | 926.82 | | | | | 0.09 | 8110.32 | | | | 18.04 | | |
| Meq. % | 3.45 | | 40.85 | 5.70 | | | | | --- | 49.89 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 686,680 Fe present Specific Gravity 1.337 @60°F Observed pH 6.5 @ 74

Calculated 445,952 After Ignition 399,340 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.077 ohm meters @ 68

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 70% light brown coloured water and 30% mud. Much organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-3

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #18

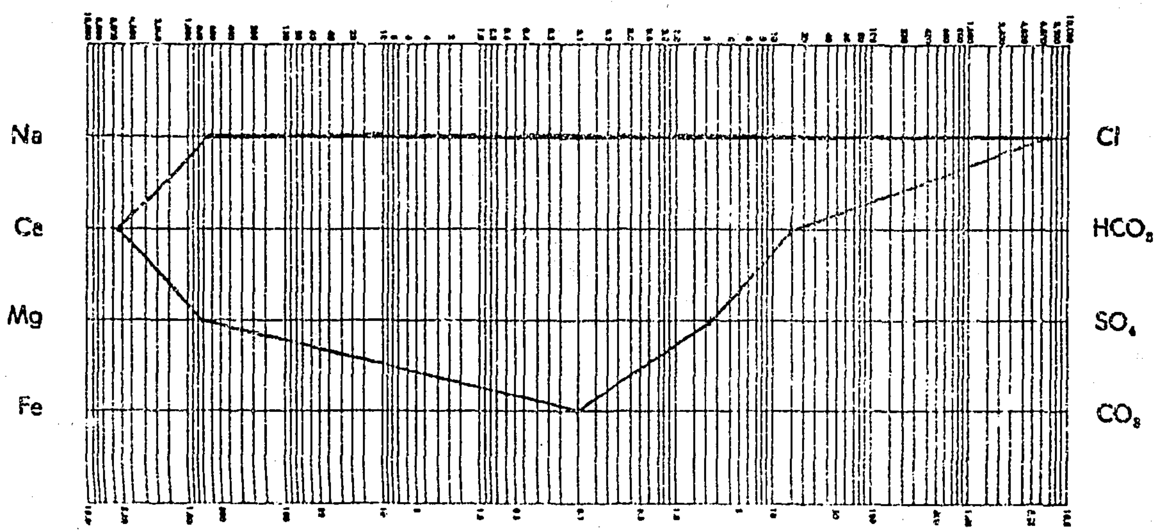
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 15493 | | 110991 | 9040 | | | | | 123 | 246000 | | | | 956 | | |
| Meq./L | 673.94 | | 5538.45 | 743.06 | | | | | 2.57 | 6937.20 | | | | 15.68 | | |
| Meq. % | 4.84 | | 39.82 | 5.34 | | | | | 0.02 | 49.87 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 458,240 Fe present Specific Gravity 1.292 @60°F Observed pH 6.9 @ 74 °

Calculated 382,603 After Ignition 348,580 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.061 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 60% light brown coloured water and 45% mud. Organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-4

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #19

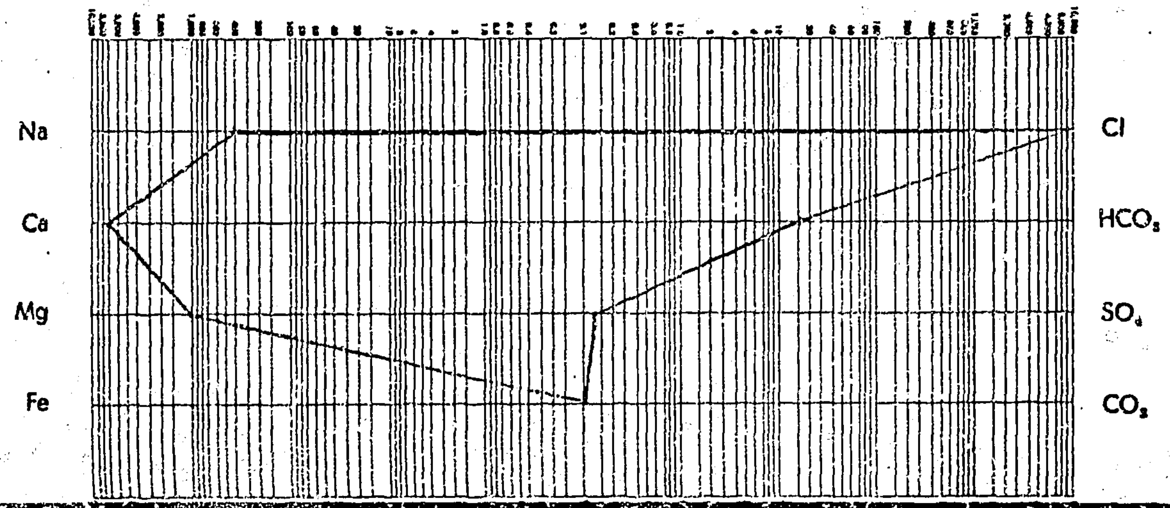
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9761 | | 153914 | 13997 | | | | | 6 | 327600 | | | | 1036 | | |
| Meq./L | 424.60 | | 7680.30 | 1150.54 | | | | | 0.13 | 9238.32 | | | | 16.99 | | |
| Meq. % | 2.29 | | 41.49 | 6.22 | | | | | ---- | 49.91 | | | | 0.09 | | |

Total Solids Mg/L: By Evaporation 785,320 Fe present Specific Gravity 1.372 @60°F Observed pH 5.5 @ 74 °

Calculated 506,314 After Ignition 484,580 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.092 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of light brown coloured water with a trace of sediment. Organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-5

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #20

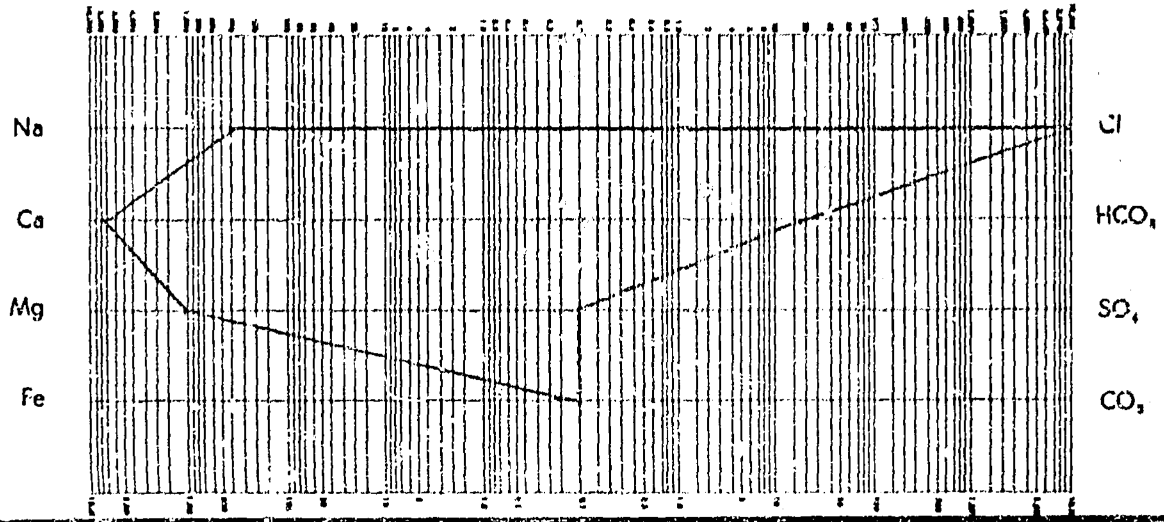
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9872 | | 158238 | 14483 | | | | | 2 | 336800 | | | | 1110 | | |
| Meq./L | 429.43 | | 7896.08 | 1190.49 | | | | | 0.04 | 9497.76 | | | | 18.20 | | |
| Meq. % | 2.26 | | 41.49 | 6.25 | | | | | --- | 49.90 | | | | 0.10 | | |

Total Solids Mg/L: By Evaporation 697,140 Fe much Specific Gravity 1.379 @60°F Observed pH 5.6 @ 74°

Calculated 520,505 After Ignition 489,580 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.097 ohm meters @ 68°

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 95% light brown coloured water and 5% mud.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-6

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #21.

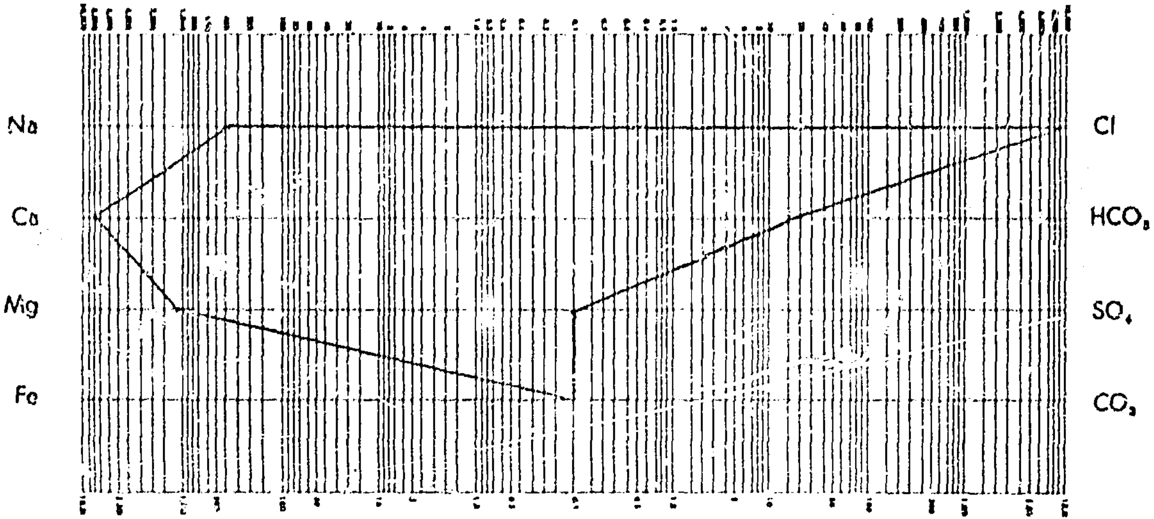
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9037 | | 160961 | 15163 | | | | | 2 | 342400 | | | | 960 | | |
| Meq./L | 393.10 | | 8031.94 | 1246.42 | | | | | 0.04 | 9655.68 | | | | 15.74 | | |
| Meq. % | 2.03 | | 41.53 | 6.44 | | | | | --- | 49.92 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 691,660 Fe much Specific Gravity 1.384 @60°F Observed pH 5.1 @ 74 °

Calculated 528,523 After Ignition 498,800 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.098 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of light brown coloured water with a trace of sediment.

AQUITAINE COMPANY OF CANADA LTD.
2000 AQUITAINE TOWER · 540-5TH AVENUE S.W.
PHONE: 263-3916 · AREA CODE: 403 · TELEX: 038-2349 PETRAKI CGY · CABLES: PETRAKI CALGARY
CALGARY 1, ALBERTA, CANADA

WALRUS A-71

## Details of the samples

SAMPLES No. 22, 23 and 24: Samples of mud contained in the core barrel of CORE No. 4 (3917 - 3926').

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C.G.L. 64

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

OPERATOR: AQUITAINE COMPANY OF CANADA LTD.

REPORT NUMBER: E69-11597

DATE SAMPLED: ---

DATE RECEIVED: December 1, 1969

DATE REPORTED: December 11, 1969

Gas samples in glass bottles. Item A1 on Purchase Order #A 3099.

| | SAMPLE NO. 22 | SAMPLE NO. 23 | SAMPLE NO. 24 |
|---|---|---|---|
| Oxygen | 12.61 | 10.82 | 2.17 |
| Nitrogen | 86.73 | 88.53 | 96.56 |
| Carbon Dioxide | Trace | .00 | Trace |
| Hydrogen Sulfide | .00 | .00 | .00 |
| Helium | .01 | .07 | .02 |
| Hydrogen | .03 | .08 | .25 |
| Methane | .62 | .50 | 1.00 |
| Ethane | .00 | .00 | .00 |

Compositions are reported as percent by volume.

Trace components are less than 0.005%.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11597-1

Received: Dec. 1, 1969 Reported: Dec. 11, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #22.

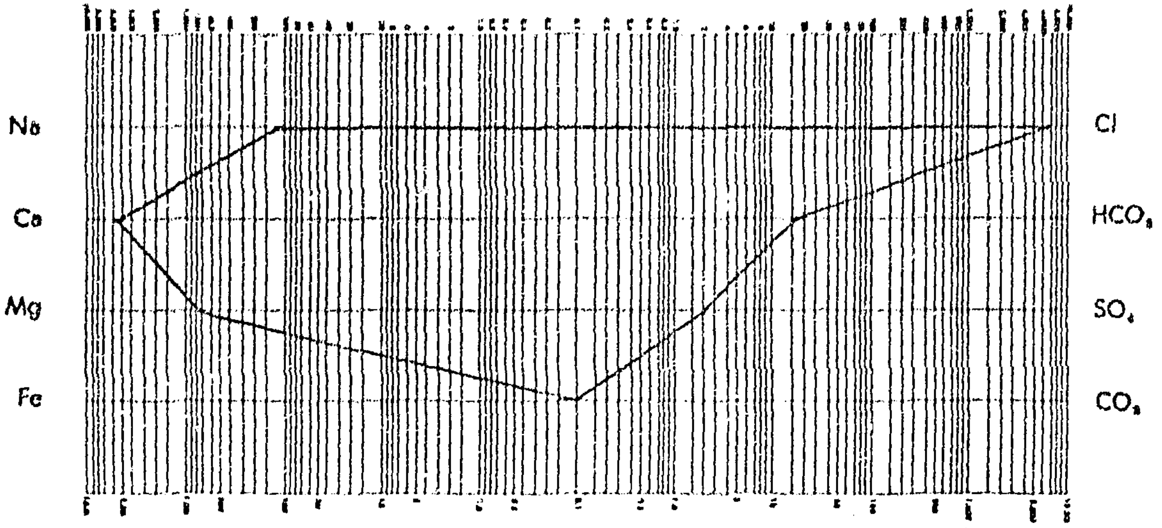
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 3,054 | | 116,757 | 8,845 | | | | | 103 | 236,400 | | | | 1,066 | | |
| Meq./L | 132.86 | | 5826.16 | 727.08 | | | | | 2.14 | 6660.48 | | | | 17.48 | | |
| Meq. % | 0.99 | | 43.57 | 5.44 | | | | | 0.02 | 49.85 | | | | 0.13 | | |

Total Solids Mg/L: By Evaporation 577,620 Fe Much Specific Gravity 1.308 @60°F Observed pH 7.3 @ 77 °F

Calculated 366,225 After Ignition 359,240 $H_2S$ Nil Refractive Index Too High To Be Determined @25°C Resistivity 0.076 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 40% light brown colored water and 60% mud. There was much highly refractory organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11597-2

Received: Dec. 1, 1969 Reported: Dec. 11, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #23.

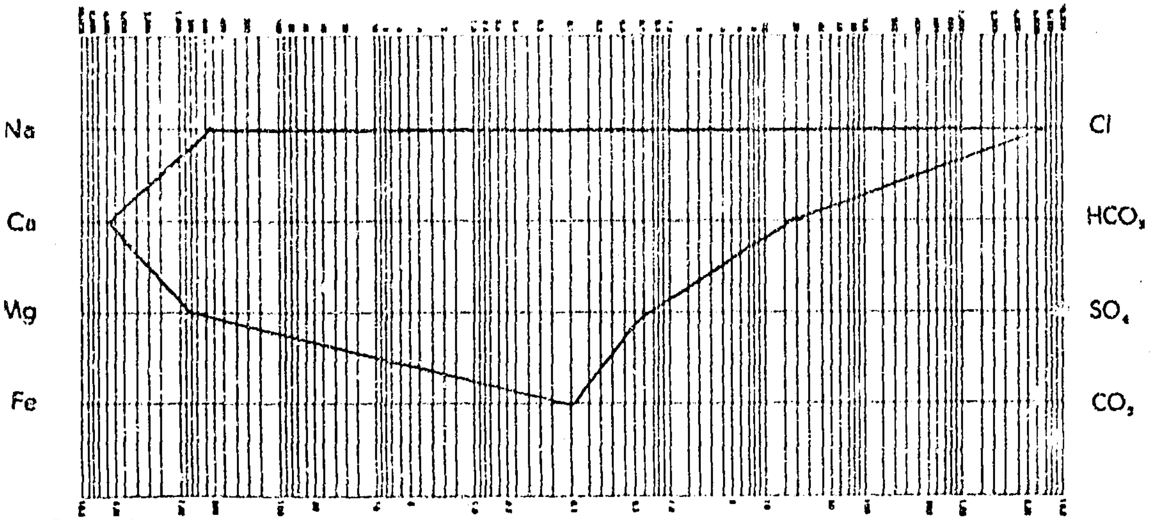
(Signed)

| | Na | K | Ca | Mg | | | | | SO$_4$ | Cl | | | CO$_3$ | HCO$_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g./L | 13,029 | | 118,358 | 9,720 | | | | | 29 | 257,200 | | | | 1,110 | | |
| eq./L | 566.78 | | 5906.08 | 798.98 | | | | | 0.60 | 7253.04 | | | | 18.20 | | |
| q. % | 3.90 | | 40.61 | 5.49 | | | | | --- | 49.87 | | | | 0.13 | | |

Total Solids Mg/L: By Evaporation 561,580 Fe Much Specific Gravity 1.314 @60°F Observed pH 7.3 @ 77 °F

Calculated 399,446 After Ignition 339,880 H$_2$S Nil Refractive Index Too High To Be Determined @25°C Resistivity 0.078 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 40% light brown colored water and 60% mud. There was much highly refractory organic matter detected in total evaporated solids.

# CHEMICAL & GEOLOGICAL LABORATORIES LTD.

WATER ANALYSIS

Lab No. E69-11597-3

Received: Dec. 1, 1969 Reported: Dec. 11, 1969

Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD.

Field or Area:

Elev.: K.B. Grd.

Zone/Formation:

Sample Interval:

Method of Production:

Sampled from:

Sampled by:

Date:

OTHER PERTINENT DATA Sample #24.

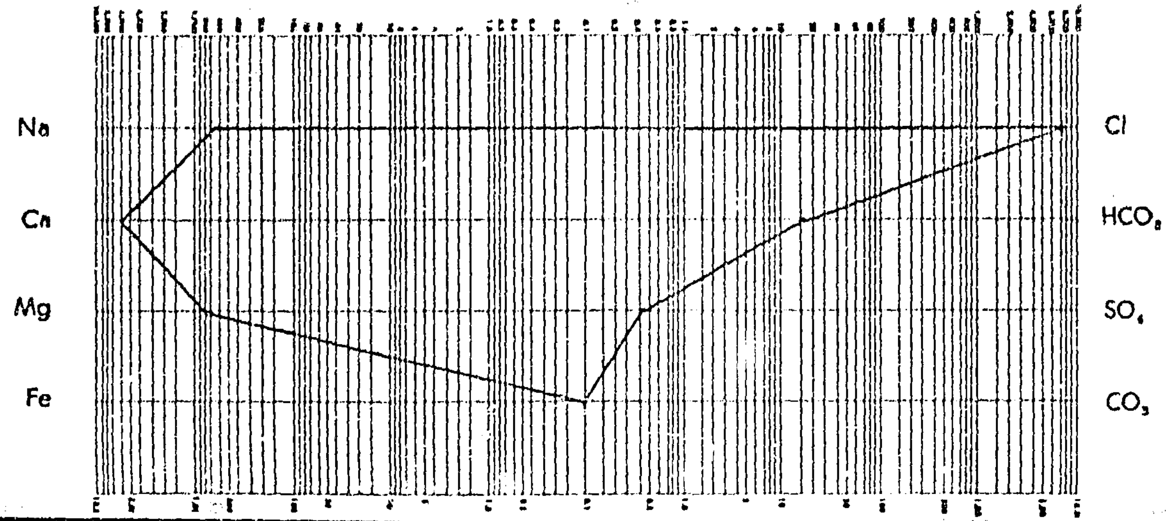
(Signed)

| | Na | K | Ca | Mg | | | | | SO₄ | Cl | | | CO₃ | HCO₃ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 15,278 | | 119,800 | 9,428 | | | | | 21 | 262,400 | | | | 1,066 | | |
| Meq./L | 664.58 | | 5978.00 | 775.01 | | | | | 0.43 | 7399.68 | | | | 17.48 | | |
| eq. % | 4.48 | | 40.30 | 5.22 | | | | | --- | 49.88 | | | | 0.12 | | |

Total Solids Mg/L: By Evaporation 571,840 Fe Much Specific Gravity 1.315 @60°F Observed pH 7.4 @ 77 °F

Calculated 407,993 After Ignition 384,840 $H_2S$ Nil Refractive Index Too High To Be Determined @25°C Resistivity 0.077 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 50% light brown colored water and 50% mud. There was much highly refractory organic matter detected in total evaporated solids.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

Date Reported: December 18, 1969 LABORATORY REPORT NUMBER: E69-11936

AQUITAINE COMPANY OF CANADA LTD.

KIND OF SAMPLE: Water

DATE RECEIVED: October 3, October 27,
& December 1, 1969

Analysis was made for naturally occurring hydrocarbons which may be dissolved in water; with emphasis on benzene which is the most soluble of the hydrocarbons. The equipment used was set at a sensitivity capable of detecting hydrocarbons in parts per billion. In all samples analyzed there was no indication of hydrocarbons.

The samples analyzed are as follows:

Item A 2 on Purchase Order #2442
Sample Numbers: 1, 2, 3, 4, 5, 6, 7, 13

Item C on Purchase Order #2442
Sample Numbers: 9, 10, 11, 12

Item A 2 on Purchase Order #2503
Sample Numbers: 16, 17, 18, 19, 20, 21

Item A 2 on Purchase Order #3099
Sample Numbers: 22, 23, 24

AQUITAINE ET AL. HUDSON WALRUS A-71

## P. TECTONICS (DIPMETER STUDY)

# AQUITAINE ET AL. HUDSON WALRUS A-71

## CONTINUOUS DIPMETER STUDY

BY

SCHLUMBERGER OF CANADA

3000 - 3500

The Dip frequency plot for this interval indicates a strong South West trend with most of the data falling in a dip direction between S 20° W and due West. The interval may be divided into three smaller sections which are 3000 - 3200, 3200 - 3380, 3380 - 3500.

a) 3000 - 3200:

This section averages 3° dip in a direction S 45° W. The quality of the data is high and reliability therefore good. The presence of a quantity of argillaceous material likely contributes to the bedding defined by the dipmeter.

b) 3200 - 3380

Average dip is 2° - 3° in a direction S 80° W. The massive nature of the formation limits the number of computable dips. However, consistancy in dip and direction is good.

c) 3380 - 3500

Structural dip direction appears to be SSW. An unconformity likely occurs at 3400 as evidenced by a change in dip pattern. Depositional dips may be influencing the patterns from 3420 - 3450 or they may be a reflection of the unconformity.

3500 - 3580

Dip is 3° in a direction of S 40° E.

3580 - 3720

Data is scarce except for 3700 - 3720 where a Southwest dip at 3° is in evidence, with a possible SW dip from 3580 to 3630.

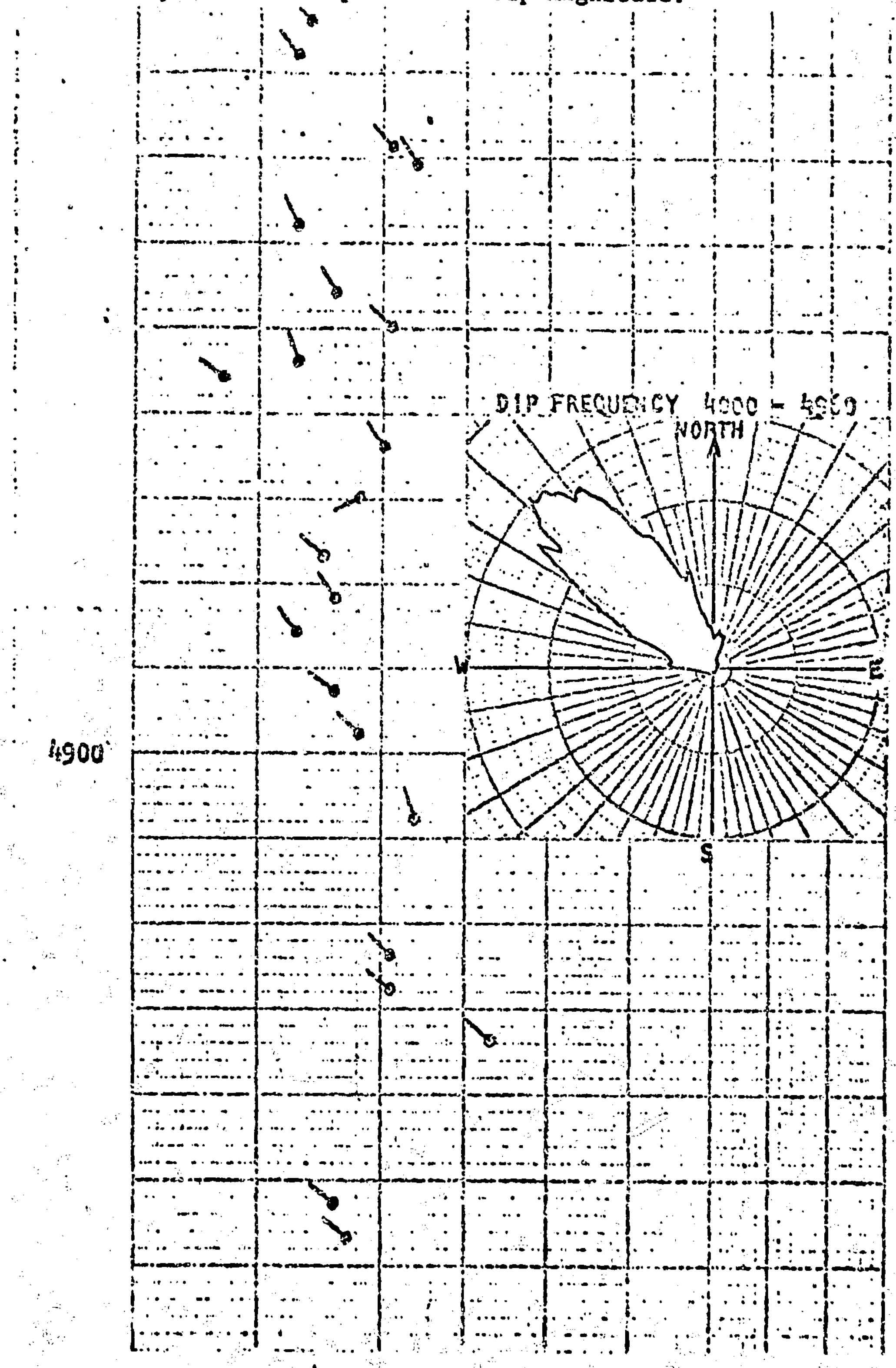
**Thank you for running the Continuous Dipmeter in this well. If we can be of additional service with its interpretation, please call upon us.**

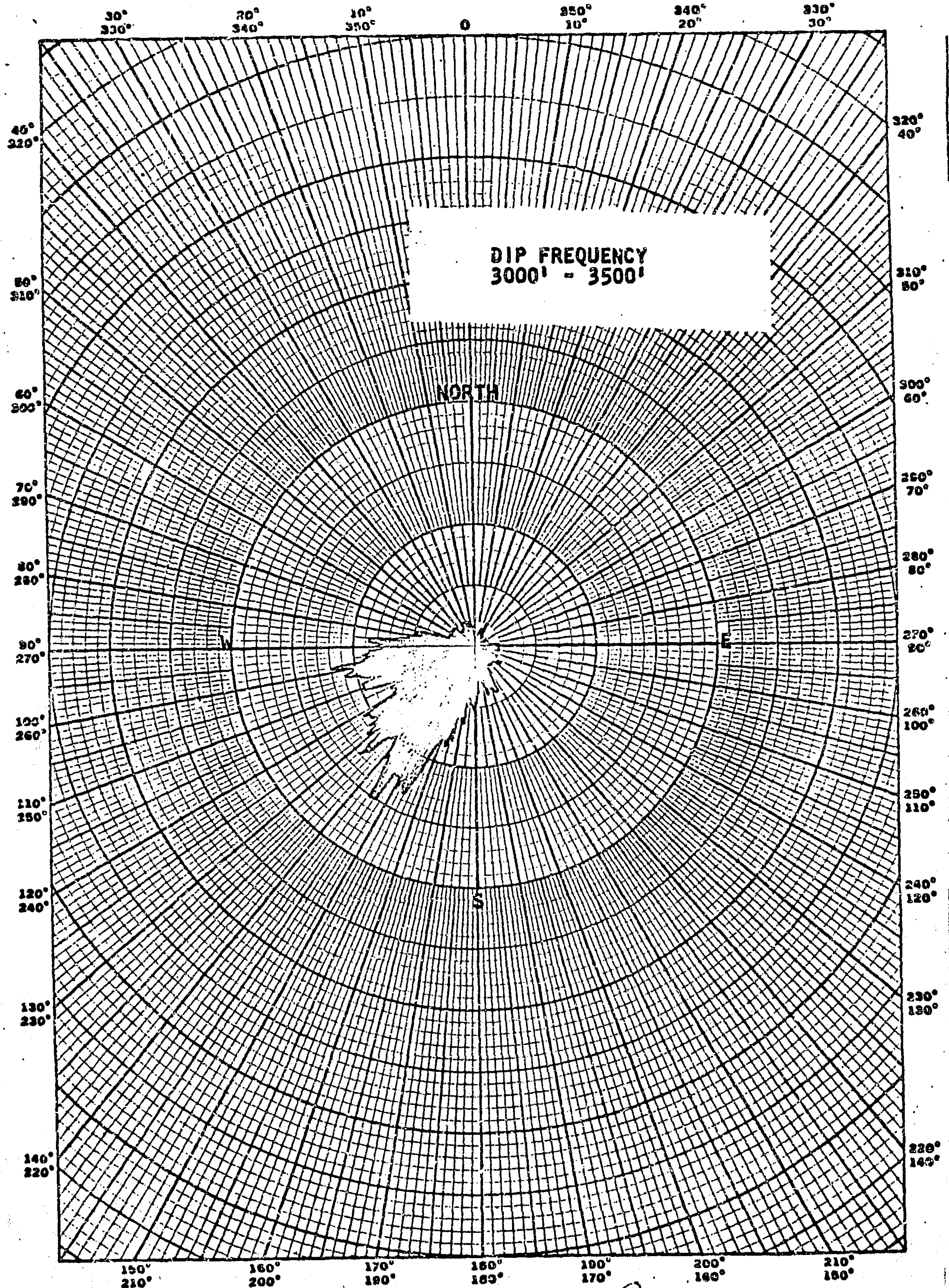
# POLAR PLOTS

## A) Azimuth Frequency Diagram, Rose Diagram, Polar Plot

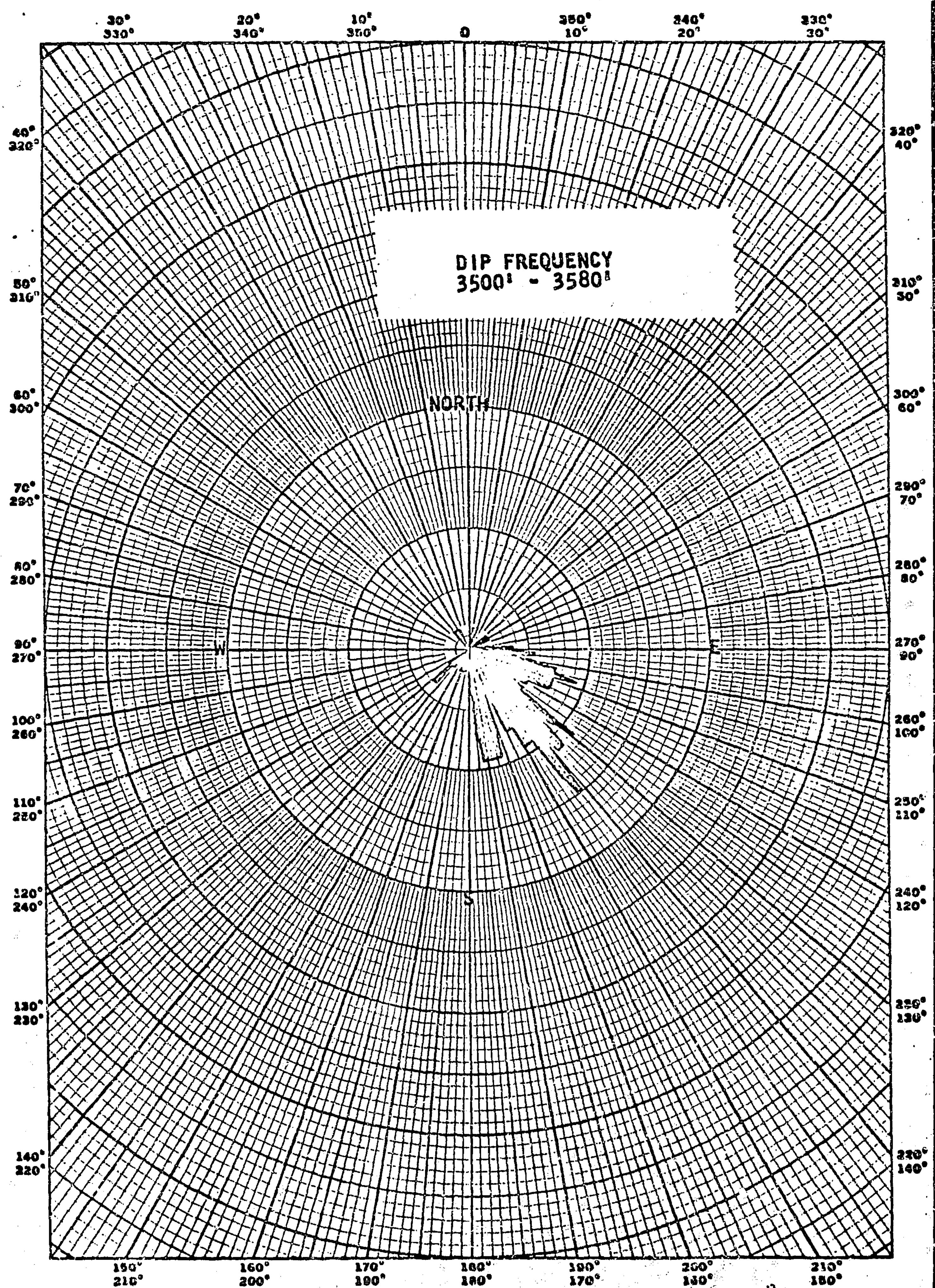
A count is made of the number of dip calculations within a 14° sector for each 1° from 0° to 360°. The results are plotted as an envelope on polar grid joining all points of which the distance from the origin is proportional to the number of dip calculations within the sector.

The plot is used to sort out structural direction trends over selected intervals where the arrow plot may not be definitive. It is a good quick-look summary but is independent of dip magnitude.



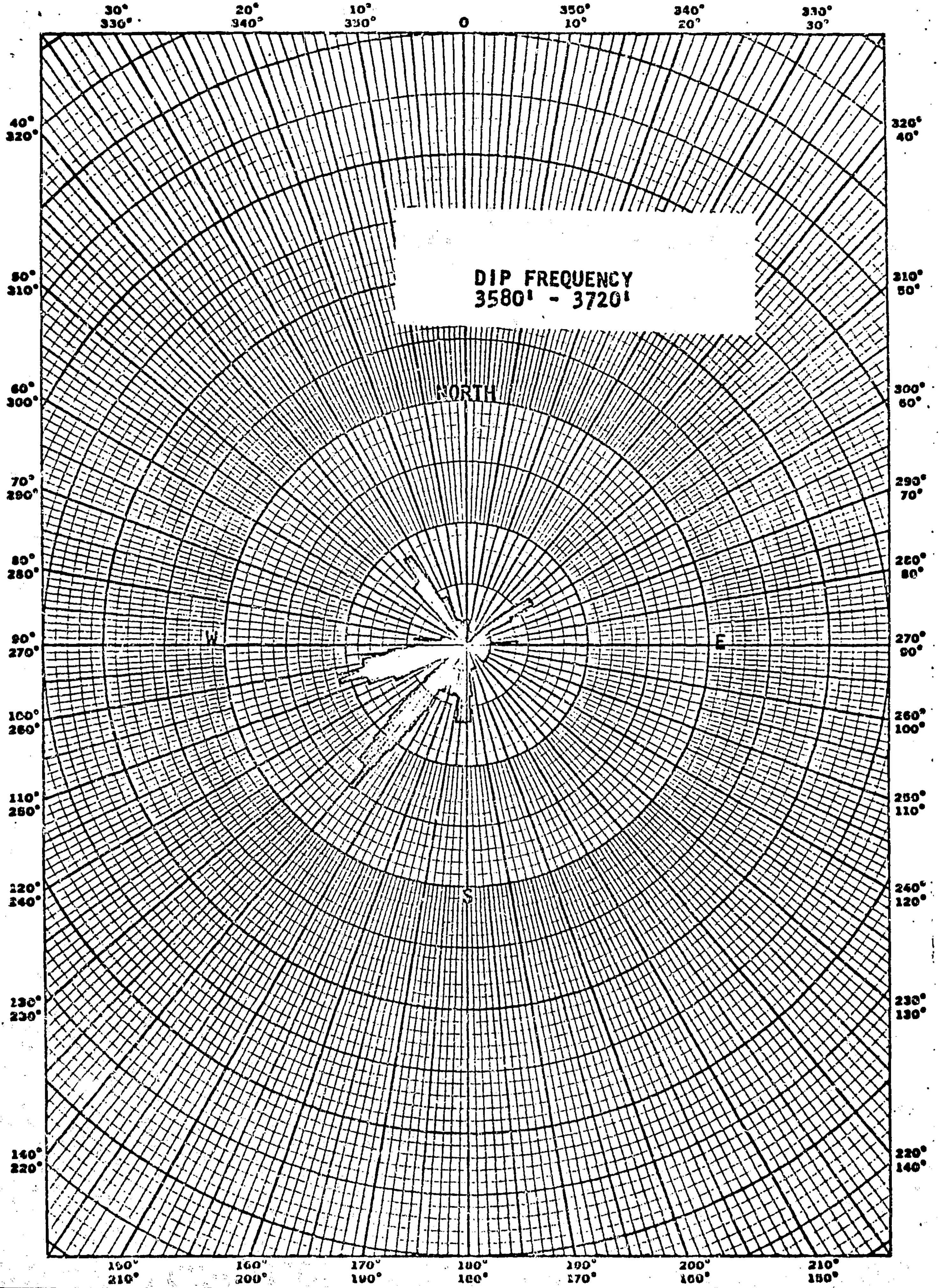

DIP FREQUENCY
3000' - 3500'

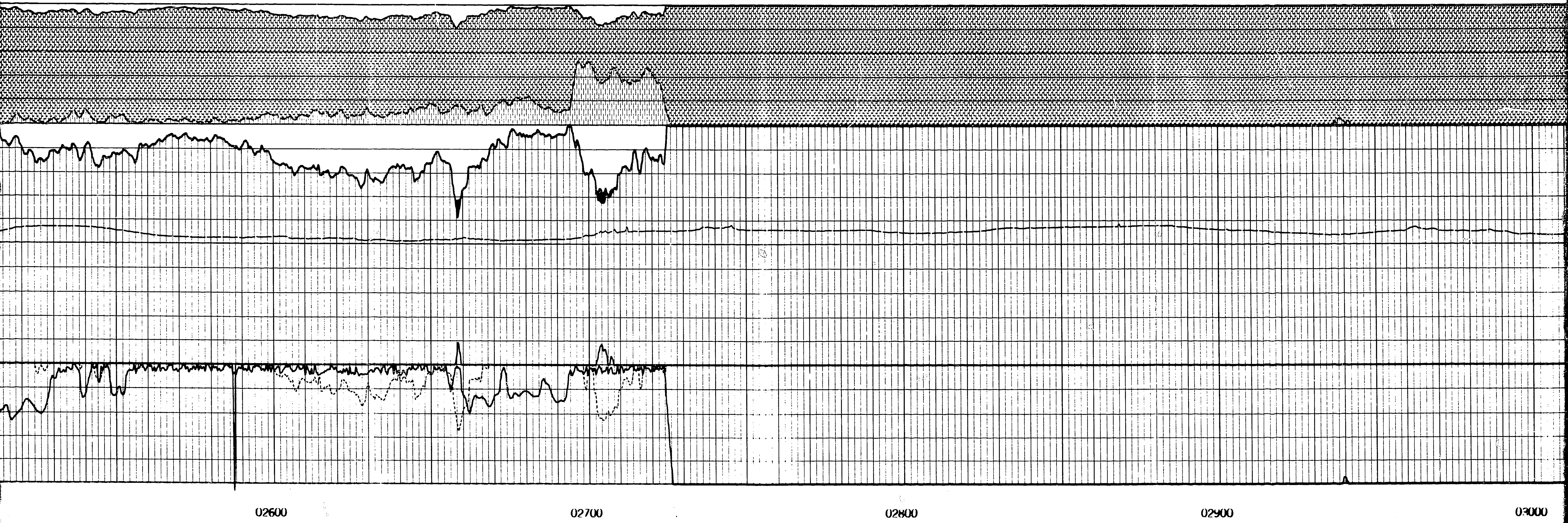
(1) 2152 3000- 3500



DIP FREQUENCY
3500' - 3580'

3500 - 3580


DIP FREQUENCY
3580' - 3720'



5 9

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.I

## CUTTINGS, DESCRIPTION AND PERCENTAGE

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| August 22, 1969 | 1 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 800' | 950' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 800 | 810 | 820 | 830 | 840 | 850 | 860 | 870 | 880 | 890 | 900 | 910 | 920 | 930 | 940 | 950 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | | 13 | | 10 | | | 14 | | 11 | | 10 | | 10 | | 6 | |
| | | | | | Calcimetry 3 min | | 16 | | 12 | | | 19 | | 14 | | 13 | | 17 | | 8 | |
| | | | | | Calcimetry 10 min | | 17 | | 12 | | | | | | | | | | | | |
| Argillaceous Rocks | Clays ↓ Marls | - | - | Red-brown finely silty to sandy plastic clay. | | 10 | 20 | 55 | 90 | 90 | 90 | 95 | 90 | 80 | 80 | 80 | 80 | 80 | 75 | 80 | 80 |
| Carbonate | Limestone ↓ Dolomite | - | - | Light brown microcrystalline limestone. | | Tr | Tr | Tr | | | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | | Tr | |
| Detritic Rocks | Silt ↓ Conglomerate | - | - | White to pinky-brown, slightly argillaceous, very fine to fine sand. | | Tr | Tr | | | | | 5 | 10 | 15 | 15 | 15 | 15 | 10 | 15 | 15 | 15 |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White fibrous gypsum | | | Tr | | | T: | | Tr | Tr | 5 | 5 | 5 | 5 | 10 | 10 | 5 | 5 |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous | | | Igneous and metamorphic rocks. Green rocks and white quartzite. | | | | | | 5 | 5 | Tr | Tr | | Tr | Tr | Tr | | | Tr | Tr |
| | Cement<br>Mud<br>Cavings | | | Cement. | | 90 | 80 | 45 | 10 | 5 | - | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

DATE: August 22, 1969

No.: 2

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 960' To 1110'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 960 | 970 | 980 | 990 | 1000 | 1010 | 1020 | 1030 | 1040 | 1050 | 1060 | 1070 | 1080 | 1090 | 1100 | 1110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min. | 9 | | 13 | | 15 | | 14 | | 15 | | 35 | | 30 | | 25 | |
| | | | | Calcimetry 2 min. | 12 | | 16 | | 20 | | 17 | | 18 | | 43 | | 37 | | 33 | |
| | | | | Calcimetry 15 min. | 12 | | 17 | | 22 | | 21 | | 22 | | 47 | | 42 | | 44 | |
| Argillaceous Rocks | Clays ↓ Marls | - | - | Red-brown finely silty to sandy plastic clay. | 85 | 85 | 80 | 80 | 85 | 80 | 80 | 75 | 75 | 80 | 85 | 80 | 70 | 90 | 85 | 80 |
| Carbonate | Limestone | - | - | Light brown microcrystalline limestone. | | | Tr | | | | | | | | | | | | | |
| | Dolomite | - | - | Light brown hard microcrystalline dolomite. | | | | | | | | | | | | Tr | 10 | Tr | Tr | |
| Detritic Rocks | Silt ↓ Conglomerate | - | - | Red-brown, locally cemented, very fine to fine sand. | 10 | 10 | 15 | 10 | 10 | 15 | 15 | 20 | 15 | 15 | 10 | 10 | 10 | 5 | 10 | 10 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White microcrystalline anhydrite | | | | | | | | | | | | Tr | | | | |
| | Gypsum | | | White fibrous gypsum. | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 5 | 5 | 10 |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

DATE: August 23, 1969

No.: 3

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From: 1120' To: 1210'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1120 | 1130 | 1140 | 1150 | 1160 | 1165 | 1170 | 1175 | 1180 | 1185 | 1190 | 1195 | 1200 | 1205 | 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 26 | | | 15 | 16 | | 17 | | 25 | | 25 | | 27 | | 24 |
| | | | | | Calcimetry 3 min. | 37 | | | 20 | 19 | | 21 | | 27 | | 27 | | 35 | | 29 |
| | | | | | Calcimetry 15 min. | 37 | | | 24 | 24 | | 25 | | | | | | 35 | | 32 |
| Argillaceous Rocks | Clays<br>↓<br>Marls | - | - | Red-brown finely silty to sandy plastic clay. | | 80 | Tr | 10 | 45 | 60 | 60 | 80 | 90 | 80 | 80 | 85 | 80 | 80 | 80 | 80 |
| Carbonate | Limestone<br>↓<br>Dolomite | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | - | - | Red-brown, locally cemented, very fine to fine sand. | | 10 | Tr | Tr | 5 | 5 | 5 | Tr | Tr | 10 | 5 | 5 | 10 | 10 | 10 | 10 |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White fibrous gypsum. | | 10 | Tr | Tr | 10 | 15 | 15 | 10 | 10 | 10 | 15 | 10 | 10 | 10 | 10 | 10 |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cement. | | | 100 | 90 | 40 | 20 | 20 | 10 | Tr | Tr | Tr | Tr | | | | Tr |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| August 26, 1969 | 4 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 1215' | 1290' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 1215 | 1220 | 1225 | 1230 | 1235 | 1240 | 1245 | 1250 | 1255 | 1260 | 1265 | 1270 | 1275 | 1220 | 1285 | 1290 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 | | 28 | | 29 | | 23 | | 38 | | 35 | | 33 | | 23 | | 26 |
| | | | | Calcimetry 3 | | 35 | | 34 | | 35 | | 40 | | 40 | | 38 | | 28 | | 32 |
| | | | | Calcimetry 15 | | 37 | | 37 | | 38 | | 45 | | 45 | | 42 | | 30 | | 35 |
| Argillaceous Rocks | Clays ↓ Marls | - | - | Red-brown finely silty to sandy plastic calcareous clay. | 80 | 80 | 80 | 75 | 80 | 80 | 70 | 70 | 75 | 80 | 75 | 80 | 80 | 80 | 80 | 80 |
| Carbonate | Limestone ↓ Dolomite | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt ↓ Conglomerate | - | - | White, pink to light red-brown, very fine, locally cemented, sand. | 10 | 10 | 10 | 15 | 10 | 10 | 20 | 20 | 20 | 15 | 10 | 10 | 15 | 10 | 15 | 15 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | | | | | Tr+ | 5 | 5 | Tr+ | | | 5 | | | | | |
| | Gypsum | | | Fibrous gypsum + bi-pyramidal elongated crystals of gypsum. | 10 | 10 | 10 | 10 | 10 | 5 | 5 | 10 | 5 | 5 | 10 | 10 | 5 | 10 | 5 | 5 |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | Cement. | Tr | Tr | 5 | Tr | Tr | | | Tr | Tr | | | | | | | Tr |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | |
| Fractura | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. |
|---|---|
| August 26, 1969 | 5 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DEPTH From | DEPTH To | WELL NAME |
|---|---|---|
| 1300' | 1375' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 1300 | 1305 | 1310 | 1315 | 1320 | 1325 | 1330 | 1335 | 1340 | 1345 | 1350 | 1355 | 1360 | 1365 | 1370 | 1375 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min. | 30 | | 27 | | 30 | | 33 | | 30 | | 30 | | 37 | | 22 | |
| | | | | Calcimetry 5 min. | 36 | | 33 | | 36 | | 40 | | 37 | | 37 | | 45 | | 35 | |
| | | | | Calcimetry 15 min. | 39 | | 35 | | 43 | | 46 | | 43 | | 40 | | 53 | | 43 | |
| Argillaceous Rocks | Clays ↓ Marls | - | - | Red-brown finely silty to sandy plastic calcareous clay. | 80 | 80 | 80 | 80 | 80 | 80 | 60 | 80 | 75 | 75 | 80 | 75 | 75 | 75 | 75 | 75 |
| Carbonate | Limestone ↓ Dolomite | - | - | Grey chalky (?) limestone. | | | | | | | | Tr | Tr | Tr | | Tr | | Tr | Tr | Tr |
| Detritic Rocks | Silt ↓ Conglomerate | | | White to pink very fine, locally cemented sand. | 5 | 10 | 10 | 5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | 15 | 10 | 10 | 15 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 10 | 10 | 10 | 10 | 15 |
| | Gypsum | | | Fibrous gypsum. | | | | | | | | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | Tr |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | Cement. | | | | | | | | Tr | Tr | Tr | Tr | | | | | |
| | Mud<br>Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | August 26-27, 1969 | 6 | | 1380' | 1500' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). DEPTH | 1380 | 1390 | 1400 | 1410 | 1420 | 1430 | 1432 | | 1450 | 1460 | 1470 | 1480 | 1485 | 1490 | 1495 | 1500 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | 37 | 40 | 43 | 45 | 53 | 55 | | | 83 | 78 | 85 | 100 | | 97 | | 95 |
| | | | | Calcimetry 3 min | 47 | 50 | 53 | 55 | 65 | 73 | | | 94 | 88 | 100 | | | 98 | | 95 |
| | | | | Calcimetry 15 min | 54 | 56 | 58 | 62 | 77 | 81 | | | 100 | 95 | | | | 98 | | |
| Argillaceous Rocks | Clays | - | - | Red-brown (brick), slightly silty, very calcareous plastic clay. | 75 | 75 | 70 | 65 | 70 | 50 | 20 | | | | | | | | | |
| | | | | Red-brown plastic to slightly indurated clay. | | | | | | | | | 5 | 10 | 5 | Tr | Tr | 5 | 5 | 5 |
| | Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | - | - | White to pale grey chalky limestone. | Tr | Tr | | | | | | | | | | | | | | |
| | | Inter-gran + Organ. | 8% | Pinky beige soft bioclastic limestone. Traces of cellular dolomite. | | | | | 5 | 25 | 60 | 1432' - 1447' = CORE #1. Recovered 15' = 100% | 85 | 80 | 80 | 95 | 95 | 95 | 90 | 90 |
| | | | | Pink slightly sandy limestone. | | | | | Tr | 10 | 15 | | | | | | | | | |
| | | | | Light beige bioclastic dolomitic limestone. | | | | | | Tr | Tr | | | | | | | | | |
| | Dolomite | | | Pinky grey saccharoidal microxl. dolomitic limestone. | | | | | | | | | 10 | 10 | 15 | 5 | 5 | Tr | 5 | 5 |
| Detritic Rocks | Silt | | | Calcareous very fine grained silt and sandstone. | 10 | 10 | 10 | 10 | 10 | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White anhydrite. | 15 | 15 | 20 | 25 | 15 | 15 | 5 | | | | | | | | | |
| | Gypsum | | | White fibrous translucid gypsum. | Tr | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | | DEPTH From | To | WELL NAME |
|---|---|---|---|---|---|
| August 27-28, 1969 | 7 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 1510' | 1550' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1510 | 1515 | 1520 | 1530 | 1540 | 1550 | 1560 | 1570 | 1580 | 1590 | 1600 | 1610 | 1620 | 1630 | 1640 | 1650 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 98 | | 96 | 83 | 73 | 58 | 85 | 40 | 56 | 45 | 50 | 47 | 63 | 64 | 53 | 22 |
| | | | | | Calcimetry 3 min | 100 | | 98 | 94 | 83 | 73 | 100 | 44 | 60 | 48 | 54 | 50 | 64 | 65 | 59 | 30 |
| | | | | | Calcimetry 15 min | | | 98 | 96 | 85 | 73 | 100 | 45 | 61 | 48 | 54 | 50 | 64 | 65 | 59 | 32 |
| Argillaceous Rocks | Clays | | | Red-brown plastic to slightly indurated clay. | | 5 | 5 | 10 | 10 | 10 | 10 | 15 | 35 | | | | | | | | |
| | ↓ | | | Brick-red silty argillites. | | | | | | | | | | 30 | 35 | 35 | 35 | 30 | 30 | 40 | 60 |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Pinky beige locally vuggy crumbly limestone. | | 85 | 90 | 85 | 75 | 75 | 70 | 70 | 45 | | | | | | | | |
| | ↓ | | | Pinky grey saccharoidal microcrystalline dolomitic limestone. | | 10 | 5 | 5 | 15 | 15 | 20 | 15 | 20 | | | | | | | | |
| | | | | Pink bioclastic limestone. | | | | | | | | | | 20 | 20 | 10 | 10 | 25 | (1)<br>25 | (2)<br>25 | 15 |
| | | | | Pale beige pelletoidal dolomitic limestone. | | | | | | | | | | 20 | 20 | 30 | 30 | 20 | 20 | 10 | 5 |
| | Dolomite | | | Dark pink slightly sandy crumbly limestone. | | | | | | | | | | 20 | 20 | 20 | 20 | 15 | 15 | 15 | 10 |
| Detritic Rocks | Silt ↓ Conglomerate | | | Soft silt with red clayey cement. | | | | | | | | | | 10 | 5 | 5 | 5 | 10 | 10 | 10 | 5 |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White anhydrite. | | | | | | | | | | Tr | Tr | Tr | Tr | | Tr | Tr | 5 |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | (1) = Amphipora?<br>(2) = 1 small Brachiopod (Atrypa?) | | | | | | | | | | | | | | | | | |
| | | | | Cement. | | | | | | | | | | Tr | Tr | Tr | Tr | Tr | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| August 28-29, 1969 | 8 | | 1660' | 1780' | WALRUS A-71 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1660 | 1570 | 1680 | 1690 | 1700 | 1710 | 1720 | 1730 | 1740 | 1750 | 1760 | 1770 | 1780 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 40 | | 51 | 58 | 40 | 40 | 50 | 60 | 40 | 22 | 35 | 50 | 85 | | | |
| | | | | | Calcimetry 2 min. | 53 | | 55 | 70 | 47 | 48 | 64 | 83 | 51 | 35 | 46 | 56 | 88 | | | |
| | | | | | Calcimetry 15 min. | 53 | | 57 | 73 | 49 | 51 | 67 | 85 | 53 | 37 | 56 | 62 | 89 | | | |
| Argillaceous Rocks | Clays | | | Brick-red silty argillites. | | 60 | 60 | 50 | 50 | 40 | 30 | 40 | 20 | 20 | 30 | 20 | 15 | 10 | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Pink bioclastic limestone. | | 15 | 15 | 10 | 10 | 10 | 10 | 10 | 40 | 40 | 20 | 10 | 10 | 5 | | | |
| | | | | Pale beige pelletoidal dolomitic limestone. | | 5 | 5 | 5 | 5 | | | | 20 | 10 | 10 | | 70 | 80 | | | |
| | | | | Dark pink slightly sandy crumbly limestone. | | 15 | 15 | 30 | 30 | 40 | 40 | 30 | 10 | 10 | | | | | | | |
| | | | | White to pale beige microcrystalline micro-oolitic lms. | | Tr | | 5 | 5 | 5 | 10 | 15 | 10 | 20 | 40 | 30 | 5 | 5 | | | |
| | | | | Beige to gray chalky and argillaceous crumbly limestone. | | | | | | | | | | | | 40 | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | White anhydrite. | | | | 5 | 5 | Tr | Tr | 5 | 5 | 5 | | Tr | Tr | | | | | | |
| | Gypsum | Gypsum. | | | | | | Tr | Tr | Tr | 5 | Tr | | Tr | Tr | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

DATE: September 7, 1969

No. 9

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 1790' To 1830'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1790 | 1800 | 1805 | 1810 | 1815 | 1820 | 1825 | 1830 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 67 | 72 | 90 | 63 | 85 | 75 | 65 | 79 |
| | | | | | Calcimetry 3 min | 67 | 80 | 95 | 70 | 90 | 78 | 70 | 82 |
| | | | | | Calcimetry 15 min | 67 | 82 | 93 | 74 | 92 | 79 | 73 | 83 |
| Argillaceous Rocks | Clays | | | Brick-red silty argillites. | | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | | | | Grey finely bedded argillites. Brachiopods. | | | | | Tr | | | | |
| | ↓ | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | |
| Carbonate | Limestone | | | Pink bioclastic limestone. | | 10 | 10 | 10 | 15 | 15 | 15 | 15 | 15 |
| | | | | Pale beige pelletoidal dolomitic limestone. | | 20 | 20 | 10 | 20 | 10 | | | 10 |
| | ↓ | | | Dark pink slightly sandy crumbly limestone. | | 15 | 15 | 15 | 5 | | 5 | 5 | 5 |
| | | | | White to pale beige microcrystalline micro-oolitic lms. | | | | | | 5 | 20 | 20 | 5 |
| | | Inter-gran + | 12% | Pale beige to grey chalky and argillaceous, locally bio- | | 40 | 40 | 40 | 40 | 55 | 40 | 40 | 50 |
| | Dolomite | Organ | | clastic limestone. | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | |
| | Anhydrite | | | White and pink-violet anhydrite. | | Tr | Tr | 10 | 5 | Tr | 5 | 5 | Tr |
| | Gypsum | | | Gypsum. | | Tr | Tr | | | | | | |
| | Etc. | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | |

**AQUITAINE**

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 7, 1969 | 10 | 1840' | 1920' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1840 | 1845 | 1850 | 1855 | 1860 | 1865 | 1870 | 1875 | 1886 | 1890 | 1894 | 1900 | 1905 | 1910 | 1915 | 1920 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 78 | 62 | 80 | 80 | 85 | 72 | 75 | 73 | | | | | | | | |
| | | | | | 3 min. | 80 | 68 | 83 | 86 | 88 | 74 | 76 | 74 | | | | | | | | |
| | | | | | 15 min. | 82 | 68 | 84 | 88 | 89 | 75 | 77 | 75 | | | | | | | | |
| Argillaceous Rocks | Clays | | | Brick-red silty plastic clay. | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | | | |
| | | | | Brown calcareous argillites. Cellular dolomite. | | Tr | 5 | Tr | 5 | 20 | 15 | 10 | 10 | 10 | 30 | 50 | 30 | 15 | 20 | 10 | 5 |
| | ↓ | | | Orange to red plastic to indurated argillites. | | Tr | 5 | 5 | 15 | | | | | | 10 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | Intergran | 8% | Pink slightly sandy bioclastic limestone. | | 20 | 15 | 5 | | | | | | | | | | | | | |
| | | Organ | 15% | Grey bioclastic, locally oolitic limestone. | | 20 | 20 | 20 | 10 | 30 | (1)<br>50 | 30 | (1)<br>30 | 30 | 20 | | | | 5 | (1)<br>5 | |
| | | | | Grey microcrystalline limestone. | | 10 | | 10 | | | 10 | | | | | | | | | | |
| | ↓ | | | Grey soft argillaceous limestone. | | 10 | | | 10 | | | 5 | 5 | | | | | | | | |
| | | Intergran | 12% | Red-orange to brown limestone. Cellular dolomite. Small | | (1)<br>30 | (1)<br>40 | (1)<br>40 | (2)<br>40 | 30 | 15 | (1)<br>40 | (1)<br>35 | 20 | 10 | | 10 | (3)<br>25 | 5 | 5 | 5 |
| | Dolomite | Organ | | Brachiopods. * | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | Pink siltstone and sandstone. | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | * Greenish grey argillaceous limestone. | | | | | | | | | 5 | 30 | 20 | 40 | 60 | 60 | 70 | 80 | 90 |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White to pinky anhydrite. | | Tr | 5 | 10 | 10 | 10 | | 5 | 5 | Tr | | Tr | Tr | | Tr | Tr | Tr |
| | Gypsum | | | Gypsum. | | | | Tr | | | | | | Tr | | Tr | Tr | | | | Tr |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | Cement. | | Tr | Tr | Tr | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | (1) = Brachiopods. | | | | | | | | | | | | | | | | | |
| | Dolomite<br>Anhydrite | | | (2) = Crinoids. | | | | | | | | | | | | | | | | | |
| | Quartz | | | (3) = Amphipora? | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

| **AQUITAINE** | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | September 7, 1969 | 11 | | 1925' | 2000' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 1925 | 1930 | 1935 | 1940 | 1945 | 1950 | 1955 | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calci-matry 1 min | 60 | 63 | 40 | 62 | 58 | 58 | 68 | 60 | 56 | 55 | 55 | 50 | 55 | 77 | 73 | 75 |
| | | | | | 3 min | 62 | 67 | 45 | 65 | 60 | 60 | 72 | 62 | 59 | 58 | 57 | 51 | 57 | 78 | 75 | 77 |
| | | | | | 15 min | 62 | 68 | 45 | 65 | 60 | 62 | 73 | 65 | 60 | 60 | 59 | 53 | 60 | 78 | 77 | 80 |
| Argillaceous Rocks | Clays | | | Red to brown hard argillites. Cellular dolomite. | | 10 | 5 | 15 | 15 | 15 | 20 | 20 | 15 | 15 | 15 | 15 | 10 | 10 | 10 | 15 | 10 |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Greenish grey soft argillaceous limestone. | | 80 | 70 | 70 | 80 | 70 | 65 | 65 | 70 | 70 | 70 | 70 | 80 | 80 | 60 | 30 | 20 |
| | ↓ | | | Pinky red microcrystalline limestone. | | 5 | 10 | 15 | 5 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 10 | 10 | 20 | 20 | 10 |
| | | | | Grey bioclastic limestone. | | 5 | 5 | | | | | | | | | | | | | | |
| | | | | Pale grey to pink bioclastic limestone and grey beige pellstoidal limestone (calcilutite). | | | | | | | | | | | | | | | 10 | 35 | 60 |
| | | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | Anhydrite. | | | | | Tr | | | | | | Tr | | Tr | | | | | | |
| | Gypsum | Gypsum. | | | | | Tr | Tr | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous<br>Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | Cavings. | | | | | 10 | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. |
|---|---|
| September 15, 1969 | 12 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DEPTH | |
|---|---|
| From 2010' | To 2160' |

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2090 | 2100 | 2110 | 2120 | 2130 | 2140 | 2150 | 2160 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min. | 20 | 24 | 12 | 42 | 35 | 8 | 8 | | 10 | 7 | 9 | 5 | 4 | 7 | 5 | 4 |
| | | | | Calcimetry 3 min. | 23 | 25 | 18 | 65 | 50 | 12 | 12 | | 13 | 9 | 12 | 6 | 5 | 9 | 5 | 5 |
| | | | | Calcimetry 15 min | 23 | 25 | 18 | 75 | 55 | 12 | 13 | | 14 | 10 | 13 | 6 | 5 | 9 | 5 | 6 |
| Argillaceous Rocks | Clays ↓ Marls | | | Grey plastic clay. | | | 100 | Tr | Tr | Tr | 5 | 100 | 85 | 95 | 95 | 100 | 100 | 100 | 100 | 100 |
| | | | | Pale grey dolomitic shale. | | 5 | | 5 | Tr | | | | | | | | | | | |
| | | Organ. | 6-12% | Dark grey to brown slightly dolomitic shale. Corals and some silicified organisms. (Calcimetry = 40 - 53 - 56) | | | | 45 | 55 | 50 | 35 | | 5 | 5 | 5 | Tr | Tr | Tr | Tr | Tr |
| Carbonate | Limestone ↓ Dolomite | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings = red plastic clay, pink to red limestone, pale grey plastic clay. | 45 | 35 | Tr | Tr | Tr | Tr | | | | | | Tr | Tr | Tr | Tr | Tr |
| | | | | Cement. | 55 | 60 | | 40 | 45 | 50 | 60 | | 10 | | | Tr | Tr | Tr | Tr | Tr |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White calcite. | | | | 10 | Tr | | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 15, 1969 | 13 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 2170' | 2320' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2170 | 2180 | 2190 | 2200 | 2210 | 2220 | 2230 | 2240 | 2250 | 2260 | 2270 | 2280 | 2290 | 2300 | 2310 | 2320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 6 | 10 | | | 5 | 3 | 4 | 10 | 6 | 7 | 6 | 5 | 5 | 5 | 5 | 4 |
| | | | | | Calcimetry 3 min. | 7 | 12 | | | 5 | 4 | 5 | 10 | 6 | 8 | 7 | 6 | 5 | 5 | 5 | 5 |
| | | | | | Calcimetry 15 min. | 7 | | | | 5 | 4 | 5 | 10 | 6 | 8 | 7 | 6 | 5 | 5 | 5 | 5 |
| Argillaceous Rocks | Clays ↓ Marls | | | Grey plastic clay. | | 100 | 100 | 100 | 100 | | | | | | | | | | | | |
| | | | | Beige to pale brown plastic clay with grey patches. | | | | | | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | |
| | | | | Brown plastic clay. | | | | | | | | | | | | 100 | 100 | 100 | 100 | 100 | 100 |
| Carbonate | Limestone ↓ Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | September 16, 1969 | 14 | | 2330' | 2440' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Textura, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2330 | 2340 | 2350 | 2360 | 2365 | 2370 | 2375 | 2380 | 2385 | 2390 | 2395 | 2400 | 2410 | 2420 | 2430 | 2440 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | 3 | 6 | 7 | 21 | | 16 | | 22 | | 20 | | 20 | 8 | 8 | 5 | |
| | | | | | Calcimetry 3 min. | 4 | 6 | 8 | 25 | | 22 | | 52 | | 30 | | 37 | 20 | 18 | 10 | |
| | | | | | Calcimetry 15 min. | 4 | 6 | 8 | 27 | | 24 | | 67 | | 32 | | 42 | 23 | 25 | 13 | |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | Brown to red-brown plastic clay. | | 100 | 100 | 100 | 100 | 95 | 80 | 65 | 60 | 60 | 55 | 60 | 60 | 65 | 70 | 100 | 85 |
| | | | | Pink and grey dolomitic shale. (Calcimetry at 2380' = 35 - 60 - 80). | | | | | | | | 10 | 15 | 20 | 30 | 25 | 30 | 30 | 30 | Tr | 5 |
| Carbonate | Limestone<br>↓<br>Dolomite | | | Beige to light brown cryptocrystalline dolomite. (Calcimetry at 2380' = 20 - 55 - 83). | | | | | | | | | 10 | 15 | 5 | 10 | 5 | Tr | Tr | Tr | Tr |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | Beige to light grey and red-brown very fine to fine grained compact calcareous sandstone. (Calcimetry at 2380' = 45 - 48 - 48). | | | | | Tr | 5 | 20 | 25 | 15 | 5 | 10 | 5 | 5 | 5 | Tr | Tr | Tr |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White to brown anhydrite. | | | | | | | | | | | | | | | | | 10 |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 16, 1969 | 15 | 2450' | 2560' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 | 2510 | 2520 | 2530 | 2535 | 2540 | 2545 | 2550 | 2560 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 8 | 8 | 7 | 8 | 8 | 3 | 5 | 18 | 45 | | 45 | | 65 | 30 | | |
| | | | | | Calcimetry 3 min | 20 | 14 | 10 | 12 | 12 | 5 | 6 | 35 | 93 | | 80 | | 98 | 60 | | |
| | | | | | Calcimetry 10 min | 25 | 15 | 13 | 15 | 14 | 5 | 10 | 54 | 100 | | 98 | | 100 | 75 | | |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | Brown to red-brown plastic clay. | | 95 | 70 | 90 | 60 | 65 | 40 | 50 | 10 | 25 | 25 | 20 | 10 | | | | |
| | | | | Pink and grey dolomitic shale. | | Tr | 5 | Tr | 5 | 5 | 5 | Tr | Tr | Tr | | | | | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | Inter cryst. + organ. | < 6% | Light brown microcrystalline to crystalline bioclastic to biohermal limestone. (Calcimetry at 2560' = 60 - 92 - 100) | | | | | | | | | | 75 | 75 | 80 | 90 | 100 | | | |
| | | | | Light brown cryptocrystalline to microcrystalline calcareous dolomite. (Calcimetry at 2560' = 30 - 65 - 76). | | | | | | | | | | | | | | | 90 | | |
| | | | < 6% | Beige, red speckled, locally porous, calcareous dolomite (Calcimetry at 2520' = 35 - 77 - 100). * | | | | | | | | | 30 | Tr | Tr | Tr | | | | | |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | - | - | Beige to light grey and red-brown very fine to fine grained calcareous sandstone. | | Tr | Tr | Tr | 5 | Tr | 5 | Tr | Tr | Tr | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White, light to dark grey and brown anhydrite. | | 5 | 20 | 5 | 20 | 25 | 50 | 50 | 60 | Tr | Tr | Tr | Tr | Tr | 10 | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Pyrite. | | | | Tr | Tr | | | | | | | | | | Tr | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | * Beige to light brown cryptocrystalline dolomite. | | Tr | 5 | 5 | 10 | 5 | Tr | Tr | Tr | Tr | | | | | | | |

**AQUITAINE**

DATE: September 16, 1969

No. 16

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 2575' To 2655'

WELL NAME: WALRUS A-79

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2575 | 2580 | 2585 | 2590 | 2595 | 2600 | 2605 | 2610 | 2615 | 2620 | 2625 | 2630 | 2635 | 2645 | 2650 | 2655 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calcimetry 1 min. | 23 | 23 | 48 | 42 | 34 | 42 | 34 | 35 | 48 | 57 | | | 80 | | 55 | 68 |
| | | | | | 3 min. | 35 | 30 | 55 | 53 | 40 | 50 | 40 | 38 | 51 | 62 | | | 87 | | 62 | 70 |
| | | | | | 15 min. | 42 | 30 | 57 | 54 | 42 | 54 | 42 | 40 | 54 | 65 | | | 87 | | 65 | 70 |
| Argillaceous Rocks | Clays | | | Pale beige, brown to red-brown plastic clay. | | 50 | 25 | 20 | 50 | 40 | 35 | 35 | 35 | 25 | 35 | 20 | 25 | 25 | 25 | 25 | 25 |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Light brown cryptocryst. to microcryst. calc. dolomite. | | 10 | 60 | 60 | 30 | 25 | 35 | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | 10 | 10 |
| | | | | Light brown microcryst. to cryst. biocl. to bioherm. lms. | | 10 | Tr | | | | | | | | | | | | | | |
| | ↓ | | | Grey shaly dolomite. (Calcimetry at 2600'= 25-65-75). | | | | | Tr | 15 | 15 | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | | Inter-gran.+ Organ. | 6-8% | Beige to pale brown calcarenitic, bioclastic to biohermal | | | | | | | | 35 | 55 | 55 | 45 | 60 | 65 | 65 | 65 | 60 | 55 |
| | | | | limestone. (Calcimetry at 2610' = 76 - 90 - 94 ; | | | | | | | | | | | | | | | | | |
| | Dolomite | | | at 2630' = 97 - 100 - 100). | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | ↓ | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | White, grey and brown anhydrite. | | 10 | 5 | 5 | 10 | 5 | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic | | | Pyrite. | | Tr | Tr | | | | Tr | | | | | | | | | | |
| | Igneous<br>Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud<br>Cavings | | | Cavings. | | 20 | 10 | 15 | 10 | 15 | 10 | 5 | Tr | 5 | 5 | 10 | Tr | Tr | 5 | Tr | Tr |
| Fracture | Calcite<br>Dolomite | | | White calcite. | | | | | | | | | | 5 | 5 | Tr | Tr | Tr | Tr | 5 | 10 |
| | Anhydrite<br>Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. |
|---|---|
| September 16, 1969 | 17 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DEPTH From | DEPTH To | WELL NAME |
|---|---|---|
| 2660' | 2790' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2660 | 2665 | 2668 | 2670 | | 2715 | 2720 | 2725 | 2730 | 2735 | 2740 | 2750 | 2760 | 2770 | 2730 | 2790 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calcimetry 1 min | 95 | | | | | 45 | 25 | | 35 | 48 | 43 | 65 | 50 | 50 | 37 | 37 |
| | | | | | 3 min | 100 | | | | | 74 | 58 | | 75 | 72 | 72 | 82 | 78 | 83 | 67 | 55 |
| | | | | | 15 min | 100 | | | | | 74 | 70 | | 92 | 85 | 83 | 87 | 90 | 94 | 85 | 63 |
| Argillaceous Rocks | Clays | | | Pale beige, brown to red-brown plastic clay = CAVINGS? | | 25 | 25 | 25 | 25 | | 25 | 25 | 25 | 20 | 20 | 20 | 15 | 15 | 15 | 20 | 35 |
| | Marls | | | Greenish grey shale. | | | | | | | | | | | | Tr | Tr | Tr | Tr | Tr | Tr |
| Carbonate | Limestone | | | Light brown crypto. to microcryst. calcareous dolomite. | | 10 | 10 | 10 | 10 | | | | | | | | | | | | |
| | | Inter-gran. & Organ. | 6-8% | Whitish beige to pale brown calcarenitic, bioclastic to biohermal limestone. (Calcimetry at 2630' = 97 - 100 - 100) | | 55 | 50 | 50 | 50 | 2670' - 2684' = CORE #3. Recovered 14' = 100% | 10 | Tr | | | | | | | | | |
| | | | | Grey shaly dolomite. | | Tr | Tr | Tr | Tr | | | | | | | | | | | | |
| | | Intxl + vugs | 5-12% | Very dark brown microcrystalline bituminous dolomite. | | | | | | | 55 | 70 | 70 | 75 | 75 | 60 | 50 | 65 | 60 | 40 | 35 |
| | Dolomite | | | Whitish to pale beige slightly bitumous, microcrystalline slightly bioclastic limestone. (Calcimetry at 2760' = 95 - 98). | | | | | | | | | | | | 10 | 30 | 15 | 20 | 35 | 20 |
| Detritic Rocks | Silt<br>Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White, grey and brown anhydrite. | | Tr | Tr | Tr | Tr | | 5 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | 5 | 5 | 5 | 5 | | 5 | 5 | 5 | 5 | 5 | 10 | 5 | 5 | 5 | 5 | 5 |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White calcite. | | 5 | 10 | 10 | 10 | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | 5 |

AQUITAINE

DATE: September 16, 1969

No. 16

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 2800' To 2885'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2800 | 2810 | 2820 | 2825 | 2830 | 2835 | 2840 | 2845 | 2850 | 2855 | 2860 | 2865 | 2870 | 2875 | 2880 | 2885 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 30 | 14 | 30 | 15 | 12 | | 8 | | 18 | | 15 | | 17 | | 15 | |
| | | | | | Calcimetry 3 min | 45 | 37 | 51 | 30 | 28 | | 24 | | 32 | | 22 | | 31 | | 25 | |
| | | | | | Calcimetry 15 min | 55 | 43 | 64 | 55 | 53 | | 40 | | 58 | | 50 | | 50 | | 56 | |
| Argillaceous Rocks | Clays ↓ Marls | | | Pale beige to brown plastic clay = CAVINGS? | | 50 | 50 | 50 | 40 | 35 | 30 | 30 | 30 | 30 | 30 | 20 | 15 | 15 | 15 | 10 | 5 |
| Carbonate | Limestone ↓ Dolomite | | | Whitish to pale beige microcrystalline slightly bituminous, slightly bioclastic limestone. | | 20 | | | | | | | | | | | | | | | |
| | | Intxl + vugs | 5-12% | Very dark brown microcrystalline bituminous dolomite. | | 30 | | | | | | | | | | | | | | | |
| | | | | Pinky to whitish beige cryptocrystalline dolomite. (Calcimetry = 8 - 27 - 73). | | | 45 | 45 | 55 | 60 | 55 | 15 | 5 | 5 | | | | | | | |
| | | Intergran. | 1-2% | Whitish to pale grey cryptoxl. dol.(Calci. = 8 - 25 - 93). | | | | | | | 10 | 45 | 40 | 40 | 60 | 75 | 80 | 80 | 75 | 85 | 90 |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | White and grey anhydrite. | | Tr | | | | Tr | | | | | | | | | | Tr | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | Tr | 5 | 5 | 5 | 5 | 5 | 10 | 25 | 25 | 10 | 5 | 5 | 5 | 10 | 5 | 5 |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White calcite. | | Tr | Tr | Tr | | | | | | | | | | | | | |

**AQUITAINE**

DATE: September 16 & 19, 1969
No. 19

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 2890' To 2920'
WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | | 2890 | 2895 | 2900 | 2903 | 2906 | 2908 | 2910 | 1912 | 2914 | 2915 | 2916 | 2918 | 2920 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry | 1 min. | 14 | 37 | 32 | | 12 | | 17 | | | 12 | | | 11 | | | |
| | | | | | 3 min. | 27 | 55 | 38 | | 22 | | 30 | | | 29 | | | 26 | | | |
| | | | | | 15 min. | 57 | 63 | 72 | | 53 | | 54 | | | 69 | | | 50 | | | |
| Argillaceous Rocks | Clays ↓ Marls | | | Pale beige to brown plastic clay = CAVINGS? | | 5 | 5 | 5 | Tr | Tr | Tr | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | Inter-gran. | <1% | Whitish cryptocrystalline to microcrystalline very slightly silicified dolomite. | | 90 | 85 | 90 | 95 | 60 | 65 | 55 | 90 | 100 | 100 | 100 | 100 | 100 | | | |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | 5 | 10 | 5 | 5 | 40 | 35 | 45 | 10 | Tr | Tr | Tr | Tr | Tr | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 19, 1969 | 20 | 2922' | 2945' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2922 | 2924 | 2925 | 2926 | 2928 | 2930 | 2932 | 2934 | 2935 | 2936 | 2939 | 2940 | 2942 | 2944 | 2945 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | | | 18 | | | 15 | | | 20 | | | 20 | | | 20 |
| | | | | | Calcimetry 3 min. | | | 24 | | | 25 | | | 50 | | | 50 | | | 32 |
| | | | | | Calcimetry 15 min. | | | 34 | | | 45 | | | 62 | | | 72 | | | 57 |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | Inter-gran. | < 1% | Whitish cryptocrystalline to microcrystalline very slightly silicified dolomite, From 2926' = white to beige | | 95 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | Grey anhyrite, | | | | | | | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | 5 | Tr | Tr | Tr | Tr | Tr | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DATE: September 19, 1969

No.: 21

DEPTH From: 2946' To: 2972'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2946 | 2948 | 2950 | 2952 | 2954 | 2955 | 2956 | 2958 | 2960 | 2962 | 2964 | 2965 | 2966 | 2968 | 2970 | 2972 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | | | 13 | | | | 15 | | 17 | | 25 | | | 15 | | |
| | | | | | Calcimetry 3 min. | | | 27 | | | | 40 | | 40 | | 60 | | | 35 | | |
| | | | | | Calcimetry 15 min. | | | 55 | | | | 85 | | 90 | | 100 | | | 78 | | |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | Inter-gran. | < 1% | Whitish to pale beige cryptocrystalline to microcrystalline very slightly silicified dolomite. | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | Grey anhydrite. | | Tr | | | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | Cavings. | | | | | | | | Tr | | | Tr | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 19 & 24,'69 | 22 | 2974' | 3045' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 2974 | | 2986 | 2990 | 2995 | 3000 | 3005 | 3010 | 3015 | 3020 | 3025 | 3030 | 3035 | 3040 | 3045 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min. | | | 12 | | 15 | 20 | | 17 | 15 | 18 | 20 | 20 | 15 | 15 | 18 | |
| | | | | | Calcimetry 3 min. | | | 29 | | 40 | 50 | | 39 | 40 | 45 | 45 | 45 | 35 | 35 | 40 | |
| | | | | | Calcimetry 15 min. | | | 57 | | 75 | 100 | | 94 | 100 | 92 | 92 | 90 | 73 | 78 | 78 | |
| Argillaceous Rocks | Clays → Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone → Dolomite | | | Whitish to beige cryptocryst. to microcryst. very slightly silicified dolomite. | | 100 | | 10 | 60 | 85 | 90 | 95 | 100 | 95 | 65 | 55 | 30 | 20 | 25 | 15 | |
| | | | | Pinky white, pink and slightly brown, locally yellowish micxl to crpxl. compact and azoic dolomite. (Calcimetry at 3020' = 22 - 51 - 91). | | | | | | | | Tr | Tr | 5 | 35 | 45 | 65 | 75 | 75 | 70 | |
| | | | | Pale beige, pale grey to pale brown micxl. slightly arg. dolomitic limestone. (Calcimetry at 3035'= 45 - 76 - 88). | | | 9 5/8" CASING SHOE AT 2960' | | | | | | | | | | 5 | 5 | Tr | 15 | |
| Detritic Rocks | Silt → Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | Grey anhydrite. | | Tr | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement<br>Mud | | | Cement. | | | | 85 | 40 | 15 | 10 | 5 | Tr | Tr | Tr | Tr | | | | | |
| | Cavings | | | Cavings (from the mud circuit). | | | | 5 | Tr | Tr | Tr | Tr | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 25-26, '69 | 23 | | 3050' | 3125' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3050 | 3055 | 3060 | 3065 | 3070 | 3075 | 3080 | 3085 | 3090 | 3096 | 3100 | 3105 | 3110 | 3115 | 3120 | 3125 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 30 | 18 | 22 | 35 | 35 | 35 | 34 | 20 | 25 | 25 | 15 | 25 | 30 | 30 | 28 | 40 |
| | | | | | Calcimetry 3 min | 60 | 42 | 56 | 70 | 77 | 63 | 70 | 47 | 57 | 57 | 35 | 57 | 65 | 72 | 63 | 78 |
| | | | | | Calcimetry 15 min | 98 | 74 | 86 | 88 | 100 | 95 | 98 | 90 | 150 | 100 | 64 | 94 | 100 | 100 | 82 | 90 |
| Argillaceous Rocks | Clays | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | ** | | | | | | | | | | | |
| Carbonate | Limestone | | | White chalky limestone. | | | | | | | | | | Tr | | Tr | Tr | Tr | Tr | | |
| | | Inter-gran + | < 6% | Pale beige, pale grey and pale brown microcrystalline | | 10 | 30 | 30 | 25 | 60 | 70 | 70 | 60 | 80 | | 75 | 90 | 90 | 90 | 100 | 100 |
| | | Inter-cryst. | | slightly argillaceous dolomitic limestone. * | | | | | | | | | | | | | | | | | |
| | | | | Pinky white to pinky brown and yellowish microcrystal- | | 70 | 60 | 60 | 65 | 30 | 20 | 20 | 35 | 20 | | 15 | 10 | 10 | 10 | Tr | Tr |
| | | | | line to crystalline compact and azoic dolomite. | | | | | | | | | | | | | | | | | |
| | Dolomite | | | Whitish to pale beige cryptocrystalline to microcrystal- | | 20 | 10 | 10 | 10 | 10 | 10 | 10 | 5 | Tr | | 5 | Tr | | | | |
| Detritic Rocks | Silt | | | line compact and azoic dolomite. | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | Cavings. | | | | | | | | | | | | | 100 | 5 | Tr | | | | |
| Fracture | Calcite<br>Dolomite | * Few fragments of organisms: Algae (?), Pteropods. | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | ** From 3070' to 3100': grains of glauconite in every facies. | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

| AQUITAINE | DATE | No. | CUTTINGS: DESCRIPTION AND PERCENTAGE | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|---|
| | September 26, 1969 | 26 | | 3130' | 3205' | WALHUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | | 3130 | 3135 | 3140 | 3145 | 3150 | 3155 | 3160 | 3165 | 3170 | 3175 | 3180 | 3185 | 3190 | 3195 | 3200 | 3205 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry | 1 min | 33 | 45 | 52 | 35 | 30 | 45 | 35 | 25 | 30 | 30 | 40 | 29 | 44 | 35 | 65 | 72 |
| | | | | | | 3 min | 65 | 78 | 65 | 70 | 72 | 72 | 53 | 57 | 54 | 60 | 72 | 58 | 77 | 64 | 80 | 92 |
| | | | | | | 15 min | 83 | 100 | 92 | 100 | 96 | 90 | 58 | 100 | 64 | 85 | 90 | 76 | 100 | 80 | 83 | 98 |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | | | White chalky limestone. | | | Tr | Tr | Tr | Tr | Tr | Tr | | Tr | | | | | Tr | Tr | 10 | 10 |
| | | | | Pale beige to pale brown microcrystallize slightly argillaceous dolomitic limestone. | | | 85 | 75 | 70 | 75 | 95 | 100 | 100 | 100 | 95 | 95 | 95 | 90 | 95 | 100 | 90 | 90 |
| | | | | Pinky white to pinky brown and yellowish microcrystalline to crystalline compact and azoic dolomite. | | | 15 | 25 | 30 | 25 | 5 | Tr | | Tr | 5 | 5 | 5 | 10 | 5 | Tr | Tr | Tr |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | White chert. | | | | | | | | | | Tr | Tr | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 27, 1969 | 25 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 3210' | 3285' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | | 3210 | 3215 | 3220 | 3225 | 3230 | 3235 | 3240 | 3245 | 3250 | 3255 | 3260 | 3265 | 3270 | 3275 | 3280 | 3285 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calci-metry | 1 min | 76 | 80 | 60 | 75 | 72 | 65 | 92 | 80 | 75 | 95 | 67 | 60 | 88 | 70 | 54 | 65 |
| | | | | | | 3 min | 92 | 100 | 77 | 86 | 93 | 74 | 100 | 91 | 86 | 100 | 75 | 80 | 92 | 75 | 58 | 80 |
| | | | | | | 15 min | 94 | 100 | 80 | 90 | 97 | 75 | 100 | 95 | 87 | 100 | 75 | 80 | 92 | 75 | 60 | 82 |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | White chalky limestone. | | | 15 | 20 | 15 | 10 | 10 | 20 | 10 | 10 | 20 | 10 | 10 | Tr | 10 | 20 | 20 | 30 |
| | | | | White, slightly grey to beige microcrystalline spathic partly dolomitic limestone. | | | 85 | 80 | 85 | 90 | 90 | 80 | 90 | 90 | 80 | 90 | 90 | 100 | 90 | 80 | 80 | 70 |
| | ↓<br>Dolomite | | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 28, 1969 | 26 | 3290' | 3365' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3290 | 3295 | 3300 | 3305 | 3310 | 3315 | 3320 | 3325 | 3330 | 3335 | 3340 | 3345 | 3350 | 3355 | 3360 | 3365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TYPE | % | | Calcimetry 1 mn | 70 | 80 | 78 | 78 | 52 | 52 | 63 | 61 | 80 | 82 | 82 | 83 | 85 | 78 | 90 | 85 |
| | | | | | Calcimetry 3 mn | 90 | 85 | 82 | 80 | 54 | 56 | 66 | 68 | 94 | 90 | 83 | 96 | 89 | 85 | 100 | 90 |
| | | | | | Calcimetry 15 mn | 90 | 87 | 82 | 87 | 55 | 58 | 66 | 66 | 98 | 98 | 83 | 93 | 87 | 85 | 100 | 90 |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | | | White chalky limestone. | | 30 | 80 | 80 | 90 | 80 | 70 | 60 | 45 | 30 | 30 | 40 | 40 | 50 | 60 | 60 | 70 |
| | | | | Pinky beige ferruginous finely bedded limestone. | | | | | | | | Tr | 5 | 10 | 5 | Tr | Tr | Tr | Tr | Tr | |
| | | | | Light grey and very light beige microcrystalline re-crystallised fossiliferous limestone. | | 70 | 20 | 20 | 10 | 20 | 30 | 40 | 50 | 60 | 65 | 60 | 60 | 50 | 40 | 40 | 30 |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. | | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|---|
| September 29, 1969 | 27 | **CUTTINGS: DESCRIPTION AND PERCENTAGE** | 3370' | 3445' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 3370 | 3375 | 3380 | 3385 | 3390 | 3395 | 3400 | 3405 | 3410 | 3415 | 3420 | 3425 | 3430 | 3435 | 3440 | 3445 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min. | 87 | 87 | 63 | 82 | 76 | 78 | 95 | 92 | 91 | 89 | 90 | 76 | 81 | | 79 | 59 |
| | | | | Calcimetry 3 min. | 93 | 90 | 66 | 83 | 79 | 60 | 100 | 98 | 94 | 93 | 96 | 80 | 84 | | 83 | 77 |
| | | | | Calcimetry 15 min. | 93 | 90 | 66 | 83 | 79 | 80 | 100 | 98 | 94 | 94 | 96 | 80 | 84 | | 85 | 86 |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | Brick-red plastic clay. | | | | | | | | | | | | 5 | Tr | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | | | White chalky limestone. | 70 | 70 | 80 | 80 | 80 | 70 | 70 | 80 | 70 | 70 | 60 | 50 | 60 | 60 | 50 | 30 |
| | | | | Light beige to whitish microcrystalline recrystallised, locally pseudo-oolitic, compact, fossiliferous limestone.<br>* From 3440' = dolomitic. | 30 | 30 | 20 | 20 | 20 | 30 | 30 | 20 | 20 | 15 | 30 | 40 | 40 | 40 | (*)<br>50 | 70 |
| | | | | Light pink, partly microcrystalline, slightly argillaceous chalky dolomitic limestone. | | | | | | | | | 10 | 15 | 10 | 5 | Tr | Tr | | |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

| DATE | No. |
|---|---|
| September 30, 1969 | 28 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DEPT. From | DEPT. To | WELL NAME |
|---|---|---|
| 3450' | 3525' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3450 | 3455 | 3460 | 3465 | 3470 | 3475 | 3480 | 3485 | 3490 | 3495 | 3500 | 3505 | 3510 | 3515 | 3520 | 3525 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calc. met. [illegible] | 57 | 52 | 45 | 50 | 65 | 67 | 90 | 50 | 60 | 58 | 55 | 58 | 63 | 62 | 68 | 65 |
| | | | | | [illegible] | 87 | 86 | 95 | 87 | 100 | 100 | 100 | 68 | 85 | 88 | 84 | 82 | 83 | 84 | 78 | 76 |
| | | | | | 15 min. | 90 | 90 | 100 | 91 | 100 | 100 | 100 | 70 | 90 | 92 | 96 | 94 | 93 | 95 | 79 | 78 |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | | | White chalky limestone. | | 10 | 10 | 5 | 5 | 10 | 20 | 20 | 10 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | Tr |
| | | | | Light beige to whitish microcrystalline compact dolomitic limestone. | | 90 | 90 | 95 | 95 | 90 | 80 | 80 | 90 | 90 | 95 | 90 | 95 | 95 | 90 | 85 | 90 |
| | | | | Pink crystalline slightly argillaceous dolomitic limestone. | | Tr | | | | | | | | | | 5 | Tr | Tr | 5 | 10 | 10 |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | Tr | Tr | Tr | Tr | Tr | | | Tr | Tr | Tr | Tr | Tr | Tr | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| September 30, 1969 | 29 | 3530' | 3605' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3530 | 3535 | 3540 | 3545 | 3550 | 3555 | 3560 | 3565 | 3570 | 3575 | 3580 | 3585 | 3590 | 3595 | 3600 | 3605 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 75 | 70 | 60 | 72 | 80 | 77 | 81 | 82 | 72 | 75 | 73 | | 86 | 85 | 88 | 60 |
| | | | | | Calcimetry 2 min | 93 | 90 | 73 | 90 | 100 | 96 | 97 | 94 | 80 | 84 | 82 | | 94 | 92 | 98 | 65 |
| | | | | | Calcimetry 15 min | 97 | 95 | 77 | 90 | 100 | 96 | 97 | 95 | 90 | 93 | 91 | | 95 | 93 | 98 | 65 |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | White chalky limestone. | | 5 | 5 | 5 | 5 | 5 | 5 | 30 | 30 | 15 | 20 | 30 | Tr | Tr | Tr | Tr | 20 |
| | | | | Light beige microcrystalline compact dolomitic limestone | | 95 | 95 | 95 | 95 | 95 | 95 | 70 | 70 | 85 | 80 | 70 | 70 | 85 | 95 | 95 | 80 |
| | | | | Pink slightly argillaceous dolomitic limestone. | | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | | |
| | ↓ Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | Mud product (CMC). | | | | | | | | | | | | | | | 30 | 15 | 5 | 5 | Tr |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DATE: October 4, 1969

No.: 30

DEPTH From: 3610' To: 3685'

WELL NAME: WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3610 | 3615 | 3620 | 3625 | 3630 | 3635 | 3640 | 3645 | 3650 | 3655 | 3660 | 3665 | 3570 | 3675 | 3680 | 3685 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 68 | 86 | 88 | 76 | 54 | 55 | | 53 | 65 | 72 | 69 | 74 | 66 | 83 | 90 | 86 |
| | | | | | Calcimetry 3 min | 72 | 100 | 100 | 95 | 73 | 65 | | 63 | 68 | 77 | 71 | 78 | 68 | 83 | 100 | 100 |
| | | | | | Calcimetry 15 min | 73 | 100 | 100 | 100 | 75 | 67 | | 65 | 69 | 77 | 71 | 80 | 69 | 83 | 100 | 100 |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | | | White chalky limestone. | | 40 | 10 | 20 | 30 | 10 | 10 | 30 | 30 | 40 | 60 | 60 | 60 | 70 | 80 | 60 | 5 |
| | | | | Light beige, grey to whitish microcrystalline pseudo-oolitic compact limestone. Fragments of Ostracods. | | 40 | 90 | 80 | 70 | 90 | 60 | 70 | 70 | 60 | 40 | 40 | 40 | 30 | 20 | 40 | 95 |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Mud product (CMC). | | 20 | Tr | Tr | | | 30 | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | Tr | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

DATE: October 5, 1969

No. 31

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 3690' To 3730'

WELL NAME: WALRUS A-71

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROCK CLASSIFICATION | | POROSITY | | LITHOLOGY<br>Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3690 | 3695 | 3700 | 3705 | 3710 | 3715 | 3720 | 3725 | 3730 | | | | | | | |
| | | TYPE | % | | Calcimetry 1 min. | 50 | 50 | 50 | 60 | 65 | 65 | 80 | 75 | 52 | | | | | | | |
| | | | | | Calcimetry 3 min. | 73 | 94 | 83 | 88 | 76 | 73 | 100 | 92 | 90 | | | | | | | |
| | | | | | Calcimetry 15 min. | 80 | 100 | 100 | 95 | 77 | 78 | 100 | 95 | 100 | | | | | | | |
| Argillaceous Rocks | Clays<br>↓<br>Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone<br>↓<br>Dolomite | | | Beige, grey to whitish microcrystalline or recrystallised, crumbly, pseudo-oolitic to pseudo-brecciated, compact, partly dolomitic limestone. Laths of Anhydrite. Microfauna. | | 95 | 95 | 95 | 95 | 100 | 100 | 100 | 100 | 100 | | | | | | | |
| | | | | White chalky limestone. | | 5 | 5 | 5 | 5 | Tr | Tr | Tr | Tr | Tr | | | | | | | |
| Detritic Rocks | Silt<br>↓<br>Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | | | | | | | | | | | | | | | | | | |

**AQUITAINE**

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DATE | No. | DEPTH From | DEPTH To | WELL NAME |
|---|---|---|---|---|
| October 11-12, 1969 | 32 | 3735' | 3810' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY<br>Description. Colour, Texture, Mineral and organic content (Nature, Diameter, %). | DEPTH | 3735 | 3740 | 3745 | 3750 | 3755 | 3760 | 3765 | 3770 | 3775 | 3780 | 3785 | 3790 | 3795 | 3800 | 3805 | 3810 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Calcimetry 1 min | 75 | 72 | 35 | 20 | 25 | 55 | 53 | 80 | 50 | 60 | 65 | 65 | 84 | 70 | 83 | 80 |
| | | | | | Calcimetry 3 min | 95 | 100 | 43 | 52 | 55 | 78 | 91 | 97 | 78 | 93 | 80 | 83 | 100 | 100 | 100 | 100 |
| | | | | | Calcimetry 15 min | 100 | 100 | 56 | 75 | 78 | 82 | 92 | 100 | 93 | 100 | 82 | 85 | 100 | 100 | 100 | 100 |
| Argillaceous Rocks | Clays | | | | | | | | | | | | | | | | | | | | |
| | Marls | | | | | | | | | | | | | | | | | | | | |
| Carbonate | Limestone | | | Whitish, light beige and light grey microcrystalline compact slightly dolomitic limestone. | | 100 | 100 | 10 | 20 | 20 | 80 | 95 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | | | | Beige microcrystalline compact dolomitic limestone. | | | | 90 | 80 | 80 | 20 | 5 | Tr | Tr | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| Detritic Rocks | Silt | | | | | | | | | | | | | | | | | | | | |
| | Conglomerate | | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Gypsum | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |
| Miscellaneous | Lignite | | | | | | | | | | | | | | | | | | | | |
| | Metamorphic | | | | | | | | | | | | | | | | | | | | |
| | Igneous | | | | | | | | | | | | | | | | | | | | |
| | Cement | | | | | | | | | | | | | | | | | | | | |
| | Mud | | | | | | | | | | | | | | | | | | | | |
| | Cavings | | | | | | | | | | | | | | | | | | | | |
| Fracture | Calcite | | | | | | | | | | | | | | | | | | | | |
| | Dolomite | | | | | | | | | | | | | | | | | | | | |
| | Anhydrite | | | | | | | | | | | | | | | | | | | | |
| | Quartz | | | | | | | | | | | | | | | | | | | | |
| | Etc. | | | | | | | | | | | | | | | | | | | | |

AQUITAINE

| DATE | No. |
|---|---|
| October 13-14, 1969 | 33 |

# CUTTINGS: DESCRIPTION AND PERCENTAGE

| DEPTH From | DEPTH To | WELL NAME |
|---|---|---|
| 3815' | 3880' | WALRUS A-71 |

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 3815 | 3820 | 3825 | 3830 | 3835 | 3840 | 3845 | 3850 | 3855 | 3860 | 3865 | 3870 | 3875 | 3580 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry | 17 | 8 | 20 | | 78 | 75 | 76 | 93 | 90 | | | | 74 | 75 | | |
| | | | | | 19 | 16 | 35 | | 91 | 100 | 90 | 98 | 98 | | | | 88 | 87 | | |
| | | | | | 19 | 18 | 50 | | 93 | 100 | 91 | 99 | 100 | | | | 90 | 87 | | |
| Argillaceous Rocks | Clays ↓ Marls | | | Grey blue marls | | | | | | | | | 60 | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | | | Whitish, light beige to light grey microcrystalline locally calcarenitic to microconglomeratic (intraformational) limestone. | 100 | 100 | 100 | 65 | 90 | 75 | 65 | 60 | 25 | | | 80 | 85 | 95 | | |
| | | | | Grey brown microcrystalline limestone. | | | | 30 | 10 | 25 | 35 | 40 | 15 | | | 15 | 5 | Tr | | |
| | | | | Very dark brown microcrystalline locally calcarenitic, anhydritic, bituminous limestone. | | | | | | | | | | | | 5 | 10 | 5 | | |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | Grey anhydrite. | | | | 5 | | | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | Cavings. | | | | | | | | | | 100 | 100 | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White calcite (with oil fluorescence). | | | | | | | | | | | | Tr | Tr | Tr | | |

AQUITAINE

DATE: October 14, 1969

No. 34

# CUTTINGS: DESCRIPTION AND PERCENTAGE

DEPTH From 3885' To 3926'

WELL NAME WALRUS A-71

| ROCK CLASSIFICATION | | POROSITY TYPE | POROSITY % | LITHOLOGY Description: Colour, Texture, Mineral and organic content (Nature, Diameter, %). | 3885 | 3890 | 3895 | 3900 | 3905 | 3910 | 3915 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calcimetry 1 min | 85 | 60 | 65 | 55 | 65 | 65 | 65 |
| | | | | Calcimetry 3 min | 100 | 76 | 78 | 98 | 100 | 96 | 94 |
| | | | | Calcimetry 15 min | 100 | 77 | 78 | 100 | 100 | 100 | 98 |
| Argillaceous Rocks | Clays ↓ Marls | | | | | | | | | | |
| Carbonate | Limestone ↓ Dolomite | | | Very light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. | 95 | 100 | 95 | 100 | 100 | 100 | 100 |
| | | | | Grey brown microcrystalline limestone. | Tr | | | | | | |
| | | | | Very dark brown, microcrystalline, locally calcarenitic, anhydritic, bituminous limestone. | 5 | Tr | 5 | Tr | Tr | Tr | Tr |
| Detritic Rocks | Silt ↓ Conglomerate | | | | | | | | | | |
| Evaporite | Salt<br>Anhydrite<br>Gypsum<br>Etc. | | | | | | | | | | |
| Miscellaneous | Lignite<br>Metamorphic<br>Igneous<br>Cement<br>Mud<br>Cavings | | | | | | | | | | |
| Fracture | Calcite<br>Dolomite<br>Anhydrite<br>Quartz<br>Etc. | | | White calcite (with oil fluorescence). | Tr | Tr | Tr | Tr | Tr | Tr | Tr |

3917' - 3926' = CORE #4. Recovered 9' = 100%

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.II

## CORE SHEETS

| AQUITAINE | DATE | CORE SHEET | CORE No | WELL NAME |
|---|---|---|---|---|
| | 27 8 1969 | | 1 | WALRUS A 71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 15 Ft in 1 Hr 55 Min | 1432' | 1447 ' | 15 Ft ( 100 %) |

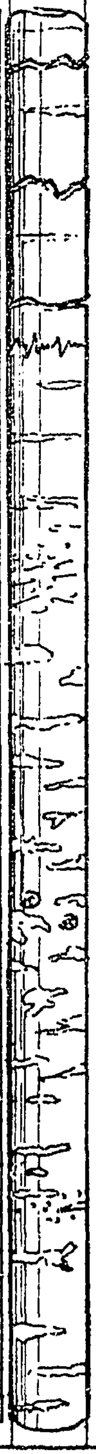
| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: CHRISTENSEN Diameter 6 3/4 | D= 1,04 V= 62 WL = 11 cc | M.C. KMIECLUCK |

Scale 1/2"=1' or 1/24

| Depth | Calcimetry 1' | Calcimetry 15' |
|---|---|---|
| 1432 | | |
| 1433 | 92 | 100 |
| 1434 | 93 | 100 |
| 1435 | 97 | 100 |
| 1436 | 75 | 88 |
| 1437 | 97 | 100 |
| 1438 | 98 | 100 |
| 1439 | 55 | 100 |
| 1440 | 72 | 100 |
| 1441 | 57 | 100 |
| 1442 | 70 | 100 |
| 1443 | 66 | 90 |
| 1444 | 60 | 87 |
| 1445 | 53 | 100 |
| 1446 | 73 | 100 |
| 1447 | | |

Fragments: 1, 2, 3, 4, 5, 5b, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

Log



Shows: NIL

Fractures: Some oblique open fractures

Dips: Subhorizontal

Age: DEVONIAN

Formation: KWATABOAHEGAN FORMATION

Apparent Porosity Grade: 6 % (1432–1438); 8 % (1438–1447)

Laboratory Results: NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density

LITHOLOGY

Calcaire rose-beige grumeleux a passees centimetriques de calcaire plus fin et plus fonce

Quelques joints tapisses par de l'argilite rouge brique ferrugineuse, un joint stylolithique.

Intercalations centimetriques de calcaire organogenes (algues et stromatopores ) tres recristallise.

Pink-beige crumbly limestone with centimetric intercalations of finer and darker limestone.

Few bedding planes lined with ferruginous brick-red argillite, one stylolithic bedding plane.

Centimetric intercalations of organogenic limestone (Algae and Stromatoporas ), higly recrystallized.

1438

Calcaire dolomitique rose fonce plus fin a larges plages allongees a contours dechiquetes representant des lits d'algues encroutantes tres recristallisees.

Nombreuses vacuoles et geodes et plages cargneulisees.

Plusieurs niveaux a stromatopores (amphipora branchus ?), receptaculites et favosites.

Finer dark pink dolomitic limestone, with long patches with jagged edges uprepresenting beds of encrusting Algae highly recrystallized

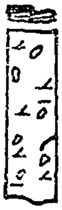
Numerous vesicles, geodes and patches of cellular dolomite.

Several floors with Stromatoporas (branching Amphiporas ), Receptaculites and Favosites.

**AQUITAINE**

# CORE SHEET

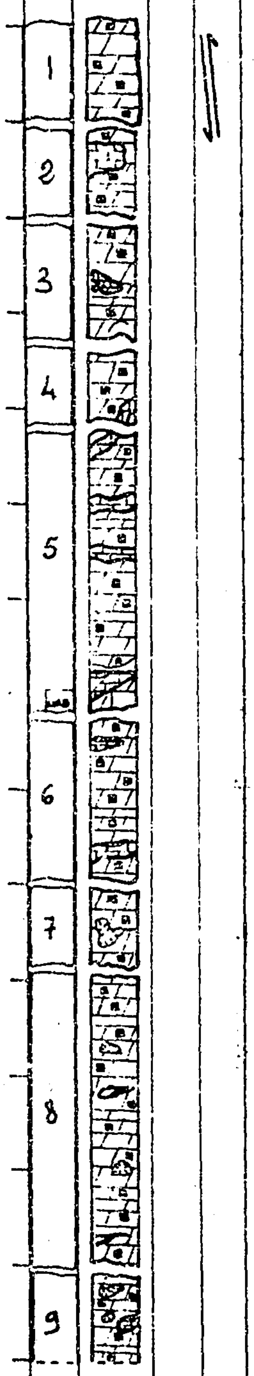
| | | | |
|---|---|---|---|
| DATE | Sept. 15th 69 | CORE No | 2 |
| WELL NAME | Walrus A - 71 | | |
| CORED | 1 Ft / in / Hr 30 Min | FROM | 2000 ' |
| TO | 2001 ' | RECOVERED | 1 Foot ( 100 %) |
| CORE BARREL | Type: JUNK BASKET Diameter: 12 ¼ | MUD | SEA WATER-DUOVIS SYSTEM |
| GEOLOGIST | SERGE RUEFF | | |

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 2 |  | | | | 28 65 85 | + + | SILURIAN | KENOGAMI RIVER | Vug | | - Black intraformationnal shaly calcareous breccia<br>Grey millimetric pebbles of shale.<br>- Grey lacinated shale. | | | | | | |
| 2001 | | | | | | 23 54 60 | + | | | | | - Dark grey,slightly greenish shale. | | | | | | |

| AQUITAINE | DATE | CORE SHEET (1 of 2) | CORE Nc | WELL NAME |
|---|---|---|---|---|
| | Sept. 17 th 69 | | 3 | WALRUS A 71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 14 Ft . in 2 Hr 30 Min | 2670 feet | 2684 Ft | 14 Ft ( 100 %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: Christensen Diameter: 6"¾ | sea water - DUOVIS SYSTEM | SERGE RUEFF |



| Scale 1"=1' or 1/12 Depth | Fragments | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2670 | 1 | | | SILURIAN | EKWAN RIVER (LOWER MEMBER) | | | ABSTRACT: Very darck brown fractured microcrystalline bituminous, calcareous dolomite and dolomite millimetric to centimetric levels of bitumen: Few ghosts and fragments of organisms. Some zones of grey microcrystalline dolomitic limestone and of anhydrite.<br>Porosity: - vugs<br>- intercrystalline porosity: 2 - 15%<br>- size of largest pores =2 mm; average size of porese =60 microns<br>Content=salty water; neither gas nor oil show. | | | | | | |
| | 2 | | | | | | | | | | | | | |
| 2671 | 3 | 45 80 97 + | | | | | | Zone of grey microcrystalline dolomitics limstone<br>Very darck brown macrocrystalline bituminous dolomite millimetric to centimetric levels of bitumen<br>Porosity = 5% Size of largest pore = 400 microns average size of pore = 80 microns | | | | | | |
| 2672 | 4 | | | | | | | | | | | | | |
| | 5 | | | | | | | Several zones of grey macrocrystalline dolomitic limstone. | | | | | | |
| 2673 | | 50 68 74 | | | | | | | | | | | | |
| 2674 | 6 | | | | | | | Very dark brown macrocrystalline bituminous dolomite; millimetric to centimetric levels of bitumen;<br>Porosity = 5% Size of largest pore = 2 mm<br>Average size of pore =120 microns | | | | | | |
| | 7 | | | | | Vug | | Very dark brown macrocrystalline bituminous dolomite. Anhydrite. Millimetric to centimetric levels of bitumen. Crinoids<br>Porosity = 2% Size of largest pore = 1200 microns<br>Average size of pore = 80 microns | | | | | | |
| 2675 | 8 | 35 65 70 + | | | | | | | | | | | | |
| 2676 | | | | | | Vug | | Zone of grey microcrystalline dolomite limstone | | | | | | |
| 2677 | 9 | 17 52 65 + | | | | Vug | | Very dark brown macrocrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen<br>Porosity = 15% + very large amount of pores filled with bituminens. Size of largest pore = 40 microns<br>Average size of pore = 40 microns. | | | | | | |

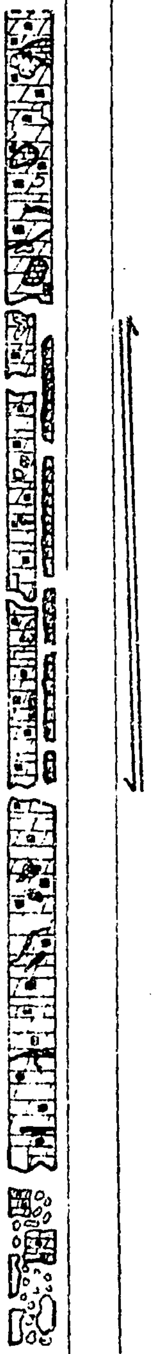
**AQUITAINE**

# CORE SHEET ( 2 of 2 )

| DATE | CORE No | WELL NAME |
|---|---|---|
| | | |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| Ft in Hr Min | | | ( %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type: Diameter. | | |



| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Grade | LITHOLOGY | Laboratory Results NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2677 | | | | | | | | SILURIAN | EKWAN RIVER (LOWER MEMBER) | | | | | | | | | |
| | 9 | | | | | | | | | Vug<br>Vug | | Several zones of grey microcrystalline dolomitic limestone. | | | | | | |
| 2578 | | | | | | | | | | | | | | | | | | |
| | 10 | | | | | | | | | Vug | | Very dark brown microcrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts of organisms.<br>porosity = 5% Size of largest pore 300 microns<br>Average size of pores = 40 microns. | | | | | | |
| 2679 | | | | | | 45 59 59 | + | | | Vug | | | | | | | | |
| | 11 | | | | | | | | | | | | | | | | | |
| 2680 | LAB | | | | | 10 26 26 | + | | | Vug | | Very dark brown microcrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts and fragments of organisms + Algae and Ostracods.<br>Porosity = 2% Size of largest pore ≠ 400 microns<br>Average size of pores = 40 microns | | | | | | |
| | 12 | | | | | | | | | | | | | | | | | |
| 2681 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | Zones of anhydrite | | | | | | |
| 2682 | 13 | | | | | | | | | | | | | | | | | |
| 2683 | LAB | | | | | 65 84 88 | + | | | | | Very dark brown microcrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts and fragments of fossils<br>Porosity: nihil; all pores filled with bitumen. | | | | | | |
| | 14 | | | | | | | | | | | REMARK : Fragment 14 ; many pieces in the core boxes + 1 plastic bag + 2 metallic cans. | | | | | | |
| 2684 | | | | | | | | | | | | Well site salinity = 5,6 gr / Cm3 | | | | | | |

AQUITAINE

DATE: Oct- 14th 1969

# CORE SHEET (1 of 2)

CORE No: 4

WELL NAME: WALRUS A-71

CORED: 9 Ft – in 3 Hr 15 Min

FROM: 3917'

TO: 3926'

RECOVERED: 9 Ft ( 100 %)

CORE BARREL

Type: Christiansen
RC 6905 160 367

Diameter: 8 7/16

MUD: DUOVIS SYSTEM - D=1,72 NaCl: 320

GEOLOGIST: Serge RUFF

Scale 1"=1' or 1/12

**ABSTRACT** = Alternating
-Light brown slightly bituminous limestone.
-Beige to light grey mottled slightly dolomitic, bioclastic and calcarenitic Limestone. Traces of anhydrite. Crinoids, corals, brachiopods and mollusca.

**Porosity** Few vugs, some filled with salt. One level with intergranular porosity (-6%)

**Content** Salted water

| Depth | Fragments | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | Lithology | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3917' | 1 |  |  |  | 70 98 100 x |  | ORDOVICIAN | CHURCHILL RIVER GROUP |  |  |  |  |  |  |  |  |  |
| 3918' | 2 | Salted Water |  |  |  |  |  |  |  |  | Alternating.<br>-Light brown cryptocryst intraformational calcareous breccia with microcryst pebbles. Slightly bituminous. Traces of anhydrite. Brown millimetric straight bands of bitumen. |  |  |  |  |  |  |
| 3919' | 3 |  |  |  | 90 100 100 x |  |  |  | Vug<br>Int grn<br>Vug | Few<br><6%<br>Few | -Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes corals, mollusca.<br>← centimetric coral<br>← Vug filled with salt<br>Light brown cryptocryst to microcryst Limestone. With large dolomite crystals. Fragments of [illegible] of organisms |  |  |  |  |  |  |
| 3920' | 4 | Salted Water | NONE | NONE |  |  |  |  |  |  | ← Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes. Corals. Mollusca |  |  |  |  |  |  |
| 3921' | 5 |  |  |  |  |  |  |  |  |  | Light brown cryptocryst Limestone |  |  |  |  |  |  |
|  | 6 | Yellow Pale Fluorescence |  |  | 75 94 100 x |  |  |  |  |  | Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes corals, mollusca. |  |  |  |  |  |  |
| 3922' | 7 |  |  |  |  |  |  |  |  |  | ← Centimetric Coral<br>-Beige to light grey cryptocryst to microcryst Limestone with undulating millimetric levels of bitumen. "Vermiform" aspect. |  |  |  |  |  |  |
|  | 8 |  |  |  | 60 96 100 x |  |  |  |  |  | Light brown cryptocryst Limestone. |  |  |  |  |  |  |
| 3923' |  | Yellow Pale Fluorescence |  |  |  |  |  |  |  |  | Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes, corals, mollusca. |  |  |  |  |  |  |
|  | 9 |  |  |  |  |  |  |  |  |  | Light brown cryptocryst Limestone. |  |  |  |  |  |  |
| 3924' |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

AQUITAINE

DATE: Oct-14 th 1969

# CORE SHEET (1 of 2)

CORE No: 6

WELL NAME: WALRUS A-71

CORED: 9 Ft - in 3 Hr 15 Min

FROM: 3917

TO: 3926

RECOVERED: 9 Ft (100 %)

CORE BARREL: Type: BC 3906 180 347 Diameter: 8 7/16

MUD: BOOVIS SYSTEM - D: 1,72 Heal: 320

GEOLOGIST: Serge [illegible]

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3924' | 9 |  | Salted Water | NONE | NONE | | | ORDOVICIAN | CHURCHILL RIVER GROUP | | | **Alternating**<br>-Light brown cryptocryst to microcryst Limestone with millimetric dark brown straight bands of bitumen;<br>-Beige to light grey cryptocryst to microcryst Limestone with undulating millimetric bands of bitumen. "Vermiform" aspect.<br>Beige to light grey mottled microcryst bioclastic and calcarenitic limestone. Larges crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes, corals, molluscs. | | | | | | |
| 3925' | 10 | | Yellow Pale Fluorescence | | | | | | | | | | | | | | | |
| 3926' | | | | | | 65 68 98 | x | | | | | Light brown cryptocryst to microcryst Limestone.<br>Salinity on core= 76 gr/dm3 | | | | | | |

CORE LABORATORIES - CANADA LTD.
*Petroleum Reservoir Engineering*

P.O. BOX 5870, POSTAL STATION "A"
CALGARY 9, ALBERTA
TELEPHONE: 253-3391

September 23, 1969

Aquitaine Company Of Canada Ltd.
1300, 550 - 6th Avenue S.W.
Calgary 1, Alberta

Attention: Mr. R. Bonafaux

Dear Sir:

Re: $Cl^-$ determinations on core from Walrus A-71 well

In our analysis, 100 mls. of water were used to leach the salt from a dried, pulverized, 20 gram sample. The $Cl^-$ concentrations are as follows:

| Depth | PPM $Cl^-$ |
|---|---|
| 1432 | 1018 |
| 1432.5 | 4110 |
| 1433.7 | 1226 |
| 1434.5 | 839 |
| 1435.5 | 2267 |
| 1436.8 | 1261 |
| 1438.1 | 4141 |
| 1439.3 | 5440 |
| 1440.4 | 3998 |
| 1441.3 | 2159 |
| 1442.3 | 26154 |
| 1443.3 | 6447 |
| 1444.3 | 3587 |
| 1445.6 | 2197 |

In relating these $Cl^-$ determinations to pore water, the values are all excessively high. Due to the presence of salt crystals in the rock, $Cl^-$ determinations related to pore water would be meaningless.

A complete analysis of the water from leaching 20 grams of sample from 1432.5 feet, with 100 ml. water, is attached.

Yours truly,

M. McLaren

M. McLaren,
Lab Supervisor

MM/aw

# CORE LABORATORIES – CANADA LT

PETROLEUM RESERVOIR ENGINEERING

WATER ANALYSIS

File CNP-4

Company Aquitaine Company Of Canada Ltd.

Well Aquitaine Walrus A-71 K.B. Grd.

Location Field Province

Formation Interval

Sampled from Leached from core sample # 2 by

Date sampled Date analyzed Analyst

Recovery

Mud type Water cushion

Total Solids:

Resistivity 0.612 Ohm-meters @ 75 °F

Calculated 9040 mg/liter

Specific gravity 1.0118 @ 60°F

By evaporation @ 110°C mg/liter

pH 7.40 $H_2S$ Absent

By evaporation @ 180°C mg/liter

Refractive Index 1.330 @ 75°F

At ignition mg/liter

## MILLIGRAMS PER LITER

| Na + K | Ca | Mg | Fe | Ba | Br | I | Cl | $HCO_3$ | $SO_4$ | $CO_3$ | OH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2668 | 595 | 44 | Tr. | Abs. | | | 4110 | 83 | 1540 | | |

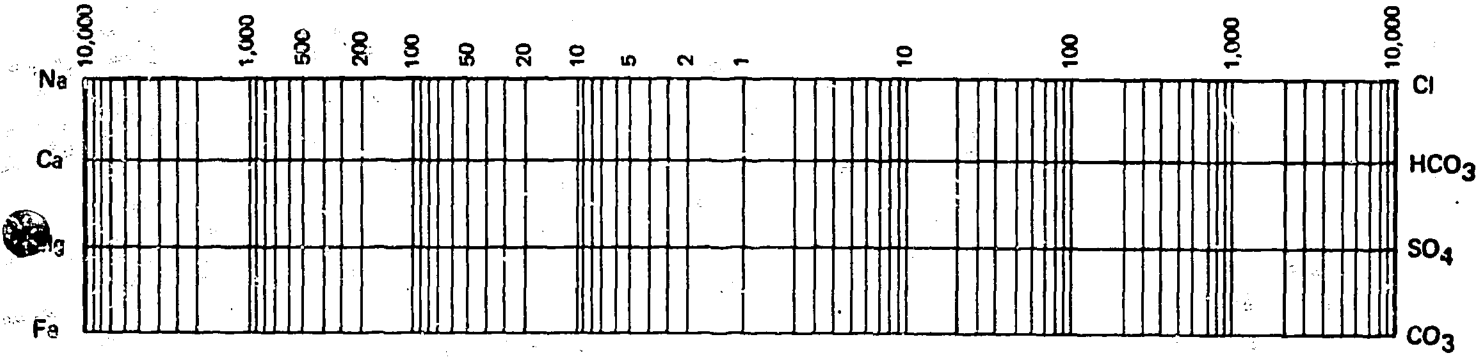
## PER CENT CALCULATED SOLIDS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 29.5 | 6.6 | 0.5 | | | | | 45.5 | 0.9 | 17.0 | | |

## MEQ PER LITER

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 116.0 | 29.7 | 3.6 | | | | | 115.9 | 1.4 | 32.0 | | |

## LOGARITHMIC PATTERN MEQ PER LITER



AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.III

## DAILY REPORT - GEOLOGY - SHOWS

N.B. Numbering of the Daily Report - Geology - Shows is the same as that of the Daily Drilling Reports.

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Aug. 22, '69 | 2 16 | | 3 259 Ft. | 4 13 Hr. | 5 1040 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 781 | 860 | 18 - 96 | 5-12 | 5-20 | | - | - | Yellow brown silty to sandy calcareous plastic clay. Conglomeratic elements of metamorphic rocks. |
| 860 | 1040 | 16 - 96 | 5-15 | 8-20 | | - | - | Red-brown, silty to sandy gypsiferous plastic clay. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 15"OSC JK + 26" HO. 16

AGE/FORMATION 781' - 860' = Pleistocene Drift
860' - 1040' = Devonian, Moose River Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | Colour Intensity |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background | | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | C1/C2 | C1/C3 | | | | C1/C2 | C1/C3 | /Choke | Kick | Suct. | Comp. | |
| 26 Constant Increasing Decreasing Regularly Irregularly | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD = Sea Water.

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D | 43 | 44 | 45 | 47 | 48 | 49 |
| V | | | | | | |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Re-drilling cement.
Touched bottom (781') at 12.24 a.m.

Program Drilling. 52

Position at 8 A.M. 1120'. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Aug. 23, '69. | 2 17 | 3 80 Ft. | 4 4.30 Hr. | 5 1120 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 1040 | 1060 | 20 - 24 | 15-35 | 18-40 | 20-50 | - | - | Red-brown, silty to sandy gypsiferous plastic clay. |
| 1060 | 1120 | 18- 48 | 25-30 | 35-40 | 38-45 | - | - | Red-brown, silty to sandy gypsiferous plastic clay.<br>Thin alternating levels of:<br>- slightly indurated red-brown clay<br>- light beige microcrystalline dolomite<br>- gypsum and anhydrite<br>- pink very fine-grained calcareous sandstone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 15"OSC JK + 26" HO 16

AGE/FORMATION Devonian, Mosse River Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | $C1/_{C2}$ | $C1/_{C3}$ | | | | $C1/_{C2}$ | $C1/_{C3}$ | /Choke | Kick | Suct. | Comp. | |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD = Sea Water

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D | 43 | 44 | 45 | 47 | 48 | 49 |
| V | | | | | | |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Casing 20". 52

Position at 8 A.M. 1,120'. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Aug. 26, '69 | 2 20 | 3 312 Ft. | 4 14.45 Hr. | 5 1432 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 1120 | 1385 | 10-12 | 12-35 | 18-45 | 21-52 | - | - | Red-brown, silty to sandy gypsiferous and anhydritic calcareous plastic clay.<br>Thin alternating levels of:<br>- slightly indurated red-brown clay<br>- light beige microcrystalline dolomite<br>- gypsum and anhydrite<br>- pink very fine-grained calcareous sandstone. |
| 1385 | 1420 | 30-96 | 40-52 | 45-62 | 52-70 | - | - | idem + abundant white soft anhydrite. |
| 1420 | 1432 | 26-96 | 52-56 | 65-73 | 78-80 | Inter-granular | 8% | Pinky beige microcrystalline, soft, locally sandy limestone. Traces of cellular dolomite. |

Devonian: 1120' - 1385' = Moose River Form.

TYPE OF DRILLING ROTARY.

TYPE OF BIT 12 1/4" OSC 3 je 16 + 17 1/2" HO

AGE/FORMATION 1385' - 1432' = Kwataboahegan Form 17

**OIL SHOWS**

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

**GAS SHOWS**

Gas Background

26 Constant Increasing Decreasing Regularly Irregularly

| From | To | % | Ratio C1/C2 | Ratio C1/C3 |
|---|---|---|---|---|
| 27 | 28 | 29 | 30 | 31 |

Gas Shows (Kicks)

| Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

**MUD**

42
D 1.04
V 72
F 7
NaCl
% Fuel

| Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

- 20" casing: shoe at 1106'. Cement up to B.O.P.
- 1333' - 1432': Drilling in 12 1/4". No Hole Opener.

Program Coring. 52

Position at 8 A.M. Tripping out core barrel. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Aug. 27, '69 | 2 21 | | 3 143 Ft. | 4 7 Hr. | 5 1575 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft./Hr | 10 | 11 | 12 | 13 | 14 | 15 CORE #1. 1432' - 1447'. Recovered 15' = 100%. |
| 1432 | 1438 | 8 - 60 | 75 | - | 98 | Vugs | 6 - 8% | Pinky beige crumbly limestone. Recrystallised Algae and Stromatopora. |
| 1438 | 1447 | 34-160 | 53 | - | 100 | Vugs | 6 - 8% | Pinky beige crumbly dolomitic limestone. Traces of cellular dolomite. Recrystallised Algae and Stromatopora. |
| 1447 | 1560 | 12-480 | 58 -<br>100 | 72 -<br>100 | 75 -<br>100 | Vugs | 6 - 8% | Pinky beige to pale beige, crumbly to chalky, slightly dolomitic, limestone. |
| 1560 | 1575 | 28-40 | 40 -<br>85 | 45 -<br>100 | 50 -<br>100 | - | - | Brick-red plastic clay. |

TYPE OF DRILLING ROTARY TYPE OF BIT 12 1/4" OSC 3jet 16

AGE/FORMATION Devonian - Kwataboahegan Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | Odour Intensity |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background | | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | C1/C2 | C1/C3 | | | | C1/C2 | C1/C3 | /Choke | Kick | Suct. | Comp. | |
| 26 Constant Increasing Decreasing Regularly Irregularly | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D 1.13 | 43 | 44 | 45 | 47 | 48 | 49 |
| V 55 | | | | | | |
| F 14.8 | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. Circulating. Waiting on weather. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Aug. 28, '69 | 2 22 | | 3 92 Ft. | 4 3.30 Hr. | 5 1667 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 1575 | 1667 | 10-80 | 25-65 | 30-65 | 35-70 | Inter-granular | 0-69 | Alternating:<br>- pink slightly dolomitic bioclastic limestone<br>- brick-red argillite. |

TYPE OF DRILLING ROTARY TYPE OF BIT 12 1/4" OSC IG 16 AGE/FORMATION Devonian - Kwataboahegan Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | | |
|---|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity | |
| | | | Mud | Cuttings | | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 | |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background | | | Ratio | | Gas Shows (Kicks) | | | Ratio | | Duration | | Density | | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | C1/C2 | C1/C3 | Depth or Time | % Max. | Nature | C1/C2 | C1/C3 | /Choke | Kick | Succ. | Comp. | |
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D 1.13 | 43 | 44 | 45 | 47 | 48 | 49 |
| V 44 | | | | | | |
| F 12.4 | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling 52

Position at 8 A.M. 1786'. Waiting on weather. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Aug. 29,'69 | 2 23 | 3 119 Ft. | 4 4.45 Hr. | 5 1786 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 1667 | 1710 | 13-60 | 40-56 | 45-70 | 50-72 | Inter-granular | 0-6% | Pink bioclastic limestone with alternating levels of:<br>- dark pink sandy limestone<br>- red-brown silty plastic clay.<br>Traces of anhydrite and gypsum.<br>Brachiopods amd Stromatopora. |
| 1710 | 1786 | 15-240 | 22-82 | 35-83 | 36-90 | - | - | White, light beige and grey, locally dolomitic and chalky limestone with alternating levels of:<br>- grey bioclastic, locally oolitic, limestone. Brachiopods;<br>- red, orange and brown limestone. Crinoids, Brachiopods;<br>- red-brown claystone. Traces of cellular dolomite, calcite and anhydrite. |

Devonian: 1667' - 1710' = Kwataboahegan Form.

TYPE OF DRILLING ROTARY

TYPE OF BIT 12 1/4"OSC IG3 16

AGE/FORMATION 1710' - 1786' = Stooping River F. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background 26 | From | To | % | Ratio C1/C2 | Ratio C1/C3 |
|---|---|---|---|---|---|
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 27 | 28 | 29 | 30 | 31 |

| Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Gust. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD 42

| | | Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|---|---|
| D | 1.20 | 43 | 44 | 45 | 47 | 48 | 49 |
| V | 44 | | | | | | |
| F | 48 | | | | | | |
| NaCl | 33 | | | | | | |
| % Fuel | 0 | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 1786'. Waiting on weather. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 7, '69 | 2 32 | 3 214 Ft. | 4 8.30 Hr. | 5 2000 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 1786 | 1830 | 18-40 | 65-71 | - | 65-95 | - | - | White, light beige and grey locally dolomitic and chalky limestone with alternating levels of:<br>- grey bioclastic, locally oolitic, limestone. Brachiopods;<br>- red, orange and brown limestone. Crinoids, Brachiopods;<br>- red-brown claystone. Traces of cellular dolomite, calcite and anhydrite. |
| 1830 | 2000 | 18-60 | 40-83 | - | 45-83 | - | - | Alternating:<br>- red-brown shale<br>- grey to light grey-green soft calcareous shale. |
| | | | | | | | | At 1885': a bed of beige to dark grey and pink to red spotty bioclastic limestone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 15" OSC IG3 16

AGE/FORMATION 1786-1830' = Devonian: 1830-2000' = Silurian. 17
Stooping R.F. Kenogami R.F.

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

25 Constant
Increasing
Decreasing
Regularly
Irregularly

| Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD

42
D 1.20
V 56
F 48
NaCl 33
% Fuel 0

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total | | 46 | Daily Total | | 50 |

REMARKS 51

Run Dual Induction + SP from 1994' to 1108'.

Program Schlumberger operations. Reaming in 17 12". 13 3/8" casing. 52

Position at 8 A.M. 2000'. Schlumberger operations. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Sept. 8, '69 | 2 33 | | 3 - Ft. | 4 - Hr. | 5 2000 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | | | | | SCHLUMBERGER OPERATIONS. |
| | | | | | | | | Dual Induction + SP from 1994' to 1108'. |
| | | | | | | | | Microlog + Microcaliper from 1998' to 1108'. |
| | | | | | | | | Sonic BHC + Caliper from 1998' to 1040'. |

TYPE OF DRILLING -

TYPE OF BIT - 16

AGE/FORMATION Silurian - Kenogami River Form. Middle Member 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background | | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | $C_1/C_2$ | $C_1/C_3$ | | | | $C_1/C_2$ | $C_1/C_3$ | /Choke | Kick | Suct. | Comp. | |
| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D | | | | | | |
| V | 43 | 44 | 45 | 47 | 48 | 49 |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Reaming in 17 1/2". 13 3/8" casing. 52

Position at 8 A.M. 2000'. Reaming. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Sept. 11,'69 | 2 36 | | 3 - Ft. | 4 - Hr. | 5 2000 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | | | | | SCHLUMBERGER OPERATIONS. |
| | | | | | | | | Caliper from 1996' to 1106'. |

TYPE OF DRILLING - TYPE OF BIT - 16

AGE/FORMATION Silurian - Kenogami River Form. Middle Member 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Direct Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD

| 42 | Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|---|
| D | | | | | | |
| V | 43 | 44 | 45 | 47 | 48 | 49 |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program 13 3/8" casing. 52

Position at 8 A.M. Waiting on weather. 53

AQUITAINE

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 12, '69 | 2 37 | 3 - Ft. | 4 - Hr. | 5 2000 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | CARBONATE W.UW 3 min | CARBONATE W.UW 15 min | POROSITY Type | POROSITY Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | | | | | SCHLUMBERGER OPERATIONS. |
| | | | | | | | | Gamma Ray from 1998' to 540'. |

TYPE OF DRILLING -

TYPE OF BIT - 16

AGE/FORMATION Silurian - Kenogami River Form. Middle Member. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| Gas Background 26 | From | To | % | Ratio C1/C2 | Ratio C1/C3 |
|---|---|---|---|---|---|
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 27 | 28 | 29 | 30 | 31 |

| Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Sect. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

## MUD

| 42 | Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|---|
| D | | | | | | |
| V | 43 | 44 | 45 | 47 | 48 | 49 |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program 13 3/8" casing. 52

Position at 8 A.M. Waiting on weather. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 15,'69 | 2 40 | 3 355 Ft. | 4 5:30 Hr. | 5 2355 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | | | | | Core #2 Junk Basket. 2000' - 2001'. Recovered 1' = 100%. |
| | | | | | | | | Alternating: |
| 2000 | 2000'3" | | 28 | 65 | 85 | - | - | Black intraformational, shaly, calcareous breccia, grey millimetric pebbles of shale |
| | | | | | | - | - | Grey laminated shale |
| 2000'3" | 2001' | | 23 | 54 | 60 | - | - | Dark grey slightly greenish shale |
| 2001 | 2058 | 20-240 | 13-42 | 19-63 | 22-74 | | | Dark grey to brown slightly dolomitic shale. Corals and silicified organisms |
| 2058 | 2355 | 55-500 | 3-10 | 5-12 | 9-15 | | | Grey, brown to red-brown, plastic shale. |

TYPE OF DRILLING Rotary

TYPE OF BIT 12 1/4 OSC JH 16

AGE/FORMATION Silurian: Kenogami River Formation - Middle Member. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background | | | Ratio | | Gas Shows (Kicks) | | | Ratio | | Duration | | Density | | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | C1/C2 | C1/C3 | Depth or Time | % Max. | Nature | C1/C2 | C1/C3 | /Chcks | Kick | Suct. | Comp. | |
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

**Remarks:** Slight occurrences of gas from 2502'. C1/C2 = 27.

## MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D 1.15 | 43 | 44 | 45 | 47 | 48 | 49 |
| V 47 | | | | | | |
| F 18.6 | | | | | | |
| NaCl 20 | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

2355-2520 - plastic clay, dolomitic shale, dolomite, calcareous sandstone and anhydrite. Kenogami River Formation - Lower Member.

2520-2557 - slightly porous limestone and calcareous dolomite. Ekwan River Formation - Upper Member.

Program Drilling. 52

Position at 8 A.M. Circulating at 2557'. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 16,69 | 2 41(i) | 3 315 Ft. | 4 13 Hr. | 5 2670 Ft. | 6 Walrus A-71 |

| From 7 | To 8 | Drilling Rate 9 | CARBONATE W.UW 1 min 10 | CARBONATE W.UW 3 min 11 | CARBONATE W.UW 15 min 12 | POROSITY Type 13 | POROSITY Grade 14 | LITHOLOGY 15 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ft/Hr. | | | | | | | |
| 2355 | 2430 | 20-40 | 5 | 7 | 8 | - | - | Alternating: | Beige to brown plastic clay |
| | | | 35 | 60 | 80 | - | - | | Pink and grey dolomitic shale |
| | | | 20 | 55 | 83 | - | - | | Beige to light brown cryptocrystalline dolomite |
| | | | 45 | 48 | 48 | - | - | | Beige to light grey and red-brown calcareous sandstone |
| | | | | | | | | | Compact, very fine to fine grained. |
| 2430 | 2526 | 30-200 | 20 | 55 | 83 | - | - | Alternating: | Beige to light brown cryptocrystalline dolomite |
| | | | - | - | - | - | - | | White to brown and light to dark grey anhydrite |
| | | | - | - | - | - | - | | Traces of pyrite |
| 2526 | 2605 | 10-17 | 60 | 92 | 100 | interx + organic | 6% | Alternating: | Light brown, microcrystalline to crystalline bioclastic limestone |
| | | | 35 | 77 | 100 | interx | 6% | | Beige, red speckled, locally porous, calcareous dolomite |
| | | | 30 | 65 | 76 | - | - | | Light brown cryptocrystalline to microcrystalline calcareous dolomite, traces of pyrite. |

TYPE OF DRILLING Rotary TYPE OF BIT 12 1/4 OSC JH 16

AGE/FORMATION Silurian 17

## OIL SHOWS

| Depth or Time 18 | Colour 19 | Odour 20 | Fluorescence Direct Mud 21 | Fluorescence Direct Cuttings 22 | Fluorescence Extr. Cuttings 23 | Colour Intensity 24 |
|---|---|---|---|---|---|---|
| | | | | | | |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| Gas Background 26 | From 27 | To 28 | % 29 | Ratio C1/C2 30 | Ratio C1/C3 31 | Gas Shows (Kicks) Depth or Time 32 | % Max. 33 | Nature 34 | Ratio C1/C2 35 | Ratio C1/C3 36 | Duration /Choke 37 | Duration Kick 38 | Density Suct. 39 | Density Comp. 40 | Sample 41 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~Constant~~<br>~~Increasing~~<br>Decreasing<br>Regularly<br>~~Irregularly~~ | | | | | | 2502 | | first traces of gas | | | | | | 1.12 | |
| | | | | | | 2563 | 1.9 | | 30 | | | 22 | | | |
| | | | | | | 8:a.m. | 0.9 | R1 | 29 | | | 20 | | | |
| | | | | | | 9:a.m. | 0.4 | R2 | | | | - | | | |
| | 2568 | | 0.1 to 0 | | | | | | | | | | | | |
| | | | | | | 2568 | 0.48 | gas trip | 30 | | | 15 | 1.19 | 12 | X3 |

## MUD

42
D 1.21
V 41
F 16.8
NaCl 47
% Fuel

| Gain From 43 | Gain To 44 | Gain bbl/h 45 | Loss From 47 | Loss To 48 | Loss bbl/h 49 |
|---|---|---|---|---|---|
| 2628 | 2667 | 8 | | | |
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling 52

Position at 8 A.M. Coring. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 16, '69 | 2 41 (ii) | 3 315 Ft. | 4 13 Hr. | 5 2670 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr. | 10 | 11 | 12 | 13 | 14 | 15 |
| 2605 | 2670 | 15-120 | 76 | 90 | 94 | interx | | Alternating: beige to pale brown microcrystalline to crystalline |
| | | | 97 | 100 | 100 | intergran. | 6-8% | - bioclastic |
| | | | | | | organic | | - calcarenitic |
| | | | | | | | | - biohermal limestone |
| | | | | | | | | + traces of pyrite & white crystalline calcite. |
| | | | | | | | | AGE/FORMATION: |
| | | | | | | | | 2354-2520 - Kenogami River Form., Lower Member. |
| | | | | | | | | 2520-2602 - Ekwan River Form., Upper Member. |
| | | | | | | | | 2602-2670 - Ekwan River Form., Attawapiskat Member. |

TYPE OF DRILLING

TYPE OF BIT 16

AGE/FORMATION 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

26 Constant ~~Increasing~~ Decreasing Regularly ~~Irregularly~~

| Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| 2572 | 2612 | 0.07 | | | 2614' | 0.17 | show | | | | 10 | 1.19 | 120 | |
| 2614 | 2668 | 0.05 | | | 2668' | 0.17 | show | | | | 15 | 1.22 | 123 | |
| 2668 | end cir | 0.05 to 0 | | | | | | | | | | | | |

Remark: too weak for ratios.

## MUD

42

D 1.21

V 41

F 16.8

NaCl 47

% Fuel

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. Coring. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 17, '69 | 2 42 (i) | 3 233 Ft. | 4 Hr. | 5 2903 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 2670 | 2684 | 5 | 40 | 80 | 97 | | | Core #3. Recuperation 14' = 100%. |
| | | | 50 | 68 | 74 | vugs | | Very dark brown, fractured, microcrystalline, bituminous, calcareous |
| | | | 35 | 65 | 70 | and | | dolomite and dolomite, and millimetric to centimetric levels of |
| | | | 17 | 52 | 65 | inter- | 2 - 15 % | bitumen. Few ghosts and fragments of organisms. |
| | | | 45 | 59 | 59 | crystal- | | Some zones of grey, microcrystalline, dolomitic limestone and of |
| | | | 10 | 26 | 26 | line | | anhydrite. |
| | | | 65 | 84 | 84 | | | Porosity = (few) vugs |
| | | | | | | | | - intercrystalline porosity = 2 - 15% |
| | | | | | | | | Content - salty water (150 g/l?). No gas or oil shows. |
| 2684 | 2740 | 20-60 | " | " | " | " | " | Lithology same as in Core #3. |

TYPE OF DRILLING Rotary TYPE OF BIT 16

AGE/FORMATION Silurian. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

Gas Background

| 26 | From | To | % | Ratio C1/C2 | C1/C3 |
|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 |
| Constant<br>~~Increasing~~<br>~~Decreasing~~<br>~~Regularly~~<br>~~Irregularly~~ | 2672 | 2684 | 0.1 | | |

Gas Shows (Kicks)

| Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| 2668' | 0.5 | trip gas | 18 | | | 20 | 121 | 126 | |
| 2684' | 0.6 | trip gas | | | | 15 | 1.22 | 1.26 | |
| 2:00pm | 0.18 | R1 | | | | 15 | | | |
| 2:40pm | 0.14 | R2 | | | | 7 | | 1.2 | |
| 2748' | 0.35 | Kick | 4 | | | 20 | 1.21 | 1.23 | |
| 2782' | 0.25 | Kick | 6 | | | 30 | 1.20 | 1.23 | |

## MUD

42
D 1.23
V 41
F 16.8
NaCl 48
% Fuel —

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| 2858 | 2890 | 17 | | | |
| Total | | 46 | Daily Total | | 50 |

REMARKS 51

Shows at 2748' and 2782' = gas of different nature - ratio of 4 and 8, instead of 30 detected at 2563'.

Program Drilling. 52

Position at 8 A.M. 53

AQUITAINE

| DATE | No. | | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|
| 1 Sept. 17, '69 | 2 42 (ii) | **DAILY REPORT GEOLOGY - SHOWS** | 3 Ft. | 4 Hr. | 5 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | CARBONATE W.UW 3 min | CARBONATE W.UW 15 min | POROSITY Type | POROSITY Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr. | 10 | 11 | 12 | 13 | 14 | 15 |
| 2740 | 2810 | 9 - 80 | 95 | 98 | 98 | - | - | Whitish to pale beige microcrystalline, slightly bituminous and slightly bioclastic limestone. White crystalline calcite. Traces of anhydrite. |
| 2810 | 2905 | 9 - 48 | 8 | 27 | 73 | intergran | <1% | Pink to white, microcrystalline dolomite. |
| | | | | | | | | AGE/FORMATION:<br>2670-2802' = Ekwan River Form., Lower Member<br>2802-2905' = Severn River Form. |

TYPE OF DRILLING Rotary

TYPE OF BIT 16

AGE/FORMATION Silurian. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr. Cuttings | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background From | Gas Background To | Gas Background % | Ratio C1/C2 | Ratio C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| (1) | 2782 | 2830 | 0.07 to 0 | | | 2830 | 0.03 | after conn. | - | | | | 1.19 | 122 | |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | 2862 | 0.02 | after conn. | - | | | 7 | 123 | 123 | |
| (2) | 2830 | 2890 | 0.03 to 0.1 | | | | | | | | | | | | |
| | | | | | | 2890 | 0.20 | | | | | | | | |

MUD see page (i)

| 42 | Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|---|
| D | 43 | 44 | 45 | 47 | 48 | 49 |
| V | | | | | | |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

(1) Decreasing regularly.
(2) Increasing regularly.

Program Drilling. 52

Position at 8 A.M. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 18, '69 | 2 43 | 3 7 Ft. | 4 1.45 Hr. | 5 2910 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | CARBONATE W.UW 3 min | CARBONATE W.UW 15 min | POROSITY Type | POROSITY Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr. | 10 | 11 | 12 | 13 | 14 | 15 |
| 2903 | 2910 | 7 - 30 | 8 | 25 | 93 | - | - | Whitish to pale beige, cryptocrystalline to microcrystalline, very slightly silicified dolomite. |

TYPE OF DRILLING Rotary

TYPE OF BIT 12 1/4 OSC JH 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr. Cuttings | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | Ratio C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant | 0 | 4H | 0.07 | | | 1:50am | 0.09 | | - | | | 40 | | 127 | |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | 3:00am | 0.1 | | - | | | 35 | | | |
| | | | | | | 6:50am | 0.42 | after cir casing shoe | | | | 45 | 1.22 | 129 | |
| | 6:50H end cir. to 0.08 0.18 (irregular) | | | | | | | | | | | | | | |
| | | | | | | 2904' | 1.5 | trip gas | 40 | | | 50 | 131 | 133 | |
| | | | | | | 20:30H | 92 | R1 | | | | 30 | | | |

## MUD

| 42 | Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|---|
| D 1.33 | 43 | 44 | 45 | 47 | 48 | 49 |
| V 37-42 | | | | | | |
| F 19 | 24:00H | 10:00 | 10.5 | | | |
| NaCl 135 | 19:00 | 20:45 | 80 | | | |
| % Fuel -0- | 2905 | 2912 | | | | |
| | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling to 3030', then casing 9 5/8". 52

Position at 8 A.M. 53

**AQUITAINE**

# DAILY REPORT
# GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 19, '69 | 2 44 | 3 55 Ft. | 4 11 Hr. | 5 2965 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 2910 | 2965 | 4-17 | 8 | 25 | 93 | - | - | Whitish to pale beige cryptocrystalline to microcrystalline, very slightly silicified dolomite, few traces of anhydrite. |
| | | | | | | | | SCHLUMBERGER OPERATIONS. |
| | | | | | | | | Dual Induction + SP from 2958' to 1975'. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 12 1/4" OSC J4 [illegible]

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Direct Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| Gas Background 26 | From | To | % | Ratio C1/C2 | Ratio C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| | | | | | | 2915 | 0.35 | Trip gas | | | | 30 | 133 | 133 | |
| ~~Constant~~<br>~~Increasing~~<br>Decreasing<br>Regularly<br>~~Irregularly~~ | 1:00 | 4:30 | 0.1 to | | | | | | | | | | | | |
| | | | 0.07 | | | 2940 | 0.2 | | | | | 30 | | | |
| | | | | | | 5:55 | 0.14 | R1 | | | | 7 | | | |
| | | | | | | 6:50 | 2.09 | R2 | | | | 7 | | | |
| | 2940 | 2960 | 0.2 to | | | 2955 | 0.2 | Circulation | | | | 60 | | | |
| | | | 0.05 | | | 10:50 | 0.14 | R1 | | | | 15 | | | |

## MUD

42

D ~~1.33~~ 1.35

V 41.46

F 17.6

NaCl 280

% Fuel —

| Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| 4H | 24H | 20 | | | |
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Electric operations. 9 5/8" casing. 52

Position at 8 A.M. 2965'. Standby for weather. 53

**AQUITAINE**

| | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Sept. 23, '69 | 2 48 | | 3 - Ft. | 4 - Hr. | 5 2965 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | | | | | SCHLUMBERGER OPERATIONS |
| | | | | | | | | Sonic - Gamma Ray - Caliper from 2959' to 1975' |
| | | | | | | | | Laterolog 3 from 2956' to 1975' |
| | | | | | | | | Gamma-Gamma (FDT) from 2959' to 2300' |
| | | | | | | | | Neutron (SNP) from 2959' to 2300'. |

TYPE OF DRILLING -

TYPE OF BIT - 16

AGE/FORMATION Silurian - Severn River Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | C1/C2 | C1/C3 | | | | C1/C2 | C1/C3 | /Choke | Kick | Suct. | Comp. | |
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D | 43 | 44 | 45 | 47 | 48 | 49 |
| V | | | | | | |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

9 5/8" Casing: shoe at 2960'. Cement up to B.O.P.

Program Drilling. 52

Position at 3 A.M. Waiting on cement. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 24, '69 | 2 49 | 3 49 Ft. | 4 4 Hr. | 5 3014 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr. | 10 | 11 | 12 | 13 | 14 | 15 |
| 2965 | 3014 | 12 - 24 | 15-30 | 30-50 | 60-100 | - | - | White to pale beige cryptocrystalline to microcrystalline dolomite, azoic and compact. |

TYPE OF DRILLING ROTARY TYPE OF BIT 8 1/2" OSC J.H 16 AGE/FORMATION Silurian - Severn River Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

26 Constant Increasing Decreasing Regularly Irregularly

| Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

MUD

42

D 1.34

V 46

F 34.2

NaCl 190

% Fuel -

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total | | 46 | Daily Total | | 50 |

REMARKS 51

1. Calcium in mud = 100 gr/litre.
2. No gas from 2965' to 3075'. Gas background increasing from 0% to 0.38% from 3075' to 3090'. (Mud density = 1.34).

Program Drilling. 52

Position at 8 A.M. 3092'. Dolomitic limestone. Severn River Formation. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Sept. 25,'69 | 2 50 | | 3 88 Ft. | 4 7.30 Hr. | 5 3102 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3014 | 3030 | 12-15 | 22 | 52 | 91 | - | - | Pinky white, pink, slightly brown, locally yellowish microcrystalline to crystalline dolomite , compact, azoic. |
| 3030 | 3102 | 12-30 | 45 | 76 | 88 | - | - | Pale beige, pale grey to pale brown microcrystalline slightly argillaceous dolomitic limestone. |
| | | | | | | | | Traces of white chalky limestone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 8 1/2" OSC JH 16

AGE/FORMATION Silurian - Severn River Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background | | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | C1/C2 | C1/C3 | | | | C1/C2 | C1/C3 | /Choke | Kick | Suct. | Comp. | |
| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| ~~Constant~~<br>Increasing<br>~~Decreasing~~<br>Regularly<br>~~Irregularly~~ | 3075 | 3090 | 0 to<br>0.38<br>(C1) | | | 23:45 | 7.5 | Trip<br>gas | 48 | | | | | | |

MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| | 43 | 44 | 45 | 47 | 48 | 49 |
| D 1.75 | | | | | | |
| V 62 | | | | | | |
| F 21.4 | | | | | | |
| NaCl 240 | | | | | | |
| % Fuel - | Total 25 bbl. 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling 52

Position at 8 A.M. 3161'. Dolomitic limestone. Traces of chert. Severn River Form. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 26, '69 | 2 51 | 3 86 Ft. | 4 14 Hr. | 5 3188 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | CARBONATE W.UW 3 min | CARBONATE W.UW 15 min | POROSITY Type | POROSITY Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3102 | 3188 | 3-11 | 28-45 | 55-80 | 65-100 | - | - | Pale beige to pale brown microcrystalline slightly argillaceous dolomitic limestone with intercalations of pinky white to pinky brown microcrystalline compact and azoic dolomite.<br>Traces of white chalky limestone. |

TYPE OF DRILLING ROTARY    TYPE OF BIT 8 1/2" OSC IG 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| | Gas Background From | Gas Background To | Gas Background % | Ratio C1/C2 | Ratio C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| | 3105 | 3188 | 0.10 | | | | | | | | | | | | |
| Constant | | | C1 | | | 3140 | 0.33 | After circulation | | | | | | | |
| ~~Increasing~~ | | | | | | 3160 | 9.5 | Trip | 37 | | | | | | |
| ~~Decreasing~~<br>~~Regularly~~<br>~~Irregularly~~ | | | | | | | | gas | | | | | | | |

## MUD

42
D 1.73
V 60
F 32
~~Na~~Cl 210
% Fuel

| Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |

Total 25 bbl 46    Daily Total 50

REMARKS 51

Program Drilling 52

Position at 8 A.M. 3230'. Limestone, light grey beige. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 27, '69 | 2 52 | 3 87 Ft. | 4 17.45 Hr. | 5 3275 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3188 | 3195 | 8-11 | 35-45 | 55-65 | 82-88 | - | - | Pale beige to pale brown microcrystalline slightly argillaceous dolomitic limestone. |
| 3195 | 3275 | 4-9 | 60-91 | 75-100 | 78-100 | - | - | Whitish to light beige, microcrystalline, locally recrystallised, hard, compact slightly dolomitic limestone.<br>Echinoderms. Brachiopods. Bryozoa. Dasycladacae? |

TYPE OF DRILLING ROTARY TYPE OF BIT 8 1/2" W7R 16

AGE/FORMATION Silurian - Severn River Formation 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| Gas Background 26 | From | To | % | Ratio $C_1/C_2$ | $C_1/C_3$ |
|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | Traces of $H_2$ and $N_2$ | | | | |

| Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio $C_1/C_2$ | $C_1/C_3$ | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

## MUD

42
D 1.78
V 62
F 20
~~Na~~Cl 210
% Fuel -

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling 52

Position at 8 A.M. 3305'. Limestone, beige. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Sept. 28, '69 | 2 53 | | 3 74 Ft. | 4 21 Hr. | 5 3349 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | CARBONATE W.UW 3 min | CARBONATE W.UW 15 min | POROSITY Type | POROSITY Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft./Hr. | 10 | 11 | 12 | 13 | 14 | 15 |
| 3275 | 3349 | 3 - 7 | 65-85 | 75-97 | 77-100 | - | - | Alternating:<br>- whitish to light beige, microcrystalline, locally recrystallised, locally pseudo-oolitic, hard, compact, slightly dolomitic limestone<br>- white chalky limestone.<br>From 3320' to 3330' : pinky beige ferruginous limestone. |

TYPE OF DRILLING ROTARY TYPE OF BIT 8 1/2" OWV Jet 16

AGE/FORMATION Silurian - Severn River Formation 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background 26 | From | To | % | Ratio C1/C2 | Ratio C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | Traces of $N_2$ and $H_2$ | | | | | | | | | | | | | | |

MUD

| 42 | | Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|---|---|
| D | 1.80 | 43 | 44 | 45 | 47 | 48 | 49 |
| V | 60 | | | | | | |
| F | 22 | | | | | | |
| NaCl | 220 | | | | | | |
| % Fuel | | Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3370'. Limestone. 53

**AQUITAINE**

| DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|
| 1 Sept. 29,'69 | 2 54 | | 3 56 Ft. | 4 11.15 Hr. | 5 3405 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3349 | 3405 | 6 - 8 | 60-95 | 65-<br>100 | 70-<br>100 | - | - | Alternating:<br>- whitish to light beige, microcrystalline, locally recrystallised, locally pseudo-oolitic, hard, compact slightly dolomitic limestone<br>- white chalky limestone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 8 1/2" OWV 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Direct Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | Traces of $H_2$ and $N_2$ | | | | | | | | | | | | | | |

## MUD

42
D 1.72
V 65
F 21
NaCl 210
% Fuel

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3470'. Dolomitic limestone. 53

AQUITAINE

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Sept. 30,'69 | 2 55 | 3 151 Ft. | 4 20.45 Hr. | 5 3556 Ft. | 6 Walrus A-71 |

| From 7 | To 8 | Drilling Rate Ft/Hr | CARBONATE W.UW 1 min 10 | 3 min 11 | 15 min 12 | POROSITY Type 13 | Grade 14 | LITHOLOGY 15 |
|---|---|---|---|---|---|---|---|---|
| 3405 | 3440 | 6 - 13 | 78-92 | 80-<br>100 | 82-<br>100 | - | - | Alternating:<br>- whitish to light beige microcrystalline, locally recrystallised, locally pseudo-oolitic, compact limestone<br>- white chalky limestone.<br>3425' = brick-red plastic marl. |
| 3440 | 3556 | 4 - 30 | 45-90 | 68-<br>100 | 72-<br>100 | - | - | Whitish to light beige microcrystalline compact dolomitic limestone.<br>Intercalations of:<br>- white chalky limestone<br>- crystalline calcareous dolomite<br>- from 3500': pink slightly argillaceous dolomitic limestone. |

TYPE OF DRILLING ROTARY TYPE OF BIT 8 1/2" OSC IG 16 AGE/FORMATION Silurian - Severn River Formation. 17

OIL SHOWS

| Depth or Time 18 | Colour 19 | Odour 20 | Fluorescence Direct Mud 21 | Cuttings 22 | Extr. 23 | Colour Intensity 24 |
|---|---|---|---|---|---|---|
| | | | | | | |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| Gas Background 26 | From 27 | To 28 | % 29 | Ratio C1/C2 30 | C1/C3 31 | Gas Shows (Kicks) Depth or Time 32 | % Max. 33 | Nature 34 | Ratio C1/C2 35 | C1/C3 36 | Duration /Choke 37 | Kick 38 | Density Suct. 39 | Comp. 40 | Sample 41 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

MUD

42
D 1.82
V 75
F 20
NaCl 210
% Fuel

| Gain From 43 | To 44 | bbl/h 45 | Loss From 47 | To 48 | bbl/h 49 |
|---|---|---|---|---|---|
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3580'. Dolomitic limestone. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Oct. 1, 1969 | 2 56 | 3 23 Ft. | 4 4.30 Hr. | 5 3579 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3556 | 3579 | 4 - 8 | 73-82 | 80-96 | 90-98 | - | - | Alternating:<br>- light beige microcrystalline dolomitic limestone<br>- white chalky limestone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 8 1/2" OSC IG 16

AGE/FORMATION Silurian - Severn River Formation 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | Colour Intensity |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid Heavy-Pasty-Dry

## GAS SHOWS

| Gas Background | | | | | | Gas Shows (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | C1/C2 | C1/C3 | | | | C1/C2 | C1/C3 | /Choke | Kick | Suct. | Comp. | |
| 26 Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |

## MUD

42

D 1.82

V 75

F 21

NaCl 220

% Fuel

| Gain | | | Loss | | |
|---|---|---|---|---|---|
| From | To | bbl/h | From | To | bbl/h |
| 43 | 44 | 45 | 47 | 48 | 49 |
| Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3579', Waiting on weather. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Oct. 3, '69 | 2 58 | 3 18 Ft. | 4 3.00 Hr. | 5 3597 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3579 | 3597 | 4 - 8 | 86 | 100 | 100 | - | - | Whitish, light beige to light grey microcrystalline compact limestone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 8 1/2" OSC IG 16

AGE/FORMATION Silurian - Severn River Formation. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| ~~Constant~~<br>~~Increasing~~<br>Decreasing<br>~~Regularly~~<br>~~Irregularly~~ | | | 0.4 to 0.1 | | | 2965' | 7.0 | Trip gas 38 | | | | | | | |

MUD

| 42 | Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|---|
| D 1.72<br>V 65<br>F 20<br>NaCl 200<br>% Fuel | 43 | 44 | 45 | 47 | 48 | 49 |
| | Total 40 bbl. 46 | | | Daily Total 50 | | |

REMARKS 51

2965': Circulating at casing shoe. Trip gas and water flow.

Program Drilling. 52

Position at 8 A.M. 3627'. Limestone. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Oct. 4, '69 | 2 59 | | 3 53 Ft. | 4 18.30 Hr. | 5 3650 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3597 | 3650 | 3 - 8 | 65 | 78 | 80 | - | - | Whitish, light beige to light grey microcrystalline, locally argillaceous, pseudo-oolitic, compact limestone. |

TYPE OF DRILLING ROTARY

TYPE OF BIT 8 1/2" OWV 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Direct Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| ~~Constant~~<br>~~Increasing~~<br>Decreasing<br>~~Regularly~~<br>~~Irregularly~~ | 3630 | 3650 | 0.1 C1 | | | 3630 | 1.25 C1 | Trip gas. | | | | | | | |

## MUD

| 42 | | Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|---|---|
| D | 1.74 | 43 | 44 | 45 | 47 | 48 | 49 |
| V | 60 | | | | | | |
| F | 12 | | | | | | |
| NaCl | 315 | | | | | | |
| % Fuel | — | Total 5 bbl. 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3677'. Limestone. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Oct. 5, '69 | 2 60 | | 3 68 Ft. | 4 18:00 Hr. | 5 3718 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grad | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3650 | 3718 | 3 - 8 | 60 | 80 | 95 | - | - | Beige to light grey microcrystalline or recrystallised, pseudo-oolitic, dolomitic limestone. Fossils. |

TYPE OF DRILLING ROTARY TYPE OF BIT 8 1/2" OSC IG 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | C1/C3 |
|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 |
| ~~Constant~~<br>~~Increasing~~<br>Decreasing<br>~~Regularly~~<br>~~Irregularly~~ | | | 0.2 to 0.1 | | |

| Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| 3652 | 3.8 | Trip gas | 54 | | | | | | |
| 3690 | 4.5 | Trip gas | 70 | | | | | | |

## MUD

| 42 | | Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|---|---|
| D | 1.72 | 43 | 44 | 45 | 47 | 48 | 49 |
| V | 65 | | | | | | |
| F | 12 | | | | | | |
| NaCl | 310 | | | | | | |
| % Fuel | | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3729'. Dolomitic limestone. Waiting on weather. 53

| AQUITAINE | DATE | No. | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|---|
| | 1 Oct. 6, '69 | 2 61 | | 3 11 Ft. | 4 2:30 Hr. | 5 3729 Ft. | 6 Walrus A-71 |

| From 7 | To 8 | Drilling Rate Ft/Hr | CARBONATE W.UW 1 min 10 | 3 min 11 | 15 min 12 | POROSITY Type 13 | Grade 14 | LITHOLOGY 15 |
|---|---|---|---|---|---|---|---|---|
| 3718 | 3729 | 3-7 | 65 | 80 | 95 | - | - | Light beige microcrystalline, locally pseudo-oolitic and fossiliferous, compact dolomitic limestone. |

TYPE OF DRILLING ROTARY TYPE OF BIT 8 1/2" OSC IG 16

AGE/FORMATION Silurian - Severn River Formation. 17

OIL SHOWS

| Depth or Time 18 | Colour 19 | Odour 20 | Fluorescence Direct Mud 21 | Fluorescence Direct Cuttings 22 | Extr. 23 | Colour Intensity 24 |
|---|---|---|---|---|---|---|
| | | | | | | |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background From 27 | To 28 | % 29 | Ratio C1/C2 30 | C1/C3 31 | Gas Shows (Kicks) Depth or Time 32 | % Max. 33 | Nature 34 | Ratio C1/C2 35 | C1/C3 36 | Duration /Choke 37 | Kick 38 | Density Suct. 39 | Comp. 40 | Sample 41 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

MUD

| 42 | Gain From 43 | To 44 | bbl/h 45 | Loss From 47 | To 48 | bbl/h 49 |
|---|---|---|---|---|---|---|
| D 1.72 | | | | | | |
| V 60 | | | | | | |
| F 10 | | | | | | |
| NaCl 320 | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Waiting on weather. 52

Position at 8 A.M. 3729'. Waiting on weather. 53

AQUITAINE

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Oct. 11, '69 | 2 66 | 3 24 Ft. | 4 4:30 Hr. | 5 3753 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr. | 10 | 11 | 12 | 13 | 14 | 15 |
| 3729 | 3745 | 5 - 9 | 40-80 | 45-93 | 50-100 | - | - | Whitish beige and light grey microcrystalline, partly recrystallised, pseudo-oolitic to pseudo-brecciated compact dolomitic limestone. Traces of anhydrite. Microfauna. |
| 3745 | 3753 | 4 - 7 | 20-25 | 54-55 | 60-75 | - | - | Beige microcrystalline compact dolomitic limestone. |

SCHLUMBERGER OPERATIONS.

Laterolog 3 : 3723' - 2965'

Sonic-Gamma Ray-Caliper : 3725' - 2965'

Dipmeter : 3722' - 2965'.

TYPE OF DRILLING ROTARY

TYPE OF BIT OSC IG Jet 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

26 Constant ~~Increasing~~ ~~Decreasing~~ ~~Regularly~~ ~~Irregularly~~

| Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration /Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| 3729 | 3770 | 0.1 | - | - | 3729 | 8.75 | Trip gas. | 68 | | | | | | |

## MUD

42 D 1.73

V 50

F

NaCl

% Fuel

| Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |

Total 46

Daily Total 50

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3845'. Drilling ahead. 53

**AQUITAINE**

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Oct. 12, '69 | 2 67 | 3 64 Ft. | 4 18:15 Hr. | 5 3817 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | 3 min | 15 min | POROSITY Type | Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3753 | 3817 | 3 - 9 | 55-83 | 78-<br>100 | 85-<br>100 | - | - | Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. Compact and azoic. |

TYPE OF DRILLING ROTARY

TYPE OF BIT DIAMOND EC6933 MD19V 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Cuttings | Extr. | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | C1/C3 | Duration / Choke | Kick | Density Suct. | Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 27 | 28 | 29 | 30 | 31 | 32 10:30 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| | 3755 | 3770 | 0.1 | | | 3770' | 5.75 | Trip gas | | | | | | | |
| | | | | | | 12:00 | 1.1 | R1 | | | | | | | |
| | 3790 | 3818 | 0.2 | | | | | | | | | | | | |

## MUD

| 42 | Gain From | To | bbl/h | Loss From | To | bbl/h |
|---|---|---|---|---|---|---|
| D 1.70<br>V 62<br>F<br>NaCl<br>% Fuel | 43 | 44 | 45 | 47 | 48 | 49 |
| | Total 46 | | | Daily Total 50 | | |

REMARKS 51

Program Drilling. 52

Position at 8 A.M. 3842'. Drilling ahead. 53

AQUITAINE

# DAILY REPORT GEOLOGY - SHOWS

| DATE | No. | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|
| 1 Oct. 13, '69 | 2 68 | 3 40 Ft. | 4 16:30 Hr. | 5 3857 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW 1 min | CARBONATE W.UW 3 min | CARBONATE W.UW 15 min | POROSITY Type | POROSITY Grade | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 Ft/Hr | 10 | 11 | 12 | 13 | 14 | 15 |
| 3817 | 3830 | 4-5 | 8-15 (?) | 15-22 (?) | 17-25 (?) | - | - | Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. Compact and azoic. |
| 3830 | 3855 | 4-6 | 78-90 | 90-98 | 93-100 | - | - | Grey brown microcrystalline limestone, compact and azoic. |
| 3855 | 3857 | 3-5 | 55 | 67 | 70 | - | - | Grey blue marl. |

TYPE OF DRILLING ROTARY

TYPE OF BIT DIAMOND MD19V 16

AGE/FORMATION Silurian - Severn River Formation. 17

## OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence Direct Mud | Fluorescence Direct Cuttings | Fluorescence Extr. Cuttings | Colour Intensity |
|---|---|---|---|---|---|---|
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 3855 | | | x | | | Traces yellow |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

| 26 | Gas Background From | To | % | Ratio C1/C2 | Ratio C1/C3 | Gas Shows (Kicks) Depth or Time | % Max. | Nature | Ratio C1/C2 | Ratio C1/C3 | Duration /Choke | Duration Kick | Density Suct. | Density Comp. | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | 3817 | 3857 | 0.2 | | | | | | | | | | | | |

## MUD

42

D 1.70

V 63

F

NaCl

% Fuel

| Gain From | Gain To | Gain bbl/h | Loss From | Loss To | Loss bbl/h |
|---|---|---|---|---|---|
| 43 | 44 | 45 | 47 | 48 | 49 |

Total 46

Daily Total 50

REMARKS 51

Program Drilling and coring. 52

Position at 8 A.M. 3874'. Very dark brown microcrystalline, locally calcarenitic, anhydritic, bituminous limestone. 53

| AQUITAINE | DATE 1 | No. 2 | DAILY REPORT GEOLOGY - SHOWS | FOOTAGE 3 | 4 | LAST DEPTH 5 | WELL NAME 6 |
|---|---|---|---|---|---|---|---|
| | Oct. 14, '69 | 69 | | 69 Ft. | 11:45 Hr. | 3926 Ft. | Walrus A-71 |

| From 7 | To 8 | Drilling Rate 9 Ft/Hr | CARBONATE W.UW 1 min 10 | 3 min 11 | 15 min 12 | POROSITY Type 13 | Grade 14 | LITHOLOGY 15 |
|---|---|---|---|---|---|---|---|---|
| 3857 | 3890 | 5-13 | 40-82 | 60-<br>100 | 70-<br>100 | - | - | Very dark brown microcrystalline, locally calcarenitic, anhydritic, bituminous limestone. |
| 3890 | 3917 | 6-15 | 55-64 | 68-<br>100 | 70-<br>100 | - | - | Very light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. |
| 3917 | 3926 | 3 | 65-90 | 88-<br>100 | 98-<br>100 | | | CORE #4. Recovered 9'= 100%.<br>Alternating:<br>- light brown slightly bituminous limestone.<br>- beige to light grey mottled slightly dolomitic bioclastic and calcarenitic limestone, with traces of anhydrite<br>Corals, Crinoids, Brachiopods, Mollusca.<br>Porosity: few vugs; some filled with salt. Show: levels with pale yellow fluorescence. Content: small amount of salty water. |

TYPE OF DRILLING ROTARY/CORING TYPE OF BIT OSC IG Jet 16

AGE/FORMATION 17 From 3845'= Ordovician - Churchill River Group

## OIL SHOWS

| Depth or Time 18 | Colour 19 | Odour 20 | Fluorescence Direct Mud 21 | Direct Cuttings 22 | Extr. Cuttings 23 | Colour Intensity 24 |
|---|---|---|---|---|---|---|
| 3857'<br>to<br>3926' | | - | Tr | Tr + | Fair | Pale |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

## GAS SHOWS

26 ~~Constant~~ ~~Increasing~~ Decreasing Regularly ~~Irregularly~~

| Gas Background From 27 | To 28 | % 29 | Ratio C1/C2 30 | Ratio C1/C3 31 |
|---|---|---|---|---|
| 3880 | 3917 | 0.25 | | |
| 3920 | 3926 | 0.3 | | |

| Gas Shows (Kicks) Depth or Time 32 | % Max. 33 | Nature 34 | Ratio C1/C2 35 | Ratio C1/C3 36 | Duration /Choke 37 | Duration Kick 38 | Density Suct. 39 | Density Comp. 40 | Sample 41 |
|---|---|---|---|---|---|---|---|---|---|
| 3857 | 5 | Trip gas | 68 | - | | 30 | | | |
| 3917 | 3.45 | Trip gas | 54 | - | | 30 | | | |

## MUD

42
D 1.70
V 65
F
NaCl
% Fuel

| Gain From 43 | Gain To 44 | Gain bbl/h 45 | Loss From 47 | Loss To 48 | Loss bbl/h 49 |
|---|---|---|---|---|---|
| | | | | | |
| Total 46 | | | Daily Total 50 | | |

REMARKS 51

Tentative correlation with Kaskattama according to macrofacies, microfacies and Gamma Ray = 3700' of Walrus = 2120' of Kaskattama and
3920' of Walrus = 2400' of Kaskattama.

Program Drilling and logging. 52

Position at 8 A.M. Tripping in. Standby for weather. 53

AQUITAINE

| DATE | No. | | FOOTAGE | | LAST DEPTH | WELL NAME |
|---|---|---|---|---|---|---|
| 1 Oct.15, '69 | 2 70 | **DAILY REPORT GEOLOGY - SHOWS** | 3 - Ft. | 4 - Hr. | 5 3926 Ft. | 6 Walrus A-71 |

| From | To | Drilling Rate | CARBONATE W.UW | | | POROSITY | | LITHOLOGY |
|---|---|---|---|---|---|---|---|---|
| | | | 1 min | 3 min | 15 min | Type | Grade | |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | | | | | SCHLUMBERGER OPERATIONS. |
| | | | | | | | | Sonic-Gamma Ray-Caliper : 3923' - 3650' |
| | | | | | | | | Laterolog 3 : 3920' - 3650' |
| | | | | | | | | Gamma Ray-Neutron : 3924' - 614'. |
| | | | | | | | | Sidewall Coring - 30 shots. No recovery. |

TYPE OF DRILLING -

TYPE OF BIT - 16

AGE/FORMATION Ordovician - Churchill River Group. 17

OIL SHOWS

| Depth or Time | Colour | Odour | Fluorescence | | | Colour Intensity |
|---|---|---|---|---|---|---|
| | | | Direct | | Extr. | |
| | | | Mud | Cuttings | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |

25 Oil/Bitumen/Fluid-Heavy-Pasty-Dry

GAS SHOWS

| 26 | Gas Background | | | | | Gas Show (Kicks) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | % | Ratio | | Depth or Time | % Max. | Nature | Ratio | | Duration | | Density | | Sample |
| | | | | C1/C2 | C1/C3 | | | | C1/C2 | C1/C3 | /Choke | Kick | Suct. | Comp. | |
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| Constant<br>Increasing<br>Decreasing<br>Regularly<br>Irregularly | | | | | | | | | | | | | | | |

MUD

| 42 | Gain | | | Loss | | |
|---|---|---|---|---|---|---|
| | From | To | bbl/h | From | To | bbl/h |
| D | 43 | 44 | 45 | 47 | 48 | 49 |
| V | | | | | | |
| F | | | | | | |
| NaCl | | | | | | |
| % Fuel | Total | | 46 | Daily Total | | 50 |

REMARKS 51

Program Moving out. 52

Position at 8 A.M. Waiting for the tug. 53

AQUITAINE ET AL. HUDSON WALRUS A-71

# ANNEX 4.Q.IV

## WEEKLY REPORTS

AQUITAINE

# WEEKLY REPORT NO. 1

WELL WALRUS A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB 31'
Province MANITOBA
Rig WODECO II
Commenced 7.8.69
Completed

Week from 17/8 to 24/8 19 69
Last Depth 1120' Footage 338'

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 782'<br>860' | PLEISTOCENE | DRIFT | Yellow-brown silty to sandy calcareous plastic clay. Conglomeratic elements of metamorphic rocks (quartzite, dolorite, chloritoschist) |
| 1120' | DEVONIAN | MOOSE RIVER FORMATION | Red-brown silty to sandy gypsiferous plastic clay.<br>Thin alternating levels of:<br>- red-brown slightly indurated clay,<br>- light beige microcrystalline dolomite,<br>- gypsum and anhydrite,<br>- pink, very fine grained calcareous sandstone |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 36" | 618' | 782' |
| 26" | 782' | 1120' |

### CASING

| Diameter | Shoe |
|---|---|
| 30" | 772' |
| 20" | 1106' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| | | | |

### LOGS RUN

| Type | From | To |
|---|---|---|
| Temperature | 744' | 20' |
| 3 runs (total from commencement of drilling). | | |

### SHOWS

NONE

### TESTS

NONE

### REMARKS

NONE

Geologist C. Kmiecluck

Date Aug. 24, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 2

Week from 25/8 to 31/8 19 69
Last Depth 1786' Footage 666'

WELL Walrus A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB +31'
Province MANITOBA
Rig WODECO II
Commenced 7.8. 1969
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 1120' | DEVONIAN | Moose River Formation | Red-brown silty to sandy gypsiferous plastic clay with thin alternating levels of:<br>- red brown slightly indurated clay,<br>- gypsum and anhydrite<br>- pink very fine grained calcareous sandstone. |
| 1385' | | Kwataboahegaw Formation | Beige to pink porous and vuggy fossiliferous dolomitic limestone. Thin alternating levels of:<br>- pink microcrystalline, saccharoidal, dolomitic limestone,<br>- red brown plastic to slightly indurated clay. Brachiopods. |
| 1710' | | Stooping River Formation | White, beige and light grey dolomitic and chalky limestone. Alternating levels of:<br>- grey bioclastic and oolitic limestone. Brachiopods,<br>- red, orange and brown limestone. Brachiopods, crinoids. |
| 1786' | | | |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 17 1/2" | 1120' | 1333' |
| 12 1/4" | 1333' | 1786' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| 1 | 1432' | 1447' | 100% |

### LOGS RUN

| Type | From | To |
|---|---|---|

### CASING

| Diameter | Shoe |
|---|---|
| 30" | 772' |
| 20" | 1106' |

### SHOWS

None

### TESTS

None

### REMARKS

None

Geologist C. Kmiecluck

Date Aug. 24, 1969

AQUITAINE

# WEEKLY REPORT NO. 3

Week from 1/9/69 to 7/9/69 19 69
Last Depth 2000' Footage 214'

WELL WALRUS A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB + 31'
Province Federal Waters
Rig WODECO II
Commenced 7.8.69
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 1786'<br>1830' | DEVONIAN | STOOPING RIVER FORMATION | White to beige and light grey slightly dolomitic and chalky limestone with alternating:<br>- grey bioclastic and oolitic limestone - brachiopods,<br>- brown, orange and red limestone - brachiopods - crinoids. |
| 2000' | SILURIAN | KENOGAMI RIVER FORMATION MIDDLE MEMBER | Alternating:<br>- brown to red dolomitized argillite with calcite and anhydrite,<br>- greenish grey and red shale,<br>- greenish grey calcareous shale,<br>( at 1885' - speckled pink to red, pale grey to dark grey-beige bioclastic limestone). |

## DRILLING

| Diameter | From | To |
|---|---|---|
| 15" | 1786' | 2000' |
| 17 1/2' | 1333' | 1996' |
| hole opener | | |

## CASING

| Diameter | Shoe |
|---|---|
| 30" | 772' |
| 20" | 1106' |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|

## LOGS RUN

| Type | From | To |
|---|---|---|

## SHOWS

## TESTS

## REMARKS

Geologist C. Kmiecluck
Date Sept. 10, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 4

Week from Sept. 8. to Sept. 14 19 69

Last Depth 2000' Footage -

WELL WAIRUS A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB +31'
Province Federal Waters
Rig Wodeco II
Commenced 7.8.69
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| -- | -- | -- | --------- |

## DRILLING

| Diameter | From | To |
|---|---|---|
| - | -- | - |

## CASING

| Diameter | Shoe |
|---|---|
| - | - |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| - | - | - | - |

## LOGS RUN Sept. 8th

| Type | From | To |
|---|---|---|
| Dual Induction | 1994' | 1108' |
| Sonic | " | " |
| Caliper (ML) | " | " |
| | | Sept. 11t |
| Caliper | 1196' | 1106' |
| Gamma Ray | " | " |

## SHOWS

-

## TESTS

-

## REMARKS

Stand-by for weather

Geologist S. Rueff Date Sept. 16, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 5

Week from Sept. 15 to Sept. 21 19 69

Last Depth 2965' Footage 956'

WELL WALRUS A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB +31'
Province FEDERAL WATERS
Rig WODECO II
Commenced August 7, 1969
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | | LITHOLOGY |
|---|---|---|---|---|
| 2000'<br>2354' | SILURIAN | KENOGAMI R. | Middle Member | Grey plastic clay, dark grey dolomitic shale and grey to red-brown plastic clay. |
| 2354'<br>2520' | | | Lower Member | Brown plastic clay, pink and grey dolomitic shale, beige-red speckled calcareous dolomite, beige to brown dolomite, anhydrite and compact fine grained calcareous sandstone. |
| 2520'<br>2602' | | EKWAN RIVER | Upper Member | Light brown bioclastic to biohermal limestone, light brown calcareous dolomite and anhydrite. |
| 2602'<br>2670' | | | Attawapiskat Member | Beige to pale brown calcarenitic, bioclastic and biohermal limestone. |
| 2670'<br>2802' | | | Lower Member | Very dark brown fractured bituminous dolomite and bioclastic slightly bituminous limestone |
| 2802'<br>2965' | | SEVERN RIVER | | White to pale beige cryptocrystalline to microcrystalline compact azoic dolomite |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 12 1/4" | 2000' | 2965' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| 2 | 2000' | 2001' | 100% |
| | (Junk | basket) | |
| 3 | 2670 | 2684' | 100% |

### LOGS RUN

| Type | From | To |
|---|---|---|
| Dual Induction | 2958' | 1975' |

### CASING

| Diameter | Shoe |
|---|---|
| 13 3/8" | 1975' |

### SHOWS

GAS

2563' = 1,9% $C_1/C_2$ = 30
2668' = 0,18% -
2750' = 0,35% $C_1/C_2$ = 4
2785' = 0,22% $C_1/C_2$ = 6
2870' = 0,18% $C_1/C_2$ = 40
2940' = 0,20% -

### TESTS

### REMARKS

Geologist S. Rueff

Date Sept. 21, 1969

AQUITAINE

# WEEKLY REPORT NO. 6

Week from Sept. 22 to Sept. 28 19 69

Last Depth 3349'

Footage 384'

WELL Walrus A-71

X 58°30'02"N Y 87°10'51"W

Z -618' ZKB +31'

Province Federal Waters

Rig Wodeco II

Commenced August 7, 1969

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 2965' | SILURIAN | SEVERN RIVER FORMATION | White to beige cryptocrystalline to microcrystalline, compact and azoic dolomite. |
| 3005' | | | Pink cryptocrystalline to microcrystalline, compact and azoic dolomite. |
| 3030' | | | Pale beige to pale brown microcrystalline, slightly argillaceous dolomitic limestone. |
| 3195' | | | Light beige to light grey microcrystalline limestone.<br>3200 - 3250: Echinoderms, Brachiopods, Bryozoa, Dasycladacae? |
| 3340<br>3349' | | | Whitish to light beige microcrystalline, compact and azoic dolomitic limestone. |

## DRILLING

| Diameter | From | To |
|---|---|---|
| 8½ | 2965' | 3349' |
| | | |
| | | |

## CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| | | | |

## LOGS RUN

| Type | From | To |
|---|---|---|
| Laterolog 3 | 2956' | 1975' |
| Gamma Ray<br>Sonic<br>Caliper | 2959' | 1975' |
| Gamma-Gamma | 2959' | 2300' |
| Neutron SNP | 2959' | 2300' |

## CASING

| Diameter | Shoe |
|---|---|
| | |
| 9 5/8" | 2960' |

## Gas SHOWS

| | | |
|---|---|---|
| 2345' | 7.5% | $C_1/C_2 = 48$ |
| 3140' | 0.33% | |
| 3160' | 9.5% | $C_1/C_2 = 37$ |

## TESTS

## REMARKS

Geologist C. Kmiecluck S. Rueff Date Sept. 28, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 7

Week from Sept. 29 to Oct. 5 19 69

Last Depth 3718' Footage 369'

WELL Walrus A-71
X 58°30'02"N Y 87°10'51"W
Z -618' ZKB +31'
Province Federal Waters
Rig Wodeco II
Commenced August 7, 1969
Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 3349' | SILURIAN | SEVERN RIVER FORMATION | Whitish to light beige microcrystalline compact and azoic dolomitic limestone. |
| 3515' | | | Light beige microcrystalline compact limestone with alternating levels of: - Mottled, pseudo - oolitic limestone,<br>- Recrystallised limestnne, Ostracods, Mollusca, Bryozoa and Spicules. |
| 3675' | | | Beige to light grey microcrystalline compact dolomitic limestone with intercalations of pseudo-brecciated monogenic dolomitic limestone. |
| 3718' | | | |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 8½ | 2965' | 3718' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| | | | |

### LOGS RUN

| Type | From | To |
|---|---|---|
| | | |

### CASING

| Diameter | Shoe |
|---|---|
| 9 5/8" | 2960' |

### Gas SHOWS

2900= 7.0% Trip gas $C_1/C_2$=38

3630=1.25% Trip gas $C_1$

3652=3.8% Trip gas $C_1/C_2$=54

3690=4.5% Trip gas $C_1/C_2$=70

### TESTS

### REMARKS

Geologist C. Kmiecluck Date October 5, 1969

AQUITAINE

# WEEKLY REPORT NO. 8

Week from October 6 to October 12 19 69

Last Depth 3815' Footage 97'

WELL Walrus A-71

X 58°30'02"N Y 87°10'31"W

Z -618' ZKB +31'

Province Federal Waters

Rig Wodeco II

Commenced August 7, 1969

Completed

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 3718' | SILURIAN | SEVERN RIVER FORMATION | Beige to light grey microcrystalline compact dolomitic limestone with intercalations of pseudo-brecciated monogenic dolomitic limestone. |
| 3745' | | | Beige microcrystalline compact dolomitic limestone. |
| 3755' | | | Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. |
| 3815' | | | |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 8½" | 2965' | 3815' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| | | | |

### LOGS RUN

| Type | From | To |
|---|---|---|
| Laterolog 3 | 3723 | 2965' |
| Sonic-Gamma R. | | |
| Cal. | 3725 | 2965' |
| Dipmeter | 3722 | 2965' |

### CASING

| Diameter | Shoe |
|---|---|
| | |

### Gas SHOWS

3730' = 8.75% Trip gas $C_1/C_2$ =68

3772' =5.75% Trip gas $C_1/C_2$ =48

### TESTS

### REMARKS

Geologist C. Kmiecluck and S. Rueff Date Oct. 13, 1969

**AQUITAINE**

# WEEKLY REPORT NO. 9

Week from October 13 to October 19 1969

Last Depth 3926' Footage 111'

WELL Walrus A-71
X 58°30'02"N Y 87°10'51"W
Z - 618' ZKB + 31'
Province Federal Waters
Rig Wodeco II
Commenced August 7, 1969
Completed October 15, 1969

## SUMMARIZED SECTION

| DEPTH | AGE | FORMATION | LITHOLOGY |
|---|---|---|---|
| 3815'<br>3830' | SILURIAN | SEVERN RIVER FORMATION | Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone. |
| 3845' | | | Grey brown microcrystalline limestone. |
| 3860' | ORDOVICIAN | CHURCHILL RIVER GROUP | Grey blue marls. |
| 3917' | | | Alternating: - whitish light beige to light grey microcrystalline limestone<br>- very dark brown microcrystalline bituminous limestone. |
| 3926' | | | (Core No. 4)<br>Alternating: - light brown slightly bituminous limestone,<br>- beige to light grey mottled bioclastic and calcarenitic limestone. Crinoids, corals, brachiopods and mollusca. |

### DRILLING

| Diameter | From | To |
|---|---|---|
| 8½ | 2965' | 3917' |

### CORING

| No. | From | To | Recuperation |
|---|---|---|---|
| 4 | 3917' | 3926' | 9'-100% |

### LOGS RUN

| Type | From | To |
|---|---|---|
| Sonic Gamma R. Caliper | 3923' | 3650' |
| Laterolog 3 | 3920' | 3650' |
| Gamma Ray-Neu. | 3924' | 614' |
| Sidewall Coring | 30 shots no recuperation | |

### CASING

| Diameter | Shoe |
|---|---|
| | |

### SHOWS

1) Gas
   3857' = 5% trip gas $C_1/C_2=68$
   3917' =3.45% trip gas $C_1/C_2=54$
2) Oil
   3857'-3917' Traces of pale yellow to greenish fluorescence on mud, cuttings and on solution of cuttings in $CHCl_3$.
   3917-3926' yellow fluorescence on core No. 4.

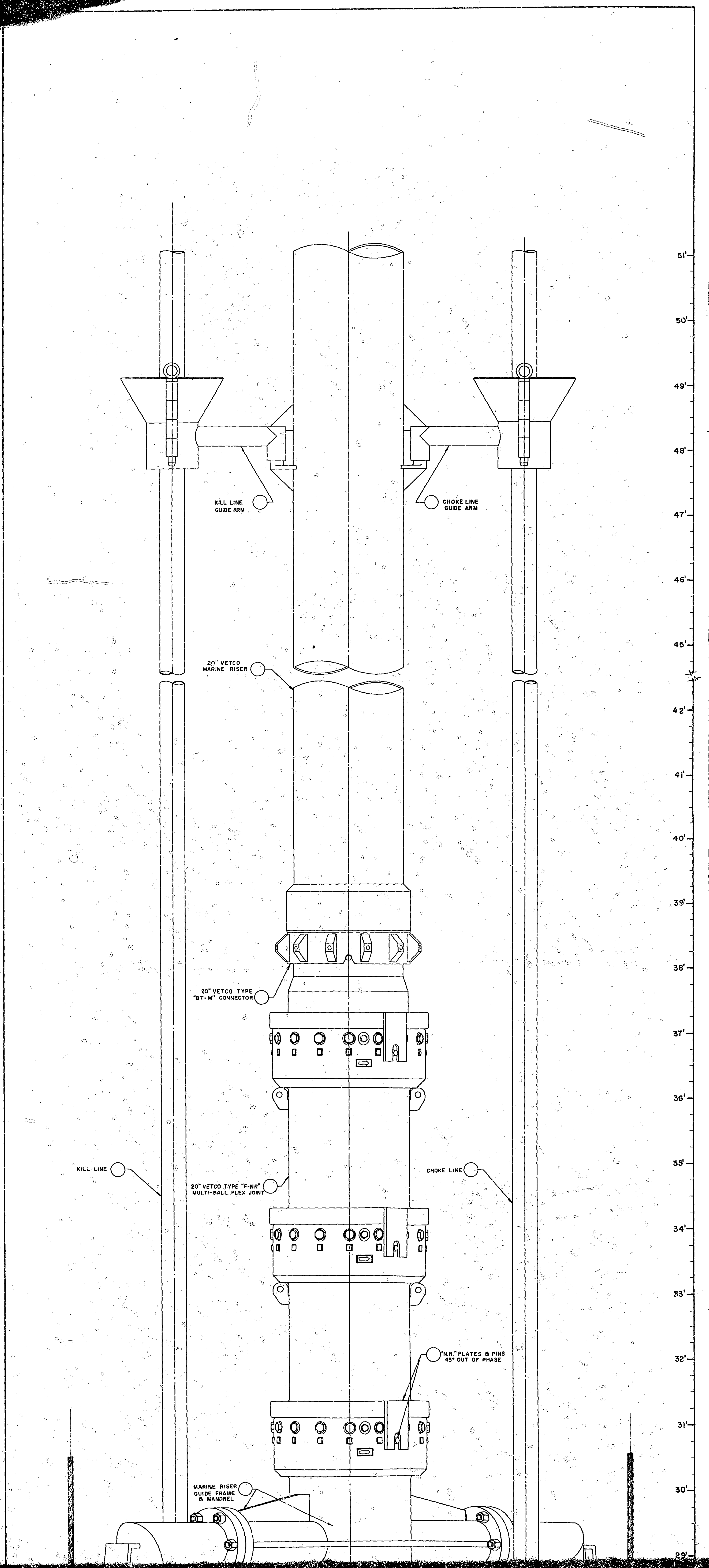
### TESTS

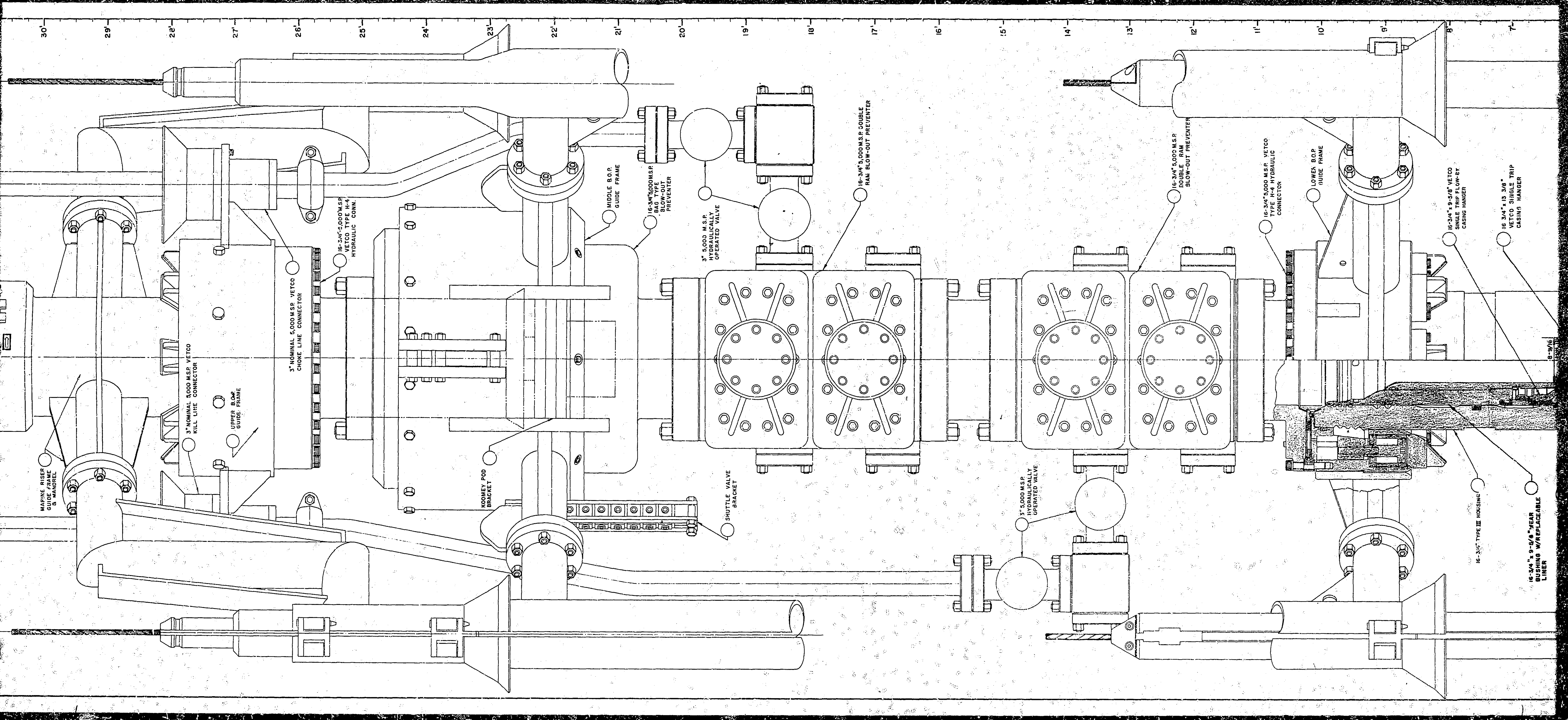
### REMARKS

Well abandoned on October 15, 1969 at midnight. Very strong westerly storm breaks anchor lines, choke, kill lines, guide lines, and riser.

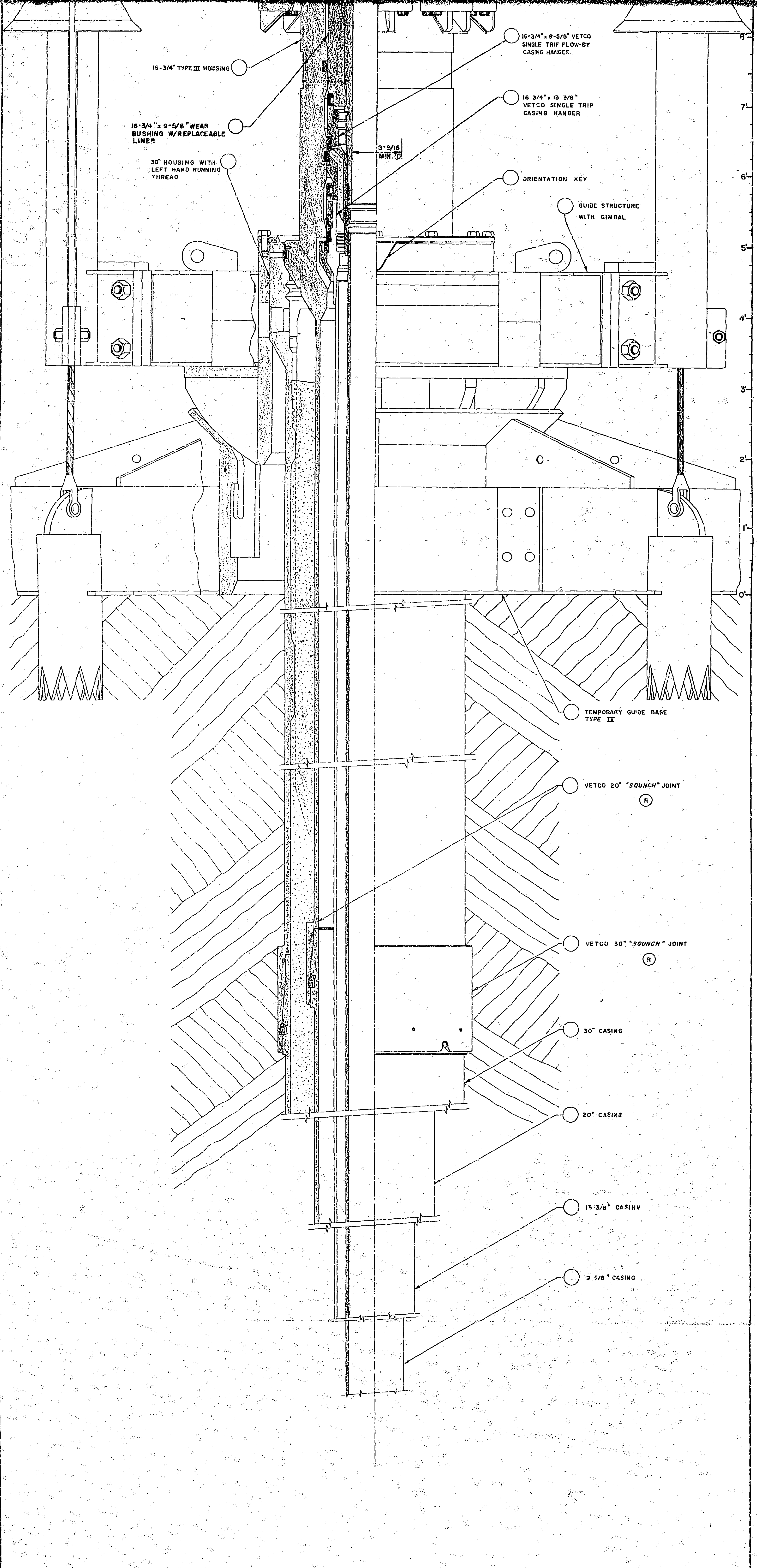
Geologist S. Rueff

Date October 21, 69

51'
50'
49'
48'
KILL LINE GUIDE ARM
CHOKE LINE GUIDE ARM
47'
46'
45'
20" VETCO MARINE RISER
42'
41'
40'
39'
38'
20" VETCO TYPE "BT-M" CONNECTOR
37'
36'
KILL LINE
CHOKE LINE
35'
20" VETCO TYPE "F-NR" MULTI-BALL FLEX JOINT
34'
33'
"N.R." PLATES & PINS 45° OUT OF PHASE
32'
31'
MARINE RISER GUIDE FRAME & MANDREL
30'
29'


30'
29'
28'
27'
26'
25'
24'
23'
22'
21'
20'
19'
18'
17'
16'
15'
14'
13'
12'
11'
10'
9'
8'
7'
MARINE RISER GUIDE FRAME & MANDREL
3" NOMINAL 5,000 M.S.P. VETCO KILL LINE CONNECTOR
UPPER B.O.P. GUIDE FRAME
3" NOMINAL 5,000 M.S.P. VETCO CHOKE LINE CONNECTOR
16-3/4"-5,000 M.S.P. VETCO TYPE H-4 HYDRAULIC CONN.
KOOMEY POD BRACKET
MIDDLE B.O.P. GUIDE FRAME
16-3/4" 5,000 M.S.P. BAG TYPE BLOW-OUT PREVENTER
3" 5,000 M.S.P. HYDRAULICALLY OPERATED VALVE
SHUTTLE VALVE BRACKET
16-3/4" 5,000 M.S.P. DOUBLE RAM BLOW-OUT PREVENTER
3" 5,000 M.S.P. HYDRAULICALLY OPERATED VALVE
16-3/4" 5,000 M.S.P. DOUBLE RAM BLOW-OUT PREVENTER
16-3/4" 5,000 M.S.P. VETCO TYPE H-4 HYDRAULIC CONNECTOR
LOWER B.O.P. GUIDE FRAME
16-3/4" TYPE III HOUSING
16-3/4" x 9-5/8" VETCO SINGLE TRIP FLOW-BY CASING HANGER
16 3/4" x 13 3/8" VETCO SINGLE TRIP CASING HANGER
16-3/4" x 9-5/8" WEAR BUSHING W/REPLACEABLE LINER
8-9/16

2 of



3 of 3

| | | | | |
|---|---|---|---|---|
| C | | | CHK'D. HYNES | VETCO OFFSHORE INDUSTRIES, INC.<br>VENTURA, CALIFORNIA |
| B | | | DRW'N. L.A.M. | |
| A | 2-5-69 | | DATE. 4-29-68 | * VETCO SUB SEA COMPLETION TYPE XIII<br>30", 16-3/4" (20" CASING), 13-3/8, 9-5/8" & 7" PROG.<br>LANDING 9-5/8" CASING |
| REVISIONS | | | SCALE. 1" = 1' | |

DRAWING Nº E-40250-8

REV. A

## Well Report

Resource Management and Conservation Branch
OPERATIONS AND CONSERVATION DIVISION
OCT 20 1971
OTTAWA, CANADA
DEPT. OF ENERGY, MINES & RESOURCES

# AQUITAINE ET AL. HUDSON WALRUS A-71

AQUITAINE COMPANY OF CANADA LTD.
Calgary, Alberta.

December, 1969.

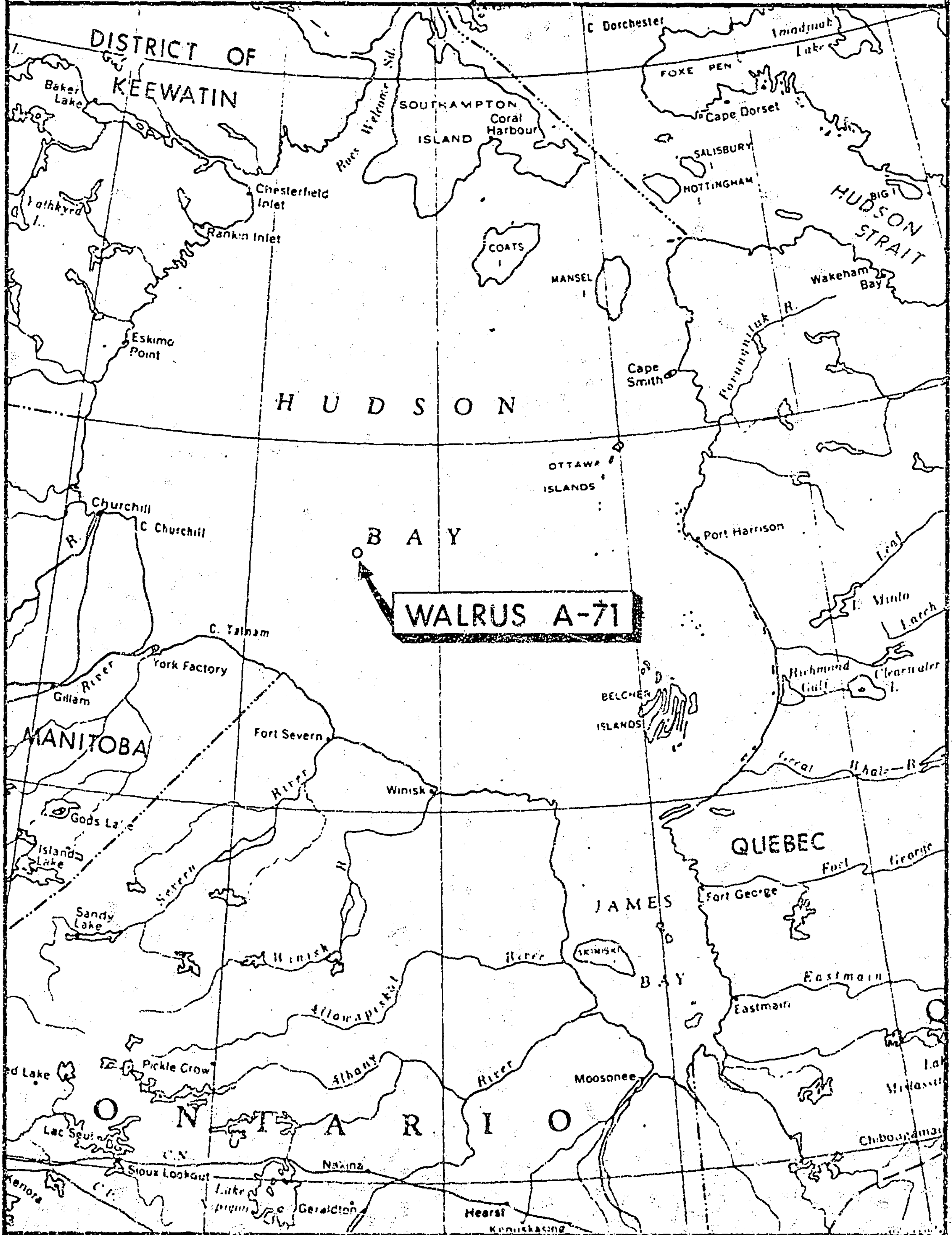
**AQUITAINE CO. OF CANADA LTD.**

LOCATION MAP

SCALE :
1" = 125 Mile or 1: 7,920,000

WELL REPORT

# AQUITAINE ET AL
# HUDSON WALRUS A-71



1. GENERAL

# WELL REPORT

## AQUITAINE ET AL HUDSON WALRUS A-71

Lat. 58° 30' 02.05" N
Long. 87° 10' 48.55" W

| | | | |
|---|---|---|---|
| Sea floor: | 587' below sea level | K.B. Elevation: | 31' above sea level |
| Spudded : | August 7th, 1969. | Rig released : | October 18th, 1969. |

Total Depth: 3926'

Drilling Contractor: Western Offshore Drilling and Exploration Co.

FORM NO. 5111-1

AQUITAINE COMPANY OF CANADA LIMITED

# SUMMARY OF WELL DATA

Well Name: AQUITAINE ET AL HUDSON WALRUS A-71 Location: Hudson Bay

Co-ordinates: Lat. 58° 30' 02.05" N Long. 87° 10' 48.55" W

Producing Horizon (s) Exploratory

Elevations: Ground 587' below sea level Kelly Bushing 31' above sea level

Spud Date August 7th, 1969 Rig Release date October 18th, 1969

Completed drilling date October 14th, 1969 Total Depth 3926' Hole Size 8½

Surface Casing: Size 30" Set at 772 K.B. Cement Class G 1000 US sacks

~~Production~~ Casing: (note if intermediate)

Size 20" Set at 1106' K.B. Cement Class G 1250 US sacks

Size 13 3/8" Set at 1975' K.B. Cement Class G 1170 US sacks

9 5/8" 2960' Class G 936 US sacks

Cement Plugs: (abandonment, lost circ. or plugback)

See summary of well data attachment

Mud Type Gel & Water to 1992' - Duovis system to 3926'

Logs: (abbreviate type of log)

| TYPE | RUN No. | DEPTH LOGGED | DATE |
|---|---|---|---|
| See attached | "Logging Data" | | |

Coring No. of cores cut 4 Total cored interval 1432-1442 2000-2002 2670-2684 3917-3926

Type & Size of core 1-3-4 cored with diamond No.2 was cored with junk basket.

D.S.T.'s No. of successful tests: Nil No. of misrun tests Nil

Drilling Contractor: Western Offshore Drilling and Exploration Co. Rig No. 2

Wellsite Supervision by:

# AQUITAINE ET AL HUDSON WALRUS A-71

## LOGGING DATA

"Depth from K.B."

| Type | Company | Interval | Date |
|---|---|---|---|
| Temperature | Schlumberger | 744 - 20' | Aug. 10. 1969 |
| Temperature | Schlumberger | 744 - 20 | Aug. 11. 1969 |
| Temperature | Schlumberger | 744 - 20 | Aug. 21. 1969 |
| Dual Induction & Lat. 8 | Schlumberger | 1994 - 1108 | Sept. 7. 1969 |
| Sonic BHC + Caliper | Schlumberger | 1994 - 1108 | Sept. 7. 1969 |
| Caliper & M.L.L. | Schlumberger | 1998 - 1040 | Sept. 7. 1969 |
| SP | Schlumberger | 1994 - 1108 | Sept. 7. 1969 |
| Caliper | Schlumberger | 1996 - 1106 | Sept. 11. 1969 |
| Gamma Ray | Schlumberger | 1998 - 590 | Sept. 11. 1969 |
| Dual Induction | Schlumberger | 2958 - 1975 | Sept. 19. 1969 |
| SP | Schlumberger | 2958 - 1975 | Sept. 19. 1969 |
| Sonic BHC + Caliper | Schlumberger | 2959 - 1975 | Sept. 23. 1969 |
| Laterolog 3 | Schlumberger | 2956 - 1975 | Sept. 23. 1969 |
| Gamma Ray | Schlumberger | 2959 - 1860 | Sept. 23. 1969 |
| Neutron (SNP) | Schlumberger | 2959 - 2300 | Sept. 23. 1969 |
| Gamma G (FDT) | Schlumberger | 2959 - 2300 | Sept. 23. 1969 |
| Laterolog 3 | Schlumberger | 3723 - 2965 | Oct. 11. 1969 |
| Sonic BHC + Gamma Ray + Caliper | Schlumberger | 3725 - 2960 | Oct. 11. 1969 |
| Dipmeter | Schlumberger | 3722 - 2965 | Oct. 11. 1969 |
| Velocity Survey | Century | 3700 & 2980 | Oct. 11. 1969 |
| Sonic BHC + Gamma Ray + Caliper | Schlumberger | 3923 - 3650 | Oct. 15. 1969 |
| Laterolog 3 | Schlumberger | 3920 - 3650 | Oct. 15. 1969 |
| Gamma Ray - Neutron | Schlumberger | 3924 - 614 | Oct. 15. 1969 |
| Sidewall Coring. (30 shots from 3924 to 2960' No recovery). | Schlumberger | - | Oct. 15. 1969 |

# 2. DRILLING

AQUITAINE ET AL. HUDSON WALRUS A-71

## 2. DRILLING

# AQUITAINE ET AL HUDSON A-71

## DRILLING DATA

(a) Drilling Contractor: Western Offshore Drilling
and Exploration Co.
6045 East Slauson Avenue
Los Angeles, California 90022

(b) Drilling Barge: Western Offshore No II
Principal characteristics:

Length Overall: 280' - 0"
Ream Molded : 68' - 0"
Depth Molded : 23' - 4"
Design Draft : 16' - 8"
Displacement at design draft : 7284.33 L.T.
Normal load draft (operating) : 12' - 8½"
Normal load displacement (operating): 5270 L.T.
Light Ship Weight : 2160.18 L.T.
Light Ship L.G.G. : 0.20 FWD of
Light Ship V.C.G. : 31.07'

Drilling plant

Make: National
Type: 1320 DE

Motors: Dual electric motor drive with two Westinghouse 371 motors, 1000 HP intermittent

(c) Mast:

Make : L.C. Moore 140' x 30' x 30' welded
Capacity: 952,000 #
Dynamic Looding: I) 55 knots wind with 15,000 feet of 5" drill pipe racked 10° angle of heel 10 sec period.
3° angle pitch 7 sec period
5 feet leave 8 sec period.

II) 55 knots wing with no pipe racked 10 sec period 30° angle of heel. 6° pitch 7 sec period 7 feet leave 16 sec period.

(d) Pumps:

2 makes : National G-1000 c 7 3/4 x 16"
Driven by: Single electric drive with
Westinghouse 371 A motor.
Continuous dydraulic horsepower 850.

(e) Blowout preventer equipment
Make:

1) wellhead Vetco sybsea system
2) blowout preventer stock, Vetco assembly
   1 16 3/4 5000// Hydril 6 K
   2 16 3/4 5000// BX Shaffer double LWS
3) Marine riser system 20" OD Vetco

# DAILY PROGRESS REPORT

## AQUITAINE ET AL HUDSON WALRUS A-71

Progress report for 24 hour period ending at 2300 hrs on date shown.

1969

August 5

On location and run anchor No. 1, 5, 8. Repair reel anchoring system.

August 6

Repair Pengo winch, run anchor No. 6, Wait on Decca, Run anchors No. 4,3,2,7 And reset anchors No. 4, 5, 3.

August 7

Finish anchoring up. Run TV. Check sea floor, OK. Water depth 617.53' from KB. Land temporary guide base, made up 26" bit and 36" H.O., prepare to drill without returns (sea water).

August 8

Drill 36" hole to 781'; circulate with sea water and fill hole with mud. Ran deviation survey 1°, trip out of hole, rig to run csg, run 30" casing, shoe at 772.50'. Run TV, cement with 1000 US sacks of class G cement.

August 9

W.O.C., pull out landing string, pick up B.O.P. stack and test all functions, run and lock stack, check B.O.P. stack with 130.000 pull, OK, run riser, try to close connector without success, hydraulic system froze, check water temperature at sea floor, 28° F.

2/...

1969

August 10

Changed emulsified fluid in Koomey accumulator for anti-freeze. Pump, top sea water and heated sea water into hole to thaw out hydraulic system, no success, waiting on equipment.

August 11

Circulating hot water in well-head, Temperature inside of stack increased from 28° to 31°., unable to raise temperature higher. Pulled & thawed red pod., filled accumulator and hoses with antifreeze. Run red pod but could not latch. Pulled pipe to 744. Run temperature survey, inside B.O.B. -34°, above BOP -32°, run drill pipe to top of hydrill, run kill line to 740', circulating through B.O.P.

August 12

Circulating warm water (100°F) through BOP stack. Repair hose connections to red pod, ran and tried to latch red pod without success.

August 13

Ran and latched red pod. 30" adapter leaking, latched riser connection. Tried to open hydrill, pull out of hole with tubing, run in with 5" drill pipe through hydrill. OK. Pull out and run in with hole opener, H.O. would not pass through hydrill. Pull out & run in with 5" drill pipe to 621' and circulate 136° sea water, pull green pod and work on accumulator.

3/...

1969

August 14

Work on green pod, ran pod but could not latch, pull red pod. Fill accumulator with diesel, run and latched red pod but BOP not functional, fill accumulator with water and soluble oil, pull red pod, found broken hose connection. Pump in 10 barrels of hot water 120° F every 15 minutes.

August 15

Waiting on weather and materials, continue filling BOP with hot water every 30 minutes.

August 16

Pulled drill pipe and riser, flushed and cleaned accumulator, repair green pod.

August 17

Release 30" hydraulic latch and close pipe rams on drill pipe and raise BOP stack 10'. Lower stack. Mix anti-freeze for Koomey system. Ran green pod. Pump into stack hot gel mud (205° F). Try to unlatch 30" adapter, close 5" drill pipe rams and pull stack. Remove H-4 connector and repair. Flush hydraulic lines with anti-freeze solution. Functional test OK.

August 18

Try to pressure test B.O.P., AX ring in lower H-4 connector leaking. Repair and install H-4 connector, test negative. Pull H-4 connector. Waiting on parts.

August 19

Move BOP to key slot, repair red pod and test BOP, test OK. Install new parts in H-4 connector. Waiting on weather.

4/...

1969

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|---|---|
| August 20<br>781' | Run and land BOP stack, unable to run riser because of bad weather. Install H-4 connector and test choke and kill lines to 5000 psi. OK. Wait on weather, moved BOP onto moon beams, ran and land BOP, open pipe rams and pull drill pipe. |
| August 21<br>781' | Pull riser, run and connect riser, run temperature survey. B.H.T. 43° F. Drilling cement. |
| August 22<br>1040' | Drilling 26" hole. Bit balled up, trip out at 954', trip in, drilling. |
| August 23<br>1120' | Drilling 26" hole to 1120', circulate, trip out and prepare to run casing, running 20". |
| August 24<br>1120' | Finish running 20" casing with shoe at 1106', cement W 1250 US sacks of class G cement. C.I.P. at 05:30 hrs, back out running tool. Stand by for bad weather. Change rams in B.O.P. Test 3½" pipe rams with 5000 psi OK. |
| August 25<br>1120' | Pull BOP on moom pool beams, hook up pod hoses and running tool. Run BOP and test latch with 1000 psi, OK. Run riser and hook up flow line and fill up line. Run kill line & choke line. Test BOP & system with 5000 psi, OK. Test 20" casing with 500 psi, OK. Make up 12¼ bit and 17½" underreamer. |

1969

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|---|---|
| August 26<br>1432' | Trip in, found top of cement at 1072'. Drill out cement and shoe with sea water. Drilling from 1120' with mud. Survey at 1432 0°.30 Trip out, pick up 3-9" Drill collars, trip in with 12¼" bit. Cir. for core No. 1. Trip out. |
| August 27<br>1575' | Trip out, make up core barrel, trip in, circulate. Core from 1432' to 1442' and cir., trip out. Trip in with 12¼" bit and ream 8 7/16" hole. Drilling, wait on weather, try to drill, (too rough to make connection) Wait on weather. |
| August 28<br>1667' | Wait on weather (17½hrs), try to drill but too much torque on riser, wait on weather (1½ hrs), drill, wait on weather (1½ hrs). |
| August 29<br>1786' | Drilling, stand by for bad weather (19¼ hrs). Repair flow line. |
| August 30 | Trip out laying down drill pipe, hang drill collars in hole on bore protector. Release and pull green pod. Release riser and pick up and hold with rucker lines. Waiting on weather. |
| August 31 | Ride out storm. Pull kill line & choke line and repair block guide. No. 2 & 3. Guide lines broke. |

1969

Sept. 1

Ride out storm. Pull kill line & choke line. Repair block guide.

Sept. 2

Slip joint would not scope, pull inner liner, remove. Rucker lines, pull riser, found guide arms broken off flex joint. Run TV. Run bore protector retreiving tool and pull bore protector. Set bore protector in stack, pull out of hole.

Sept. 3

Lay down 9" drill collars, run to 1156' with drill pipe cement with 188 sacks of Class C cement with 2% Ca Cl2 pull out. Pull stack and put on 2 guide lines. Run stack and test OK. Adjust flex joints and run riser. Welding on slip joint. Note: because of storm conditions that necessitated pulling the riser and we were presently in a reservoir. The cement plug was placed for safety reasons.

Sept. 4

Connect rucker lines to slip joint and stab into H4 connector, reweld pad eyes & hook up flow-line. Run kill line and choke line test with 5000 psi OK. Trip in with drilling assembly and found top of cement at 1297', condition mud, work on flow line. Opening 15" hole to 17½".

Sept. 5

Open hole to 1515', pull out of hole, left cones in hole. Dress hole opener and start in hole, pull back out of hole. Run in with 12¼" bit and wash from 1690' to 1780'. Pull out of hole and lay down 21 Sts of drill pipe and secure rig for storm. Waiting out storm (16 hrs).

1969

Sept. 6

Waiting out storm. (6 hrs) Run choke and kill lines run bore protector and prepare to drill. Run in hole with Bowen 12" junk basket, made one foot of hole with junk basket, trip out. Recovered 3 hole opener cones, trip in, open hole 1546' to 1601'.

Sept. 7

Opening hole, tight hole while making connections. Circulate and condition mud, raise viscosity, opening hole, short trip to condition hole, circulate, survey at 2000' 3/4°, trip out, prepare to log.

Sept. 8

Run Schlumberger, dual induction log, micro log, gamma ray log. Trip in hole with 15" bit and 17½" hole opener, pack swivel, open hole to 1992' start trip out of hole.

Sept. 9

Finish trip out of hole, left 2 cones off hole opener in hole, trip in with Bowen junk basket, made one foot of hole. Trip out, recovered 2 cones, trip in and open hole, trip out to check H.O. left one cone in hole. Dress H.O.; trip in and opening hole. Start out of hole at 6:30 p.m. because of storm warnings. Secure rig for storm.

Sept. 10

Pull marine riser - stand by for storm.

1969

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|---|---|
| Sept. 11 | Stand by for storm (9 hrs). Re-orient flex joint, run riser and prepare to run Schlumberger, run caliper log (windy and rough sea). |
| Sept. 12 | Finish running caliper log, run gamma ray, stand by for storm. (21 hrs) |
| Sept. 13 | Stand by for storm. (12 hrs) start preparations to drill at 1200' (noon). Trip in with 17½ H.O., open hole from 1850' to 1992', pull out of hole and break down drilling tools. Run kill line. |
| Sept. 14 | Latch in kill line and test with 5000 psi OK., Retrieve ware bushing. Prepare to run casing. Run 13 3/8" casing, shoe at 1975.70', cement with 110.000 lbs of class G cement, bump plug with 1200 psi, C.I.P. at 2:15 p.m. back off running tool and test seal with 500 psi OK. Trip out, run choke line and stopped at 450', found shaked in funnel, finnish running choke line and try to stab in. |
| Sept. 15<br>2355' | Try to make up choke line, tool joint broke high, pull out and tighten all tool joints. Service latch sub. Run in hole with choke line and latch in OK. Test line with 5000 psi OK. Trip in with drilling assembly, found top of cement at 1905', clean out to 1965' and pressure test casing with 500 psi OK. Drill out float at 1935' and shoe at 1975', found junk at 2000', trip out run globe basket and recovered one cone. Trip in with 12¼" bit, Drilling. |

1969

Sept. 16
2670'

Drilling, had a gas show at 2557'. Slow down pumps to 300 G.P.M. and circulating to check for flow. Gaining 10 BBLS per hour, mix weight material to 12.2 p.p.g. pull to shoe, check flow for 15 mins. Run back to bottom. Run survey at 2567' 1°. Trip to change bit, install safety valve on Kelly, circulating (gained 80 BBLS)

Sept. 17
2896'

Circulating, pull out to shoe check for flow (15 mins) pull out of hole & break down tools, make up core barrel. Trip in, circulate, cut core No. 3 from 2670' to 2684', trip out (recovered 14'). Trip in with drilling assembly, ream core hole.

Sept. 18
2910'

Drill, circulate & check for flow. Trip out to 13 3/8 shoe and check for flow. Trip to bottom, circulate and build mud weight. Trip out and lay down 9 7 3/4" drill collars. Pick up 9 joints of pipe, trip in and circulate and build mud weight (Vis 40-Wt 10.9) (gained 195 BBLS).

Sept. 19
2965'

Drilling and circulating while building mud weight. Circulate and build mud weight (storm warning) trip out; Rig Schlumberger and run dual induction log. Secure rig for storm.
Note: Prior to trip out, pump in 80 BBLS of 15 p.p.g. mud.

Sept. 20

Pull choke line and lay down slip joint and marine riser waiting out storm.

10/...

1969

Sept. 21

Wait out storm (7½ hrs), run flex joint and marine riser, run kill and choke lines and test to 5000 psi OK. Pick up 5" drill pipe. Install cementing head and circulate.

Sept. 22

Circulate and build mud weight (Wt. 13.4). Trip in with drilling assembly, circulate, off load casing from supply ship. Condition mud for log. Trip out of hole.

Sept. 23

Rig Schlumberger, run sonic, gamma ray and IES electric logs. Run side wall neutron. Trip in with drilling assembly. Condition mud for casing. Trip out and rig to run casing. Run 9 5/8" casing with shoe at 2959.70 mix 9360 US sacks of cement. C.I.P. at 11:15 a.m. test casing with 2500 psi.

Sept. 24
3014'

Lay down 14 Sts of 9 5/8" casing, made up torque tool with 3 6¼" drill collars. Trip in with test tool, test BOP, with 3000 psi OK. Test casing hanger with 2500 psi OK. Make up 8½" bit and drilling assembly, trip in, drill out float at 2882' and shoe at 2959', drilling.

Sept. 25
3102'

Drill to 3093', circulate out samples, circulate and mix weight material. (Gaining volume(25 BBLS) in pits and some gas in mud). Close in well for 2 hrs, pump in heavy mud. Survey. Trip to change bits. Drilling mud Wt. 14.5 - Vis. 63.

1969

| | |
|---|---|
| Sept. 26<br>3188' | Drill to 3160'. Circulate bottoms up. Trip for new bit and pick up 3 drill collars. Drilling, build mud weight. Trip to change. bits. (gained 70 BBLS) |
| Sept. 27<br>3275' | Drill to 3259', circulate and condition mud. Trip to change bits and install junk subs in drilling assembly. Drilling. (drilling mud is stabelized no gains or losses). |
| Sept. 28<br>3349' | Drill to 3306', trip to change bits. Drilling no gains in mud pit. Wt. 14.6 - Vis. 67. |
| Sept. 29<br>3405' | Drilling, repair Kelly spinner, drilling, work on track in derrick (rough sea). Check bumper subs for wash out, OK. Circulate and work on tracking system. Trip to change bits at 3306'. Drilling. |
| Sept. 30<br>3556' | Drill to 3480, trip to change bits, drilling no gains in mud system. Wt. 15.2 - Vis. 60. |
| Oct. 1<br>3579' | Drilling, repair flow line. (rough seas 6° roll) Trip out to bottom of 9 5/8" casing, circulate and condition mud and wait on weather (18½ hrs). |

1969

Oct. 2

Standing by for rough seas. Start trip out, seas to rough unable to finish trip out. Standing by because of rough weather. Circulating, try to pull out of hole. Seas too rough. (wait on weather 24 hrs).

Oct. 3
3597'

Standing by, rough seas (13 hrs), finish trip out at 1:00 p.m.. Install Gray safety valve 18 stand from bottom, trip in, circulate, drilling.

Oct. 4
3650'

Drill to 3630', trip for bit and remove Gray valve [illegible]m drill string, drilling, survey, drilling. Trip

Oct. 5
3718'

Finish trip for new bit. Drilling, trip to change bits at 3692', drilling.

Oct. 6

Drilling until 2:30 a.m., circulate (rough seas, 5 to 9° roll). Waiting on weather (21½ hrs).

Oct. 7

Displace 80 BBLS of heavy mud in hole, hung or 17 2/3 stands of drill pipe and drilling assembly and Gray valve, bottom at 2903'. Lay down drill pipe, pull choke & kill lines, slip joint and marine riser. Stand by for storm. (24 hrs).

13/...

1969

| | |
|---|---|
| Oct. 8 | Standing by, rough weather. (24 hrs). |
| Oct. 9 | Running riser, fish diving bell out of water. Guide line fouled around BOP. unable to stab riser, trying to unfoul guide line with divers. Lay down riser, fish for guide funnel, move funnel to side and rebuild guide arms. Running marine riser. |
| Oct. 10 | Stab riser in BOP, hook up slip joint and flow line, run kill line & choke line and test to 5000 psi, OK. Displace sea water in riser with mud. unable to stab in hanging tool. Trip out, screw into hang off tool. unable to pull loose. Pull up and remove hang off tool. Pull out & run back to bottom. Circulate at 3729' and build up mud weight. Trip out and spot 50 BBLS of heavy mud at 9 5/8" casing shoe. Trip. |
| Oct. 11<br>3753' | Finish trip out. Rig Schlumberger. Run sonic log. Continuous dipmeter and velocity survey. Rig down Schlumberger, trip in (rough seas) drilling. |
| Oct. 12<br>3817' | Drill to 3770, trip to change drilling assembly and bit. Trip in with diamond bit. Drilling. |
| Oct. 13 | Drilling to 3856'. Waiting on weather (7½ hrs) Rough seas, 5° - 10° roll. |

1969

Oct. 14

Waiting on weather 1½ hrs. Trip to change bits, drilling to 3917', trip out and make up core barrel, trip in, circulate, core to 3926', trip out and recovered 9' of core.

Oct. 15

Start trip in hole, rough seas, wait on weather (12 hrs) trip out, rig Schlumberger, run Sonic, gamma ray, neutron logs and side wall cores. Waiting out storm wind 55 mph roll $5^{o}$ - $16^{o}$.

Oct. 16

Pull electric log up in riser and close blind arms. No. 7 anchor line broke letting barge swing off hole breaking off riser, kill line and choke line. Hydraulic lines pulled into, guide line broke. Lost No. 8 anchor. barge rolling $7^{o}$-$22^{o}$. Blocks tore out tracking system. Cut no. 2-5-6 anchors so barge would head into storm. Cut no. 3-4 anchors, barge swinging on No. 1 anchor (38 stands of drill pipe is in derrick).

Oct. 17

Holding barge into weather with no. 1 anchor line and tug Vigilant. Cut anchor line no. 1, moving barge from location with tug Vigilant. Wind 50/60 knots.

Oct. 18

Tug Vigilant holding drilling barge into weather, supply ships Millerntor and Artic Shore standing by. Transfer 35 people from drilling barge to Millerntor. Secure drilling barge for towing. Transfer 6 people to Artic Shore. Start tow to Halifax.

# AQUITAINE ET AL HUDSON WALRUS A-71

## DEVIATION SURVEYS

781' - 1°

1120' - 2°

1432' - 0°30

2000' - 0°45

2567' - 1°

3093' - 0°30

3370' - 1°

3650' - 0°45

# AQUITAINE ET AL HUDSON WALRUS A-71

## BIT RECORD

28 Drilling bits were used + 1 diamond bit.

- Phase 26" + 36" hole opener.
  - 1 26" bit — Performance: 163 feet
- Phase 15" + 26" hole opener
  - 1 15" bit — Performance: 339 feet
- Phase 12¼" or 15" + 17½" hole opener
  - 4 12¼" bits
  - 4 15" bits — Performance: 880 feet
- Phase 12¼"
  - 4 12¼" bits — Performance: 965 feet
- Phase 8½"
  - 14 8½" bits
  - 1 diamond bit — Performance: 961 feet.

NOT LEGIBLE
ILLISIBLE

**AQUITAINE ET AL HUDSON WALRUS A-71**

**BIT RECORD**

**Size 8½"**

| No. | Type | Chokes | Interval | Footage | Time | Parameters |  |  |  | Mud Characteristics |  |  | Wearing |  |  | Formation | Average Pene-tration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Weight (1000 lbs) | RPM | Mud Rate | Pressure (PSI) | d. | V. | F. | Diameter | Teeth | Bearings |  |  |
| KE 055 | OSCIG J | 3x3/8 | 2965 - 3093 | 128 | 10:00 | 30 | 90 | 390 | 1,900 | 1.35 | 45 | 34.2 | o | 100% | 2.1.3 | Dolomite | 12.8 |
| KE 057 | OSCIG J | 3x7/16 | 3093 - 3160 | 67 | 8:45 | 35 | 100 | 430 | 1,800 | 1.75 | 62 | 21.4 | o | 70% | 2.1.1 | Calcareous Dolomite | 7.6 |
| KE 014 | OWV J | - | 3160 - 3188 | 28 | 6:45 | 35 | 90 | 290 | 1,100 | 1.78 | 65 | 15.8 | o | 30% | 1.0.0 | Calcareous Dolomite | 4.1 |
| KE 058 | OSCIG J |  | 3188 - 3259 | 71 | 12:00 | 40 | 80 | 440 | 2,400 | 1.80 | 62 | 20.4 | o | 50% | 1.2.1 | Limestone | 5.9 |
| LP 210 | W 7 R | Sans | 3259 - 3306 | 47 | 14:15 | 40 | 80 | 430 | 1,600 | 1.78 | 68 | 14.8 | o | 40% | 1.1.1 | Limestone | 3.2 |
| KB 040 | OWV J | 3x3/4 | 3306 - 3370 | 64 | 18:45 | 35 | 100 | 430 | 2,000 | 1.78 | 65 | 14.8 | o | 28% | 3.3.3 | Limestone | 3.3 |
| KE 056 | OSCIG J | 3x7/16 | 3370 - 3480 | 110 | 15:00 | 40 | 100 | 435 | 2,700 | 1.82 | 58 | 26 | o | 100% | 2.3.2 | Chalky Limestone | 7.3 |
| KE 060 | OSCIG J | 3x7/16 | 3480 - 3579 | 99 | 15:15 | 40 | 100 | 435 | 2,200 | 1.77 | 60 | 12.8 | o | 100% | 1.3.2 | Calcareous Dolomite | 6.4 |
| KE 059 | OSCIG J | 3x7/16 | 3579 - 3630 | 51 | 12:30 | 40 | 100 | 435 | 1,900 | 1.76 | 60 | 12.4 | o | 100% | 2.2.2 | Dolomitic Limestone | 4.1 |
| LP 471 | X 55 R | 3x7/16 | 3630 - 3650 | 20 | 9:00 | 40 | 50/100 | 435 | 1,900 | 1.75 | 62 | 12.4 | o | o | o.o.o | Partly Chalky Limestone | 2.2 |
| KB 036 | OWV J | 2x3/8 - 1x7/16 | 3650 - 3692 | 42 | 11:30 | 40 | 100 | 430 | 1,900 | 1.75 | 60 | 17.2 | o | 30% | o.o.o | Partly Chalky Limestone | 3.6 |
| KE 054 | OSCIG J | 2x3/8 - 1x7/16 | 3692 - 3729 | 37 | 9:00 | 40 | 100 | 445 | 2,000 | 1.76 | 62 | 18.4 | o |  |  | Limestone | 4.1 |
| KE 053 | OSCIG J | 3x7/16 | 3729 - 3770 | 41 | 8:45 | 40 | 100 | 430 | 2,000 | 1.75 | 60 | 19.2 | 1 | 100% |  |  | 4.7 |
| EC 6933 | MD 19 V | Christensen | 3770 - 3857 | 87 | 31:15 | 28 | 120/50 | 300/320 | 1,200 | 1.75 | 70 | 19.2 |  |  |  |  | 2.8 |
| KE 052 | OSCIG J | 3x7/16 | 3857 - 3917 | 60 | 8:30 | 40 | 100 | 350 | 2,000 | 1.75 | 60 | 16 |  |  |  |  | 7.0 |
| 6906 | Core bit | Christensen | 3917 - 3926 | 9 | 3:15 | 21 | 80 | 270 | 1,300 | 1.74 | 60 | 16 |  |  |  |  | 2.75 |

# AQUITAINE ET AL HUDSON WALRUS A-71

## MUD SUMMARY

The mud used was:

a) In the phase 36" only sea water, hole filled with gel before coring.
b) In the phase 26" bentonite CMC mud.
c) Since the phase 17½" Duovis system.
During the phase 17½" we had important gain of calcium chloride water which obliged to increase the density between 1,73 - 1,80 SG since 3528 feet.
The consumption of baryte increased and unfortunately the penetration decreased.
But even with the mixing of salt in the mud, we never lost good characteristics, and neither lost time.
The Duovis system was very well adapted.

The total of the noticeable gain was 524 barrels. The last one the 3rd of October at 3579' was 40 barrels of water with calcium chloride SG: 1.40 after a stand-by weather. After, that, we had only 3 small slugs from the bottom after stand-by, and then nothing.

## MUD CHARACTERISTICS

### Phases 36"

WT : 1,04
V min.: 50 V max.: 80

### Phase 26" 787 - 1120' : 339' in 17 hrs. 30'.

WT min. : 9 WT max.: 14.2
V. min. : 52 V. max.: 62
F. : 30
Va. : 29
Vp. : 18
YV : 22
gel 0 min.: 8
10 min.: 40
pH : 9
pF : 0.3

### Phase 17½" 1120' - 2000' : 880' in 37 hrs. 15'.

WT min. : 9.3 WT max.: 10.4
V min. : 42 V. max.: 55
F. : 14 - 20
Va. : 24 - 28
Vp. : 18 - 24
YV : 12 - 4
gel 0 min.: 2 - 5
10 min.: 10 - 15
pH : 8.5 - 10
pF : 0.3 - 1

### Phase 12¼" 2000' - 2965' : 965' in 42 hrs. 30'

WT min. : 9.2 WT max.: 14.4
V. min. : 42 V. max.: 54
F. : 17 - 22
Va. : 22 - 43
Vp. : 14 - 33
YV : 16 - 20
gel 0 min.: 3 - 4
10 min.: 8 - 14
pH : 9
pF : 0.1

Phase 8½"      2965' - 3926'   :   961' in 190 hrs. 30'

WT min. : 11.2      WT max. : 14.7
V. min. : 45      V. max. : 65
F. : 20
Va. : 35 - 60
Vp. : 16 - 45
YV : 18 - 30
gel 0 min. : 3 - 5
10 min. : 15
pH : 9
pF : 0.1

## MUD & CHEMICALS USED FOR OPERATIONS

### 36" hole

| | | |
|---|---|---|
| Magcogel | 111,900 lbs | Drilling hrs. 14 |
| Caustic Soda | 1,000 lbs | |
| | | Cost: 4,521.80 $C |

### 26" hole

| | | |
|---|---|---|
| Magcogel | 18,000 lbs | Drilling hrs. 17½ |
| Caustic Soda | 3,800 lbs | |
| C.M.C. | 600 lbs | |
| Spersene | 6,150 lbs | |
| Lime | 1,000 lbs | |
| Salt Gel | 7,200 lbs | |
| SAPP | 3,000 lbs | |
| Magcobar | 4,000 lbs | |
| | | Cost: 9,438.92 $C |

### 17½" hole

| | | |
|---|---|---|
| Magcogel | 17,000 lbs | Drilling hrs. 37½ |
| Salt | 14,200 lbs | |
| Nut Plug | 2,500 lbs | |
| Caustic Soda | 2,250 lbs | |
| C.M.C. | 1,450 lbs | |
| Spersene | 7,650 lbs | |
| Mica | 600 lbs | |
| Salt Gel | 2,000 lbs | |
| De foamer | 900 lbs | |
| Magcobar | 151,000 lbs | |
| Duovis | 118 lbs | |
| Chrome Alum. | 1,100 lbs | |
| Dowcide "B" | 300 lbs | |
| | | Cost: 19,171.70 $C |

**12¼" hole**

| | | |
|---|---|---|
| Magcogel | 1,400 lbs | Drilling hrs. 42½ |
| Magcobar | 502,000 lbs | |
| Caustic Soda | 850 lbs | |
| Bicarbonate of Soda | 600 lbs | |
| Salt Gel | 1,200 lbs | |
| Duovis | 88 lbs | |
| Dowcide "B" | 200 lbs | |
| De foamer | 350 lbs | |
| Kelzan XC | 24 lbs | |

Cost: 31,986.77 $C

**8½" hole**

| | | |
|---|---|---|
| Magcogel | 16,600 lbs | Drilling hrs. 190½ |
| Spersene | 10,200 lbs | |
| Caustic Soda | 7,400 lbs | |
| C.M.C. | 10,500 lbs | |
| Magcobar | 943,000 lbs | |
| Salt Gel | 10,480 lbs | |
| Duovis | 156 lbs | |
| Chrome Alum. | 4,800 lbs | |
| Dowcide "B" | 800 lbs | |
| Salt | 5,200 lbs | |
| De foamer | 1,800 lbs | |

Cost: 75,797.52 $C

| | |
|---|---|
| Total cost of 36" | 4,521.80 |
| 26" | 9,438.92 |
| 17½" | 19,171.70 |
| 12¼" | 31,986.77 |
| 8½" | 75,797.52 |
| | 140,916.71 $C. |

## AQUITAINE ET AL HUDSON WALRUS A-71

## TIME ANALYSIS

| | | | |
|---|---|---|---|
| 1. | Rigging up and down | 27.30 hrs | 1.60% |
| 2. | Drilling | 301.45 hrs | 17.30% |
| 3. | Redrilling (mainly for checking hole) | 2.00 hrs | 0.20% |
| 4. | Drilling trips | 111.45 hrs | 6.50% |
| 5. | Hole opening | 34.15 hrs | 2.10% |
| 6. | Coring | 7.15 hrs | 0.40% |
| 7. | Coring trips | 27.00 hrs | 1.54% |
| 8. | Testing | Nil | - |
| 9. | Miscellaneous Operations (Logging) | 66.45 hrs | 3.82% |
| 10. | Well completion | Nil | - |
| 11. | Casing | 161.45 hrs | 9.25% |
| 12. | Circulation | 57.30 hrs | 3.40% |
| 13. | Fishing job | 9.30 hrs | 0.54% |
| 14. | Abandon | 36.00 hrs | 2.05% |
| 15. | Repairs (231 hrs with frozen BOP stack). | 283.00 hrs | 16.18% |
| 16. | Waiting time (storm condition) | 626.00 hrs | 35.12% |

## AQUITAINE ET AL HUDSON WALRUS A-71

## TIME ANALYSIS

1) Rigging up and down.
This consumed 1,60% of time, for anchoring at the beginning; unfortunately at the end of the operation a storm forbade us to remove the anchors.

2) Drilling.
Drilling 301.45 hours or 17,30% of the total time.
Average drilling rate 3308/302 = 10,28 feet/hour on all diameter.
But very often the weather did not permit to drill very efficiently.
Also the heavy mud cut the penetration.

3) Re-drilling.
0,20% mainly for checking the hole.

4) Drilling trips.
111.45 hours for 29 bits.
But the duration of drilling trips was very variable from 1:30 hour to 6 or 8 hours and sometimes it was definitely impossible to make the trip because the weather was so bad and the reaction of the boat, mostly the roll did not permit any disconnection of movement.

5) Hole opening.
34.15 hours or 2,10% of total time with hydraulic hole opener, because we were obliged to drill in a diameter bigger than the opening of the 16 3/4" stack.

6) <u>Coring</u>.
7:15 hours or 0,40% of total time for 3 cores with the diamond core barrel. The core No. 2 was taken with the junk basket when we retrieved a hole opener cone which was loss.

7) <u>Coring trips</u>.
27:00 hours or 1,54%, time mostly due to the very difficult trip conditions those days.

8) <u>Testing</u>.
None and fairly impossible in the actual condition of Hudson Bay and drilling vessel.

9) <u>Miscellaneous operations</u>.
66:45 hours or 3,82% of total time for electrical surveys, velocity survey and 8 deviations surveys.

10) <u>Well completion</u>.
None.

11) <u>Casing</u>.
161:45 hours, 9,25% of total time for casings 30", 20", 13 3/8", 9 5/8", with special marine equipment.

12) <u>Circulation</u>.
57:30 hours or 3,40% of the time, the main reason being the stabilization of the hole due to high pressure calcium chloride water.

13) <u>Fishing job</u>.
9:30 hours, 0.54% of total time for removing hole opener cone loss during 17½" phase.

14) <u>Abandon</u>.
36 hours or 2.05% of total time. Time spent to prepare and secure the boats for towing during a very bad weather and trying to plug the well, remove anchor and finally clear the well, lay down drill, drill collars and equipment.

15) <u>Repairs</u>.
283 hours representing 16,18% of the total time. 52 hours for several mechanical reasons, the other 231 hours to repair the hydraulic system of the submarine stack which was frozen.

16) <u>Waiting time</u>.
626 hours representing 35,12% of the total time due to the very difficult oceanic conditions in Hudson Bay. This time included the hours spent to repair the damages caused by the storms or the rough seas.

3. ENGINEERING

AQUITAINE ET AL. HUDSON WALRUS A-71

# 3. ENGINEERING

# RUNNING AND CEMENTING

Surface Casing
~~Intermediate Casing~~ O.D. 30"
~~Production Casing~~
~~Liner~~

**GENERAL**

Well WALRUS A-71 Location Hudson Bay Date August 8th, 1969.

K.B. Elevation 618 K.B.-Csg. Flge. Total Depth (Driller) 781

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36 | | | Casing in Hole | | |
| Depth | 781 | | | Depth Set | | |

Mud: Type Sea Water Wt. Visc. W.L.

B.O.P.'s

**RUNNING**

Power Tongs Rig tongs Torque: Low torque squnch casing Max. Nom. Min.

Time pipe started 3:00 p.m. Time on Bottom 8:00 p.m. Time Circulated 1:45 min.

Fill-up Points Every other joint Btm. by Csg. 772 Ft. up from K.B.

Remarks Top of casing is 613' below K.B.

**CEMENTING**

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement 1000 US sacks, at 3% C12 Ca.

Ht. to be Cemented Surface (Sea floor)

Water ahead Cir. seawater bbls. Mix Times: Start 9:45 Finish 10:10 Slurry Wt. 15.7

Calc. Disp. 38 BBLS bbls. Est. Disp. Time 20 Mins. Start 10:10 Finish 10:30

Max. Pumping Press. 150 Bump. Press No plug Bumped by No plug No. Times Bumped

Cement Returns: Yes/No. Remarks Cement returns at sea floor.

**LANDING**

Time Landed 8:00 Date August 8th, 1969 Init. Wt. of Cem. String (less blocks) 49,290

Wt. Landed in Slips Make of Bowl Nom. Size Series

Slip & Seal Assembly Remarks Cement returns were observed at sea floor with a T.V. camera.

Agent of Operator

FORM NO. 155

# AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

Surface Casing
~~Intermediate Casing~~ O.D. 30"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date August.8.1969.

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 310 | | 3 | Std Squnch Joint | | | 4 | 772 | 159.49 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Nil Type Length

Collar: Make Nil Type Length

Landing Joint (when used) Length (Land with 5" drill pipe)

Overall Length of Casing String 159.49

Feet up from K.B. (Subtract) KB to of well head 613.01

Setting Depth: By Driller 772 By Tally

Shoe Joint: Overall 159.49 (Subtract)

Float Collar Landed: By Driller Nil By Tally 772.50

| CENTRALIZERS | SCRATCHERS |
|---|---|
| Make Nil | Make Nil |
| Number | Number |
| Positions | Positions |

No. of Collars Welded

Remarks:

Agent of Operator

# ENGINEERING PIPE TALLY SHEET

WELL NAME WALRUS A-71 DATE August. 8. 1969

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 41 | 25 | | | | | | | | |
| 41 | 59 | | | | | | | | |
| 41 | 67 | | | | | | | | |
| 34 | 98 | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| 159. | 49 | | | | | | | | |

TUBING/CASING

O.D. 30"

Wt. 310

Grade -

Range 3

Thread Squnch Joint Std

Collar -

Make Vetco

SUMMARY

| | | |
|---|---|---|
| Col. 1 | 159. | 49 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 159. | 49 |

Tallied by:

_______ Tot. Jts. on location

_______ Jts. out (Incl. Ldg. Jt.)

4 Jts. perm. in hole

Remarks:

Agent of Operator _______

# RUNNING AND CEMENTING

~~Surface Casing~~
Intermediate Casing O.D. 20"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date August 23rd, 1969.

K.B. Elevation 618 K.B.-Csg. Flge. Total Depth (Driller) 1120

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36" | 26 | | Casing in Hole | 30" | |
| Depth | 781 | 1120 | | Depth Set | 772 | |

Mud: Type Gel & Water Wt. 11.3 Visc. 50/55 W.L.

B.O.P.'s 1 16 3/4" 5000// Hydril GK. 16 3/4" 5000// BX Shaffer

## RUNNING

Power Tongs Rig tongs Torque: Max. Nom. Low torque std Min. squnch casing

Time pipe started 10:00 p.m. Time on Bottom 4:00 a.m. Time Circulated none

Fill-up Points Every third joint Btm. by Csg. 1106 Ft. up from K.B.

Remarks Top of casing is 613' below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement 1250 US sacks with 4% Ca2 Cl

Ht. to be Cemented Surface (sea floor)

Water ahead None bbls. Mix Times: Start 4:00 Finish 4:40 Slurry Wt. 15.6

Calc. Disp. 163 bbls. Est. Disp. Time 20 Mins. Start 4:40 Finish 5:10

Max. Pumping Press. 400 Bump. Press 400 Bumped by Cementer No. Times Bumped

Cement Returns: Yes/No. Remarks Cement returns observed at sea floor with T.V. camera

## LANDING

Time Landed 4:00 a.m. Date August 23.1969 Init. Wt. of Cem. String (less blocks)

Wt. Landed in Slips Make of Bowl Wellhead housing Nom. Size 16 3/4" Series 5000 psi.

Slip & Seal Assembly Remarks

Agent of Operator

FORM NO. 155

# AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 20"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date September. 24. 1969

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.625 | | 3 | Squnch | St. | Vetco | 13 | 1106' | 490.87 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Baker Type Guide Shoe Length 1.90

Collar: Make Baker Type Float Collar Length -

Landing Joint (when used) Length

Overall Length of Casing String 492.77

Feet up from K.B. (Subtract) KB to well head 613.25

Setting Depth: By Driller By Tally

Shoe Joint: Overall (Subtract)

Float Collar Landed: By Driller By Tally 1,106.02

CENTRALIZERS

Make Nil

Number

Positions

SCRATCHERS

Make Nil

Number

Positions

No. of Collars Welded

Remarks:

Agent of Operator

# ENGINEERING PIPE TALLY SHEET

**WELL NAME** WALRUS A-71 **DATE** August.24.1969.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 33 | 00 | | | | | | | | |
| 33 | 61 | | | | | | | | |
| 39 | 44 | | | | | | | | |
| 42 | 28 | | | | | | | | |
| 39 | 59 | | | | | | | | |
| 35 | 56 | | | | | | | | |
| 41 | 35 | | | | | | | | |
| 41 | 10 | | | | | | | | |
| 42 | 27 | | | | | | | | |
| 39 | 72 | | | | | | | | |
| 37 | 97 | | | | | | | | |
| 39 | 18 | | | | | | | | |
| 21 | 60 | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| 492 | 77 | | | | | | | | |

**TUBING/CASING**

O.D. 20"

Wt. -

Grade 0.625 "

Range 3

Thread Squnch Joint Std

Collar -

Make -

| SUMMARY | | |
|---|---|---|
| Col. 1 | 492 | 77 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 492 | 77 |

Tallied by:

_____ Tot. Jts. on location

_____ Jts. out (Incl. Ldg. Jt.)

13 Jts. perm. in hole

Remarks:

Agent of Operator _____

# RUNNING AND CEMENTING

~~Surface Casing~~
Intermediate Casing O.D. 13 3/8"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date September 14, 1969.

K.B. Elevation 618 K.B.-Csg. Flge. 613 Total Depth (Driller) 1992

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36 | 26 | 17½ | Casing in Hole | 30" | 20 |
| Depth | 781 | 1120 | 1992 | Depth Set | 772 | 1106 |

Mud: Type Ducvis System Wt. 9.6 Visc. 42 W.L. 19

B.O.P.'s 1 16 3/4" Hydril GK, 2 16 3/4" 5000// BX Shaffer double LWS - Vetco well head assembly & 20" OD marine riser system.

## RUNNING

Power Tongs Hydraulic B.S. Torque: Max. 5000 Nom. Min.

Time pipe started 7:00 a.m. Time on Bottom 12:00 noon Time Circulated ½ hr.

Fill-up Points Automatic fill up Btm. by Csg. 1975 Ft. up from K.B.

Remarks Top of casing is 613' below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement, 1170 US sacks.

Ht. to be Cemented To sea floor

Water ahead 20 bbls. Mix Times: Start 2:15 Finish 2:55 Slurry Wt. 15.6

Calc. Disp. 210 bbls. Est. Disp. Time 2:55 Mins. Start 2:55 Finish 3:25

Max. Pumping Press. 500 Bump. Press 1200 Bumped by Halliburton No. Times Bumped 1

Cement Returns: Yes/No. Remarks Cement to sea floor

## LANDING

Time Landed 12:30 Date September 14.1969 Init. Wt. of Cem. String (less blocks)

Wt. Landed in Slips 83.000 Make of Bowl Vetco sub sea housing 5000// Nom. Size Series

Slip & Seal Assembly Vetco single trip by Remarks

Agent of Operator

FORM NO. 155

## AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 13 3/8"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date September. 14. 1969

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 61 | J-55 | 3 | 8Rd | Short | | 37 | 1975.70 | 1,353.80 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Halliburton Type Down set guide shoe Length 1.22

Collar: Make Halliburton Type Float Collar Length 1.52

Landing Joint (when used) Length Pump and casing hanger 6.16

Overall Length of Casing String 1,352.70

Feet up from K.B. (Subtract) KB to well head 613.00

Setting Depth: By Driller ______ By Tally 1,975.70

Shoe Joint: Overall ______ (Subtract) 39.93

Float Collar Landed: By Driller ______ By Tally 1,935.77

CENTRALIZERS

Make Halliburton

Number 3

Positions 1- 1965', 1- 1938', 1- 1062'

SCRATCHERS

Make ______

Number ______

Positions ______

No. of Collars Welded Halliburton weld a shoe and collar joint.

Remarks: ______

# ENGINEERING PIPE TALLY SHEET

WELL NAME WALRUS A-71 DATE September.14.1969

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 22 | shoe | | 38 | 84 | | | | |
| 38 | 71 | | | 37 | 94 | | | | |
| 1 | 52 | collar | | 37 | 40 | | | | |
| 35 | 96 | | | 36 | 35 | | | | |
| 39 | 52 | | | 37 | 00 | | | | |
| 38 | 95 | | | 36 | 67 | | | | |
| 37 | 50 | | | 34 | 06 | | | | |
| 38 | 85 | | | 34 | 96 | | | | |
| 40 | 95 | | | 35 | 05 | | | | |
| 37 | 05 | | | 37 | 42 | | | | |
| 37 | 64 | | | 37 | 95 | | | | |
| 37 | 46 | | | 38 | 20 | | | | |
| 38 | 90 | | | 38 | 73 | | | | |
| 38 | 90 | | | 33 | 91 | | | | |
| 37 | 42 | | | 38 | 10 | | | | |
| 36 | 87 | | | 39 | 31 | | | | |
| 36 | 95 | | | 39 | 07 | | | | |
| 38 | 97 | | | 35 | 88 | | | | |
| 38 | 92 | | | 6 | 16 | Pup & Casing Hanger | | | |
| 38 | 05 | | | | | | | | |
| 689 | 50 | | | 673 | 20 | | | | |

TUBING/CASING

O.D. 13 3/8"

Wt. 61

Grade J-55

Range 3

Thread API 8Rd

Collar Short

Make -

| | SUMMARY | |
|---|---|---|
| Col. 1 | 689 | 50 |
| 2 | | |
| 3 | 673 | 20 |
| 4 | | |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 1,362 | 70 |

Tallied by:

Tot. Jts. on location

Jts. out (Incl. Ldg. Jt.)

37 Jts. perm. in hole

Remarks:

Agent of Operator

# RUNNING AND CEMENTING

~~Surface Casing~~
Intermediate Casing O.D. 9 5/8"
~~Production Casing~~
~~Liner~~

## GENERAL

Well WALRUS A-71 Location Hudson Bay Date September 23.1969

K.B. Elevation 618 K.B.-Csg. Flge. 512 Total Depth (Driller) 2965

| | | | | | | |
|---|---|---|---|---|---|---|
| Hole Size | 36" | 26" | 17½" 12¼" | Casing in Hole | 30" | 20" 13 3/8" |
| Depth | 781 | 1120 | 1992 2965 | Depth Set | 772 | 1106 1975 |

Mud: Type Duovis System Wt. 13.7 Visc. 52 W.L. 22.4

B.O.P.'s 1 16 3/4" 5000// Hydril GK, 2 16 3/4" 5000// BX Shaffer double LWS

## RUNNING

Power Tongs Hydraulic Torque: Max. 4350 Nom. Min.

Time pipe started 4:30 p.m. Time on Bottom 10:30 p.m. Time Circulated 45 min.

Fill-up Points Every joint Btm. by Csg. 2960 Ft. up from K.B.

Remarks Top of casing is 612 below K.B.

## CEMENTING

Cement Co. Halliburton Operator Bob Kelly Time on Location Permanent

Types & Quantities of Cement Class G cement, 936 US sacks

Ht. to be Cemented 650'

Water ahead 25 bbls. Mix Times: Start 11:30 p.m. Finish 12:15 a.m. Slurry Wt. 15.6

Calc. Disp. 218 bbls. Est. Disp. Time 30 Mins. Start 12:15 a.m. Finish 12:45 a.m.

Max. Pumping Press. 650 Bump. Press 1400 Bumped by No. Times Bumped

Cement Returns: Yes/No. Remarks Cement on running tool when retrieved.

## LANDING

Time Landed 10:30 p.m. Date September 23.1969 Init. Wt. of Cem. String (less blocks) 118.000

Wt. Landed in Slips 93000 Make of Bowl Vetco sub sea housing Nom. Size Series

Slip & Seal Assembly Vetco single trip by Remarks

Agent of Operator

FORM NO. 155

# AQUITAINE COMPANY OF CANADA LIMITED

## CASING INFORMATION

~~Surface Casing~~
Intermediate Casing O.D. 9 5/8"
~~Production Casing~~
~~Liner~~

Well WALRUS A-71 Location Hudson Bay Date September. 23. 1969

| Jts. on Locat. | Ft. on Locat. | Csg. Wt. | Gr. | Rge. | Thd. | T.&C. | Make | Jts. Run | Depth Landed | Ft. Run in Well |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 40 | N-80 | 3 | Buttress | Long | | 57 | 2,959.70 | 2,342.58 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Shoe: Make Halliburton Type Jet guide shoe Length 1.32

Collar: Make Halliburton Type Float collar Length 1.80

Landing Joint (when used) Length Casing Hanger 1.50

Overall Length of Casing String 2,347.20

Feet up from K.B. (Subtract) KB to well head 612.50

Setting Depth: By Driller 2,959.70 By Tally 2,959.70

Shoe Joint: Overall 79.37 (Subtract) 79.37

Float Collar Landed: By Driller 2,880.33 By Tally 2,880.33

**CENTRALIZERS**

Make Halliburton

Number 3

Positions 1 on first, second, third joint.

**SCRATCHERS**

Make

Number

Positions

No. of Collars Welded Halliburton well A on first two joints.

Remarks:

Agent of Operator

# AQUITAINE COMPANY OF CANADA LIMITED

FORM NO. 5116

-12-

## ENGINEERING PIPE TALLY SHEET

WELL NAME WALRUS A-71 DATE September 23 1969

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 32 | shoe | | 46 | 02 | 44 | 19 | | |
| 38 | 14 | | | 44 | 72 | 45 | 38 | | |
| 39 | 91 | | | 45 | 49 | 46 | 27 | | |
| 1 | 80 | float | | 41 | 70 | 44 | 40 | | |
| 44 | 82 | | | 46 | 26 | 43 | 16 | | |
| 39 | 18 | | | 39 | 63 | 43 | 21 | | |
| 36 | 44 | | | 38 | 57 | 42 | 52 | | |
| 36 | 35 | | | 38 | 44 | 44 | 06 | | |
| 45 | 10 | | | 39 | 00 | 43 | 64 | | |
| 38 | 81 | | | 37 | 12 | 45 | 81 | | |
| 37 | 86 | | | 39 | 68 | 32 | 92 | | |
| 39 | 34 | | | 46 | 96 | 32 | 84 | | |
| 39 | 65 | | | 45 | 00 | 38 | 84 | | |
| 45 | 85 | | | 40 | 18 | 38 | 56 | | |
| 46 | 26 | | | 40 | 69 | 38 | 82 | | |
| 45 | 46 | | | 42 | 87 | 38 | 73 | | |
| 43 | 49 | | | 40 | 16 | 38 | 69 | | |
| 45 | 92 | | | 43 | 04 | 38 | 27 | | |
| 46 | 15 | | | 43 | 60 | 4 | 50 | Pup Joint | |
| 45 | 08 | | | 44 | 83 | 1 | 50 | Hanger | |
| 756 | 93 | | | 843 | 96 | 746 | 31 | | |

TUBING/CASING

O.D. 9 5/8"

Wt. 40

Grade N 80

Range 3

Thread Buttress

Collar Long

Make

| | SUMMARY | |
|---|---|---|
| Col. 1 | 756 | 93 |
| 2 | | |
| 3 | 843 | 96 |
| 4 | 746 | 31 |
| 5 | | |
| | | |
| Fwd. | | |
| Fwd. | | |
| Fwd. | | |
| | | |
| | | |
| | 2,347 | 20 |

Tallied by:

Tot. Jts. on location

Jts. out (Incl. Ldg. Jt.)

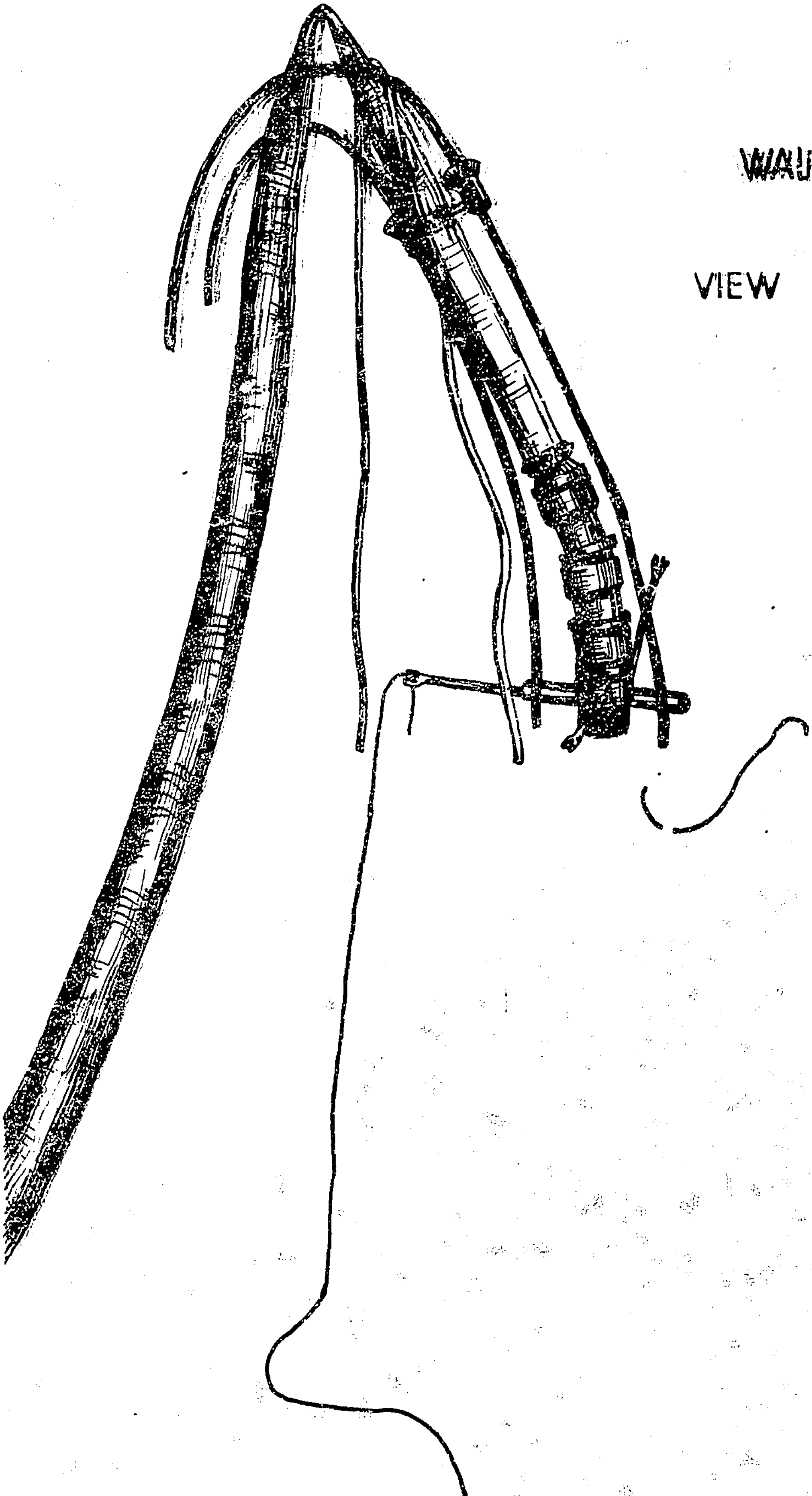
Jts. perm. in hole

Remarks:

Agent of Operator

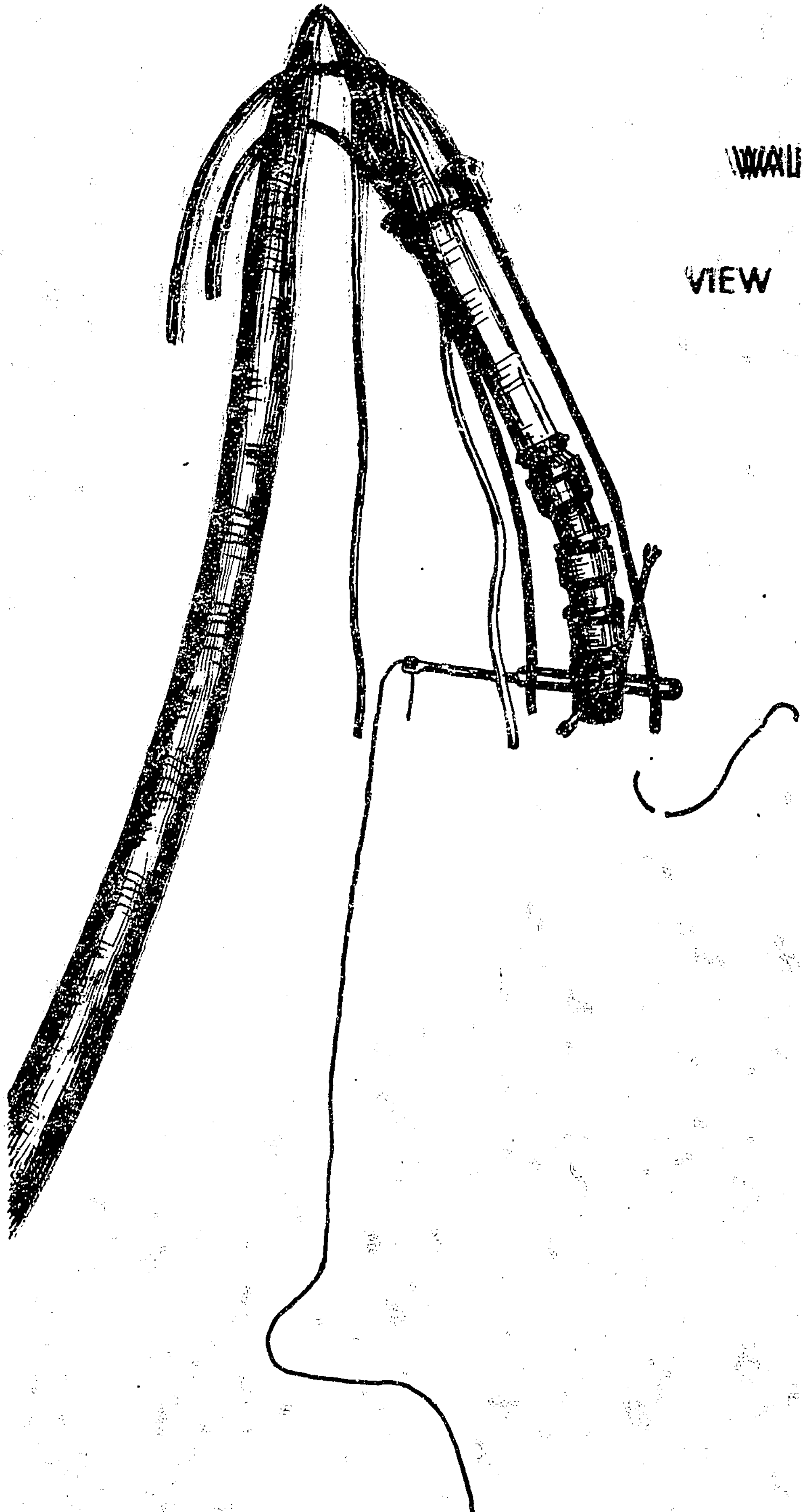
## WALRUS WELLHEAD

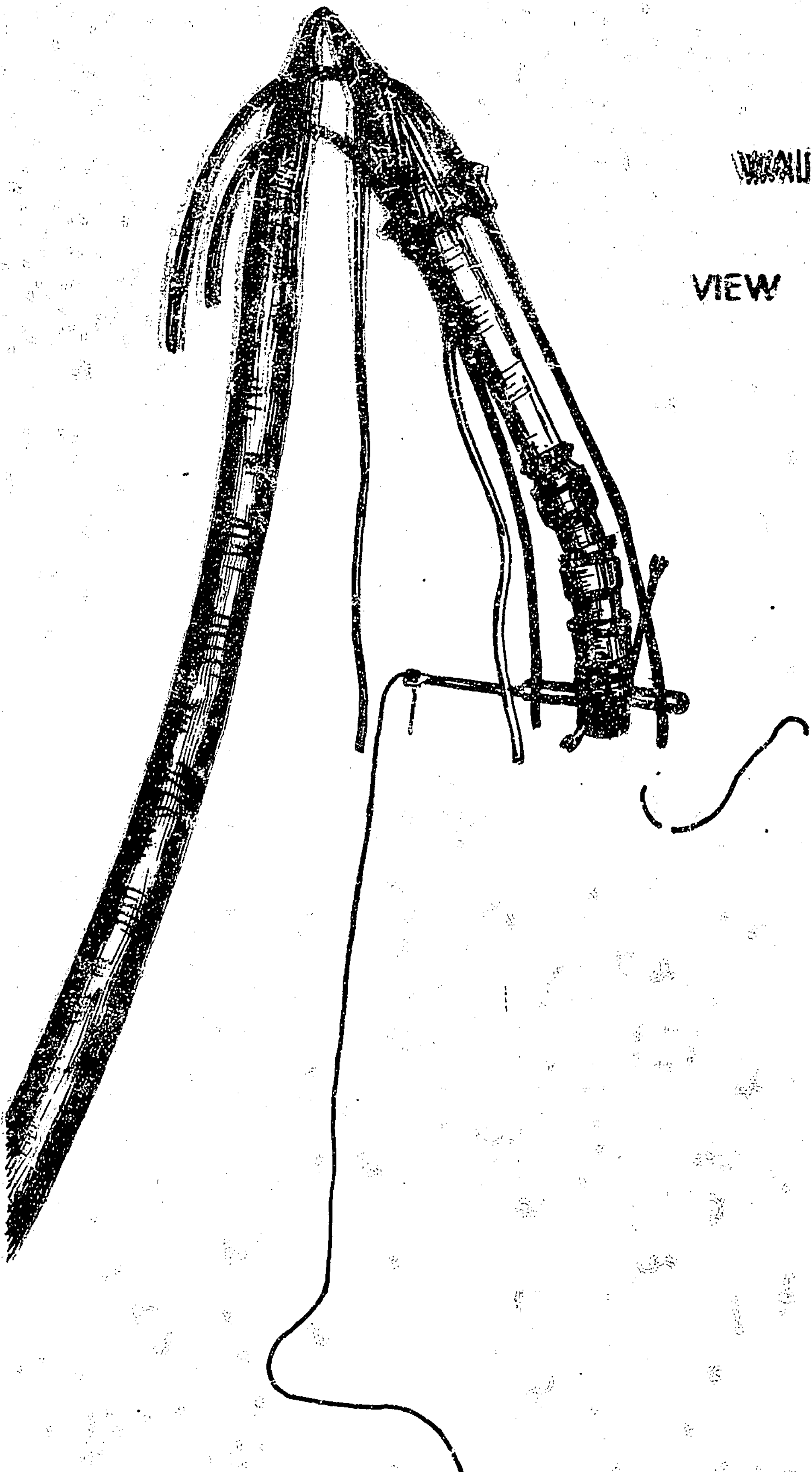
VIEW FROM THE NORTH



# WALRUS WELLHEAD

## VIEW FROM THE NORTH

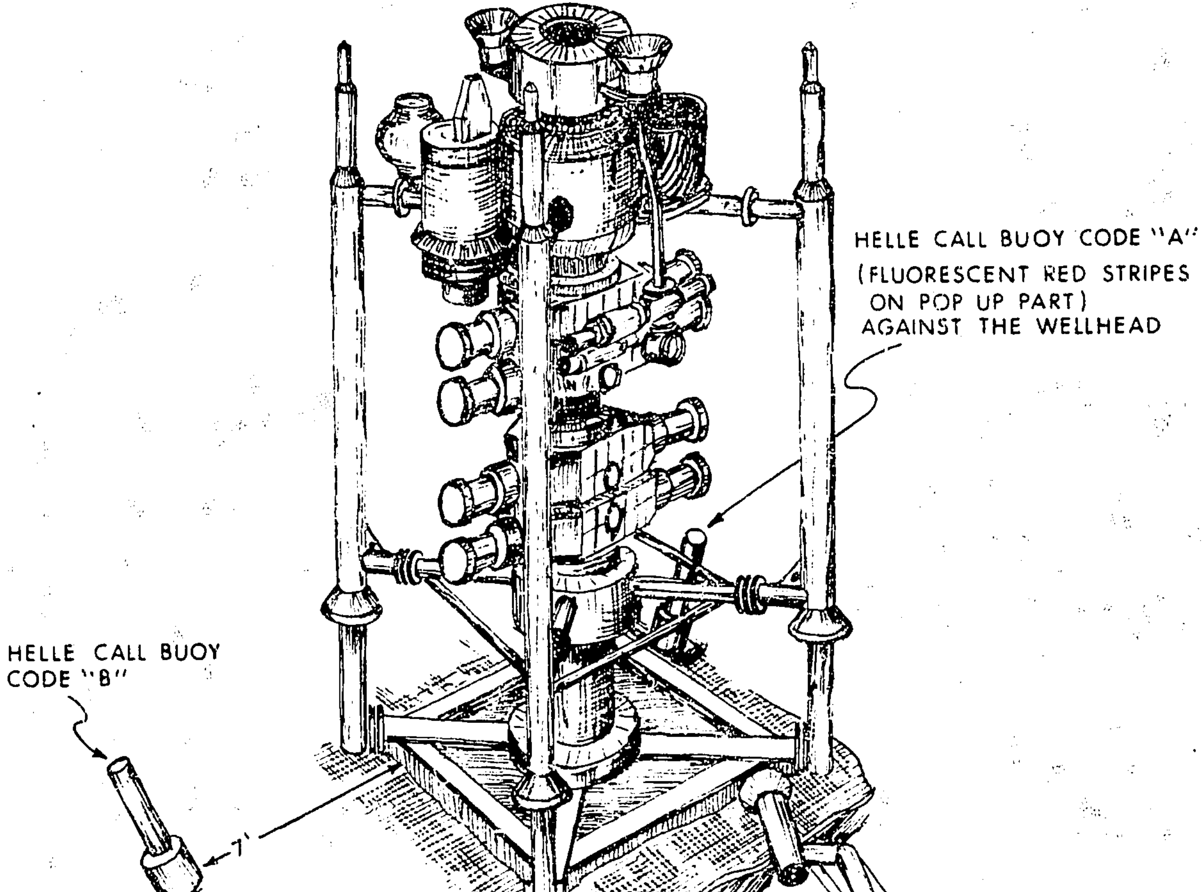




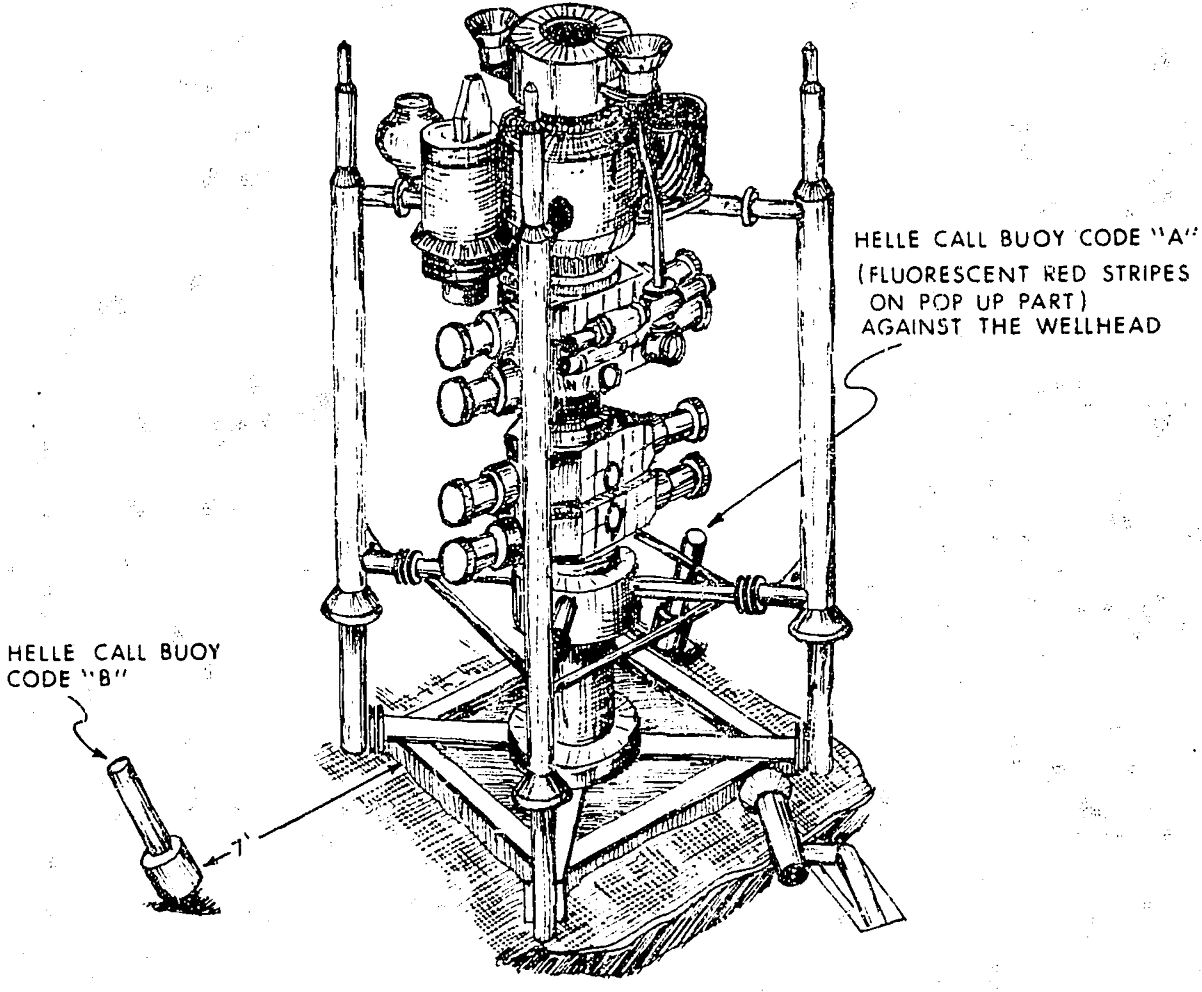
## WALRUS WELLHEAD

## VIEW FROM THE NORTH

WELL FILE
— WALRUS



WELL FILE
— WALRUS



4. GEOLOGICAL

AQUITAINE ET AL. HUDSON WALRUS A-71

## 4. GEOLOGICAL

# TABLE OF LITHOSTRATIGRAPHICAL UNITS

| | DEPTHS | THICKNESS |
|---|---|---|
| FIRST HYPOTHESIS | | |
| - Nomenclature according to Aquitaine 1968 lithostratigraphy | | |
| Sea Bottom | 618' | |
| Drift | 618 - 895' | 277' |
| Moose River Formation | 895 -1385' | 490' |
| Kwataboahegan Formation | 1385 -1500' | 115' |
| Stooping River Formation | 1500 -1882' | 382' |
| Kenogami River Formation equivalent | | |
| Middle Member | 1882 -2346' | 464' |
| Lower Member equivalent | 2346 -3846' | 1500' |
| Ekwan River Formation | | |
| Upper Member | 3846 -3926' | 80' |
| Total Depth | 3926' | |
| SECOND HYPOTHESIS | | |
| - Nomenclature according to the G.S.C. 1967 (Operation Winisk) lithostratigraphy | | |
| Sea Bottom | 618' | |
| Drift | 618 - 895' | 277' |
| Long Rapids Formation equivalent | 895 -1385' | 490' |
| Williams Island Formation equivalent | 1385 -1882' | 497' |
| Murray Island Formation equivalent | 1882 -2346' | 464' |
| Moose River Formation equivalent | 2346 -2506' | 160' |
| Kwataboahegan Formation equivalent | | |
| + Stooping River Formation equivalent | 2506 -2760' | 254' |
| Kenogami River Formation equivalent | | |
| Middle Member equivalent | 2760 -2800' | 40' |
| Lower Member equivalent | 2800 -3846' | 1046' |
| Ekwan River Formation equivalent | 3846 -3926' | 80' |
| Total Depth | 3926' | |

## TABLE OF CHRONOSTRATIGRAPHICAL UNITS

| | DEPTHS | THICKNESS |
|---|---|---|
| Pleistocene | 618 - 895' | 277' |
| "Upper Devonian" | 895 -1855' | 960' |
| "Frasnian" | 1855 -2715'(?) | 860' |
| "Upper Givetian" | 2715(?)-2850' | 135' |
| ? | 2850 -3846' | 996' |
| "Lower to Middle Devonian" (Palynology)<br>or "Silurian"(Conodonts and Corals) | 3846 -3926' | 80' |

* * * *

# SUMMARISED LITHOLOGICAL DESCRIPTION

| | |
|---|---|
| 618 - 895' | Yellow to red-brown, silty to sandy, locally calcareous, plastic clay.<br>Intercalations of white to brown fine sand.<br>Pebbles of quartzite, green rocks and limestone.<br>White fibrous gypsum. |
| 895 -1385' | Red-brown silty to sandy, locally calcareous, plastic clay.<br>Intercalations of white, pink to red-brown sand and calcareous sandstone.<br>Few levels of white anhydrite. White fibrous gypsum. |
| 1385 -1500' | Pinky beige, partly dolomitic, bioclastic limestone with thin alternating levels of:<br>-pink, sandy, locally crumbly limestone;<br>-red-brown plastic clay;<br>-white anhydrite. |
| 1500 -1712' | Alternating:<br>-red silty argillites;<br>-white to beige microcrystalline micro-oolitic limestone;<br>-pink bioclastic limestone;<br>-beige to grey partly chalky and argillaceous crumbly limestone;<br>-grey microcrystalline saccharoidal dolomitic limestone;<br>-beige pelletoidal dolomitic limestone;<br>-pink slightly sandy crumbly limestone. |
| 1712 -1882' | Alternating:<br>-beige to grey chalky and argillaceous locally bioclastic limestone;<br>-pink, partly sandy bioclastic limestone;<br>-red to brown limestone with cellular dolomite. Brachiopods;<br>-white, beige to grey microcrystalline oolitic limestone. |
| 1882 -1981' | Greenish-grey shale (or shaly limestone) with intercalations of brown to red argillites. |
| 1981 -2038' | Alternating:<br>-red to brown argillites;<br>-grey to brown dolomitic shale. Isolated corals;<br>-beige, pink to grey, partly pelletoidal bioclastic limestone. |
| 2038 -2346' | Grey, beige to brown plastic clay. Few intercalations of shale. |

| | |
|---|---|
| 2346 -2350' | Beige to brown, fine grained calcareous sandstone. |
| 2350 -2408' | Alternating:<br>-beige to brown cryptocrystalline dolomite;<br>-pink and grey dolomitic shale. |
| 2408 -2506' | Halite.<br>Few alternating levels of:<br>-white to brown anhydrite,<br>-pink and grey dolomitic shale,<br>-beige and brown cryptocrystalline dolomite. |
| 2506 -2594' | Brown, cryptocrystalline to crystalline, partly argillaceous, partly dolomitic bioclastic to biohermal limestone.<br>Few levels of beige, red speckled calcareous dolomite and of anhydrite. |
| 2594 -2664' | Beige to brown calcarenitic, bioclastic to biohermal limestone. |
| 2664 -2732' | Brown microcrystalline bituminous dolomite. |
| 2732 -2760' | White to beige microcrystalline slightly bituminous limestone. |
| 2760 -2800' | Greenish-grey shale. Few levels of white to beige microcrystalline slightly bituminous limestone. |
| 2800 -2970' | Pink, beige to grey cryptocrystalline to microcrystalline dolomite. |
| 2970 -3172' | Alternating:<br>-white, pink to beige, cryptocrystalline to microcrystalline slightly silicified, compact and azoic dolomite;<br>-beige, grey to brown microcrystalline slightly argillaceous dolomitic limestone. |
| 3172 -3288' | White microcrystalline spathic partly dolomitic limestone. Intercalations of beige to brown microcrystalline, slightly argillaceous dolomitic limestone. |
| 3288 -3400'' | White, beige to grey microcrystalline, recrystallised, locally pseudo-oolitic, compact fossiliferous limestone. |
| 3400 -3571' | Alternating:<br>-shale;<br>-white to beige microcrystalline, recrystallised, locally pseudo-oolitic, compact slightly dolomitic limestone;<br>-pink, microcrystalline to crystalline, partly chalky, slightly argillaceous dolomitic limestone. |
| 3571 -3777' | White, beige to grey, microcrystalline, partly crumbly pseudo-oolitic to pseudo-brecciated, dolomitic limestone. |

| | |
|---|---|
| 3777 -3846' | Alternating:<br>-white, beige to grey microcrystalline, partly calcarenitic to microconglomeratic limestone;<br>-brown microcrystalline dolomite. |
| 3846 -3855' | Grey-blue marls. |
| 3855 -3926' | Alternating:<br>-beige to grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone;<br>-dark brown microcrystalline, locally calcarenitic, slightly anhydritic, bituminous limestone. |

* * * *

The following Documents
are
Autopositive's
(Reversed Immage)

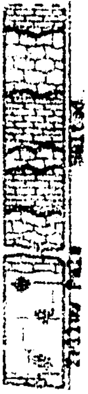
C.M.O.

**AQUITAINE**

| DATE | CORE SHEET(2 of 2) | CORE No | WELL NAME |
|---|---|---|---|
| Oct-14 th 1969 | | 4 | WALRUS A-71 |

| CORED | FROM | TO | RECOVERED |
|---|---|---|---|
| 9 Ft - in 3 Hrs 15 Min | 3917 | 3925 | 9 Ft (100 %) |

| CORE BARREL | MUD | GEOLOGIST |
|---|---|---|
| Type BC Christensen H906 16C 547 Diameter 8 7/16 | DOWELL SYSTEM - D: 1,72 Rsal: 320 | Serge ZUEFF |

| Scale 1" 1' de 1,12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Type | Grade | LITHOLOGY | NaCl | Porosity | Permeability | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3924' | 9 |  | NONE | NONE | | | | ORDOVICIAN | CHURCHILL RIVER GROUP | | | | | | | | | |
| 3925' | 1 | | | | | | | | | | | | | | | | | |
| 3926' | | | | | | 95 85 98 | x | | | | | | | | | | | |

Alternating
-Light brown cryptocryst to microcryst Limestone with millimetric dark brown straight bands of bitumen;

-Beige to light grey cryptocryst to microcryst Limestone with ondulating millimetric bands of bitumen, "Vermiform" aspect.
Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Larges crystals of dolomite. Traces of anhydrite. Framents of brachiopodes, corals, mollusca.

Light brown cryptocryst to microcryst Limestone.

Salinity on core= 70 gr/dm3

AQUITAINE

DATE: Oct. 14th 1969

# CORE SHEET (1 of 2)

CORE No: 4

WELL NAME: WALRUS A-71

CORED: 9 Ft - in 3 Hr 15 Min

FROM: 3917'

TO: 3926'

RECOVERED: 9 Ft (100 %)

CORE BARREL

Type: Christiensen EC 6906 160 4/7

Diameter: 8 7/16

MUD: BIOVIS SYSTEM - D=1,72 Ncl: 320

GEOLOGIST: Serge RUZFF

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3917' | 1 |  | | | | 70 98 100 x | | | | | | ABSTRACT = Alternating<br>-Light brown slightly bituminous limestone.<br>-Beige to light grey mottled slightly dolomitic, bioclastic and calcarenitic Limestone. Traces of anhydrite. Crinoids, corals, brachiopods and mollusca.<br>Porosity Few vugs, some filled with salt. One level with intergranular porosity(-6%).<br>Content Salted water | | | | | | |
| 3918' | 2 | | Salted Water | | | | | | | | | Alternating.<br>-Light brown cryptocryst intraformational calcareous breccia with microcryst pebbles. Slightly bituminous. Traces of anhydrite. Brown millimetric straight bands of bitumen.<br>-Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes corals, mollusca. | | | | | | |
| 3919' | 3 | | | | | 90 100 100 x | | [illegible] | CHURCHILL RIVER | Vug<br>Int grd<br>Vug | Few<br><6%<br>Few | ← centimetric coral<br>← Vug filled with salt<br>Light brown cryptocryst to microcryst Limestone. Few large dolomite crystals. Fragments of brachio- [illegible] of organisms | | | | | | |
| 3920' | 4 | | Salted Water | NONE | NONE | | | | | | | ← Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes. Corals, Mollusca | | | | | | |
| 3921' | 5 | | | | | | | | | | | Light brown cryptocryst Limestone | | | | | | |
| | 6 | | Yellow Pale Fluorescence | | | 75 94 100 x | | | | | | Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite, Fragments of brachiopodes corals, mollusca. | | | | | | |
| 3922' | 7 | | | | | | | | | | | ← Centimetric Coral<br>-Beige to light grey cryptocryst to microcryst Limestone with undulating millimetric levels of bitumen. "Vermiform" aspect. | | | | | | |
| | 8 | | Yellow Pale Fluorescence | | | 60 96 100 x | | | | | | Light brown cryptocryst Limestone. | | | | | | |
| 3923' | | | | | | | | | | | | Beige to light grey mottled microcryst bioclastic and calcarenitic Limestone. Large crystals of dolomite. Traces of anhydrite. Fragments of brachiopodes, corals, mollusca. | | | | | | |
| 3924' | 9 | | | | | | | | | | | Light brown cryptocryst Limestone. | | | | | | |

AQUITAINE

DATE: 27 8 1979

# CORE SHEET

CORE No: 1

WELL NAME: WALRUS A 71

CORED: 15 Ft in 1 Hr 25 Min

FROM: 1432'

TO: 1447 '

RECOVERED: 15 Ft ( 100 %)

CORE BARREL

Type: CHRISTENSEN Diameter 6 3/4

MUD

D= 1,04 V= 62 WL = 11 cc

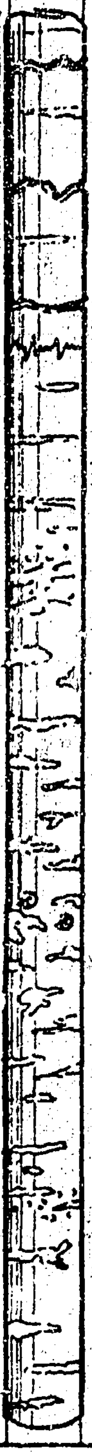
GEOLOGIST: M C. KNIECLUCK

Scale 1/2"=1' or 1/24

| Depth | Calcimetry 1' | Calcimetry 15' |
|---|---|---|
| 1432 | | |
| 1433 | 92 | 100 |
| 1434 | 93 | 100 |
| 1435 | 97 | 100 |
| 1436 | 75 | 88 |
| 1437 | 97 | 100 |
| 1438 | 98 | 100 |
| 1439 | 55 | 100 |
| 1440 | 72 | 100 |
| 1441 | 57 | 100 |
| 1442 | 70 | 100 |
| 1443 | 66 | 90 |
| 1444 | 60 | 87 |
| 1445 | 53 | 100 |
| 1446 | 73 | 100 |
| 1447 | | |

Fragments: 1, 2, 3, 4, 5, 5b, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

Log



Shows: NIL

Fractures: Some oblique open fractures

Dips: Subhorizontal

Age: DEVONIAN

Formation: KWATABCAHEGAN FORMATION

Apparent Porosity: 6 %

Apparent Porosity: 8 %

Thin Section

Laboratory Results: NaCl mg/l, Porosity %, Permeability md, Water Saturation, Oil Saturation, Density

## LITHOLOGY

Calcaire rose-beige grumeleux a passees centimetriques de calcaire plus fin et plus fonce

Quelques joints tapisses par de l'argilite rouge brique ferrugineuse, un joint stylolithique.

Intercalations centimetriques de calcaire organogene (algues et stromatopores ) tres recristallise.

Pink-beige crumbly limestone with centimetric intercalations of finer and darker limestone.

Few bedding planes lined with ferruginous brick-red argillite, one stylolithic bedding plane.

Centimetric intercalations of organogenic limestone (Algae and Stromatoporas ), higly recrystallized.

1438

Calcaire dolomitique rose fonce plus fin a larges plages allongees a contours dechiquetes representant des lits d'algues encroutantes tres recristallisees .

Nombreuses vacuoles et geodes et plages sargoulisees.

Plusieurs niveaux a stromatopores (amphipora branchu ?), receptaculites et favosites.

Finer dark pink dolomitic limestone, with long patches with jagged edges uprepresenting beds of encrusting Algae highly recrystallized.

Numerous vesicles, geodes and patches of cellular dolomite.

Several floors with Stromatoporas (branching Amphiporas ), Receptaculites and Favosites.

AQUITAINE

DATE: Sept. 15th 69

# CORE SHEET

CORE No: 2

WELL NAME: Walrus A - 71

CORED: 1 Ft / in / Hr 30 Min

FROM: 2000 '

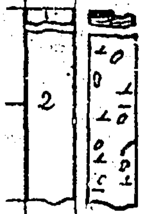
TO: 2001 '

RECOVERED: 1 Foot (100 %)

CORE BARREL: Type: JUNK BASKET Diameter 12 ¼

MUD: SEA WATER-DUOVIS SYSTEM

GEOLOGIST: SERGE RUEFF

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Appt. Porosity Type | Appt. Porosity Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 2 |  | | | | 28 65 85 | + + | SILURIAN | KENOGAMI RIVER | | | ± Black intraformational shaly calcareous breccia<br>Grey millimetric pebbles of shale.<br>- Grey laminated shale. | | | | | | |
| 2001 | | | | | | 23 54 60 | | | | | | - Dark grey, slightly greenish shale. | | | | | | |

**AQUITAINE**

DATE: Sept. 15th 69

# CORE SHEET

CORE No: 2

WELL NAME: Walrus A - 71

CORED: 1 Ft / in / Hr 30 Min

FROM: 2000 '

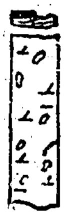
TO: 2001 '

RECOVERED: 1 Foot (100 %)

CORE BARREL: Type: JUNK BASKET Diameter 12 ¼

MUD: SEA WATER-DUOVIS SYSTEM

GEOLOGIST: SERGE RUEFF

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Type | Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 2 |  | | | | 28 65 85 | + + | SILURIAN | KENOGAMI RIVER | | | - Black intraformational shaly calcareous breccia<br>Grey millimetric pebbles of shale.<br>- Grey laminated shale. | | | | | | |
| 2001 | | | | | | 23 54 60 | | | | | | - Dark grey, slightly greenish shale. | | | | | | |

**AQUITAINE**

# CORE SHEET (1 of 2)

DATE: Sept. 17 th 69

CORE No: 3

WELL NAME: WALRUS A 71

CORED: 14 Ft in 2 Hr 30 Min

FROM: 2670 Feet

TO: 2684 Ft

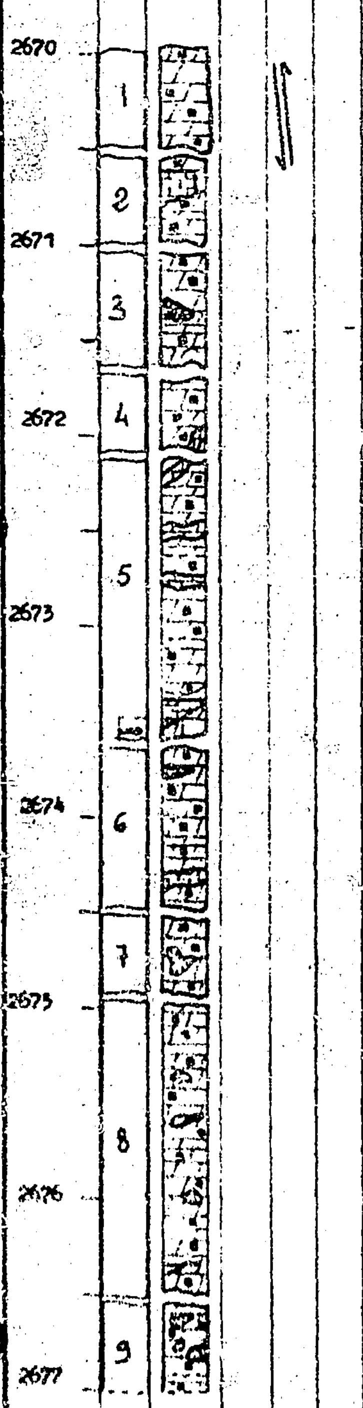
RECOVERED: 14 Ft (100 %)

CORE BARREL: Type: Caristensen Diameter 6"¾

MUD: sea water - DUOVIS SYSTEM

GEOLOGIST: SERGE RUEFF

| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Apparent Porosity Grade | LITHOLOGY | Laboratory Results NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|



Calcimetry: 45 80 97 + (2671); 50 68 74 + (2673–2674); 35 65 70 + (2675); 17 52 65 + (2676–2677)

Age: SILURIAN

Formation: EKWAN RIVER (LOWER MEMBER)

Apparent porosity type: Vug (2674–2675); Vug (2676); Vug (2677)

**LITHOLOGY**

ABSTRACT: Very darek brown fractured microcrystalline bituminous, calcareous dolomiteand dolomite millimetric to centimetric levels of bitumen: Few ghosts and fragments of organisms.
Some zones of grey microcrystalline dolomitic limstone and of anhydrite.
Porosity: - vugs
- intercristalline porosity: 2 - 15%
- size of largest pores ≈2 mm; average size of porous ≈60 microns
Content = salty water; neither gas nor oil show.

Zone of grey microcrystalline dolomitice limstone
Very darek brown macrocrystalline bituminous dolomite millimetric to centimetric levels of bitumen
Porosity = 5% Size of largest pore = 400 microns
average size of pore = 80 microns

Several zones of grey macrocrystalline dolomitic limstone.

Very dark brown macrocrystalline bituminous dolomite; millimetric to centimetric levels of bitumen;
Porosity = 8% Size of largest pore = 2 mm
Average size of pore ≈12m microns

Very dark brown macrocrystalline bituminous dolomite, Anhydrite. Millimetric to centimetric levels of bitumen. Crinoids
Porosity = 2% Size of largest pore = 1200 microns
Average size of pore = 80 microns

Zone of grey microcrystalline dolomite limstone

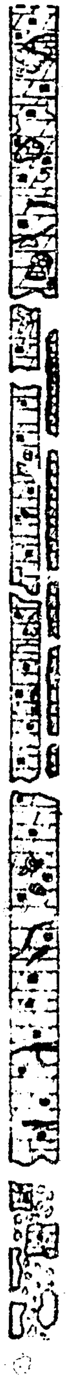
Very dark brown macrocrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen
Porosity = 15% + very large amount of pores filled with bituminens. Size of largest pore = 40 microns
Average size of pore = 40 microns.

**AQUITAINE**

# CORE SHEET ( 2 of 2 )

| DATE | CORE No | WELL NAME |
|---|---|---|
| | | |

CORED: Ft in Hr Min
FROM: TO:
RECOVERED: ( %)
CORE BARREL: Type: Diameter
MUD:
GEOLOGIST:



| Scale 1"=1' or 1/12 Depth | Fragments | Log | Shows | Fractures | Dips | Calcimetry | Thin Section | Age | Formation | Apparent Porosity Type | Grade | LITHOLOGY | NaCl mg/l | Porosity % | Permeability md | Water Saturation | Oil Saturation | Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2677 | | | | | | | | SILURIAN | EKWAN RIVER (LOWER MEMBER) | Vug<br>Vug | | Several zones of grey microcrystalline dolomitic limestone. | | | | | | |
| 2678 | 9<br>10 | | | | | | | | | Vug | | Very dark brown microcrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts of organisms.<br>porosity = 5% Size of largest pore 500 microns<br>Average size of pores = 40 microns. | | | | | | |
| 2679 | 11 | | | | | 45 59 59 | + | | | Vug | | | | | | | | |
| 2680 | LAB<br>12 | | | | | 10 26 26 | + | | | Vug | | Very dark brown microcrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts and fragments of organisms + Algae and Ostracods.<br>Porosity = 2% Size of largest pore = 400 microns<br>Average size of pores = 40 microns | | | | | | |
| 2681 | | | | | | | | | | | | Zones of anhydrite | | | | | | |
| 2682 | 13 | | | | | | | | | | | | | | | | | |
| 2683 | LOG<br>14 | | | | | 65 84 88 | + | | | | | Very dark brown microcrystalline bituminous dolomite. Millimetric to centimetric levels of bitumen. Anhydrite. Ghosts and fragments of fossils<br>Porosity: nihil; all pores filled with bitumen.<br>REMARK : Fragment 14 ; many pieces in the core boxes + 1 plastic bag + 2 metallic cans.<br>Well site salinity = 5,6 gr / dm3 | | | | | | |
| 2684 | | | | | | | | | | | | | | | | | | |

# CORE LABORATORIES — CANADA, LTD.

CALGARY ALBERTA

| | | | | | |
|---|---|---|---|---|---|
| **COMPANY** | AQUITAINE COMPANY OF CANADA LTD. | **FORMATION** | | **PAGE** | 1 of 7 |
| **WELL** | AQUITAINE ET AL HUDSON WALRUS A-71 | **DRILLING FLUID** | WATER BASE MUD | **FILE** | CNP-4-4855 |
| **FIELD** | WILDCAT-HUDSON BAY | **ELEVATION** | | **DATE REPORT** | DEC. 4, 1969 |
| **LOCATION** | LSD. 58° 30' 02" N.L.<br>87° 10' 50" W.L. | **ANALYSIS** | FULL DIAMETER | **ANALYSTS** | RM MH BK |
| | | **REMARKS** | | | |

AST - APPEARS SIMILAR TO
● - BROKEN CORE (ALSO USED FOR SUMMARY PURPOSES)
●● - PERMEABILITY > 20000 MD
— - PERMEABILITY <
FS - FINE SAND
MS - MEDIUM SAND
CS - COARSE SAND
CONG - CONGLOMERATE
DOL - DOLOMITE
SH - SHALE
LMY - LIMY
SHY - SHALY
BRK - BREAK
BIT - PYROBITUMEN
CARB - CARBONACEOUS
A - ANHYDRITE
FOSS - FOSSILIFEROUS
XLN - CRYSTALLINE
LAM - LAMINATIONS
V - VUGULAR
LV - LARGE VUGS
SV - SMALL VUGS
PPV - PIN POINT VUGS
I - INTERGRANULAR
STY - STYLOLITIC
HF - HORIZONTAL FRACTURE
VF - VERTICAL FRACTURE
SM - SMALL PLUG
SL/ - SLIGHTLY
V/ - VERY
W/ - WITH

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | PERMEABILITY TO AIR, MILLIDARCYS | | | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | DENSITY, gm./cc. | | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | KMAX | K90° | KV | | | | BULK | GRAIN | OIL | TOTAL WATER | |
| CORE NO. 1 1432.0' - 1446.8' (REC. 14.8') (6 BOXES) | | | | | | | | | | | | | |
| 1 | 1432.0-32.5 | 0.5 | 0.58 | 0.47 | -0.01 | 0.29 | 4.7 | 2.35 | 2.53 | 2.66 | 0.0 | 61.6 | I SANDY |
| 2 | 1432.5-33.7 | 1.2 | 3.06 | 2.96 | 0.42 | 3.67 | 11.0 | 13.20 | 2.39 | 2.68 | 0.0 | 61.3 | I SANDY |
| 3 | 1433.7-34.5 | 0.8 | 0.50 | 0.47 | -0.01 | 0.40 | 9.1 | 7.28 | 2.46 | 2.70 | 0.0 | 71.2 | I SANDY |
| 4 | 1434.5-35.5 | 1.0 | 0.41 | 0.37 | -0.01 | 0.41 | 9.1 | 9.10 | 2.46 | 2.70 | 0.0 | 79.5 | I PPV SANDY |
| 5 | 1435.5-36.8 | 1.3 | 4.62 | 4.15 | 0.61 | 6.01 | 10.5 | 13.65 | 2.39 | 2.67 | 0.0 | 65.9 | I SANDY |
| 6 | 1436.8-38.1 | 1.3 | 6.54 | 6.39 | 1.76 | 8.50 | 11.9 | 15.47 | 2.37 | 2.69 | 0.0 | 53.7 | I SANDY |
| 7 | 1438.1-39.3 | 1.2 | 8.09 | 7.07 | 1.10 | 9.71 | 12.7 | 15.24 | 2.35 | 2.69 | 0.0 | 72.7 | I PPV SANDY |
| 8 | 1439.3-40.4 | 1.1 | 2.18 | 1.75 | 0.22 | 2.40 | 8.0 | 8.80 | 2.40 | 2.60 | 0.0 | 74.8 | I SANDY |
| 9 | 1440.4-41.3 | 0.9 | 0.76 | 0.73 | -0.01 | 0.68 | 6.8 | 6.12 | 2.42 | 2.60 | 0.0 | 76.9 | I SV SANDY |
| 10 | 1441.3-42.3 | 1.0 | 3.72 | 3.64 | 0.93 | 3.72 | 13.3 | 13.30 | 2.32 | 2.68 | 0.0 | 72.6 | I SV SANDY |
| 11 | 1442.3-43.3 | 1.0 | 0.11 | 0.05 | -0.1 | 0.11 | 6.1 | 6.10 | 2.40 | 2.55 | 0.0 | 75.0 | I SANDY |
| 12 | 1443.3-44.3 | 1.0 | 2.47 | 2.22 | 0.97 | 2.47 | 13.8 | 13.80 | 2.27 | 2.63 | 0.0 | 78.5 | I SV SANDY |
| 13 | 1444.3-45.6 | 1.3 | 11.20 | 8.01 | 1.29 | 14.56 | 12.7 | 16.51 | 2.37 | 2.71 | 0.0 | 75.2 | I FEW PPV SAND |
| 14 | 1445.6-46.8 | 1.2 | 22.10 | 18.50 | 3.67 | 26.52 | 12.7 | 15.24 | 2.33 | 2.67 | 0.0 | 73.2 | I PPV SANDY |

PAGE: 2 of 7

WELL: AQUITAINE ET AL HUDSON WALRUS A-71

FILE: CNP-4-4855

FORMATION:

SUMMARY INTERVAL: 1432.0 - 1446.8

TOTAL FOOTAGE: 14.8

FOOTAGE ANALYZED 14.8

FOOTAGE NOT ANALYZED: TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

SUMMARY OF ANALYZED CORE:

| | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| TOTAL | 14.8 | 100.00 | 10.55 | 156.16 | 5.37 | 79.45 | .00 | 70.73 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 0.10 0.49 Md. | 2.0 | 13.51 | 7.60 | 15.20 | .26 | .52 | .00 | 77.25 |
| 0.50 0.99 Md. | 2.2 | 14.86 | 7.16 | 15.75 | .62 | 1.37 | .00 | 71.35 |
| 1.00 9.99 Md. | 8.1 | 54.74 | 11.54 | 93.46 | 4.50 | 36.48 | .00 | 67.86 |
| GREATER THAN 9.99 Md. | 2.5 | 16.89 | 12.70 | 31.75 | 16.43 | 41.08 | .00 | 74.24 |

*NOT ANALYZED BY REQUEST

PAGE: 2 of 7

WELL: AQUITAINE ET AL HUDSON WALRUS A-71

FILE: CNP-4-4855

FORMATION:

SUMMARY INTERVAL: 1432.0 - 1446.8

TOTAL FOOTAGE: 14.8

FOOTAGE ANALYZED 14.8

FOOTAGE NOT ANALYZED: TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

SUMMARY OF ANALYZED CORE:

| | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| TOTAL | 14.8 | 100.00 | 10.55 | 156.16 | 5.37 | 79.45 | .00 | 70.73 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 0.10 0.49 Md. | 2.0 | 13.51 | 7.60 | 15.20 | .26 | .52 | .00 | 77.25 |
| 0.50 0.99 Md. | 2.2 | 14.86 | 7.16 | 15.75 | .62 | 1.37 | .00 | 71.35 |
| 1.00 9.99 Md. | 8.1 | 54.74 | 11.54 | 93.46 | 4.50 | 36.48 | .00 | 67.86 |
| GREATER THAN 9.99 Md. | 2.5 | 16.89 | 12.70 | 31.75 | 16.43 | 41.08 | .00 | 74.24 |

*NOT ANALYZED BY REQUEST

# CORE LABORATORIES – CANADA, LTD.

CALGARY ALBERTA

| | | | | | |
|---|---|---|---|---|---|
| **COMPANY** | AQUITAINE COMPANY OF CANADA LTD. | **FORMATION** | | **PAGE** | 1 of 7 |
| **WELL** | AQUITAINE ET AL HUDSON WALRUS A-71 | **DRILLING FLUID** | WATER BASE MUD | **FILE** | CNP-4-4855 |
| **FIELD** | WILDCAT-HUDSON BAY | **ELEVATION** | | **DATE REPORT** | DEC. 4, 1969 |
| **LOCATION** | LSD. 58° 30' 02" N.L.<br>87° 10' 50" W.L. | **ANALYSIS** | FULL DIAMETER | **ANALYSTS** | RM MH BK |
| | | **REMARKS** | | | |

AST – APPEARS SIMILAR TO
● – BROKEN CORE (K90 USED FOR SUMMARY PURPOSES)
●● – PERMEABILITY > 30000. MD
- – PERMEABILITY <
FS – FINE SAND
MS – MEDIUM SAND
CS – COARSE SAND
CONG – CONGLOMERATE
DOL – DOLOMITE
SH – SHALE
LMY – LIMY
SHY – SHALY
/BK – BREAK
BIT – PYROBITUMEN
CARB – CARBONACEOUS
A – ANHYDRITE
FOSS – FOSSILIFEROUS
XLN – CRYSTALLINE
LAM – LAMINATIONS
V – VUGULAR
LV – LARGE VUGS
SV – SMALL VUGS
PPV – PIN POINT VUGS
I – INTERGRANULAR
STY – STYLOLITIC
HF – HORIZONTAL FRACTURE
VF – VERTICAL FRACTURE
SS – SMALL PLUG
SL/ – SLIGHTLY
V/ – VERY
W/ – WITH

CORE NO. 1 1432.0' - 1446.8' (REC. 14.8') (6 BOXES)

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | PERMEABILITY TO AIR, MILLIDARCYS | | | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | DENSITY, gm./cc. | | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | KMAX | K90° | KV | | | | BULK | GRAIN | OIL | TOTAL WATER | |
| 1 | 1432.0-32.5 | 0.5 | 0.58 | 0.47 | -0.01 | 0.29 | 4.7 | 2.35 | 2.53 | 2.66 | 0.0 | 61.6 | I SANDY |
| 2 | 1432.5-33.7 | 1.2 | 3.06 | 2.96 | 0.42 | 3.67 | 11.0 | 13.20 | 2.39 | 2.68 | 0.0 | 61.3 | I SANDY |
| 3 | 1433.7-34.5 | 0.8 | 0.50 | 0.47 | -0.01 | 0.40 | 9.1 | 7.28 | 2.46 | 2.70 | 0.0 | 71.2 | I SANDY |
| 4 | 1434.5-35.5 | 1.0 | 0.41 | 0.37 | -0.01 | 0.41 | 9.1 | 9.10 | 2.46 | 2.70 | 0.0 | 79.5 | I PPV SANDY |
| 5 | 1435.5-36.8 | 1.3 | 4.62 | 4.15 | 0.61 | 6.01 | 10.5 | 13.65 | 2.39 | 2.67 | 0.0 | 65.9 | I SANDY |
| 6 | 1436.8-38.1 | 1.3 | 6.54 | 6.39 | 1.76 | 8.50 | 11.9 | 15.47 | 2.37 | 2.69 | 0.0 | 53.7 | I SANDY |
| 7 | 1438.1-39.3 | 1.2 | 8.09 | 7.07 | 1.10 | 9.71 | 12.7 | 15.24 | 2.35 | 2.69 | 0.0 | 72.7 | I PPV SANDY |
| 8 | 1439.3-40.4 | 1.1 | 2.18 | 1.75 | 0.22 | 2.40 | 8.0 | 8.80 | 2.40 | 2.60 | 0.0 | 74.8 | I SANDY |
| 9 | 1440.4-41.3 | 0.9 | 0.76 | 0.73 | -0.01 | 0.68 | 6.8 | 6.12 | 2.42 | 2.60 | 0.0 | 76.9 | I SV SANDY |
| 10 | 1441.3-42.3 | 1.0 | 3.72 | 3.64 | 0.93 | 3.72 | 13.3 | 13.30 | 2.32 | 2.68 | 0.0 | 72.6 | I SV SANDY |
| 11 | 1442.3-43.3 | 1.0 | 0.11 | 0.05 | -0.1 | 0.11 | 6.1 | 6.10 | 2.40 | 2.55 | 0.0 | 75.0 | I SANDY |
| 12 | 1443.3-44.3 | 1.0 | 2.47 | 2.22 | 0.97 | 2.47 | 13.8 | 13.80 | 2.27 | 2.63 | 0.0 | 78.5 | I SV SANDY |
| 13 | 1444.3-45.6 | 1.3 | 11.20 | 8.01 | 1.29 | 14.56 | 12.7 | 16.51 | 2.37 | 2.71 | 0.0 | 75.2 | I FEW PPV SAND |
| 14 | 1445.6-46.8 | 1.2 | 22.10 | 18.50 | 3.67 | 26.52 | 12.7 | 15.24 | 2.33 | 2.67 | 0.0 | 73.2 | I PPV SANDY |

PAGE: 2 of 7

FILE: CNP-4-4855

WELL: AQUITAINE ET AL HUDSON WALRUS A-71

FORMATION:

SUMMARY INTERVAL: 1432.0 - 1446.8

TOTAL FOOTAGE: 14.8

FOOTAGE ANALYZED 14.8

FOOTAGE NOT ANALYZED: TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

| SUMMARY OF ANALYZED CORE: | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| TOTAL | 14.8 | 100.00 | 10.55 | 156.16 | 5.37 | 79.45 | .00 | 70.73 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 0.10 0.49 Md. | 2.0 | 13.51 | 7.60 | 15.20 | .26 | .52 | .00 | 77.25 |
| 0.50 0.99 Md. | 2.2 | 14.86 | 7.16 | 15.75 | .62 | 1.37 | .00 | 71.35 |
| 1.00 9.99 Md. | 8.1 | 54.74 | 11.54 | 93.46 | 4.50 | 36.48 | .00 | 67.86 |
| GREATER THAN 9.99 Md. | 2.5 | 16.89 | 12.70 | 31.75 | 16.43 | 41.08 | .00 | 74.24 |

*NOT ANALYZED BY REQUEST

# CORE LABORATORIES – CANADA, LTD.

CALGARY ALBERTA

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.
**WELL** AQUITAINE ET AL HUDSON WALRUS A-71

**PAGE** 3 of 7
**FILE** CNP-4-4855

CORE NO. 3 2670' - 2684' (REC. 14') (6 BOXES)

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | PERMEABILITY TO AIR, MILLIDARCYS | | | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | DENSITY, gm./cc. | | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | KMAX | K90° | KV | | | | BULK | GRAIN | OIL | TOTAL WATER | |
| 15 | 2670.0-71.1 | 1.1 | 1.56 | 0.75 | 0.68 | 1.72 | 10.6 | 11.66 | 2.42 | 2.71 | 4.0 | 62.6 | I |
| 16 | 2671.1-72.0 | 0.9 | 1.33 | 1.18 | 0.40 | 1.20 | 12.8 | 11.52 | 2.40 | 2.76 | 4.7 | 66.0 | I |
| 17 | 2672.0-73.5 | 1.5 | 0.13 | 0.02 | -0.1 | 0.20 | 9.7 | 14.55 | 2.46 | 2.72 | 4.8 | 59.6 | I |
| 18 | 2673.5-74.8 | 1.3 | 0.50 | 0.05 | 0.07 | 0.65 | 11.5 | 14.95 | 2.43 | 2.75 | 3.6 | 69.5 | I |
| 19 | 2674.8-75.8 | 1.0 | 0.33 | 0.11 | -0.1 | 0.33 | 11.5 | 11.50 | 2.43 | 2.75 | 5.4 | 73.8 | I |
| 20 | 2675.8-76.8 | 1.0 | 1.83 | 0.78 | -0.1 | 1.83 | 11.6 | 11.60 | 2.41 | 2.73 | 4.4 | 77.0 | I FEW PPV |
| 21 | 2676.8-77.9 | 1.1 | 1.95 | 1.82 | 0.21 | 2.15 | 13.5 | 14.85 | 2.37 | 2.74 | 4.4 | 70.8 | I FEW SV PPV |
| 22 | 2677.9-78.8 | 0.9 | 0.66 | 0.31 | 0.47 | 0.59 | 12.9 | 11.61 | 2.38 | 2.73 | 4.6 | 75.9 | I FEW SV |
| 23 | 2678.8-80.1 | 1.3 | -0.1 | 2.22 | -0.1 | 2.88 | 12.5 | 16.25 | 2.40 | 2.75 | 3.9 | 71.1 | I FEW SV PPV F |
| 24 | 2680.1-81.3 | 1.2 | -0.1 | 3.43 | -0.1 | 4.11 | 13.9 | 16.68 | 2.35 | 2.73 | 4.4 | 70.4 | I SV F |
| 25 | 2681.3-82.6 | 1.3 | 0.91 | 0.32 | 0.51 | 1.18 | 13.1 | 17.03 | 2.40 | 2.76 | 3.5 | 68.3 | I SV |
| 26 | 2682.6-84.0 | 1.4 | 2.09 | 0.66 | 0.91 | 2.93 | 12.2 | 17.08 | 2.36 | 2.09 | 3.1 | 63.3 | I FEW SV F |

| | | | |
|---|---|---|---|
| **WELL:** | AQUITAINE ET AL HUDSON WALRUS A-71 | **PAGE:** | 4 of 7 |
| **FORMATION:** | | **FILE:** | CNP-4-4855 |
| **SUMMARY INTERVAL:** | 2670.0 - 2684.0 | | |
| **TOTAL FOOTAGE:** | 14.0 | | |
| **FOOTAGE ANALYZED** | 14.0 | | |

**FOOTAGE NOT ANALYZED:** TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

| SUMMARY OF ANALYZED CORE: | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| TOTAL | 14.0 | 100.00 | 12.09 | 169.28 | 1.41 | 19.77 | 4.18 | 68.59 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 0.10 0.49 Md. | 2.5 | 17.86 | 10.42 | 26.05 | .21 | .53 | 5.04 | 65.28 |
| 0.50 0.99 Md. | 3.5 | 25.00 | 12.45 | 43.59 | .69 | 2.43 | 3.82 | 70.96 |
| 1.00 9.99 Md. | 8.0 | 57.14 | 12.46 | 99.64 | 2.10 | 16.82 | 4.07 | 68.58 |
| GREATER THAN 9.99 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

*NOT ANALYZED BY REQUEST

# CORE LABORATORIES – CANADA LTD.

CALGARY ALBERTA

MPANY AQUITAINE COMPANY OF CANADA LTD.
.L AQUITAINE ET AL HUDSON WALRUS A-71
LD WILDCAT - HUDSON BAY
ATION LSD. 58° 30' 02" N.L.
87° 10' 50" W.L.

FORMATION
DRILLING FLUID WATER BASE MUD
ELEVATION
ANALYSIS CONVENTIONAL
REMARKS

PAGE 5 of 7
FILE CNP-4-4855
DATE REPORT DEC. 4, 1969
ANALYSTS MH BK

- APPEARS SIMILAR TO
- BROKEN CORE [illegible] USED FOR SUMMARY PURPOSES
- PERMEABILITY > 20000 MD.

[illegible] - PERMEABILITY <
FS - FINE SAND
MS - MEDIUM SAND
CS - COARSE SAND

CONG - CONGLOMERATE
DOL - DOLOMITE
SH - SHALE
LMY - LIMY

SHY - SHALY
/BK - BREAK
BIT - PYROBITUMEN
CARB - CARBONACEOUS

A - ANHYDRITE
FOSS - FOSSILIFEROUS
XLN - CRYSTALLINE
LAM - LAMINATIONS

V - VUGULAR
LV - LARGE VUGS
SV - SMALL VUGS
PPV - PIN POINT VUGS

I - INTERGRANULAR
STY - STYLOLITIC
HF - HORIZONTAL FRACTURE
VF - VERTICAL FRACTURE

SS - SMALL PLUG SAMPLE
SL/ - SLIGHTLY
V/ - VERY
W/ - WITH

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | HORIZ. PERM TO AIR, MILLIDARCYS | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | | | | | OIL | TOTAL WATER | |
| CORE NO. 4 3917' - 3926' (REC. 9.0') (4 BOXES) | | | | | | | | | |
| 27 | 3917.0-18.3 | 1.3 | 0.70 | 0.91 | 13.7 | 17.81 | Trace | 76.3 | I |
| 28 | 3918.3-19.2 | 0.9 | 0.24 | 0.22 | 10.5 | 9.45 | 0.0 | 74.7 | I FEW PPV |
| 29 | 3919.2-19.9 | 0.7 | 0.24 | 0.17 | 12.0 | 8.40 | 0.0 | 71.1 | I |
| 30 | 3919.9-21.0 | 1.1 | -0.01 | - | 4.4 | 4.84 | Trace | 69.2 | I |
| 31 | 3921.0-21.9 | 0.9 | -0.01 | - | 3.0 | 2.70 | 0.0 | 56.6 | I |
| 32 | 3921.9-23.0 | 1.1 | 0.76 | 0.84 | 12.2 | 13.42 | 0.0 | 74.2 | I FEW PPV |
| 33 | 3923.0-24.0 | 1.0 | 0.18 | 0.18 | 8.0 | 8.00 | 0.0 | 71.5 | I |
| 34 | 3924.0-25.0 | 1.0 | -0.01 | - | 4.8 | 4.80 | Trace | 70.0 | I |
| 35 | 3925.0-26.0 | 1.0 | -0.01 | - | 1.3 | 1.30 | 0.0 | 32.7 | I |

# CORE LABORATORIES – CANADA, LTD.

*Petroleum Reservoir Engineering*

ELL: AQUITAINE ET AL HUDSON WALRUS A-71

PAGE: 6 of 7

RMATION:

FILE: CNP-4-4855

IMMARY INTERVAL: 3917.0 - 3926.0

TAL FOOTAGE: 9.0

OTAGE ANALYZED 9.0

OTAGE NOT ANALYZED: TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

| | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| IMMARY<br>:<br>IALYZED CORE: | | | | | | | | |
| TAL | 9.0 | 100.00 | 7.86 | 70.72 | .26 | 2.31 | .00 | 66.56 |
| RM<br>INGES: | | | | | | | | |
| SS THAN 0.10 Md. | 4.0 | 44.44 | 3.41 | 13.64 | .00 | .00 | .00 | 57.44 |
| 0 0.49 Md. | 2.6 | 28.89 | 9.94 | 25.85 | .22 | .56 | .00 | 72.50 |
| 0 0.99 Md. | 2.4 | 26.67 | 13.01 | 31.23 | .73 | 1.75 | .00 | 75.34 |
| 0 9.99 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| IEATER THAN 9.99 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

*NOT ANALYZED BY REQUEST

WURL LAB WURL LAB

## WATER ANALYSIS

File CNP-4-4855
Page 7 of 7

Company AQUITAINE COMPANY OF CANADA LTD.

Well AQUITAINE ET AL HUDSON WALRUS A-71 K.B. Grd.

Location LSD 58° 30' 02" N.L. 87° 10' 50" W.L. Field WILDCAT Province HUDSON BAY

Formation Interval

Sampled from LEACHED FROM CORE SAMPLE #2 by

Date sampled Date analysed Analyst

Recovery

Mud type Water cushion

Total Solids:

Resistivity 0.612 Ohm-meters @ 75 °F

Calculated 9040 mg/liter

Specific gravity 1.0118 @ 60°F

By evaporation @ 110°C - mg/liter

pH 7.40 $H_2S$ Absent

By evaporation @ 180°C - mg/liter

Refractive index 1.330 @ 75°F

At ignition - mg/liter

### MILLIGRAMS PER LITER

| Na + K | Ca | Mg | Fe | Ba | Br | I | Cl | $HCO_3$ | $SO_4$ | $CO_3$ | OH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2668 | 595 | 44 | Tr. | Abs. | - | - | 4110 | 83 | 1540 | Nil | Nil |

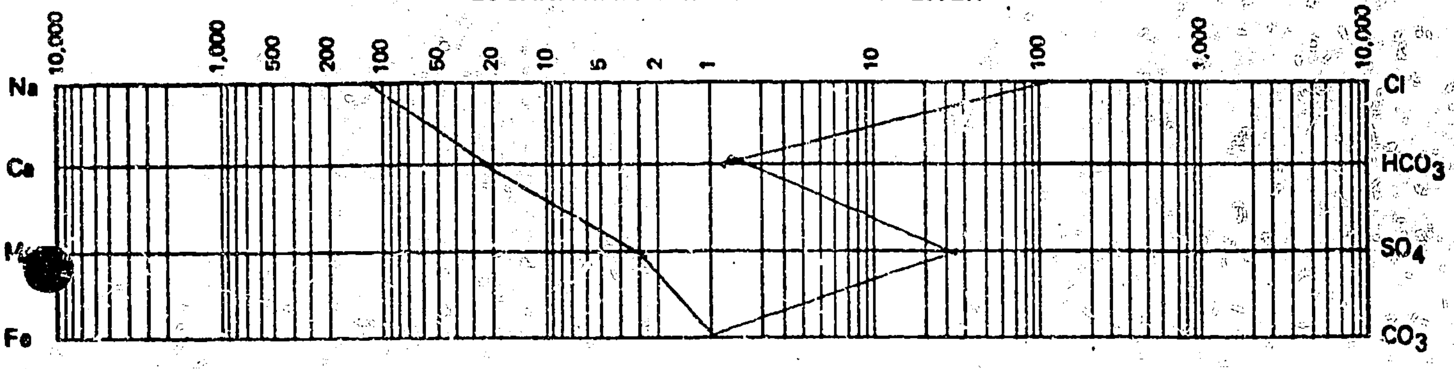
### PER CENT CALCULATED SOLIDS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 29.5 | 6.6 | 0.5 | - | - | - | - | 45.5 | 0.9 | 17.0 | Nil | Nil |

### MEQ PER LITER

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 116.0 | 29.7 | 3.6 | - | - | - | - | 115.9 | 1.4 | 32.0 | Nil | Nil |

### LOGARITHMIC PATTERN MEQ PER LITER



GEOSERVICES NORTH AMERICA LTD.

ROOM 305 - EXAMINER BLDG.
805 FIFTH ST. S.W. CALGARY 2, ALTA.

GEOCHEMICAL PROSPECTING
GEOCHEMICAL WELL LOGGING
GEOLOGICAL WELL SITE SERVICES

TELEPHONES: 269-6619
269-6576
CABLE: GEONAM
CALGARY

# REPORT ON GAS SHOWS ON WALRUS A71

## I. CHARACTERISTICS OF DETECTION SYSTEM

- Densimud.
- Stirring Degasser GZ11 constant level 40 l/mn.
- 1st Drying by $Cl_2Ca$.
- Monoflex 30 ft.
- Flow in Monoflex 40 l/h.
- 2nd Drying by $Cl_2Ca$.
- Sampling Assembly.
- Blanchette LAFOND.
- GD11 # 2220.
- GAL21 #3379 in parallel with GD11; continuous recording of gas from 772' to T.D. 3926'.
- Calibration of GAL21 - every day with drilling with 1% $C_1$; lag time due to Monoflex and drying + $Co_2$ absorbant containers : 2 mns. at 40 l/h.

Note: All depths are lagged.

## II. GAS SHOWS RECORDED

772' - 2,500' No gas recorded (Note: traces of $N_2$ while drilling cement after casing).

2502' First apparition of gas on Detectors (0.18% of $C_1$).

2563' First gas show with $C_1$ : 1.5%
$C_2$ : 0.05%
$C_1/C_2 = 30$
Traces of $H_2$
Recycled twice during circulation

## Report on Gas Shows on Walrus A71 (cont'd)

| | |
|---|---|
| 2567' | Trip Gas - after new bit with $C_1$ 0.6%<br>then back ground of 0.12% average. |
| 2614' | Gas show (0.18% $C_1$). |
| 2614' - 2665' | Back ground of 0.12% average. |
| 2667' | Gas show 0.17% $C_1$<br>0.027% $C_2$ $C_1/C_2 = 18$ |
| 2670' | After round trip Trip Gas with 0.50% $C_1$<br>and 0.027% $C_2$. |
| 2685' - 2800' | Back ground of 0.15% $C_1$ average and 0.025% $C_2$.<br>Note: Viscosity of mud 40. Allows reading of $C_2$ in this interval continuously. |
| 2750' | Kick Gas 0.35% $C_1$ and 0.06% $C_2$. |
| 2775' | Gas show for 10' 0.22% $C_1$ and 0.04% $C_2$. |
| 2800' - 2900' | Mud weight increased; less quantity of gas recorded (less than 0.02% $C_1$ at 2,850'). |
| 2902' | Trip Gas with 1.4% $C_1$ and 0.035% $C_2$ $C_1/C_2 = 40$<br>Recycled once (0.35% $C_1$). |
| 2960' | Casing 9"5/8.<br>After casing no gas show until 3070'. |
| 3070' | Sudden apparition of gas and constant reading of 0.38% $C_1$ during 20 feet. $C_1/C_2 = 48$ |
| 3095' | Mud weight increased to 1.75 when start drilling. After lag time, flow of 25 bbls of salt water reduces weight to 1.57. Trip gas of 5.8% $C_1$ and 0.12 $C_2$; recycled twice.<br>After Trip gas weight stabilizes at 1.68. |
| 3140' | Trip gas due to pipe connection of 0.35% $C_1$ |

| | |
|---|---|
| 3160' | Trip gas 6% $C_1$ and 0.16% $C_2$ $C_1/C_2 = 37$ |
| 3200' - 3510' | Mud weight put to 1.70 - 1.72 and increased to 1.78-1.82 after 3510 to 3580'.<br>No hydrocarbon gas recorded. However, continuous show of $N_2$ due to chemicals added in mud. |
| 3580' | Mud weight reduced to 1.70;<br>flow of water and gas recorded;<br>7% $C_1$ and 0.13% $C_2$. |
| 3580' - 3926' (total depth of Walrus A71) | No real shows have been recorded. But every round trip has been followed by a flow of salt water reducing mud weight and allowing records of Trip gas. Also after connections and stop circulation for well surveys.<br>Those Trip gases between 7.5% $C_1$ and 0.11% $C_2$ at 3730', and 1% $C_1$ with 0.07% $C_2$ at 3635'. |

## III. ABSTRACT

First show at 2563' 1.5% $C_1$ 0.05% $C_2$ $C_1/C_2 = 30$

Then shows at:

| | |
|---|---|
| 2614' | (0.18% $C_1$) |
| 2667' | (0.17% $C_1$) |
| 2775' | (0.22% $C_1$) lasting 10 mn. $C_2 = 0.04\%$ |
| 3070' | After casing 9"5/8 - 0.38% $C_1$ for 20 feet. |
| After 3070' | Trip gas recorded after each trip.<br>Average back ground of gas less than 0.1% $C_1$ |

Géoservices North America Ltd.
J.P. GERARD.

AQUITAINE COMPANY OF CANADA LTD.
1300 CALGARY HOUSE · 550-6TH AVENUE S.W.
PHONE: 263 3916 · AREA CODE: 403 · TELEX: 038-2349 PETRAKI CGY · CABLES: PETRAKI CALGARY
CALGARY, ALBERTA, CANADA

## WALRUS A-71

### Details of the Samples

| | |
|---|---|
| SAMPLE NO. 1 | Sample of mud contained in the core barrel of Core No. 3. |
| SAMPLE NO. 2 | Sample of mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 2568' - beginning of the kick. |
| SAMPLE NO. 3 | Same as sample No. 2 but: - middle of the kick. |
| SAMPLE NO. 4 | Same as sample No. 2 but: - end of the kick. |
| SAMPLE NO. 5 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 2906'. |
| SAMPLE NO. 6 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 3092'. Circulation had been off for 5 hours. Gas kick recorded on the well site:<br>- Duration: 30 minutes,<br>- Total gas: 7.5%,<br>- $C_1$: 5.8%<br>- $C_2$: 0.12%<br>- $C_1/C_2$ = 48.<br>- Density of mud dropped from 1.75 to 1.57. |
| SAMPLE NO. 7 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for new bit at 3160'. Gas kick recorded on the well site:<br>- Total gas: 10%<br>- $C_1$: 6%<br>- $C_2$: 0.18%<br>- $C_1/C_2$ = 33. |

/...2

| | |
|---|---|
| SAMPLE NO. 8 | Sample of gas sampled in a metallic bottle installed on the gas detection circuit of the geological cabin - before the detector - during a gas kick after a trip for new bit at 2568'. |
| SAMPLE NO. 13 | Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick after a trip for controlling the hole at 2974'. Circulation had been off for 72 hours. |

* * * * *

C.G.L. 64

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

OPERATOR: AQUITAINE COMPANY OF CANADA LTD. REPORT NUMBER: E69-11245

DATE SAMPLED: --- DATE RECEIVED: Oct. 3, 1969 DATE REPORTED: Oct. 15, 1969

Kind of Sample: Gas Samples in Glass Bottles - Item A on P.O. #A-2442.

| Sample Number: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 13 |
|---|---|---|---|---|---|---|---|---|
| Oxygen | 20.91 | 18.94 | 19.58 | 20.06 | 15.15 | 19.43 | 17.37 | 17.68 |
| Nitrogen | 78.59 | 80.66 | 80.29 | 79.85 | 83.83 | 79.40 | 77.11 | 81.32 |
| Carbon dioxide | 0.01 | 0.01 | Trace | 0.01 | Trace | Trace | 0.01 | Trace |
| Hydrogen sulfide | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Helium | 0.10 | 0.01 | 0 | Trace | 0.03 | 0.01 | 0.05 | 0.01 |
| Hydrogen | Trace | 0.02 | 0.01 | Trace | 0.09 | 0.17 | 0.01 | 0.01 |
| Methane | 0.26 | 0.35 | 0.12 | 0.08 | 0.89 | 0.95 | 5.35 | 0.96 |
| Ethane | 0.03 | 0.01 | 0 | Trace | 0.01 | 0.03 | 0.10 | 0.02 |
| Propane | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nitrogen oxide | 0.10 | Trace | Trace | Trace | Trace | Trace | Trace | Trace |

The compositions are reported as percent by volume.

The trace components are less than 0.005%.

On Sample No. 1 the nitrogen oxide was verified by mass spectrometer.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

Date Reported: October 15, 1969 Laboratory Report Number: E69-11246

AQUITAINE COMPANY OF CANADA LTD.

Kind of Sample: Gas
Date Received: October 3, 1969

Sample in Metallic Bottle
Item B on P.O. #A-2442

Sample #8.

| | % (by volume) |
|---|---|
| Oxygen | 20.31 |
| Nitrogen | 79.15 |
| Carbon dioxide | 0.02 |
| Hydrogen sulfide | 0 |
| Helium | 0 |
| Hydrogen | 0 |
| Methane | 0.52 |
| Ethane | Trace |
| Propane | 0 |

Sample was received under a pressure of 3 psig.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

Date Reported: October 14, 1969 Laboratory Report Number: E69-11265

AQUITAINE COMPANY OF CANADA LTD.

Kind of Sample: Water Field: Hudson's Bay

Date Received: October 3, 1969

Drilling Fluid and Gas Samples.

General Memorandum regarding Nitrogen Compounds.

The presence of amine compounds was verified in most of the samples examined, especially samples 1 to 5 in the series. Nitrates were also noted in these first five samples as a brown vapor on igniting the evaporated solids. The samples contained an oxidizing agent or agents which would account for the release of the brown $N_2O_3$ vapor from nitrates.

This oxidizing power of the fluids probably accounts, in part, for the presence of nitrous oxide in the gas. Nitrates are present along with amines and this leads reasonably to the formation of ammonium nitrate. Heating ammonium nitrate is the well-known method used to generate nitrous oxide in teaching elementary chemistry. An oxidizing environment should allow the reaction to proceed at a lower temperature, eg. a bottom hole temperature of 150°F. or somewhat higher.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-1

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #1

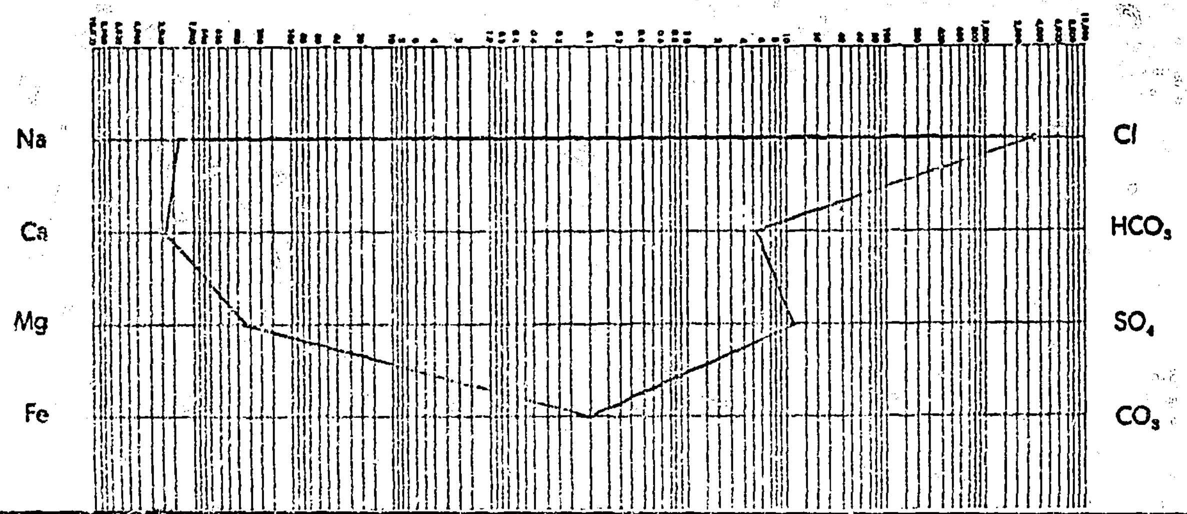
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 34187 | | 36116 | 4180 | | | | | 593 | 128200 | | | | 325 | | |
| Meq./L | 1487.15 | | 1802.19 | 343.56 | | | | | 12.33 | 3615.24 | | | | 5.33 | | |
| Meq. % | 20.47 | | 24.80 | 4.73 | | | | | 0.17 | 49.76 | | | | 0.07 | | |

Total Solids Mg/L: By Evaporation 256,480 Fe much Specific Gravity 1.153 @60°F Observed pH 7.4 @ 75 °F

Calculated 203,601 After Ignition 188,760 $H_2S$ nil Refractive Index 1.3724 @25°C Resistivity 0.062 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-2

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #2

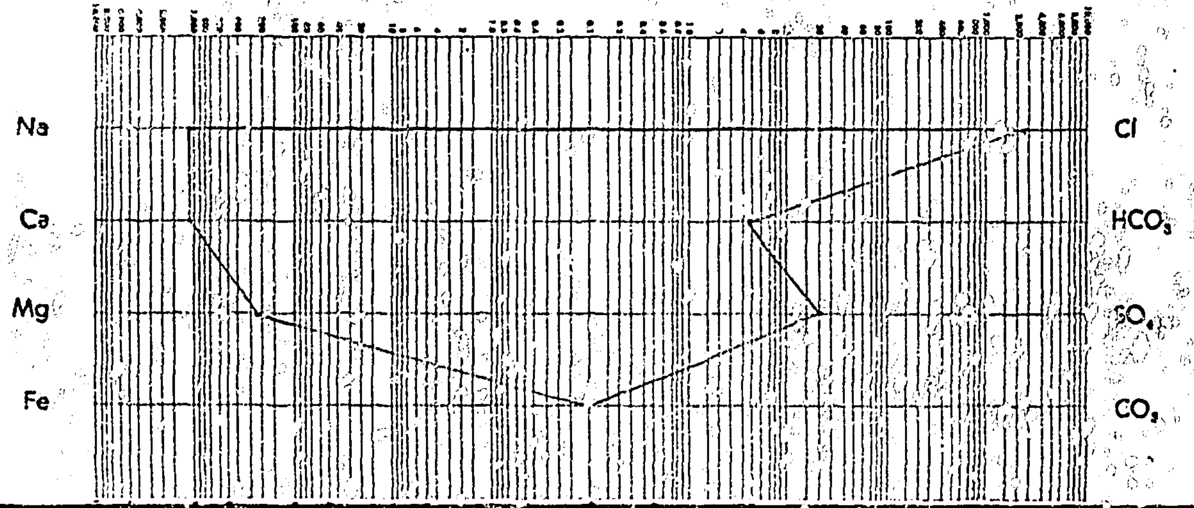
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 28194 | | 25786 | 3086 | | | | | 1000 | 97200 | | | | 303 | | |
| Meq./L | 1226.42 | | 1286.71 | 253.68 | | | | | 20.80 | 2741.04 | | | | 4.97 | | |
| Meq. % | 22.16 | | 23.25 | 4.58 | | | | | 0.38 | 49.53 | | | | 0.09 | | |

Total Solids Mg/L: By Evaporation 180,960 Fe much Specific Gravity 1.123 @60°F Observed pH 7.4 @ 79°F

Calculated 155,569 After Ignition 144,240 $H_2S$ nil Refractive Index 1.3636 @25°C Resistivity 0.072 ohm meters @ 68°F

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-3

Received: Oct. 3, 1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA

Sample #3

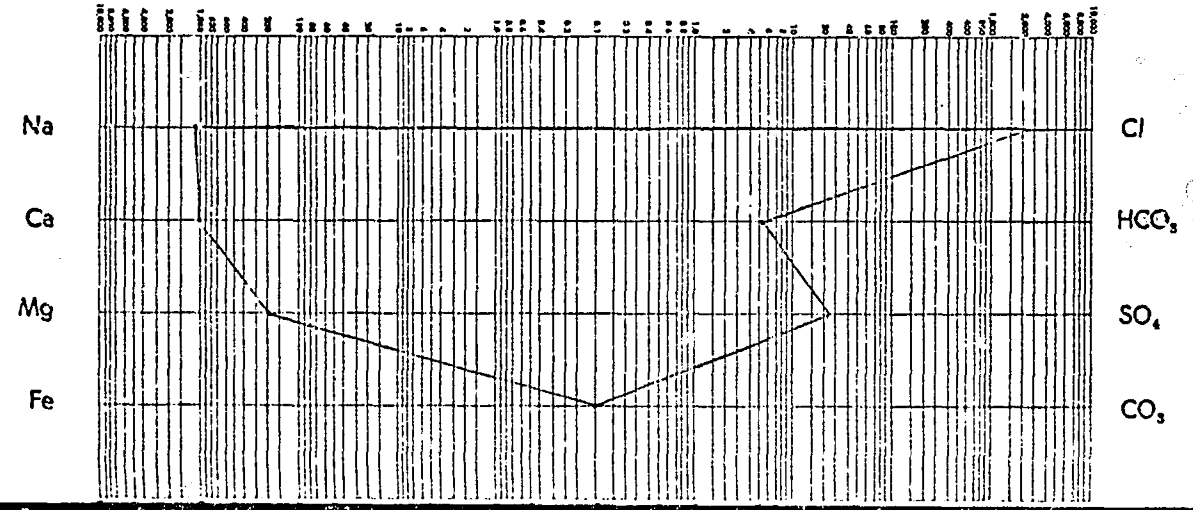
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 28156 | | 20380 | 2357 | | | | | 1189 | 85300 | | | | 325 | | |
| Meq./L | 1224.80 | | 1016.98 | 193.75 | | | | | 24.74 | 2405.46 | | | | 5.33 | | |
| Meq. % | 25.14 | | 20.88 | 3.98 | | | | | 0.51 | 49.38 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 166,680 Fe much Specific Gravity 1.108 @60°F Observed pH 7.4 @ 80°F

Calculated 137,707 After Ignition 134,980 $H_2S$ nil Refractive Index 1.3598 @25°C Resistivity 0.075 ohm meters @ 68°F

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud sample.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-4

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #4

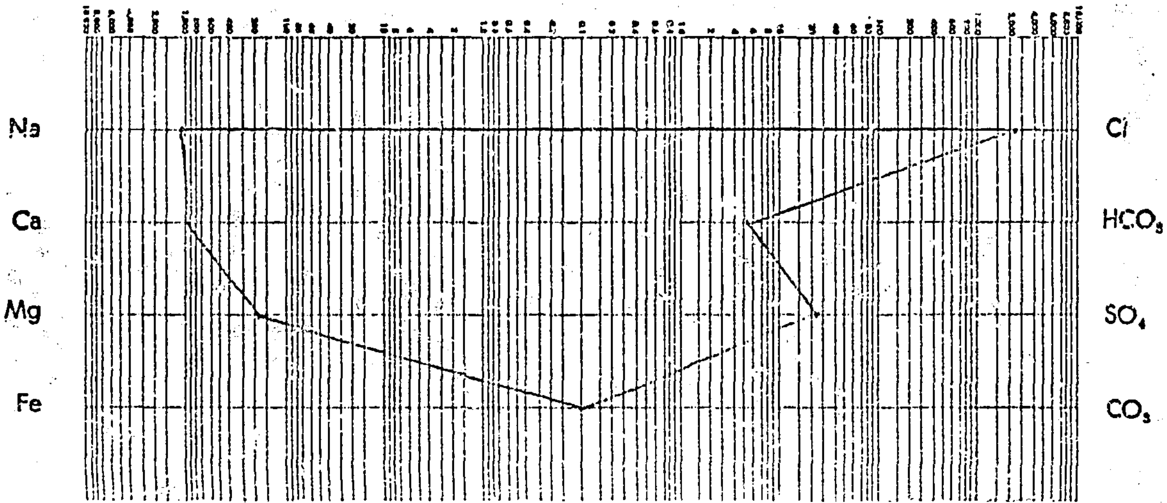
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 28291 | | 19059 | 2309 | | | | | 1235 | 83000 | | | | 317 | | |
| Meq./L | 1230.67 | | 951.05 | 189.76 | | | | | 25.68 | 2340.60 | | | | 5.20 | | |
| Meq. % | 25.95 | | 20.05 | 4.00 | | | | | 0.54 | 49.35 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 164,340 Fe present Specific Gravity 1.105 @60°F Observed pH 7.4 @ 80°F

Calculated 134,211 After Ignition 134,000 $H_2S$ nil Refractive Index 1.3592 @25°C Resistivity 0.079 ohm meters @ 68°F

Pattern Unit Meq./L



Remarks and Conclusions

Analysis determined on light greenish yellow coloured water recovered from mud.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-5

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA

Sample #5

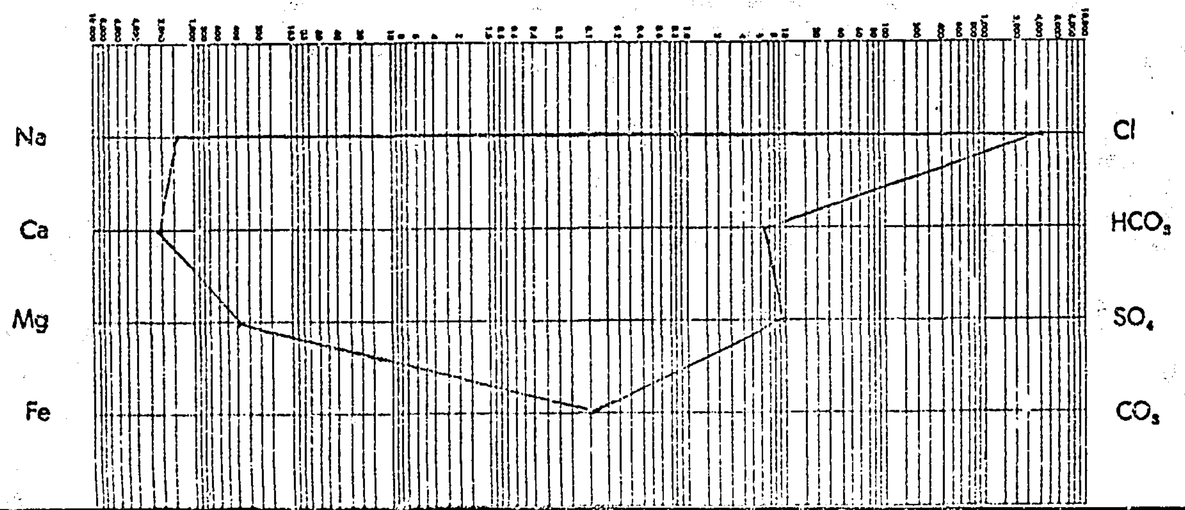
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 33914 | | 45085 | 4763 | | | | | 477 | 145400 | | | | 383 | | |
| Meq./L | 1475.25 | | 2249.74 | 391.50 | | | | | 9.93 | 4100.28 | | | | 6.28 | | |
| Meq. % | 17.92 | | 27.33 | 4.76 | | | | | 0.12 | 49.80 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 294,500 Fe present Specific Gravity 1.178 @60°F Observed pH 7.2 @ 79 °F

Calculated 230,022 After Ignition 221,700 $H_2S$ nil Refractive Index 1.3793 @25°C Resistivity 0.060 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 50% light greenish yellow water and 50% mud.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E09-11265-6

Received: Oct. 3,1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #6

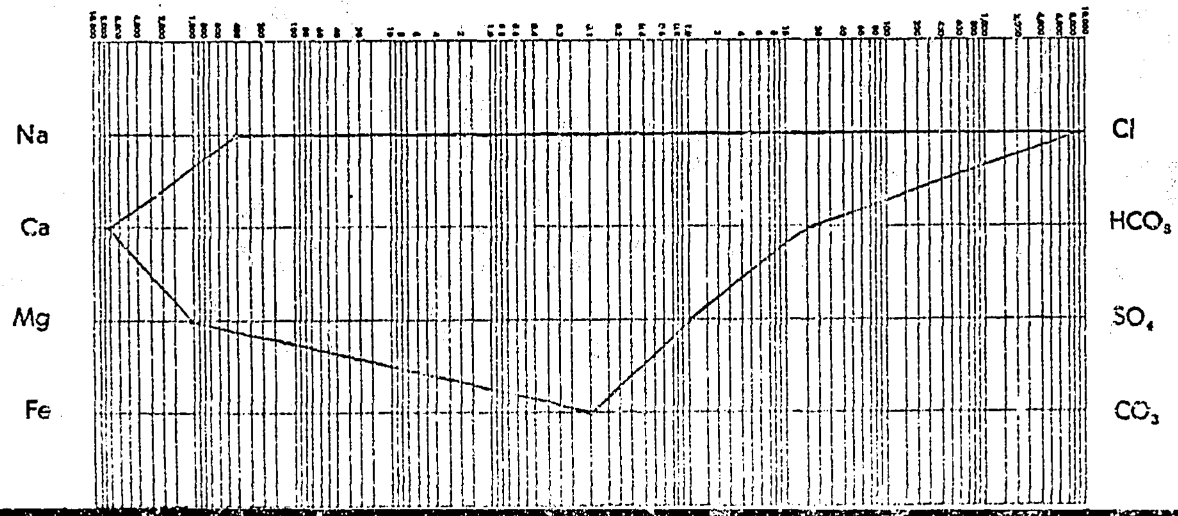
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9362 | | 151672 | 13802 | | | | | 51 | 322,400 | | | | 1066 | | |
| Meq./L | 407.26 | | 7568.41 | 1134.56 | | | | | 1.07 | 9091.68 | | | | 17.48 | | |
| Meq. % | 2.24 | | 41.54 | 6.23 | | | | | 0.01 | 49.90 | | | | 0.10 | | |

Total Solids Mg/L: By Evaporation 763,020 Fe present Specific Gravity 1.367 @60°F Observed pH 5.8 @ 80 °F

Calculated 498,353 After Ignition 450,660 $H_2S$ nil Refractive Index Note 1 @25°C Resistivity 0.088 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions: Sample consisted of yellow coloured water with a thin layer of mud. The value for the evaporated total solids is high due to the calcium chloride being in a hydrated form ($CaCl_2 . 2H_2O$) at the evaporation temperature.

Note 1:

The value of the refractive index was too high to be read by conventional refractometers.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-7

Received: Oct. 3, 1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #7.

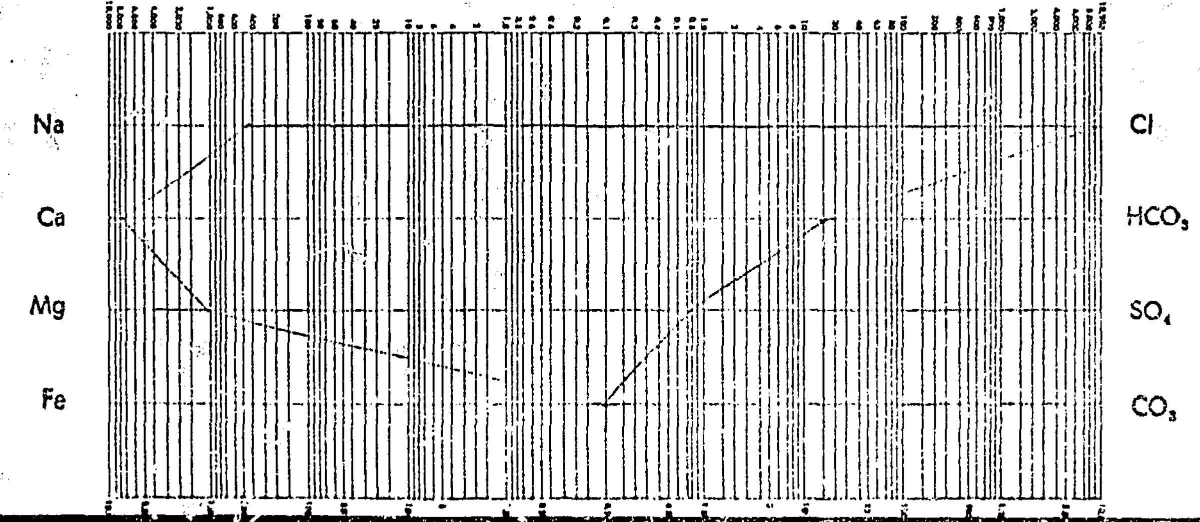
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 10,019 | | 155,035 | 13,997 | | | | | 41 | 330,000 | | | | 960 | | |
| Meq./L | 435.82 | | 7736.24 | 1150.54 | | | | | 0.86 | 9306.00 | | | | 15.74 | | |
| Meq. % | 2.34 | | 41.49 | 6.17 | | | | | --- | 49.91 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 706,580 Fe Much Specific Gravity 1.372 @60°F Observed pH 5.4 @ 80 °F

Calculated 510,052 After Ignition 477,280 $H_2S$ Nil Refractive Index Note 1 @25°C Resistivity 0.090 ohm meters @ 68 °F

Pattern Unit Meq./l.



Remarks and Conclusions

Sample consisted of approximately 90% yellow colored water and 10% mud. The value for the evaporated total solids is high due to the calcium chloride being in a hydrated form ($CaCl_2 . 2H_2O$) at the evaporation temperature.

NOTE 1: The value of the refractive index was too high to be read by conventional refractometers.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11265-12

Received: Oct. 3, 1969 Reported: Oct. 14, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area: Hudson's Bay

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #13.

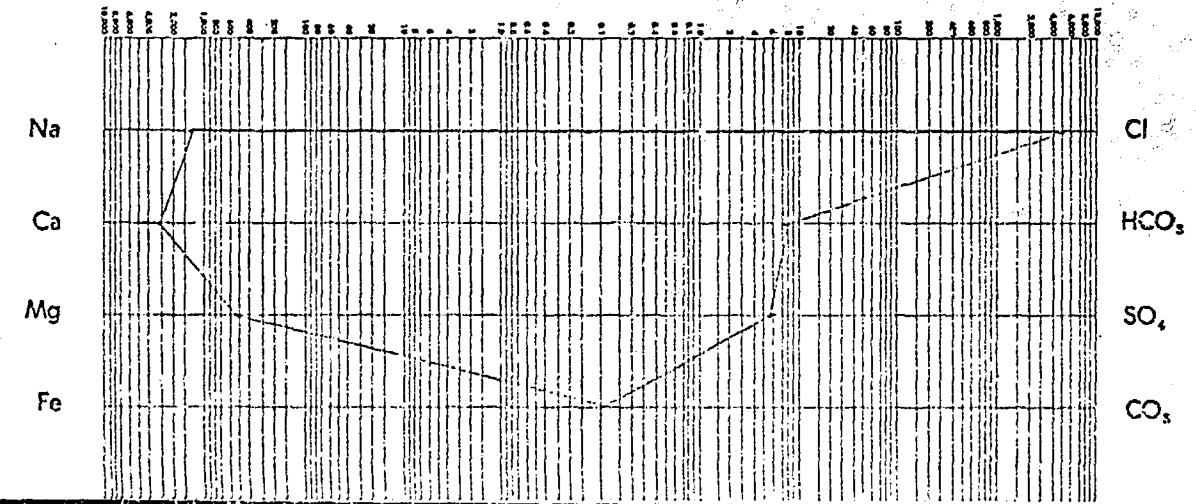
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 32,162 | | 63,023 | 6,367 | | | | | 284 | 179,200 | | | | 481 | | |
| Meq./L | 1399.06 | | 3144.85 | 523.33 | | | | | 5.91 | 5053.44 | | | | 7.89 | | |
| Meq. % | 13.80 | | 31.03 | 5.16 | | | | | 0.06 | 49.86 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 391,900 Fe Present Specific Gravity Insufficient Sample @60°F Observed pH 6.9 @ 81 °F

Calculated 281,517 After Ignition 263,260 $H_2S$ Nil Refractive Index 1.3883 @25°C Resistivity 0.058 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample as received contained approximately 60% muddy water and 40% mud. Analysis determined on colorless water recovered from the sample.

AQUITAINE COMPANY OF CANADA LTD.
2000 AQUITAINE TOWER • 540-5TH AVENUE S.W.
PHONE: 263-3916 • AREA CODE: 403 • TELEX: 038-2349 PETRAKI CGY • CABLES: PETRAKI CALGARY
CALGARY I, ALBERTA, CANADA

WALRUS A-71

## Details of the samples

SAMPLES No. 14 and 15: Samples of gas sampled in a metallic bottle installed on the gas detection circuit of the geological cabin before the detector - during a gas kick from circulation at 3729', prior to logging, on October 10, 1969. Gas kick recorded on the well site:

$C_1 = 6\%$
$C_2 = 0.075\%$

Traces N2 and H2.

SAMPLES No. 16, 17 and 18: Samples of formation water and mud shale shaker - sampled during a gas kick from circulation at 3729', prior to logging - on October 10, 1969. Gas kick recorded on the well site:

$C_1 = 6\%$
$C_2 = 0.075\%$

SAMPLED No. 19: Sample of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick from circulation at 3580', on October 3, 1969.

SAMPLES No. 20 and 21: Samples of formation water and mud from the flow line - before the shale shaker - sampled during a gas kick from circulation at 3729', after logging and velocity survey, on October 11, 1969. Gas kick recorded on the well site:

$C_1 = 7.5\%$
$C_2 = 0.11\%$

*****

C.G.L.

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

OPERATOR: AQUITAINE COMPANY OF CANADA LTD. REPORT NUMBER: E69-11377

DATE SAMPLED: --- DATE RECEIVED: Oct. 27,1969 DATE REPORTED: Oct. 31, 1969

Kind of Sample: Gas Samples in Metallic Bottles- Item B on P.O. #A 2503.

| Sample No.: | 14 | 15 |
|---|---|---|
| Oxygen | 15.67 | 16.61 |
| Nitrogen | 79.61 | 77.47 |
| Carbon dioxide | 0.01 | 0.02 |
| Hydrogen sulfide | 0.00 | 0.00 |
| Helium | 0.05 | 0.04 |
| Hydrogen | 0.01 | Trace |
| Methane | 4.58 | 5.77 |
| Ethane | 0.07 | 0.09 |
| Propane | 0.00 | 0.00 |

The compositions are reported as percent by volume.

C.G.L. 6

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

**OPERATOR:** AQUITAINE COMPANY OF CANADA LTD. **REPORT NUMBER:** E69-11376

**DATE SAMPLED:** --- **DATE RECEIVED:** Oct. 27,1969 **DATE REPORTED:** Oct. 31, 1969

Kind of Sample: Gas Samples in Glass Bottles - Item A on P.O. #A 2503

| Sample No.: | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|
| Oxygen | 11.24 | 8.74 | 16.23 | 20.49 | 21.12 | 20.27 |
| Nitrogen | 75.70 | 78.68 | 83.39 | 79.47 | 78.67 | 77.67 |
| Carbon dioxide | 0.00 | 0.00 | 0.00 | 0.00 | Trace | 0.02 |
| Hydrogen sulfide | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Helium | 0.13 | 0.13 | 0.10 | 0.01 | Trace | 0.02 |
| Hydrogen | 0.04 | 0.07 | 0.04 | Trace | Trace | 0.02 |
| Methane | 12.65 | 12.15 | 0.24 | 0.03 | 0.21 | 1.96 |
| Ethane | 0.24 | 0.23 | Trace | Trace | Trace | 0.04 |
| Propane | Trace | Trace | 0.00 | 0.00 | Trace | 0.00 |

The compositions are reported as percent by volume.

The trace components are less than 0.005%.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E[illegible] 11430-1

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #16

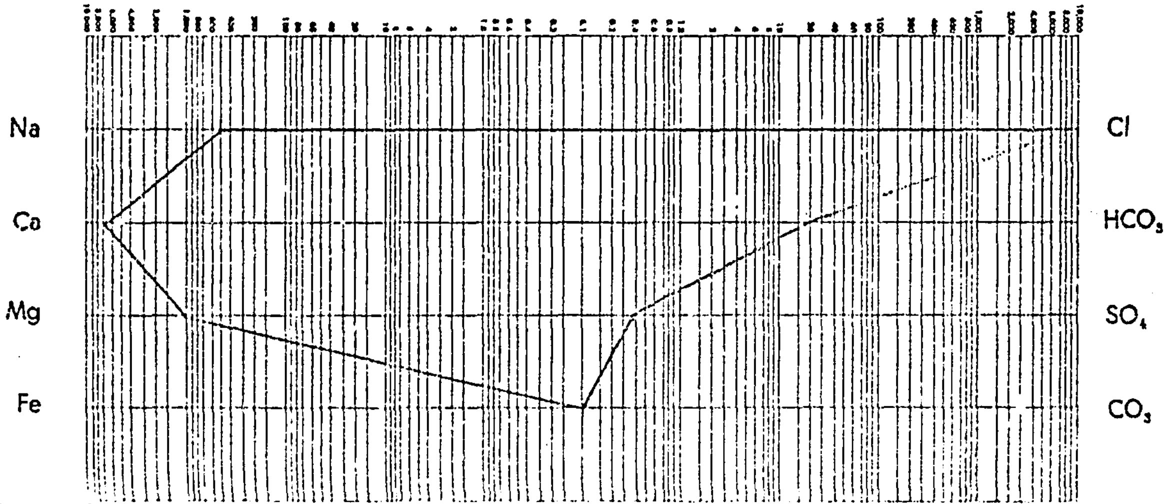
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 11947 | | 139499 | 12830 | | | | | 19 | 302000 | | | | 1134 | | |
| Meq./L | 519.71 | | 6961.02 | 1054.66 | | | | | 0.39 | 8516.40 | | | | 18.60 | | |
| Meq. % | 3.04 | | 40.78 | 6.18 | | | | | --- | 49.89 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 684,840 Fe present Specific Gravity 1.346 @60°F Observed pH 6.7 @ 74 °

Calculated 467,429 After Ignition 426,220 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.082 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 80% light brown coloured water and 20% mud. Organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-2

Received: Oct. 27, 1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #17

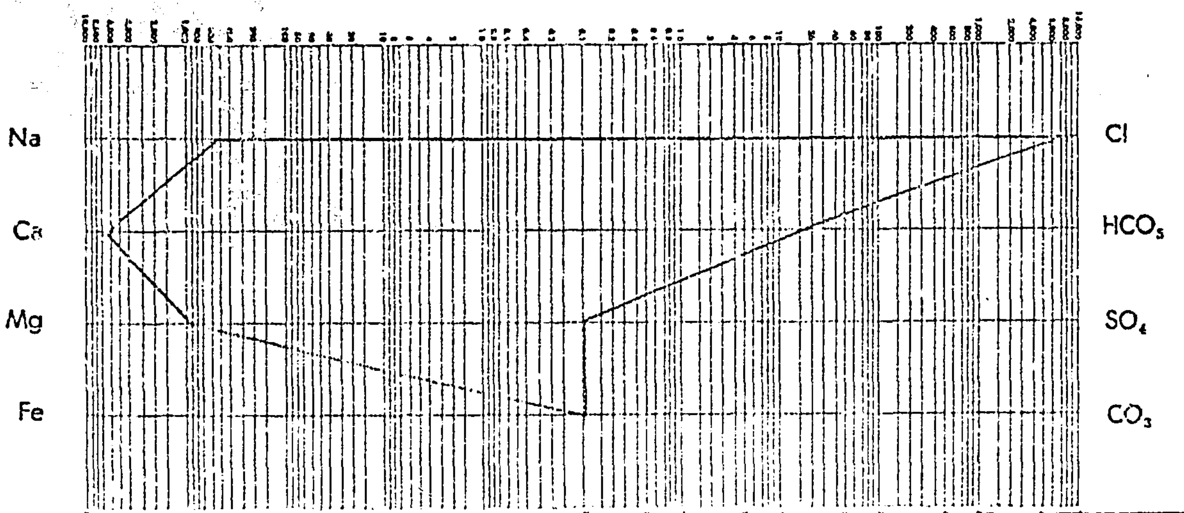
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 12880 | | 133093 | 11275 | | | | | 4 | 287600 | | | | 1100 | | |
| Meq./L | 560.29 | | 6641.34 | 926.82 | | | | | 0.09 | 8110.32 | | | | 18.04 | | |
| Meq. % | 3.45 | | 40.85 | 5.70 | | | | | --- | 49.89 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 686,680 Fe present Specific Gravity 1.337 @60°F Observed pH 6.5 @ 74 °

Calculated 445,952 After Ignition 399,340 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.077 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 70% light brown coloured water and 30% mud. Much organic matter detected in total evaporated solids.

# CHEMICAL & GEOLOGICAL LABORATORIES LTD.

WATER ANALYSIS

Lab No. E69-11430-3

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #18

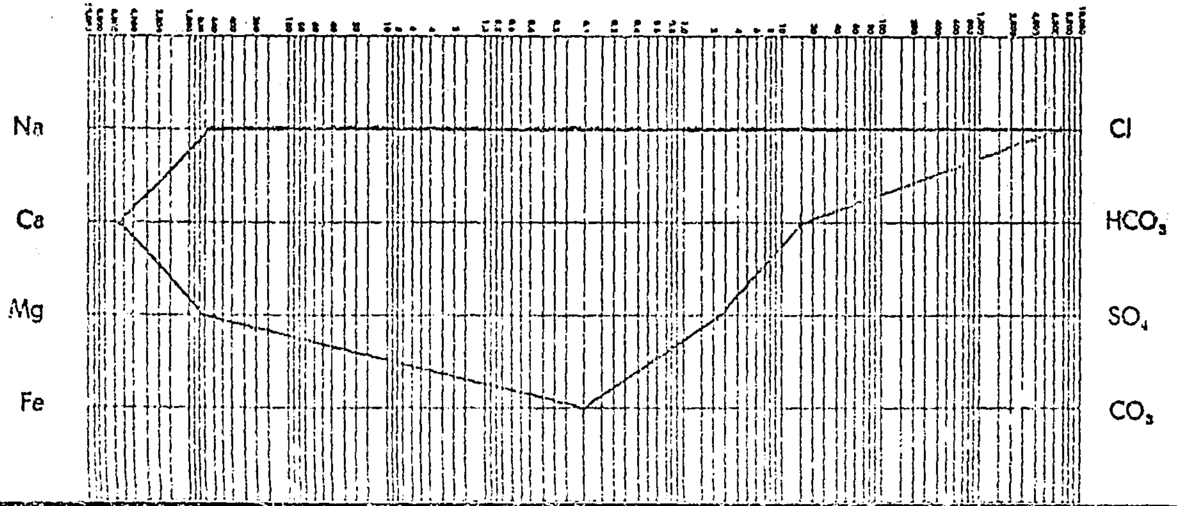
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 15493 | | 110991 | 9040 | | | | | 123 | 246000 | | | | 956 | | |
| Meq./L | 673.94 | | 5538.45 | 743.06 | | | | | 2.57 | 6937.20 | | | | 15.68 | | |
| Meq. % | 4.84 | | 39.82 | 5.34 | | | | | 0.02 | 49.87 | | | | 0.11 | | |

Total Solids Mg/L: By Evaporation 458,240 Fe present Specific Gravity 1.292 @60°F Observed pH 6.9 @ 74 °F

Calculated 382,603 After Ignition 348,580 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.061 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 60% light brown coloured water and 45% mud. Organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-4

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #19

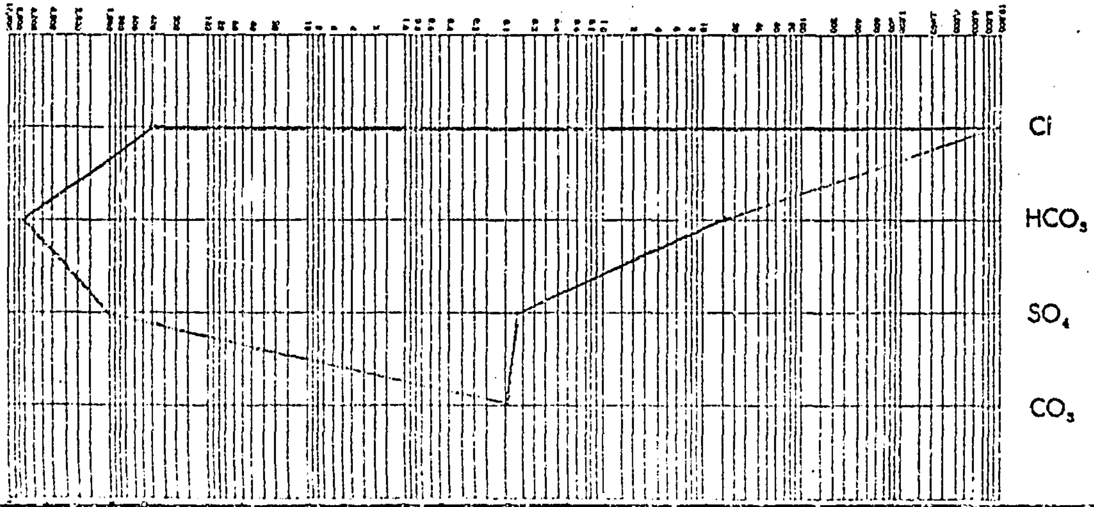
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9761 | | 153914 | 13997 | | | | | 6 | 327600 | | | | 1036 | | |
| Meq./L | 424.60 | | 7680.30 | 1150.54 | | | | | 0.13 | 9238.32 | | | | 16.99 | | |
| Meq. % | 2.29 | | 41.49 | 6.22 | | | | | --- | 49.91 | | | | 0.09 | | |

Total Solids Mg/L: By Evaporation 785,320 Fe present Specific Gravity 1.372 @60°F Observed pH 5.5 @ 74 °F

Calculated 506,314 After Ignition 484,580 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.092 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of light brown coloured water with a trace of sediment. Organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-5

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #20

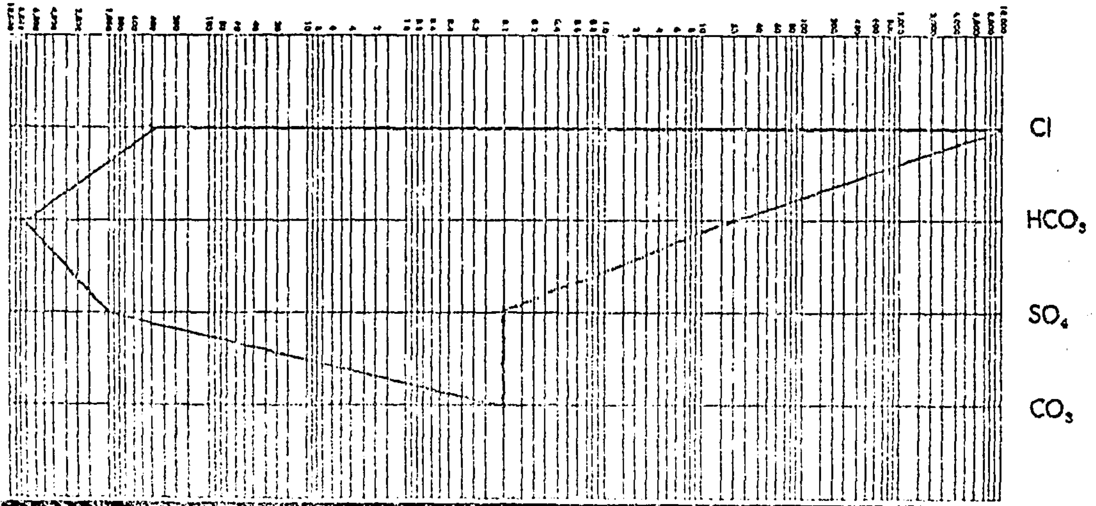
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9872 | | 158238 | 14483 | | | | | 2 | 336800 | | | | 1110 | | |
| Meq./L | 429.43 | | 7896.08 | 1190.49 | | | | | 0.04 | 9497.76 | | | | 18.20 | | |
| Meq. % | 2.26 | | 41.49 | 6.25 | | | | | --- | 49.90 | | | | 0.10 | | |

Total Solids Mg/L: By Evaporation 697,140 Fe much Specific Gravity 1.379 @60°F Observed pH 5.6 @ 74°F

Calculated 520,505 After Ignition 489,880 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.097 ohm meters @ 68°F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 95% light brown coloured water and 5% mud.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-11430-6

Received: Oct. 27,1969 Reported: Nov. 3, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #21.

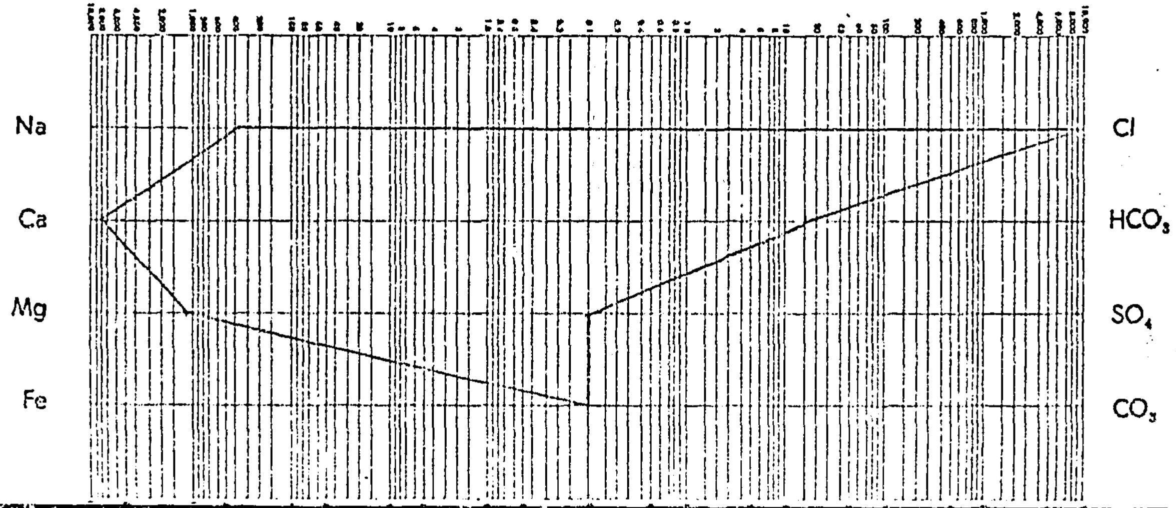
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 9037 | | 160961 | 15163 | | | | | 2 | 342400 | | | | 960 | | |
| Meq./L | 393.10 | | 8031.94 | 1246.42 | | | | | 0.04 | 9655.68 | | | | 15.74 | | |
| Meq. % | 2.03 | | 41.53 | 6.44 | | | | | --- | 49.92 | | | | 0.08 | | |

Total Solids Mg/L: By Evaporation 691,660 Fe much Specific Gravity 1.384 @60°F Observed pH 5.1 @ 74 °

Calculated 528,523 After Ignition 498,800 $H_2S$ nil Refractive Index Too high to be determined @25°C Resistivity 0.098 ohm meters @ 68 °

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of light brown coloured water with a trace of sediment.

AQUITAINE COMPANY OF CANADA LTD.
2000 AQUITAINE TOWER • 540-5TH AVENUE S.W.
PHONE:263-3916 • AREA CODE:403 • TELEX:038-2349 PETRAKI CGY • CABLES:PETRAKI CALGARY
CALGARY I, ALBERTA, CANADA

WALRUS A-71

## Details of the samples

| | |
|---|---|
| SAMPLES No. 22, 23 and 24: | Samples of mud contained in the core barrel of CORE No. 4 (3917 - 3926'). |

*****

C.G.L. 64

# CHEMICAL & GEOLOGICAL LABORATORIES LIMITED

OPERATOR: AQUITAINE COMPANY OF CANADA LTD.     REPORT NUMBER: E69-11597

DATE SAMPLED: ---     DATE RECEIVED: December 1, 1969     DATE REPORTED: December 11, 1969

Gas samples in glass bottles. Item A1 on Purchase Order #A 3099.

| | SAMPLE NO. 22 | SAMPLE NO. 23 | SAMPLE NO. 24 |
|---|---|---|---|
| Oxygen | 12.61 | 10.82 | 2.17 |
| Nitrogen | 86.73 | 88.53 | 96.56 |
| Carbon Dioxide | Trace | .00 | Trace |
| Hydrogen Sulfide | .00 | .00 | .00 |
| Helium | .01 | .07 | .02 |
| Hydrogen | .03 | .08 | .25 |
| Methane | .62 | .50 | 1.00 |
| Ethane | .00 | .00 | .00 |

Compositions are reported as percent by volume.

Trace components are less than 0.005%.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-1159[illegible]-1

Received: Dec. 1, 1969 Reported: Dec. 11, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #22.

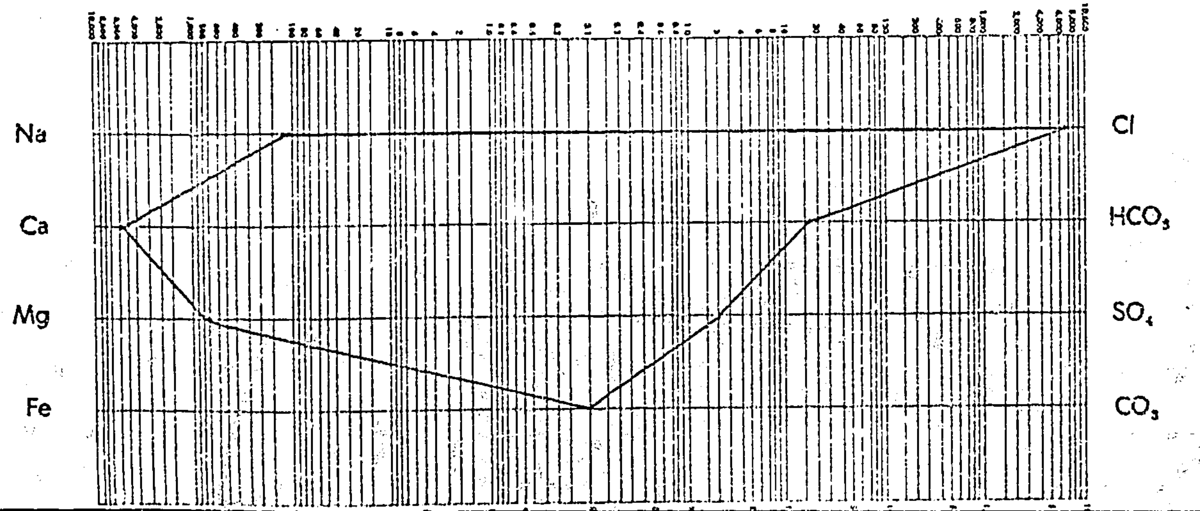
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 3,054 | | 116,757 | 8,845 | | | | | 103 | 236,400 | | | | 1,066 | | |
| Meq./L | 132.86 | | 5826.16 | 727.08 | | | | | 2.14 | 6666.48 | | | | 17.48 | | |
| Meq. % | 0.99 | | 43.57 | 5.44 | | | | | 0.02 | 49.85 | | | | 0.13 | | |

Total Solids Mg/L: By Evaporation 577,620 Fe Much Specific Gravity 1.308 @60°F Observed pH 7.3 @ 77 °F

Calculated 366,225 After Ignition 359,240 $H_2S$ Nil Refractive Index Too High To Be Determined @25°C Resistivity 0.076 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 40% light brown colored water and 60% mud. There was much highly refractory organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-1159, 2

Received: Dec. 1, 1969 Reported: Dec. 11, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #23.

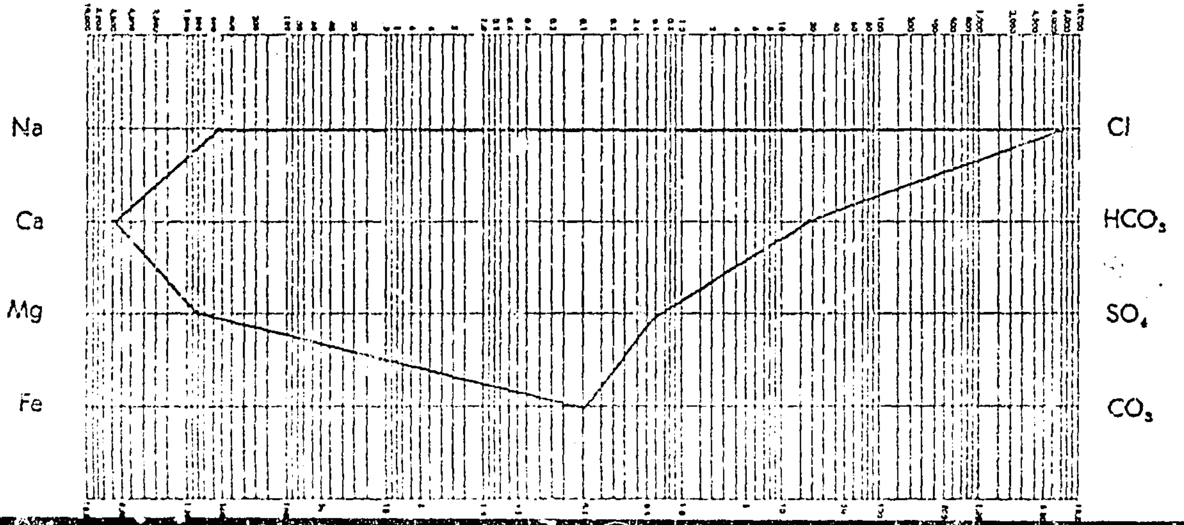
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 13,029 | | 118,358 | 9,720 | | | | | 29 | 257,200 | | | | 1,110 | | |
| Meq./L | 566.78 | | 5906.08 | 798.98 | | | | | 0.60 | 7253.04 | | | | 18.20 | | |
| Meq. % | 3.90 | | 40.61 | 5.49 | | | | | --- | 49.87 | | | | 0.13 | | |

Total Solids Mg/L: By Evaporation 561,580 Fe Much Specific Gravity 1.314 @60°F Observed pH 7.3 @ 77 °F

Calculated 399,446 After Ignition 339,880 $H_2S$ Nil Refractive Index Too High To Be Determined @25°C Resistivity 0.078 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 40% light brown colored water and 60% mud. There was much highly refractory organic matter detected in total evaporated solids.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.** WATER ANALYSIS Lab No. E69-115[illegible]-3

Received: Dec. 1, 1969 Reported: Dec. 11, 1969 Well: Location:

Operator: AQUITAINE COMPANY OF CANADA LTD. Field or Area:

Elev.: K.B. Grd. Zone/Formation: Sample Interval:

Method of Production: Sampled from: Sampled by: Date:

OTHER PERTINENT DATA Sample #24.

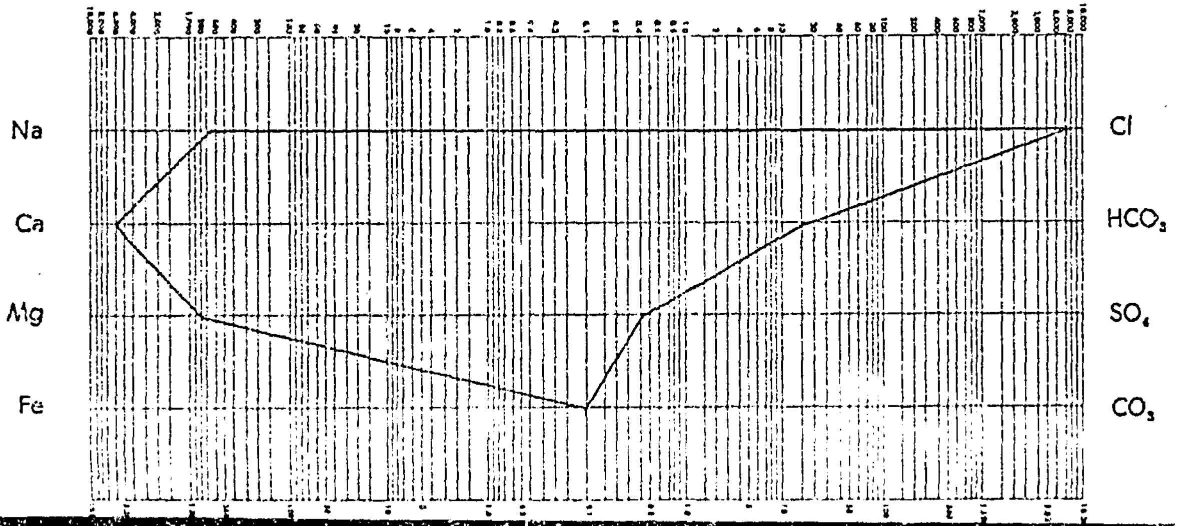
(Signed)

| | Na | K | Ca | Mg | | | | | $SO_4$ | Cl | | | $CO_3$ | $HCO_3$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mg./L | 15,273 | | 119,800 | 9,428 | | | | | 21 | 262,400 | | | | 1,066 | | |
| Meq./L | 564.58 | | 5978.00 | 775.01 | | | | | 0.43 | 7399.68 | | | | 17.48 | | |
| Meq. % | 4.48 | | 40.30 | 5.22 | | | | | --- | 49.88 | | | | 0.12 | | |

Total Solids Mg/L: By Evaporation 571,840 Fe Much Specific Gravity 1.315 @60°F Observed pH 7.4 @ 77 °F

Calculated 407,993 After Ignition 384,840 $H_2S$ Nil Refractive Index Too High To Be Determined @25°C Resistivity 0.077 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

Sample consisted of approximately 50% light brown colored water and 50% mud. There was much highly refractory organic matter detected in total evaporated solids.

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

Date Reported: December 18, 1969 **LABORATORY REPORT NUMBER: E69-11936**

**AQUITAINE COMPANY OF CANADA LTD.**

KIND OF SAMPLE: Water

DATE RECEIVED: October 3, October 27,
& December 1, 1969

Analysis was made for naturally occurring hydrocarbons which may be dissolved in water; with emphasis on benzene which is the most soluble of the hydrocarbons. The equipment used was set at a sensitivity capable of detecting hydrocarbons in parts per billion. In all samples analyzed there was no indication of hydrocarbons.

The samples analyzed are as follows:

Item A 2 on Purchase Order #2442
Sample Numbers: 1, 2, 3, 4, 5, 6, 7, 13

Item C on Purchase Order #2442
Sample Numbers: 9, 10, 11, 12

Item A 2 on Purchase Order #2503
Sample Numbers: 16, 17, 18, 19, 20, 21

Item A 2 on Purchase Order #3099
Sample Numbers: 22, 23, 24

CORE LABORATORIES-CANADA LTD.
*Petroleum Reservoir Engineering*

P.O. BOX 5670, POSTAL STATION "A"
CALGARY 9, ALBERTA
TELEPHONE: 253-3391

September 23, 1969

Aquitaine Company Of Canada Ltd.
1300, 550 - 6th Avenue S.W.
Calgary 1, Alberta

Attention: Mr. R. Bonafaux

Dear Sir:

Re: $Cl^-$ determinations on core from Walrus A-71 well

In our analysis, 100 mls. of water were used to leach the salt from a dried, pulverized, 20 gram sample. The $Cl^-$ concentrations are as follows:

| Depth | PPM $Cl^-$ |
|---|---|
| 1432 | 1018 |
| 1432.5 | 4110 |
| 1433.7 | 1226 |
| 1434.5 | 839 |
| 1435.5 | 2267 |
| 1436.8 | 1261 |
| 1438.1 | 4141 |
| 1439.3 | 5440 |
| 1440.4 | 3998 |
| 1441.3 | 2159 |
| 1442.3 | 26154 |
| 1443.3 | 6447 |
| 1444.3 | 3587 |
| 1445.6 | 2197 |

In relating these $Cl^-$ determinations to pore water, the values are all excessively high. Due to the presence of salt crystals in the rock, $Cl^-$ determinations related to pore water would be meaningless.

A complete analysis of the water from leaching 20 grams of sample from 1432.5 feet, with 100 ml. water, is attached.

Yours truly,

M. McLaren,
Lab Supervisor

MM/ew

C RE LABORATORIES – CANADA LT
PETROLEUM RESERVOIR ENGINEERING

# WATER ANALYSIS

File CNP-4

Company Aquitaine Company Of Canada Ltd.

Well Aquitaine Walrus A-71 K.B. ______ Grd. ______

Location ______ Field ______ Province ______

Formation ______ Interval ______

Sampled from Leached from core sample # 2 by ______

Date sampled ______ Date analyzed ______ Analyst ______

Recovery ______

______ Mud type ______ Water cushion ______

Total Solids:

Resistivity 0.612 Ohm-meters @ 75 °F

Calculated 9040 mg/liter

Specific gravity 1.0118 @ 60°F

By evaporation @ 110°C ______ mg/liter

pH 7.40 $H_2S$ Absent

By evaporation @ 180°C ______ mg/liter

Refractive Index 1.330 @ 75°F

At ignition ______ mg/liter

## MILLIGRAMS PER LITER

| Na + K | Ca | Mg | Fe | Ba | Br | I | Cl | $HCO_3$ | $SO_4$ | $CO_3$ | OH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2668 | 595 | 44 | Tr. | Abs. | | | 4110 | 83 | 1540 | | |

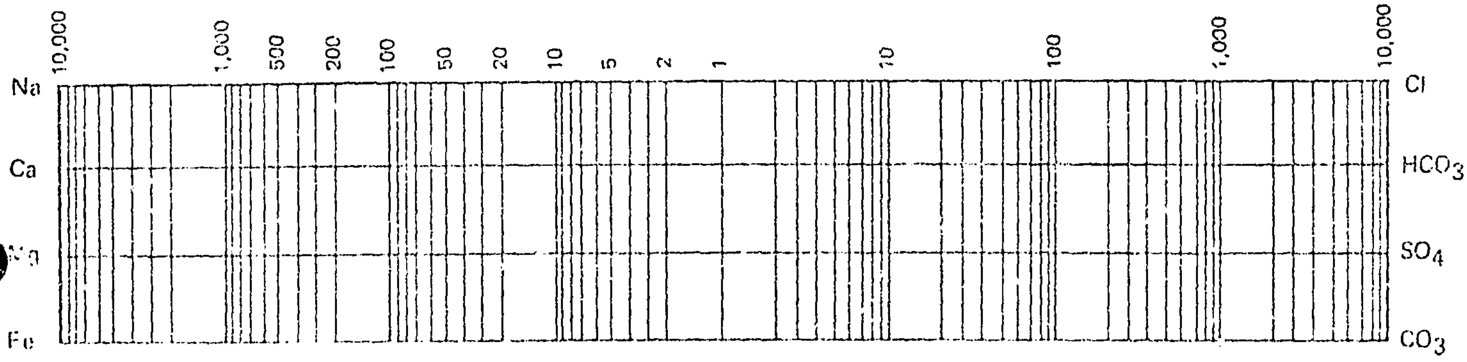
## PER CENT CALCULATED SOLIDS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 29.5 | 6.6 | 0.5 | | | | | 45.5 | 0.9 | 17.0 | | |

## MEQ PER LITER

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 116.0 | 29.7 | 3.6 | | | | | 115.9 | 1.4 | 32.0 | | |

## LOGARITHMIC PATTERN MEQ PER LITER



REPORT

Aquitaine Company of Canada Ltd

# WALRUS A-71
Permit W 1427

HUDSON BAY
Canada

## ABANDONMENT REPORT

October 1969

# TABLE OF CONTENT

## REPORT

## ATTACHMENTS

# A- GENERAL SUMMARY

# GENERAL SUMMARY

Due to very severe weather conditions, the connection between the drilling vessel and the well was lost on October 16. Because of severe damage to the equipment and the necessity to leave the Bay before the Straits were closed by ice, it was impossible to resume operations and plug the well in a conventional manner.

The well is filled with heavy salted mud SG 1.72 to 1.75 and it had been very stable even during the long periods of waiting on weather. This mud should not allow the weight material to settle nor the mud system to solidify for an extended period of time.

It is assumed that the riser broke at the flex joint situated above the BOP stack, and that the kill and choke lines broke or bent at the same depth.

There is every evidence that the BOP equipped with blind rams is closed and that the well is safely shut in.

Oil shows have only occured near the bottom of the hole, in the form of very small oil drops on the mud, associated with fluorescence on some cuttings and some part of the core n.4.

Gas shows have occured several times, always associated with calcium chloride water.

The electric log shows that water saturation in all porous zones is at or close to 100%.

# B- WELL DATA

# WELL DATA

## AQUITAINE ET AL WALRUS A-71

| | | | | | |
|---|---|---|---|---|---|
| Final Coordinates: | Lat. | 58° | 30' | 02.29" | N |
| | Long. | 87° | 10' | 48.75" | W |

270 statute miles east of Churchill.
140 statute miles from the nearest shore.

| | |
|---|---|
| Date Spudded | August 8th, 1969. |
| Date Drilling Terminated | October 14th, 1969. |
| Date Rig Released | October 18th, 1969. |
| Total Depth | 3926'below K.B. |

Casing Record:

| OD | Weight | Grade | Depth Set | Cement and Additives |
|---|---|---|---|---|
| 30" | 1" wall | - | 772' | Class B 1000 US sacks with with 3% $Ca\ Cl_2$. |
| 20" | 0.625 | - | 1106' | Class G 1250 US sacks with 4% $Ca\ Cl_2$. |
| 13 3/8" | 61lbs/ft | J 55 | 1975' | Class G 1170 US sacks. |
| 9 5/8" | 41lbs/ft | N 80 | 2960' | Class G 936 US sacks. |

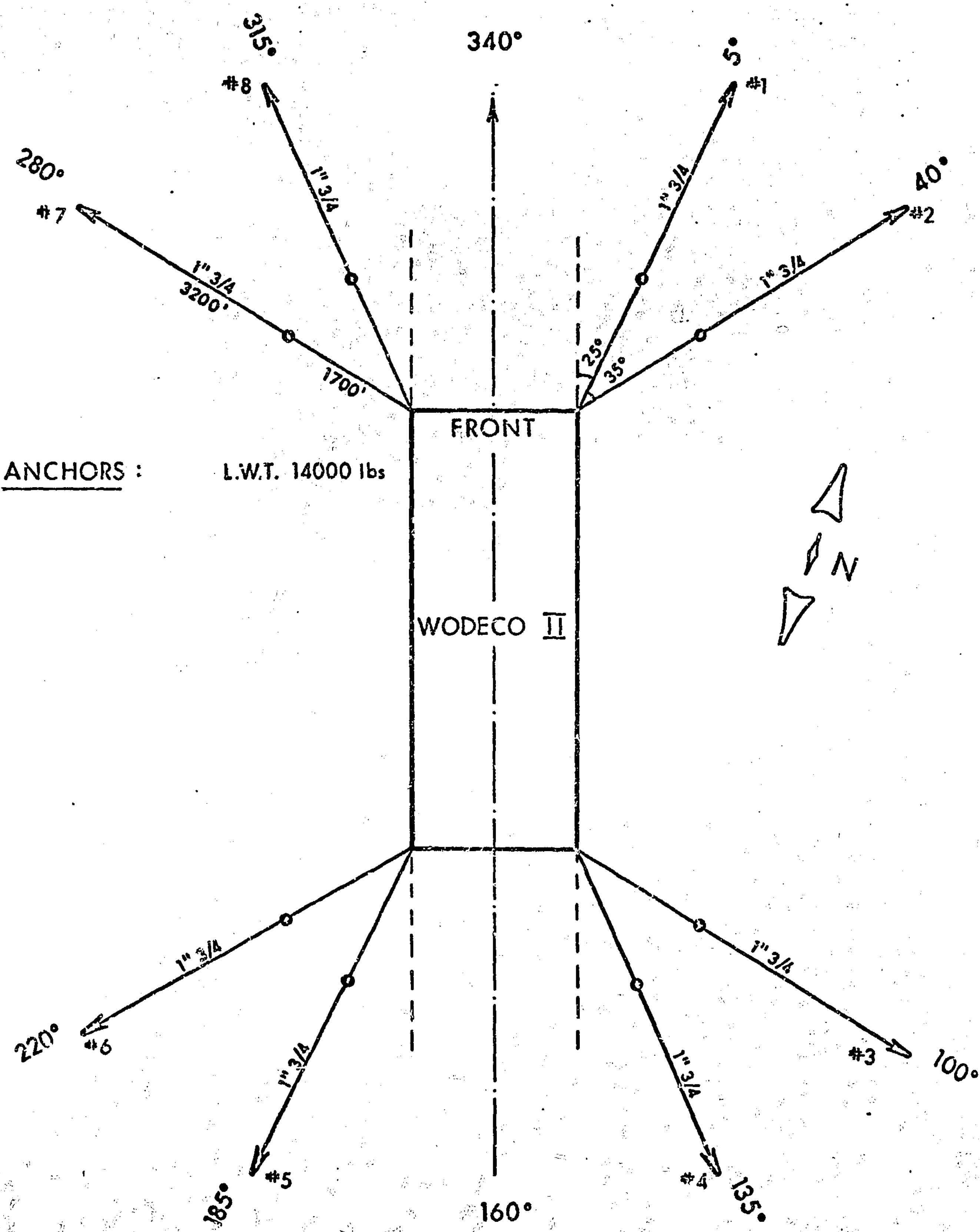
Drilling Barge: Western Offshore No. II

| | |
|---|---|
| Length overall | 280' |
| Beam molded | 68' |
| Depth molded | 23.4' |
| Design draft | 16.8' |

| | |
|---|---|
| Displacement at design draft | 7,284.33 LT |
| Normal load draft (operating) | 12'8½" |
| Normal load displacement (operating) | 5,270 LT |
| Light ship weight | 2,160.18 LT |

# C- ANCHORING SYSTEM

# WODECO II - ANCHORING SYSTEM



**ANCHORS :** L.W.T. 14000 lbs

# D- CHRONOLOGICAL SUMMARY

## CHRONOLOGICAL SUMMARY

(references to time are to the 24-hour clock)

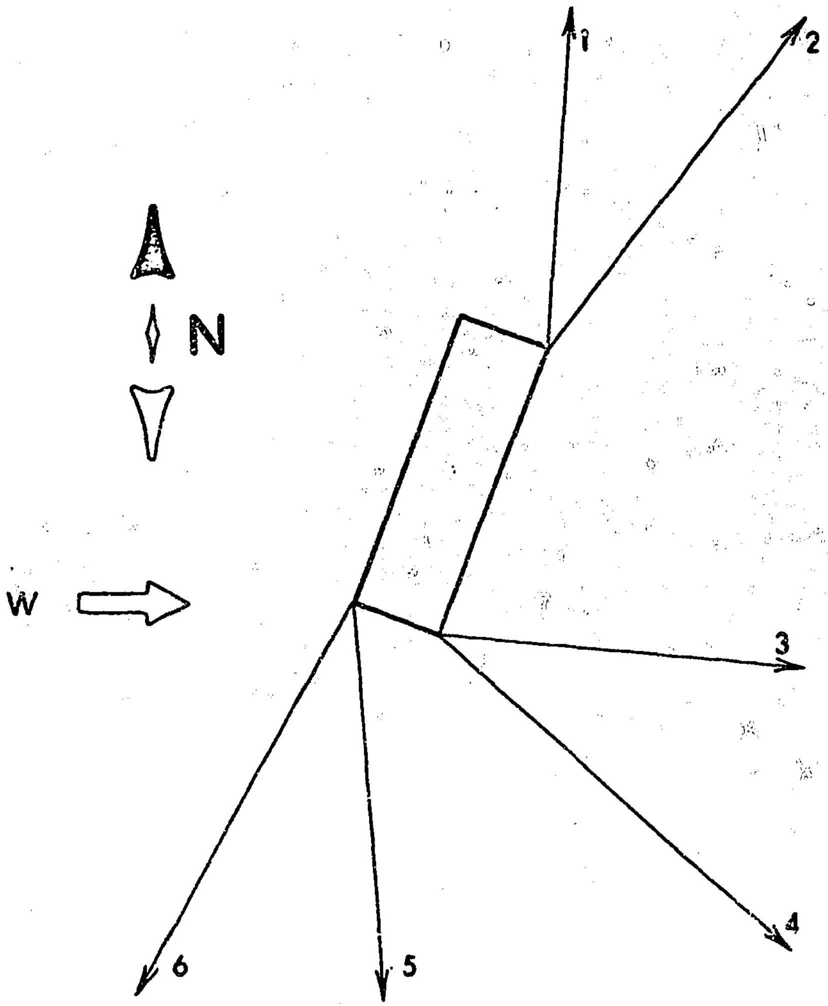
Oct. 13 - Drill 16 hrs 30 mn. during this day and wait on weather after 1630. Roll between 5° and 10°.

Oct. 14 - Wait on weather until 0130. Trip, change bit, drill and core. Trip out, get the core at 2300, service the core barrel and start to run bit in the hole.
Wind NNE 30 to 35 knots with roll between 5° and 8°. Sea 1 to 2 meters.

Oct. 15 - Run 7 stands of drill collars 6½" and 7 stands of drill pipe, stop at 0100 and wait on weather.
As we had to finish all the operations before 2400, we decided to pull drill pipe out, lay drill collars bumper subs on pipe rack and perform electrical survey. Wind decreases at 1130, 10 to 15 knots and turned north.
A roll up to 10° makes this operation very difficult and dangerous. At 1500, start to run the logs.
After 1900 the wind turns to West and increases as shown by the chart.
Electric survey completed at 2215.
The roll is up to 13° and it is impossible to run the drill pipe to plug the well with cement.
The riser has not been disconnected because it is most important to plug the well and keep our position before leaving; also as the storm came too quickly it is not wise to disconnect the riser because it could hit the BOP stack and damage it.
At 2300 the wind increases slowly but regularly and turns W.S.W., coming against the barge at 90°.
The roll very often reaches 18° and the heave 6 meters.
At 2400 the heave is 6 meters, the Wodeco II is dragged by the wind, tension on anchor line 5 and 8 is 80 to 130,000 pounds.
The riser has certainly severe inclination, making the disconnection of riser, kill and choke line very difficult and also with much heave, the riser may damage the stack.

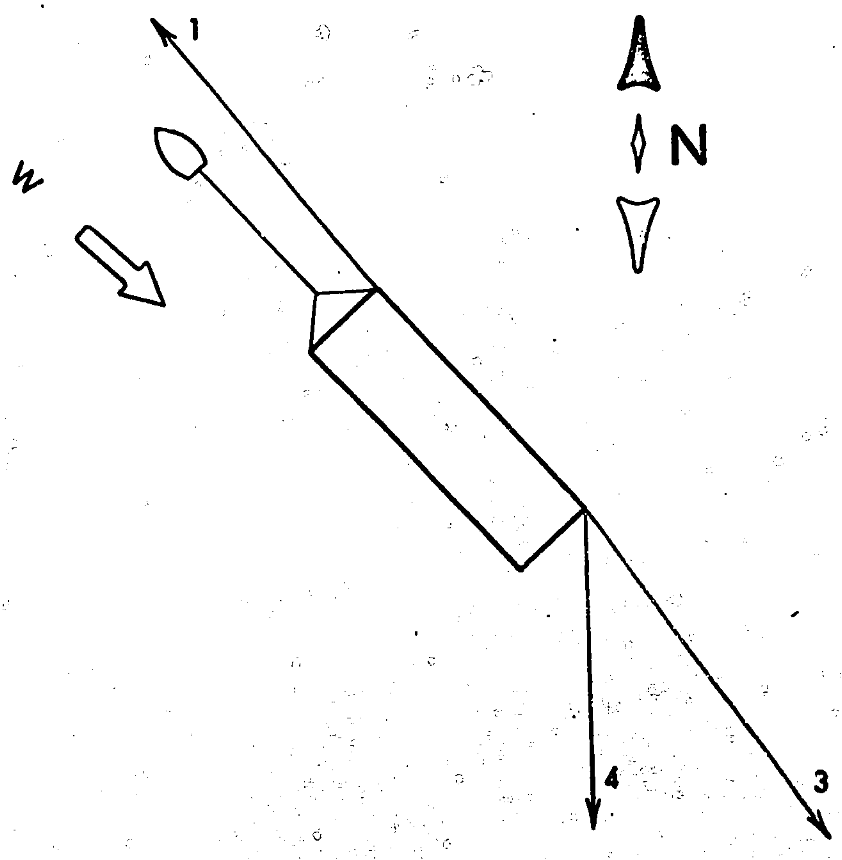
Oct. 16 - At 0030 pull out the Schlumberger tool and close blind rams, kill and choke line valves. Koomey pressure is 1600 psi and flow meter indicates correct operation.
At 0200 anchor line 7 breaks in section next to barge. Roll 18°, riser swinging and bumping the side of the moon pool. The 38 stands in the derrick are swinging very hard.
Lower the travelling block.
0215, wind WSW decrease to 20-25 knots, gusty to 40 knots. Roll 10° to 15°, sometimes 18°.
0245, the wind increases suddenly to 30 knots, gusty to 45-50.
Release tension on anchor 5 for equalization with 6. The roll increases to 18°. The waves pass over the main deck; barrels, bottles and pieces of various equipment roll over the decks. 6½" drill collar breaks chains and rolls on the pipe rack; piece of riser moves against living quarter. The 37½" master bushing of the rotary table is projected by the riser and falls against the choke manifold on the floor. Travelling block guidance system breaks. In the moon pool the riser bumps the substructure and in lower position disappears into the sea. Heave is probably more than the capacity of the inclined slip joint because it bumped down and up.
0305, wind W 40 gusty to 50 knots. Roll maximum 22°. Pitch 6 to 8°.
Ruckers cables break off close to the clamp, except one which tears out the clamp and the riser kill and choke lines sank in the sea.
Starboard side front guide line breaks.
0310, anchor line 8 breaks in the section of the line close to the anchor, tension between 60 to 160,000 pounds. The barge heading a direction NNE, but the roll is still up to 22°.
0320, no tension on anchor 5, same roll, but the lines of the anchors 1 and 2 pass under the bow of the barge, and prevent turning more to the east.
0325, release tension on anchor line 1 and 2. Barge rotates from 15° to 20° East, roll decrease to 17°.

Lay travelling block on the floor, guidance system breaks, drill pipe stand starts to destroy inside derrick equipment.
0345, wind still 35+45 West, roll 15 to 17°.
0400, wind decreases to 35 + 40 and turn WNW.



The forecast is for a NNW wind and it becomes necessary to turn the barge. <u>All accumulator pressure is gone in the Koomey</u>.
0500, ask the tug to get a line to the Wodeco II.
0630, tug at starboard passes a nylon line.

0830, during one and a half hours the tug tries to turn north without success. The WNW wind pushes it back. The skipper releases the line, mechanical trouble.
0900, forecast: NW and NNW winds 30 to 40 knots, gusty to 50 knots, waves 7 to 8 meters.
1030, the supply boat Millerntor passes a line to the tug.
1200, the tug held in position by the supply boat, passes a line to the Wodeco II.
1300, tug hooked on the barge and pulled West.
1330, cut anchor line 2.
1430, roll increases to 18° wind NW 40-45, the tug cannot turn the barge.
1500, roll 20°.
1535, cut line 6, the barge turn rapidly NW; roll down to 10°-13°.
Tension again in line 5.
1630, roll increases to 18°-20°. Wind WNW gusty to 50 knots, waves up to 7 meters, period 7 seconds.
1900, direction 340°, held by tug. Waves 9 meters, pitch 5° to 8°. Destruction of the inside equipment in the derrick. Cut line 5.



2210, wind NW increases to 50 knots, gusty to 60-70. Barge is dragged to SE. Cable 3 and 4 prevent swing into weather.
Waves 9 meters, sometimes up to the geological cabin.
Cut anchor line 3 and 4.
2400, snow, wind NW 50 gusty to 60-70. Heading 320°. Temperature 25°. Waves 9 meters.
Roll 10 + 15°. Since this time the radio communications are difficult because the antenna system in the derrick is damaged.

<u>Oct. 17</u> - 0400, wind NW 50, gusty 60 knots. Ice on the barge. Heading 320°. Roll maximum 15°.
1615, cut anchor line 1. The tug tows the barge 2 to 4 miles away from the location. (Danger for the tug to get a anchor buoy line in her propeller).

<u>Oct. 18</u> - 0800, wind NW 32, gusty to 40. Waves 4 to 5 meters, confused sea. Transfer 35 men to the Millerntor. One crew of 6 men stay on board to secure the barge.
1530, the crew of 6 men leave the barge for the Artic Shore. 9 men stay on board Wodeco II for towing.

## E- FIRST ESTIMATE OF EQUIPMENT DAMAGE.

First estimation of equipment damaged:

Rucker cables

Riser

Kill & Choke line

Flex Joint

Slip Joint

1 - Koomey hose torn off from drum (red pod).
1 - Koomey hose stuck in the pulley and mix with guide line.
1 - line of red pod broken in bottom
1 - line of green pod torn on drum
2 - hoses 3" x 5000 of kill and choke line to be checked.
2 - anchor lines broken:

#7 (on Wodeco II line)
#8 (on extension line)

6 - anchor lines cut
4 - guide lines
90 - Comex bottles
1 - Comex cabin crushed by waves
1 - lot of mud products
1 - lot of oil, antifreeze barrels

Derrick - Inside equipment, rocking equipment.
Guidance system.
Outside run around.
Choke manifold bent and broken.
38 stand bent and damaged.
Several girders damaged.

Schlumberger sheaves and equipment.

# F- MARKING OF THE WELL

# Marking of the Well

1) On the BOP stack, one pinger, one mile range with three year life battery pack.

2) October 16th, at 0845, drop 500 feet of cable with an anchor made with 3-8½ bits and a buoy, "Norvegienne" of 60 liters with one pinger attached to it. Its position is approximately 100 feet from the stack, on the East side.

3) All the anchor buoys are still in place, plus 3 buoys, "Norvegienne", with 700 feet of ½" cable with an anchor made with 3 bits.
But those surface buoys will probably be dragged by the ice.

4) One mile south a buoy used for anchoring the tug.

# G- TABLE OF WEATHER AND SEA CONDITIONS

# TABLE OF WEATHER AND SEA CONDITIONS

| Date | Time | WINDS | | ROLLS | | Waves* (meters) | Pitch degrees | Max. Heave (meters) | Temperature Fahrenheit |
|---|---|---|---|---|---|---|---|---|---|
| | | Direction (degrees) | Velocity Knots | Average degrees | Max. Degrees | | | | |
| 10/14/69 | 2300 | NNE | 30 + 35 | 5° | 8° | 1-2 | - | - | - |
| 10/15/69 | 0400 | NNE | 30 + 35 | 5° | 11° | - | - | - | 29 |
| | 0800 | N'ly | 30 + 35 | 5° | 11° | 2.5 | - | - | 34 |
| | 1200 | N'ly | 10 + 15 | 3° | 7° | - | - | - | - |
| | 1600 | NW | 25 + 30 | 5° | 11° | 2- P8 | - | - | 36 |
| | 1900 | W | 10 + 15 | - | - | - | - | - | - |
| | 2000 | W | 30 + 40 | 7° | 12° | - | - | - | - |
| | 2200 | W | 35 + 45 | 8° | 13° | 3-4 | 2° | 4-5 | - |
| | 2400 | WSW | 40 + 55 | 10° | 18° | 3-4 | 2° | 5-6 | 28 |
| 10/16/69 | 0130 | WSW | 30+40-50 | 8° | 16° | 4-6 P6 | 3° | 1-7 | - |
| | 0200 | W | 20 + 30 | 10° | 18° | - | - | 1-7 | - |
| | 0245 | W | 30+45-50 | 10° | 18° | - | - | - | - |
| | 0300 | W | 40 + 50 | 12° | 22° | -6 | 6-8° | 9 | - |
| | 0400 | WNW | 35 +40 | 10° | 17° | - | - | - | - |
| | 0600 | NW to WNW | 35 + 40 | 7° | 15° | - | 4-5° | - | - |
| | 0800 | WNW | 35 + 40 | 10° | 17° | 6-7 | - | - | 37 |
| | 1200 | NW | 40 + 45 | 10° | 15° | - | - | - | - |
| | 1600 | NW | 40 + 45 | 10° | 15° | 7 P7 | - | - | - |
| | 1700 | NW | 45 + 60 | 12° | 20° | 7-8 | - | - | 28 |
| | 2000 | NW | 50 + 60 | 10° | 18° | -9 | 5-8° | - | - |
| | 2400 | NW | 50+60/70 | 10° | 15° | -9 | - | - | 25 |
| 10/17/69 | 0400 | NW | 50 + 60 | 10° | 15° | 8-9 | - | - | 25 |
| | 0700 | NW | 40 + 45 | 10° | 15° | 6-7 | 6-7 | 6 | - |
| | 1400 | - | 30 + 40 | 5° | 10° | 5 | 2-4° | 3 | 29 |
| | 1700 | WNW | 30 + 35 | - | - | 5 | - | - | - |

* Please note that wave heights are given in terms of maximum heights (H max of the Oceanographers). They were not measured but estimated.

30 + 35 = 30 knots gusty to 35, P8 = period 8 seconds

# H- OIL AND GAS SHOWS

## OIL AND GAS SHOWS

Oil shows have only occured near the bottom of the hole, in the form of very small drops of oil on the mud, associated with fluorescence on cuttings and core.

Gas shows have occured several times (see attached gas-log). They have always been associated with calcium chloride water; also the electric log shows that water saturation is at or close to 100% in all porous zones. It is therefore concluded that gas in the well exists only in the form of solution-gas in calcium chloride water. The only occurence of gas during drilling in the open hole section is at 3070'. All other gas shows have been experienced after tripping or after the pumps have been stopped. The fact that they appear more often below 3580' is due to more frequent bit changes and to bad weather stopping the operations.

For the last week or more, the well has been stable with a mud density around 1.73. Even after long stops due to weather, no important gas and/or water pollution was encountered.

UITAINE

SCALE 2"=100' or 1:600

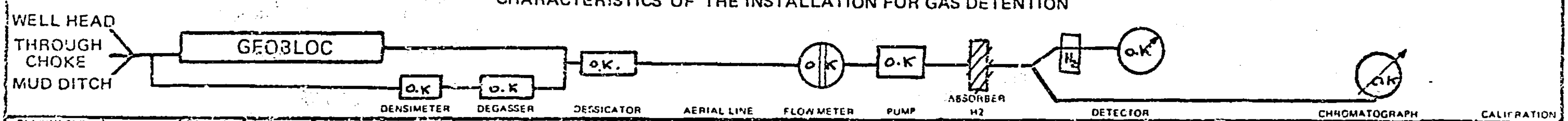
# GAS LOG

SHEET No. 2

WELL NAME WALRUS A71

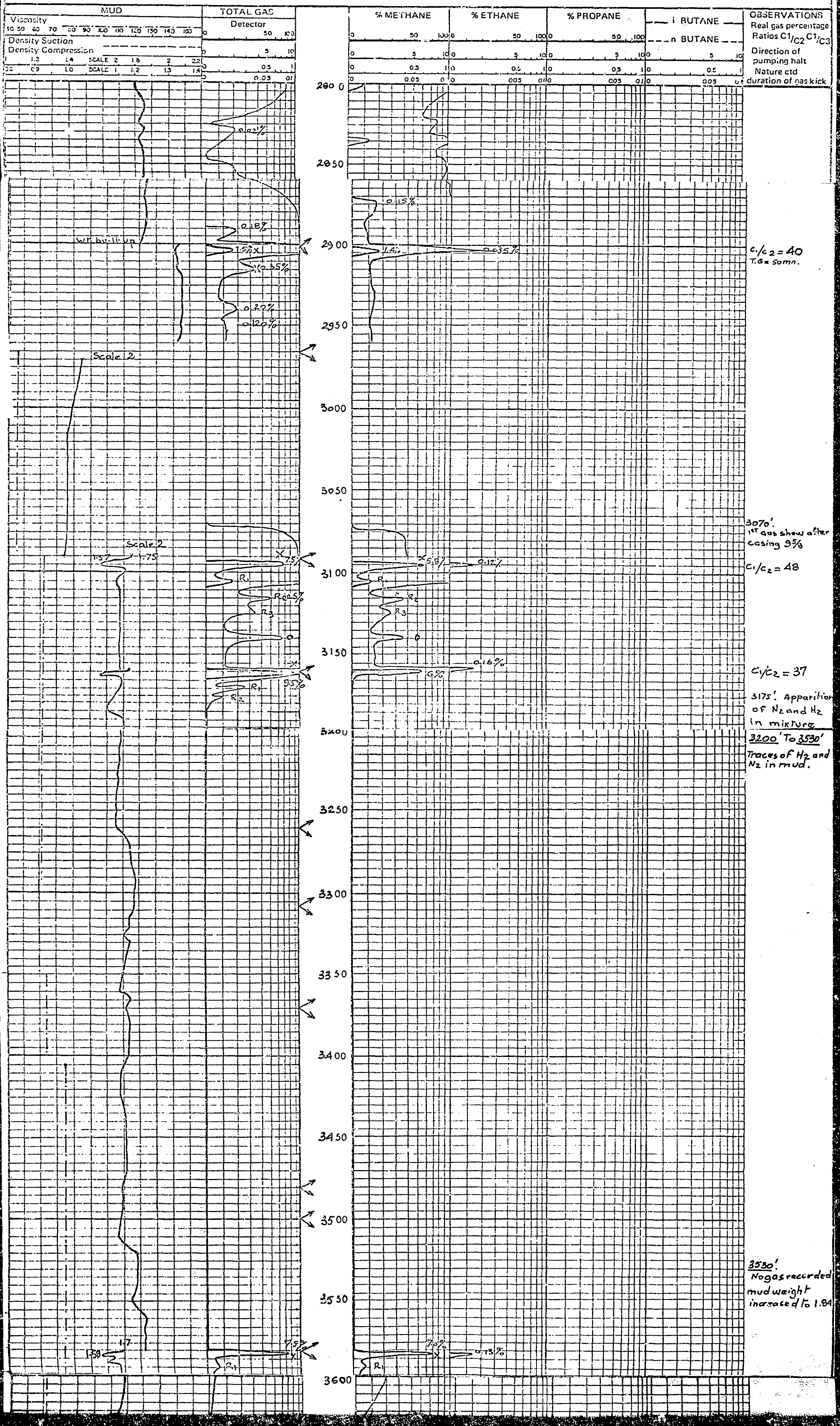
| | | | | |
|---|---|---|---|---|
| OPERATOR | PERMIT OR LEASE | TIMING | CASING | TOTAL DEPTH |
| | | COMMENCED = | ø at | |
| CONTRACTOR | PROVINCE | TEMPORARY HALT = | ø at | GEOLOGICAL FORMATION AT SPUDDING LEVEL |
| | | RESUMPTION OF DRILLING = | ø at | |
| RIG | CO-ORDINATES | | | GEOLOGICAL FORMATION AT BOTTOM HOLE |
| | X= | TEMPORARY HALT = | ø 9⅝" at 2960' | |
| BROUGHT UP TO DATE ON | Y= | RESUMPTION OF DRILLING = | ø at | GEOLOGIST |
| 21-09-69<br>26. 09. 69 | Z=<br>ZKB= | COMPLETED = | | S. RUEFF |

## CHARACTERISTICS OF THE INSTALLATION FOR GAS DETENTION



| | | | | | DENSIMETER | DEGASSER | DESSICATOR | AERIAL LINE | | FLOW METER | PUMP | ABSORBER H2 | DETECTOR | | CHROMATOGRAPH | | CALIBRATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DENSIMETER SUCTION | ELEVATION | SAMPLER WASHER | DENSIMETER | DEGASSER | N° | MUD FLOW | TYPE | TYPE | LEGEND | FLOW IN | TYPE | TYPE | BRAND | TYPE | BRAND | TYPE | DEPTH |
| | | | | | Geoservices | GD11 | | | | | | | | 2220 | | 3379 | |
| | | | | | | 40l/mn | Cl2Ca | monoflex | | 40l/h | VIBR. | catalyse | Geoservices | GD11 | Geoservices | Gd 21 | every Day |

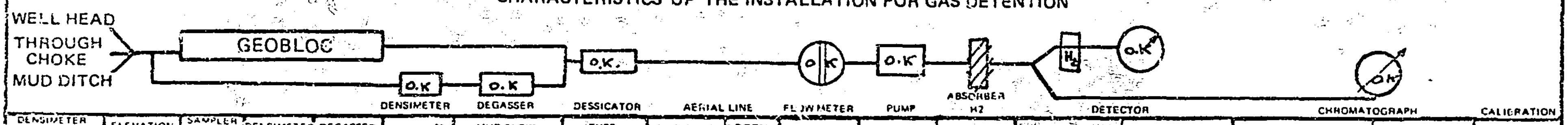
- X GAS KICK AFTER A ROUND TRIP OR A DUMMY TRIP
- GAS KICK FROM PULLING OFF BOTTOM
- ⊗ GAS KICK WHILE CIRCULATING AT THE CASING SHOE
- ⊙ GAS KICK AFTER PUMPS HAVE BEEN STOPPED
- ● GAS KICK AFTER MAKING A CONNECTION
- R1, R2 GAS KICK DUE TO RECIRCULATING GAS (R 1 = First Recirc, R 2 = Second Recirc)
- CHANGE THE BIT
- TRIP IN TO CONDITION HOLE OR DUMMY TRIP



| UITAINE | SCALE<br>2"=100' or 1:600 | GAS LOG | SHEET No.<br>2 | WELL NAME<br>WALRUS A71 |
|---|---|---|---|---|

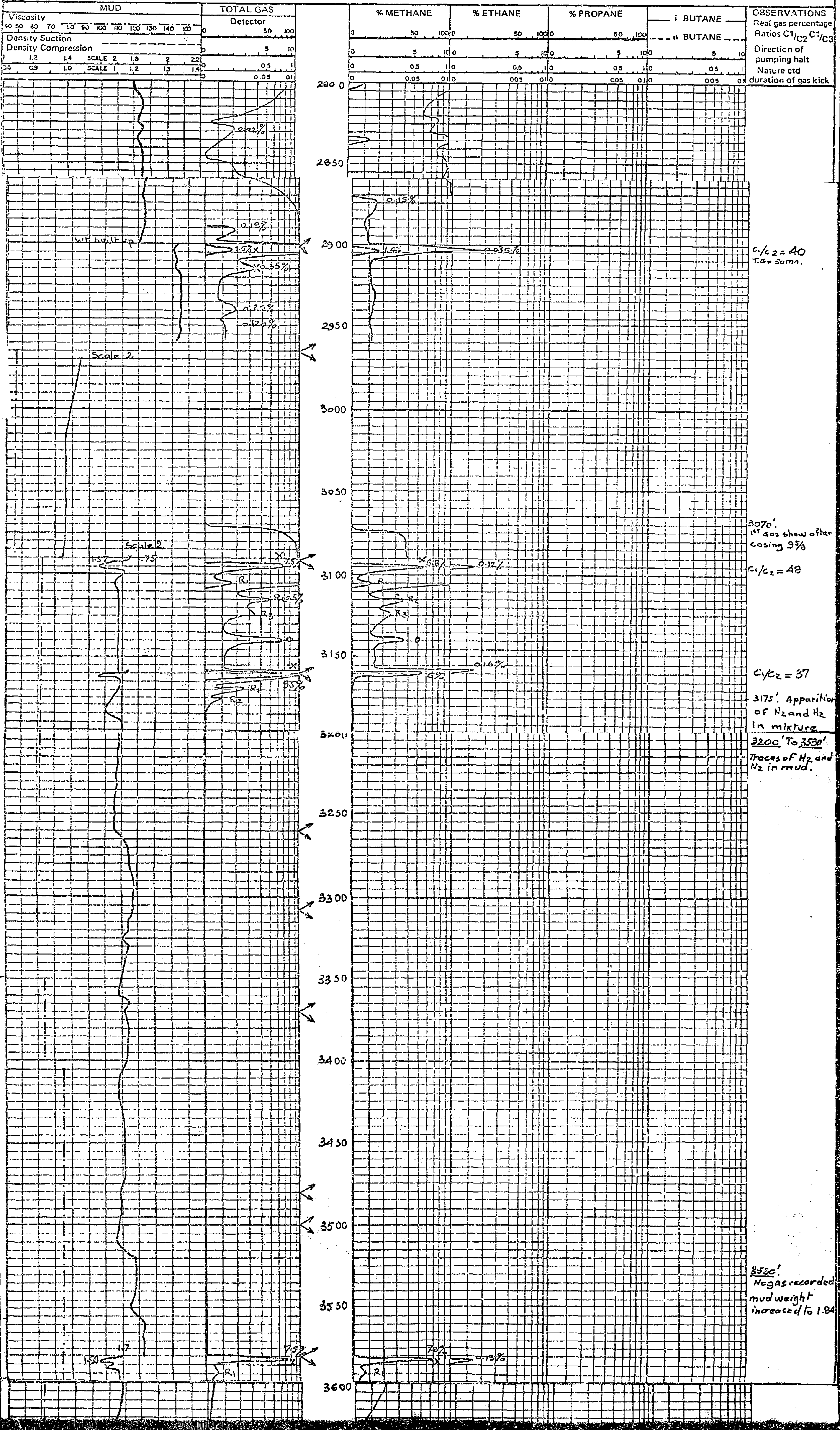
| OPERATOR | PERMIT OR LEASE | TIMING | CASING | TOTAL DEPTH |
|---|---|---|---|---|
| | | COMMENCED = | ⌀ at | |
| CONTRACTOR | PROVINCE | TEMPORARY HALT = | ⌀ at | GEOLOGICAL FORMATION AT SPUDDING LEVEL |
| | | RESUMPTION OF DRILLING = | ⌀ at | |
| RIG | CO-ORDINATES | TEMPORARY HALT = | ⌀ 9⅝" at 2960' | GEOLOGICAL FORMATION AT BOTTOM HOLE |
| | X=<br>Y= | | | |
| BROUGHT UP TO DATE ON | Z= | RESUMPTION OF DRILLING = | ⌀ at | GEOLOGIST |
| 21-09-69<br>26. 09. 69 | ZKB= | COMPLETED = | | S. RUEFF |

## CHARACTERISTICS OF THE INSTALLATION FOR GAS DETENTION



| DENSIMETER SUCTION | ELEVATION | SAMPLER WASHER | DENSIMETER | DEGASSER | | MUD FLOW | TYPE | TYPE | LEGEND | FLOW IN | TYPE | TYPE | BRAND | TYPE | BRAND | TYPE | DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| — | — | — | — | — | Geoservices | GD11 | — | — | — | — | — | — | Geoservices | 2220 | Geoservices | 3379 | — |
| | | | | | | 40l/mn | Cl2Ca | monoflex | | 40l/h | VIBR. | catalyse | | GD11 | | Gol21 | every Day |

| | | | |
|---|---|---|---|
| X GAS KICK AFTER A ROUND TRIP OR A DUMMY TRIP | ⊗ GAS KICK WHILE CIRCULATING AT THE CASING SHOE | ● GAS KICK AFTER MAKING A CONNECTION | CHANGE THE BIT |
| GAS KICK FROM PULLING OFF BOTTOM | ⊙ GAS KICK AFTER PUMPS HAVE BEEN STOPPED | R1 , R2 GAS KICK DUE TO RECIRCULATING GAS (R 1 = First Recirc, R 2 = Second Recirc) | ⇄ TRIP IN TO CONDITION HOLE OR DUMMY TRIP |



OBSERVATIONS
Real gas percentage
Ratios C1/C2 C1/C3
Direction of pumping halt
Nature and duration of gas kick

$C_1/C_2 = 40$
T.Gx somn.

3070'.
1st gas show after casing 9⅝

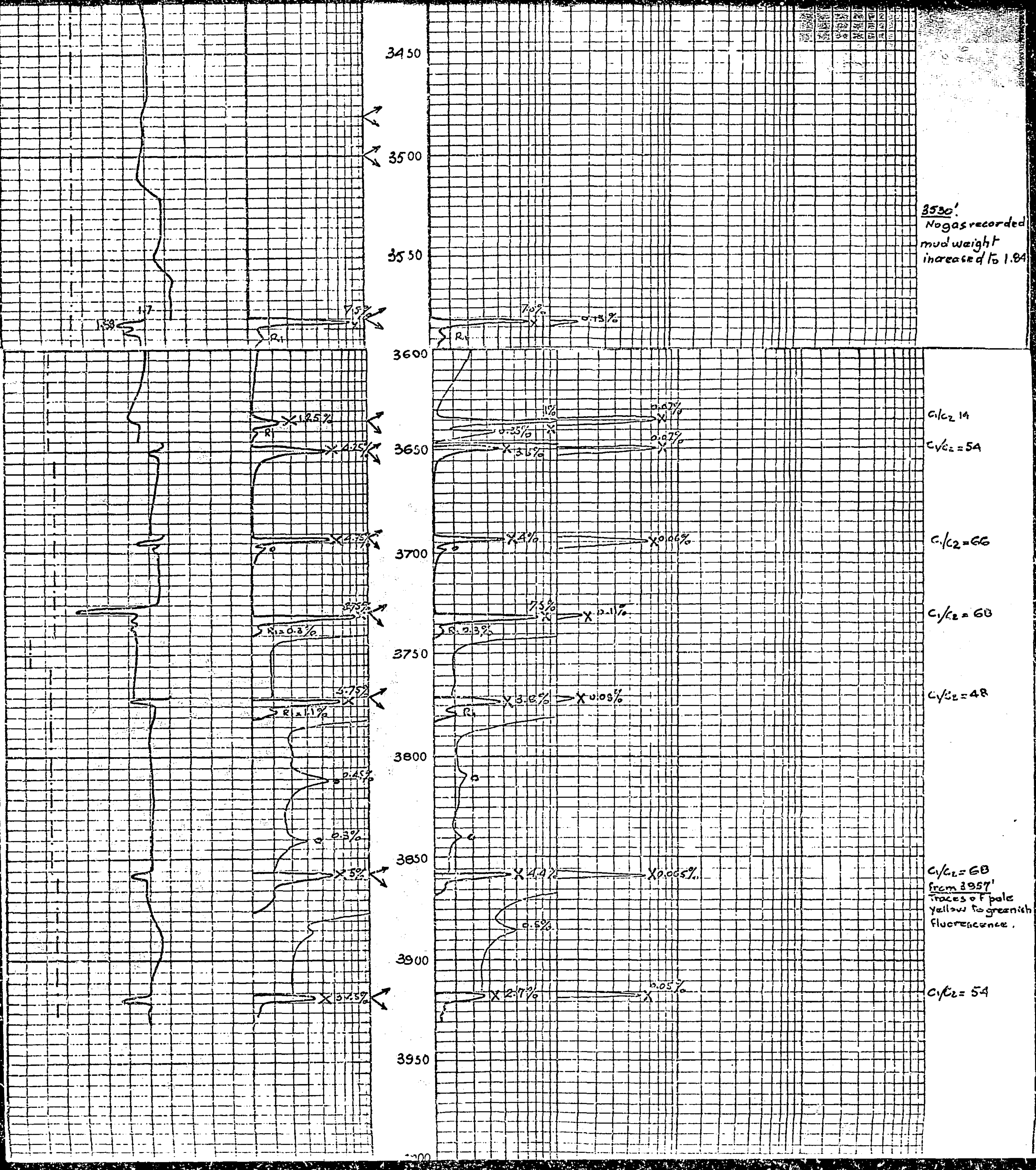
$C_1/C_2 = 48$

$C_1/C_2 = 37$

3175'. Apparition of $N_2$ and $H_2$ in mixture

<u>3200'</u> To <u>3530'</u>
Traces of $H_2$ and $N_2$ in mud.

<u>3550'</u>
No gas recorded
mud weight increased to 1.84


3450
3500
3550
3600
3650
3700
3750
3800
3850
3900
3950
1.7
1.58
7.5%
R1
7.5%
0.13%
X 1.25%
R
X 4.25%
1%
0.07%
0.35%
X 3.6%
0.07%
X 4.75%
X 4%
X 0.06%
37.5%
7.5%
X 0.1%
R1 = 0.8%
R 0.3%
5.75%
X 3.8%
X 0.08%
R1 = 1.1%
R1
0.45%
0.3%
X 5%
X 4.4%
X 0.065%
0.5%
X 37.5%
X 2.7%
0.05%
3530'
No gas recorded
mud weight
increased to 1.84
C1/C2 14
C1/C2 = 54
C1/C2 = 66
C1/C2 = 68
C1/C2 = 48
C1/C2 = 68
from 3957'
traces of pale
yellow to greenish
fluorescence.
C1/C2 = 54

ATT. 1

# ATTACHMENT NO. 1

# REPORT ON OPERATIONS ON WALRUS A-71

by

Robert Sales

Drilling Supervisor
Aquitaine Company of Canada Ltd

Period: October 14 to 19, 1969.

## AQUITAINE COMPANY OF CANADA LTD.

## HUDSON BAY - WALRUS A-71

## RAPPORT SUR TEMPETE DU 16 OCTOBRE 1969.

### 14 Octobre 1969.

Le 16-10-69 à 0:00 heure le programme d'abandonnement de Walrus A-71 devra être commencé. Le programme de travail jusqu'au 15.10.69 à 24 heures devra être le suivant:

- Carottage - Extraction de carotte.
- Forage - Dernier outil.
- Si temps disponible avant minuit Logging - Schlumberger.

- Le Forecast No. 108 du 14.10.69 à 9:00 heures nous permet de penser que le temps nous sera favorable (Copie ci-jointe).

- Cependant à l'arrivée au jour de la carotte à 23:00 heures un vent N.NE de 30 à 35 noeuds nous fait rouler de 5 à 8°.

- Commencé descente outil à 23:15 heures.

### 15 Octobre 1969.

- A 1 heure, après 1 heure 45 de manoeuvre, n'avons réussi qu'à descendre les 7 longueurs de DC 6½ et 7 longueurs, pour pouvoir éventuellement fermer les obturateurs.

- Stand by.

- 9:00 heures. Les prévisions météo annoncent un déplacement du vent au N.N.W. ce qui nous est le plus favorable étant donné notre cap au 345. (Forecast No. 111 du 15-10-69 - 9:00 heures, ci-joint).

- 11:00 heures. Après discussion avec SERGE RUEFF, tombons d'accord sur l'inutilité de faire une passe d'outil qui ne donnerait dans les meilleures conditions qu'un avancement de cinquante pieds supplémentaires. Serge RUEFF préférerait avoir davantage d'informations sur le puits par logging.

- En avisons CHURCHILL. Pouvons communiquer directement depuis le Wodeco II avec ROGER BONAFOUX à CALGARY. Avons accord.

- 11:30 heures. Le vent décroit à 10-15 noeuds et tourne au Nord.

- 12:00 heures. RAY MOORE pense que nous pouvons essayer de remonter l'outil, mais nous devons degerber les DC qu'il est trop dangereux de stocker.

- 15:00 heures. Durant ces trois heures, le personnel du Wodeco a montré une fois de plus sa bonne volonté de coopération et son extraordinaire technique. Car cette manoeuvre avec 7 à 10° de roulis a été vraiment dangereuse et acrobatique.

- 16:00 heures. Installation SCHLUMBERGER avec Weave Compensator terminée. Début des opérations électriques.

- 22:15 heures. Terminé les opérations prévues soit: SONIC - LATEROLOG III - GAMMA RAY NEUTRON.

- Depuis 20 heures, le vent, comme le montre le tableau ci-après, tourne à l'Ouest en augmentant. Nous espérons toujours que cette situation est passagère et que les vents vont revenir comme prévu au N.N.W.

- Les roulis sont de 7 à 12°. La descente des tiges nues pour PLUGGING ne peut être envisagée. Donnons accord à Serge RUEFF pour un run de SIDE WALL CORING.

TABLEAU DES VENTS POUR LA JOURNEE DU 15-10-69

| Heures | Direction | Force | Roulis | |
|---|---|---|---|---|
| | | | Moyen | Maximum |
| 4:00 | N.N.E. | 30.35 | 2-5° | 8° |
| 8:00 | N'LY | 30.35 | 3-5° | 11° |
| 12:00 | N'LY | 10.15 | 1-3° | 7° |
| 16:00 | N.W. | 25.30 | 3-5° | 11° |
| 20:00 | W. | 30.40 | 3-7° | 12° |
| 22:00 | W. | 35.45 | 3-8° | 13° |
| 24:00 | W.S.W | 40.55 | 5-10° | 18° |

- Comme le montre le tableau des vents, cette situation fausse par rapport aux prévisions, a empiré très rapidement depuis 20 heures.

15-10-69 (suite)

- Imaginant les graves conséquences d'une déconnection du Riser le jour même, où impérativement devaient débuter les opérations d'abandonnement du puits, nous avons voulu, au seul risque d'écraser le slip joint au droit du moon pool, garder notre position.

- A 23 heures. Lentement mais régulièrement le vent augmente de vitesse et tourne au W.S.W. nous arrivant franchement à 90°.

- De nuit il nous est impossible d'évaluer la hauteur des vagues. Nous accusons les roulis fréquents à 18°. Le pilonnement évalué au Riser est de 5 à 6 mètres.

- Appelons René CLERC. Laison obtenue à 23:30 heures.

- Lui donnons notre situation. Demandons si ce type de vent devra se maintenir longtemps. Il nous rappelera après avoir contacté la DOT à CHURCHILL.

- 23:45 heures. Appel de René CLERC. La situation a évolué plus rapidement que prévu. Les vents doivent se maintenir à cette valeur et dans cette direction jusqu'à 6 ou 7 heures du matin. Puis remonter très lentement au N.N.W. et décroître à 35-45 noeuds? .....

- 24:00 heures. Fin d'appel. Ces dernières prévisions nous laissent sans réponse. Avec René BROCQ et Al SUTHERLAND Tool Pusher Wodeco, nous réfléchissons au problème sans trouver une solution.

- Nous prévoyons qu'un vent continu de cette force et dans cette direction va soulever des vagues de plus en plus grandes et dangereuses. Depuis 23 heures le pilonnement est passé de 6 mètres à 8 mètres.

- Le WODECO II est déporté au maximum par le vent, les tensions sur les lignes d'ancre 5 et 8 sont de 80 à 130.000 lbs. Le Riser doit être fortement incliné. Et nous savons que dans ce cas la déconnection est très difficile, de plus il nous faut déconnecter à la fois le Riser, la kill line et la choke line. Quelle sera la conséquence alors du pilonnement du riser sur le stack? .... et en même temps sur les kill et choke connectors? ....

16 Octobre 1969

- 0 heure 30. Faisons remonter rapidement les CLABS SCHLUMBERGER. Sitôt dans le Riser, fermeture de la totale, des kill et choke valves. Les débits de fermeture sont normaux, la pression de service du KOOMEY toujours à 1600 psi.

- Appelons FOUNDATION VIGILANT, le remorqueur, et MILLERNTOR, le supply de service pour leur demander de se tenir en alerte. Tous deux depuis minuit ont relevé leur ancre et se tiennent à proximité du WODECO II. Effectivement nous apercevons leurs feux, fréquemment cachés par les vagues.

- 1:30 heure. Toujours même situation. Roulis maximum 18°. Le Riser bat fortement dans le moon pool, il doit être partiellement écrasé car le slip joint en remontant le soulève à chaque fois.

- Dans le derrick, les tiges battent régulièrement et très fortement, elles sont toujours tenues à l'accrochage par une chaine tendue et 2 cordes, au plancher par une chaine et tendeur.

- Le moufle en position opération SCHLUMBERGER bat sur son chariot et risque d'arracher les rails de guidage. Descendu le moufle en position basse maximum en rompant les cables de retenue dans le derrick.

- 2:15 heures. Le vent toujours W.S.W. semble diminuer à 20-25 noeuds. Le roulis est de 10 à 15° de moyenne. Les pointes à 18° sont moins fréquentes. Nous reprenons espoir, tout a encore tenu bon.

- 2:30 heures. Vent 25 noeuds. Rares rafales à 40 noeuds. Roulis maximum 16°. L'espoir grandi. Presque tout le personnel du bord est éveillé et en alerte, et se tient au mess ou à proximité de la salle radio. Le calme règne, aucun affolement, l'équipe de quart est prête à intervenir.

- 2:45 heures. Le vent remonte brusquement entre 30 et 40 noeuds et se maintient à cette valeur, toujours W.S.W. Les tensions sur la ligne d'ancre No. 5 sont trop fortes. Relachons progressivement du cable pour égaliser avec la ligne No. 6.

- Le roulis remonte à 15° - 18°. Appelons P. ALLIBAUD à CHURCHILL, lui demandons d'appeler Don COKER à l'appareil.

- Avec Ray MOORE nous leur exposons la situation. Nous songeons à couper les cables du Rucker car durant les cinq dernières minutes, des vagues plus fortes qu'au cours de toute la nuit déferlent sur le pont principal emportant les bouteilles de gaz COMEX, les futs d'huile et d'antigel roulent d'un bord sur l'autre. Un fut en roulant a rompu une conduite d'air 1" au tableau des Ruckers, jusqu'à la fermeture de la valve d'isolement de ce circuit l'air s'en échappait bruyamment.

- Sur le pont supérieur les DC 6½ ont cassé leurs chaînes et roulent en se cognant fortement d'un côté à l'autre du Rack. Sur le rack également les éléments de Riser de réserve sont emportés, un des éléments vient s'écraser sur la porte de la chambre de Serge RUEFF qui déménage précipitamment.

- Dans le derrick le master Busking 37½ de la table, soulevé par le Riser est venu s'écraser contre le manifold duses. Le moufle et son chariot ont cassé le guide et viennent battre violemment d'une part le train des tiges, d'autre part la tole de protection du plancher au-dessus du manifold, tordant departs des kill et choke lines.

- Dans le moon pool le Riser en position haute disparait dans le substructure, comme il disparait dans l'autre sens dans l'eau pourtant basse à ce moment dans le moon pool. Le pilonnement doit être au maximum des 40' du slip joint car nous l'entendons cogner de part et d'autre.

- 3:05 heures. Comme nous exposions cette situation à Don COKER on nous annonce que les cables du Rucker se sont cassés au droit du collier sauf à une attache, le collier est arraché, est resté suspendu à un cable, de Riser, kill et choke lines ont disparu dans les flots. Heureusement à ce moment là personne ne se trouvait à proximité du moon pool.

- En même temps la guide line Tribord avant se cassait, rappelée violemment par le tensionner, l'extrémité du cable fouette sur le pont principal et vient effleurer le cou et le visage de RICCI un plongeur COMEX entre les frigos et la salle radio, lui marquant légèrement le visage et lui cinglant la main gauche le coupant assez profondément sur 4 doigts.

- Des observateurs placés en face du pendule de roulis ont noté 3 pointes à $22^{o}$.

- 3:10 heures. Les lignes d'ancres No. 7 et 8 se sont cassées. Nous lisons sur diagrammes, des enregistrements de 60 à 160.000 lbs.

- N'étant plus retenu par les lignes avant et le Riser, le Wodeco II a du se déporter sous l'effet du vent car nous lisons une direction S.S.W. et nous enregistrons encore, malgré cette position plus favorable, des roulis de 15 à 20°.

- 3:20 heures. Tension de la ligne d'ancre No.5 -0. Nous pensons a une rupture de cette ligne.

- Le roulis reste 18 à 20°. Le vent se maintient à 40-50 noeuds.

- Constatons que les lignes d'ancre No. 1 et 2 passent sous l'avant du Wodeco II nous empêchant de tourner davantage vers l'est.

- 3:25 heures. Relachons tension des lignes 1 et 2 au maximum ne gardant que quelques tours sur tambour de l'ancre No. 2.

- La barge accuse une rotation de 15 à 20° vers l'est par rapport à sa position initiale. Le vent souffle trois quart arrière le roulis est moins fort et ne dépasse plus 17°.

- Le plus dur était maintenant passé.

- Notre seul espoir, sauver le Riser et le puits était maintenant anéanti. Notre position n'était plus aussi alarmante qu'elle l'a été soudainement durant ces 45 minutes. Nous pouvions maintenant sans regret couper les lignes d'ancre si nécessaire pour nous mettre à la cape.

- Nous songeons à conserver le maximum de lignes d'ancrage pour éventuellement se repositionner ultérieurement si le temps le permet. Comme 3 guide lines semblent encore en place, nous envisageons la possibilité d'un run de TV pour contrôler l'état de la tête de puits.

- Durant ces 45 minutes, nous pouvions lire l'angoisse sur tous les visages présents. Les montées de roulis à 22° que nous avons tous senties venir progressivement en 5 ou 6 mouvements continus et accentués du Wodeco II ont été un suspense inoubliable durant lequel les mains qui se crispaient à un point d'appui quelconque ne serraient pas uniquement afin d'éviter d'être emporté par le mouvement, mais semblaient vouloir s'accrocher à la vie. Je n'exagère rien! Sans avoir eu une "peur bleue" je crois que nous nous sommes tous à ces moments là posé la question... est-ce pour ce coup-ci!

- Pourtant il n'y a jamais eu la moindre trace d'affollement. Tout au long de cette interminable nuit le personnel est resté près de nous, attendant les ordres, obéissant avec une extraordinaire discipline vu la situation. Aussi nous devons signaler que dans le même temps où ont été enregistrés les incidents précédents, les mesures suivantes ont été prises.

- Dès la perte du Riser et la rupture de la guide line Tribord, la tension des 3 autres guide lines a été relachée.

- Quelques minutes après la rupture du chemin de roulement du moufle Junio LAWELLIN, Driller de poste est monté sur le plancher, et sous le train de tiges qui battait follement dans le derrick a attendu le moment propice pour lever le frein et coucher à la volée moufle et chariot sur la table. Plusieurs doigts d'accrochage des tiges étaient déjà couchés sur le plancher.

- Dès que possible une équipe a bloqué les DC 6½ fous sur le pipe rack en les callant aux mouvements de roulis, les chaines d'amarrage ont été remplacées.

- Dans l'eau jusqu'aux genoux une équipe a relevé et calé les futs roulant dangereusement sur le pont principal.

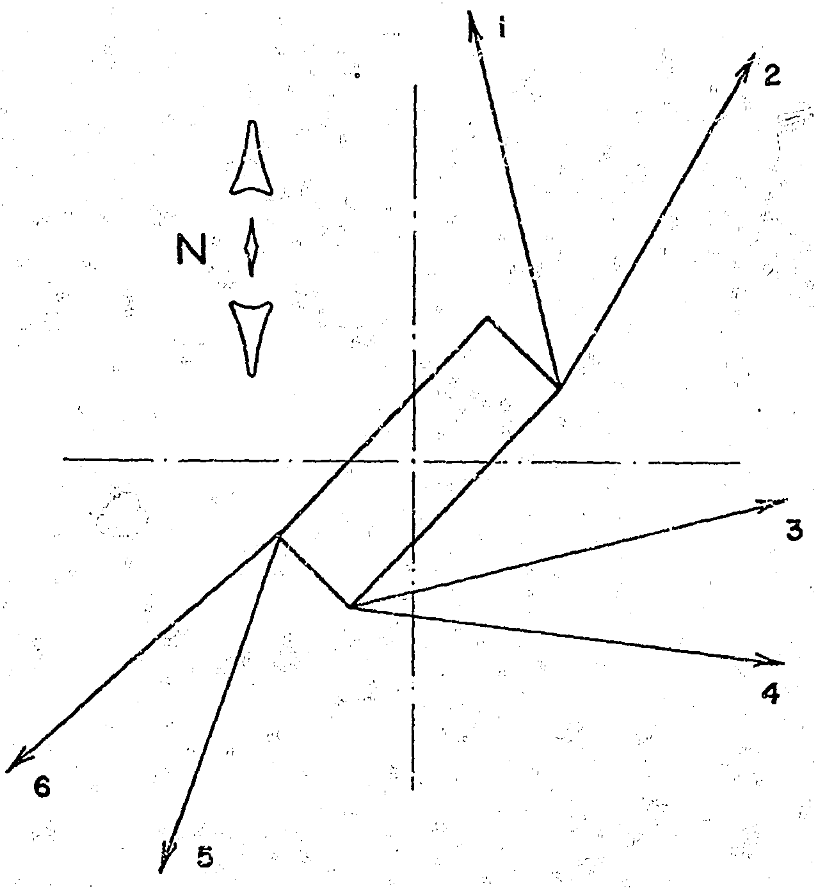
- Plus tard LAWELLIN et son équipe ont eu à couper des lignes d'ancre dont la 5 et la 6, face au vent, sous des vagues de plusieurs mètres.

- Afin de ne pas inquiéter davantage le personnel, et tant que le Wodeco II était sur ses 8 ancres, nous n'avions pas voulu distribuer les vêtements de survie. Les caisses étaient simplement ouvertes et tenues à disposition de chacun près de la salle radio.

- 3:45 heures. Vent toujours 35-45 noeuds de l'Ouest. Roulis 15-17$^{o}$. Seules les tiges continuent à battre régulièrement dans le derrick. La chaine d'amarrage à l'accrochage est lâche mais tient toujours.

- 4:30 heures. Le vent baisse brusquement à 20-25 noeuds et en 15 minutes remonte à W.N.W.

- Les dernières prévisions météorologiques données par René CLERC à 0 heure semblent se confirmer. La position actuelle du Wodeco II sur ses lignes d'ancre, comme le montre le croquis ci-dessous, est très défavorable au vent prévu N.N.W. puisque à 90$^{o}$.



- 5:00 heures. Appelons FOUNDATION VIGILANT et lui demandons de se préparer à prendre la remorque.

- 600 pieds de cable 2¼" vont en pendant en bout de la patte d'oie. Nous prévoyons d'utiliser une manille coulissant sur cette remorque, attachée par un cable 3/4" que nous filerions au remorqueur.

- 6:30 heures. Foundation Vigilant croise à Tribord et nous envoie un lance-amarre suivi de nylons de plus gros diamètres que nous avalons à bord du Wodeco II.

- 8:30 heures. Durant plus d'une heure et demi le remorqueur a essayé de se retourner pour mettre cap au Nord sans succès. Il est soulevé et déporté dans tous les sens, le vent W.N.W. l'écarte de nous et le repousse vers l'arrière.

- Le commandant nous annonce qu'il largue le nylon, il est en panne et ne peut contrôler la manoeuvre.

- 8:45 heures. Demandons à CHURCHILL si un remorqueur est disponible à quai. Négatif. L'Artic Shore part de suite vers la location. Don COKER sera à bord.

- 9:00 heures. FORECAST No. 113. Valable jusqu'à 18:50 heures. Vents N.W. à N.N.W. 30 à 40 noeuds se maintiendra avec rafales à 50 noeuds. Vagues supérieures à 5 mètres (en H 1/10 ce qui fera des maximums à 7-9 mètres).

- Il ne nous reste que 2 possibilités. Ou le remorqueur nous tourne face au vent annoncé ou couper au moment voulu les lignes d'ancre 5 et 6.

- 10:30 heures. Vigilant dépanné. Demandons au MILLERNTOR de l'aider à la manoeuvre. Les 2 bateaux se passent une remorque.

- [illegible]:00 heures. Vigilant remorqué par Millerntor passe à Tribord. Envoyons lance amarre à son bord, suivi du nylon de 40 et du cable 3/4 manillé sur notre remorque de 600 pieds.

- Les 2 bateaux sont séparés de 40 mètres maximum, le Millerntor avance complètement de biais pour retourner le Vigilant. Tous deux parfois nous surplombent depuis une colline d'eau ou disparaissent complètement cachés par les vagues.

- 13:00 heures. Vigilant amarre notre remorque.

- 13:30 heures. Le Millerntor largue la remorque du Vigilant qui a notre cable en tension et tire à l'Ouest. Coupé cable d'ancre No. 2 qui trop court nous retient vers l'Est.

- Depuis 5 heures du matin le roulis a été régulier et continu de 10 à 15°.

- A 8:00 heures la chaine d'amarrage des tiges à l'accrochage s'est rompue et les tiges battent d'un bord à l'autre du derrick.

- A 8:45 heures. Dropé 500' de cable amarré à la base à 3 outils 8½, au sommet à une bouée plastique NORVEGIENNE de 60 litres et au PINGER que nous avions à bord.

- Nous avons donc le puits reperé par 2 pingers. 1 fixé au stack, un second à 100 pieds à proximité du stack.

- A 11:00 heures. En prévision du retour éventuel d'un supply sur la location, largué 3 outils 8½ amarrés par 700 pieds de cable ½" à 3 bouées NORVEGIENNES.

- Pour contrôler la bonne tenue des 3 guide lines restées immergées, essayons de mettre les cables en tension. Les 3 lignes sont arrachées et ne tenaient plus au stack.

- Commencé rangement, stockage et amarrage du matériel restant à bord.

- 14:30 heures. Le roulis qui depuis une heure était de 10-13° remonte progressivement à 18°. Le vent remonte au N.W. Le Foundation Vigilent ne peut tourner le Wodeco II tenu sur ses lignes d'ancre (vent 40-45 noeuds).

- Essayons de contacter CHURCHILL sans succès. Trop d'interférences.

- 15:00 heures. Pointes de roulis à 20°. Demandons avis à Don COKER à bord de l'Artic Shore et au Commandant du remorqueur, pour supprimer les lignes Babord Arrières.

- Don COKER nous signale qu'il nous laisse toute initiative à compter de ce moment et compte tenu de l'évolution du temps.

- 15:35 heures. Coupé ligne d'ancre No. 6. Le Wodeco II tourne très rapidement au Nord Ouest. Le roulis tombe aussitôt à 10-13°.

- La ligne No. 5 que nous croyions cassée prend de la tension. Mais elle ne gène pas encore. Nous la conservons.

- 16:30 heures. Telle une sonnerie d'alarme le roulis augmente très rapidement pour atteindre à nouveau 18-20°.

- Coupé ligne d'ancre No. 5 qui nous retenait encore.

- Le vent est maintenant à 50 noeuds toujours N.W. Les vagues dépassent 7 mètres suivant les commandants des navires. La houle de 6 à 7 secondes et scandée par le balancement des tiges.

- 19:00 heures. Cap au 340. Tenu par le remorqueur. Les vagues maintenant atteignent les 9 mètres. Le tangage est de 5 à 8°. Les tiges battent dans le derrick d'avant en arrière et commencent à arracher la passerelle d'accrochage.

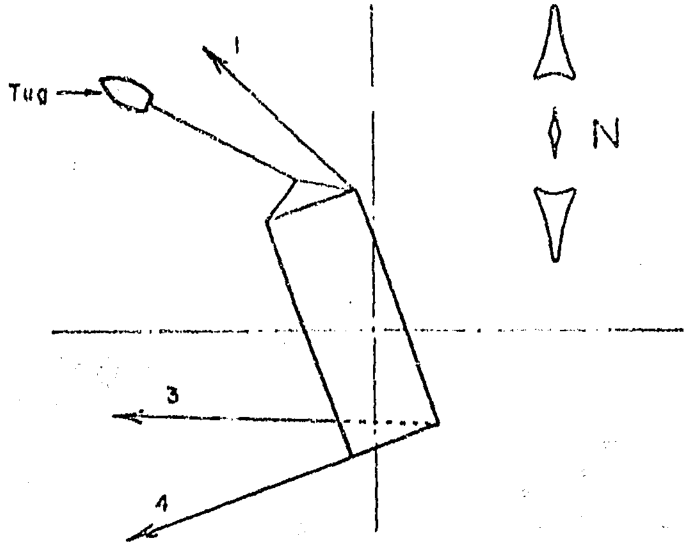
- Le chemin de roulement du moufle arraché à sa partie inférieure est tombé sur le plancher. Une deuxième partie se détache et se balance dans le derrick. Les contre poids des clés ont été arrachés dans le moon pool, les clés à 10 mètres au dessus du plancher sont mêlées aux tiges ainsi que les cables du mouflage, des treuil a air, du cable de curage, une vraie toile d'arraignée indemelable.

- 3 tiges ont traversé le plancher et sont coincées dans le moon pool à l'endroit de stockage du stack.

- A hauteur de l'accrochage le mat intérieurement est nu de doigts, de passerelle, la poutre d'arrêt des tiges à cette hauteur a été arrachée et repose sur la passerelle extérieure au dessus de la géologie.

- 22:10 heures. Le vent augmente toujours et se maintient à 60 noeuds avec rafales à 70 noeuds. Le Wodeco II est déporté au Sud Est et les cables d'ancres No. 3 et 4 nous empêchent de tenir face au vent.

- Les vagues font toujours 9 mètres et dépassent le laboratoire géologique par moment.



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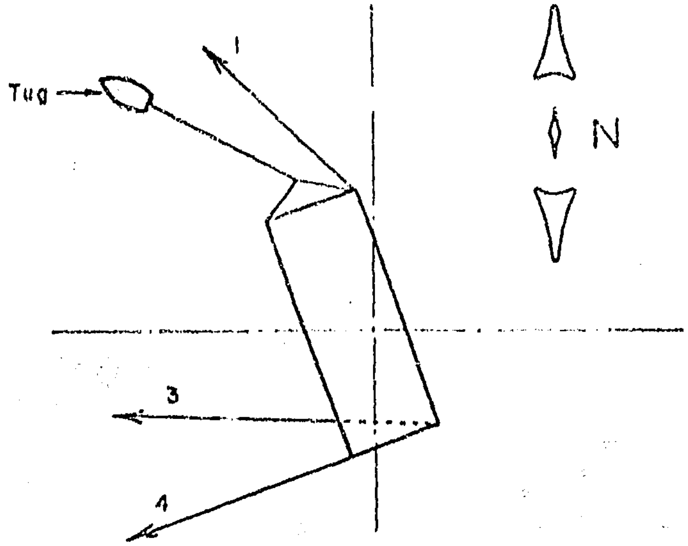

- 22:20 heures. Coupé lignes d'ancre No. 3 et 4.

- 24:00 heures. Neige - Vent 50 à 60 noeuds au 340. Température 25°. Vagues 7 à 9 mètres du N.W. Roulis 10-13°.

TABLEAU DES VENTS POUR LA JOURNEE DU 16-10-69

| Heures | Direction | Force |
|---|---|---|
| 4:00 | W.S.W. | 35.40 |
| 8:00 | SW - WSW | 35.40 |
| 12:00 | W.N.W. | 40.45 |
| 16:00 | N.W. | 40.50 |
| 20:00 | N.W. | 50.60 |
| 24:00 | N.W. | 50.60/70 |

17 Octobre 1969

4:00 heures. Vent toujours 50-60 noeuds avec rafales à 70. Neige. Température 25°. Les rambardes du Wodeco II sont recouvertes de glace et sur Tribord des stalactites apparaissent sur les cables, les chaines et différent matériel.

- Le remorqueur nous tient au 340. Roulis maximum 13°.

- 7:00 heures. Contactons CHURCHILL donnons notre position. Pensons que le plus gros de la tempête est passé.

- La plus grande partie du personnel est couchée sauf 1 équipe de quart, et prend un repos mérité après 32 heures de veille pénible.

- 11:30 heures. P. ALLIBAUD nous annonce que l'hélico essayera un vol dans l'après-midi pour récupérer si possible le personnel AQUITAINE et autre suivant places disponibles.

- Donnons la situation météo de la location à 14 heures. Vent 30-35 noeuds. 340°. Houle 3-4 mètres. Roulis 6-7°. Tangage 5°.

- 16:00 heures. Hélico avise CHURCHILL qu'il se pose à PEN ISLAND un moteur en panne.

- 16:10 heures. Arrivée de l'Artic Shore sur la location. Depuis le bord Don COKER inspecte le Wodeco II pour constater les dégats.

- 16:15 heures. Don COKER demande la coupe de la ligne d'ancre No. 1 dernière attache à la location. Le FOUNDATION VIGILENT craint de prendre son hélice à un cable de bouée d'Orin.

- 16:30 heures. Le remorqueur avance de 2 à 4 milles au N.W. de la location et nous tient dans cette position.

- Faisons remarquer à Don qu'un remorquage normal dans cette direction nous rapprocherait durant les premières 36 heures, de CHURCHILL- OK - mais cette route éloignerait le Wodeco II du Strait. Très juste. Décidons d'attendre 12 à 24 heures.

- 22:15 heures. Don COKER donne ordre de faire route au N.W.

18 Octobre 1969

- 8:00 heures. Avons avancé de 10 milles de la location.

- Le MILLERNTOR va tenter un accostage pour le transbordement du personnel du Wodeco II.

- Vent 35-40 noeuds de 340. Vagues 3 à 6 mètres, avec toutes les 3 minutes des vagues de 1 à 3 mètres.

- 8:05 heures. Amarré par l'avant au Wodeco II le MILLERNTOR manoeuvre avec une extraordinaire dextérité pour se tenir le plus près possible de notre bord durant les vagues moins fortes.

- Le passage est possible par l'arrière sur la passerelle d'antenne DECCA, qui est à bonne hauteur. les premiers passagers ont sauté, les suivants sont arrachés du bord par les premiers.

- 8:30 heures. Le personnel et les bagages sont transbordés. Largué amarre du Millerntor qui fait route sur CHURCHILL.

- Une équipe est restée à bord du Wodeco II pour tenter d'assurer le train de tiges dans le derrick. Ils reviendront avec l'Artic Shore.

- 12:00 heures. Les tiges sont assurées dans le derrick. Le FOUNDATION VIGILENT peut prendre son CAP normal sur HALIFAX. Full speed.

- 15:30 heures. Transbordement du personnel restant sur Wodeco II sauf ceux prévus pour le remorquage.

19 Octobre 1969

- 14:00 heures. Arrivée MILLERNTOR à CHURCHILL. Le port est gelé. La traversée a été difficile. 35 passagers du Wodeco II, les vagues étaient de 9 mètres toute la nuit. Tout le monde était malade, personne ne s'est plaint.

- 20:30 heures. Arrivée 'rtic Shore. Ils ont été très secoués aussi.

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## LISTE DU MATERIEL DETERIORE DU 15 AU 16 OCTOBRE 1969.

- Rupture cables Rucker - Perte Riser - Kill et Choke line - Flex et Slip Joint - Stack.

1 - Flexible KOOMEY a été arraché du tambour (Red Pod).
1 - Flexible KOOMEY est resté pendu, mais coincé dans sa poulie, torsadé avec les guide lines.
1 - Cable du POD vert cassé au fond.
1 - Cable du POD rouge arraché du tambour.
2 - Flexibles 3"x5000 des K. et CH. lines a controler - se sont cassés au droit des R. Union en tête des tubings.
2 - Cables de ligne d'ancre cassés. 7 (sur le cable Wodeco II)
8 (sur le cable de rallonge).
6 - Cables de lignes d'ancre coupés (tous sur cable Wodeco II).
90 - Bouteilles COMEX emportées par les vagues.
1 - Cabine COMEX littéralement écrasée sous les vagues.
1 - Lot de produits boue.
1 - Lot de futs huile et Anti Gel.

- Derrick

  - Plusieurs cornières tordues à l'accrochage.
  - Toutes les passerelles intérieures et doigts arrachés.
  - Passerelle extérieure endommagée.
  - Chemin de guidage arraché en grande partie.
  - Manifold duses tordu, partiellement cassé.
  - 38 longueurs tordues, probablement HS.

Un contrôle détaillé de ces détériosations rapidement estimées pourrait être fait à HALIFAX à l'arrivée du WODECO II.

Sales

ATT. 2

ATTACHMENT NO. 2

# REPORT OF WESTERN OFFSHORE II STORM DAMAGE

by

K.M. Nicolson

Hudson Bay Project Manager
Western Offshore Drilling and Exploration Co

TO: R.F. Woidneck DATE: 10/23/69

FROM: K.Nicolson

SUBJECT: Report of Western Offshore II storm damage

The attached report was prepared by Don Coker and Ray [illegible] describing the chain of events at the time of the [illegible] 15th to 18th storm. Also attached is a list of equ[illegible] lost during the storm and left on the bottom at th[illegible] area location. Materials lost or damaged during the storm a[illegible] listed in the attachments.

No survey of damage to the Western Offshore II has been made to date. This will be done in Halifax and a separate report submitted at a later date.

One copy of an Aquitaine report of the storm is attached to the original copy of this memorandum. This report is written in French by Robert Sales, the Aquitaine drilling superintendent aboard the Wodeco II.

K.M. Nicolson

K.M. Nicolson-

KMN:BV

c.c. w/attachments
F.A. Ackema
G. Robertson
J.A. Sage
D.H. Coker ✓
R. Moore

## SUMMARY OF EVENTS DURING STORM

10/13/69

0000-1630 Normal operation.
1630-2400 Circulate. Rough seas. 5° - 10° Roll.

10/14/69

0000-0130 Circulate. Rough seas. 5° - 10° Roll.
0130-2400 Normal operation. Coring. Rough seas after core recovery.

10/15/69

0000-0100 Start in hole. Rough seas.
0100-1200 Stand by with drilling assembly and 7 stand.
1200-1530 Pull D.P. Lay down drill collars.
1530-2400 Run Schlumberger.
Very rough seas. Wind west and gusting to 55 mph. Barge roll 5° to 11° from vertical zero.

10/16/69

0000 At 2400 check was made with local meteo and were assured the worst was over and wind would turn north.
Pull logging tool above BOP. Close blind rams. Koomey pressure 1600 psi. Flow meter indicated rams functioned properly. Kill and choke line valves were in closed position.

0200 #7 anchor wire broke in section next to barge. Estimate
1600' from barge. This permitted barge to swing consider-
able distance off hole. #8 anchor wire gave way. It is not
known for certain if this wire broke. At this time two
rucker riser tension lines broke. The unequal strain
causing rucker attachment ring on slip joint to part and
riser, kill and choke lines fell into sea. At this time,
the guide lines broke at the bottom of the ship. Also the
wire lines to Koomey pods broke at the bottom of ship. One
hose bundle (red) pulled completely from reel. The other
pulled off reel and hung in sheave and broke at bottom of ship.
Above events occurred within 30 minutes from time #7 anchor
broke. It is estimated this was worst part of storm. Wind
still westerly 45 knots per hour. Barge roll up to 20°.
Tug Foundation Vigilant was asked to try to attach line at
0400 approximately 0400. Captain refused because of rough seas
and water on his after decks at night. On Wodeco II anchor
wires were being relaxed and tensioned to ease barge motion.
Oxygen and gas bottles and various equipment was breaking
loose. Water was washing across decks too severely to work
or re-secure gear.

0500 It is estimated #5 anchor gave way at about this time. Wire
was pulled into the "Jewels" without tension. Constantly
working anchor wires to ease vessel.

0600 Vigilant attempting to get line on Wodeco II. With help of
Millerntor a tow line was finally secured from Vigilant to
1200 Wodeco II at 1200.
Winds changing to NW and gusting to 60 knots. Vessel roll
approximately 12° to 15°. Travelling blocks tore guidance
system loose. Blocks were dropped to rig floor. 38 stands
drill pipe broke loose from lashing, tearing out racking
fingers and boards, breaking and bending girders and braces.
Noise was terrible. Rig floor has suffered much damage.
Vessel motion was still severe.

1500 It was decided at this time by Moore, Coker and Glover to
cut the anchor wires to ease vessel. #2 wire was cut. 30
minutes or so later #5 (which had tensioned up again) was
cut, also #6. Vessel motion with help of Vigilant was
eased considerably. Winds were northwesterly and about 40
to 50 knots. Vessel and tug drift finally caused vessel
2100 to come up tight over #3 and #4 wires and these were cut.
This left barge riding fairly well on tug and anchor.
#8 WIRE WAS CUT AT THIS TIME.

10/17/69: Gear, etc., was re-secured. Lines were drained, mud pits
were pumped out and barge was prepared for tow. A constant
watch of sea condition was maintained to pick time for boat
to come along side and take off people.

1200 Wind northwesterly to 40-50 knots and 12 to 20 foot seas.

1500 Arctic Shore joined Wodeco II, Millerntor and Vigilant.
Captain Collett requested to move out of buoy area before
dark.

1530 + #1 anchor wire was cut and barge was towed out of buoy area.
Tug held II into weather through the night. Winds down to
10/18/69: 20 knots and switch to north.
0900 Change in sea conditions. Wind back up to 40 knots.
Millerntor managed to get alongside and take off 35 men.
0930 Millerntor away to Churchill. A system of lines and snatch
blocks were rigged by Moore and Sutherland and 38 stands of
drill pipe were finally secured in the derrick. Tug was
instructed to turn to course to leave Hudson Bay. It was
1200 considered safe to tow and barge was as secure as possible.
1500 Tug was again turned into weather and remaining 6 men
drilling crew was taken off by Arctic Shore. Vigilant again
on course to leave Hudson Bay. Arctic Shore enroute to
Churchill arriving at 2200 10/19/69.

# Equipment left in Hudson Bay

1 - 16 3/4 5000 msp Vetco type H-4 Hydraulic connector with B.O.P. guide frame.

1 - 16 3/4 Double ram blow out preventer with two sets 16 3/4" x 5" type 60 Ram blocks.

1 - 16 3/4 Double ram blow out preventer w/one set 16 3/4" x 3½" type 60 Ram blocks and one set complete blank off Ram blocks.

1 - 16 3/4 Hydril 5000 msp Bag type Blow out preventer with Vetco guid frame.

2 - Fail safe 3" 5000 msp Shaffer Valves on kill line. Hydraulically operated.

2 - Fail safe 3" 5000 msp Shaffer Valves on choke line. Hydraulically operated.

1 - 3" Vetco nominal 5000 msp kill line connector w/3" kill line and cameron clamps.

1 - 3" Vetco nominal 5000 msp choke line connector w/3" kill line and cameron clamps.

1 - 16 3/4 5000 msp Vetco type H-4 Hydraulic Connector w/Vetco Guide frame.

1 - Vetco Marine Riser mandrel w/guide frame.

1 - Vetco 20" Flex Joint.

1 - Vetco 20" Marine Riser Twelve 41' Joints, one 10' Joint w/50 choke and kill line guide funnels.

1 -20" Vetco Slip Joint w/four guide funnels.

2 - Hydril Type K-20 Pulsation dampeners.

1 - 560'-3" 5000 msp kill line w/Safety Joint, stab in shoe, goose neck and 3" Cameron clamp.

1 - 560'-3" 5000 msp choke line w/Safety Joint, stab in shoe, goose neck and 3" Cameron clamp.

2 - Koomey Retrievable Hydraulic connectors each w/18 line hose bundles 750' long w/ Junction Boy on carrot and Junction Boy on hose reel.

2 - 700 x 3/4" Hose bundle guide lines.

4 - 800' x 3/4 B.O.P. Stack guide lines.

1 - 20" Rucker Tie down clamp.

8 - 14,000 lb. Danforth anchors.

8 - 58" Dia anchor buoys.

8 - 1½ x 700' Pendent lines.

8 - 3" anchor shackles.

8 - anchor lines 5200' x 1 7/8 w/anchor Jewels.

continued

## Equipment Left in Hudson Bay - continued

1 - 1¼ x 700' pendant line - "for tug anchor".

2 - Kill and choke line safety clamps.

1 - Moon pool Beam.

1 - Schlumberger motion compensator

1 - Schlumberger Sheave.

72

AQUITAINE COMPANY OF CANADA

## DAILY CONSUMPTION REPORT

| NTITY | DESCRIPTION OF MATERIALS | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|
| | Chemicals Delivered on WODECO II in Store | 6-16-69. | |
| | | | |
| 0. sk | Salt Gel | 3.76c | 225.60 |
| 0. " | Gel | 3.90c | 390.00 |
| 0. " | Salt | 4.08c | 81.60 |
| 0. " | CMC | 48.43c | 2421.50 |
| 2. " | Spersene. | 13.48c. | 566.16 |
| 0. " | Chrome Alum | 62.42c | 1872.60 |
| 4. " | Dowicide | 126.25c/100# | 505.00 |
| 60. " | Caustic. | 8.47c | 508.20 |
| 26. " | Kelzan. | 135.54c | 4879.44 |
| 24 sk | Calcium chloride. | 10.00c | 240.00 |
| 4 sx | HALLIBURTON HR-4 | 30.00c | 120.00 |
| | | | |
| | | | 11,810.10 |
| | 2800 Sk Barite on Board. TO HUDSON BAY OIL + GAS.? | | |
| | 2100 Sk Cement on Board. TO SEA | 3.66c | 7686.00 |
| | CMT. | | |
| | CAN | | 19,496.10 |
| | ~~CAN.~~ | | ~~11,810.10~~ |
| | ~~U.S.~~ = | | ~~11,[illegible]~~ |
| | SEE A.II-1 (A) OF CONTRACT. | | |
| | D.H.C. | | |
| | US | | 18,220.65 |

## WESTERN OFFSHORE DRILLING AND EXPLORATION COMPANY

QUITAINE COMPANY OF CANADA LTD

## DAILY CONSUMPTION REPORT

| ANTITY | DESCRIPTION OF MATERIALS | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|
| | MATERIALS ON BOARD MILLERNTOR | | |
| | AND DAMAGED DURING STORM. | | |
| | TAKEN OFF AND DISPOSED OF AT CHURCHILL. | | |
| 400 SXS. | SALT GEL | 3.76 c | 1504.00 |
| 60 SXS. | KELSAN | 135.54 c | 8132.40 |
| 46 SXS. | SALT | 4.08 c | 187.68 |
| 124 SXS. | MAGCOGEL | 3.90 c | 483.60 |
| 80 SXS. | NUT PLUG | 6.50 c | 520.00 |
| 40 SXS. | SAWDUST | 2.24 c | 89.60 |
| 40 SXS. | CAUSTIC | 8.47 c | 33880 |
| 1800 # | CFR-2 x | 1.10 # US | 1980.00 |
| 10 GAL. | HAI 50 x | 7.00 GAL. US | 70.00 |
| | | | |
| | | | |
| | CAN | | 11,256.08 |
| | | | |
| | = US | | 10,519.70 |
| | | | |
| | X + US | | 2050.00 |
| | | | |
| | US | 9/ | 12,569.70 |
| | THIS MATERIAL WAS BEING | | |
| | TRANSPORTED FROM WODECO II | | |
| | TO CHURCHILL BASE FOR RETURN | | |

ATT. 3

# ATTACHMENT NO. 3

## LETTERS FROM VETCO OFFSHORE INDUSTRIES, INC.

VETCO OFFSHORE INDUSTRIES, INC.

CONFIDENTIAL

October 29, 1969

TO: Aquitaine Company of Canada Ltd.
Attention: Mr. Marcel Labouysse

FROM: Vetco Offshore Industries, Incorporated

SUBJECT: Vetco Sub Sea Equipment (Wellhead and BOP Stack)
Aquitaine Company of Canada,
Well Walrus A-71
Hudson's Bay

REFERENCE:
1. Aquitaine Report - by Pierre Allibaud, ACC, October 16, 1969
2. WODECO Report - by Ken Nickolson, WODECO, October 23, 1969
3. Sequence Drawing 40250 - No. 8

The following report, as requested by Mr. Labouysse on October 29, 1969 represents the opinion of the undersigned (Vetco's representative) as to the most likely status of the wellhead and blowout preventor stack as left on the ocean floor on subject well. Because the evidence provided by reference above is lacking in anything specific with regard to these two particular pieces of equipment, the comments will be in the form of an explanation hoping to clarify what is actually on the ocean floor.

The attached photographs showing the temporary and permanent guide structures with 30" casing extension and the temporary and permanent guide structure plus the 16 3/4" housing with ribbed section demonstrates the method in which (No. 1) the 30" casing has attached to the permanent guide structure, and (No. 2) the manner in which the pile section for the 16 3/4" housing is reinforced to take excessive bending moments at the mud line. This reinforcement is also illustrated on reference 3 of the sequence drawings. It is to be noted that not only does the ribbed portion of the extension on the 16 3/4" housing provide additional rigidity in this location, but also some additional rigidity is provided by the fact that the annuli of all the casing strings-one to the other-are filled with cement. This is shown by morning reports which indicate that good cement returns were received at the ocean floor on all cement jobs. Additional graphical representation of this pile section can be seen on the slide taken by Guy Soulie and is shown on the reference drawing, the blue-section of the 16 3/4" housing is the piece of equipment which not only receives the casing hangers for all subsequent strings, namely, in this particular case, 13 3/8" casing and 9 5/8" casing. Because of the gimballed arrangement of the guide structure with regard to the temporary guide base the rigidity of the 30" and 20" as transferred to the 30" housing provide the necessary bending resistance at the mud line.

The drawing also indicates the exact condition in which the well was left with the 13 3/8" casing hanger set, the seal actuated and pressure test obtained and the 9 5/8" casing hung, cemented and the seal actuated in place, the seal on the 9 5/8" casing in addition to the normal torquing with the running tool was also provided with additional torque by the use of the torque tool. After the use of this tool the seal was tested at approximately 2,500 psi successfully, therefore, it is known that the 9 5/8" casing is in satisfactory condition, both from the standpoint of good cement returns and an adequate, tested seal at the casing hanger. The 16 3/4" x 9 5/8" wear bushing was left in place when the well was suspended.

The sequence drawing shows in green, the hydraulically actuated Vetco connector which is presently in place. This connector provides the pressure integrity by and through the AX ring gasket shown in grey between the stack and the well bore. A detailed drawing of this connector is also attached No. 120048.

An external protective coating on the 16 3/4" wellhead housing above the flange connecting to the 30" housing is a manganese phosphate coating which is applied by immersion of the piece for about thirty minutes. This protective coating has proven to be satisfactory for this type of equipment at other locations and thus, it should provide a satisfactory coating to prevent or inhibit corrosion particularly in 580' of water at extremely low water temperatures. With regard to protective coatings of the BOP stack itself the sample of the zinc coating is left with Mr. Labouysse for reference. In addition, the paint specifications P-3 have been provided showing the amount of zinc coating, the amount of primer and the amount of epoxy actually applied to the particular stack in question. With regard to the rigidity of the system from the wellhead to the top connector on top of the guide posts and the guide funnels provide additional bending resistance over and above that of the stack itself. Lateral support from the stack to the guide post through guide arms is provided at the lower H-4 connector, at the GK Hydril and also on the marine riser mandrel, thus, it would be expected that the stack would remain rigidly in place and that any major deflections or breakage would have occurred above the upper connector.

Attachments to the report include:

2 - 8 x 10" black and white photos of the WODECO 2 Stack as in place.

The aforementioned photos of the temporary and permanent guide structures with 30" extension and 16 3/4" housing.

A 16 3/4" H-4-D connector.

A 16 3/4" x 9 5/8" casing hanger.

A copy of Vetco Paint specifications P-3.

Sample of zinc coating as applied to the BOP stack.

Yours very truly,

H. J. Smith

HJS:jm
Attachs.

# VETCO OFFSHORE INDUSTRIES, INC.

## PAINT SPECIFICATIONS - NO. P3

Adopted: April 1, 1969

Approved: Vetco Management (4-1-69)
JWEH

Revised:

Approved:

Company:

| Item | No. Coats | Description | Thickness in Mils |
|---|---|---|---|
| 1 | - | Sandblast Bright Metal | - |
| 2 | 1 | Zinc Primer | - 3.5 |
| 3 | 1 | Epoxy Primer | - 1.5/2.0 |
| 4 | 1 | Epoxy Finish Coat White | - 5.0 |

369/E199-A

NO. P3

VETCO OFFSHORE INDUSTRIES, INC.

CONFIDENTIAL

October 29, 1969

TO: Aquitaine Company of Canada Ltd.
Attention: Mr. Marcel Labouysse

FROM: Vetco Offshore Industries, Incorporated

SUBJECT: Vetco Sub Sea Equipment (Riser, Flexjoint and Slip Joint)
Aquitaine Company of Canada Ltd.
Well Walrus A-71
Hudson's Bay

REFERENCE:
1. Aquitaine Report - Pierre Allibaud, ACC Ltd. October 16, 1969
2. WODECO Report - by Ken Nickolson, WODECO October 23, 1969

The following report, as requested by Mr. Labouysse on October 29, 1969, represents the opinion of the undersigned (VETCO's representative) as to the most likely status of equipment (VETCO) remaining at the well site based upon evidence provided in reference reports and basic information of Vetco equipment.

It is understood from references 1 and 2 that the vessel moved a considerable distance off the hole to the northeast and at least 100'. With this displacement in 550' ± of vertical column the flex joint was at or near ± its 9° limit of deflection. Because the slip joint was bumping up and down it was probably still attached at wellhead.

After the riser bumped the base of drilling substructure and two Rucker cables broke, then the remaining two cables, due to excessive loads, pulled the damp from slip joint and it disappeared in a lowered position. It is my opinion that due to the considerable horizontal distance and the amount of vertical loads ±, the riser probably failed at the flex joint. If the vessel had been over the hole the probability would have been minimized and the riser itself would take the buckling when it fell.

With the vessel off location, it is likely that the riser fell clear of the BOP stack. If, however, the riser did strike the stack, the guide frame and guide posts provide some external protection.

Attached are drawings of the Multi-ball Flex Joint (25105) and the Slip Joint. Also included is a service manual for WODECO II.

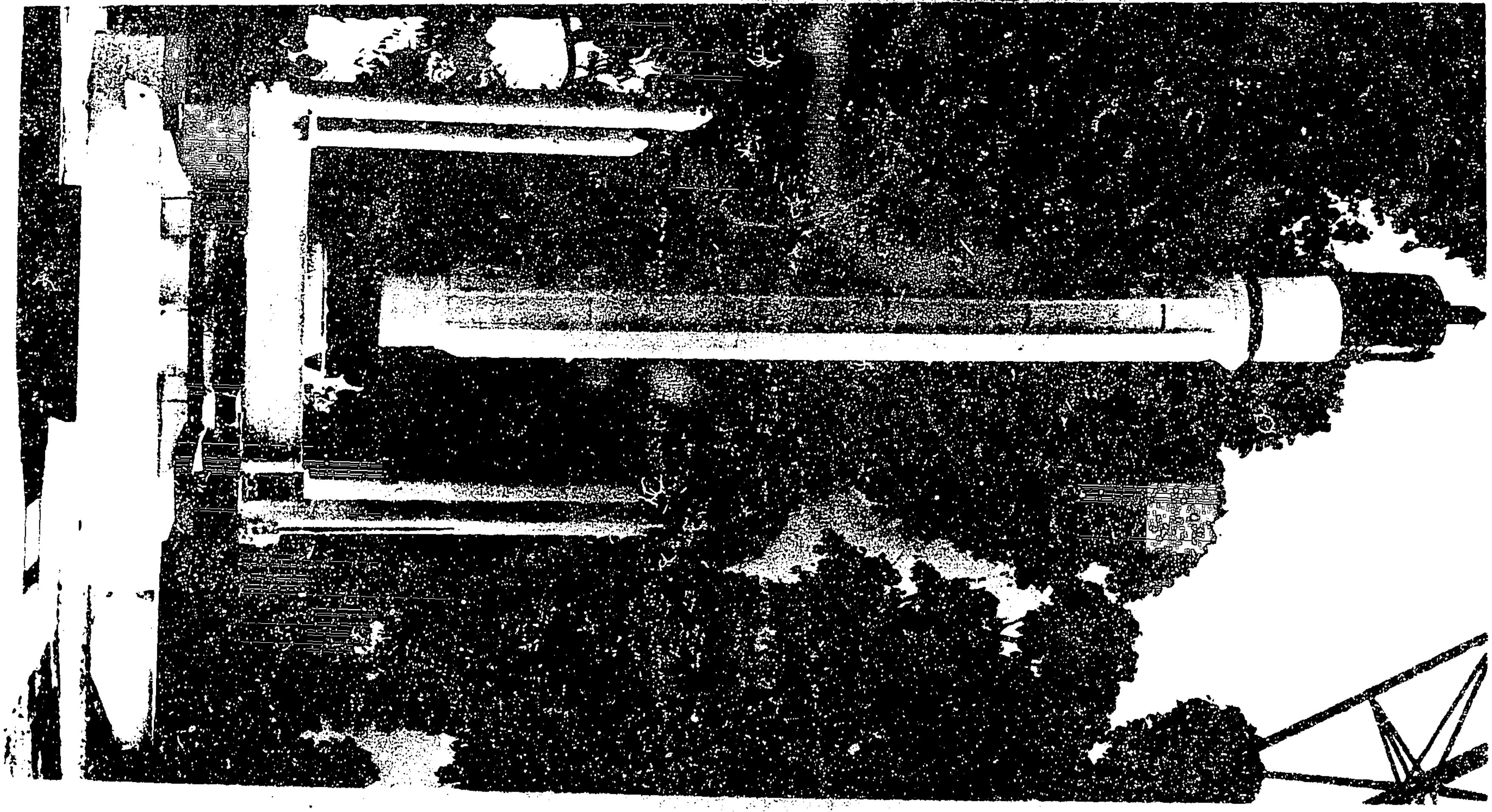
NOTE: The riser in use was a 20" O.D. riser with ½" wall pipe and Vetco Riser Connectors.

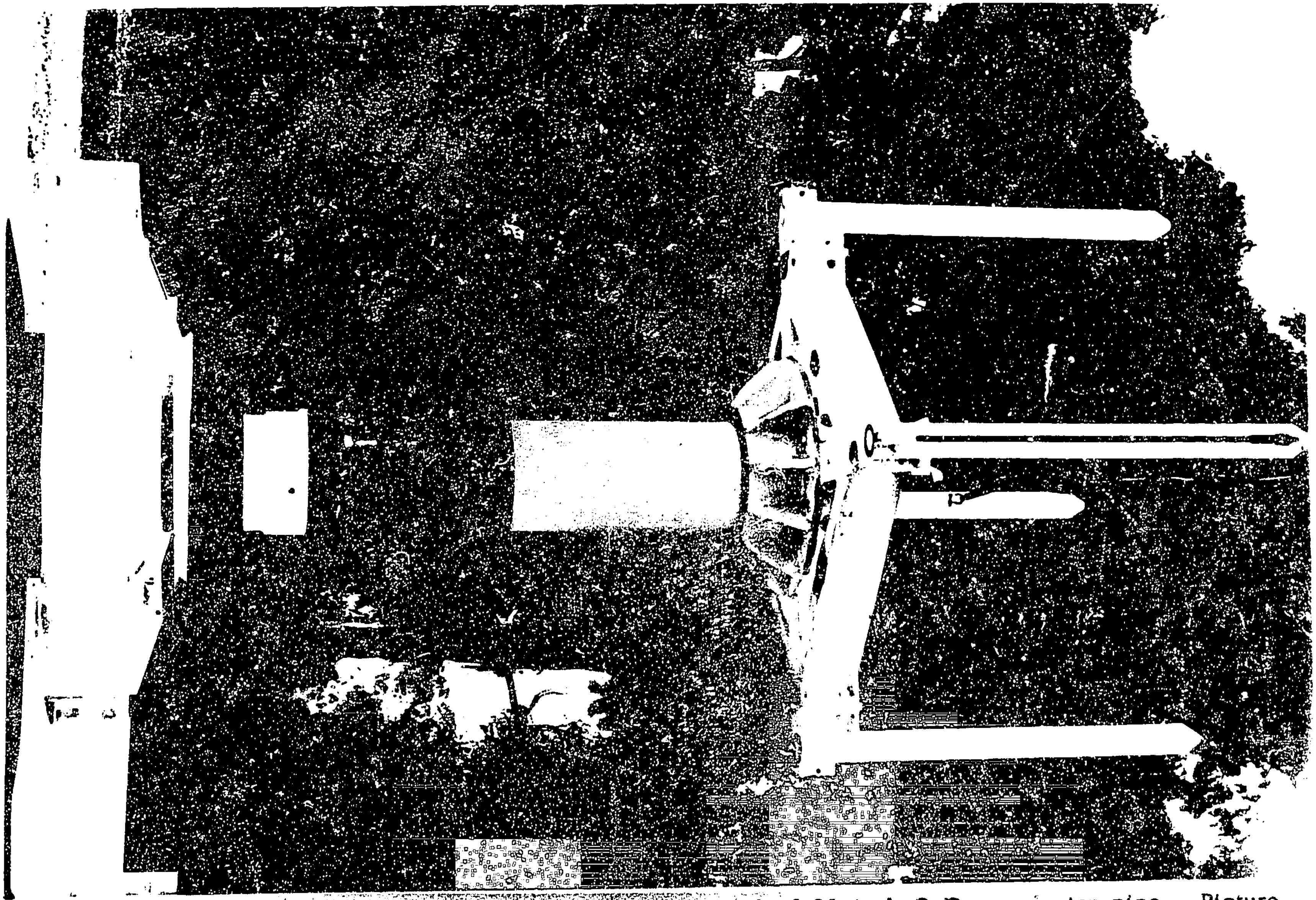
H.J. Smith

Attach.

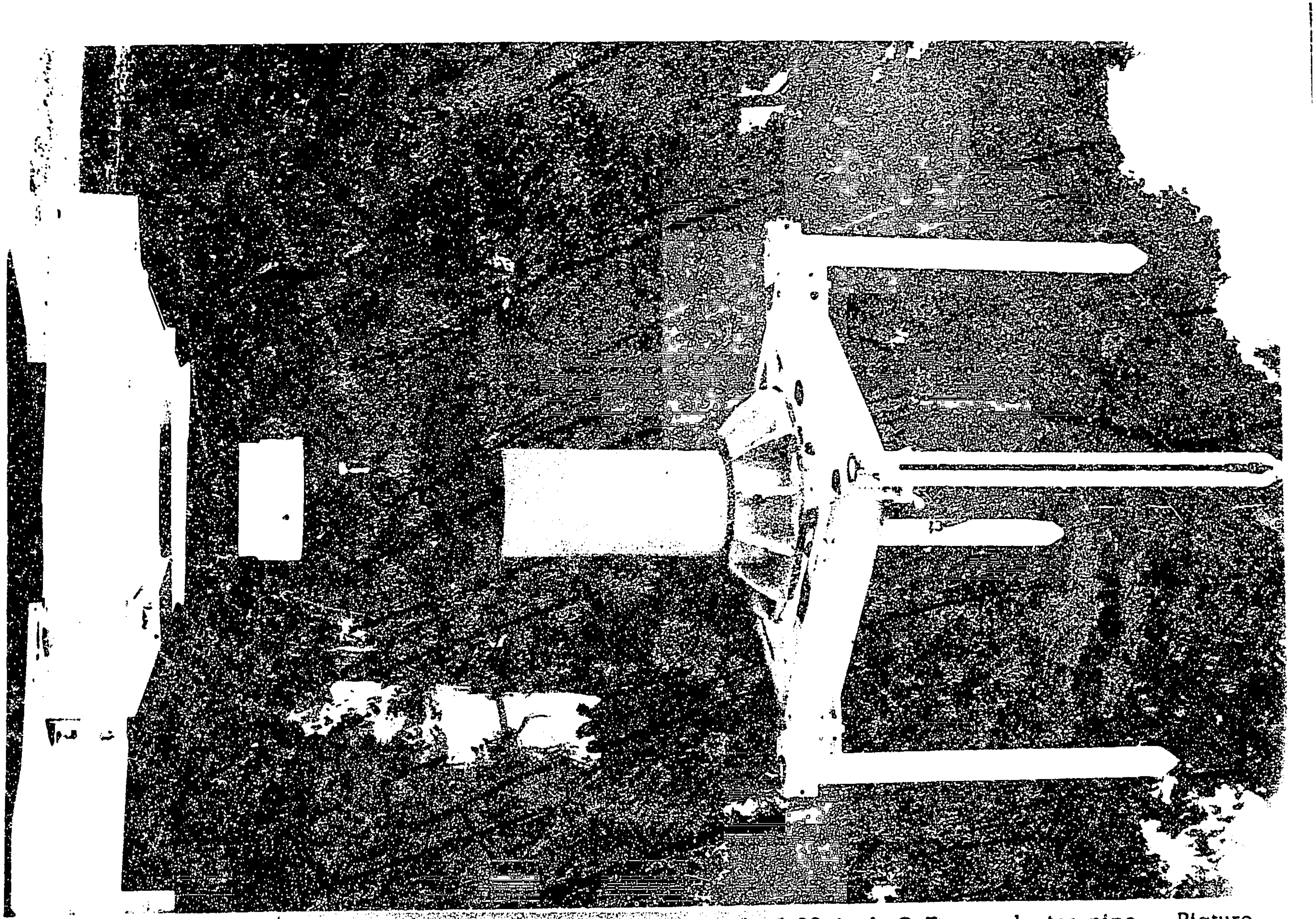
cc: Vetco file

16-3/4" WELLHEAD HOUSING ASSEMBLY: After the 26" hole has been drilled to depth, the 20" casing is run and topped out with a 16-3/4" Wellhead Housing Assembly as shown. The 20" O.D. casing immediately below the 16-3/4" Wellhead Housing is usually of slightly heavier wall thickness pipe and is ribbed on the outside to centralize inside the 30" conductor pipe. This compact assembly offers maximum resistance to bending in the critical area immediately below the mudline. At the lower end of this 20" O.D. ribbed assembly is a 20" squnch joint which allows quick make-up to the 20" casing string and requires no rotation of this long and rather heavy assembly. The 16-3/4" housing is provided with a lock-down ring which engages the 30" Wellhead Housing. This lock-down ring is shown immediately above the 20" O.D. ribbed section.

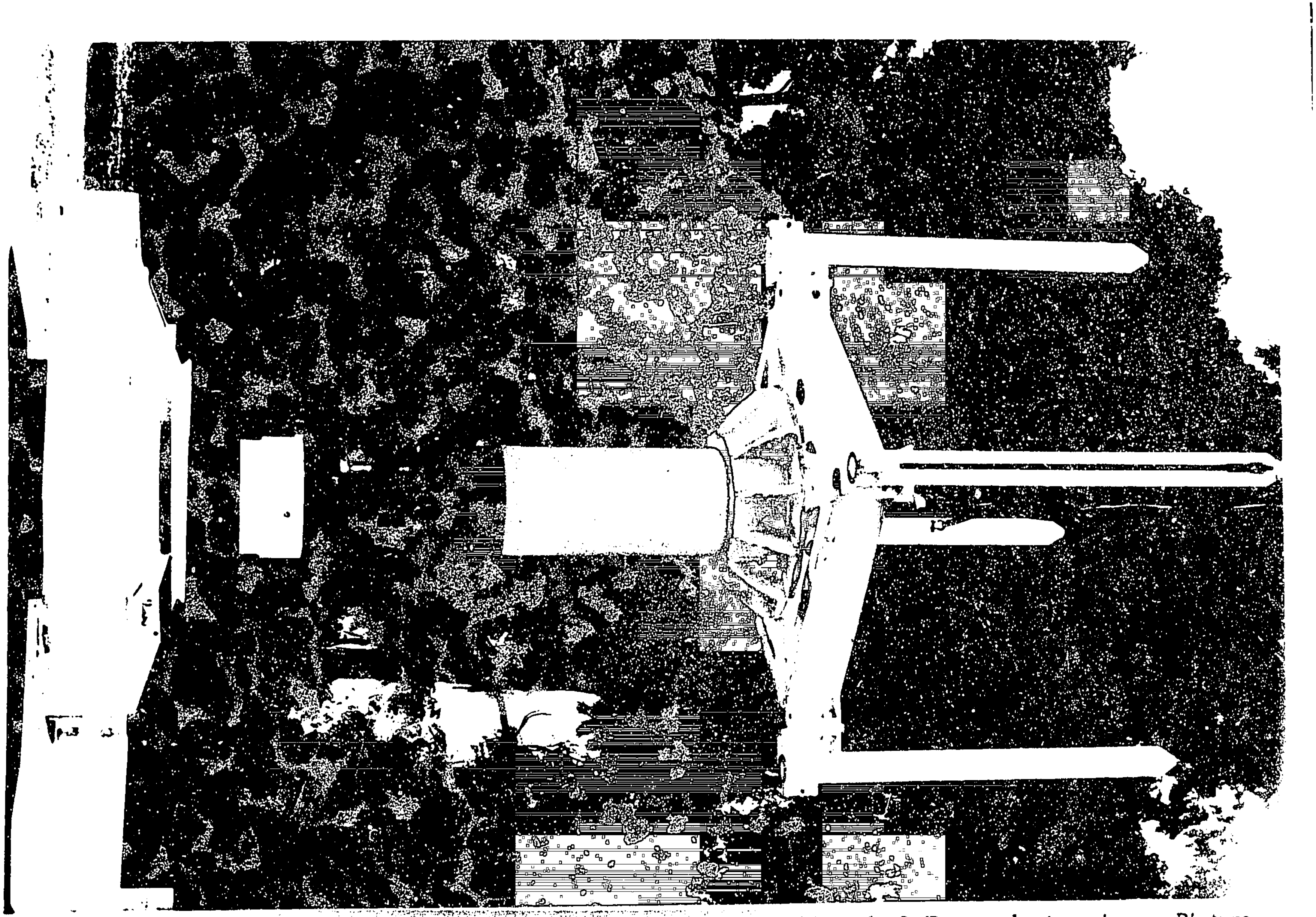




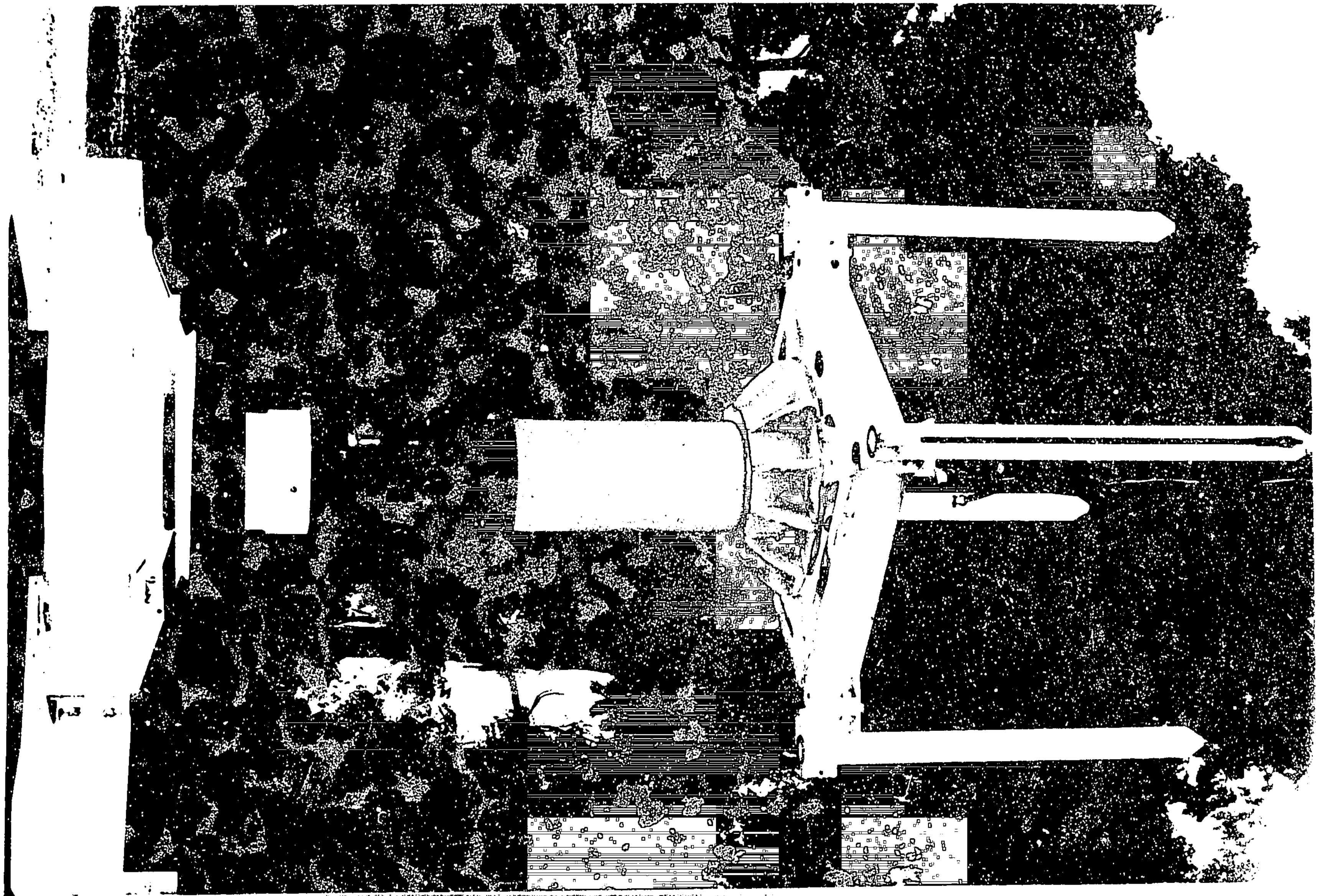
PERMANENT GUIDE STRUCTURE ASSEMBLY: Complete with top end of 30-inch O.D. conductor pipe. Picture simulates Permanent Guide Structure and 30-inch conductor pipe immediately prior to being landed onto Temporary Guide Base Assembly. Guide lines extend from Temporary Guide Base through the Permanent Guide Structure Posts to the drilling rig. The central black section of the 30-inch conductor pipe is a shear joint assembly to assist in retrieving the wellhead equipment during salvage operations.



PERMANENT GUIDE STRUCTURE ASSEMBLY: Complete with top end of 30-inch O.D. conductor pipe. Picture simulates Permanent Guide Structure and 30-inch conductor pipe immediately prior to being landed onto Temporary Guide Base Assembly. Guide lines extend from Temporary Guide Base through the Permanent Guide Structure Posts to the drilling rig. The central black section of the 30-inch conductor pipe is a shear joint assembly to assist in retrieving the wellhead equipment during salvage operations.



PERMANENT GUIDE STRUCTURE ASSEMBLY: Complete with top end of 30-inch O.D. conductor pipe. Picture simulates Permanent Guide Structure and 30-inch conductor pipe immediately prior to being landed onto Temporary Guide Base Assembly. Guide lines extend from Temporary Guide Base through the Permanent Guide Structure Posts to the drilling rig. The central black section of the 30-inch conductor pipe is a shear joint assembly to assist in retrieving the wellhead equipment during salvage operations.



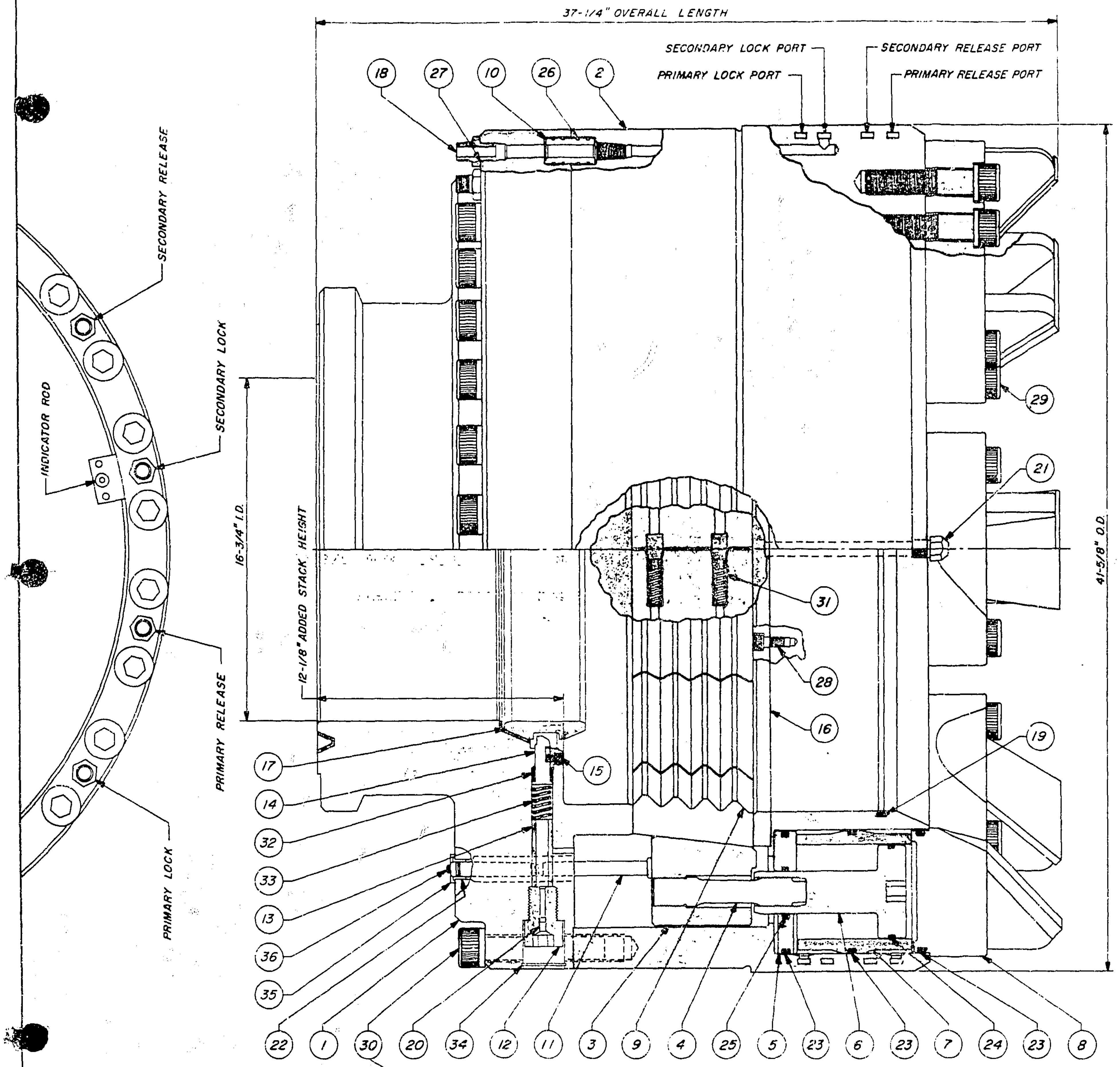
PERMANENT GUIDE STRUCTURE ASSEMBLY: Complete with top end of 30-inch O.D. conductor pipe. Picture simulates Permanent Guide Structure and 30-inch conductor pipe immediately prior to being landed onto Temporary Guide Base Assembly. Guide lines extend from Temporary Guide Base through the Permanent Guide Structure Posts to the drilling rig. The central black section of the 30-inch conductor pipe is a shear joint assembly to assist in retrieving the wellhead equipment during salvage operations.

INDICATOR ROD

# VETCO

16 3/4" 5000 M.S.P. "H-4" CONNECTOR

ASSEMBLY NO. 120048-16 3/4-5



NOTE 1 THESE SCREWS TO BE TIGHTENED TO 1800 FT LB TORQUE

| ITEM | PART NO. | REQ'D | DESCRIPTION |
|---|---|---|---|
| 36 | | 2 | SOCKET HEAD CAP SCREW 1/4"-20 NC x 1/2" LONG |
| 35 | 120311 | 1 | RETAINER PLATE |
| 34 | | 4 | RETAINER RING (SPIROLOX NO RR-200) |
| 33 | | 4 | SPRING (CALIF SPG CO NO 65) |
| 32 | | 4 | SPRING (CALIF SPG CO NO 67) |
| 31 | | 24 | SPRING (CALIF SPG CO NO 51) |
| 30 | | 32 | SOCKET HEAD CAP SCREW 1-1/4"-7 NC x 6" LONG |
| 29 | | 32 | SOCKET HEAD CAP SCREW 1-1/4"-7NC x 4-1/2" LONG |
| 28 | | 8 | SOCKET HEAD CAP SCREW 1/2"-13NC x 1" LONG |
| 27 | | 4 | O-RING (NO 568-116) |
| 26 | | 16 | O-RING (NO 568-024) |
| 25 | | 8 | O-RING (NO 568-330) |
| 24 | | 8 | O-RING (NO 568-347) |
| 23 | | 24 | O-RING (NO 568-432) |
| 22 | 120310 | 1 | BUSHING |
| 21 | | 2 | BUTTON HEAD GREASE FITTING 1/2"-14 N.P.T. |
| 20 | | 4 | 1/8" N.P.T. PIPE PLUG |
| 19 | 110039 | 1 | O-RING .275 X-SEC. x 25-13/16" I D |
| 18 | 120056 | 4 | DOUBLE PIN SUB 7/8"-14 N.F x 1/2" N.P.T. |
| 17 | | 1 | GASKET AX 16-3/4"- 5,000 M S P |
| 16 | 120049 | 1 | WEAR RING |
| 15 | 120263 | 4 | LATCH PIN RETAINING SCREW |
| 14 | 120015 | 4 | LATCH PIN |
| 13 | 120016-3-21/64 | 4 | SPACER RINGS |
| 12 | 120017 | 4 | RING RETAINER SCREW |
| 11 | 120309 | 1 | INDICATOR ROD |
| 10 | 120014 | 4 | SEAL SUBS |
| 9 | 120024-100 | 1 | DOG RING SUBASSEMBLY (INCLUDES 12 DOG SEG- |
| | | | MENTS P/N 120024-1 & 24 TIE PINS P/N 120004 |
| 8 | 120013-1 | 8 | CYLINDER HEAD |
| 7 | 120005 | 8 | CYLINDER LINER |
| 6 | 120007 | 8 | PISTON |
| 5 | 120006 | 8 | CYLINDER END PLATE |
| 4 | 120008 | 4 | CONNECTING ROD |
| 3 | 120023 | 1 | CAM RING |
| 2 | 120027 | 1 | STYLE "D" LOWER BODY ONLY |
| 1 | 120119 | 1 | UPPER BODY-16-3/4" C I W HUB FOR NO 673719-1 |
| | | | CLAMP & NO BX-161 GASKET (5,000 M.S.P.) |
| 1 | 120108 | 1 | UPPER BODY-16-3/4" C I W HUB FOR NO 673719-1 |
| | | | CLAMP & 16-3/4"-5,000 AX GASKET |

## PARTS LIST

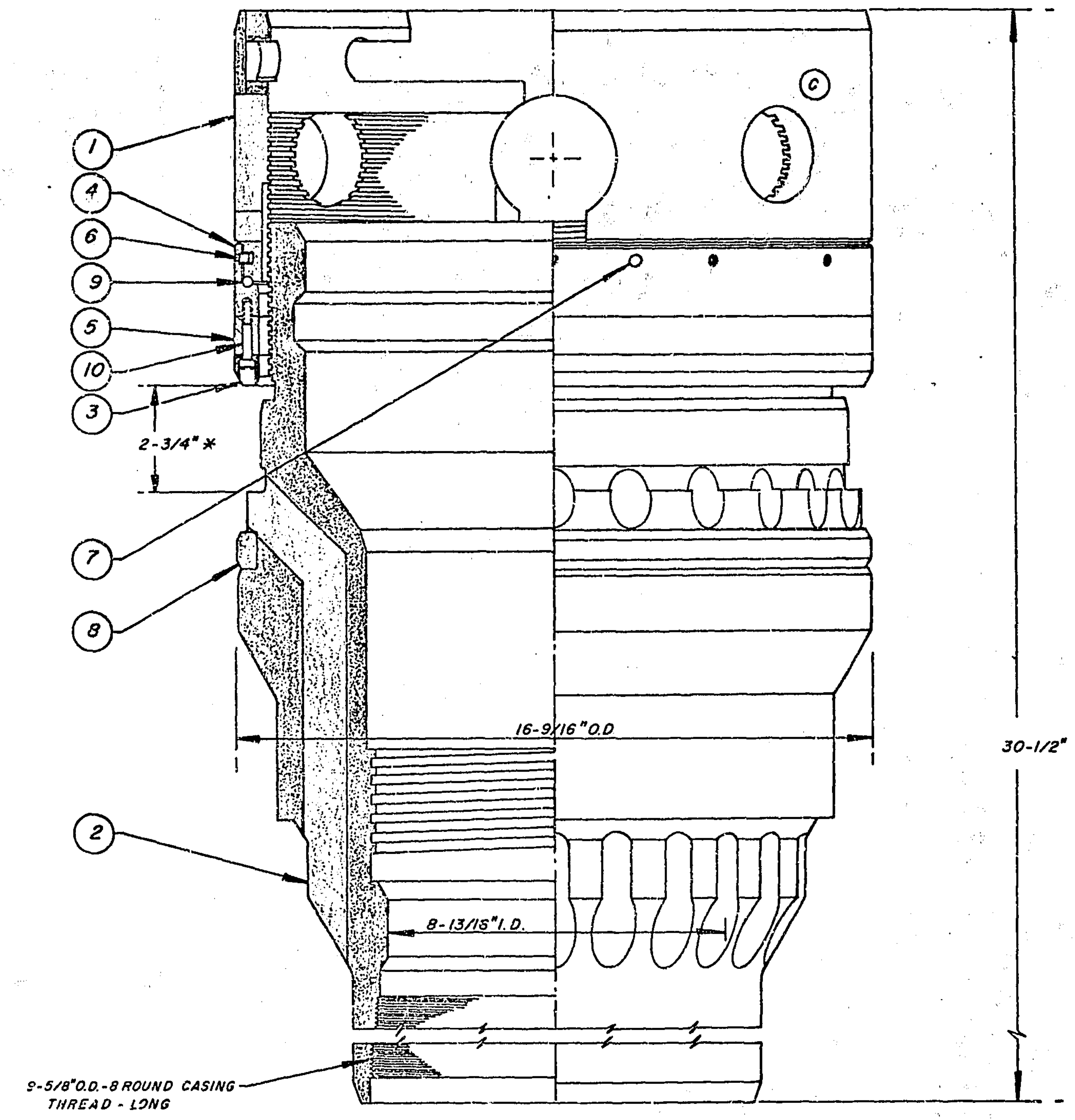
(G) REDRAWN

CHECKED BY QJ
DRAWN BY D H G
DATE 1-16-69
SCALE 3/16" = 1"

**VENTURA TOOL COMPANY**
VENTURA CALIFORNIA

SUBSEA DRILLING EQUIPMENT
ASSEMBLY - STYLE D HYD SECTION
C/W 16 3/4-5000 M S P CLAMP TYPE HUB

SHEET 1 OF 1
DRAWING NO 12004[illegible]-16 3/4-5
REV G



ASSEMBLY NO. 110170

* NOTE

THIS DIMENSION TO BE SET AT TIME OF FINAL INSPECTION & ASSEMBLY ON RUNNING TOOL

| ITEM NO. | PART NO. | NO. REQ'D. | DESCRIPTION |
|---|---|---|---|
| 10 | | 24 | SOCKET HEAD CAP SCREW 1/4-20 N.C. x 1-1/2" LG. |
| 9 | | 202 | STEEL BALL .250 DIA. GRADE 25 |
| 8 | 110617 | 1 | ANTI-LOCK DOWN RING |
| 7 | 110166-7 | 1 | STOPPER .250 DIA. x 3/32" THICK |
| 6 | 110166-6 | 1 | SNAP RING |
| 5 | 110166-4 | 1 | PACKING |
| 4 | 110166-3 | 1 | UPPER PACKING RING |
| 3 | 110166-5 | 1 | LOWER PACKING RING |
| 2 | 110170-2 | 1 | BODY |
| 1 | 110166-100 | 1 | PACKING NUT SUBASSEMBLY |

PARTS LIST

| | | | |
|---|---|---|---|
| REV. A. | REV. C. 10-8-69 FLOW-BY HOLES ADDED AJ CAL | REV. E. | REV. G. |
| REV. B. REDRAWN 5-9-69 E.J.B. | REV. D. | REV. F. | REV. H. |

| | |
|---|---|
| DRAWN BY E.J.BRYAN | DATE 5-9-69 |
| CHECKED BY JRH | DATE 5-15-69 |
| APPROVED BY | DATE |
| APPROVED BY HYNES | DATE 5-21-69 |

**VETCO OFFSHORE INDUSTRIES**
VENTURA CALIFORNIA

SUBSEA WELLHEAD EQUIPMENT
ASSY.-CASING HANGER 16-3/4" x 9-5/8"
MODEL 1 THR'D 9-5/8" OD. 8RD. CASING-LONG

SCALE - 1/4
PART NO. 110170
SHEET NO. 1 OF 3
DRAWING NO. C-110170
REV. C

21

## VETCO

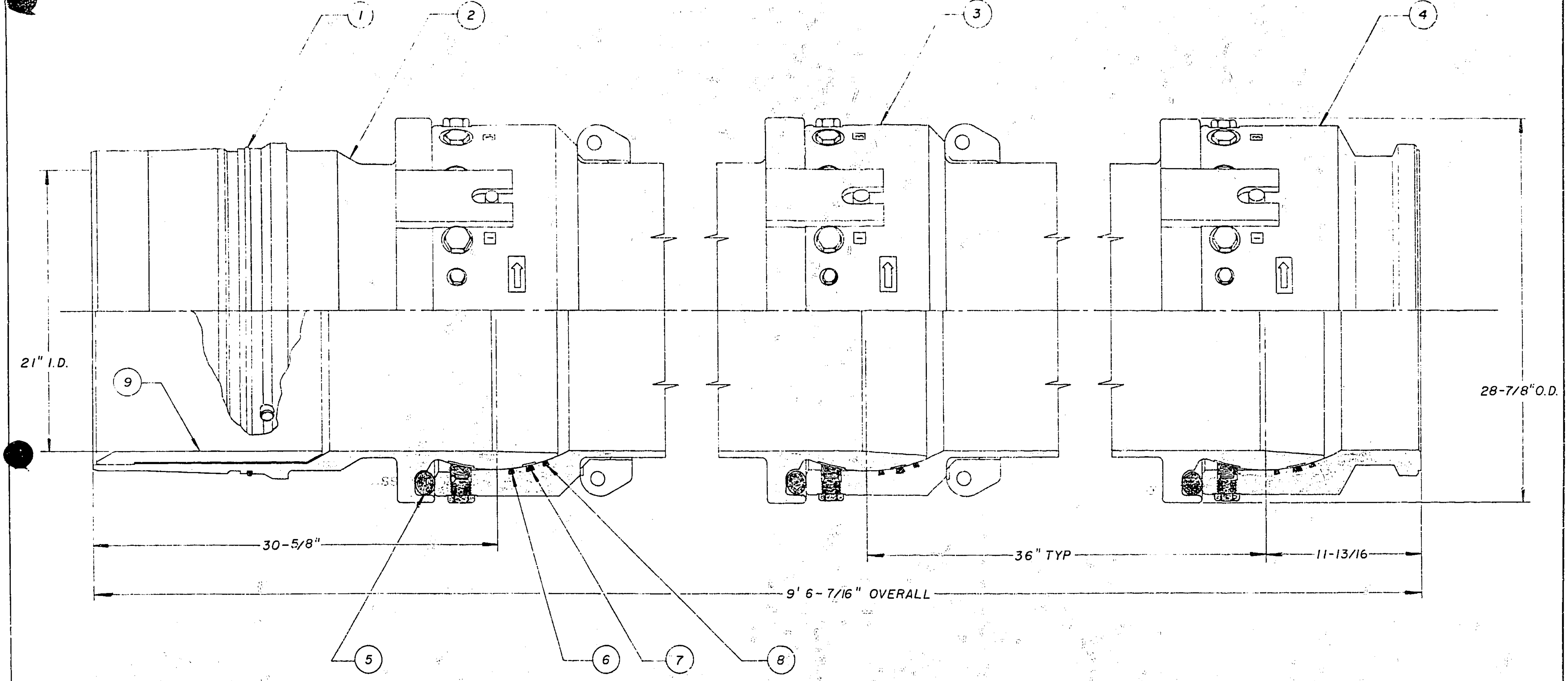
## MULTI-BALL FLEX JOINT

## ASSEMBLY NO. 25105

# VETCO

## MULTI-BALL FLEX JOINT

ASSEMBLY NO. 25105



| | | | |
|---|---|---|---|
| 9 | 25104-2 | 1 | WEAR BUSHING |
| 8 | 23116-2 | 3 | SMALL WIPER RING |
| 7 | 96255-1 | 3 | SEAL RING |
| 6 | 23116-3 | 3 | LARGE WIPER RING |
| 5 | 96255-2 | 3 | STABILIZER RUBBER |
| 4 | 25058 | 1 | LOWER SECTION |
| 3 | 25088 | 2 | 22" INTERMEDIATE SECTION |
| 2 | 25104 | 1 | UPPER SECTION - TYPE F PIN |
| 1 | 23101-3 | 1 | SECONDARY O-RING |
| ITEM | PART NO | REQD | DESCRIPTION |

PARTS LIST

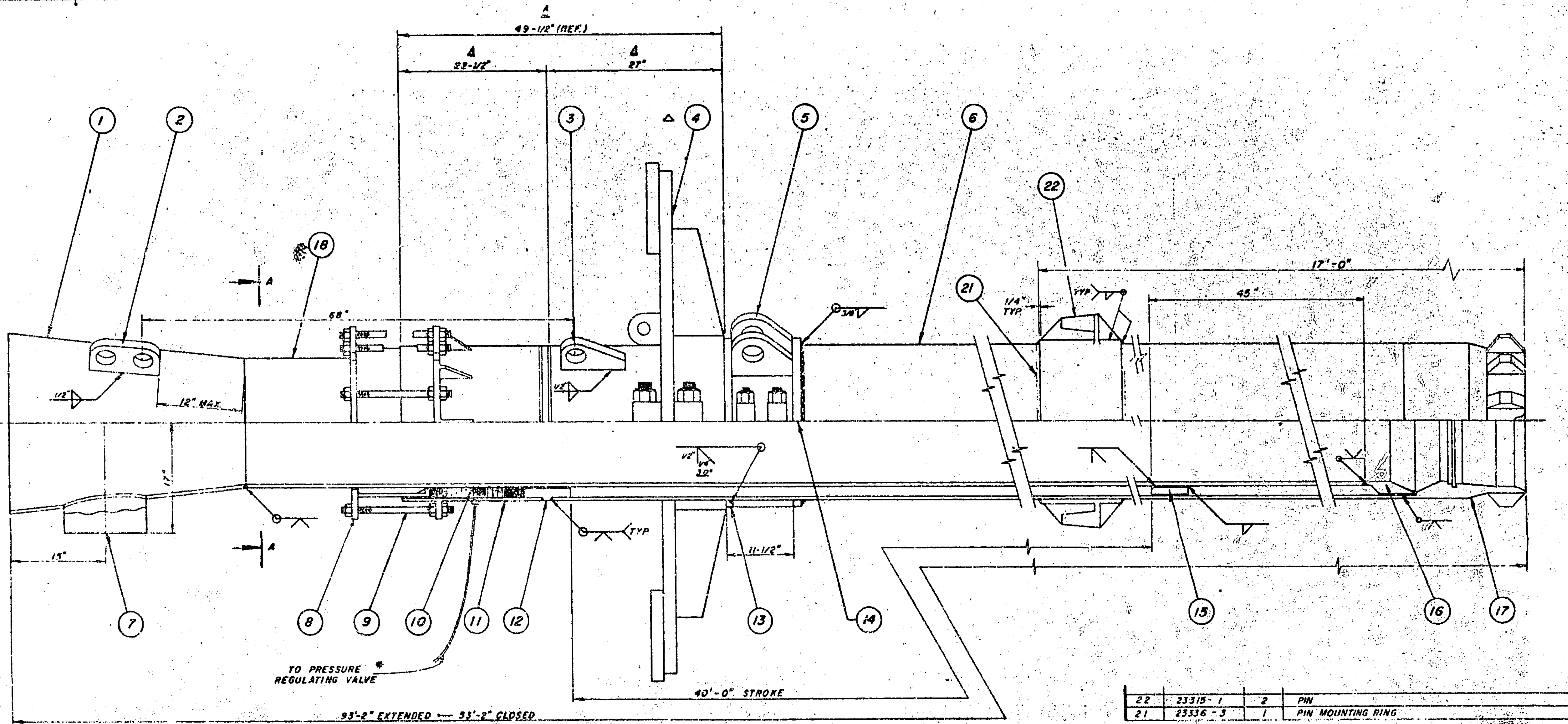
A C E G
B D F H

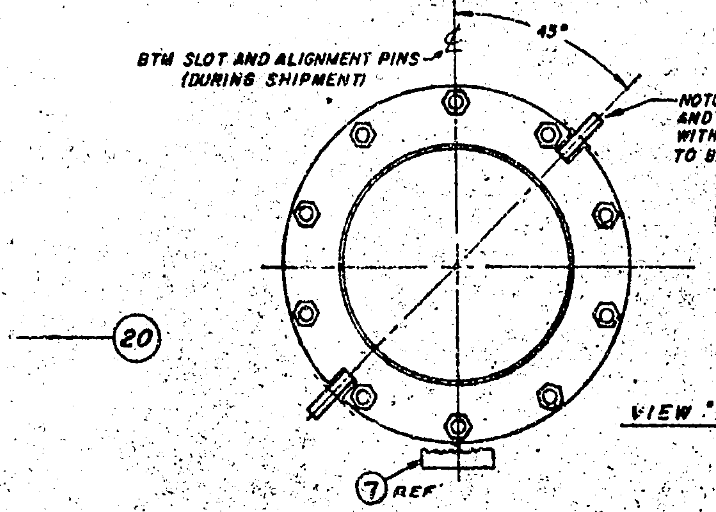
CHECKED BY 4GW DRAWN BY R A B
DATE 26 NOV 68 SCALE 1:4

VENTURA TOOL COMPANY
VENTURA CALIFORNIA
VETCO FLEX JOINTS
ASSEMBLY 22" TYPE F MULTI-BALL
24" BTL PIN TOP C/W WEAR BUSHING
BOTTOM NC 16 C/W MALE SEAL HUB

SHEET 1 OF 1
DRAWING NO D-25105

# VETCO SLIP JOINTS





NOTCHES IN PACKING GLAND (ITEM 8) AND PACKING BOX (ITEM 11) ALONG WITH LIFTING EYES (ITEMS 2 & 3) TO BE POSITIONED AS SHOWN.

VIEW "A-A"

△ SHOWN FOR REFERENCE ONLY

* USED ONLY WITH RUBBER BLADDER TYPE SEAL.

| | | | |
|---|---|---|---|
| 22 | 23315-1 | 2 | PIN |
| 21 | 23336-3 | 1 | PIN MOUNTING RING |

PARTS LIST

| ITEM | PART Nº | REQ'D | DESCRIPTION |
|---|---|---|---|
| 1 | 24069-14 | 1 | BELL NIPPLE |
| 2 | 24069-2 | 2 | LIFTING EYE |
| 3 | 24062-6 | 2 | LIFTING EYE |
| △ 4 | 24070 | 1 | CHOKE & KILL LINE SUPPORT YOKE ASSEMBLY |
| 5 | 24053 | 1 | RUCKER TENSIONING SYSTEM ASSEMBLY |
| 6 | 24069-3 | 1 | OUTER BARREL 24" OD. x .500" WALL - 44'-6" LONG |
| 7 | 24069-15 | 1 | 12" NIPPLE (W/GROOVE FOR VICTAULIC COUPLING) |
| 8 | 24069-100 | 1 | PACKING GLAND |
| 9 | - | 10 | 1" THD ROD 21" LG. (W/ 2-1"-8 HEX & 1-1"-8 SELF-LOCK NUTS |
| 10 | | AS SPEC | PACKING |
| 11 | 24069-101 | 1 | PACKING BOX |
| 12 | 24069-6 | 1 | UPPER STOP RING, OUTER BARREL |
| 13 | 24069-7 | 1 | UPPER LIFT RING |
| 14 | 24069-8 | 1 | LOWER LIFT RING |
| 15 | 24069-9 | 1 | UPPER STOP RING INNER BARREL |
| 16 | 24069-10 | 1 | LOWER STOP RING INNER BARREL |
| 17 | 24069-11 | 1 | 20" VETCO TYPE "BT-M" BOX - BW 24" OD x .500" WALL |
| 18 | 24069-12 | 1 | INNER BARREL 20" OD x .594" WALL 48 FT. LONG |
| 19 | 24069-13 | 2 | TIE BAR ASSEMBLY |
| 20 | 7624-28-G | 2 | SETS TYPE "T" SAFETY CLAMPS |

| | |
|---|---|
| D | ADDED ITEM 21 & 22, ADDED DIM. 17'-0" |
| C | ADDED VIEW AA 6-23-68 |
| A | Added dimension locating Upper Lift Ring 5-5-67 |
| B | Revised Packing Gland & Low Stop Ring 1-25-68 |

CHECKED BY JRL/HYNES
DRAWN BY S.E.A.
DATE 4-13-67
SCALE 1/8" = 1"
MAT. ______
H.T. ______
UNLESS OTHERWISE SPECIFIED 2 PLACE ± .010 3 PLACE ± .005
FRACT. ± 1/64 ANGLE ± 0° 30'

**VENTURA TOOL COMPANY**
VENTURA CALIFORNIA

VETCO SLIP JOINTS
20" x 40' STROKE - 20" VETCO BTM BOX BOTTOM
C/W ADAPTER RING FOR
RUCKER SYSTEM

SHEET 1 OF 12
DRAWING No. D-24069
REV. D

ATT. 4

## ATTACHMENT NO. 4

LETTER FROM DRESSER MAGCOBAR CANADA

Dresser Magcobar CANADA

DRILLING MUD REPORT

DIVISION OF DRESSER INDUSTRIES, INC.

CHECK No. 52

CALGARY, ALBERTA

DATE OCT 14 1969

Well Name & Number AQUITAINE ET AL HUDSON
Legal Description W6 R25 2-31
Company AQUITAINE OF CANADA
Contractor WORECO RIG # 11
Report for Mr. ROBERT SALES
Report for Mr. RAY MOORE
Address LOCATION
Address LOCATION

Sample from: Pit ☐ Flowline ☑

| | |
|---|---|
| Time Sample Taken | 10 P.M. |
| Mud Temperature °F. | 52 |
| Weight - Suction | 1.72 |
| Weight (lb./gal.) Flowline | 1.72 |
| Funnel Viscosity (secs.) | 65 |
| Fann Viscosity (cps.) | 45.5 |
| Plastic Viscosity (cps.) | 37 |
| Yield Point (lb./100 sq. ft.) | 17 |
| Gel-Initial (lb./100 sq. ft.) | 3 |
| Gel-10 min. (lb./100 sq. ft.) | 10 |
| pH: Bechman ☑ Strip ☐ | 8.7 |
| Water Loss (c.c. in 30 mins.) | 26 |
| Cake Thickness (32nds) | 3 |
| Sand Content (% by Vol.) | 3 |
| Oil Content (% by Vol.) | Nil |
| Water Content (% by Vol.) | 74 |
| Solids Content (% by Vol.) | 26 |
| Methyl Blue (lbs./bbl.) | 6 |
| Pf ........Pm | .2 |
| Preservative Content (lb./bbl.) | 300 PPM |
| Chloride p.p.m. ☐ Salt ☑ p.p.m. | 315,00 |
| Calcium ☑ p.p.m. ☐ Sulphate ☐ | 120,00 |

| Mud Contains | | Daily Treatment |
|---|---|---|
| ☐ Magcobar | sx | |
| ☐ Magcogel | sx | |
| ☐ Caustic | lb. | |
| ☐ Cromex | lb. | |
| ☐ Spersene | lb. | |
| ☐ XP-20 | lb. | |
| ☐ Tannathin | lb. | |
| ☐ Oil | bbl. | |
| ☐ Driscose | lb. | |
| ☐ Rapidril | lb. | |
| ☐ My-lo-jel | lb. | |
| ☐ Preservative | lb. | |
| ☐ | | |

K.B. Elev. ........ Spud Date AUG 7, 1969
Last Casing ........ in. @ ........ ft.
Bit Size ........ in. Present depth 5926 ft.
Mud in hole ........ bbls. Mud in pits ........ bbls.
Total Mud in System ........ bbls.
Pump size ........ x ........ in. Strokes/min. ........
Bbls./stroke ........ Output ........ bbls./min.
Mud Cycle ........ min.
Circulating pressure ........ p.s.i.
Annular Velocity ........ ft./min.
Annular Velocity Drill Collars ........ ft./min.
Hydrostatic pressure of mud column ........ p.s.i.
Lost circulation @ ........ ft. ........
Anhydrite @ ........ ft. Salt @ ........ ft.

REMARKS—(Give operation and nature of any problems)

CASING

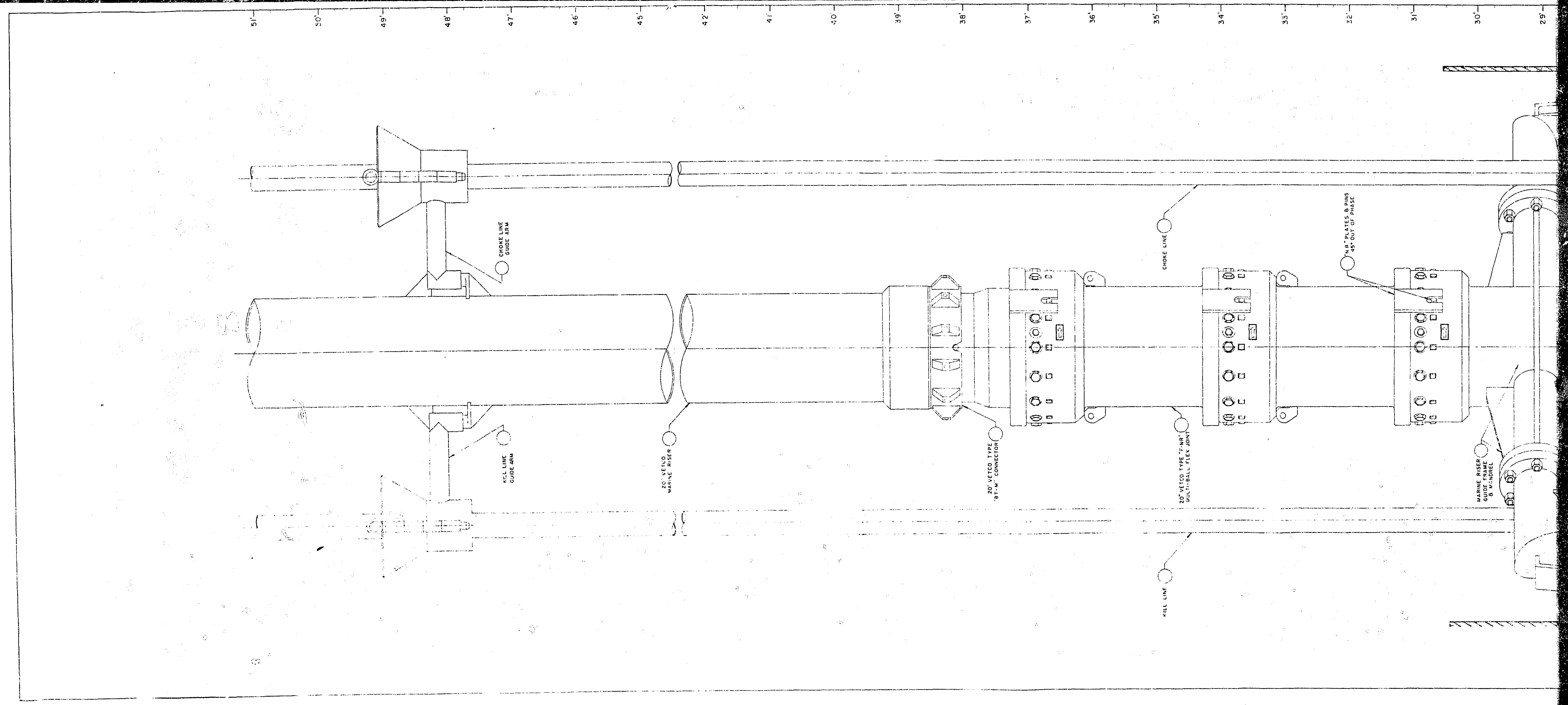
SUGGESTIONS — To be followed only if the operator deems advisable

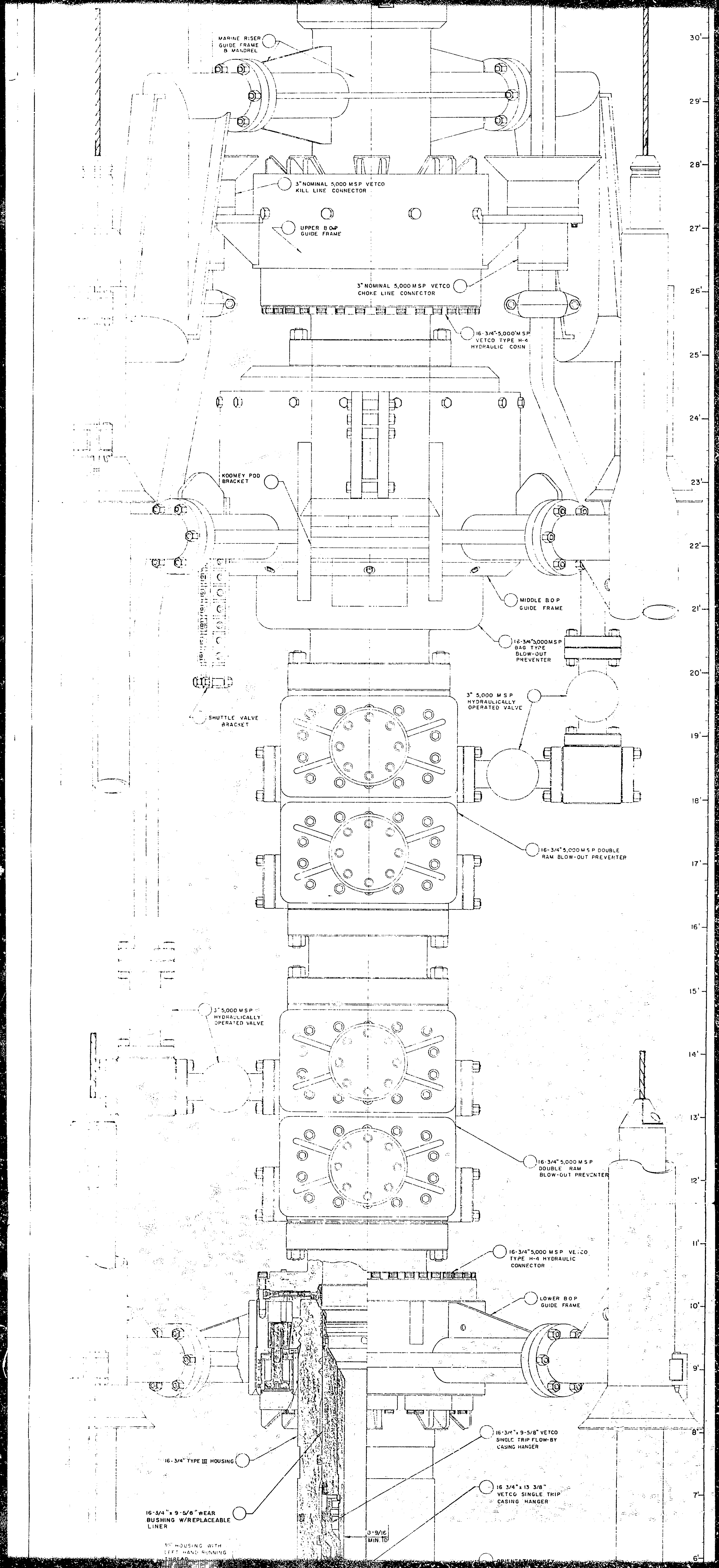
RAISE WT OF SYSTEM TO 1.74 - 1.75 SP. GR. WHEN BACK ON BOTTOM.
MAINTAIN SAME TO END OF B.T. (APPROX. 350 Sx MAGCOBAR NEEDED).

MIX 50 BBL PILL AND STRING IN AT FLOWLINE

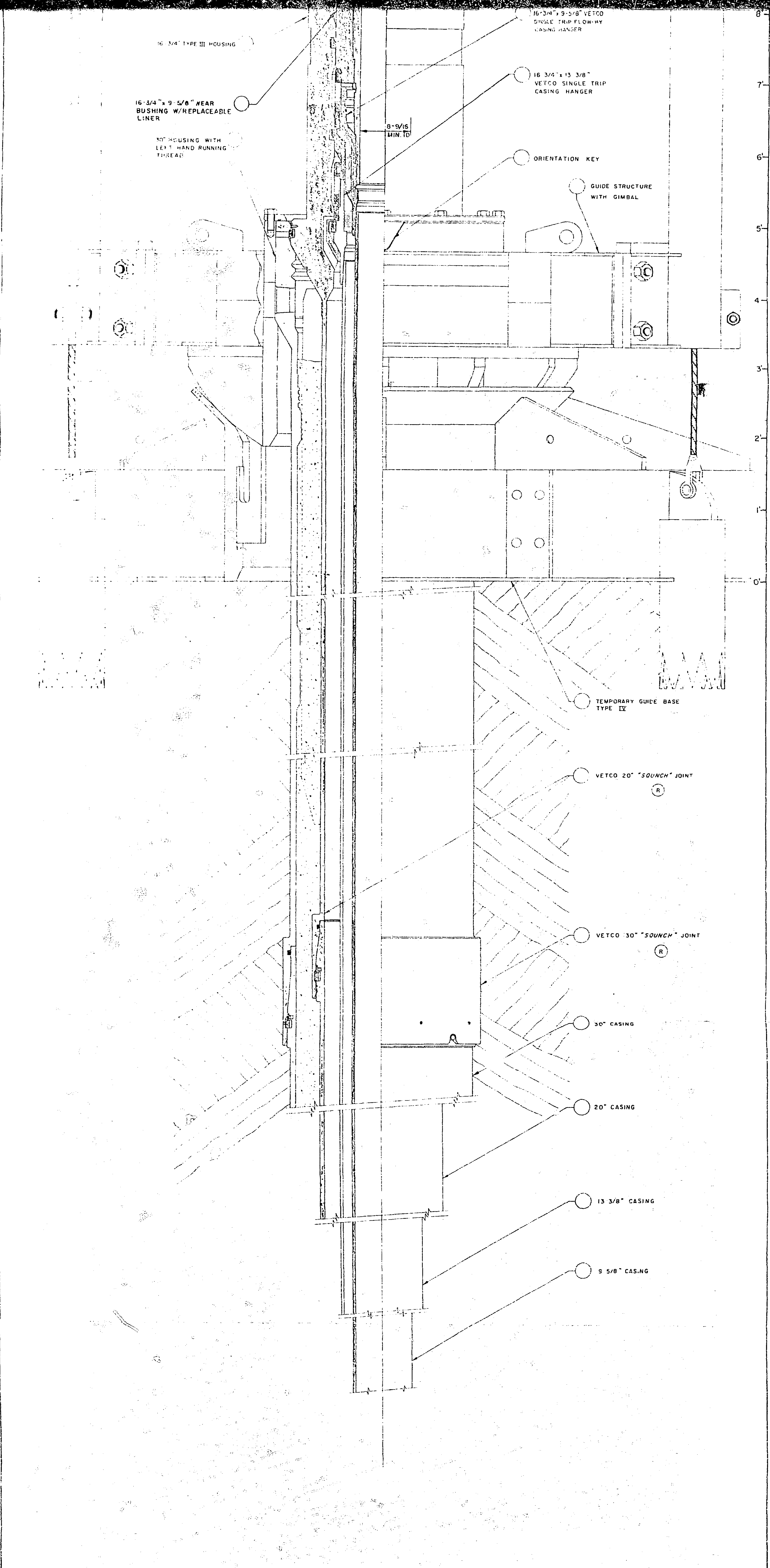
DRESSER MAGCOBAR WAREHOUSE
ADDRESS
PHONE

DRESSER MAGCOBAR ENGINEER
ADDRESS
PHONE
MOBILE


51'
50'
49'
48'
47'
46'
45'
42'
41'
40'
39'
38'
37'
36'
35'
34'
33'
32'
31'
30'
29'
CHOKE LINE GUIDE ARM
KILL LINE GUIDE ARM
20" VETCO MARINE RISER
20" VETCO TYPE "BT-M" CONNECTOR
20" VETCO TYPE "F-NR" MULTI-BALL FLEX JOINT
CHOKE LINE
KILL LINE
"NR" PLATES & PINS 45° OUT OF PHASE
MARINE RISER GUIDE FRAME & MANDREL


MARINE RISER GUIDE FRAME & MANDREL
3" NOMINAL 5,000 M S P VETCO KILL LINE CONNECTOR
UPPER B O P GUIDE FRAME
3" NOMINAL 5,000 M S P VETCO CHOKE LINE CONNECTOR
16-3/4"-5,000 M S P VETCO TYPE H-4 HYDRAULIC CONN
KOOMEY POD BRACKET
MIDDLE B O P GUIDE FRAME
16-3/4" 5,000 M S P BAG TYPE BLOW-OUT PREVENTER
3" 5,000 M S P HYDRAULICALLY OPERATED VALVE
SHUTTLE VALVE BRACKET
16-3/4" 5,000 M S P DOUBLE RAM BLOW-OUT PREVENTER
3" 5,000 M S P HYDRAULICALLY OPERATED VALVE
16-3/4" 5,000 M S P DOUBLE RAM BLOW-OUT PREVENTER
16-3/4" 5,000 M S P VETCO TYPE H-4 HYDRAULIC CONNECTOR
LOWER B O P GUIDE FRAME
16-3/4" TYPE III HOUSING
16-3/4" x 9-5/8" VETCO SINGLE TRIP FLOW-BY CASING HANGER
16 3/4" x 13 3/8" VETCO SINGLE TRIP CASING HANGER
16-3/4" x 9-5/8" WEAR BUSHING W/REPLACEABLE LINER
8-9/16 MIN. ID
30" HOUSING WITH LEFT HAND RUNNING THREAD
30'
29'
28'
27'
26'
25'
24'
23'
22'
21'
20'
19'
18'
17'
16'
15'
14'
13'
12'
11'
10'
9'
8'
7'
6'

2 of



| | | | | | |
|---|---|---|---|---|---|
| C | | | CHK'D. HYNES | VETCO OFFSHORE INDUSTRIES, INC.<br>VENTURA, CALIFORNIA | |
| B | | | DRW'N L.A.M. | - VETCO SUB SEA COMPLETION TYPE XIII<br>30", 16-3/4" (20" CASING), 13-3/8, 9-5/8" & 7" PROG<br>LANDING 9-5/8" CASING | |
| A | 2-5-69 | | DATE 4-29-68 | | DRAWING Nº E-40250-8 |
| REVISIONS | | | SCALE 1" = 1' | | REV. A |

# CORE LABORATORIES – CANADA, LTD.

CALGARY ALBERTA

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.
**WELL** AQUITAINE ET AL HUDSON WALRUS A-71
**FIELD** WILDCAT-HUDSON BAY
**LOCATION** LSD. 58° 30' 02" N.L.
87° 10' 50" W.L.

**FORMATION**
**DRILLING FLUID** WATER BASE MUD
**ELEVATION**
**ANALYSIS** FULL DIAMETER
**REMARKS**

**PAGE** 1 of 7
**FILE** CNP-4-4855
**DATE REPORT** DEC. 4, 1969
**ANALYSTS** RM MH BK

AST – APPEARS SIMILAR TO
¢ – BROKEN CORE (K90 USED FOR SUMMARY PURPOSES)
N.A. – PERMEABILITY > 20000 MD
– – PERMEABILITY <
FS – FINE SAND
MS – MEDIUM SAND
CS – COARSE SAND
CONG – CONGLOMERATE
DOL – DOLOMITE
SH – SHALE
LMY – LIMY
SHY – SHALY
/BK – BREAK
BIT – PYROBITUMEN
CARB – CARBONACEOUS
A – ANHYDRITE
FOSS – FOSSILIFEROUS
XLN – CRYSTALLINE
LAM – LAMINATIONS
V – VUGULAR
LV – LARGE VUGS
SV – SMALL VUGS
PPV – PIN POINT VUGS
I – INTERGRANULAR
STY – STYLOLITIC
HF – HORIZONTAL FRACTURE
VF – VERTICAL FRACTURE
SS – SMALL PLUG SAMPLE
SLI – SLIGHTLY
V/ – VERY
W/ – WITH

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | PERMEABILITY TO AIR, MILLIDARCYS | | | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | DENSITY, gm./cc. | | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | KMAX | K90° | KV | | | | BULK | GRAIN | OIL | TOTAL WATER | |
| CORE NO. 1 1432.0' - 1446.8' (REC. 14.8') (6 BOXES) | | | | | | | | | | | | | |
| 1 | 1432.0-32.5 | 0.5 | 0.58 | 0.47 | -0.01 | 0.29 | 4.7 | 2.35 | 2.53 | 2.66 | 0.0 | 61.6 | I SANDY |
| 2 | 1432.5-33.7 | 1.2 | 3.06 | 2.96 | 0.42 | 3.67 | 11.0 | 13.20 | 2.39 | 2.68 | 0.0 | 61.3 | I SANDY |
| 3 | 1433.7-34.5 | 0.8 | 0.50 | 0.47 | -0.01 | 0.40 | 9.1 | 7.28 | 2.46 | 2.70 | 0.0 | 71.2 | I SANDY |
| 4 | 1434.5-35.5 | 1.0 | 0.41 | 0.37 | -0.01 | 0.41 | 9.1 | 9.10 | 2.46 | 2.70 | 0.0 | 79.5 | I PPV SANDY |
| 5 | 1435.5-36.8 | 1.3 | 4.62 | 4.15 | 0.61 | 6.01 | 10.5 | 13.65 | 2.39 | 2.67 | 0.0 | 65.9 | I SANDY |
| 6 | 1436.8-38.1 | 1.3 | 6.54 | 6.39 | 1.76 | 8.50 | 11.9 | 15.47 | 2.37 | 2.69 | 0.0 | 53.7 | I SANDY |
| 7 | 1438.1-39.3 | 1.2 | 8.09 | 7.07 | 1.10 | 9.71 | 12.7 | 15.24 | 2.35 | 2.69 | 0.0 | 72.7 | I PPV SANDY |
| 8 | 1439.3-40.4 | 1.1 | 2.18 | 1.75 | 0.22 | 2.40 | 8.0 | 8.80 | 2.40 | 2.60 | 0.0 | 74.8 | I SANDY |
| 9 | 1440.4-41.3 | 0.9 | 0.76 | 0.73 | -0.01 | 0.68 | 6.8 | 6.12 | 2.42 | 2.60 | 0.0 | 76.9 | I SV SANDY |
| 10 | 1441.3-42.3 | 1.0 | 3.72 | 3.64 | 0.93 | 3.72 | 13.3 | 13.30 | 2.32 | 2.68 | 0.0 | 72.6 | I SV SANDY |
| 11 | 1442.3-43.3 | 1.0 | 0.11 | 0.05 | -0.1 | 0.11 | 6.1 | 6.10 | 2.40 | 2.55 | 0.0 | 75.0 | I SANDY |
| 12 | 1443.3-44.3 | 1.0 | 2.47 | 2.22 | 0.97 | 2.47 | 13.8 | 13.80 | 2.27 | 2.63 | 0.0 | 78.5 | I SV SANDY |
| 13 | 1444.3-45.6 | 1.3 | 11.20 | 8.01 | 1.29 | 14.56 | 12.7 | 16.51 | 2.37 | 2.71 | 0.0 | 75.2 | I FEW PPV SANDY |
| 14 | 1445.6-46.8 | 1.2 | 22.10 | 18.50 | 3.67 | 26.52 | 12.7 | 15.24 | 2.33 | 2.67 | 0.0 | 73.2 | I PPV SANDY |

**WELL:** AQUITAINE ET AL HUDSON WALRUS A-71 **PAGE:** 2 of 7

**FORMATION:** **FILE:** CNP-4-4855

**SUMMARY INTERVAL:** 1432.0 - 1446.8

**TOTAL FOOTAGE:** 14.8

**FOOTAGE ANALYZED** 14.8

**FOOTAGE NOT ANALYZED:** TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

| | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| SUMMARY OF ANALYZED CORE: | | | | | | | | |
| TOTAL | 14.8 | 100.00 | 10.55 | 156.16 | 5.37 | 79.45 | .00 | 70.73 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 0.10 0.49 Md. | 2.0 | 13.51 | 7.60 | 15.20 | .26 | .52 | .00 | 77.25 |
| 0.50 0.99 Md. | 2.2 | 14.86 | 7.16 | 15.75 | .62 | 1.37 | .00 | 71.35 |
| 1.00 9.99 Md. | 8.1 | 54.74 | 11.54 | 93.46 | 4.50 | 36.48 | .00 | 67.86 |
| GREATER THAN 9.99 Md. | 2.5 | 16.89 | 12.70 | 31.75 | 16.43 | 41.08 | .00 | 74.24 |

*NOT ANALYZED BY REQUEST

# CORE LABORATORIES — CANADA, LTD.

CALGARY ALBERTA

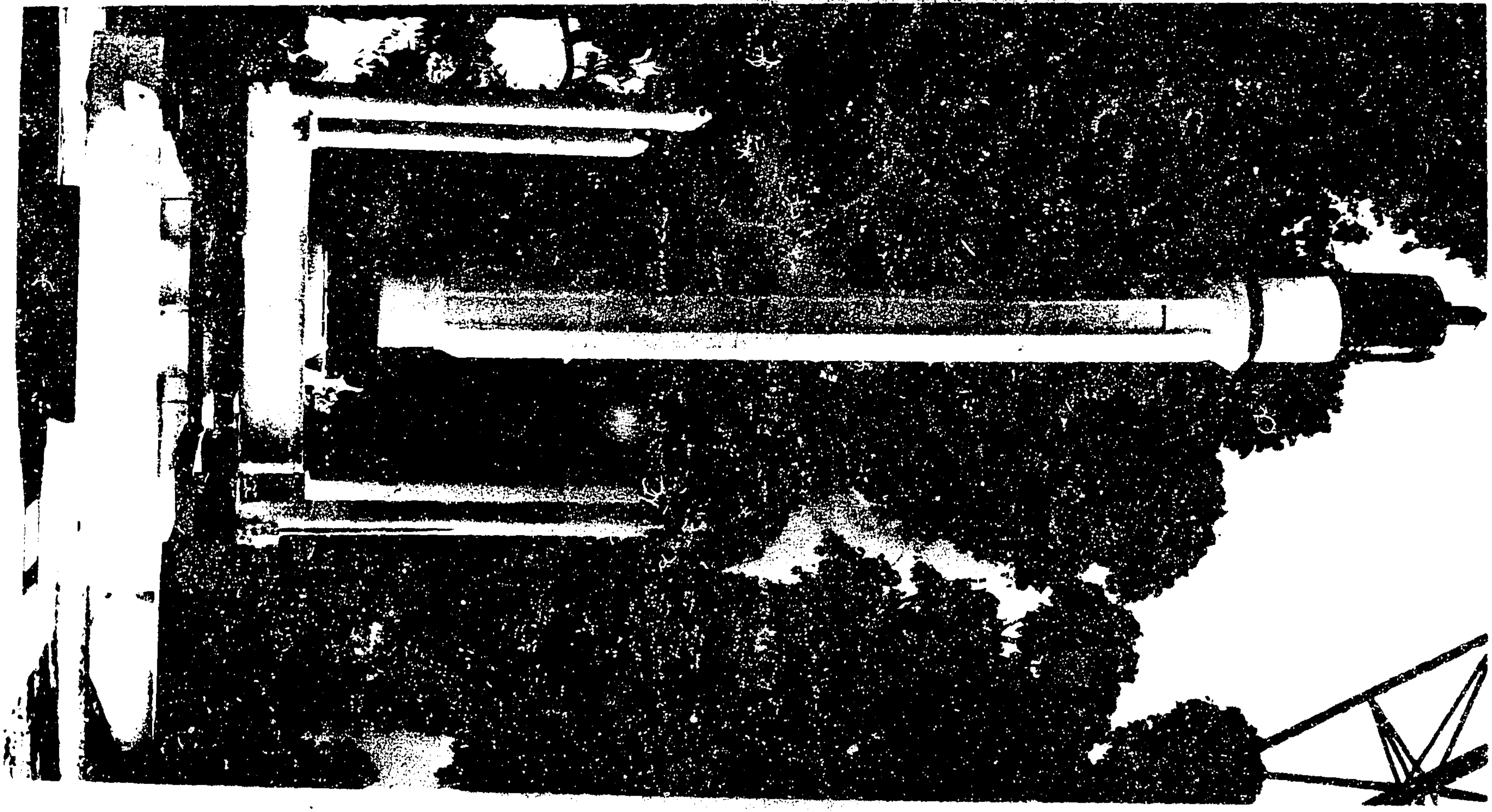
**COMPANY** AQUITAINE COMPANY OF CANADA LTD.
**WELL** AQUITAINE ET AL HUDSON WALRUS A-71

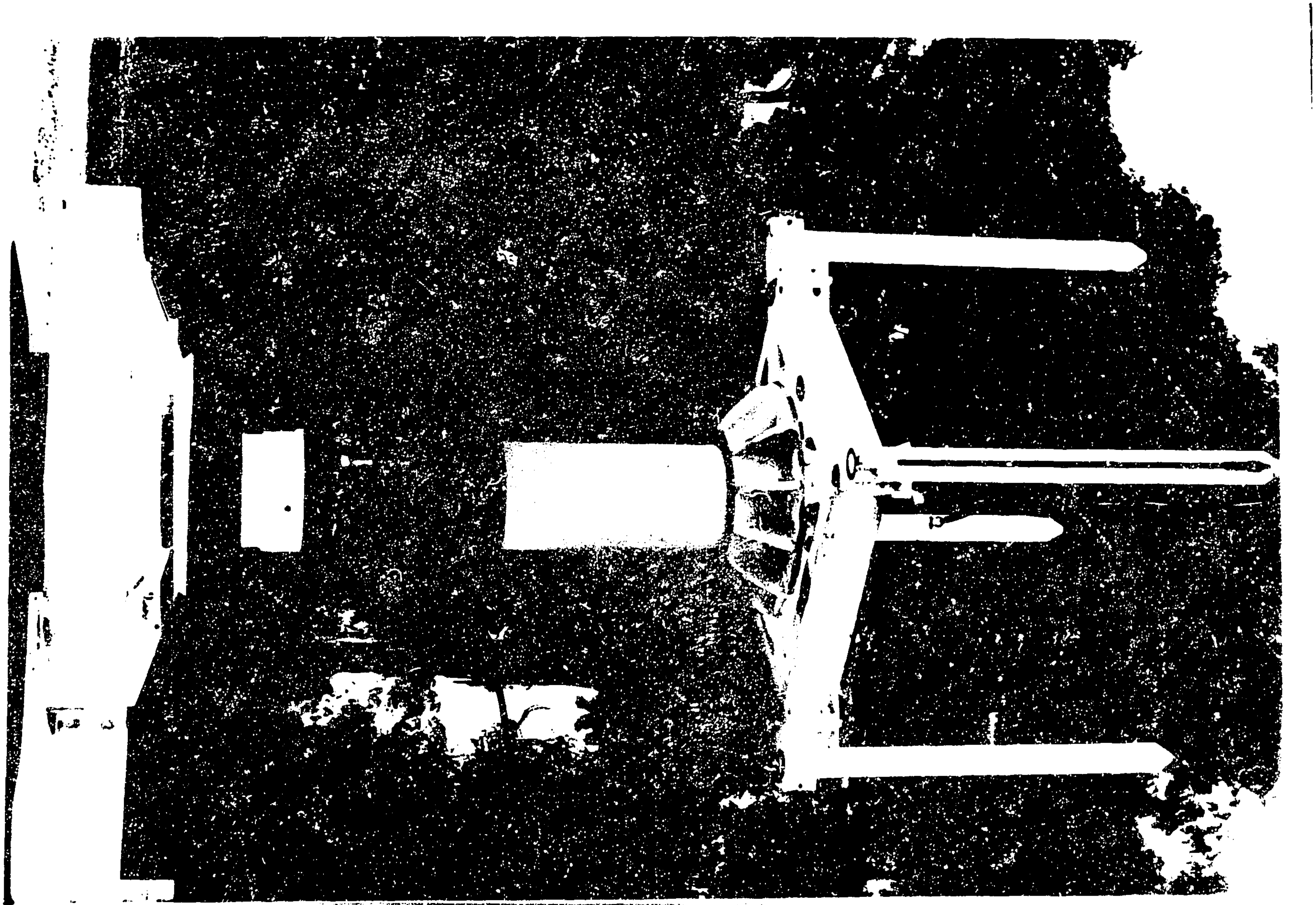
**PAGE** 3 of 7
**FILE** CNP-4-4855

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | PERMEABILITY TO AIR, MILLIDARCYS | | | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | DENSITY, gm./cc. | | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | KMAX | K90° | KV | | | | BULK | GRAIN | OIL | TOTAL WATER | |
| CORE NO. 3 2670' - 2684' (REC. 14') (6 BOXES) | | | | | | | | | | | | | |
| 15 | 2670.0-71.1 | 1.1 | 1.56 | 0.75 | 0.68 | 1.72 | 10.6 | 11.66 | 2.42 | 2.71 | 4.0 | 62.6 | I |
| 16 | 2671.1-72.0 | 0.9 | 1.33 | 1.18 | 0.40 | 1.20 | 12.8 | 11.52 | 2.40 | 2.76 | 4.7 | 66.0 | I |
| 17 | 2672.0-73.5 | 1.5 | 0.13 | 0.02 | -0.1 | 0.20 | 9.7 | 14.55 | 2.46 | 2.72 | 4.8 | 59.6 | I |
| 18 | 2673.5-74.8 | 1.3 | 0.50 | 0.05 | 0.07 | 0.65 | 11.5 | 14.95 | 2.43 | 2.75 | 3.6 | 69.5 | I |
| 19 | 2674.8-75.8 | 1.0 | 0.33 | 0.11 | -0.1 | 0.33 | 11.5 | 11.50 | 2.43 | 2.75 | 5.4 | 73.8 | I |
| 20 | 2675.8-76.8 | 1.0 | 1.83 | 0.78 | -0.1 | 1.83 | 11.6 | 11.60 | 2.41 | 2.73 | 4.4 | 77.0 | I FEW PPV |
| 21 | 2676.8-77.9 | 1.1 | 1.95 | 1.82 | 0.21 | 2.15 | 13.5 | 14.85 | 2.37 | 2.74 | 4.4 | 70.8 | I FEW SV PPV |
| 22 | 2677.9-78.8 | 0.9 | 0.66 | 0.31 | 0.47 | 0.59 | 12.9 | 11.61 | 2.38 | 2.73 | 4.6 | 75.9 | I FEW SV |
| 23 | 2678.8-80.1 | 1.3 | -0.1 | 2.22 | -0.1 | 2.88 | 12.5 | 16.25 | 2.40 | 2.75 | 3.9 | 71.1 | I FEW SV PPV F |
| 24 | 2680.1-81.3 | 1.2 | -0.1 | 3.43 | -0.1 | 4.11 | 13.9 | 16.68 | 2.35 | 2.73 | 4.4 | 70.4 | I SV F |
| 25 | 2681.3-82.6 | 1.3 | 0.91 | 0.32 | 0.51 | 1.18 | 13.1 | 17.03 | 2.40 | 2.76 | 3.5 | 68.3 | I SV |
| 26 | 2682.6-84.0 | 1.4 | 2.09 | 0.66 | 0.91 | 2.93 | 12.2 | 17.08 | 2.36 | 2.09 | 3.1 | 63.3 | I FEW SV F |

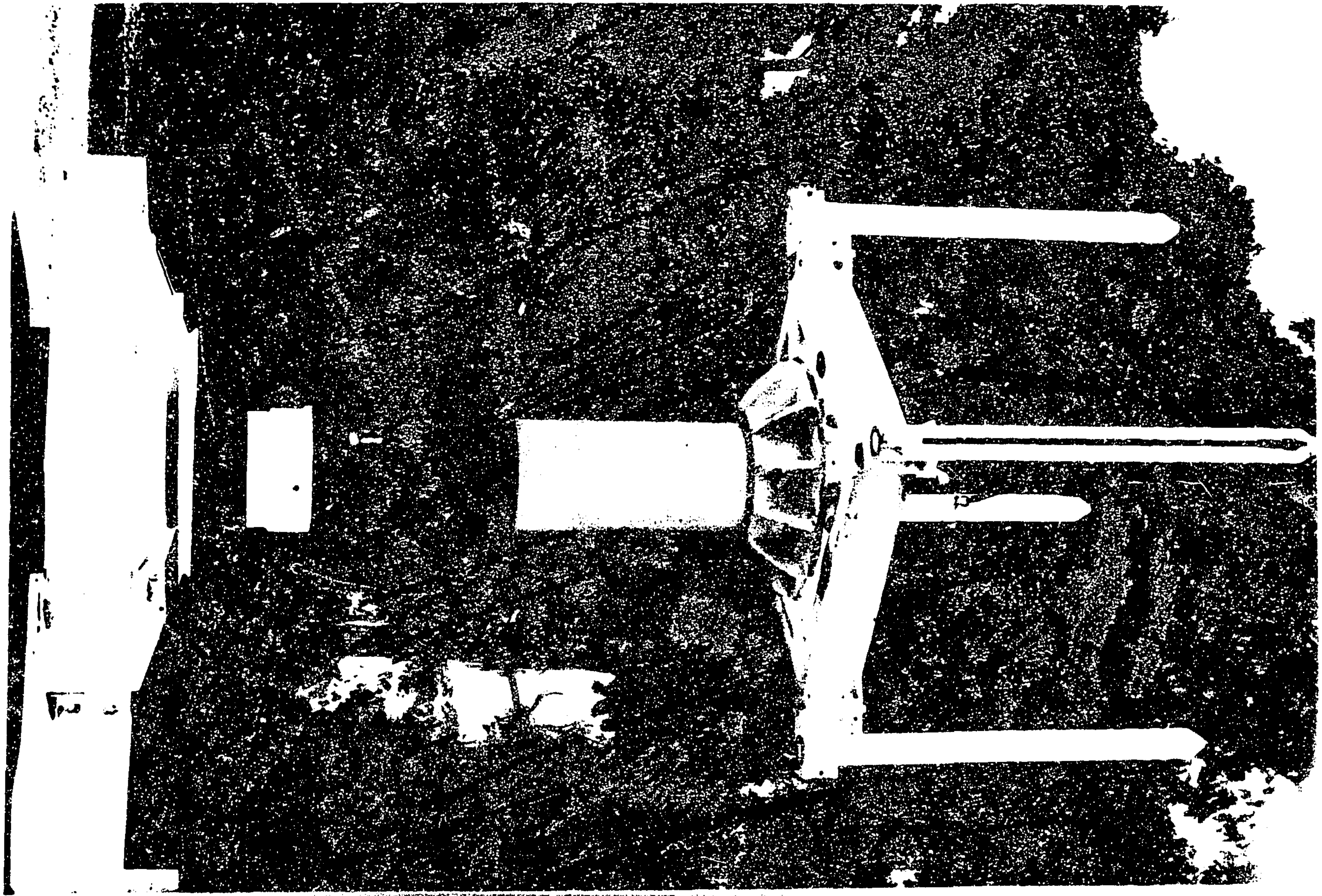
Form 50A

16-3/4" WELLHEAD HOUSING ASSEMBLY: After the 26" hole has been drilled to depth, the 20" casing is run and topped out with a 16-3/4" Wellhead Housing Assembly as shown. The 20" O.D. casing immediately below the 16-3/4" Wellhead Housing is usually of slightly heavier wall thickness pipe and is ribbed on the outside to centralize inside the 30" conductor pipe. This compact assembly offers maximum resistance to bending in the critical area immediately below the mudline. At the lower end of this 20" O.D. ribbed assembly is a 20" squnch joint which allows quick make-up to the 20" casing string and requires no rotation of this long and rather heavy assembly. The 16-3/4" housing is provided with a lock-down ring which engages the 30" Wellhead Housing. This lock-down ring is shown immediately above the 20" O.D. ribbed section.





PERMANENT GUIDE STRUCTURE ASSEMBLY. Complete with top end of 30-inch O.D. conductor pipe. Picture simulates Permanent Guide Structure and 30-inch conductor pipe immediately prior to being landed onto Temporary Guide Base Assembly. Guide lines extend from Temporary Guide Base through the Permanent Guide Structure Posts to the drilling rig. The central black section of the 30-inch conductor pipe is a shear joint assembly to assist in retrieving the wellhead equipment during salvage operations.



PERMANENT GUIDE STRUCTURE ASSEMBLY. Complete with top end of 30-inch O.D. conductor pipe. Picture simulates Permanent Guide Structure and 30-inch conductor pipe immediately prior to being landed onto Temporary Guide Base Assembly. Guide lines extend from Temporary Guide Base through the Permanent Guide Structure Posts to the drilling rig. The central black section of the 30-inch conductor pipe is a shear joint assembly to assist in retrieving the wellhead equipment during salvage operations.

DRESSER MAGCOBAR CANADA, DIVISION OF DRESSER INDUSTRIES INC., 301, 415 - 3rd STREET S.W., CALGARY 1, ALBERTA

Dresser Magcobar CANADA
DIVISION OF DRESSER INDUSTRIES, INC

November 4, 1969

Mr. Marcel Labouysse,
Societe Nationale Des Petroles D'Aquitaine,
Villa "Les Alles",
Alles De Morlaas,
Pau (B.P.), France

Dear Sir:

Re: Final Mud System in Hole on
Aquitaine et al Hudson Bay Walrus A-71

Enclosed is a copy of Dresser Magcobar Canada's final mud check taken at 10:00 P.M. on October 14th, 1969

In my opinion, under normal conditions the drilling mud will not allow the weight material to settle nor the mud system to solidify for an extended period of time of 5 to 10 years or very possibly longer.

This statement is made based on the following:

1. Mud temperature is relatively low compared to majority of holes. This means there will not be any high temperature decomposition of any components of the drilling fluid nor any solidification from high temperature gelation.

2. Funnel Viscosity of 65, Plastic Viscosity 37, Yield Point of 17 plus initial Gel of 3 and 10 Min. Gel of 10. The combination of these properties will keep the Barite ($BaSO_4$) in suspension, with an initial-Gel of 3 and an increase to 10 of the 10 Min.-Gel, this indicates that the system will gel even more with time which will give further resistence to the Barite settling.

3. In the past Dresser Magcobar has re-entered holes that have been abandoned for periods of time up to 15 years and have found the drilling fluids in a pumpable state.

Yours very truly,

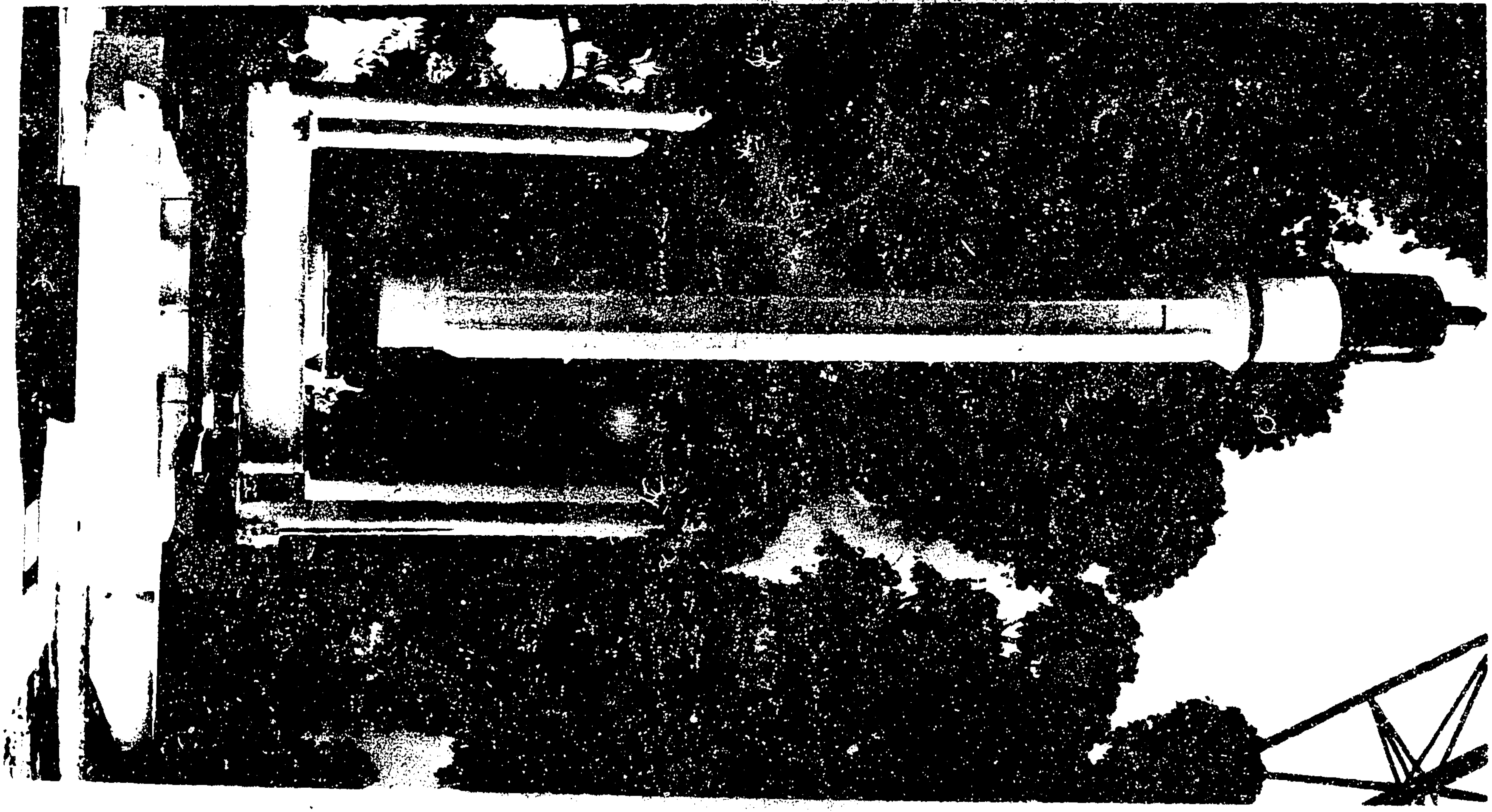
DRESSER MAGCOBAR CANADA

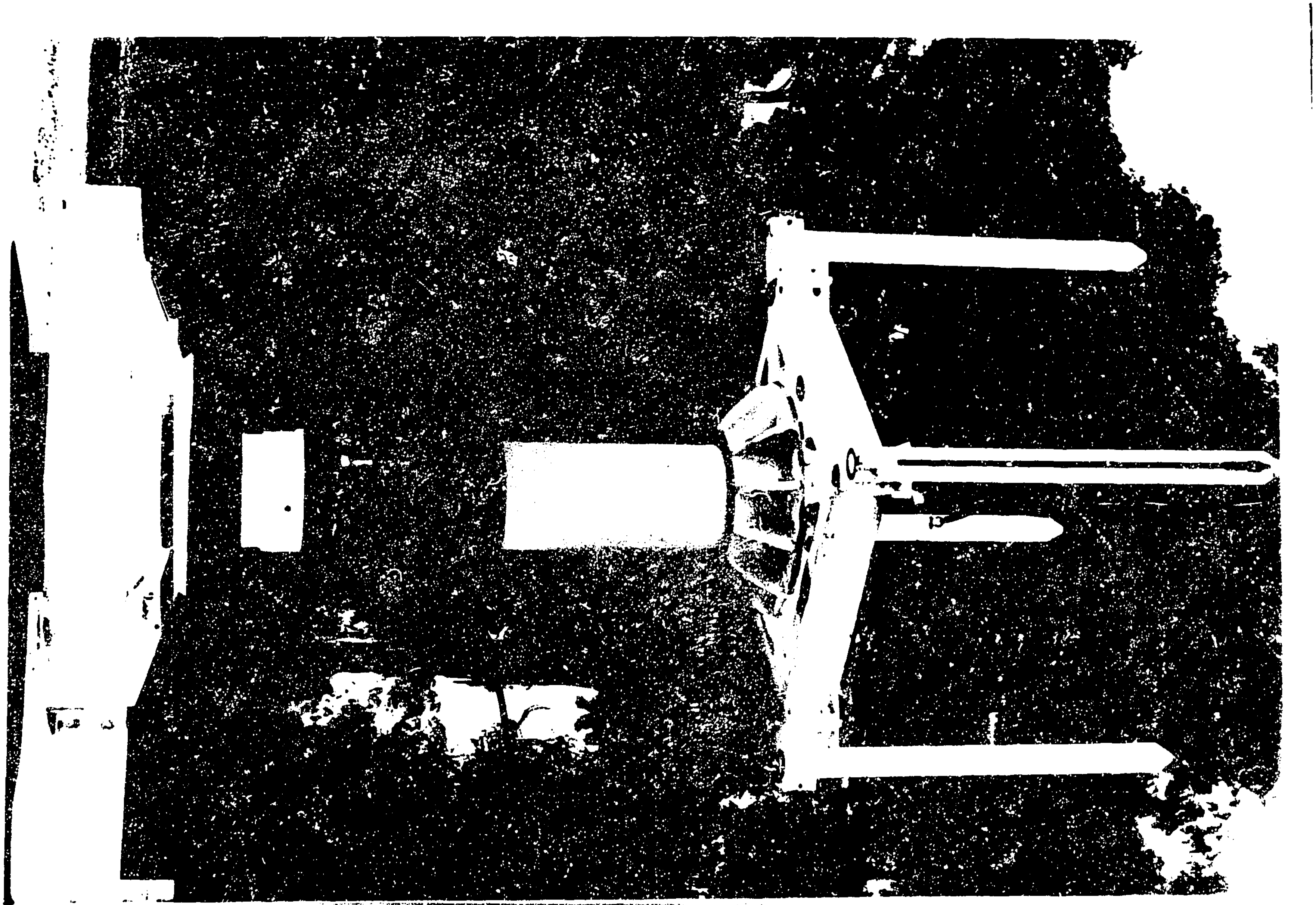
Earl Brown

E. W. Brown
Canadian Area Manager

EWB:ak

**16-3/4" WELLHEAD HOUSING ASSEMBLY:** After the 26" hole has been drilled to depth, the 20" casing is run and topped out with a 16-3/4" Wellhead Housing Assembly as shown. The 20" O.D. casing immediately below the 16-3/4" Wellhead Housing is usually of slightly heavier wall thickness pipe and is ribbed on the outside to centralize inside the 30" conductor pipe. This compact assembly offers maximum resistance to bending in the critical area immediately below the mudline. At the lower end of this 20" O.D. ribbed assembly is a 20" squnch joint which allows quick make-up to the 20" casing string and requires no rotation of this long and rather heavy assembly. The 16-3/4" housing is provided with a lock-down ring which engages the 30" Wellhead Housing. This lock-down ring is shown immediately above the 20" O.D. ribbed section.





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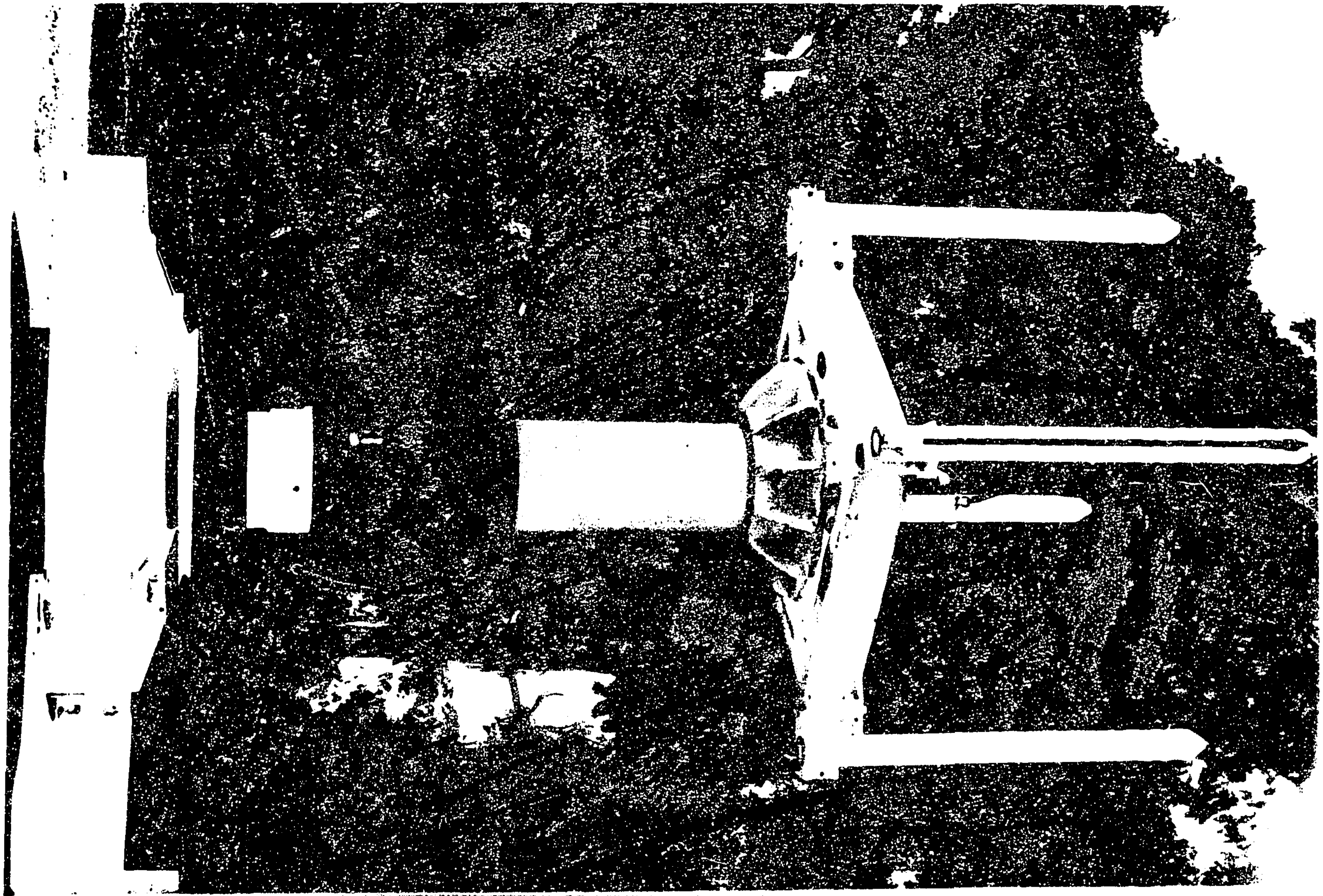

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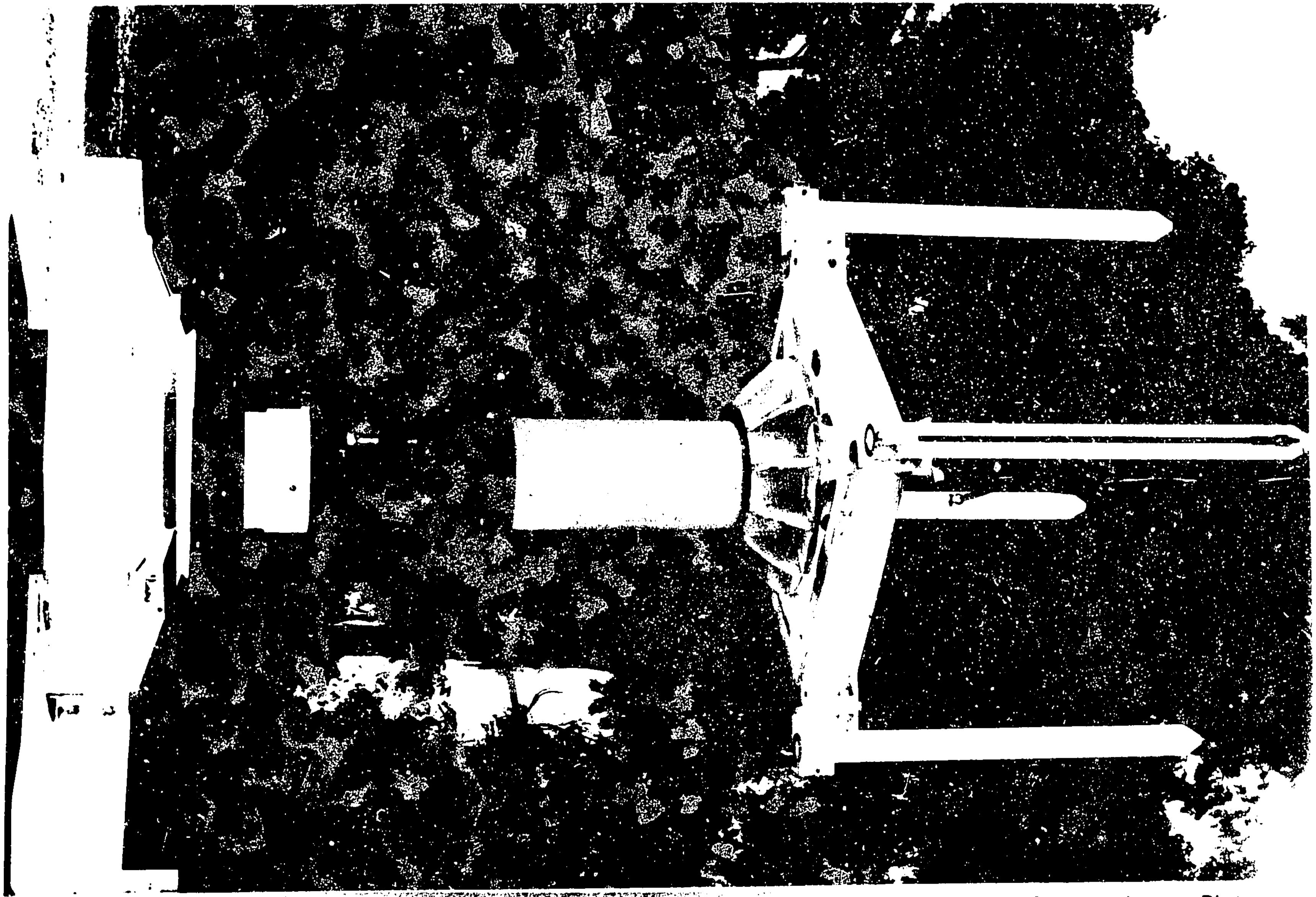

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# CORE LABORATORIES – CANADA, LTD.

*Petroleum Reservoir Engineering*

WELL: AQUITAINE ET AL HUDSON WALRUS A-71

PAGE: 4 of 7

FORMATION:

FILE: CNP-4-4855

SUMMARY INTERVAL: 2670.0 - 2684.0

TOTAL FOOTAGE: 14.0

FOOTAGE ANALYZED 14.0

FOOTAGE NOT ANALYZED: TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

| | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| SUMMARY OF ANALYZED CORE: | | | | | | | | |
| TOTAL | 14.0 | 100.00 | 12.09 | 169.28 | 1.41 | 19.77 | 4.18 | 68.59 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 0.10 0.49 Md. | 2.5 | 17.86 | 10.42 | 26.05 | .21 | .53 | 5.04 | 65.28 |
| 0.50 0.99 Md. | 3.5 | 25.00 | 12.45 | 43.59 | .69 | 2.43 | 3.82 | 70.96 |
| 1.00 9.99 Md. | 8.0 | 57.14 | 12.46 | 99.64 | 2.10 | 16.82 | 4.07 | 68.58 |
| GREATER THAN 9.99 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

*NOT ANALYZED BY REQUEST

# CORE LABORATORIES – CANADA LTD.

CALGARY ALBERTA

| | | | | | |
|---|---|---|---|---|---|
| **COMPANY** | AQUITAINE COMPANY OF CANADA LTD. | **FORMATION** | | **PAGE** | 5 of 7 |
| **WELL** | AQUITAINE ET AL HUDSON WALRUS A-71 | **DRILLING FLUID** | WATER BASE MUD | **FILE** | CNP-4-4855 |
| **FIELD** | WILDCAT - HUDSON BAY | **ELEVATION** | | **DATE REPORT** | DEC. 4, 1969 |
| **LOCATION** | LSD. 58° 30' 02" N.L.<br>87° 10' 50" W.L. | **ANALYSIS** | CONVENTIONAL | **ANALYSTS** | MH BK |
| | | **REMARKS** | | | |

AST - APPEARS SIMILAR TO
* - BROKEN CORE (K50 USED FOR SUMMARY PURPOSES)
** - PERMEABILITY > 3000 MD.
— - PERMEABILITY <
FS - FINE SAND
MS - MEDIUM SAND
CS - COARSE SAND
CONG - CONGLOMERATE
DOL - DOLOMITE
SH - SHALE
LMY - LIMY
SHY - SHALY
/BK - BREAK
BIT - PYROBITUMEN
CARB - CARBONACEOUS
A - ANHYDRITE
FOSS - FOSSILIFEROUS
XLN - CRYSTALLINE
LAM - LAMINATIONS
V - VUGULAR
LV - LARGE VUGS
SV - SMALL VUGS
PPV - PIN POINT VUGS
I - INTERGRANULAR
STY - STYLOLITIC
HF - HORIZONTAL FRACTURE
VF - VERTICAL FRACTURE
SS - SMALL PLUG SAMPLE
SL/ - SLIGHTLY
V/ - VERY
W/ - WITH

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | HORIZ. PERM TO AIR, MILLIDARCYS | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | | | | | OIL | TOTAL WATER | |
| CORE NO. 4 3917' - 3926' (REC. 9.0') (4 BOXES) | | | | | | | | | |
| 27 | 3917.0-18.3 | 1.3 | 0.70 | 0.91 | 13.7 | 17.81 | Trace | 76.3 | I |
| 28 | 3918.3-19.2 | 0.9 | 0.24 | 0.22 | 10.5 | 9.45 | 0.0 | 74.7 | I FEW PPV |
| 29 | 3919.2-19.9 | 0.7 | 0.24 | 0.17 | 12.0 | 8.40 | 0.0 | 71.1 | I |
| 30 | 3919.9-21.0 | 1.1 | -0.01 | - | 4.4 | 4.84 | Trace | 69.2 | I |
| 31 | 3921.0-21.9 | 0.9 | -0.01 | - | 3.0 | 2.70 | 0.0 | 56.6 | I |
| 32 | 3921.9-23.0 | 1.1 | 0.76 | 0.84 | 12.2 | 13.42 | 0.0 | 74.2 | I FEW PPV |
| 33 | 3923.0-24.0 | 1.0 | 0.18 | 0.18 | 8.0 | 8.00 | 0.0 | 71.5 | I |
| 34 | 3924.0-25.0 | 1.0 | -0.01 | - | 4.8 | 4.80 | Trace | 70.0 | I |
| 35 | 3925.0-26.0 | 1.0 | -0.01 | - | 1.3 | 1.30 | 0.0 | 32.7 | I |

**CORE LABORATORIES – CANADA, LTD.**

*Petroleum Reservoir Engineering*

**WELL:** AQUITAINE ET AL HUDSON WALRUS A-71

**PAGE:** 6 of 7

**FORMATION:**

**FILE:** CNP-4-4855

**SUMMARY INTERVAL:** 3917.0 - 3926.0

**TOTAL FOOTAGE:** 9.0

**FOOTAGE ANALYZED** 9.0

**FOOTAGE NOT ANALYZED:** TOTAL: .0 DENSE .0 LOST .0 DRILLED .0 *NABR .0 RUBBLE .0

| | FOOTAGE | % OF ANALYZED CORE | WEIGHTED AVERAGE POROS. % | POROSITY FEET | WEIGHTED AVERAGE PERM. MD. | PERM. FEET | WEIGHTED AVERAGE RESID. OIL % | WEIGHTED AVERAGE TOT. WATER % |
|---|---|---|---|---|---|---|---|---|
| SUMMARY OF ANALYZED CORE: | | | | | | | | |
| TOTAL | 9.0 | 100.00 | 7.86 | 70.72 | .26 | 2.31 | .00 | 66.56 |
| BY PERM RANGES: | | | | | | | | |
| LESS THAN 0.10 Md. | 4.0 | 44.44 | 3.41 | 13.64 | .00 | .00 | .00 | 57.44 |
| 0.10 0.49 Md. | 2.6 | 28.89 | 9.94 | 25.85 | .22 | .56 | .00 | 72.50 |
| 0.50 0.99 Md. | 2.4 | 26.67 | 13.01 | 31.23 | .73 | 1.75 | .00 | 75.34 |
| 1.00 9.99 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| GREATER THAN 9.99 Md. | .0 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |

*NOT ANALYZED BY REQUEST

# CORE LABORATORIES — CANADA LTD.

CALGARY ALBERTA

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.
**WELL** AQUITAINE ET AL HUDSON WALRUS A-71
**FIELD** WILDCAT - HUDSON BAY
**LOCATION** LSD. 58° 30' 02" N.L.
87° 10' 50" W.L.

**FORMATION**
**DRILLING FLUID** WATER BASE MUD
**ELEVATION**
**ANALYSIS** CONVENTIONAL
**REMARKS**

**PAGE** 5 of 7
**FILE** CNP-4-4855
**DATE REPORT** DEC. 4, 1969
**ANALYSTS** MH BK

AST - APPEARS SIMILAR TO
* - BROKEN CORE (K90 USED FOR SUMMARY PURPOSES)
** - PERMEABILITY > 3000. MD.
→ - PERMEABILITY <
FS - FINE SAND
MS - MEDIUM SAND
CS - COARSE SAND
CONG - CONGLOMERATE
DOL - DOLOMITE
SH - SHALE
LMY - LIMY
SHY - SHALY
/BK - BREAK
BIT - PYROBITUMEN
CARB - CARBONACEOUS
A - ANHYDRITE
FOSS - FOSSILIFEROUS
XLN - CRYSTALLINE
LAM - LAMINATIONS
V - VUGULAR
LV - LARGE VUGS
SV - SMALL VUGS
PPV - PIN POINT VUGS
I - INTERGRANULAR
STY - STYLOLITIC
HF - HORIZONTAL FRACTURE
VF - VERTICAL FRACTURE
SS - SMALL PLUG SAMPLE
SL/ - SLIGHTLY
V/ - VERY
W/ - WITH

| SAMPLE NUMBER | INTERVAL REPRESENTED, FEET | | HORIZ. PERM TO AIR, MILLIDARCYS | PERMEABILITY FEET | POROSITY, PER CENT | POROSITY FEET | RESIDUAL SATURATIONS, PER CENT PORE SPACE | | VISUAL EXAMINATION |
|---|---|---|---|---|---|---|---|---|---|
| | DEPTH | THICK | | | | | OIL | TOTAL WATER | |
| CORE NO. 4 3917' - 3926' (REC. 9.0') (4 BOXES) | | | | | | | | | |
| 27 | 3917.0-18.3 | 1.3 | 0.70 | 0.91 | 13.7 | 17.81 | Trace | 76.3 | I |
| 28 | 3918.3-19.2 | 0.9 | 0.24 | 0.22 | 10.5 | 9.45 | 0.0 | 74.7 | I FEW PPV |
| 29 | 3919.2-19.9 | 0.7 | 0.24 | 0.17 | 12.0 | 8.40 | 0.0 | 71.1 | I |
| 30 | 3919.9-21.0 | 1.1 | -0.01 | - | 4.4 | 4.84 | Trace | 69.2 | I |
| 31 | 3921.0-21.9 | 0.9 | -0.01 | - | 3.0 | 2.70 | 0.0 | 56.6 | I |
| 32 | 3921.9-23.0 | 1.1 | 0.76 | 0.84 | 12.2 | 13.42 | 0.0 | 74.2 | I FEW PPV |
| 33 | 3923.0-24.0 | 1.0 | 0.18 | 0.18 | 8.0 | 8.00 | 0.0 | 71.5 | I |
| 34 | 3924.0-25.0 | 1.0 | -0.01 | - | 4.8 | 4.80 | Trace | 70.0 | I |
| 35 | 3925.0-26.0 | 1.0 | -0.01 | - | 1.3 | 1.30 | 0.0 | 32.7 | I |

# CORE LABORATORIES — CANADA LTD.

PETROLEUM RESERVOIR ENGINEERING

## WATER ANALYSIS

File CNP-4-4855

Page 7 of 7

**Company** AQUITAINE COMPANY OF CANADA LTD.

**Well** AQUITAINE ET AL HUDSON WALRUS A-71 **K.B.** **Grd.**

**Location** LSD 58° 30' 02" N.L. 87° 10' 50" W.L. **Field** WILDCAT **Province** HUDSON BAY

**Formation** **Interval**

**Sampled from** LEACHED FROM CORE SAMPLE #2 **by**

**Date sampled** **Date analysed** **Analyst**

**Recovery**

**Mud type** **Water cushion**

**Resistivity** 0.612 **Ohm-meters @** 75 **°F**

**Specific gravity** 1.0118 **@ 60°F**

**pH** 7.40 **$H_2S$** Absent

**Refractive Index** 1.330 @ 75°F

**Total Solids:**

**Calculated** 9040 **mg/liter**

**By evaporation @ 110°C** - **mg/liter**

**By evaporation @ 180°C** - **mg/liter**

**At ignition** - **mg/liter**

### MILLIGRAMS PER LITER

| Na + K | Ca | Mg | Fe | Ba | Br | I | Cl | $HCO_3$ | $SO_4$ | $CO_3$ | OH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2668 | 595 | 44 | Tr. | Abs. | - | - | 4110 | 83 | 1540 | Nil | Nil |

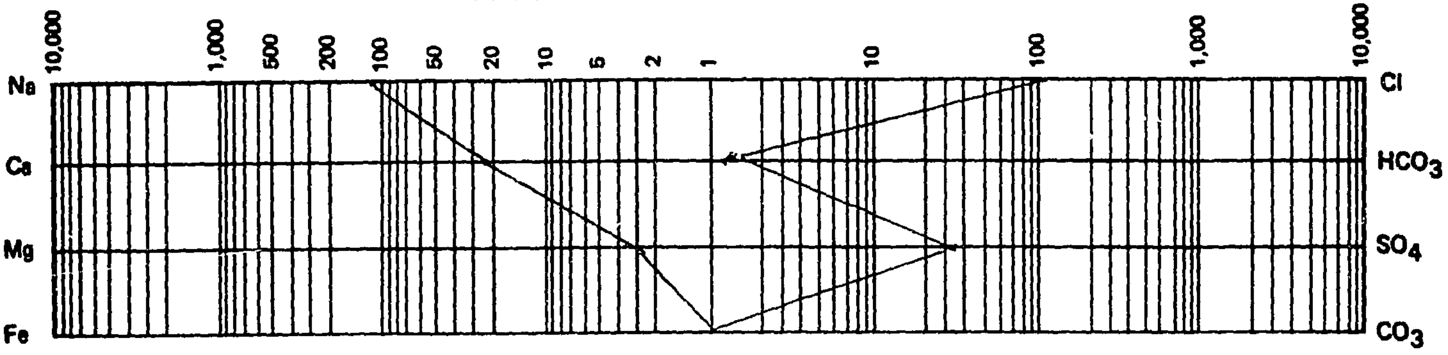
### PER CENT CALCULATED SOLIDS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 29.5 | 6.6 | 0.5 | - | - | - | - | 45.5 | 0.9 | 17.0 | Nil | Nil |

### MEQ PER LITER

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 116.0 | 29.7 | 0.3.6 | - | - | - | - | 115.9 | 1.4 | 32.0 | Nil | Nil |

### LOGARITHMIC PATTERN MEQ PER LITER



# AQUITAINE INTERPRETATIVE LOG WALRUS A 71

| OPERATOR | PERMIT OR LEASE | TIMING | CASING | TOTAL DEPTH |
|---|---|---|---|---|
| AQUITAINE CO. OF CANADA LTD. | W 1427 | COMMENCED = AUG. 8, '69 | ø 30" at 772' | 3926' |
| CONTRACTOR | PROVINCE | TEMPORARY HALT = | ø 20" at 1120' | GEOLOGICAL FORMATION AT SPUDDING LEVEL |
| WESTERN OFFSHORE DRILLING & EXPLORATION CO. | FEDERAL WATERS<br>HUDSON BAY<br>CANADA | RESUMPTION OF DRILLING = | ø 13" 3/8 at 1975' | PLEISTOCENE DRIFT |
| RIG | CO-ORDINATES | TEMPORARY HALT = | ø 9'5/8 at 2960' | GEOLOGICAL FORMATION AT BOTTOM HOLE |
| WODECO II | x = 58°30'02.29" N<br>y = 87°10'48.75" W | RESUMPTION OF DRILLING = | ø at | |
| BROUGHT UP TO DATE ON | z = - 618' | | | SCALE |
| DEC. 18, 1969 | ZKB= + 31' | COMPLETED = OCT. 18, '69 | | 2" = 100' or 1 / 600 |

COMMENTS,

## STRATIGRAPHICAL HYPOTHESES

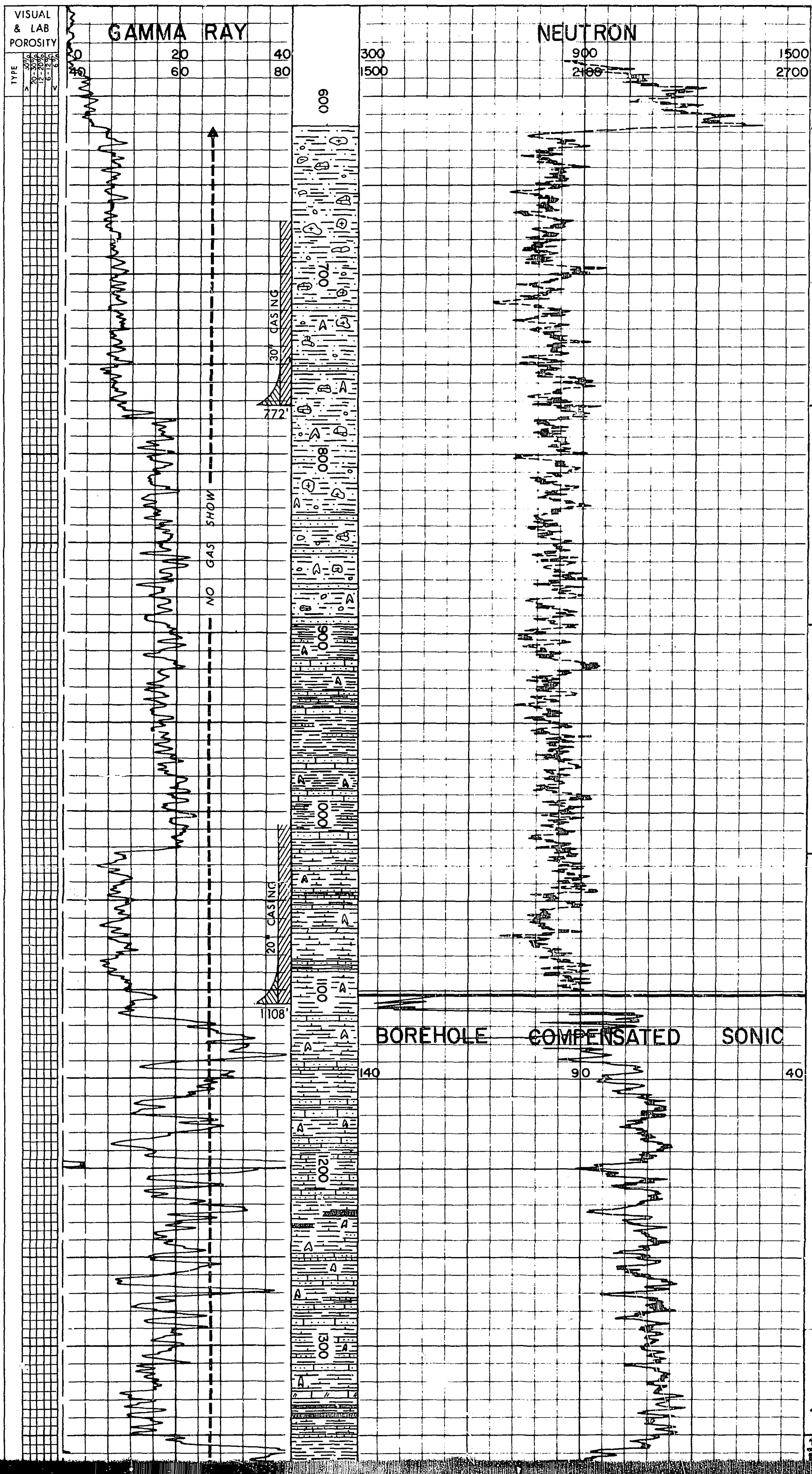
1. Nomenclature according to Aquitaine 1968 lithostratigraphy.

618' - 895' . Drift.
895' - 1385' . Moose River Formation.
1385' - 1500' . Kwataboahegan Formation.
1500' - 1882' . Stooping River Formation.
1882' - 2346' . Kenogami River Formation
Middle Member.
2346' - 3846' . Kenogami River Formation Equivalent
Lower Member Equivalent (highly developed).
3846' - 3926' . Ekwan River Formation
Lower Member.

2. Nomenclature according to the G.S.C. 1967 (Operation Winisk) lithostratigraphy.

618' - 895' . Drift.
895' - 1385' . Long Rapids Formation Equivalent.
1385' - 1882' . Williams Island Formation Equivalent.
1882' - 2346' . Murray Island Formation Equivalent.
2346' - 2506' . Moose River Formation Equivalent.
2506' - 2760' . Kwataboahegan Formation Equivalent
+ Stooping River Formation Equivalent.
. Kenogami River Formation Equivalent
2760' - 2800' . Middle Member Equivalent (highly reduced - eroded?).
2800' - 3846' . Lower Member Equivalent (highly developed).
3846' - 3926' . Ekwan River Formation Equivalent
Upper Member.

DATATION OF THE INTERVAL 3846' - 3926': PALYNOLOGY = Lower to Middle Devonian.
CONODONTS & CORALS = Silurian.



618-772' Yellow brown silty to sandy calcareous clay.
Pebbles of quartzite, dolerite, chlorite-schist, limestone.
(No cutting. Description of sample on the drilling bit).

772-895' Red brown finely silty to sandy plastic clay.
Intercalations of white to pinky brown, slightly argillaceous, very fine to fine sand.
Pebbles of green rocks, white quartzite and light brown microcrystalline limestone.
White fibrous gypsum.

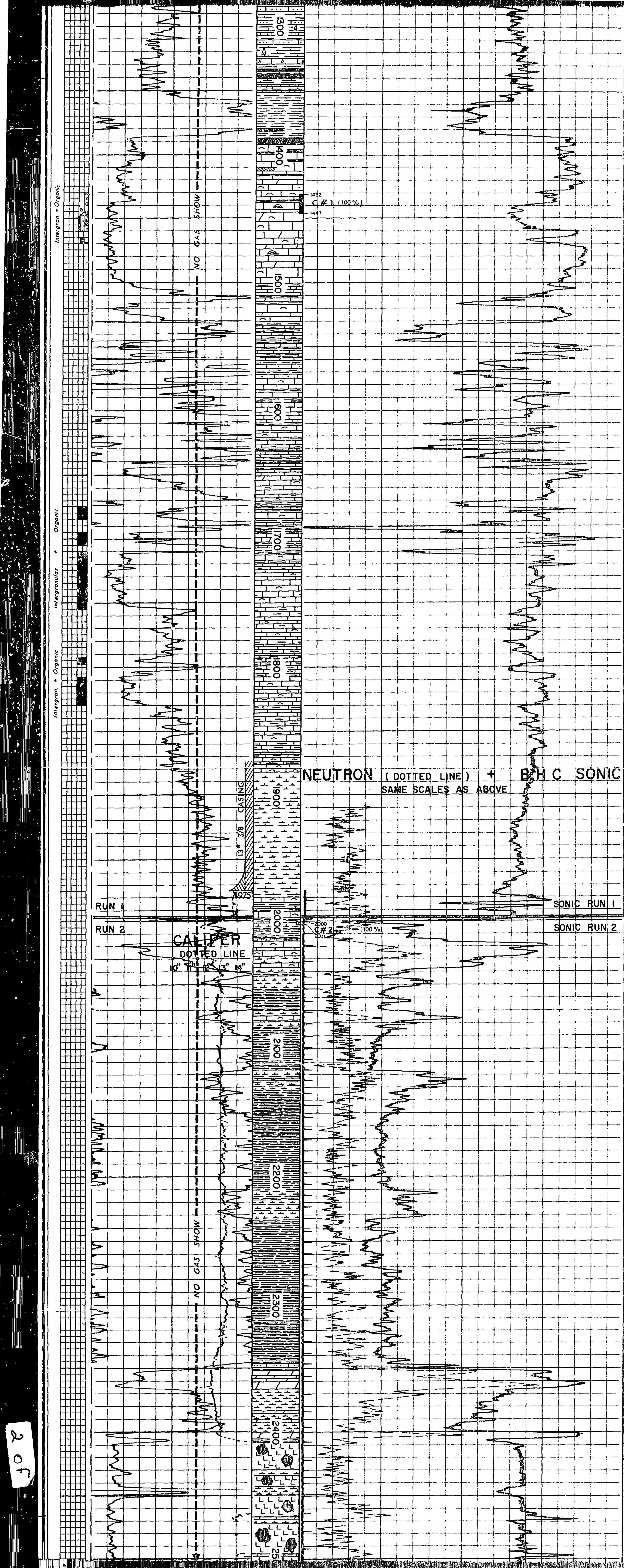
[illegible] Red brown finely silty to sandy plastic clay.
Intercalations of white, pinky brown to red brown, locally cemented, very fine to fine sand.
White fibrous gypsum.

[illegible] Red brown finely silty to sandy plastic calcareous clay.
Intercalations of white, pink to red brown, very fine to fine, locally cemented sand and of calcareous very fine grained sandstone.
Few levels of white anhydrite.
White fibrous gypsum.

— [illegible] = a bed of grey chalky (?) limestone.

[illegible] Red brown (brick) plastic clay with interca-

1 of



— 1337' = a bed of grey chalky (?) limestone.

1350-1385' Red brown (brick) plastic clay with intercalations of white anhydrite.

1385-1500' Pinky beige soft bioclastic, partly dolomitic limestone with alternating levels of:
- pink sandy, locally crumbly limestone;
- white anhydrite.

Thin layers of red-brown plastic to slightly indurated clay.

1500-1712' Alternating:
- pink bioclastic limestone
- white to pale beige micro micro-oolitic limestone;
- beige, pinky beige to grey, partly chalky and argillaceous crumbly limestone;
- pinky grey saccharoidal microcrystalline dolomitic limestone;
- pale beige pelletoidal dolomitic limestone;
- dark pink slightly sandy crumbly limestone;
- brick-red silty argillites.

1712-1832' Alternating:
- pale beige to grey chalky & argillaceous, locally bioclastic limestone;
- pink, slightly sandy in part, bioclastic limestone;
- red-orange to brown limestone with cellular dolomite and small brachiopods;
- white, pale beige to grey, microcrystalline, micro-oolitic to oolitic, partly bioclastic limestone.

1832-1981' Greenish grey shale with intercalations of brown to red calcareous argillite.

1981-2038' Alternating:
- beige, pink to grey bioclastic, partly pelletoidal limestone;
- red to brown hard argillite;
- grey to brown dolomitic shale with isolated Corals.

2038-2346' Grey, beige to brown, plastic clay. Few intercalations of grey, beige to brown shale and of beige, pink to grey bioclastic(?) limestone.

2346-2408' Alternating:
- beige to light brown crystal dolomite;
- pink & grey dolomitic shale.

Few intercalations of brown plastic clay.

(2346-2380': beige, grey to brown, very f. to f. grained compact calc. sandstone).

2408-2505' Halite.

Few patches of white to brown anhydrite.

Few intercalations of pink & grey dolomitic shale & of beige to light brown cryptocrystalline dolomite.

2 of

compact calc. sandstone).

2408-2506' Halite.
Few patches of white to brown anhydrite.
Few intercalations of pink & grey dolomitic shale & of beige to light brown cryptocrystalline dolomite.

2506-2557' Alternating:
- light brown micxl to xl. bioc to biohermal limestone
- light brown crpxl to micxl calc. dolomite;
- beige, red speckled calc. dolomite.

2557-2594' Brown, cryptocrystalline to crystalline, partly arg., dolomitic or anhydritic, bioclastic to biohermal limestone.

2594-2664' Beige to pale brown calcarenitic, bioclastic to biohermal limestone.

2664-2718' Very dark brown microcrystalline bituminous dolomite.

2718-2732' Beige to brown micxl slightly bit. dolomite

2732-2800' Alternating:
- whitish to pale beige, microcrystalline, slightly bituminous bioclastic limestone;
- greenish grey shale.

2800-2830' Pinky to whitish beige cryptocrystalline dolomite.

2830-2970' Whitish beige to pale grey cryptocrystalline to microcrystalline, locally slightly anhydritic dolomite.

2970-3073' Alternating:
- white to beige cryptocrystalline to microcrystalline very slightly silicified dolomite;
- pink, slightly brown, locally yellowish, cryptocrystalline to microcrystalline compact & vugic dolomite;
- beige, grey to brown microcrystalline slightly argillaceous dolomitic limestone.

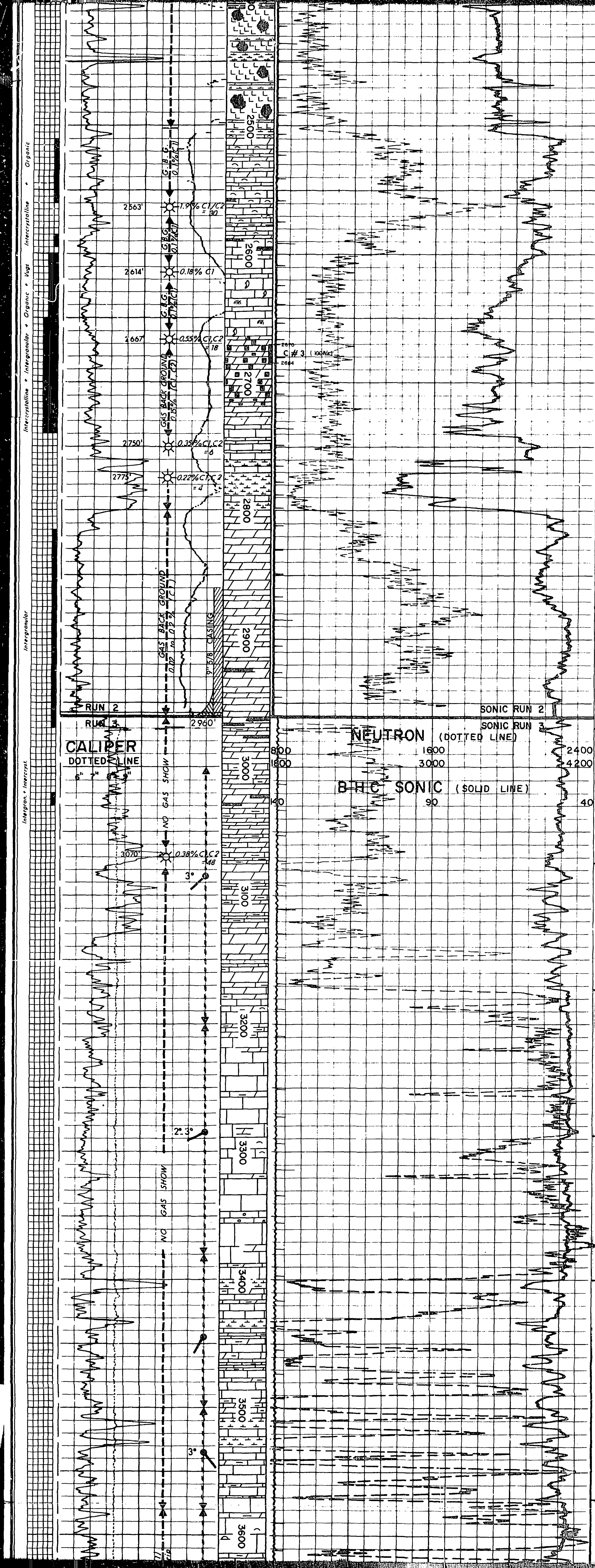
3073-3172' Alternating:
- pinky white, pinky brown & yellowish microcrystalline to crystalline compact & vugic dolomite;
- pale beige to pale brown microcrystalline slightly argillaceous dolomitic limestone.

3172-3283' White, slightly grey to beige, microcrystalline spathic partly dolomitic limestone.
Intercalations of pale beige to pale brown microcrystalline slightly argillaceous dolomitic limestone.

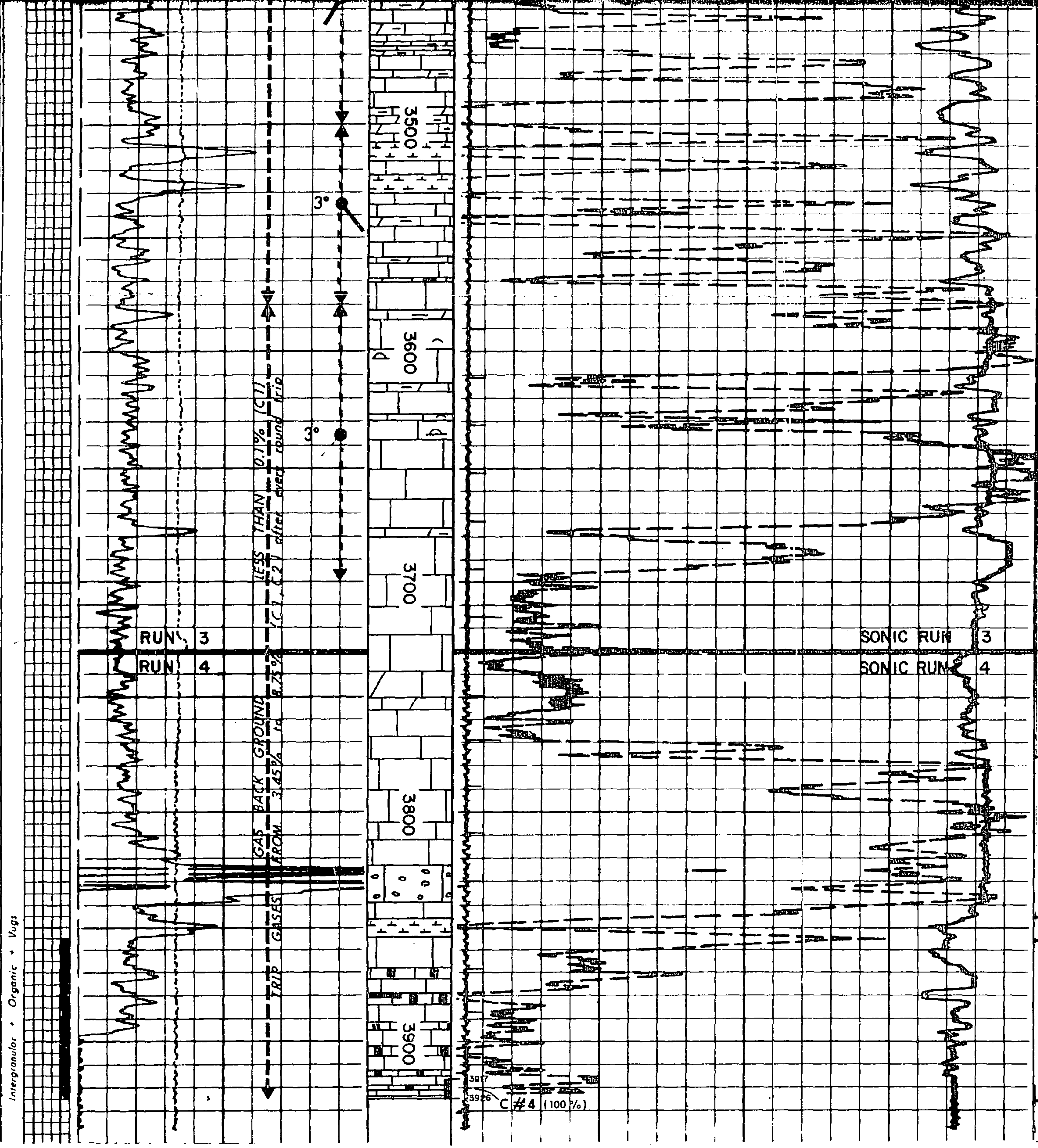
3283-3400' Whitish, light beige to light grey, microcrystalline recrystallized, locally pseudo-oolitic, compact, fossiliferous limestone.

3400-3571' Alternating:
- shale;
- light beige to whitish microcrystalline recrystallized, locally pseudo-oolitic, compact, slightly dolomitic limestone;
- pink, microcrystalline to crystalline, partly chalky, slightly argillaceous dolomitic limestone.

3571-3688' Whitish, light beige to grey, microcrystalline pseudo-oolitic compact limestone.
Few intercalations of pink slightly argillaceous dolomitic limestone.



3 of



stone;
- pink, microcrystalline to crystalline, partly chalky, slightly argillaceous dolomitic limestone.

3571-3680' Whitish, light beige to grey, microcrystalline pseudo-oolitic compact limestone.
Few intercalations of pink slightly argillaceous dolomitic limestone.

3680-3777' Beige, grey to whitish, microcrystalline or recrystallised, crumbly, pseudo-oolitic to pseudo-brecciated, compact, partly dolomitic limestone.

3777-3846' Alternating:
- whitish, light beige to light grey, microcrystalline, locally calcarenitic to microconglomeratic limestone;
- grey brown microcrystalline limestone.

3846-3855' Grey blue marls.

3855-3926' Alternating:
- very light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone;
- very dark brown, microcrystalline, locally calcarenitic, anhydritic, bituminous limestone.

CONFIDENTIAL

SCHLUMBERGER

# SEISMIC REFERENCE SERVICE

## Geophysical Log

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE Federal Waters
FIELD Wildcat
WELL Aquitaine et al Hudson Walrus A-71
COMPANY Aquitaine Company of Canada Limited

COMPANY Aquitaine Company of Canada Limited

WELL Aquitaine et al Hudson Walrus A-71
87° 10' 51"W 58° 30' 02"N

FIELD Wildcat

PROVINCE Federal Waters

LOCATION 87° 10' 51"W
58° 30' 02"N

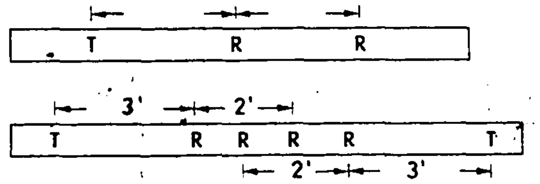
Other Services:
DIL, SNP, CAL, LL, ML
FDC-GR, GRL, CDM

Permanent Datum Sea Level Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| SONIC DATA | | |
|---|---|---|
| Sonic Run No. | One & Two | Three&Four |
| Date | Sept.8,23/69 | Oct.11,15/69 |
| First Reading | 2957 | 3923 |
| Last Reading | 1108 | 2965 |
| Feet Measured | 1849 | 958 |
| Depth Reached | 2959 | 3925 |
| Bottom Driller | 2959 | 3926 |
| Csg. SOC | 1975 | 2965 |
| Csg. Driller | 1975 | 2965 |

Sonic Span and Spacing Used:



| | | |
|---|---|---|
| Bit Size : | 17 1/2" to 1333'<br>15" from 1333' to 2000'<br>12 1/4" from 2000' to 2959' | 8 1/2" |
| Opr. Rig Time | 8 hrs. | 4 hrs. |
| Truck No. | OSU-C 285 | OSU-C 285 |
| Recorded By | Berry | Stuehmer |
| Witness | Rueff | Kmiecluck |

SEISMIC DATA
(By Century Geophysical Corp. of Canada)

Seismic Datum: 0
Difference Between Seismic and Sonic Datum: 32
Amplifiers: CGC Model 510

WELL GEOPHONE
Make: Gulf 57
Type: Pressure
Filter: 20-100

SURFACE SPREAD
Surface Geophone Stations:
Geophones per Station:
Reflection Filters:

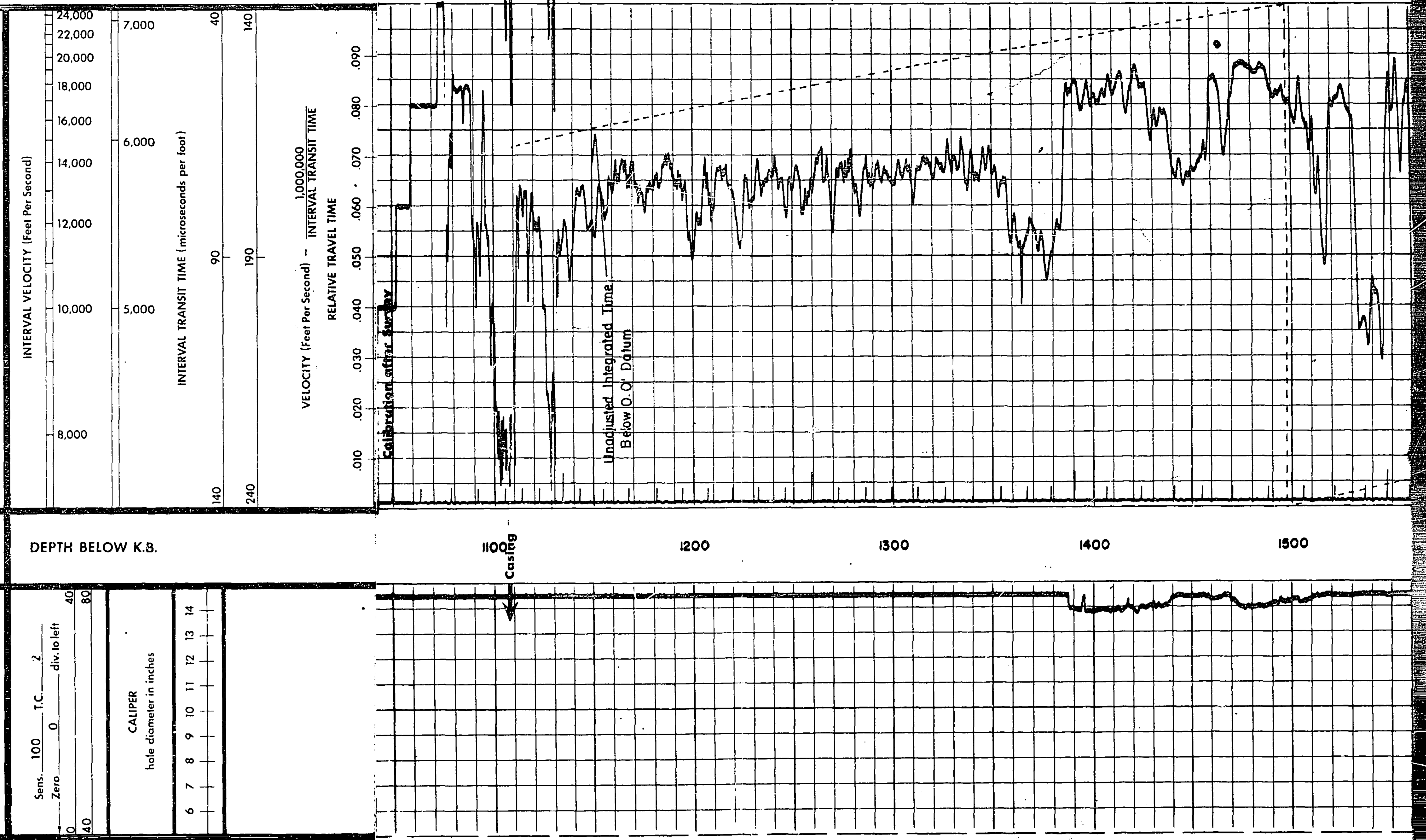
Recording Time: 5 1/2 hrs.
Crew No.: 1
Truck No. PR-2
Operator: K. Samchuck
Survey No. 1126

REMARKS This survey was shot with a portable set of instruments.

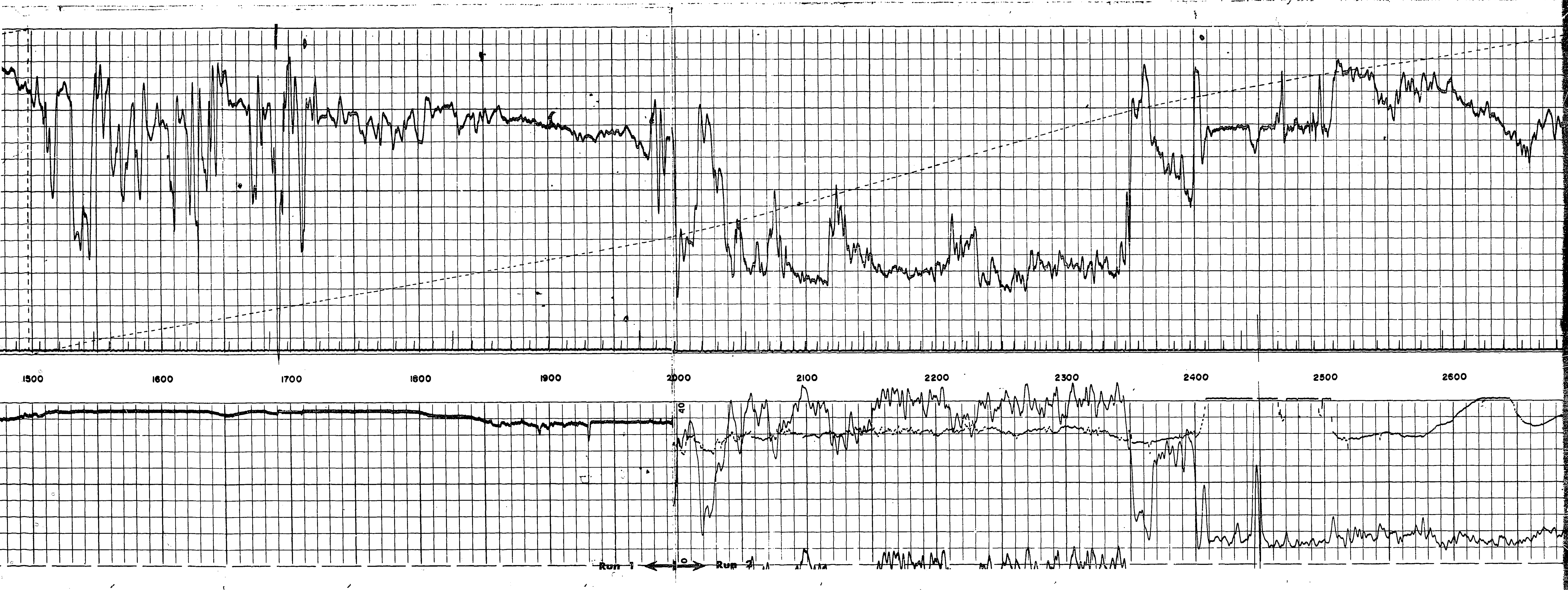
Because rough water made the shooting boat difficult to handle, waves breaking over the over the deck hampered the shooter and the time break radio frequency was being used by another party, the client, at the end of 5 1/2 hours stopped the shoot.

THIS IS AN UNCORRECTED LOG

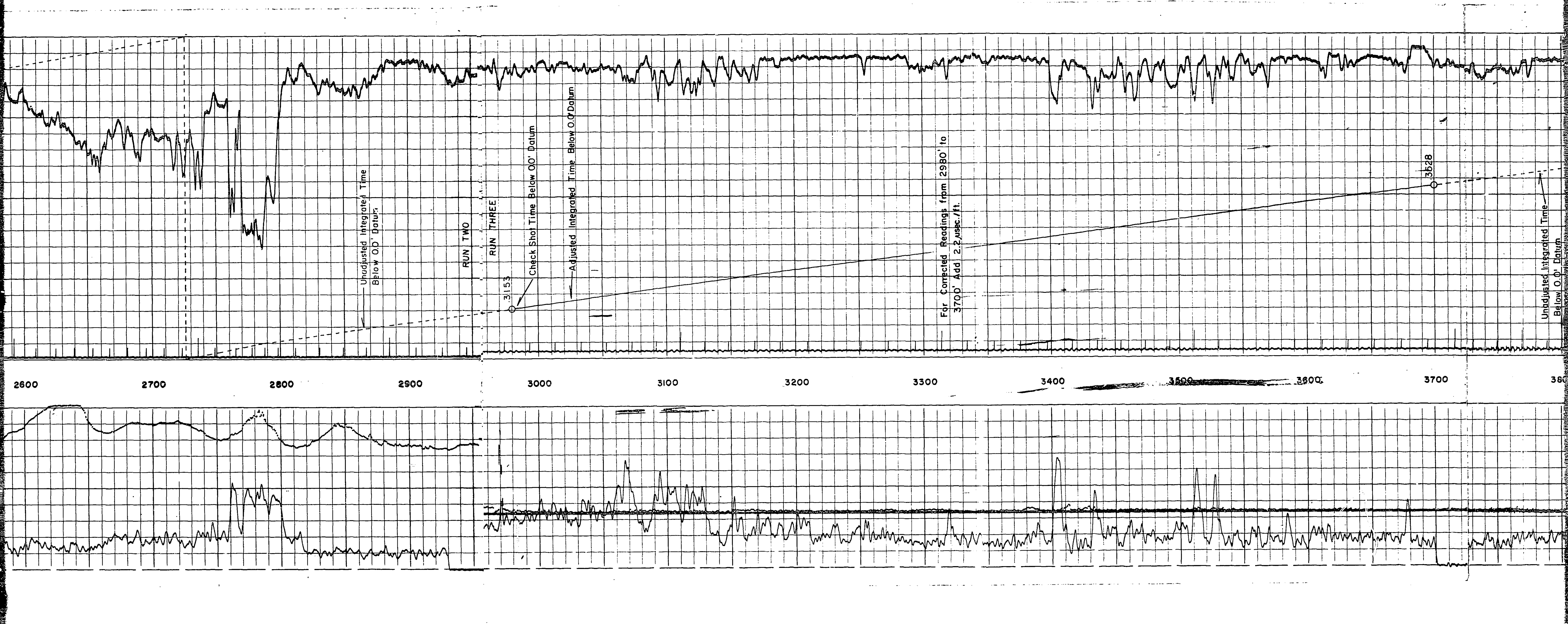
GAMMA RAY
API UNITS



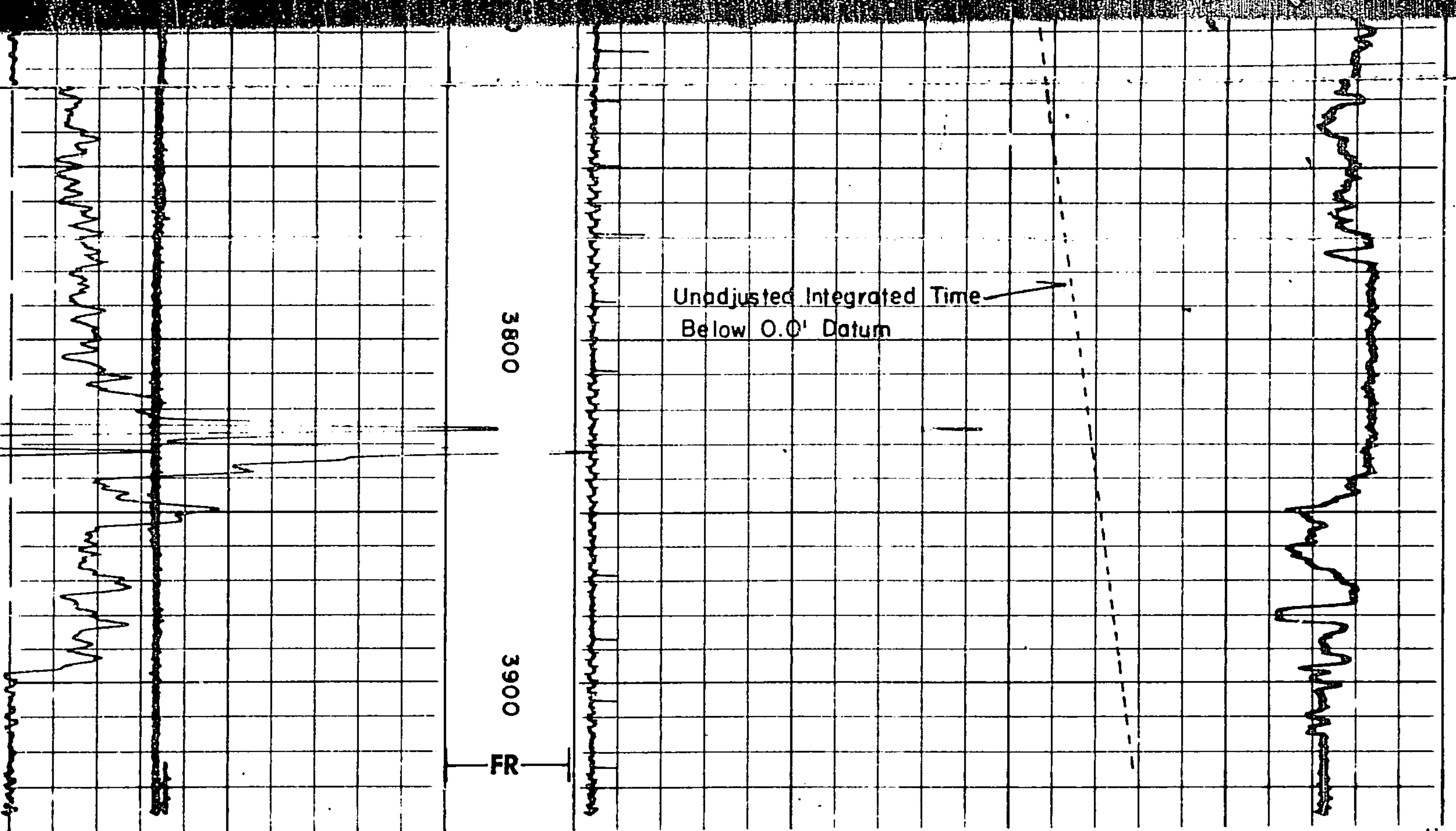
CONFIDENTIAL


1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
40
0
Run 1
Run 2

2 of


Unadjusted Integrated Time Below O.D' Datum
RUN TWO
RUN THREE
3153
Check Shot Time Below O.O' Datum
Adjusted Integrated Time Below O.O' Datum
For Corrected Readings from 2980' to 3700' Add 2.2 μsec./ft.
3528
Unadjusted Integrated Time Below O.O' Datum
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
38

3 of



| ADJUSTED INTEGRATED TIME BELOW 0 FOOT DATUM | DEPTH BELOW K.B. 32 FEET | UNADJUSTED INTEGRATED TIME BELOW 0 FOOT DATUM | AVERAGE VELOCITY BELOW 0 FOOT DATUM | INTERVAL VELOCITY OVER PRECEDING MILLISECOND | REFLECTION COEFFICIENT $\frac{(V2-V1)}{(V2+V1)}$ |
|---|---|---|---|---|---|
| 0.1715 | 1109. | 0.1715 | 6277. | | |
| 0.1720 | 1114. | 0.1720 | 6290. | 11374. | 0.0039 |
| 0.1730 | 1125. | 0.1730 | 6317. | 11465. | -0.0809 |
| 0.1740 | 1135. | 0.1740 | 6339. | 9748. | 0.1053 |
| 0.1750 | 1147. | 0.1750 | 6371. | 12043. | 0.0194 |
| 0.1760 | 1159. | 0.1760 | 6403. | 12521. | 0.0372 |
| 0.1770 | 1173. | 0.1770 | 6446. | 13489. | -0.0095 |
| 0.1780 | 1186. | 0.1780 | 6483. | 13235. | -0.0176 |
| 0.1790 | 1199. | 0.1790 | 6519. | 12775. | -0.0042 |
| 0.1800 | 1211. | 0.1800 | 6549. | 12668. | 0.0032 |
| 0.1810 | 1224. | 0.1810 | 6585. | 12751. | 0.0191 |
| 0.1820 | 1237. | 0.1820 | 6620. | 13248. | -0.0000 |
| 0.1830 | 1251. | 0.1830 | 6661. | 13246. | 0.0041 |
| 0.1840 | 1264. | 0.1840 | 6695. | 13356. | -0.0000 |
| 0.1850 | 1277. | 0.1850 | 6729. | 13355. | -0.0018 |
| 0.1860 | 1291. | 0.1860 | 6768. | 13305. | 0.0099 |
| 0.1870 | 1304. | 0.1870 | 6802. | 13571. | 0.0066 |
| 0.1880 | 1318. | 0.1880 | 6840. | 13753. | 0.0056 |
| 0.1890 | 1332. | 0.1890 | 6878. | 13910. | -0.0027 |
| 0.1900 | 1346. | 0.1900 | 6915. | 13833. | -0.0257 |
| 0.1910 | 1359. | 0.1910 | 6947. | 13138. | -0.0627 |
| 0.1920 | 1371. | 0.1920 | 6973. | 11587. | -0.0120 |
| 0.1930 | 1302. | 0.1930 | 6994. | 11311. | 0.1841 |
| 0.1940 | 1398. | 0.1940 | 7041. | 16418. | 0.0342 |
| 0.1950 | 1416. | 0.1950 | 7097. | 17584. | -0.0194 |
| 0.1960 | 1433. | 0.1960 | 7147. | 16913. | -0.0853 |
| 0.1970 | 1447. | 0.1970 | 7182. | 14252. | 0.0299 |
| 0.1980 | 1462. | 0.1980 | 7222. | 15133. | 0.0743 |
| 0.1990 | 1480. | 0.1990 | 7276. | 17565. | 0.0086 |
| 0.2000 | 1498. | 0.2000 | 7329. | 17873. | -0.0706 |
| 0.2010 | 1513. | 0.2010 | 7368. | 15515. | -0.0110 |
| 0.2020 | 1528. | 0.2020 | 7405. | 15174. | -0.1796 |
| 0.2030 | 1539. | 0.2030 | 7423. | 10553. | 0.0906 |
| 0.2040 | 1552. | 0.2040 | 7450. | 12656. | 0.0606 |
| 0.2050 | 1566. | 0.2050 | 7482. | 14291. | -0.0506 |
| 0.2060 | 1579. | 0.2060 | 7509. | 12913. | 0.0228 |
| 0.2070 | 1592. | 0.2070 | 7536. | 13517. | 0.0229 |
| 0.2080 | 1606. | 0.2080 | 7567. | 14152. | -0.0254 |
| 0.2090 | 1620. | 0.2090 | 7598. | 13450. | -0.0451 |
| 0.2100 | 1632. | 0.2100 | 7619. | 12287. | 0.0601 |
| 0.2110 | 1646. | 0.2110 | 7649. | 13859. | 0.0949 |
| 0.2120 | 1663. | 0.2120 | 7693. | 14766. | -0.0964 |
| 0.2130 | 1677. | 0.2130 | 7723. | 13816. | -0.0331 |
| 0.2140 | 1689. | 0.2140 | 7742. | 12930. | 0.0178 |
| 0.2150 | 1703. | 0.2150 | 7772. | 13400. | -0.0211 |
| 0.2160 | 1716. | 0.2160 | 7796. | 12844. | 0.0879 |
| 0.2170 | 1731. | 0.2170 | 7829. | 15321. | -0.0088 |
| 0.2180 | 1746. | 0.2180 | 7862. | 15053. | -0.0208 |
| 0.2190 | 1761. | 0.2190 | 7894. | 14438. | -0.0077 |
| 0.2200 | 1775. | 0.2200 | 7922. | 14216. | -0.0134 |
| 0.2210 | 1789. | 0.2210 | 7950. | 13839. | 0.0133 |
| 0.2220 | 1803. | 0.2220 | 7977. | 14214. | 0.0416 |
| 0.2230 | 1818. | 0.2230 | 8008. | 15451. | -0.0146 |
| 0.2240 | 1833. | 0.2240 | 8040. | 15005. | -0.0098 |
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| 0.2270 | 1878. | 0.2270 | 8132. | 14705. | -0.0038 |
| 0.2280 | 1892. | 0.2280 | 8157. | 14592. | -0.0116 |
| 0.2290 | 1907. | 0.2290 | 8187. | 14257. | -0.0117 |
| 0.2300 | 1921. | 0.2300 | 8213. | 13926. | -0.0113 |
| 0.2310 | 1934. | 0.2310 | 8233. | 13612. | 0.0054 |
| 0.2320 | 1948. | 0.2320 | 8258. | 13763. | 0.0034 |
| 0.2330 | 1962. | 0.2330 | 8283. | 13857. | -0.0271 |
| 0.2340 | 1975. | 0.2340 | 8303. | 13126. | 0.0032 |
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| 0.2360 | 2000. | 0.2360 | 8338. | 12311. | -0.1373 |
| 0.2370 | 2010. | 0.2370 | 8345. | 9338. | 0.1186 |
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| 0.2410 | 2053. | 0.2410 | 8385. | 9428. | -0.0281 |
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| 0.2490 | 2125. | 0.2490 | 8405. | 10054. | -0.0266 |
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| 0.2510 | 2144. | 0.2510 | 8414. | 9166. | -0.0119 |
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| 0.2670 | 2285. | 0.2670 | 8438. | 8917. | -0.0102 |
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4 of

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0.3160     GL  (2980)
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0.3530     GL  (3700)
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3490.   0.3408   10111.   18847.   -0.0223
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3604.   0.3466   10264.   19920.   -0.0080
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3663.   0.3494   10344.   20208.   -0.0138
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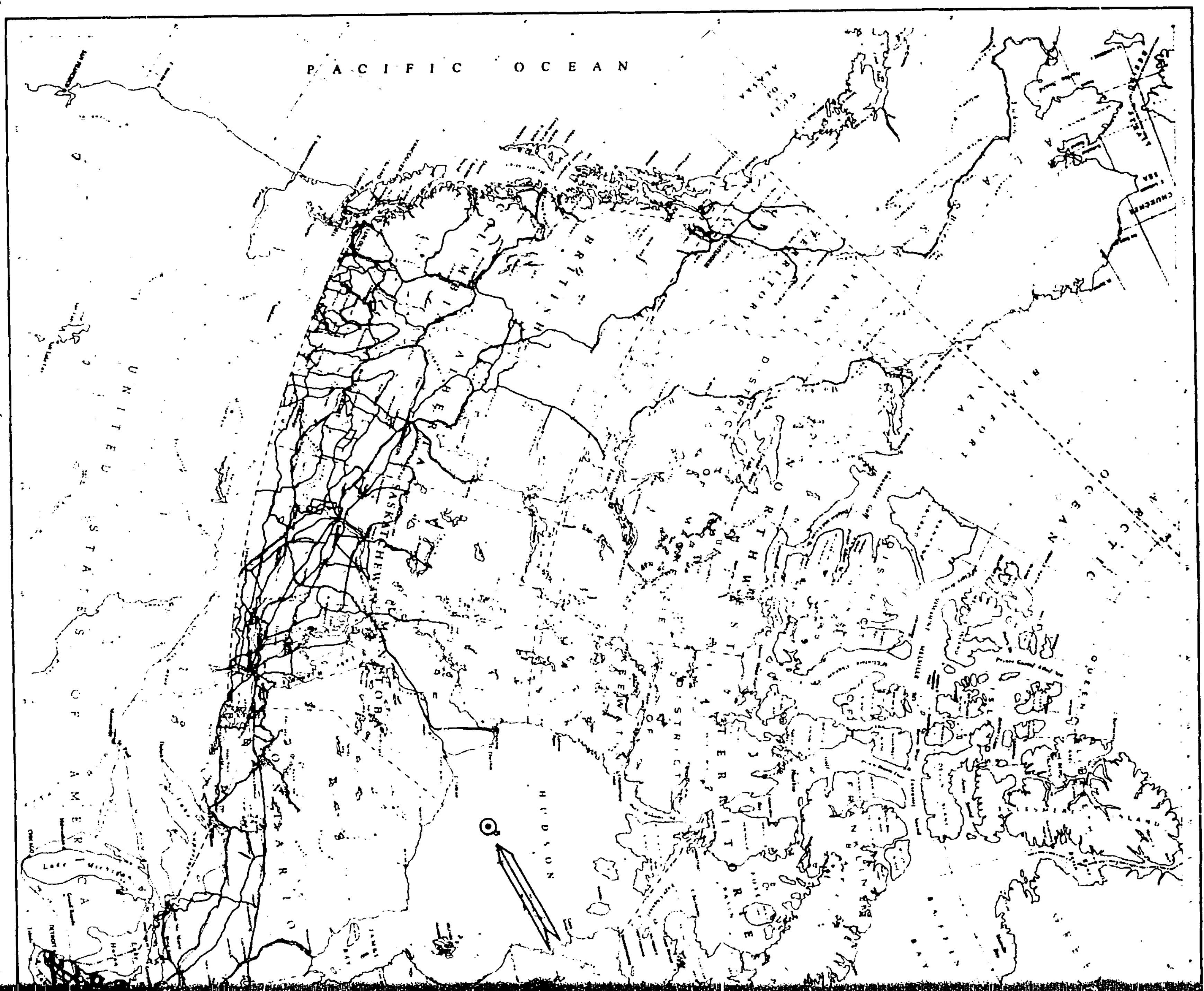
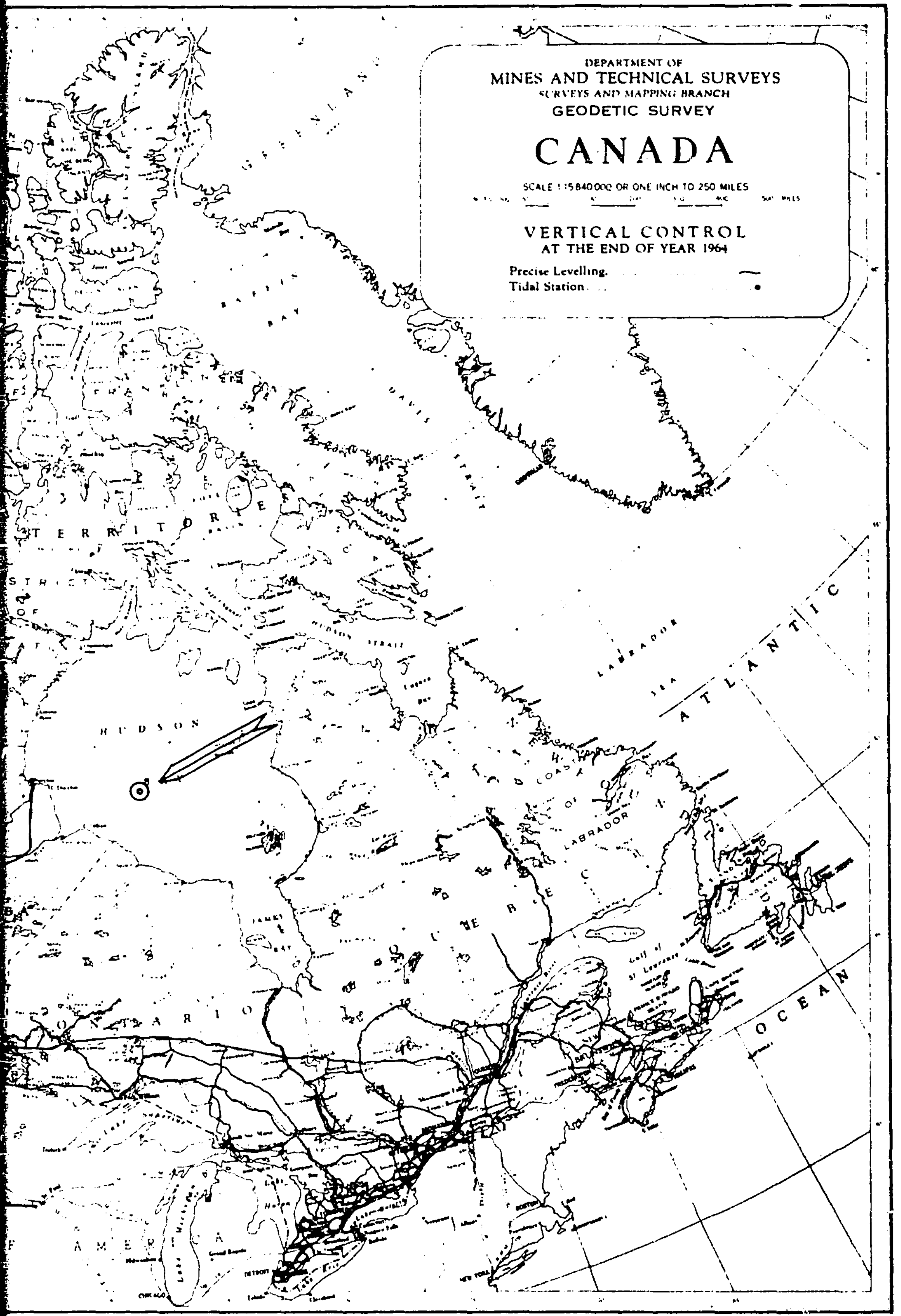
3845.   0.3584   10591.   20433.   -0.0623
3863.   0.3594   10612.   18034.    0.0210
3881.   0.3604   10632.   18811.   -0.0004
3900.   0.3614   10655.   18794.   -0.0045
3919.   0.3624   10678.   18622.    0.0065
3924.   0.3626   10684.   18867.
```



5 of



# Seismic Reference Service

Aquitaine et al Hudson Walrus A-71

87° 10' 51" W.
58° 30' 02" N.

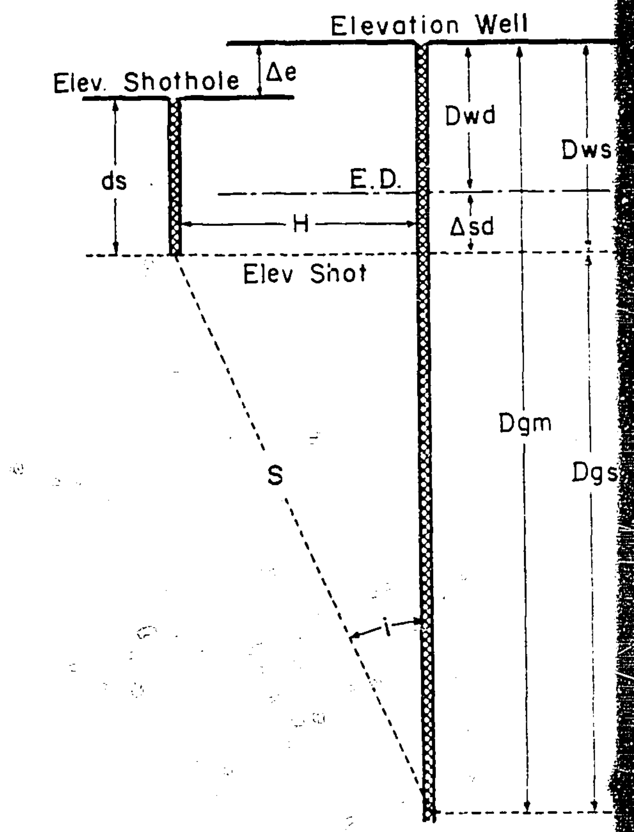
| ELEV. 32 | Dwd 32 | TOTAL DEPTH 3926 | CSG DEPTH 2965 | ELEV DATUM 0 | ELEV VEL ve: | DATE: Oct. 11, 1969 |
|---|---|---|---|---|---|---|

| Rec. No | Formation | Dgm | Dgd | S.P. No. | Sh Seq. | Dyn. Chg. | ts | Hydro. Ph. at Rig | Elev. | ds | H Dist. | Δ sd | Dgs | cos i | T | Gr. | Tgs | $\frac{\Delta sd}{ve}$ | Tgd | Average Tgd | va Average Velocity | ΔDgd | ΔTgd | vi Interval Velocity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 2980 | 2948 | 1 | A | 2 ½ | | .338 | 0 | 30 | 1625 | -30 | 2918 | .8737 | .354 | P | .3093 | -.006 | .3153 | .3153 | 9350 | | | |
| 2 | | 3700 | 3668 | 1 | B | 20 | | .314 | 0 | 30 | 1512 | -30 | 3638 | .9234 | .376 | P | .3472 | -.006 | .3532 | | | 720 | .0375 | 19200 |
| 3 | | 3700 | 3668 | 1 | C | 20 | | .236 | 0 | 30 | 1144 | -30 | 3638 | .9539 | .363 | F | .3463 | -.006 | .3523 | .3528 | 10397 | | | |

Velocity of sea water @ 30° F with salinity of 30,500 milligrams per liter is 4,720 ft. per second.

Since seas were running @ only 1.6 meters @ the time of the shoot and the tides only varied by 2.5 ft.
no tide or wave corrections have been made.

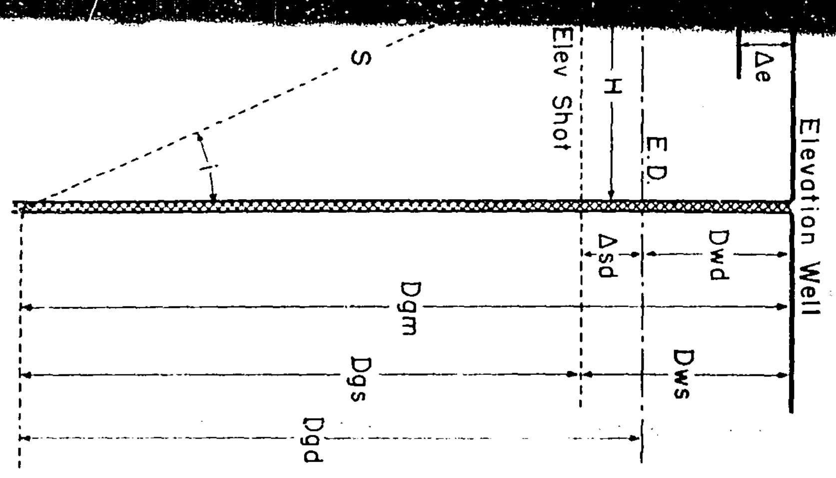
## CROSS-SECTION AND DEFINITION



Dgm = Geophone depth below well elevation
Dwd = Difference between well elevation and elevation d
Dgd = Geophone depth below elevation datum = Dgm
ts = Uphole time in shothole
tR = Refraction time from reference geophone
ds = Depth of shot
H = Horizontal distance from well to shothole
Δsd = Difference between shot elevation and elevation d
Dgs = Geophone depth below shot elevation = Dgd +
cos i = $Dgs/\sqrt{H^2 + Dgs^2}$
T = Observed travel time from shot to well geophon
Gr = Quality grade of well geophone "break"
Tgs = Travel time for Dgs distance = T cos i
Δsd/ve = Time correction from shot to elevation datum
Tgd = Travel time for Dgd distance = Tgs − Δsd/ve
va = Average velocity to depth Dgd = Dgd/Tgd
ΔDgd = Interval distance = $Dgd_n - Dgd_m$
ΔTgd = Interval time for ΔDgd distance = $Tgd_n - Tgd_m$
vi = Interval velocity = ΔDgd/ΔTgd
S = Direct diagonal distance from shot to geopho
ED = Elevation or reference datum
ve = Elevation correction velocity
Δe = Difference between well elevation and shothole e

6 of

N AND DEFINITION OF TERMS

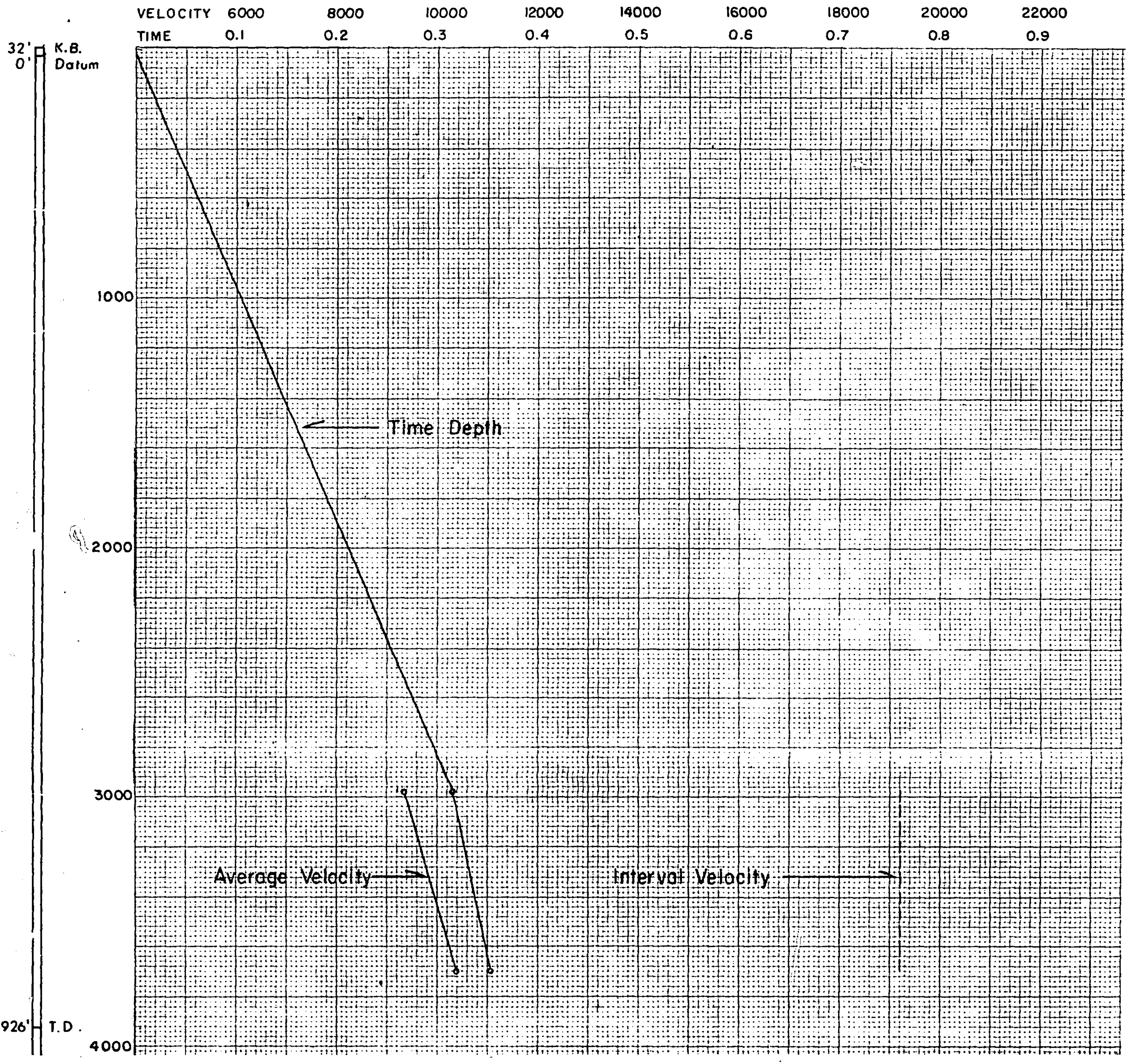


th below well elevation
ween well elevation and elevation datum = Ew — ED
th below elevation datum = Dgm — Dwd
n shothole
e from reference geophone
tance from well to shothole
ween shot elevation and elevation datum = Es — ds — ED
th below shot elevation = Dgd + Δsd
el time from shot to well geophone
of well geophone "break"
or Dgs distance = T cos i
n from shot to elevation datum
or Dgd distance = Tgs — Δsd/ve
ity to depth Dgd = Dgd/Tgd
ce = $Dgd_n - Dgd_m$
for ΔDgd distance = $Tgd_n - Tgd_m$
ty = ΔDgd/ΔTgd
al distance from shot to geophone = Dgs/cos i
reference datum
ection velocity
tween well elevation and shothole elevation = Ew — Es

# VELOCITY CURVES

Aquitaine et al Hudson Walrus A-71 87° 10' 51" W. 58° 30' 02" N.

This graph is based on data from the computation sheet

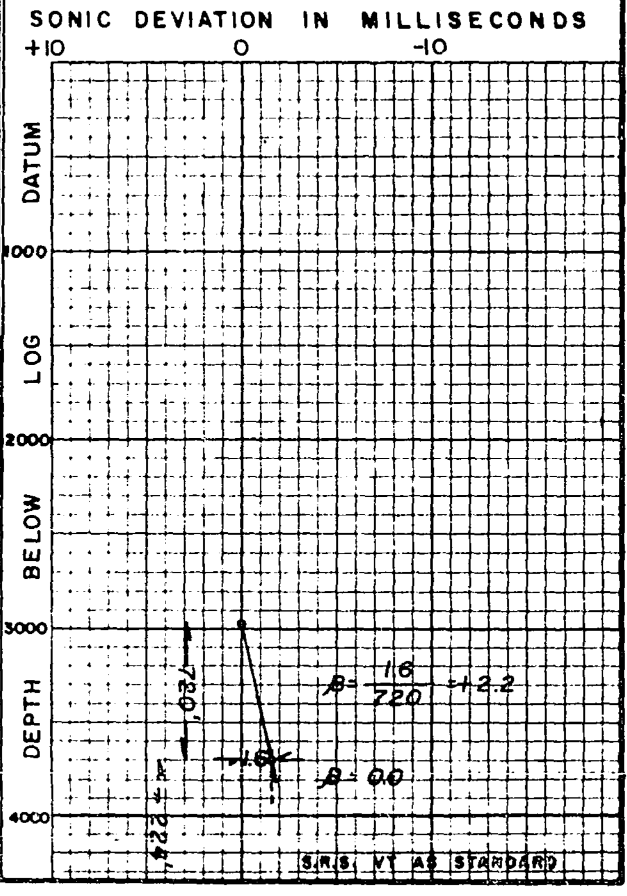


## Century SEISMIC REFERENCE SERVICE

## TIME COMPARISON

| Depths Below | | S.R.S | | Sonic Log | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | INTERVAL | | |
| LOG DATUM | SEISMIC DATUM | VERTICAL TIME | Difference | VERTICAL TIME | AVERAGE VELOCITY | DEPTH | TIME | VELOCITY |
| UNADJUSTED DIGITAL INTEGRATION | | | | | | | | |
| 2980 | 2948 | .3153 | +.0000 | .3153 | 9350 | 720 | .0359 | 20056 |
| 3700 | 3668 | .3528 | -.0016 | .3512 | 10444 | | | |
| ADJUSTED DIGITAL INTEGRATION | | | | | | | | |
| 2980 | 2948 | .3153 | +.0000 | .3153 | 9350 | 720 | .0375 | 19200 |
| 3700 | 3668 | .3528 | +.0000 | .3528 | 10397 | | | |

GRAPHIC COMPARISON
S.R.S. TO SONIC



## VELOCITY RECORDS

### TRACE ARRANGEMENT

**Trace 1** - Time Break

**Trace 2** - Mechanical EVS-2 Marsh Geophone

**Trace 3** - Well Geophone (Gulf), high gain, 20-100 filter

**Trace 4** - Well Geophone (Gulf), medium gain, 20-100 filter

**Trace 5** - Well Geophone (Gulf), low gain, 20-100 filter

For Record No. 1 - Traces 6,7,8 Well Geophone (Gulf) high, medium, low gains respectively on 31-68 filter.

For Record No.s 2 & 3 - Traces 6,7,8 not used.

Trace 9-Crystal Hydrophone on Hi Pass 30 feet from K.B.

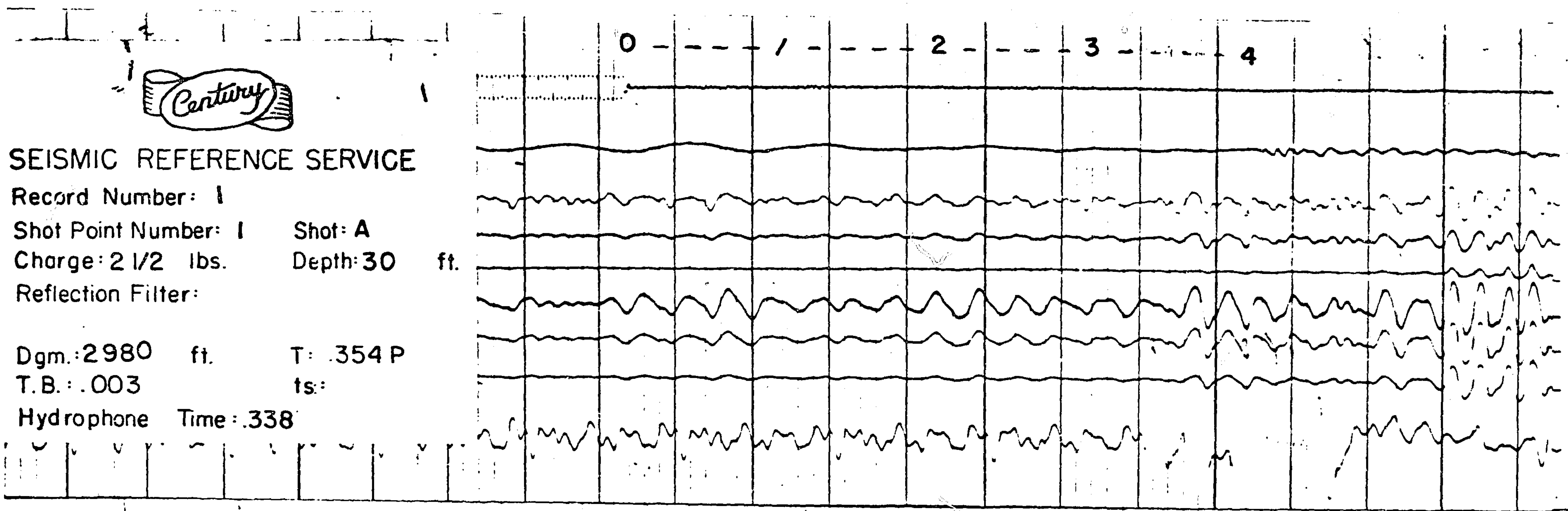
70F

Trace 5 - Well Geophone (Gulf), low gain, 20-100 filter

For Record No. 1 - Traces 6,7,8 Well Geophone (Gulf) high, medium, low gains respectively on 31-68 filter.

For Record No.s 2 & 3 - Traces 6,7,8 not used.

Trace 9-Crystal Hydrophone on Hi Pass 30 feet from K.B.



Century

SEISMIC REFERENCE SERVICE

Record Number: 1

Shot Point Number: 1 Shot: A

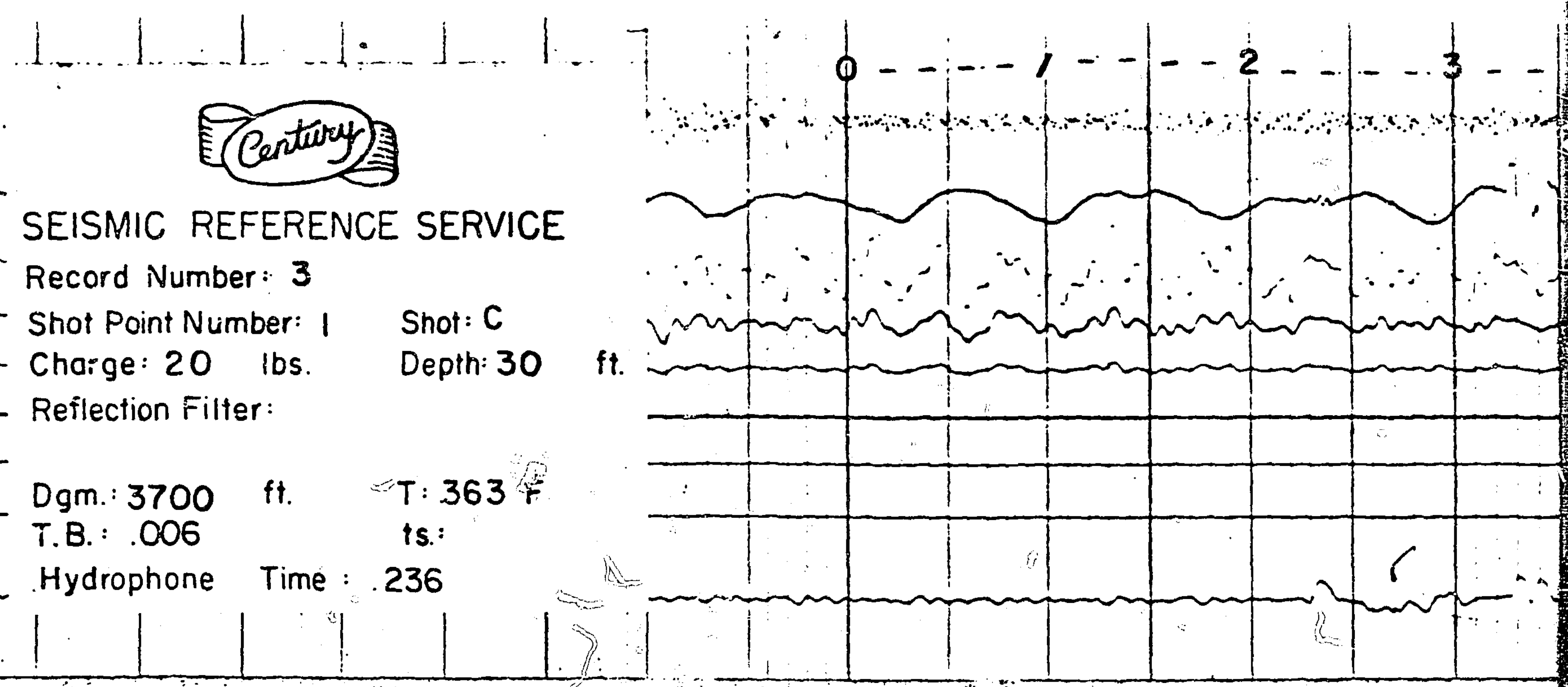
Charge: 2 1/2 lbs. Depth: 30 ft.

Reflection Filter:

Dgm.: 2980 ft. T: .354 P

T.B.: .003 ts:

Hydrophone Time: .338



Century

SEISMIC REFERENCE SERVICE

Record Number: 3

Shot Point Number: 1 Shot: C

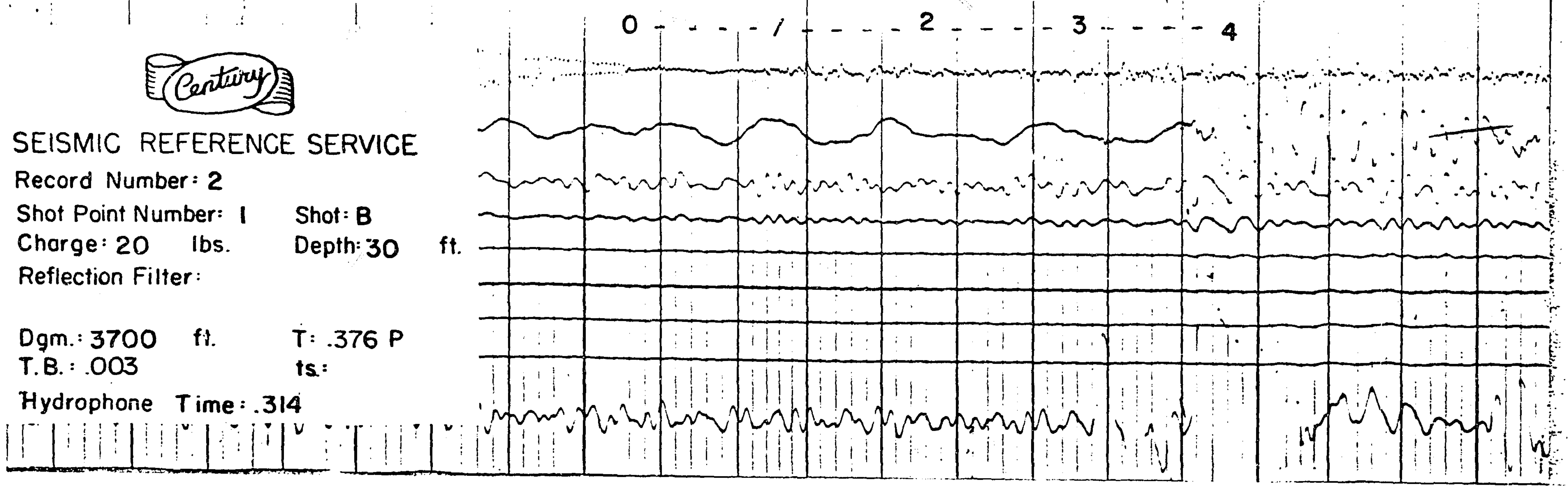
Charge: 20 lbs. Depth: 30 ft.

Reflection Filter:

Dgm.: 3700 ft. T: 363 F

T.B.: .006 ts:

Hydrophone Time: .236



Century

SEISMIC REFERENCE SERVICE

Record Number: 2

Shot Point Number: 1 Shot: B

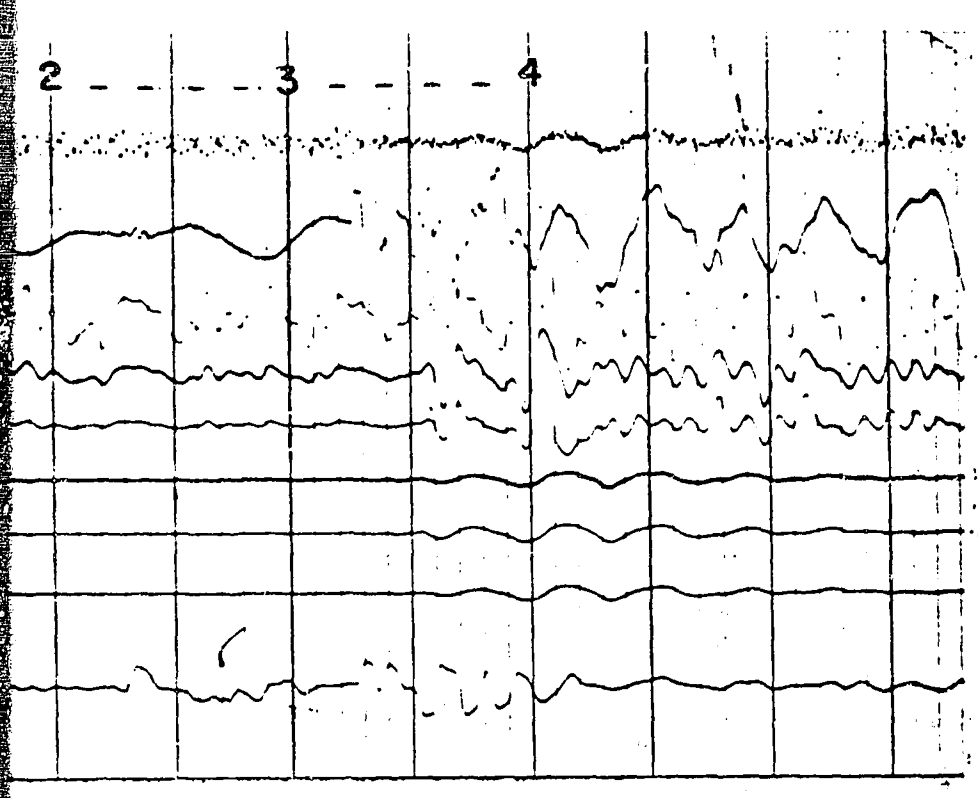
Charge: 20 lbs. Depth: 30 ft.

Reflection Filter:

Dgm.: 3700 ft. T: .376 P

T.B.: .003 ts:

Hydrophone Time: .314



## NORMAL MOVEOUT DETERMINATION

$$N.M.O. = \sqrt{To^2 + X^2/V^2} - To$$

Where: To = two way time below 0' Datum, X = spread distance and V = average velocity

| TIME | SPREAD DISTANCE | | | | |
|---|---|---|---|---|---|
| | 660. | 1320. | 1800. | 2640. | 5280. |
| 0.200 | 0.0112 | 0.0419 | 0.0728 | 0.1377 | 0.3799 |
| 0.300 | 0.0078 | 0.0304 | 0.0544 | 0.1082 | 0.3298 |
| 0.400 | 0.0059 | 0.0234 | 0.0426 | 0.0870 | 0.2847 |
| 0.500 | 0.0048 | 0.0190 | 0.0348 | 0.0723 | 0.2484 |
| 0.600 | 0.0040 | 0.0159 | 0.0294 | 0.0616 | 0.2191 |
| 0.700 | 0.0028 | 0.0114 | 0.0210 | 0.0446 | 0.1647 |

## GEOLOGIC TOPS

| Formation | Symbol | Dgm | 2 TL | Formation | Symbol | Dgm | 2 TL | Formation | Symbol | Dgm | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

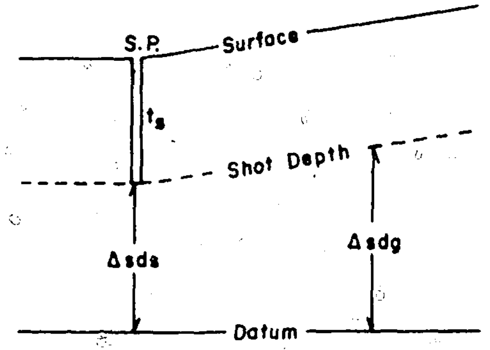
Where: $T_L$ = Adjusted Log Time Below Seismic Datum, And Dgm = Depth Below Log Datum

### Shift From Log To Specimen Record (ΣT)

$$\Sigma T = \frac{\Delta sds}{Ve} + \frac{\Delta sdg}{Ve} + t_s$$

= + + = Secs.

Correction Velocity (Ve) =
Feet Per Second



### Synthetic Seismogram Input Wavelet

Wavelet Frequency (Peak to Peak)

From Start to .801 Secs. = 50 Cps.

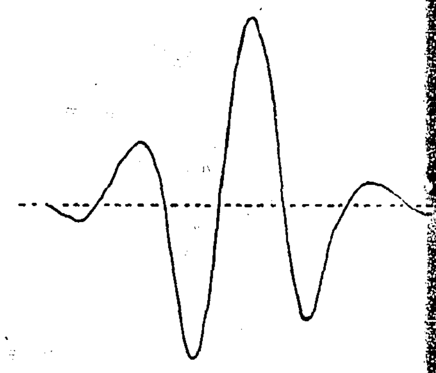
From Secs. to Secs. = Cps.

From Secs. to Secs. = Cps.

From Secs. to Secs. = Cps.

A.G.C. Time Constant = .150 Secs.

Waveform



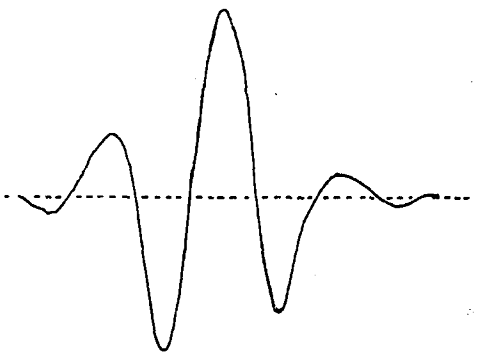
9 of

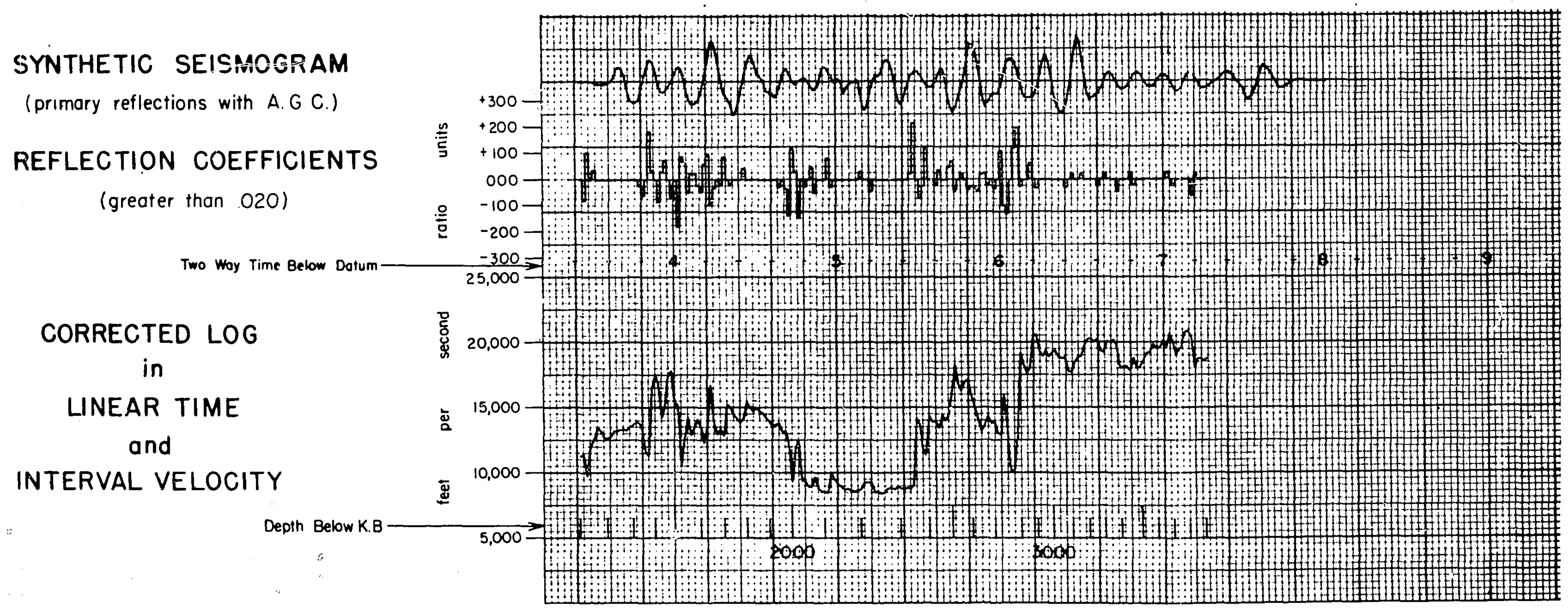
|  | Symbol | Dgm | 2 TL |
|---|---|---|---|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

og Datum

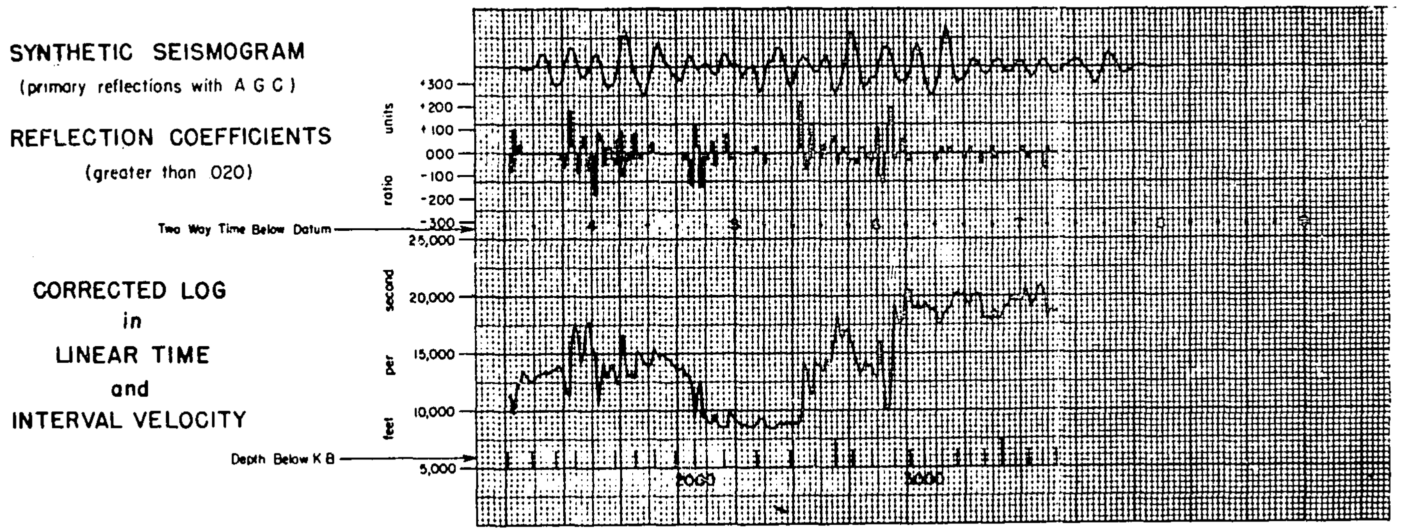
Input Wavelet

Waveform





This Plot Has Been Reduced to Standard Record Section Paper Speed



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# AQUITAINE ET AL HUDSON WALRUS A-71

# TIME ANALYSIS

| ITEMS | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | 10 | 11 | 12 | 13 | 14 | | 15 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPERATIONS | | RIGGING UP & DOWN | DRILLING | REDRILLING | DRILLING TRIP | HOLE OPENING | CORING | CORING TRIP | TEST | SCHLUMBERGER | TOTCO | VELOCITY SURVEY | CASING | CIRCULATION | FISHING | ABANDON | REPAIRS Contractor | REPAIRS Stack | WAITING TIME | *TOTAL* |
| AUGUST | 7 1 | 15:30 | 3:30 | | 2:30 | | | | | | | | | | | | 2:30 | | - | 24:00 |
| | 8 2 | | 10:30 | | | | | | | | | | 13:30 | | | | | | - | 24:00 |
| | 9 3 | | | | | | | | | | | | 20:30 | | | | | 3:30 | - | 24:00 |
| | 10 4 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 11 5 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 12 6 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 13 7 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 14 8 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 15 9 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 16 10 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 17 11 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 18 12 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 19 13 | | | | | | | | | | | | | | | | | 24:00 | - | 24:00 |
| | 20 14 | | | | | | | | | | | | | | | | | 10:00 | 14:00 | 24:00 |
| | 21 15 | | | | | | | | | | | | 8:00 | | | | | 16:00 | - | 24:00 |
| | 22 16 | | 13:00 | 2:00 | 5:30 | | | | | | | | | | | | 3:30 | | - | 24:00 |
| | 23 17 | | 4:30 | | | | | | | | 0:30 | | 19:00 | | | | | | - | 24:00 |
| | 24 18 | | | | | | | | | | | | 8:00 | | | | | | 16:00 | 24:00 |
| | 25 19 | | | | | | | | | | | | 24:00 | | | | | | -- | 24:00 |
| | 26 20 | | 14:45 | | 4:30 | | | 2:15 | | | 0:30 | | 2:00 | | | | | | - | 24:00 |
| | 27 21 | | 5:45 | | | | 1:15 | 12:45 | | | | | | | | | | | 4:15 | 24:00 |
| | 28 22 | | 3:30 | | | | | | | | | | | | | | | | 20:30 | 24:00 |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 25 19 | | | | | | | | | | | | 24:00 | | | | | | -- | 24:00 |
| | 26 20 | | 14:45 | | 4:30 | | | 2:15 | | | 0:30 | | 2:00 | | | | | | - | 24:00 |
| | 27 21 | | 5:45 | | | | 1:15 | 12:45 | | | | | | | | | | | 4:15 | 24:00 |
| | 28 22 | | 3:30 | | | | | | | | | | | | | | | | 20:30 | 24:00 |
| | 29 23 | | 1:45 | | | | | | | | | | | | | | | | 19:15 | 24:00 |
| | 30 24 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 31 25 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| *SUB-TOTAL AUG.* | | 15:30 | 60:15 | 2:00 | 12:30 | - | 1:15 | 15:00 | - | - | 1:00 | - | 95:00 | - | - | - | 6:00 | 269:30 | 122:00 | 600:00 |
| SEPTEMBER | 1 26 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 2 27 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 3 28 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 4 29 | | | | | 5:30 | | | | | | | | | | | | | 18:30 | 24:00 |
| | 5 30 | | | | 4:00 | 1:00 | | | | | | | | | | | | | 19:00 | 24:00 |
| | 6 31 | | | | 8:30 | 1:30 | | | | | | | | | | | | | 14:00 | 24:00 |
| | 7 32 | | 8:30 | | 4:45 | 3:30 | | | | 4:45 | | | | 2:30 | | | | | - | 24:00 |
| | 8 33 | | | | 3:45 | 5:15 | | | | 15:00 | | | | | | | | | - | 24:00 |
| | 9 34 | | | | | 9:15 | | | | | | | | | 7:00 | | | | 7:45 | 24:00 |
| | 10 35 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 11 36 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 12 37 | | | | | | | | | 2:00 | | | | | | | | | 2:00 | 24:00 |
| | 13 38 | | | | | 8:15 | | | | | | | | | | | | | 15:45 | 24:00 |
| | 14 39 | | | | | | | | | | | | 20:30 | | | | | | 3:30 | 24:00 |
| | 15 40 | | 5:30 | | 2:15 | | | | | | | | 13:45 | | 2:30 | | | | - | 24:00 |
| | 16 41 | | 13:00 | | 2:30 | | | 1:30 | | | | | | 7:00 | | | | | - | 24:00 |
| | 17 42 | | 10:45 | | | | 2:45 | 10:30 | | | | | | | | | | | - | 24:00 |
| | 18 43 | | 2:15 | | 3:15 | | | | | | | | | 18:30 | | | | | - | 24:00 |
| | 19 44 | | 11:00 | | | | | | | 4:30 | | | | | | | | | 8:30 | 24:00 |
| | 20 45 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 21 46 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 22 47 | | | | | | | | | 2:00 | | | | 12:30 | | | | | 9:30 | 24:00 |
| | 23 48 | | | | | | | | | 11:30 | | | 12:30 | | | | | | - | 24:00 |
| | 24 49 | | 4:00 | | | | | | | | | | 20:00 | | | | | | - | 24:00 |
| | 25 50 | | 7:30 | | 4:00 | | | | | | 0:30 | | | 12:00 | | | | | - | 24:00 |
| | 26 51 | | 14:00 | | 6:00 | | | | | | | | | 4:00 | | | | | - | 24:00 |
| | 27 52 | | 17:45 | | 5:15 | | | | | | | | | 1:00 | | | | | - | 24:00 |
| | 28 | | | | | | | | | | | | | | | | | | | |

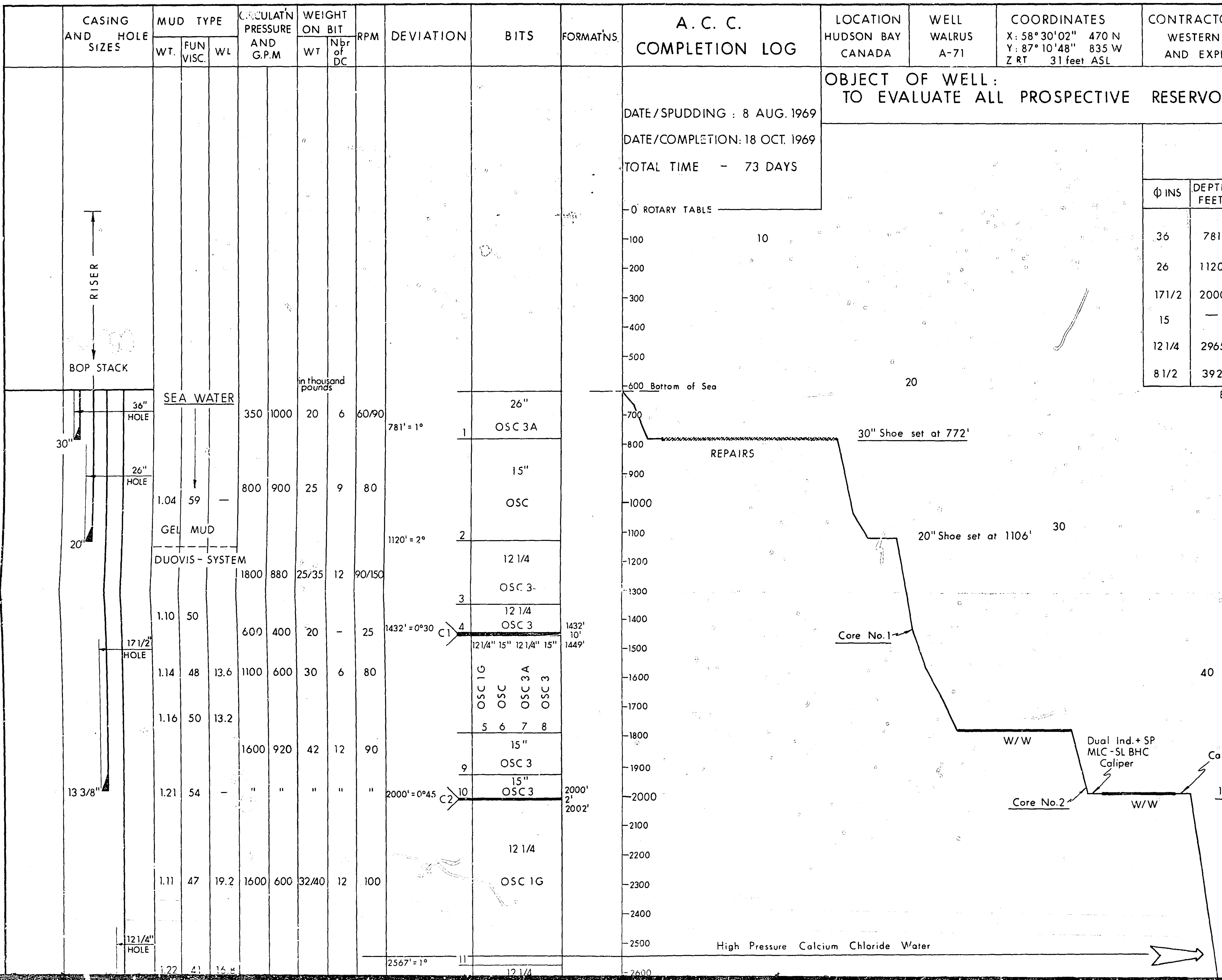
| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 19 44 | | 11:00 | | | | | | | 4:30 | | | | | | | | | 8:30 | 24:00 |
| | 20 45 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 21 46 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 22 47 | | | | | | | | | 2:00 | | | | 12:30 | | | | | 9:30 | 24:00 |
| | 23 48 | | | | | | | | | 11:30 | | | 12:30 | | | | | | - | 24:00 |
| | 24 49 | | 4:00 | | | | | | | | | | 20:00 | | | | | | - | 24:00 |
| | 25 50 | | 7:30 | | 4:00 | | | | | | 0:30 | | | 12:00 | | | | | - | 24:00 |
| | 26 51 | | 14:00 | | 6:00 | | | | | | | | | 4:00 | | | | | - | 24:00 |
| | 27 52 | | 17:45 | | 5:15 | | | | | | | | | 1:00 | | | | | - | 24:00 |
| | 28 53 | | 21:00 | | 3:00 | | | | | | | | | | | | | | - | 24:00 |
| | 29 54 | | 11:15 | | 6:00 | | | | | | 0:15 | | | | | | 6:30 | | - | 24:00 |
| | 30 55 | | 20:45 | | 3:15 | | | | | | | | | | | | | | - | 24:00 |
| SUB-TOTAL AUG. + SEPT. | | 15:30 | 201:30 | 2:00 | 69:00 | 34:15 | 4:00 | 27:00 | - | 39:45 | 1:45 | - | 161:45 | 57:30 | 9:30 | - | 12:30 | 269:30 | 408:30 | 1320:00 |
| OCTOBER | 1 56 | | 4:30 | | | | | | | | | | | | | | 1:00 | | 18:30 | 24:00 |
| | 2 57 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 3 58 | | 3:00 | | 8:00 | | | | | | | | | | | | | | 13:00 | 24:00 |
| | 4 59 | | 18:30 | | 5:15 | | | | | | 0:15 | | | | | | | | - | 24:00 |
| | 5 60 | | 18:00 | | 6:00 | | | | | | | | | | | | | | - | 24:00 |
| | 6 61 | | 2:30 | | | | | | | | | | | | | | | | 21:30 | 24:00 |
| | 7 62 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 8 63 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 9 64 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 10 65 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 11 66 | | 4:30 | | 3:30 | | | | | 9:45 | | 6:15 | | | | | | | - | 24:00 |
| | 12 67 | | 18:15 | | 5:45 | | | | | | | | | | | | | | - | 24:00 |
| | 13 68 | | 16:30 | | | | | | | | | | | | | | | | 7:30 | 24:00 |
| | 14 69 | | 8:30 | | 10:45 | | 3:15 | | | | | | | | | | | | 1:30 | 24:00 |
| | 15 70 | | | | 3:30 | | | | | 9:00 | | | | | | | | | 11:30 | 24:00 |
| | 16 71 | | | | | | | | | | | | | | | | | | 24:00 | 24:00 |
| | 17 72 | | | | | | | | | | | | | | | 24:00 | | | - | 24:00 |
| | 18 73 | 12:00 | | | | | | | | | | | | | | 12:00 | | | - | 24:00 |
| | | | | | | | | | | | 66:45 | | | | | 283:00 | | | | |
| TOTAL | | 27:30 | 301:45 | 2:00 | 111:45 | 34:15 | 7:15 | 27:00 | - | 58:30 | 2:00 | 6:15 | 161:45 | 57:30 | 9:30 | 36:00 | 13:30 | 269:30 | 626:00 | 1752:00 |
| ITEMS | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | 10 | 11 | 12 | 13 | 14 | | 15 | |

# A. C. C.
# COMPLETION LOG

| LOCATION | WELL | COORDINATES | CONTRACTOR: | RIG: WODECO II |
|---|---|---|---|---|
| HUDSON BAY<br>CANADA | WALRUS<br>A-71 | X: 58°30'02" 470 N<br>Y: 87°10'48" 835 W<br>Z RT 31 feet ASL | WESTERN OFFSHORE DRILLING<br>AND EXPLORATION CO. | TOTAL HP 4,000<br>DERRICK L.C.MOORE |

OBJECT OF WELL:
TO EVALUATE ALL PROSPECTIVE RESERVOIRS DOWN TO BASEMENT

DATE/SPUDDING : 8 AUG. 1969
DATE/COMPLETION: 18 OCT. 1969
TOTAL TIME - 73 DAYS



## DRILLING STATISTICS

| Φ INS | DEPTH FEET | FEET DRILLED | HOURS | Ft/H | BITS |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  | No. of BITS | OSC | OSC 1G | OSC 3 | OSC 3A | OWV | X 55 R | |
| 36 | 781 | 163 | 14 | 11.6 | Hole | Openers |  |  |  |  | W7R |  |
| 26 | 1120 | 339 | 17 30 | 19.3 | 1 |  |  |  | 1 |  |  |  |
| 17 1/2 | 2000 | 880 | 37 15 | 23.6 | Hole | Openers |  |  |  |  |  |  |
| 15 | — | — | — |  | 5 | 2 |  | 3 |  |  |  |  |
| 12 1/4 | 2965. | 965 | 42 30 | 22.7 | 8 | 2 | 3 | 2 | 1 |  |  |  |
| 8 1/2 | 3926 | 961 | 190 30 | 5 | 14 |  | 9 |  |  | 3 | 1 | 1 |

BIT No. 28 = 8 7/16" CHRISTENSEN TYPE MD 19 V

DRA
PUM

1 RIG
2 DRI
3 RE
4 DR
5 HO
6 CO
7 CO
8 TES
9 MI
10 W
11 CA
12 CI
13 FI
14 A
15 R
16 V
17 V

%
100
90
80
70
60
50
40
30
20
10
0

1 of

| | |
|---|---|
| DRILLING<br>O. | RIG: WODECO II<br>TOTAL HP 4,000<br>DERRICK L.C. MOORE |

DRAW - WORKS : 1320 DE NATIONAL
PUMPS 1 G 1000 C NATIONAL
2 G 1000 C NATIONAL

## WN TO BASEMENT

## RILLING STATISTICS

| URS | Ft / H | BITS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | No. of BITS | OSC | OSC1G | OSC3 | OSC3A | OWV | X 55 R |
| | 11.6 | Hole | Openers | | | | | W7R |
| 30 | 19.3 | 1 | | | | 1 | | |
| 15 | 23.6 | Hole | Openers | | | | | |
| — | | 5 | 2 | | 3 | | | |
| 30 | 22.7 | 8 | 2 | 3 | 2 | 1 | | |
| 0 30 | 5 | 14 | | 9 | | | 3 | 1 1 |

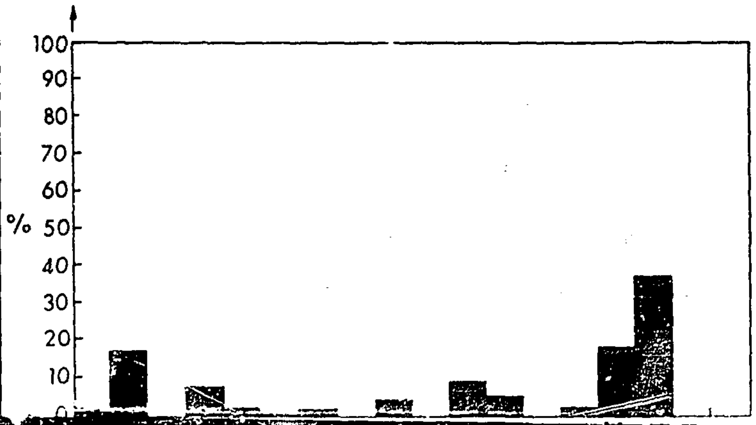
/16" CHRISTENSEN TYPE MD 19 V

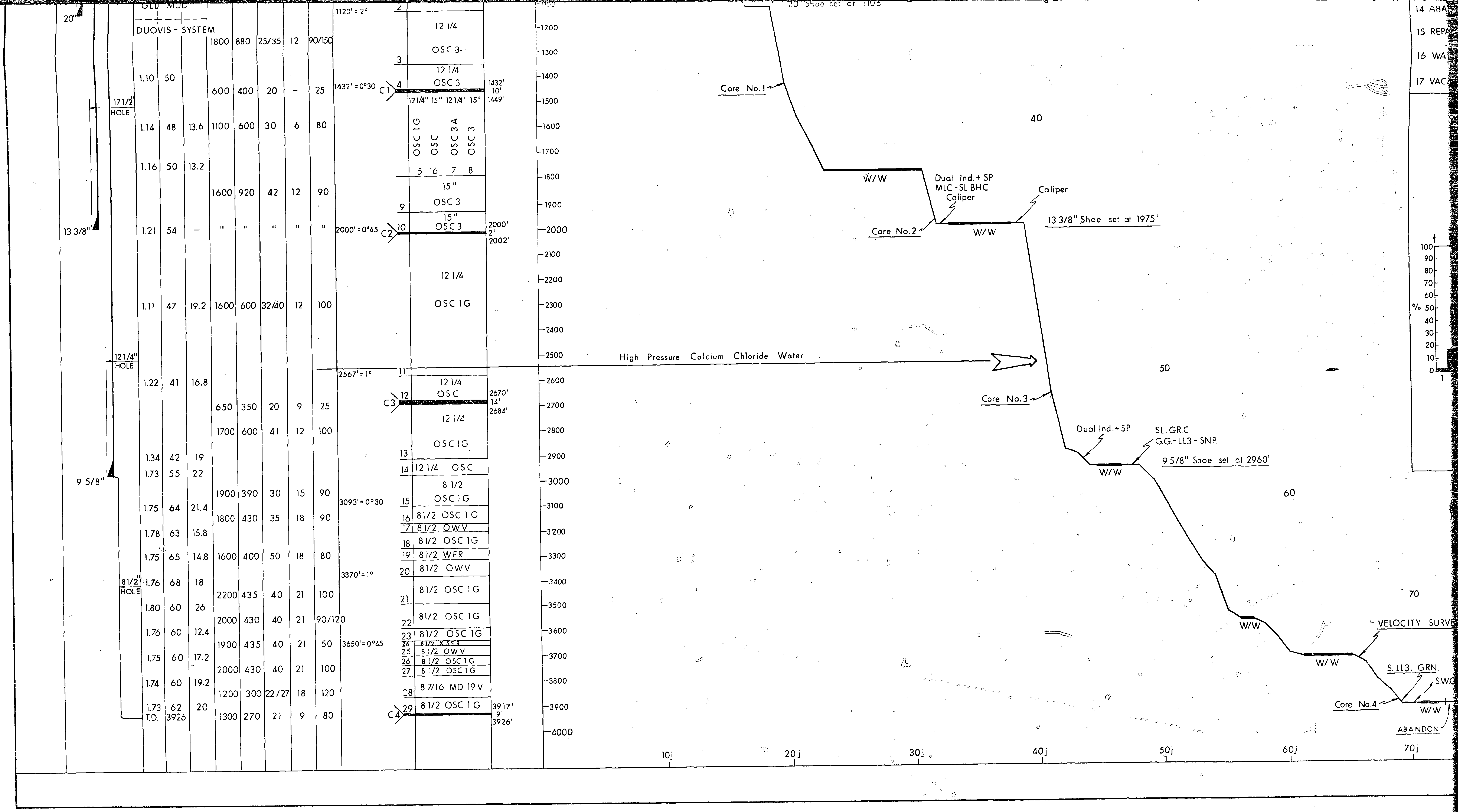
et at 1975'

## TIME ANALYSIS

| ITEMS | NUMBER OF HRS | % |
|---|---|---|
| 1 RIGGING UP AND DOWN | 27.30 | 1.60 |
| 2 DRILLING | 301.45 | 17.30 |
| 3 REDRILLING | 2.00 | 0.20 |
| 4 DRILLING TRIP | 111.45 | 6.50 |
| 5 HOLE OPENING | 34.15 | 2.10 |
| 6 CORING | 7.15 | 0.40 |
| 7 CORING TRIP | 27.00 | 1.54 |
| 8 TESTING | — | — |
| 9 MISC. OPERATIONS | 66.45 | 3.82 |
| 10 WELL COMPLETION | — | — |
| 11 CASING | 161.45 | 9.25 |
| 12 CIRCULATION | 57.30 | 3.40 |
| 13 FISHING JOB | 9.30 | 0.54 |
| 14 ABANDON | 36.00 | 2.05 |
| 15 REPAIRS | 283.00 | 16.18 |
| 16 WAITING TIME | 626.00 | 35.12 |
| 17 VACATION | — | — |

## TIME ANALYSIS CHART

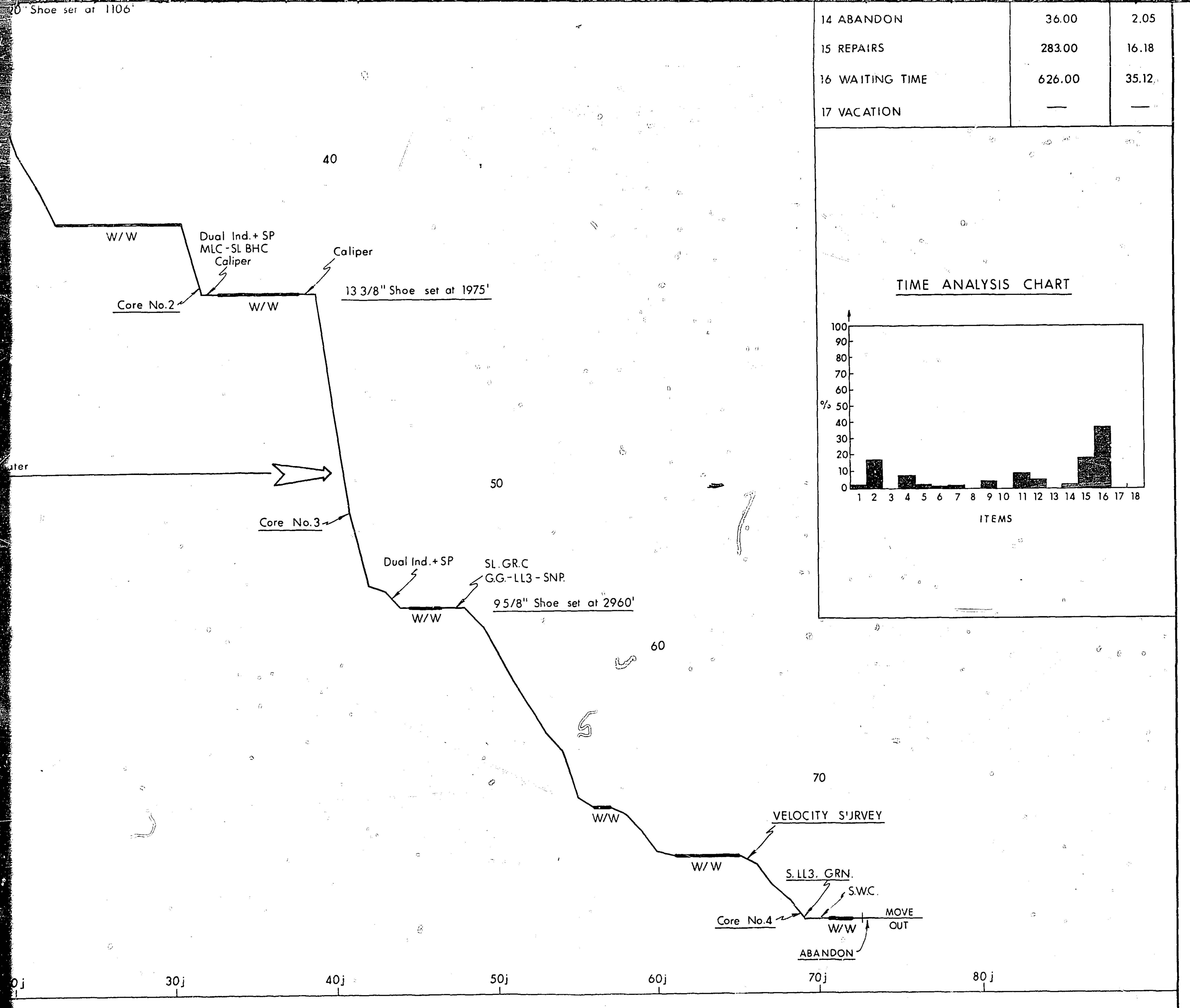




20"
GEL MUD
DUOVIS - SYSTEM
17 1/2" HOLE
13 3/8"
12 1/4" HOLE
9 5/8"
8 1/2" HOLE
1.10 50
1.14 48 13.6 1100 600 30 6 80
1.16 50 13.2
1800 880 25/35 12 90/150
600 400 20 – 25
1600 920 42 12 90
1.21 54 – " " " " "
1.11 47 19.2 1600 600 32/40 12 100
1.22 41 16.8
650 350 20 9 25
1700 600 41 12 100
1.34 42 19
1.73 55 22
1900 390 30 15 90
1.75 64 21.4
1800 430 35 18 90
1.78 63 15.8
1.75 65 14.8 1600 400 50 18 80
1.76 68 18
2200 435 40 21 100
1.80 60 26
2000 430 40 21 90/120
1.76 60 12.4
1900 435 40 21 50
1.75 60 17.2
2000 430 40 21 100
1.74 60 19.2
1200 300 22/27 18 120
1.73 62 20
T.D. 3926
1300 270 21 9 80
1120' = 2°
1432' = 0°30
2000' = 0°45
2567' = 1°
3093' = 0°30
3370' = 1°
3650' = 0°45
2
12 1/4
OSC 3
3
12 1/4
OSC 3
C1 4
12 1/4" 15" 12 1/4" 15"
OSC 1G
OSC
OSC 3A
OSC 3
5 6 7 8
15"
OSC 3
9
15"
C2 10 OSC 3
12 1/4
OSC 1G
11
12 1/4
C3 12 OSC
12 1/4
OSC 1G
13
14 12 1/4 OSC
8 1/2
15 OSC 1G
16 8 1/2 OSC 1G
17 8 1/2 OWV
18 8 1/2 OSC 1G
19 8 1/2 WFR
20 8 1/2 OWV
21 8 1/2 OSC 1G
22 8 1/2 OSC 1G
23 8 1/2 OSC 1G
24 8 1/2 X 55 R
25 8 1/2 OWV
26 8 1/2 OSC 1G
27 8 1/2 OSC 1G
28 8 7/16 MD 19 V
C4 29 8 1/2 OSC 1G
1432' 10' 1449'
2000' 2' 2002'
2670' 14' 2684'
3917' 9' 3926'
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
20" Shoe set at 1106
Core No.1
40
W/W
Dual Ind. + SP
MLC - SL BHC
Caliper
Caliper
Core No.2
W/W
13 3/8" Shoe set at 1975'
High Pressure Calcium Chloride Water
50
Core No.3
Dual Ind. + SP
SL.GR.C
G.G.-LL3 - SNP.
W/W
9 5/8" Shoe set at 2960'
60
70
W/W
VELOCITY SURVE
W/W
S. LL3. GRN.
SWC
Core No.4
W/W
ABANDON
10j
20j
30j
40j
50j
60j
70j
14 ABA
15 REPA
16 WA
17 VAC
100
90
80
70
60
% 50
40
30
20
10
0
1

2 of

|  |  |  |
|---|---|---|
| 14 ABANDON | 36.00 | 2.05 |
| 15 REPAIRS | 283.00 | 16.18 |
| 16 WAITING TIME | 626.00 | 35.12 |
| 17 VACATION | — | — |



4 of 4

AQUITAINE

SCALE: 2"=100'or 1:600

# COMPOSITE LOG

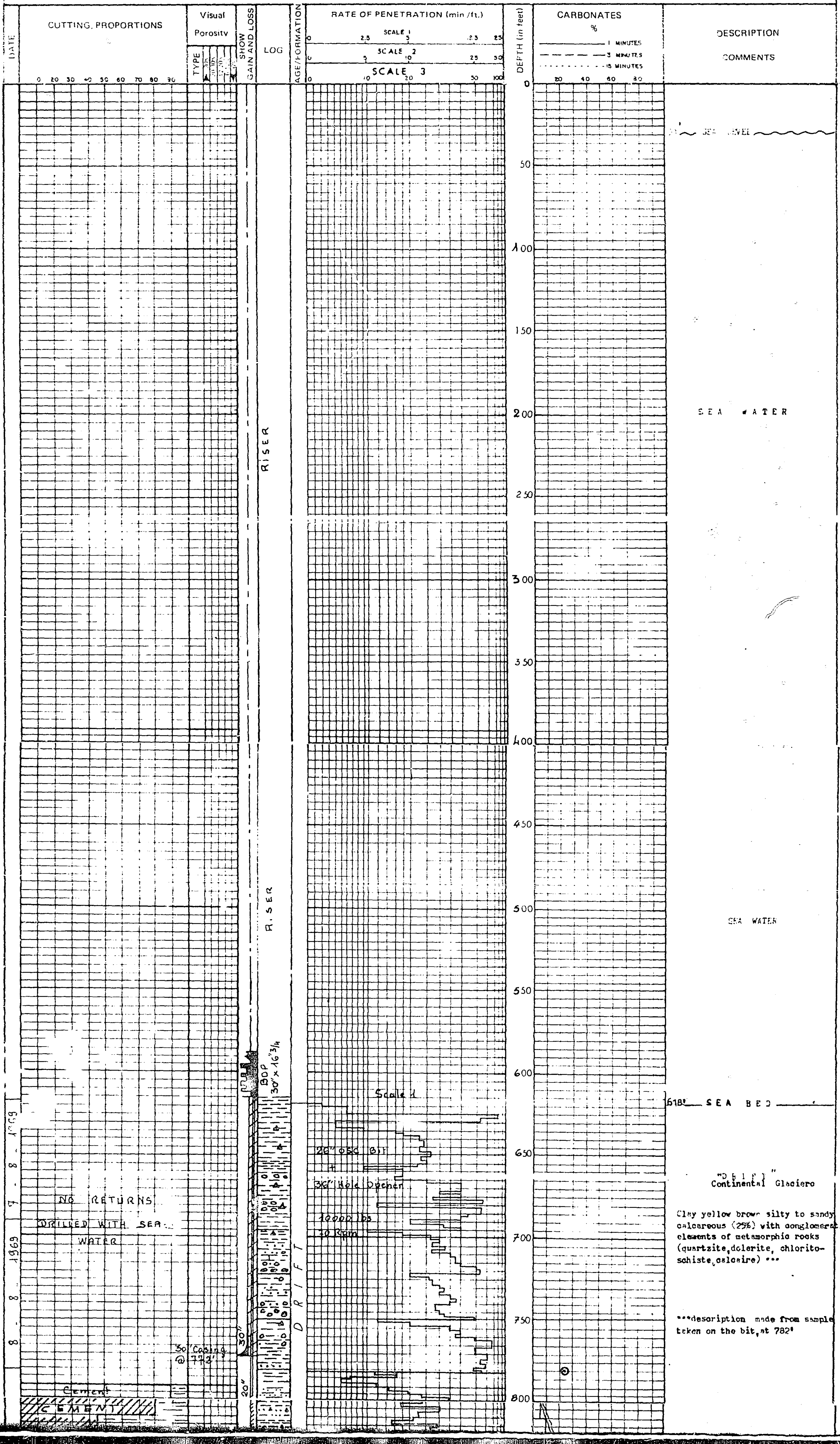
SHEET No.: 1 to 10

WELL NAME: WALRUS A 71

| OPERATOR | PERMIT OR LEASE | TIMING | CASING | TOTAL DEPTH |
|---|---|---|---|---|
| AQUITAINE CO of CANADA LTD | W 1427 | COMMENCED = AUG 8, 69 | ø 30" at 772' | 3926' |
| CONTRACTOR | PROVINCE | TEMPORARY HALT = | ø 20" at 1120' | GEOLOGICAL FORMATION AT SPUDDING LEVEL |
| WESTERN OFFSHORE DRILLING & EXPLORATION CO | FEDERAL WATERS HUDSON BAY CANADA | RESUMPTION OF DRILLING = | ø 13 "3/8 at 1975' | PLEISTOCENE DRIFT |
| RIG | COORDINATES | TEMPORARY HALT = | ø 9 "5/8 at 2960' | GEOLOGICAL FORMATION AT BOTTOM HOLE |
| WODECO II | x = 58°30' 02 29" N<br>y = 87°10'18 75" W | RESUMPTION OF DRILLING = | ø at | GEOLOGISTS |
| BROUGHT UP TO DATE ON | z = - 618' | | | Serge RUEFF<br>&<br>Casimir KMIECLUCK |
| OCT. 15, 69 | ZKB= + 31' | COMPLETED = OCT. 18, 69 | | |

COMMENTS.

DRILLING STOPPED AT 3926' AT END OF DRILLING SEASON FOR 1969.



SEA WATER

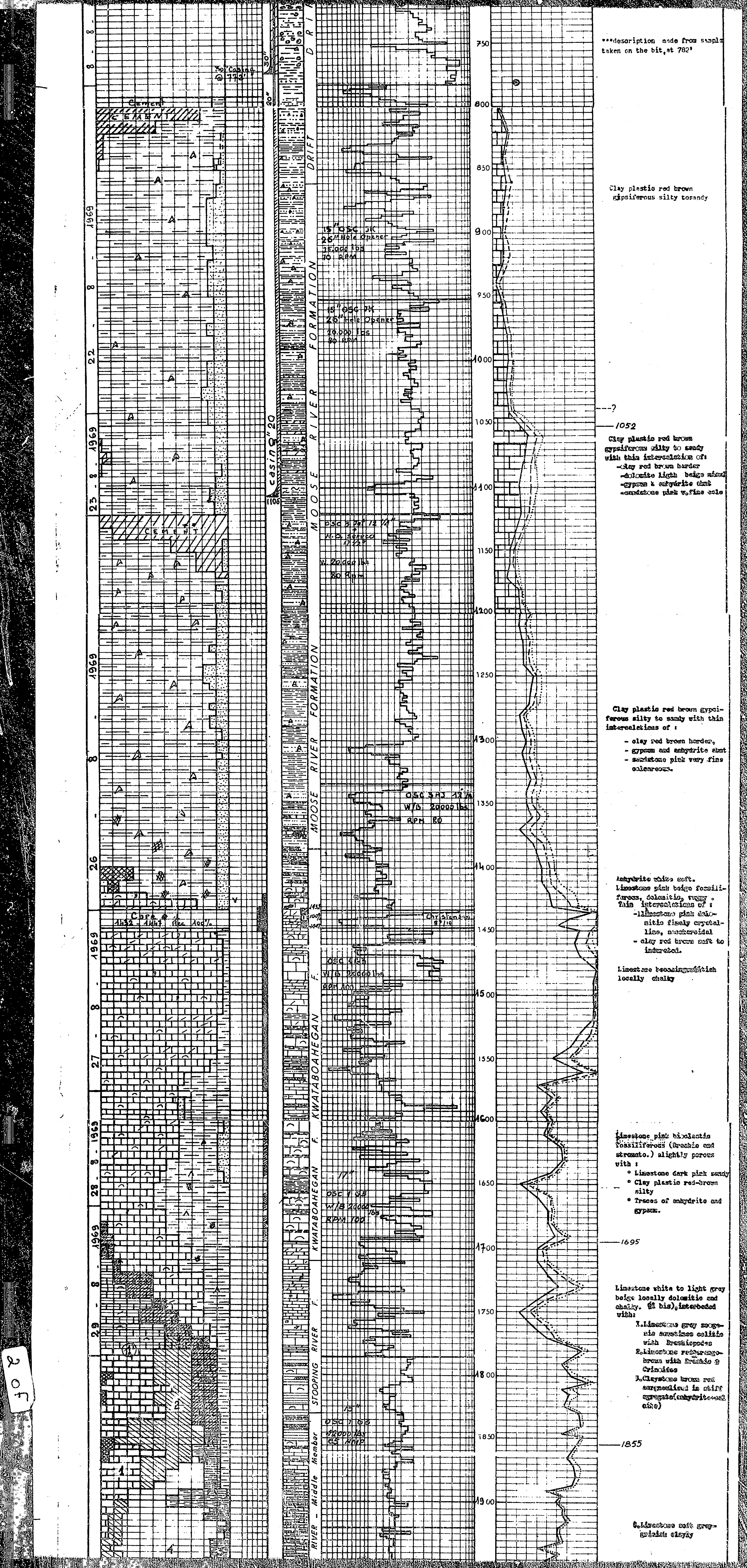
SEA WATER

618' SEA BED

"DRIFT"
Continental Glaciere

Clay yellow brown silty to sandy calcareous (25%) with conglomeratic elements of metamorphic rocks (quartzite, dolerite, chlorito-schiste, calcaire) ***

***description made from sample taken on the bit, at 782'



***description made from sample taken on the bit, at 782'

Clay plastic red brown gipsiferous silty tosandy

Clay plastic red brown gypsiferous silty to sandy with this intercalation of:
-clay red brown harder
-dolomite ligth beige microc
-gypsum & anhydrite chert
-sandstone pink v.fine calc

Clay plastic red brown gypsiferous silty to sandy with this intercalations of :
- clay red brown harder,
- gypsum and anhydrite chert
- sandstone pink very fine calcareous.

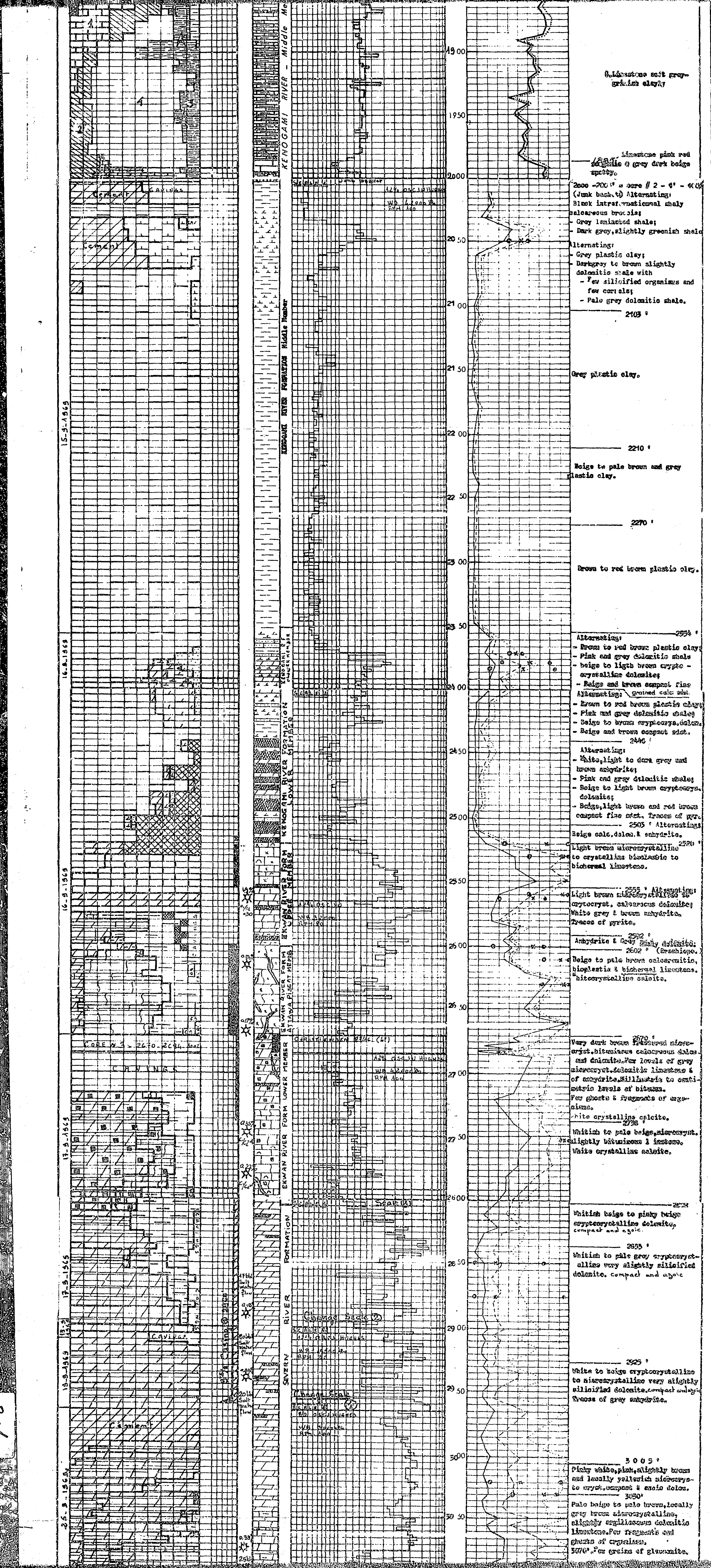
Anhydrite white soft.
Limestone pink beige fossiliferous, dolomitic, vuggy.
Thin intercalations of :
-limestone pink dolomitic finely crystalline, saccharoidal
- clay red brown soft to indurated.

Limestone becoming oolitic locally chalky

Limestone pink bioclastic fossiliferous (Brachio and stromato.) slightly porous with :
- Limestone dark pink sandy
- Clay plastic red-brown silty
- Traces of anhydrite and gypsum.

Limestone white to light grey beige locally dolomitic and chalky. (1 bis), interbedded with:
1.Limestone grey nodular ? oolitic with Brachiopodes
2.Limestone red-orange-brown with Brachio & Crinoides
3.Claystone brown red ? in stiff aggregate(anhydrite-calcite)

4.Limestone soft grey-greyish clayey



0.Limestone soft grey-greenish clayly

Limestone pink red ... & grey dark beige spotty.

2000 -2006' = core # 2 - 6' - 60%
(Junk basket) Alternating:
Black intraformational shaly calcareous breccia;
- Grey laminated shale;
- Dark grey, slightly greenish shale

Alternating:
- Grey plastic clay;
- Darkgrey to brown slightly dolomitic shale with
  - Few silicified organisms and few corals;
  - Pale grey dolomitic shale.

2103 '

Grey plastic clay.

2210 '

Beige to pale brown and grey plastic clay.

2270 '

Brown to red brown plastic clay.

2354 '

Alternating:
- Brown to red brown plastic clay;
- Pink and grey dolomitic shale
- beige to ligth brown crypto - crystalline dolomite;
- Beige and brown compact fine grained calc sdst.

Alternating:
- Brown to red brown plastic clay;
- Pink and grey dolomitic shale;
- Beige to brown cryptocrys. dolom.
- Beige and brown compact sdst.

2446 '

Alternating:
- White, light to dark grey and brown anhydrite;
- Pink and grey dolomitic shale;
- Beige to light brown cryptocrys. dolomite;
- Beige, light brown and red brown compact fine sdst. Traces of pyr.

2505 ' Alternating:
Beige calc. dolom. & anhydrite.

2520 '
Light brown microcrystalline to crystalline bioclastic to biohermal limestone.

2555 ' Alternating:
Light brown microcrystalline to crytocryst, calcareous dolomite;
White grey & brown anhydrite.
Traces of pyrite.

2592 '
Anhydrite & Grey Pinky dolomite.
2602 ' (Brachiopo.)
Beige to pale brown calcarenitic, bioplastic & biohermal limestone.
Microcrystalline calcite.

2670 '
Very dark brown fractured microcryst. bituminous calcareous dolom. and dolomite. Few levels of grey microcryst. dolomitic limestone & of anhydrite. Millimetric to centimetric levels of bitumen.
Few ghosts & fragments of organisms.
White crystalline calcite.

2738 '
Whitish to pale beige, microcryst. slightly bituminous limestone.
White crystalline calcite.

2788

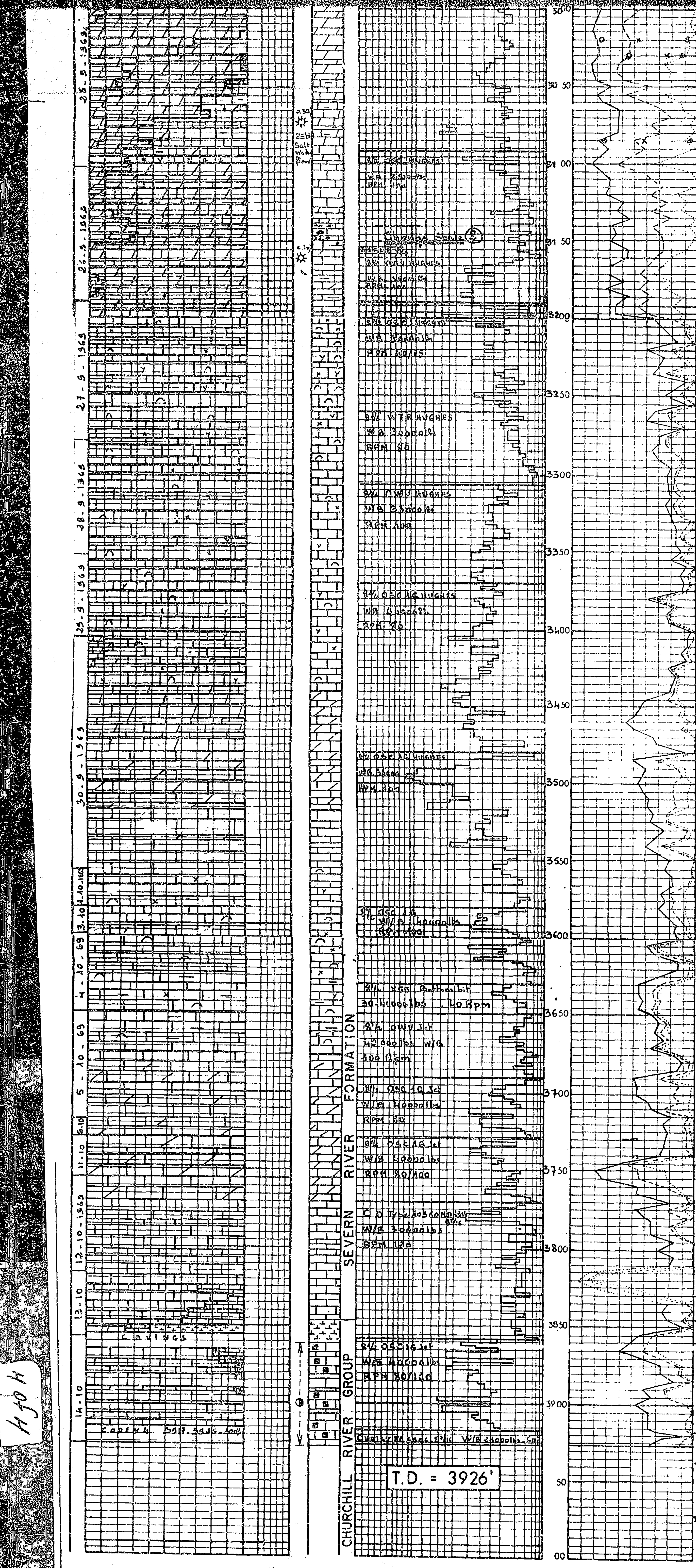
Whitish beige to pinky beige cryptocrystalline dolomite, compact and azoic.

2835 '
Whitish to pale grey cryptocrystalline very slightly silicified dolomite. compact and azoic

2925 '
White to beige cryptocrystalline to microcrystalline very slightly silicified dolomite. compact and azoic
Traces of grey anhydrite.

3009 '
Pinky white, pink, slightly brown and locally yellowish microcrys. to cryst. compact & azoic dolom.

3050'
Pale beige to pale brown, locally grey brown microcrystalline, slightly argillaceous dolomitic limestone. Few fragments and ghosts of organisms.
3076'. Few grains of glauconite.



3005'

Pinky white, pink, slightly brown and locally yellowish microcrys- to cryst. compact & vacuole dolom.

3030'

Pale beige to pale brown, locally grey brown microcrystalline, slightly argillaceous dolomitic limestone. Few fragments and ghosts of organisms.
3070'. Few grains of glauconite.

3090'

pale beige to pale brown, locally grey brown microcrystalline, slightly argillaceous, compact and vacuole dolomitic limestone. Traces of white chalky limestone.

3155'
White cherts.

3195'

Limestone light grey-beige microcrystalline, fossiliferous, recrystallised, (Echino. Brachio. Bryo. Dasycladacea.)

Limestone light beige to whitish, microcrystalline to cryptocrystalline compact locally pseudo-oolitic. Traces of dolomitic limestone light pink slightly argillaceous

3440'

Dolomitic limestone, light beige to whitish, microcrystalline, compact and vacuolar. Traces of dolomitic limestone pink slightly argillaceous.

3515'

Limestone light beige. compact, microcrystalline with intercal. of - limestone, mottled pseudo-oolitic
- limestone, fossiliferous recrystallised (ostra. lam. bryo. spic.) crystals of anhydrite.

3675'

Dolomitic limestone. light grey beige, compact, microcrystalline with intercalations of dolomitic limestone, pseudo-breccia monogenic

3745'

Beige microcryst. compact dolomite

3755'

Whitish, light beige to light grey microcrystalline, locally calcarenitic to microconglomeratic (intraformational) limestone.

3830'

Grey brown microcrystalline limestone.

3845'

Grey blue marls.

3860' Alternating:
- whitish, light beige to light grey microcrystalline limestone
- very dark brown microcrystalline locally calcarenitic, anhydritic, bituminous limestone.

3917'

3917' - 3926' = Core #4.
Alternating:
- light brown slightly bituminous limestone.
- beige to light grey, mottled, slightly dolomitic, bioclastic and calcarenitic limestone.
Traces of anhydrite. Crinoids, Corals, Brachiopods and Mollusca.

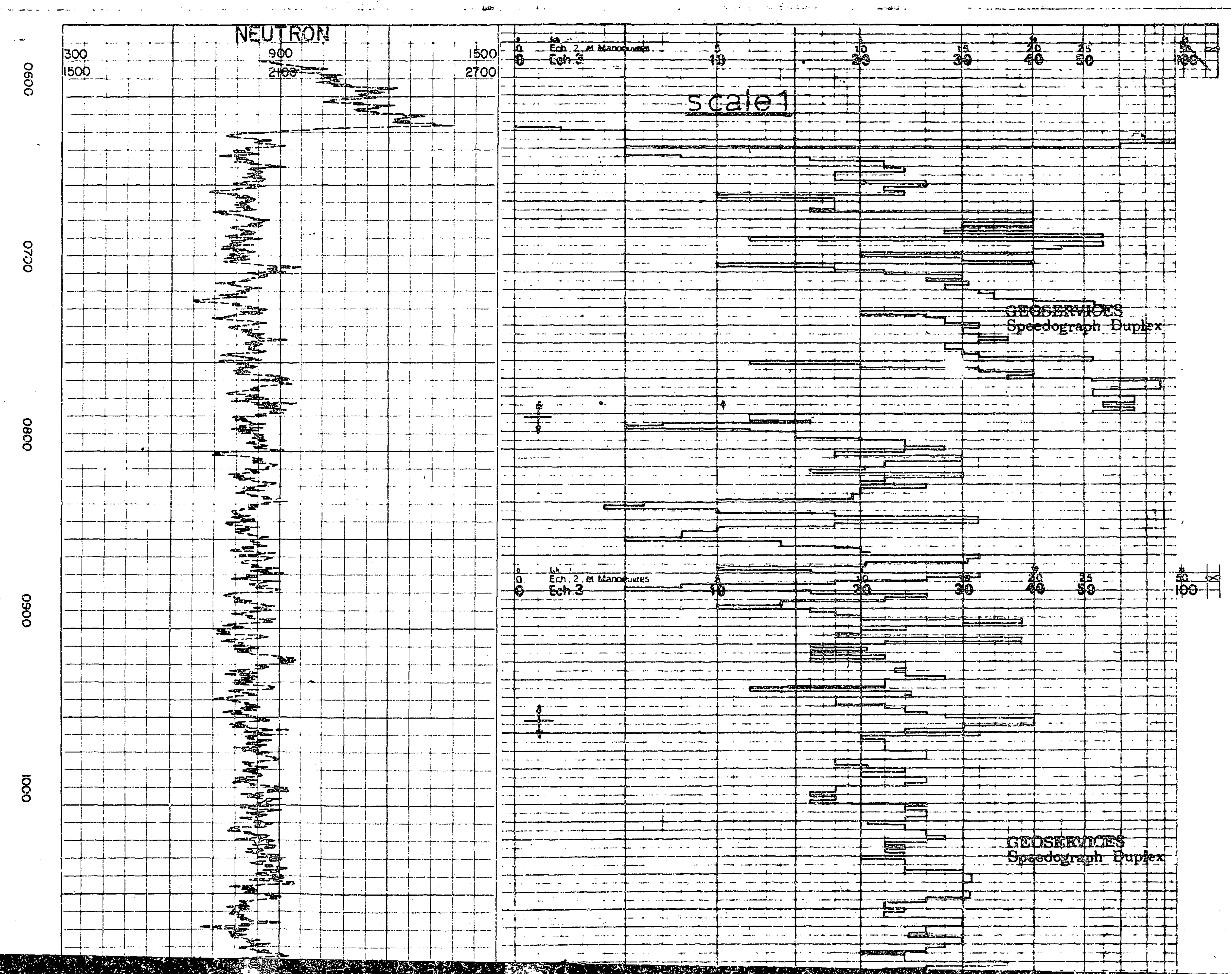
4 of 4

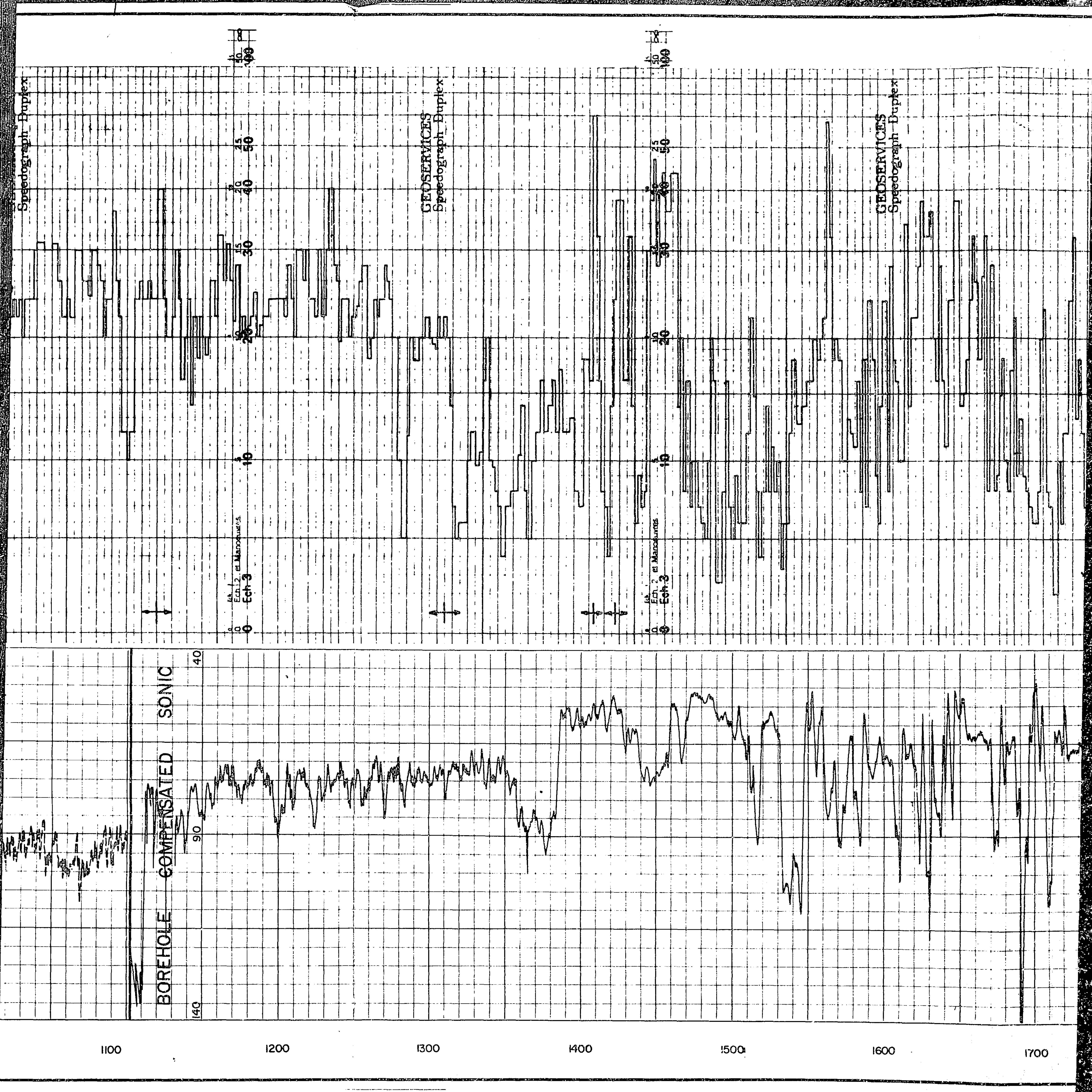
AQUITAINE

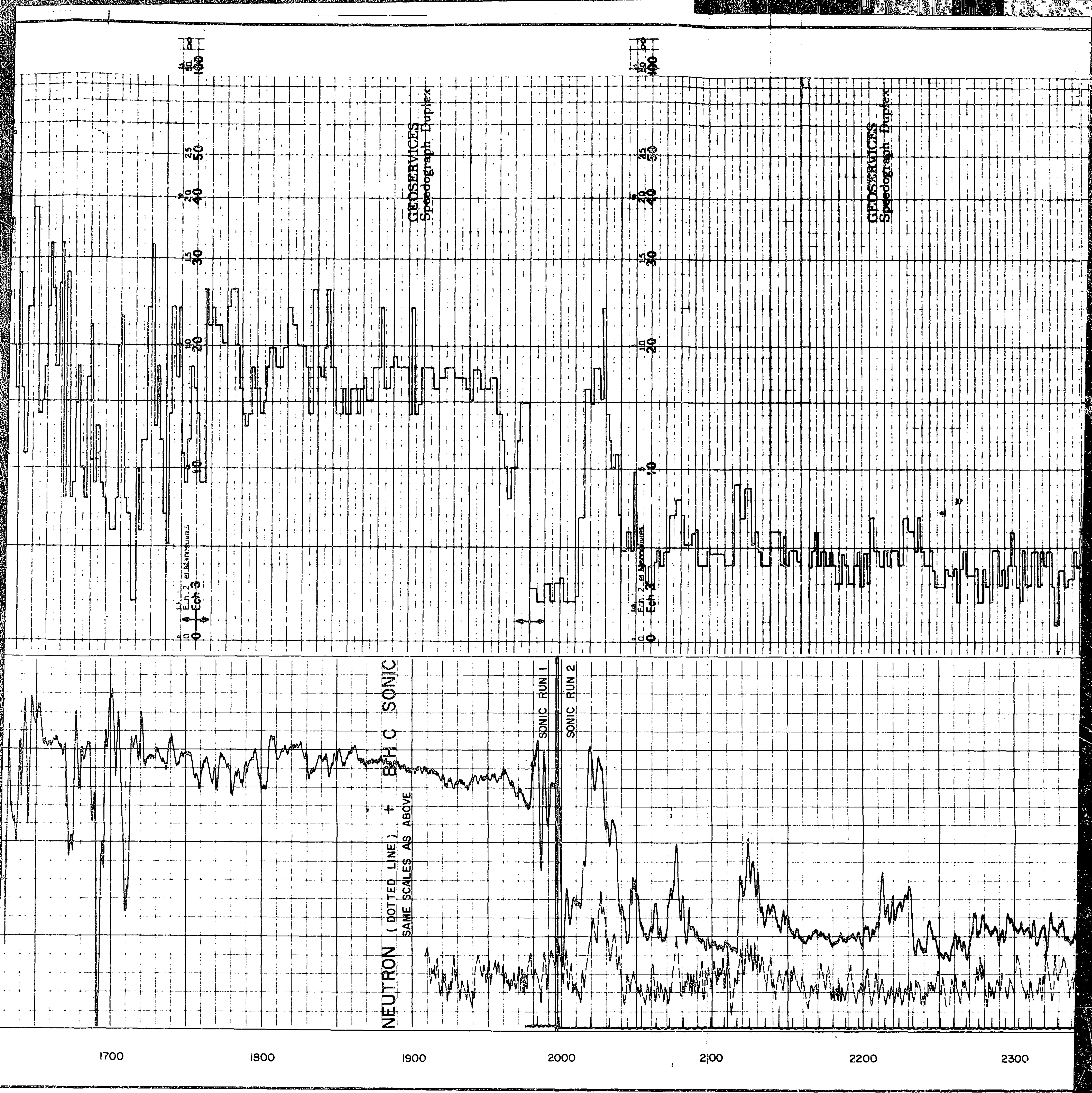
## PENETRATION RATE ( Speedograph Geoservices )

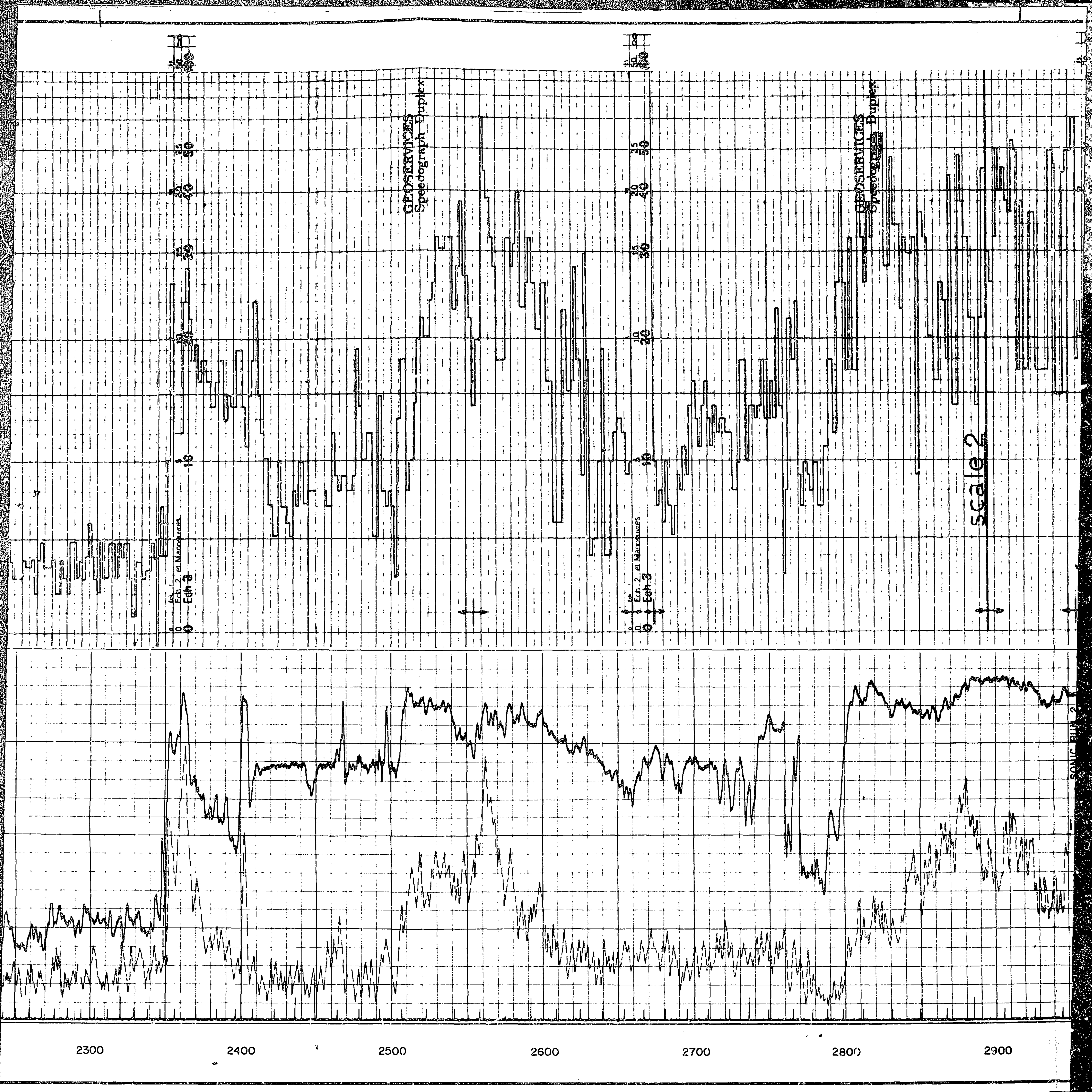
## NEUTRON Log — SONIC Log

# WALRUS A-71

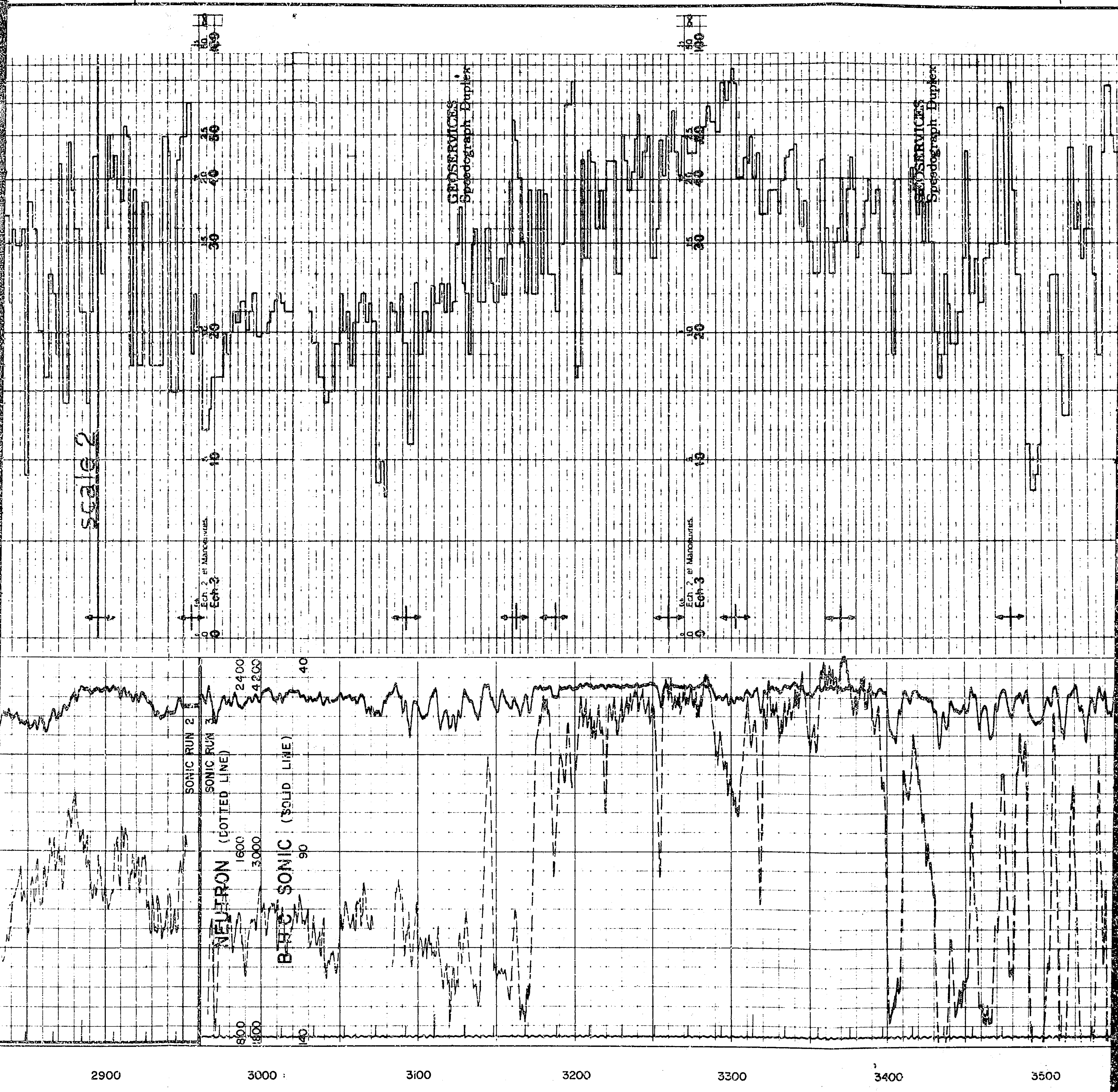



Speedograph Duplex
GEOSERVICES
Speedograph Duplex
GEOSERVICES
Speedograph Duplex
Ech 1
Ech 2 et Manoeuvres
Ech 3
0
10
20
30
40
50
100
BOREHOLE COMPENSATED SONIC
40
90
140
1100
1200
1300
1400
1500
1600
1700

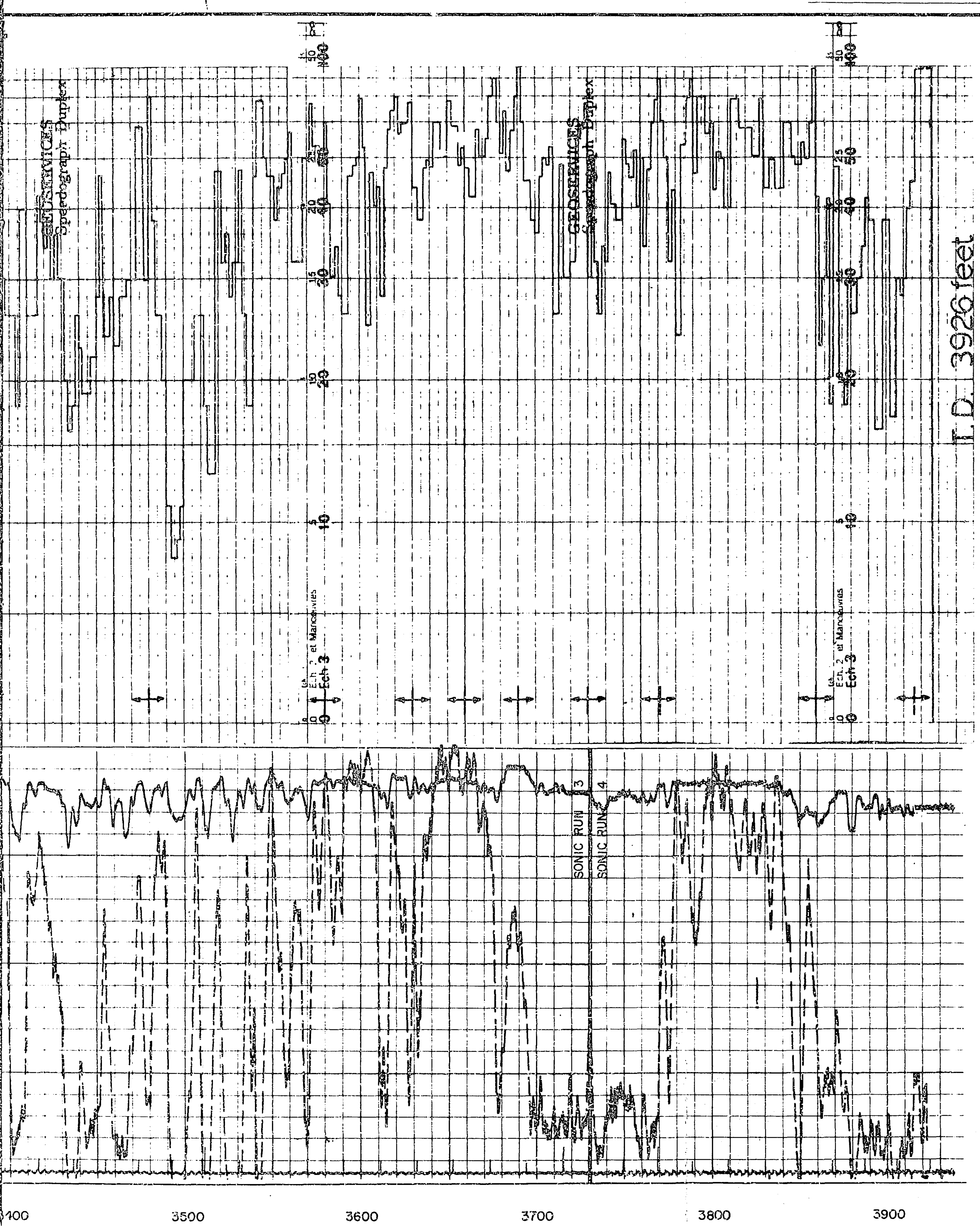

GEOSERVICES
Speedograph Duplex
GEOSERVICES
Speedograph Duplex
Ech 2 et Manomètres
Ech 3
0
10
20
30
40
50
100
NEUTRON ( DOTTED LINE ) + B H C SONIC
SAME SCALES AS ABOVE
SONIC RUN 1
SONIC RUN 2
1700
1800
1900
2000
2100
2200
2300



GEOSERVICES Speedograph Duplex
GEOSERVICES Speedograph Duplex
Ech 2 et Manoeuvres
Ech 3
0
10
20
30
40
50
scale 2
SONIC RUN 2
2300
2400
2500
2600
2700
2800
2900



scale 2
GEOSERVICES
Speedograph Duplex
0
10
20
30
40
50
Ech 2 et Manoeuvres
Ech 3
SONIC RUN 2
SONIC RUN 3
NEUTRON (DOTTED LINE)
B-H-C SONIC (SOLID LINE)
2400
4200
40
1600
3000
90
800
1800
140
2900
3000
3100
3200
3300
3400
3500

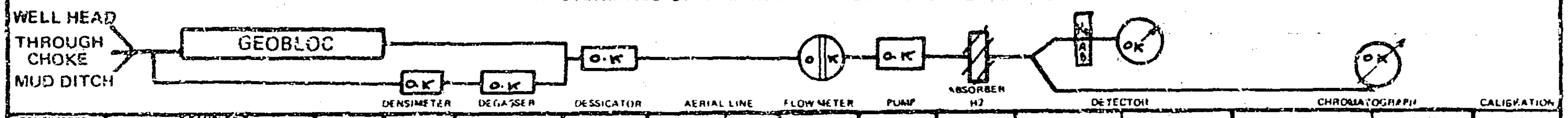

GEOSERVICES
Speedograph Duplex
GEOSERVICES
Speedograph Duplex
Ech. 2 et Manoeuvres
Ech 3
0
5
10
15
20
25
50
40
30
20
10
0
SONIC RUN 3
SONIC RUN 4
T.D. 3926 feet
400
3500
3600
3700
3800
3900

AQUITAINE

| SCALE | GAS LOG | SHEET No. | WELL NAME |
|---|---|---|---|
| 2" = 100' or 1 600 |  | 1 to 4 | WALRUS A 71 |

| OPERATOR | PERMIT OR LEASE | TIMING | CASING | TOTAL DEPTH |
|---|---|---|---|---|
| AQUITAINE CO. of CANADA LTD | W 1427 | COMMENCED = AUG 8, 69 | ø 30" at 772' | 3926' |
| **CONTRACTOR** | **PROVINCE** | TEMPORARY HALT = | ø 20" at 1120' | **GEOLOGICAL FORMATION AT SPUDDING LEVEL** |
| WESTERN OFFSHORE DRILLING & EXPLORATION CO | FEDERAL WATERS HUDSON BAY CANADA | RESUMPTION OF DRILLING = | ø 13" 3/8 at 1975' | PLEISTOCENE DRIFT |
| **RIG** | **CO-ORDINATES** | TEMPORARY HALT = | ø 9" 5/8 at 2960' | **GEOLOGICAL FORMATION AT BOTTOM HOLE** |
| WODECO II | X= 58°30'02 29" N<br>Y= 87°10'48 75" W | RESUMPTION OF DRILLING = | ø at |  |
| **BROUGHT UP TO DATE ON** | Z= -618' | | | **GEOLOGISTS** |
| OCT 15, 69 | ZKB +31' | COMPLETED = OCT 18, 69 | | Serge RUEFF<br>& Casimir KMIECLUCK |

## CHARACTERISTICS OF THE INSTALLATION FOR GAS DETENTION



| DENSIMETER SUCTION | ELEVATION | SAMPLER WASHER | DENSIMETER | DEGASSER |  | MUD FLOW | TYPE | TYPE | LENGTH | FLOW IN | TYPE | TYPE | BRAND | TYPE | BRAND | TYPE | DEPTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  | Geoservices | GZ11<br>40 l/mn | Cl₂Ca | monoflex | 20ft | 40 l/h | Vibr. | Catalyst | Geoservices | n° 2230<br>GD11 | Genservices | n° 3373<br>Gal21 | every Day |

X GAS KICK AFTER A ROUND TRIP OR A DUMMY TRIP

GAS KICK FROM PULLING OFF BOTTOM

(X) GAS KICK WHILE CALCULATING AT THE CASING SHOE

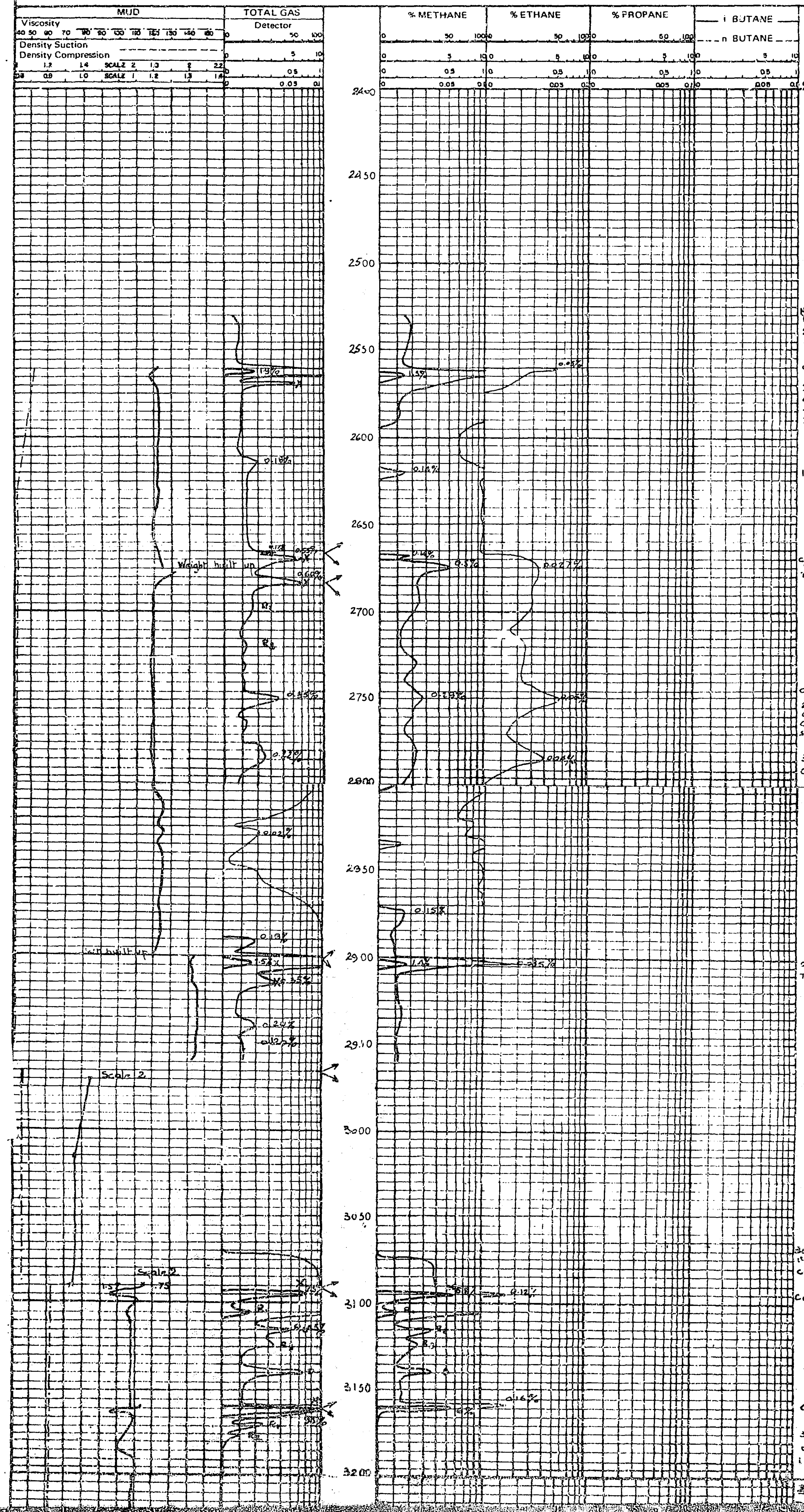
(●) GAS KICK AFTER PUMPS HAVE BEEN STOPPED

● GAS KICK AFTER MAKING A CONNECTION

R₁ , R₂ GAS KICK DUE TO RECIRCULATING GAS (R 1 = First Recirc, R 2 = Second Recirc)

CHANGE THE BIT

TRIP IN TO CONDITION HOLE OR DUMMY TRIP



OBSERVATIONS
Real gas percentage
Ratios $C_1/C_2$ $C_1/C_3$
Direction of pumping halt
Nature and duration of gas kick

Traces of $N_2$

Note:
From 2500' to 2567': Densimud bypassed (Clay)

$C_1/C_2$ = 30
22 mn
Remark
Gas of Meillon and St Faust type !
Traces of $H_2$

10 mn

$C_1/C_2$ = 18
T.G = 30 mn

$C_1/C_2$ = 4
20 mn.
Gas of different caracteristic from show at 2563'

35 mn.
$C_1/C_2$ = 6

$C_1/C_2$ = 40
T.G = 50 mn.

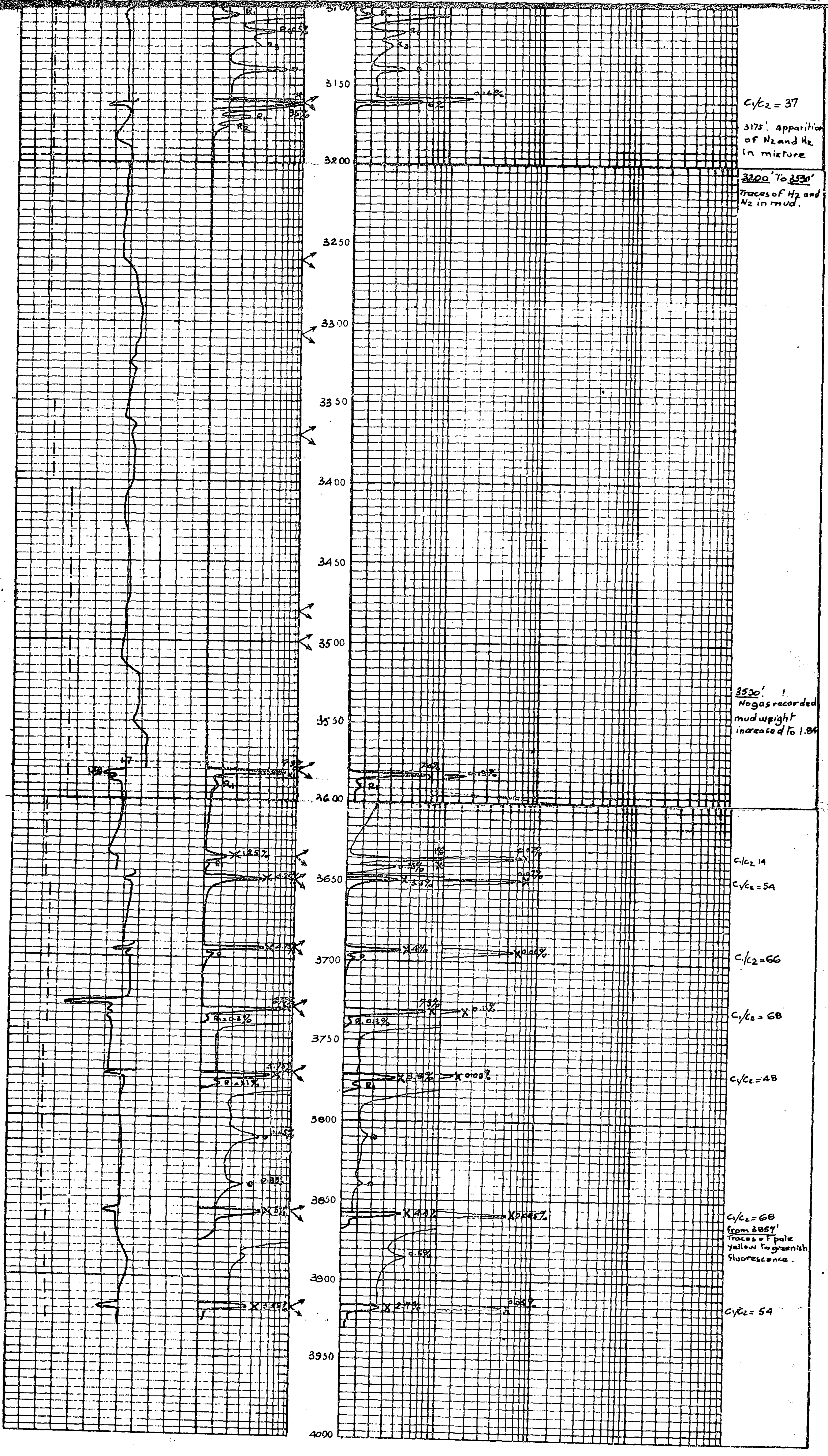
3070'
1st gas show after casing 9⅝

$C_1/C_2$ = 48

$C_1/C_2$ = 37

3175'. Appurition of $N_2$ and $H_2$ in mixture

3200' To 3590'



C₁/C₂ = 37

3175' Apparition of N₂ and H₂ in mixture

<u>3200</u>' To <u>3530</u>' Traces of H₂ and N₂ in mud.

<u>3530</u>' No gas recorded mud weight increased to 1.84

C₁/C₂ 14

C₁/C₂ = 54

C₁/C₂ = 66

C₁/C₂ = 68

C₁/C₂ = 48

C₁/C₂ = 68
<u>from 3857</u>'
Traces of pale yellow to greenish fluorescence.

C₁/C₂ = 54

2 of 2

**SCHLUMBERGER**

# CALIPER

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: FDC·SRS GRL, SLC-GR, ML, DIL, SNP, LL

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

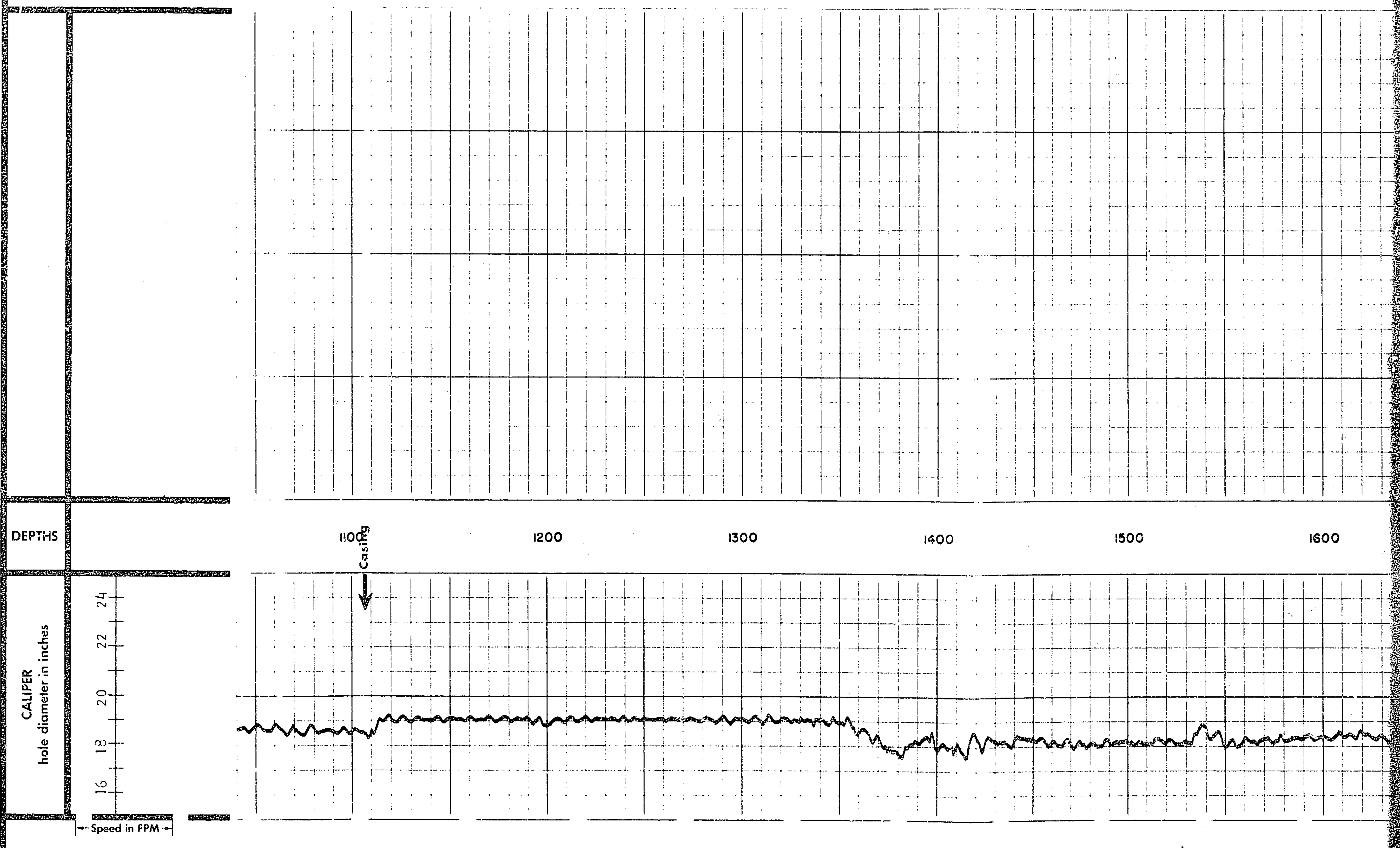
ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 12 SEPT 69 | | |
| Run No. | ONE | | |
| First Reading | 1992 | | |
| Last Reading | 1040 | | |
| Feet Measured | 952 | | |
| Depth Reached | 1994 | | |
| Bottom Driller | 2000 | | |
| Csg. SOC | 1108 | | |
| Csg. Driller | 1106 | | |
| Mud Nature | SALT-GEL-BARITE | | |
| Dens. \| Visc. | 10.2 \| 58 | \| | \| |
| Mud pH | 11.0 | | |
| " Water Loss | 48 | | |
| " Res. | 0.10 @ 70 °F | @ °F | @ °F |
| " " @ BHT | 0.08 @ 74 °F | @ °F | @ °F |
| " Rmf | 0.07 @ 70 °F | @ °F | @ °F |
| " Rmc | 0.19 @ 70 °F | @ °F | @ °F |
| Bit Size | 17 1/2 | | |
| Mud Log: | | | |
| Rm | - | | |
| Limit | - | | |
| Depth | - | | |
| Opr. Rig Time | 2 HRS. | | |
| Truck No. | OSU-C 285 | | |
| Recorded By | BERRY | | |
| Witness | RUEFF | | |

REMARKS

Drilling Stopped 2000 / 7th : Circulation Stopped 1300 / 10th : Tool on Bottom 2300 / 11th : 1st Run Service Order # 43218 B.H.T. 74 °F

MCP # 8138
PMS # -
Pad Type — Hydraulic -



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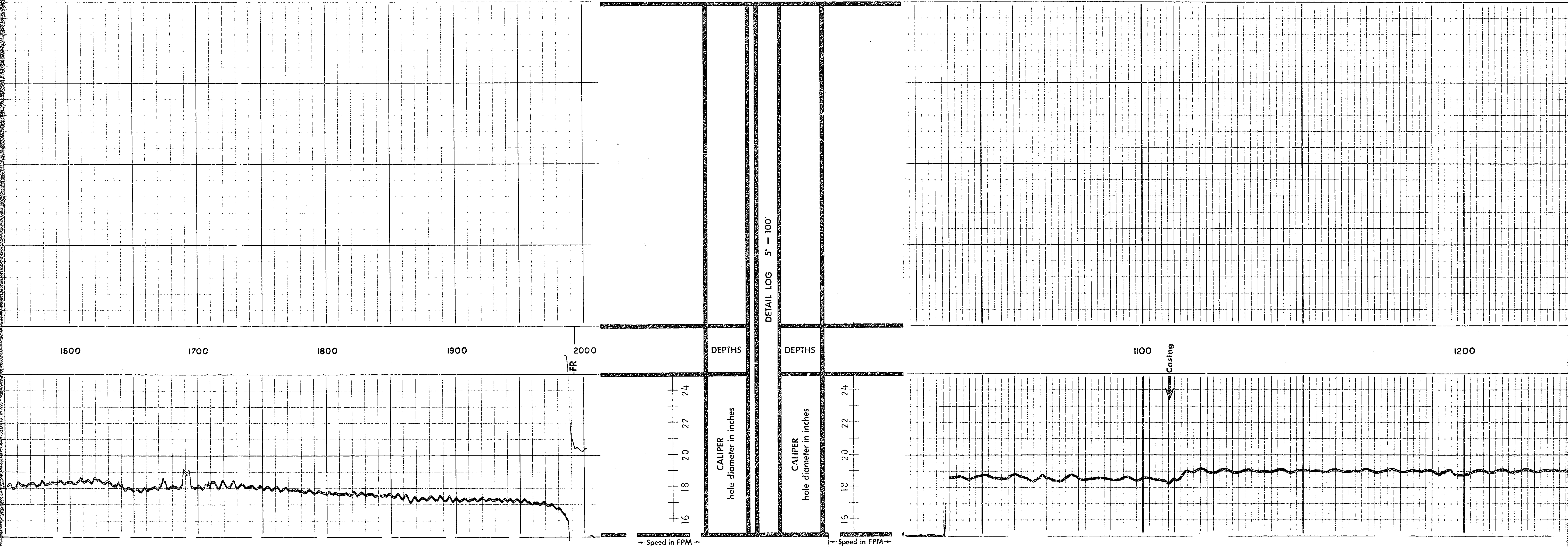
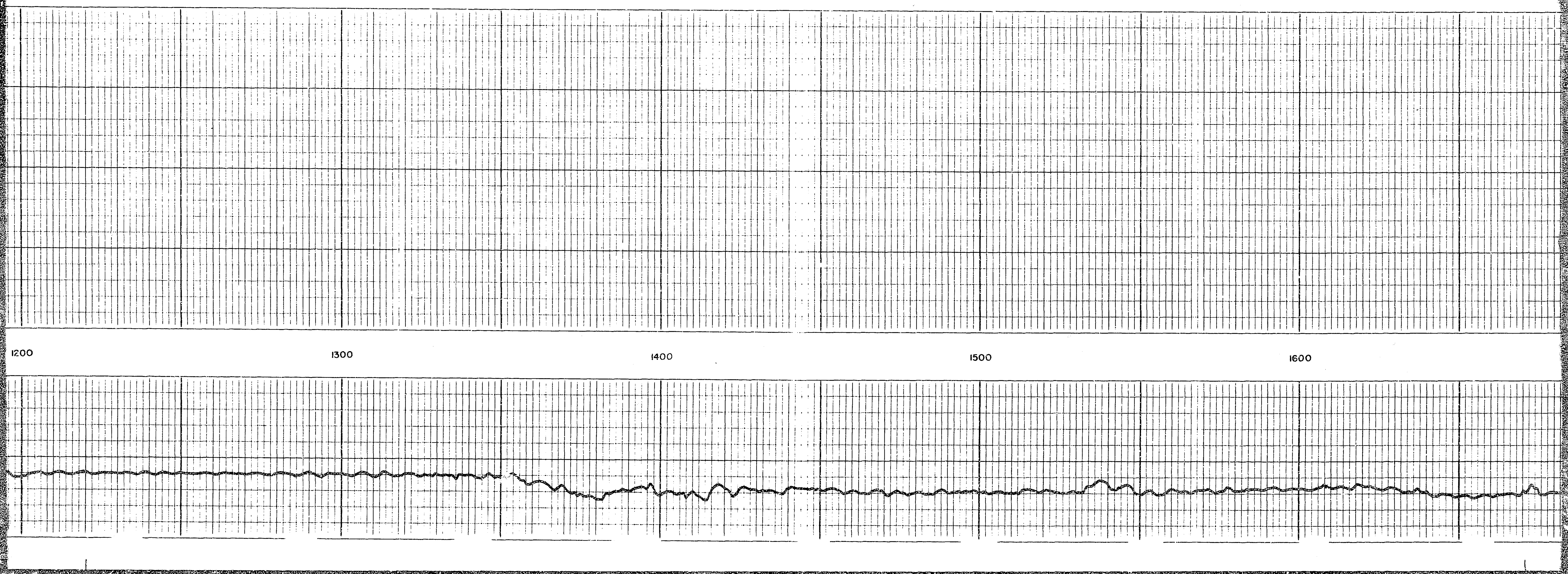


1600
1700
1800
1900
2000
FR
DEPTHS
DETAIL LOG 5" = 100'
DEPTHS
CALIPER hole diameter in inches
24
22
20
18
16
Speed in FPM
1100
Casing
1200

2 of



2 of

SCHLUMBERGER

COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A-71

FIELD WILDCAT PROVINCE FEDERAL WATERS

4 of 4

# SCHLUMBERGER GAMMA RAY-NEUTRON LOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL QUITAINE ET AL WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL WALRUS
A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

**LOCATION** 87° 10' 51'' WEST LONG
58° 30' 02'' NORTH LAT

Other Services: CAL SLC-GR, SRS, DIL ML, LL, SNP, FDC

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 15 OCT 69 | | |
| Run No. | THREE | | |
| First Reading | 3924 | | |
| Last Reading | 614 | | |
| Feet Measured | 3310 | | |
| Depth Reached | 3925 | | |
| Bottom Driller | 3926 | | |
| Mud Nature | GEL-SALT | | |
| Dens. \| Visc. | 14.5 \| 65 | \| | \| |
| Mud pH | 8.5 | | |
| " Water Loss | 29.0 | | |
| " Res. | .093 @ 54 °F | @ °F | @ °F |
| " " @ BHT | – @ °F | @ °F | @ °F |
| " Rmf | – @ °F | @ °F | @ °F |
| " Rmc | – @ °F | @ °F | @ °F |
| Bit Size | 8 1/2'' to | to | to |
| | to | to | to |
| Csg. Size—Inches | 17 1/2'' to 1333 | to | to |
| | 15'' to 2000 | to | to |
| | 9 3/8'' to 2965 | to | to |
| | to | to | to |
| Source to Detector | 19.5 inches | inches | inches |
| Opr. Rig Time | 3 HRS. | | |
| Truck No. | OSU-C285 | | |
| Recorded By | STUEHMER | | |
| Witness | RUEFF | | |

REMARKS

1st Run Service Order # 43818

Drilling Stopped / : Circulation Stopped 2000 / 15th : Tool on Bottom B.H.T. 71 °F

COLLARS RECORDED 9.5 DEEP

Panel No.
Cartridge No
Neutron Detector No.
Gamma Ray Detector No.
Equipment Designation

| CALIBRATION: | Background CPS. | | Test Source CPS. | | Galv. Deflection Divisions | | Panel Sens. Tap for Cal. |
|---|---|---|---|---|---|---|---|
| Gamma Ray Before Survey | 10 | | 440 | | 8.25 | | 500 |
| After | | | | | | | |
| | | | Near | Far | Near | Far | |
| Neutron Before Survey | 4 | | 440 | 68 | 10 | 1.5 | |
| After | 4 | | 430 | 70 | 10 | 1.5 | |

**NEUTRON API UNITS**

Sensitivity 150 Time Constant 2
Zero 5 divisions to left of this line

| | | |
|---|---|---|
| 300 | 900 | 1500 |
| 1500 | 2100 | 2700 |

SCALE CHANGES 1384' , 2965'

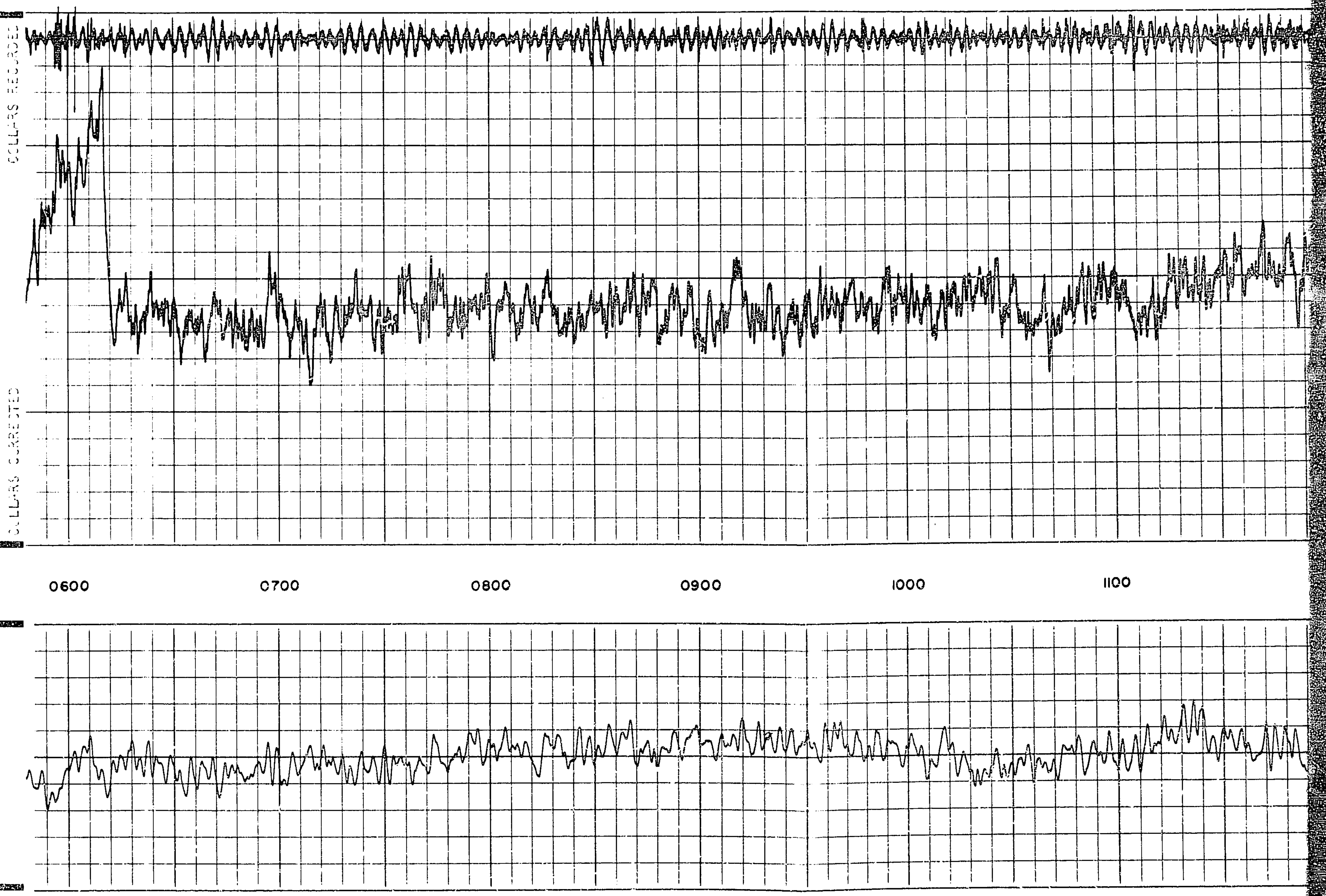
**DEPTHS**

**GAMMA RAY API UNITS**

Sens. 100 T.C. 2
Zero 0 div. to left

| | |
|---|---|
| 0 | 40 |
| 40 | 80 |

Speed in FPM



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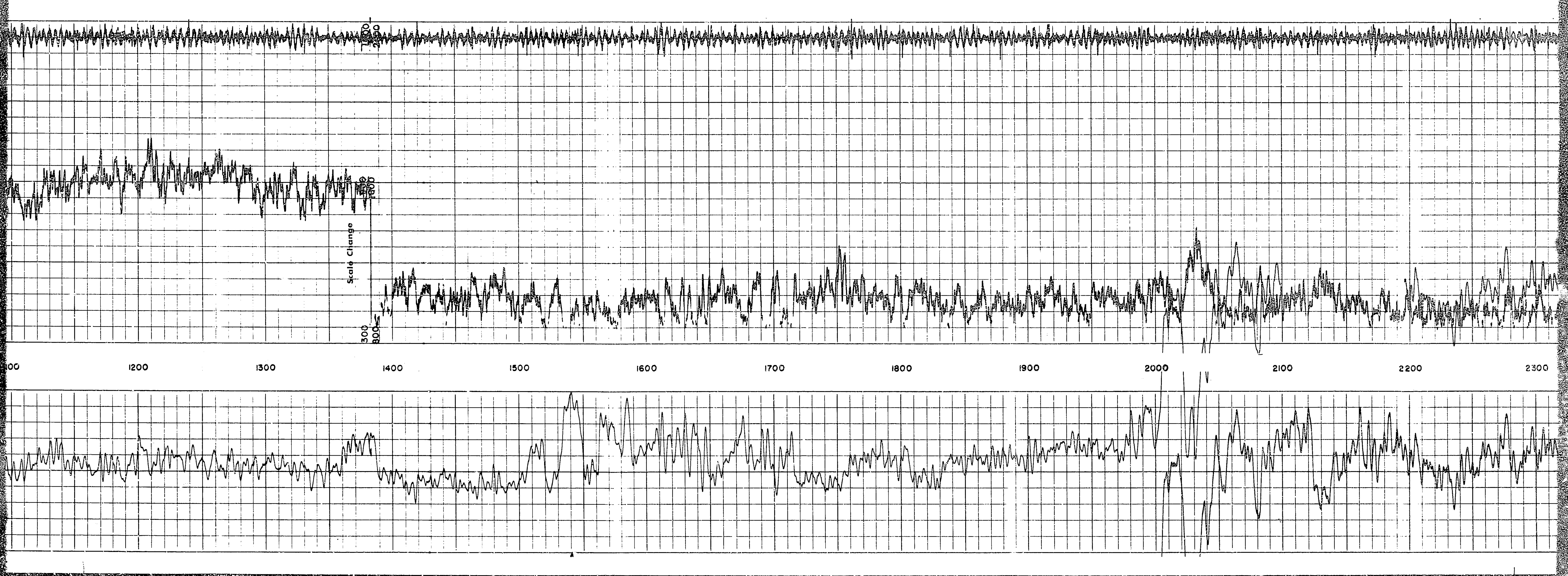
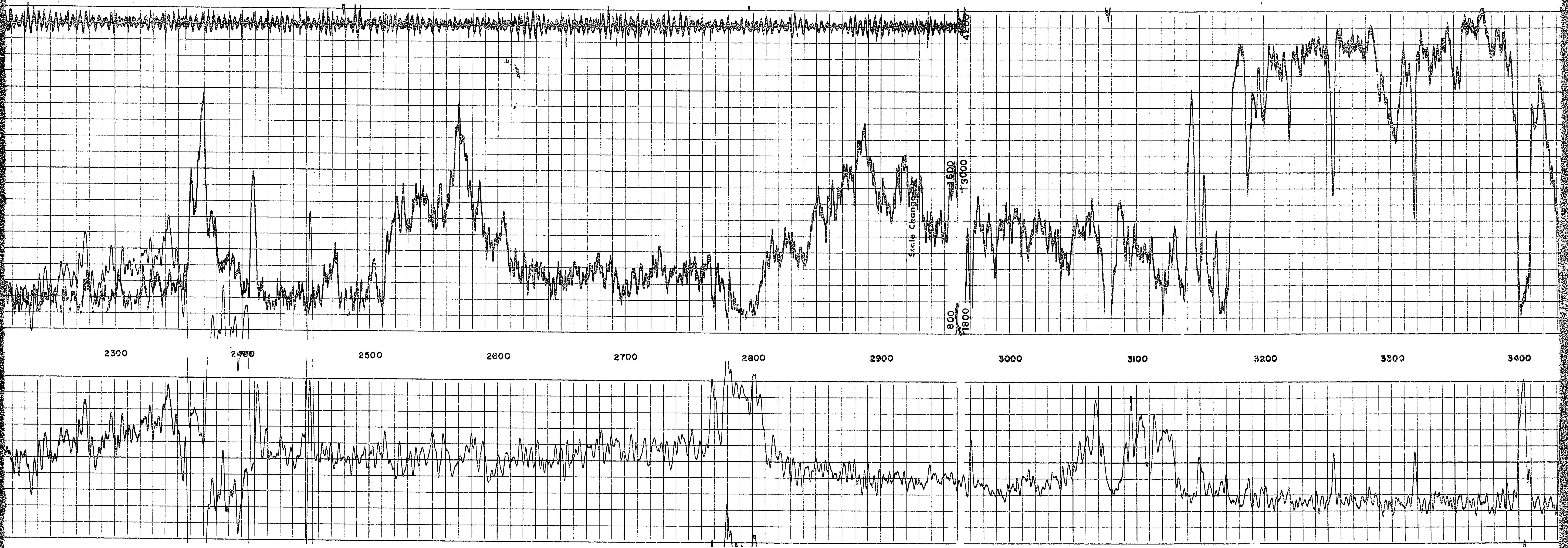
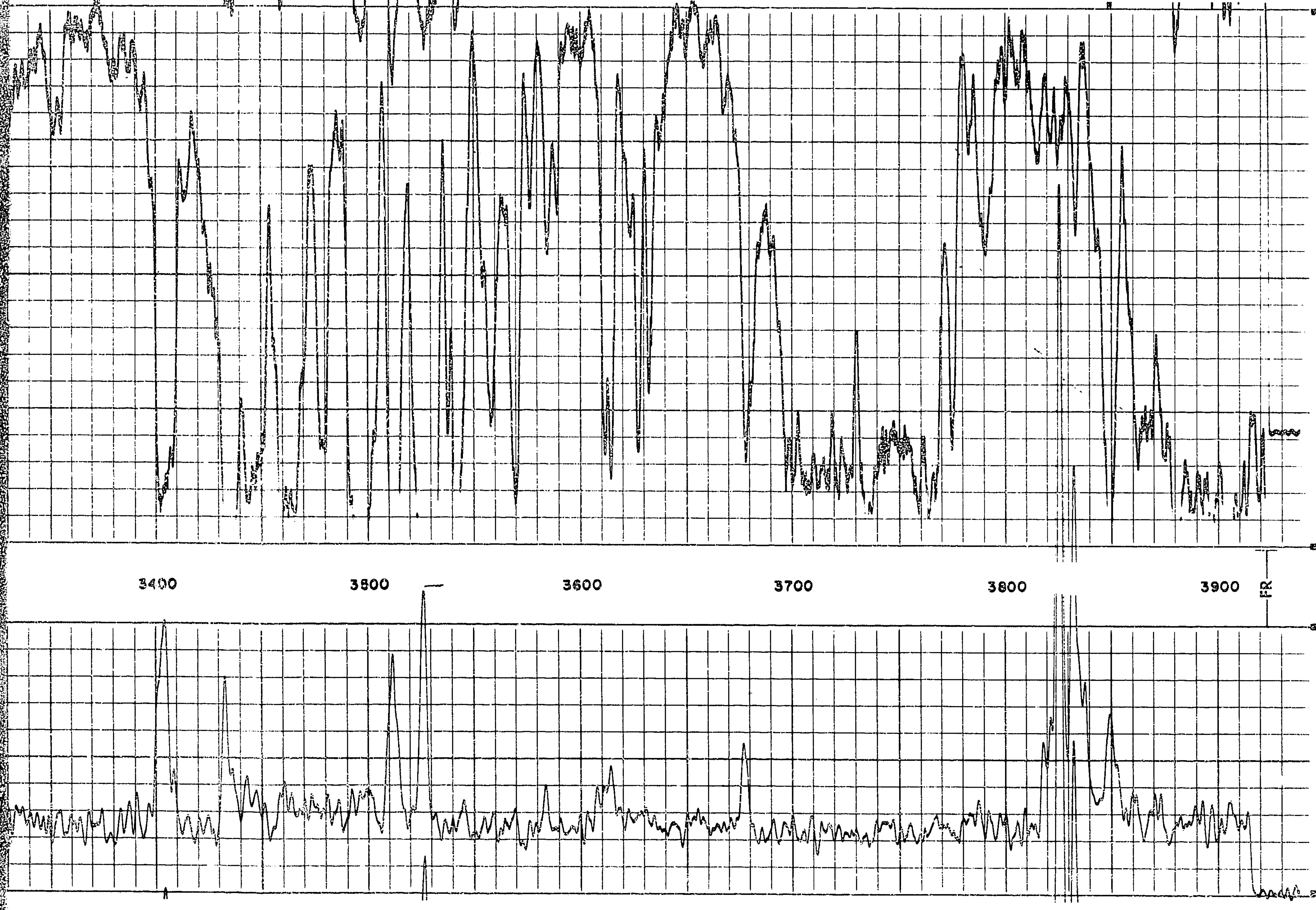


1000
2000
Scale Change
300
800
00
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300

2 of


4200
1600
3000
Scale Change
800
1800
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400

3 of



Sensitivity 300 Time Constant 2
Zero 15 divisions to left of this line
1800 3000 4200
4200 5400 6600

NEUTRON
API UNITS

DEPTHS

GAMMA RAY
API UNITS

Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80

Speed in FPM

DETAIL LOG
5" = 100'

NEUTRON
API UNITS

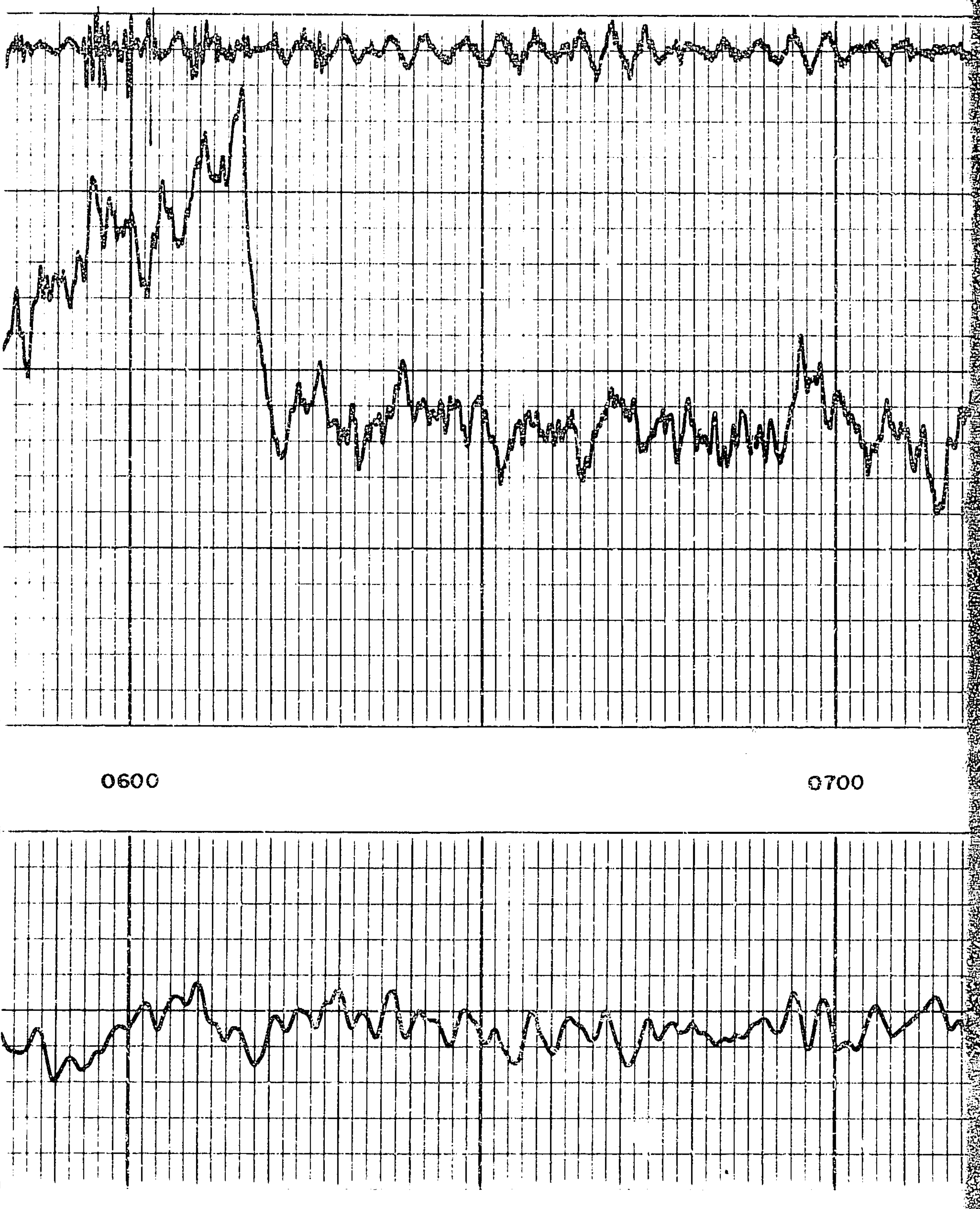
DEPTHS

GAMMA RAY
API UNITS

Sensitivity 150 Time Constant 2
Zero 5 divisions to left of this line
300 900 1500
1500 2100 2700

Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80

Speed in FPM



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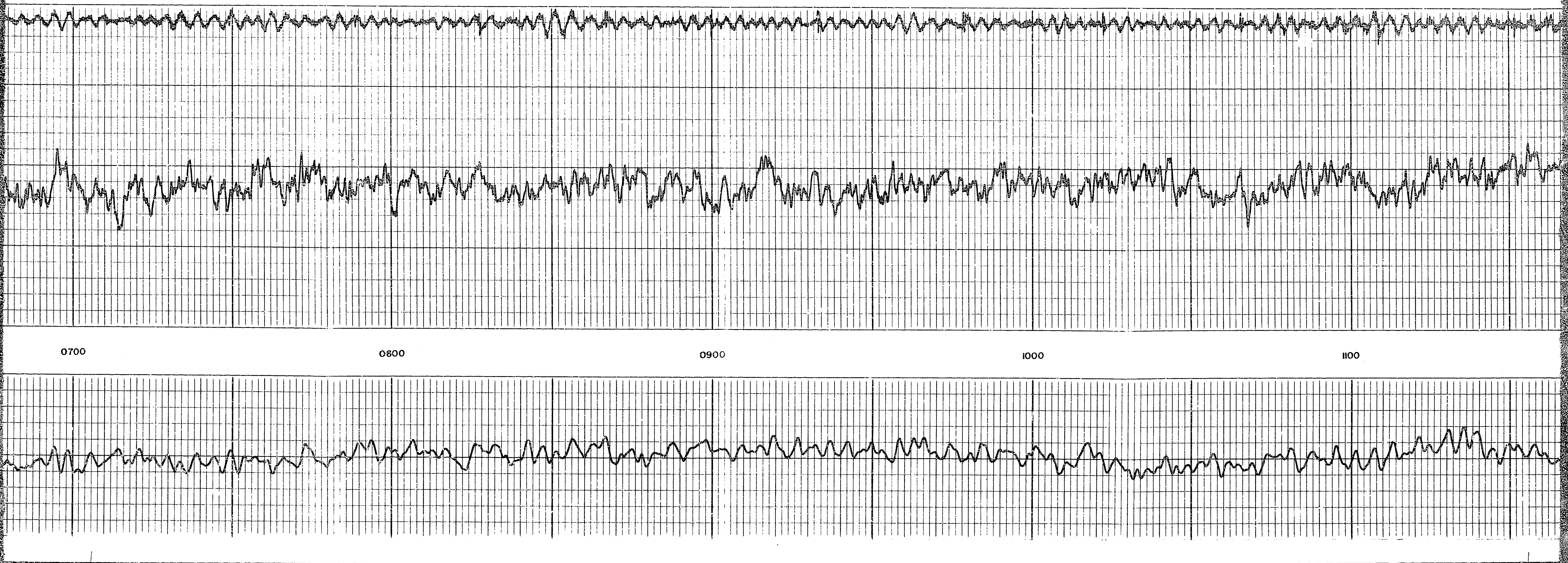
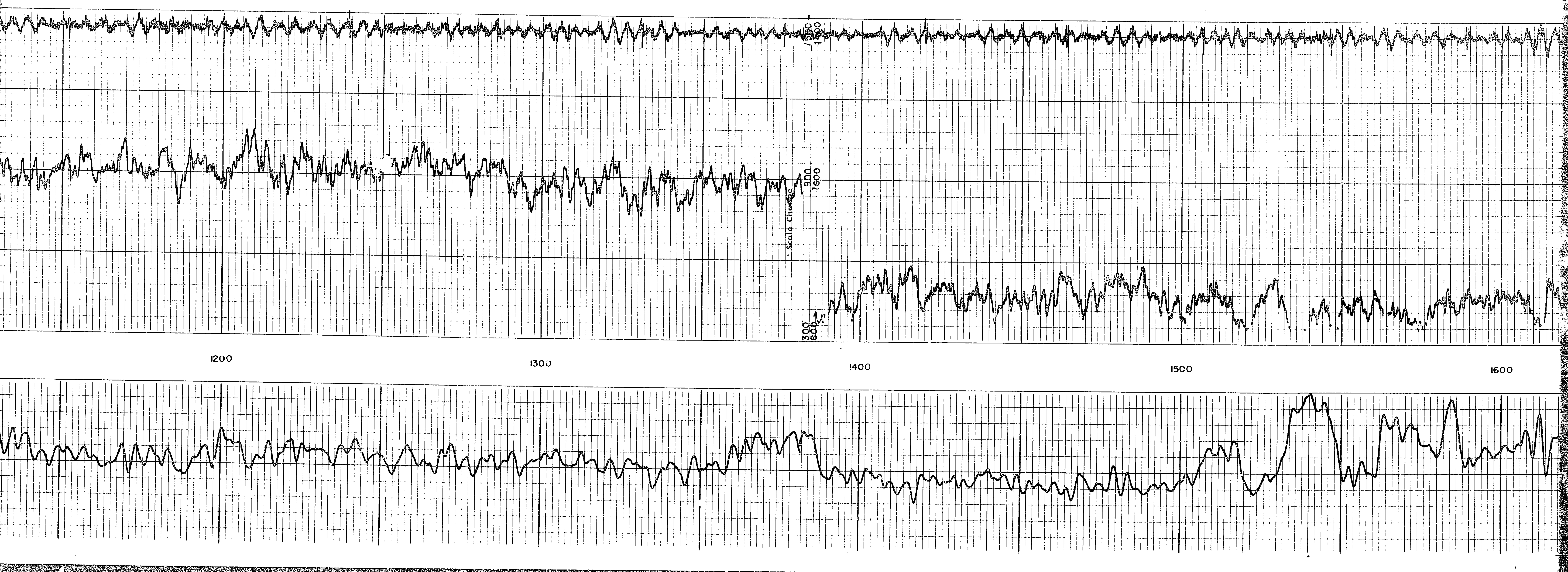
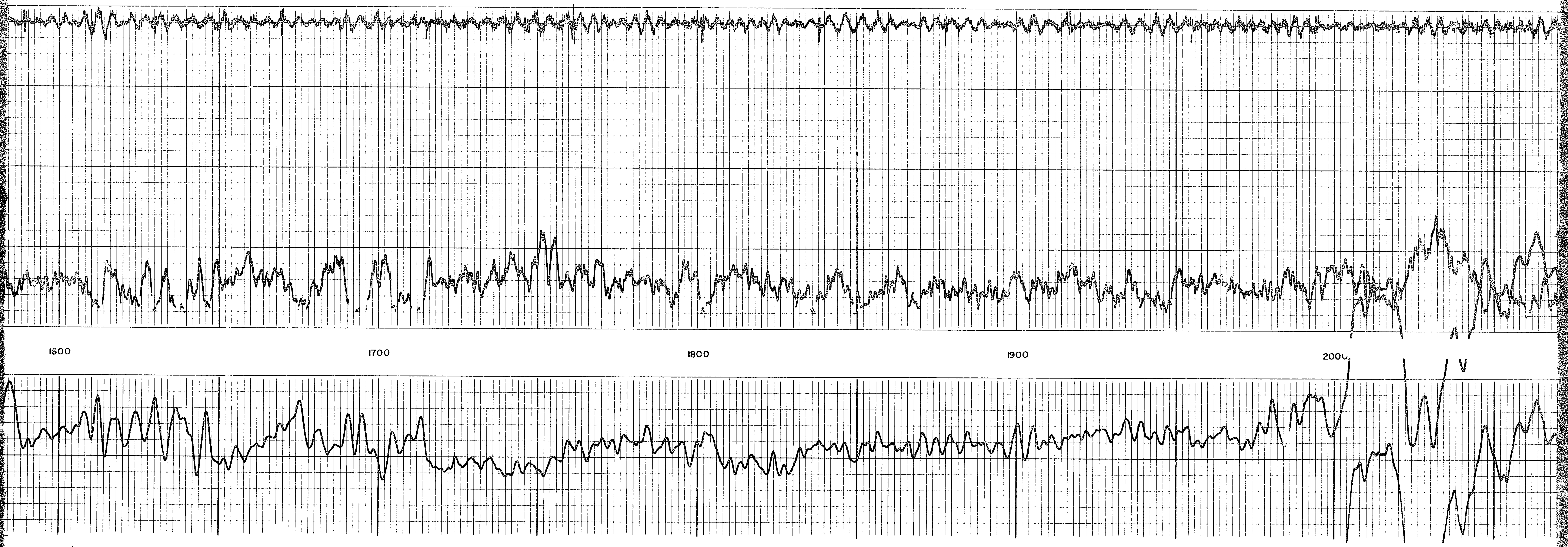


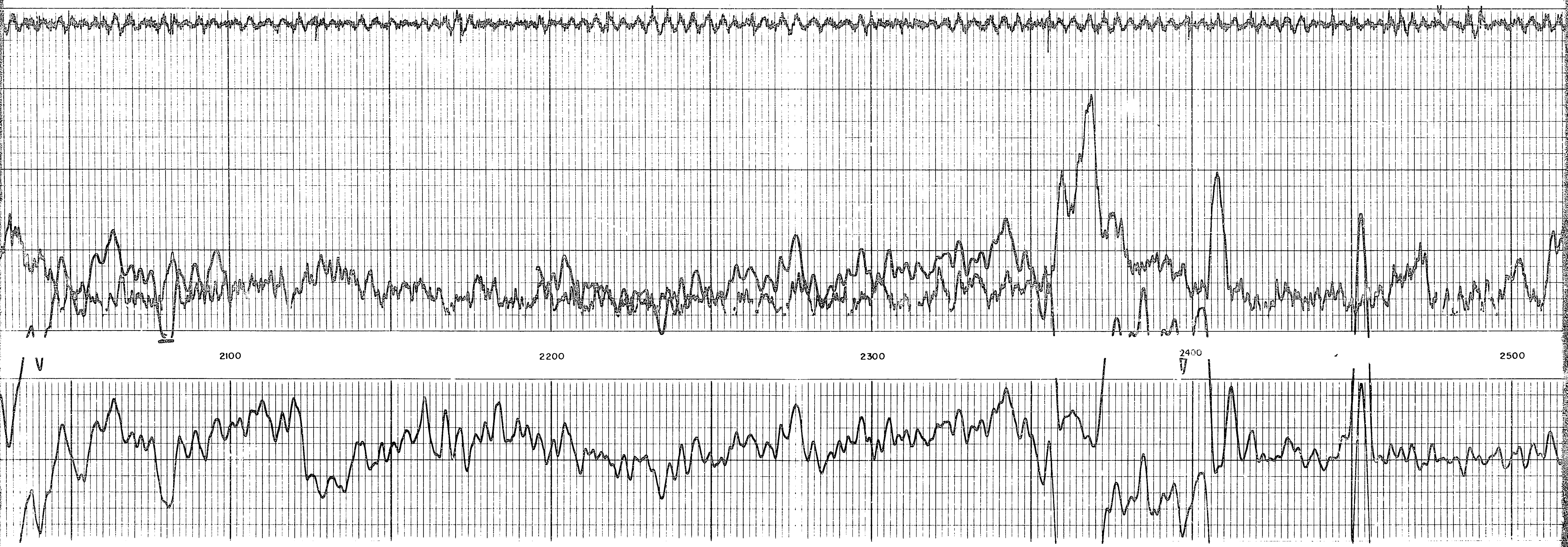
5 of

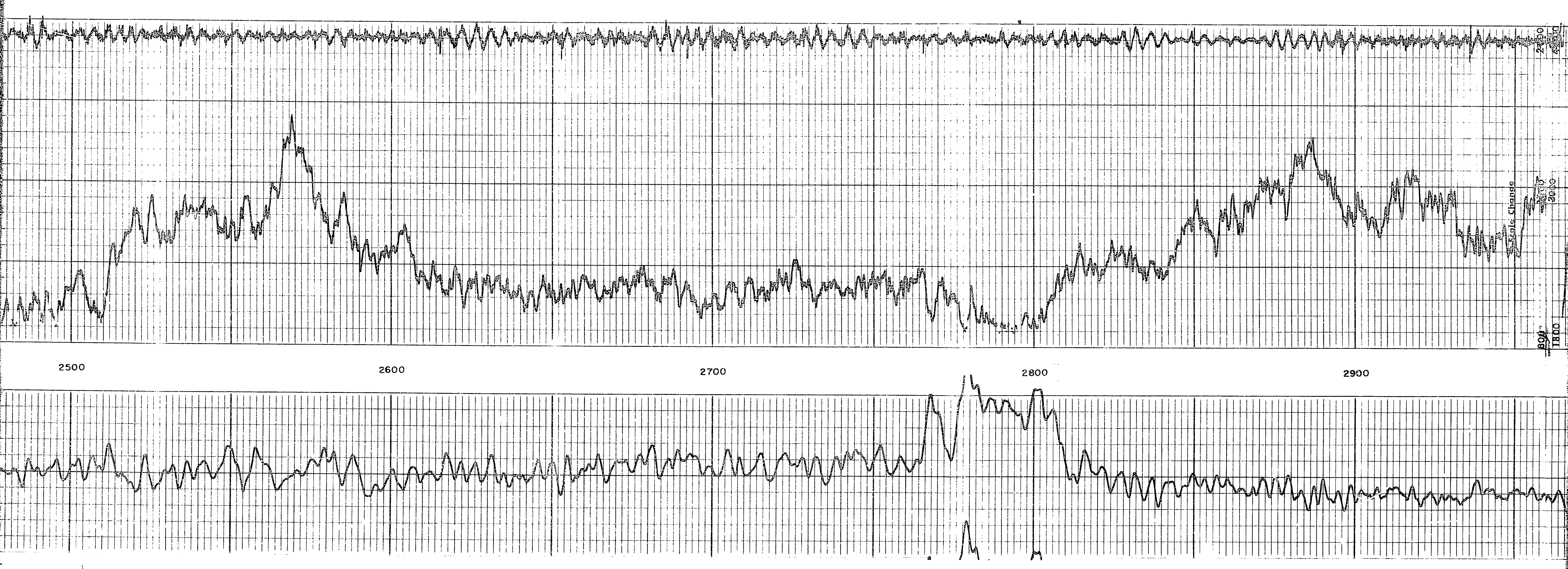

1500
1900
900
1600
Scale Change
300
800
1200
1300
1400
1500
1600

6 of

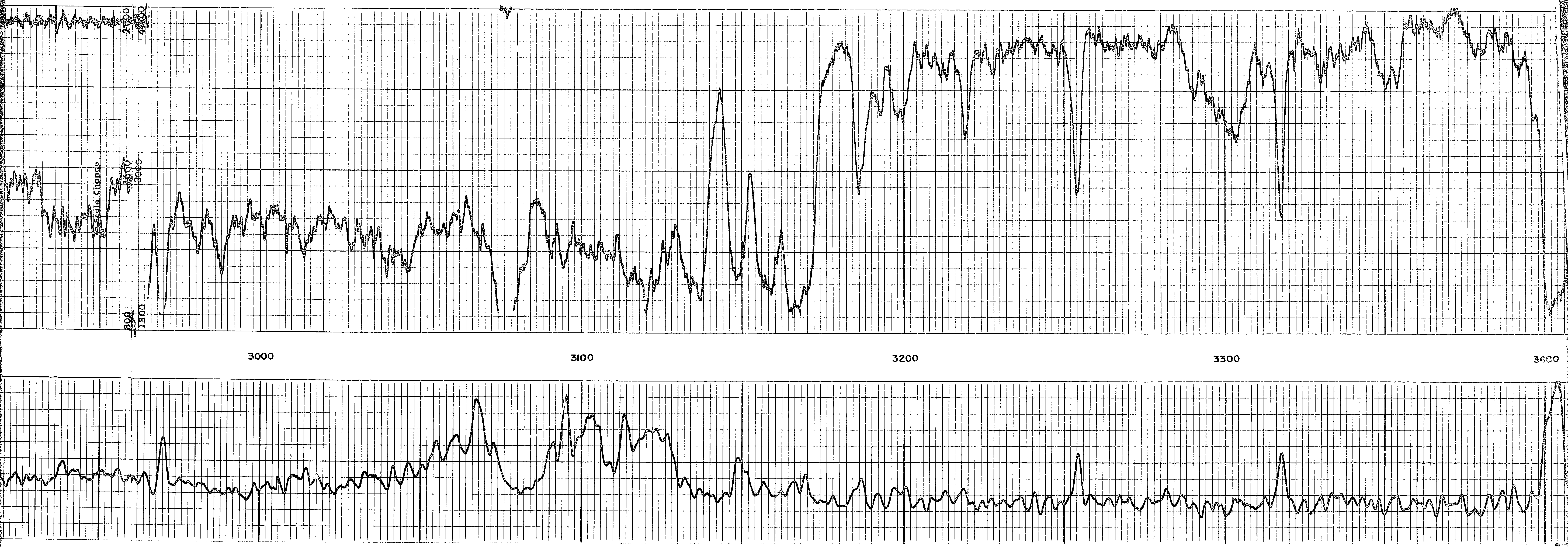


707

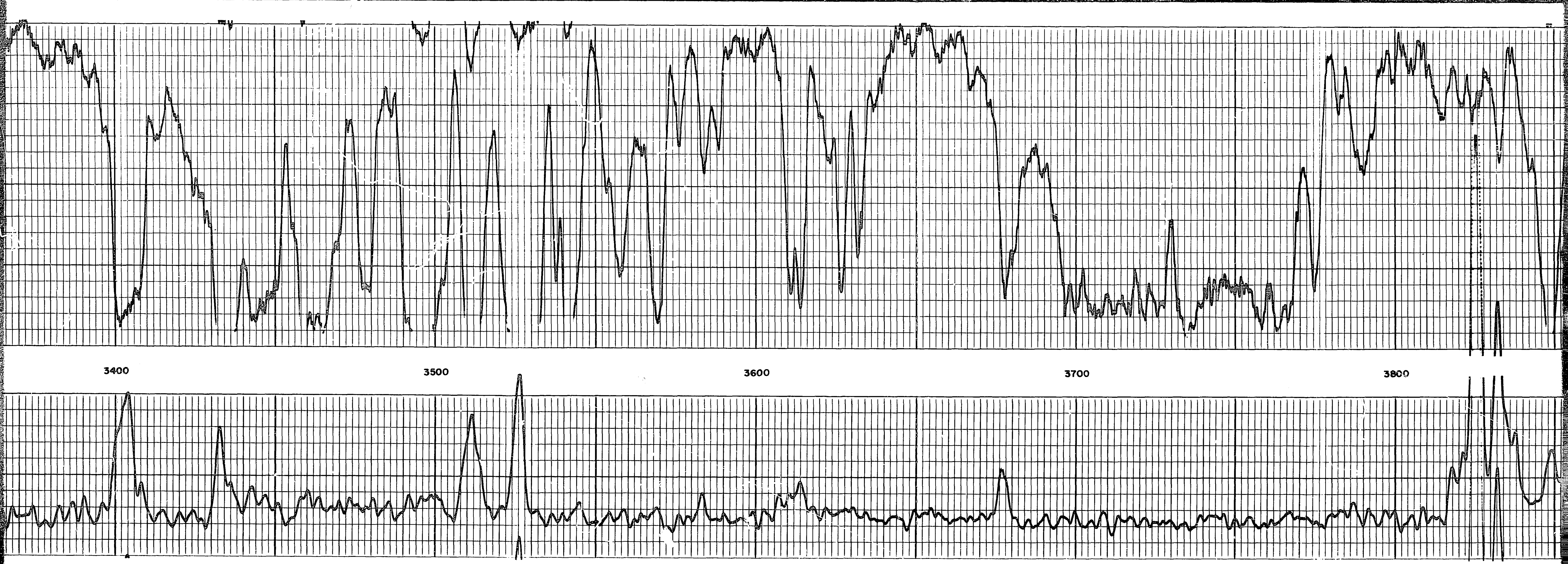

2100
2200
2300
2400
2500


2500
2600
2700
2800
2900
Scale Change
2500
4500
2800
3800
800
1800

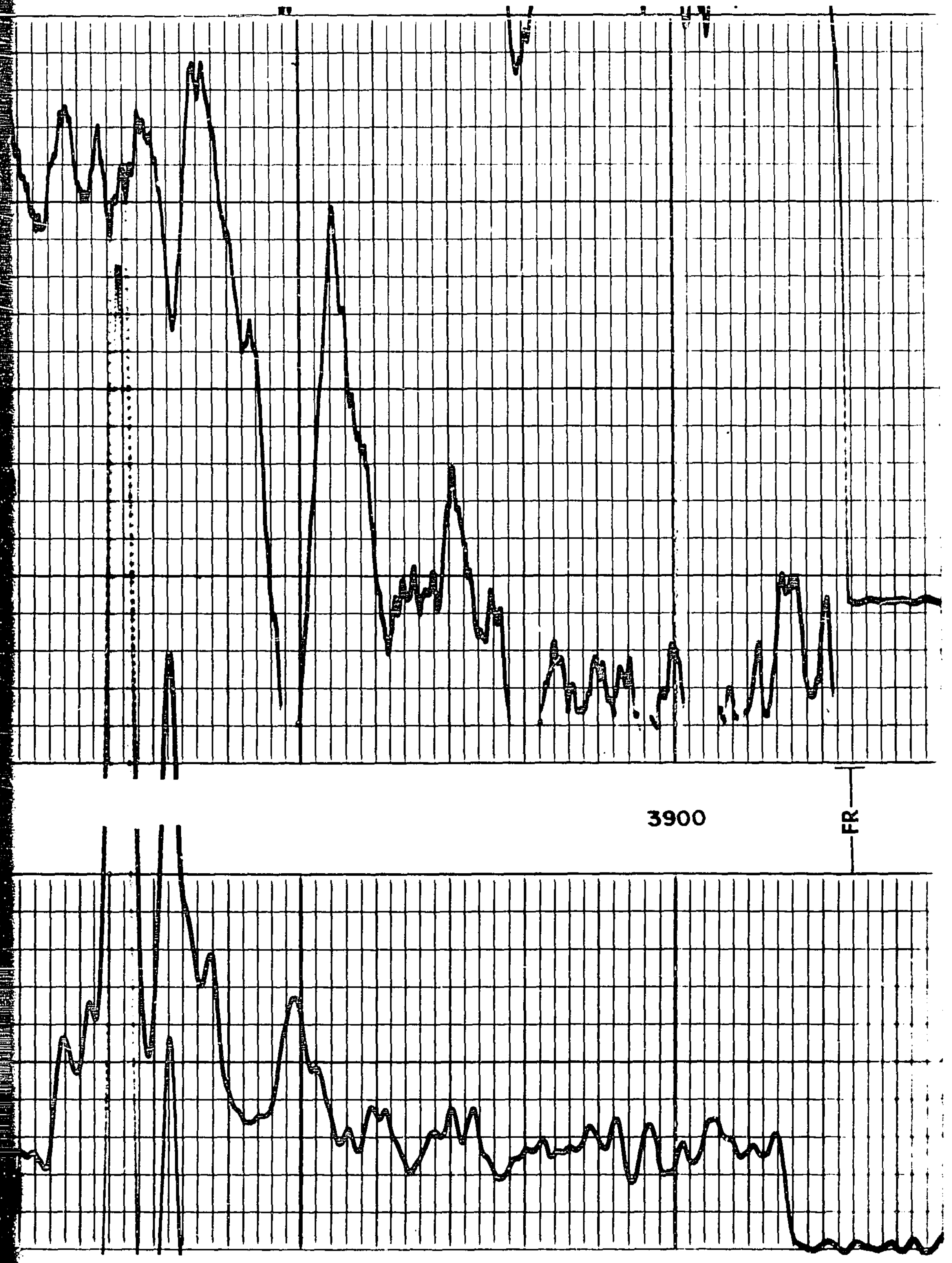
9 of

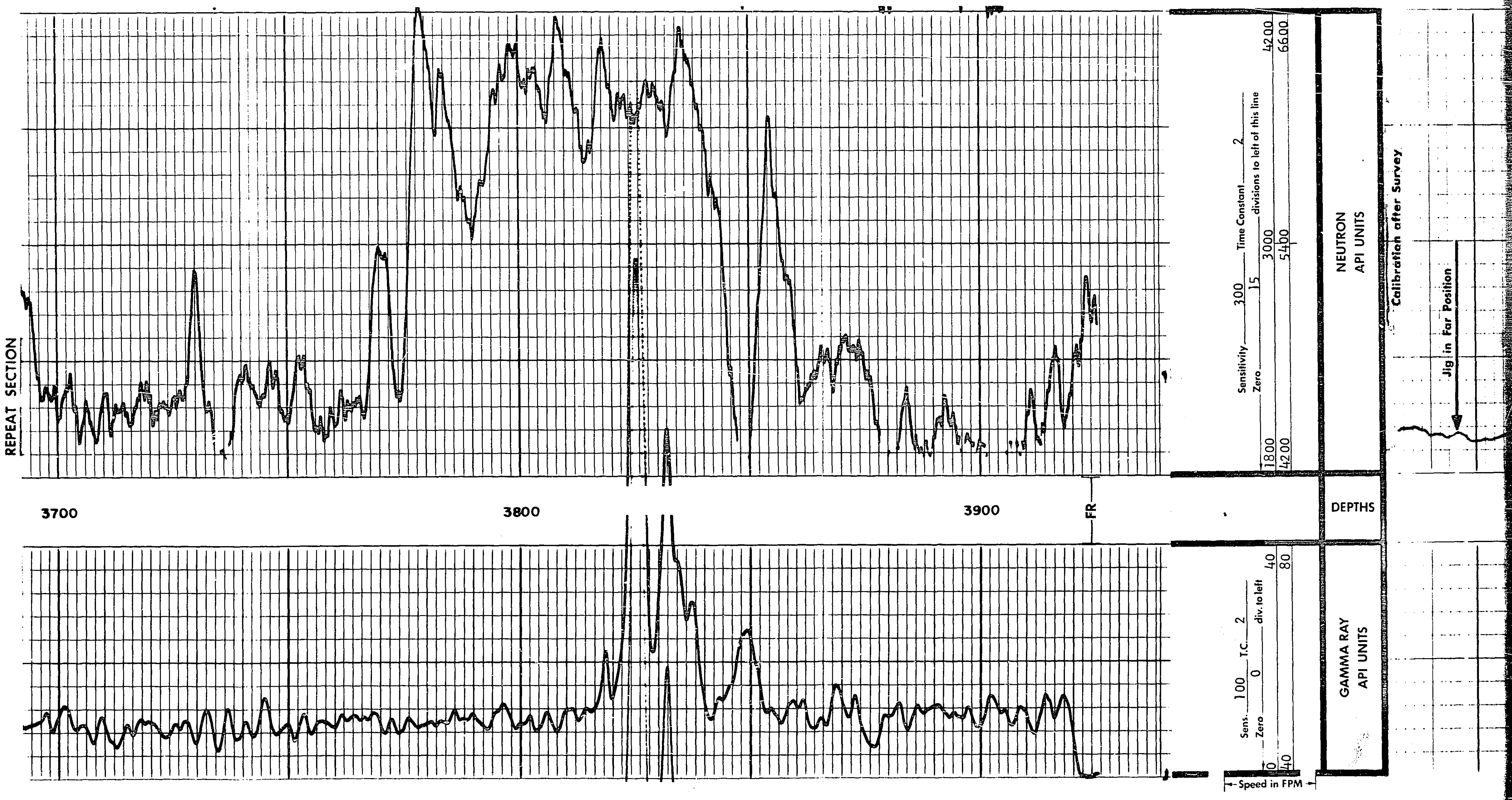

2400
4800
Scale Change
1500
3000
900
1800
3000
3100
3200
3300
3400

10of

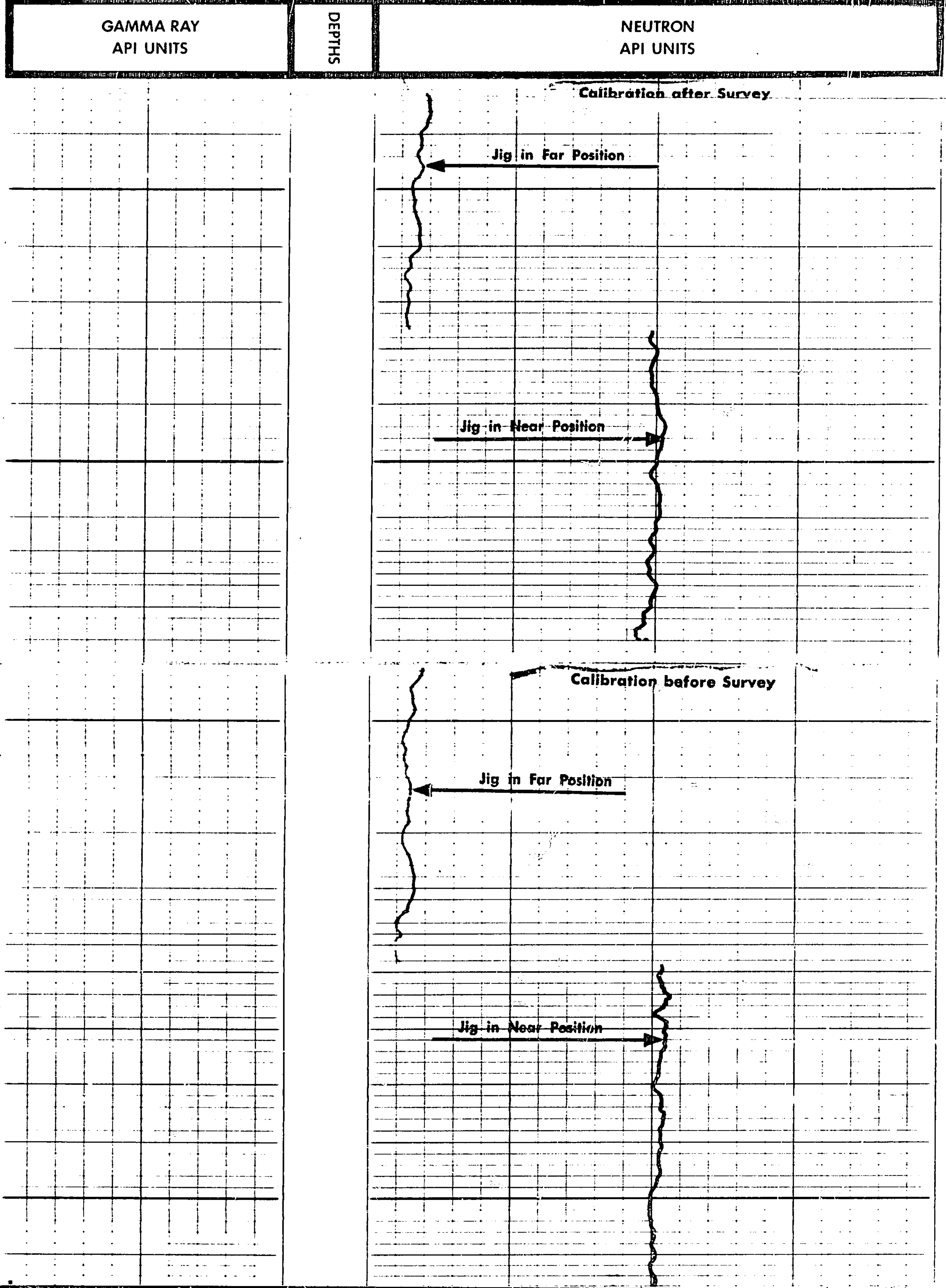


11 of


3900
FR


REPEAT SECTION
3700
3800
3900
FR
Sensitivity 300 Time Constant 2
Zero 15 divisions to left of this line
1800 3000 4200
4200 5400 6600
NEUTRON
API UNITS
DEPTHS
Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80
GAMMA RAY
API UNITS
Speed in FPM
Calibration after Survey
Jig in Far Position

12 of



**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL WALRUS A 71

**FIELD** WILDCAT **PROVINCE** FEDERAL WATERS

SCHLUMBERGER

**SCHLUMBERGER**

# GAMMA RAY LOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

**LOCATION** 87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services:
CAL, DIL, SNP, LL
ML, FDC-GR, SLC-GR

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 12 SEPT 69 | | |
| Run No. | ONE | | |
| First Reading | 1988 | | |
| Last Reading | 540 | | |
| Feet Measured | 1448 | | |
| Depth Reached | 1996 | | |
| Bottom Driller | 2000 | | |
| Mud Nature | SALT-GEL-BARITE | | |
| Dens. \| Visc. | 10.2 \| 58 | \| | \| |
| Mud pH | 11.0 | | |
| " Water Loss | 48.0 | | |
| " Res. | 0.10 @ 70 °F | @ °F | @ °F |
| " " @ BHT | 0.08 @ 74 °F | @ °F | @ °F |
| " Rmf | 0.07 @ 70 °F | @ °F | @ °F |
| " Rmc | 0.19 @ 70 °F | @ °F | @ °F |
| Bit Size | 17 1/2" to | to | to |
| | CSG to 1992 | to | to |
| Csg. Size—Inches | 20" to | to | to |
| | to | to | to |
| Csg. Weight—Pounds | - to | to | to |
| | to | to | to |
| Source to Detector | - inches | inches | inches |
| Opr. Rig Time | 2 HRS. | | |
| Truck No. | OSU-C 285 | | |
| Recorded By | BERRY | | |
| Witness | RUEFF | | |

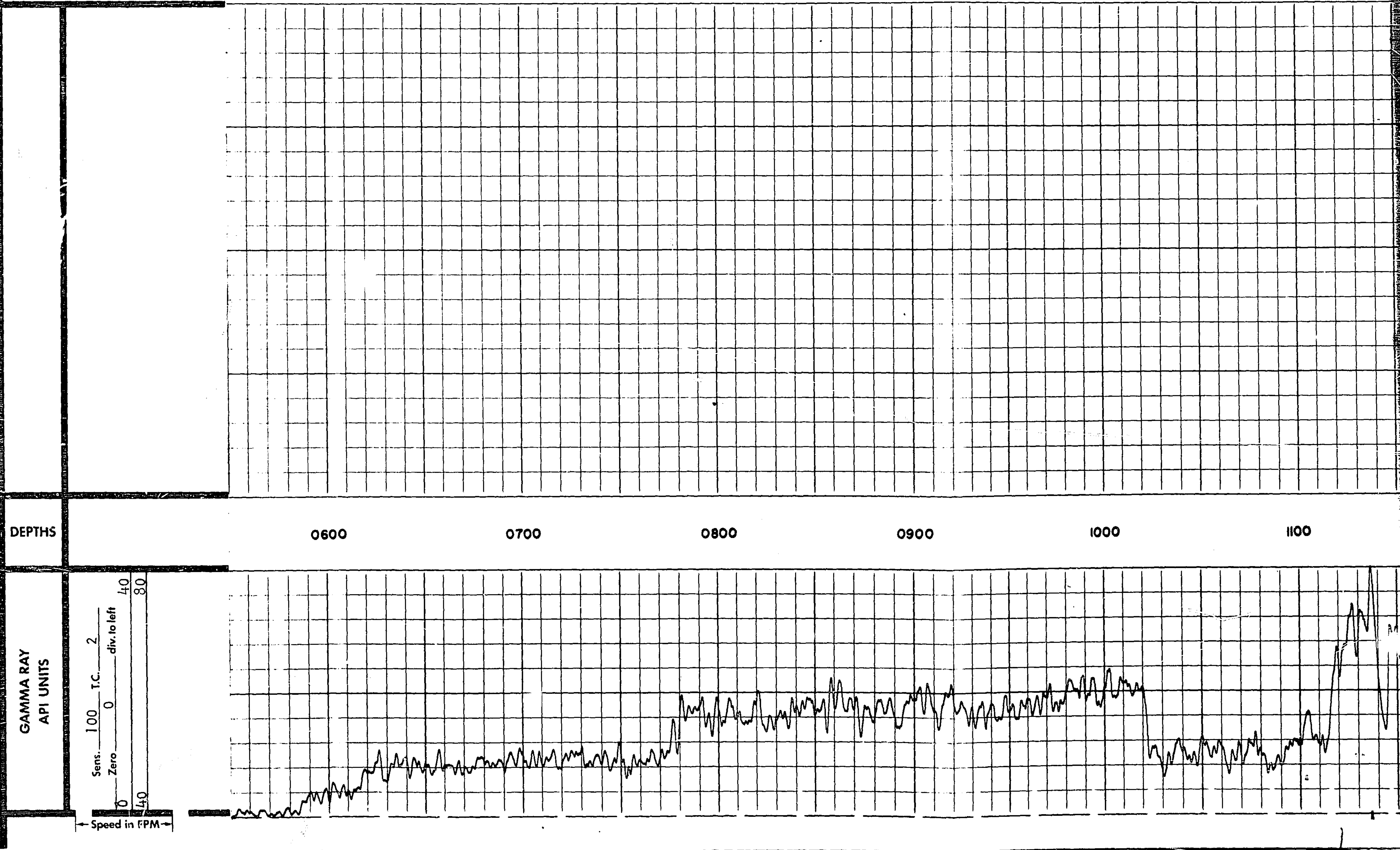
1st Run Service Order # 43818 B.H.T. 74 °F

Drilling Stopped 2000 / 7th : Circulation Stopped 1800 / 10th : Tool on Bottom 0100 / 12th :

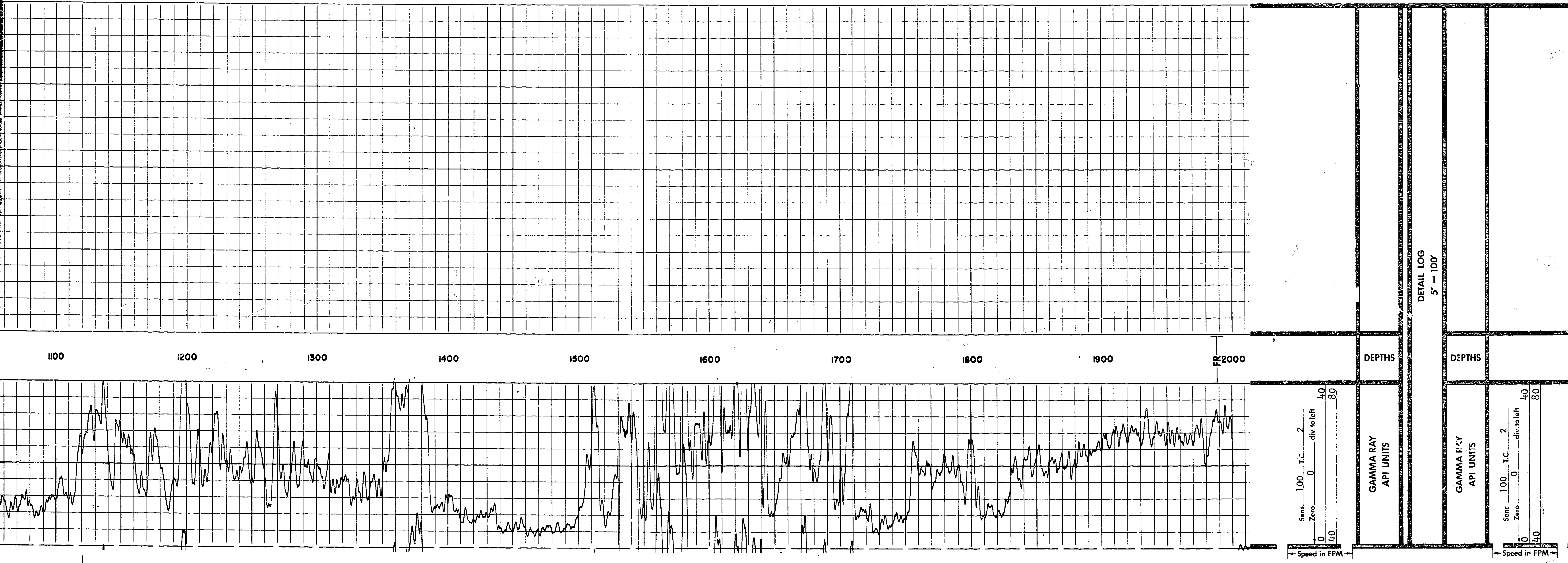
REMARKS
2 OCT 69 CAL RS

Panel No. 521
Cartridge No. G 69
Neutron Detector No. -
Gamma Ray Detector No. H 53
Equipment Designation G

| CALIBRATION: | Background CPS. | Test Source CPS. | | Galv. Deflection Divisions | | Panel Sens. Tap for Cal. |
|---|---|---|---|---|---|---|
| | | Near | Far | Near | Far | |
| Gamma Ray Before Survey | | | | | | |
| " After | | | | | | |
| Neutron Before Survey | | | | | | |
| " After | | | | | | |



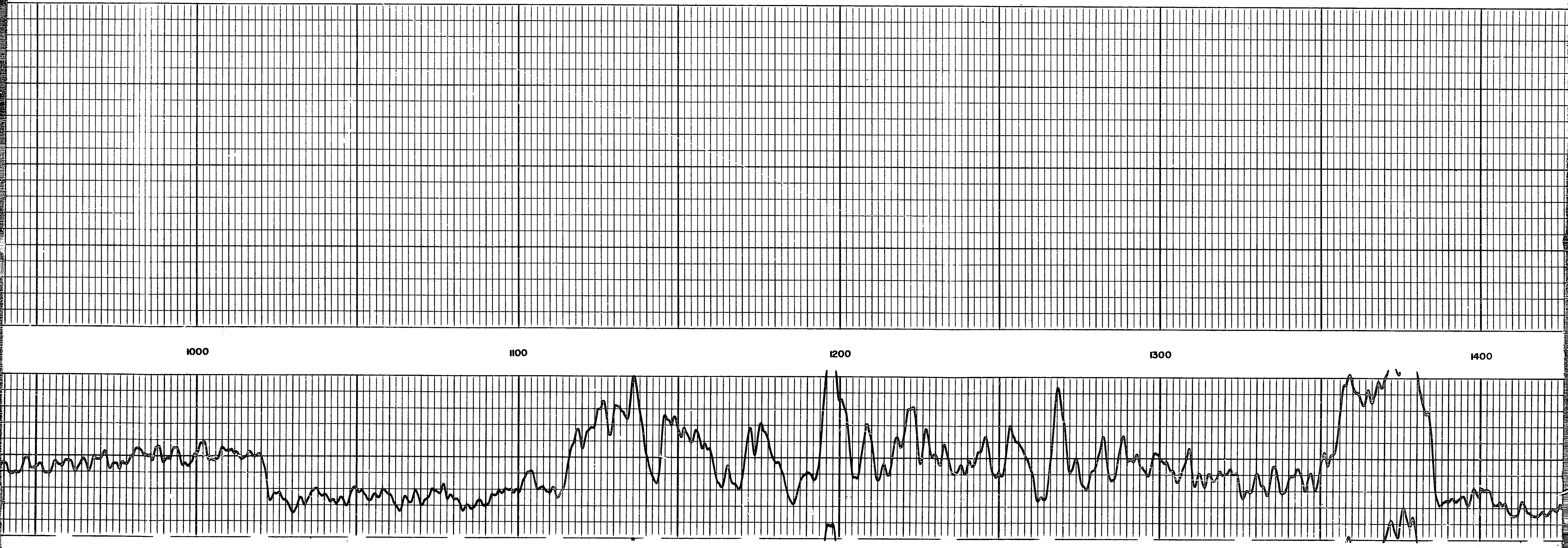
Sens. 100 T.C. 2
Zero 0 div. to left


1100
1200
1300
1400
1500
1600
1700
1800
1900
FR
2000
DEPTHS
GAMMA RAY
API UNITS
Sens. 100 T.C. 2
Zero 0 div. to left
0
40
40
80
Speed in FPM
DETAIL LOG
5" = 100'
DEPTHS
GAMMA RAY
API UNITS
Sens. 100 T.C. 2
Zero 0 div. to left
0
40
40
80
Speed in FPM

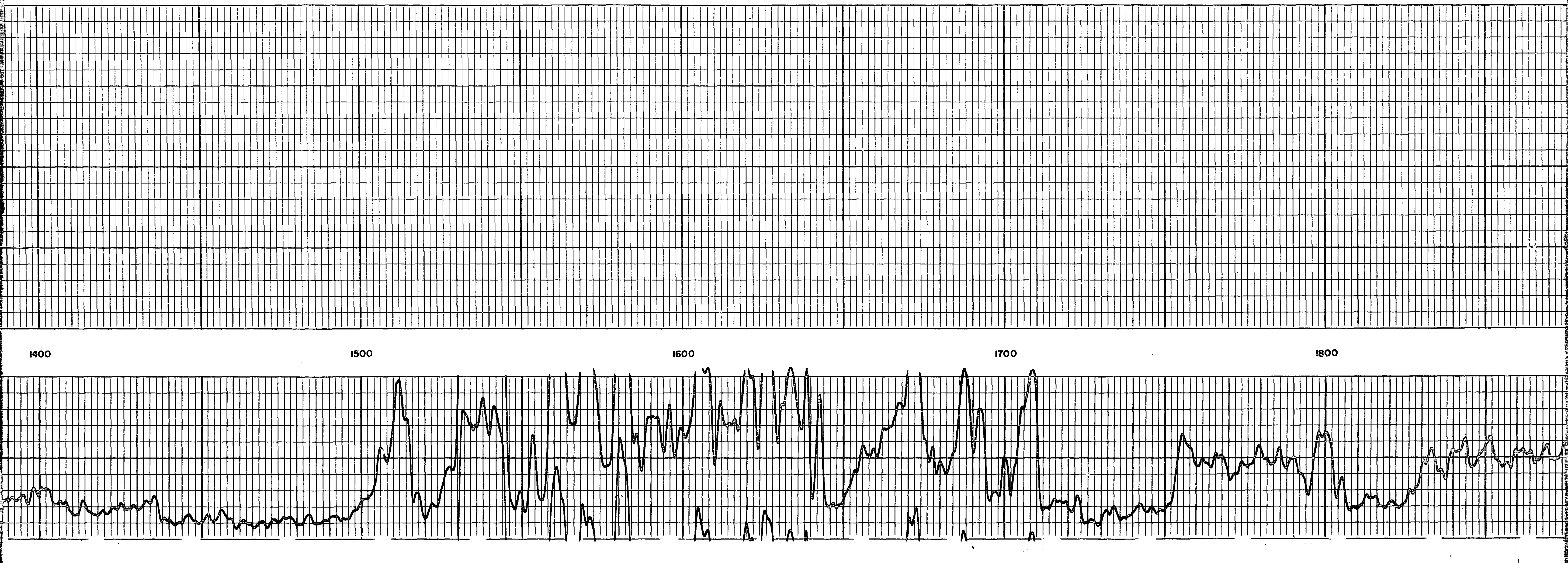
2 of

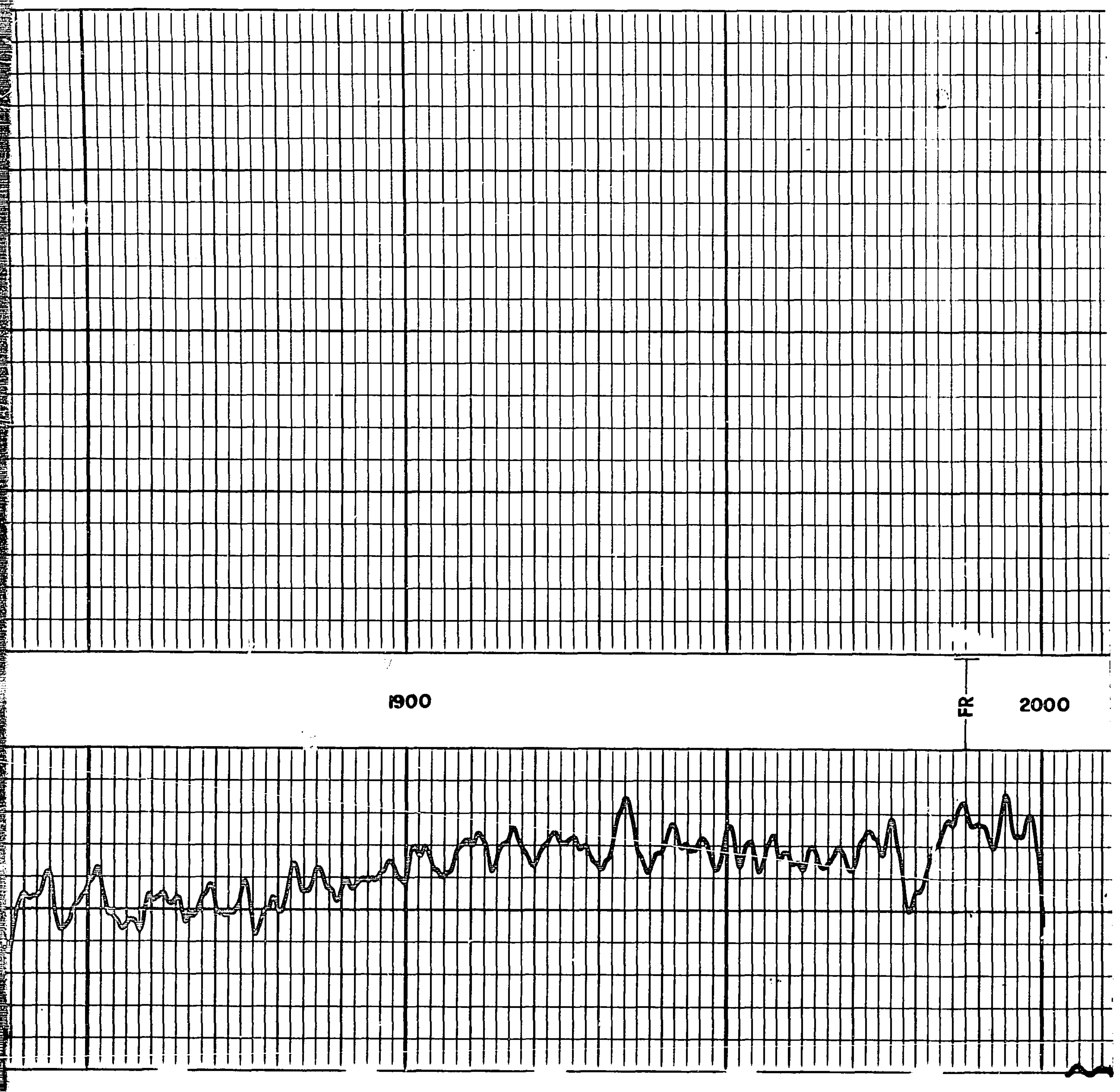

THS
0600
0700
0800
0900
API UNITS
Sens. 100
T.C. 2
Zero 0
div. to left
40
80
0
40
Speed in FPM

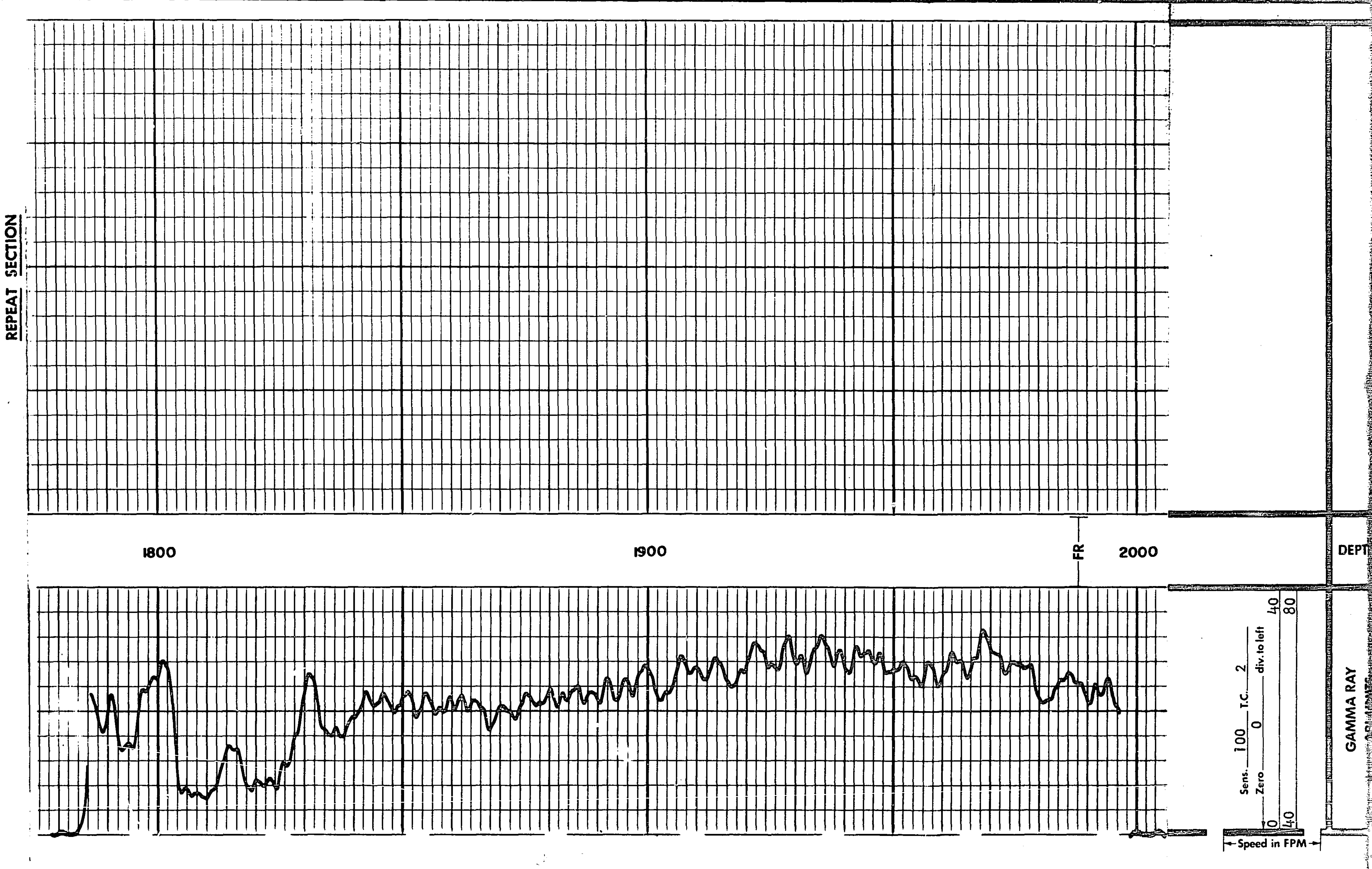
2 of



49


1400
1500
1600
1700
1800


1900
FR
2000


REPEAT SECTION
1800
1900
FR
2000
DEPT
Sens. 100 T.C. 2 div. to left
Zero 0
40
80
0
40
GAMMA RAY
Speed in FPM

6 of

Speed in FPM

Sens. 100 T.C. 2

Zero 0 div. to left

| | |
|---|---|
| 0 | 40 |
| 40 | 80 |

**GAMMA RAY**
**API UNITS**

**DEPTHS**

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT **PROVINCE** FEDERAL WATERS

**SCHLUMBERGER**

SCHLUMBERGER

# SIDEWALL NEUTRON POROSITY LOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: SRS FDC-GR, SLC-GR, LL ML, CAL, SNP, DIL

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 23 SEPT 69 | | |
| Run No. | ONE | | |
| First Reading | 2959 | | |
| Last Reading | 2300 | | |
| Feet Measured | 659 | | |
| Depth Reached | 2960 | | |
| Bottom Driller | 2959 | | |
| Csg. SOC | 1975 | | |
| Csg. Driller | 1975 | | |
| Mud Nature | SALT-GEL-BARITE | | |
| Dens. \| Visc. | 14.0 \| 48 | \| | \| |
| Mud pH | 9.5 | | |
| " Water Loss | 13.0 | | |
| " Res. | 0.07 @ 48 °F | @ °F | @ °F |
| " Rmf | 0.06 @ 50 °F | @ °F | @ °F |
| " " @ BHT | 0.04 @ 82 °F | @ °F | @ °F |
| " Rmc | 0.10 @ 50 °F | @ °F | @ °F |
| " ppm-Cl. | - | | |
| Bit Size | 12 1/4" | | |
| | | | |
| | | | |
| Equipment Type | PGT-D | | |
| Opr. Rig Time | 3 HRS | | |
| Truck No. | OSU-C 285 | | |
| Recorded By | BERRY | | |
| Witness | RUEFF | | |

2 OCT 69 CAL RS

REMARKS

Drilling Stopped 1100 / 19th : Circulation Stopped 2200 / 22nd : Tool on Bottom 1000 / 23rd : 1st Run Service Order # 43878 B.H.T. 82 °F

Panel No. 363
Cartridge No. 13
Sonde No. 310
Detector No. 78
SFT-116 No.

CALIBRATION: Gamma Ray

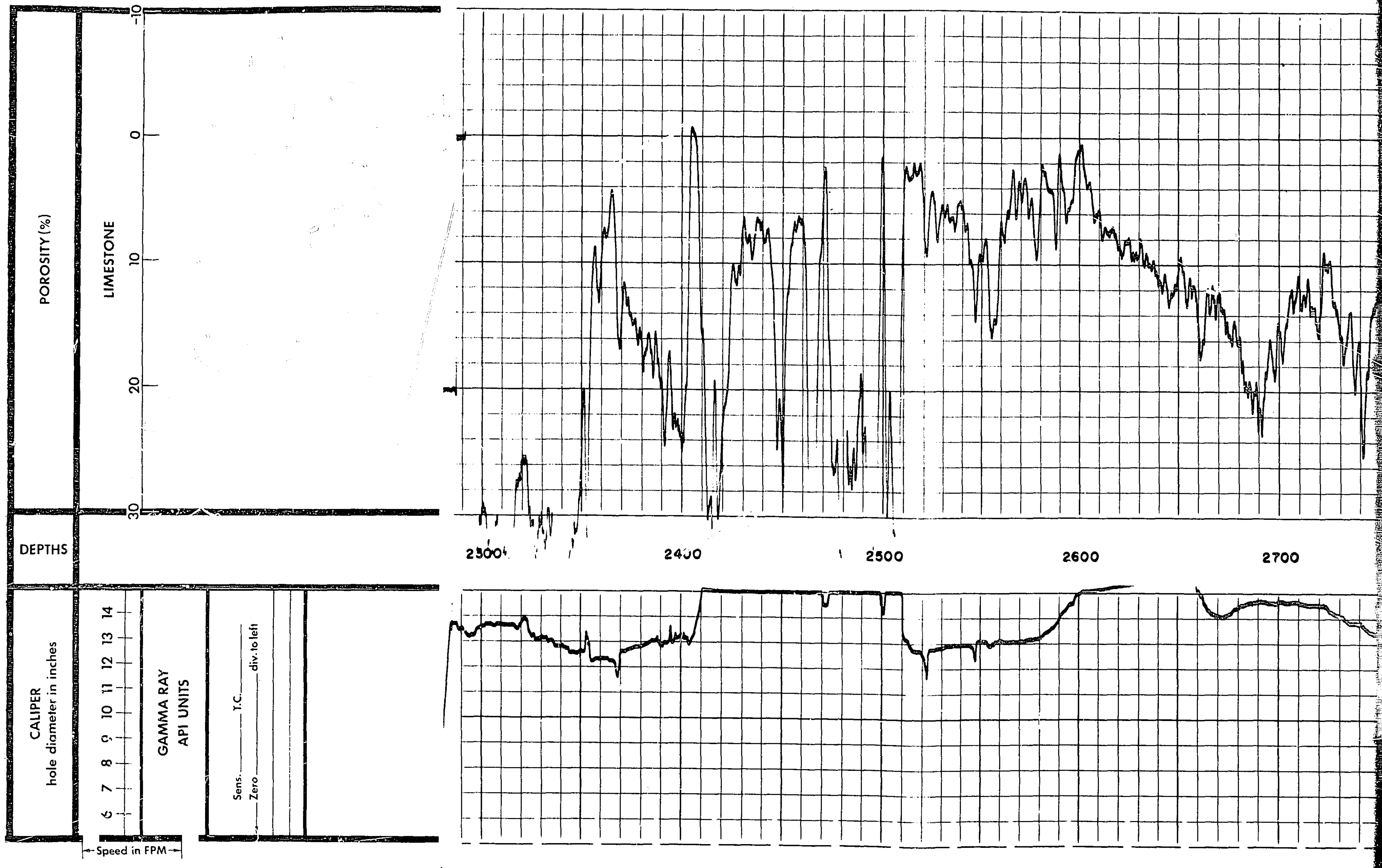
| Background CPS | Test Source CPS | Galv. Deflection | Sens. Tap |
|---|---|---|---|
| | | | |

| Neutron Environmental Cal. | | |
|---|---|---|
| | Drawer In-CPS | Drawer Out-CPS |
| Before | 240 | 420 |
| After | | |

| Neutron Auxiliary Cal.-CPS | |
|---|---|
| Before | |
| After | |

| Panel Settings: Function Former | Temp. Comp. Setting | T.C. | Mud Wt./Salinity Comp. set as per recorded value |
|---|---|---|---|
| LIMESTONE-LIQUID | 80 | 2 | from 2959 to 2300 |
| | | | from to |
| | | | from to |

This interpretation represents our best judgment. Nevertheless since all interpretations are opinions based solely on inferences from electrical or other measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation and shall not be liable or responsible for any loss, cost, damages, or expenses that may be incurred or sustained resulting from this or any other interpretation.



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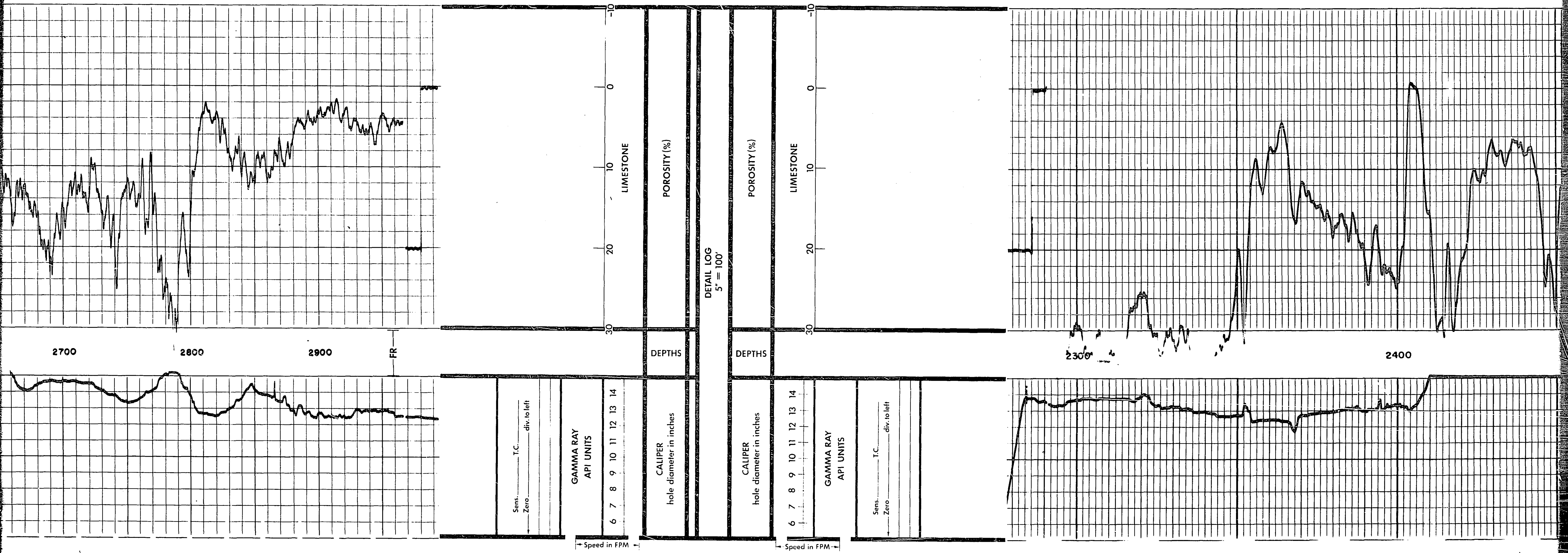
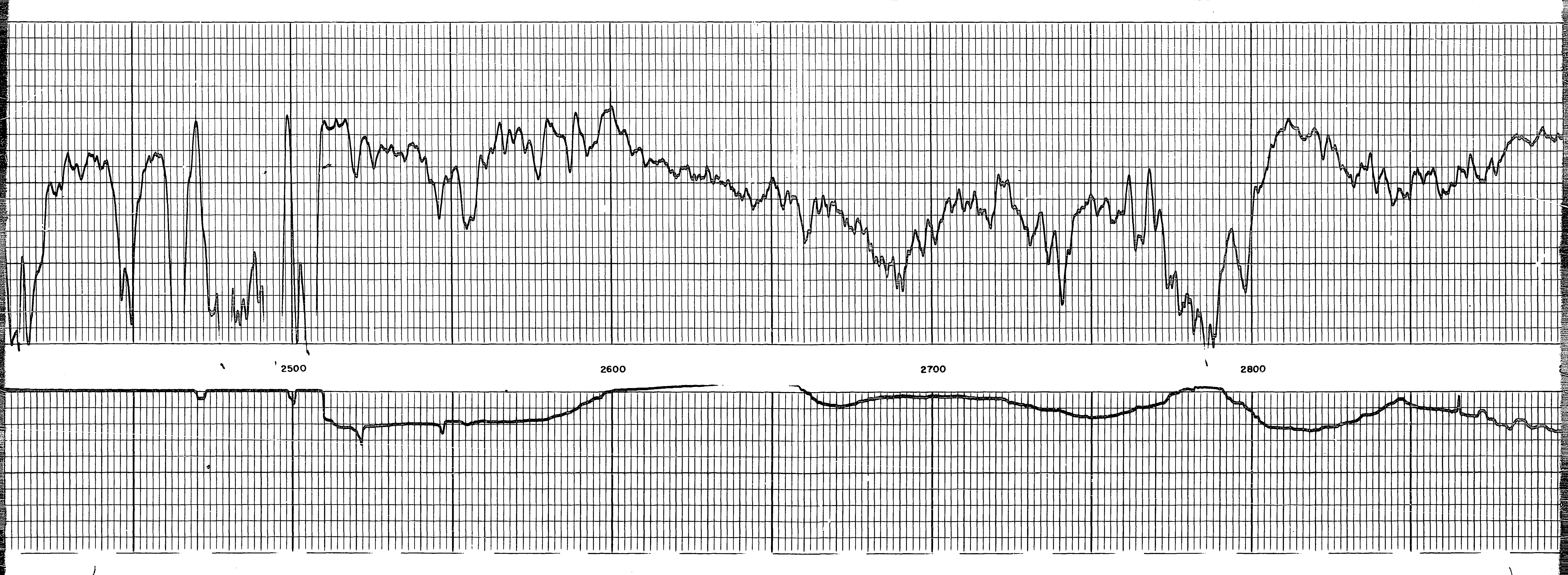
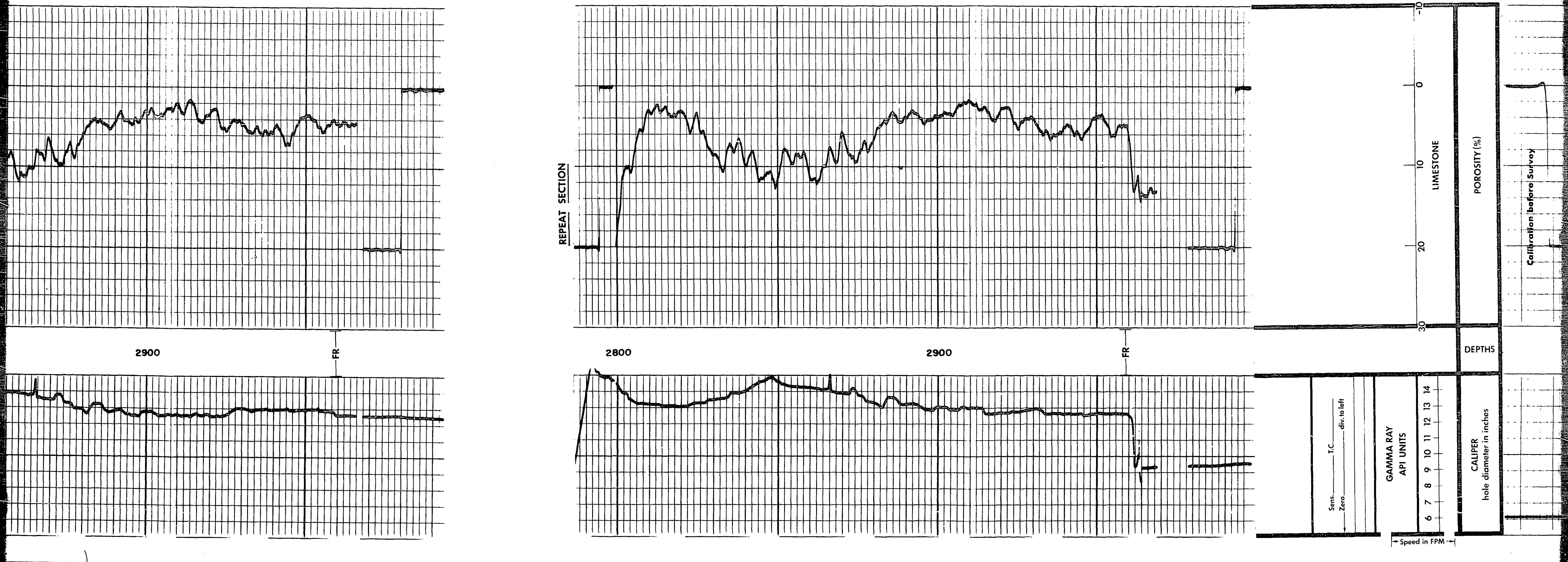
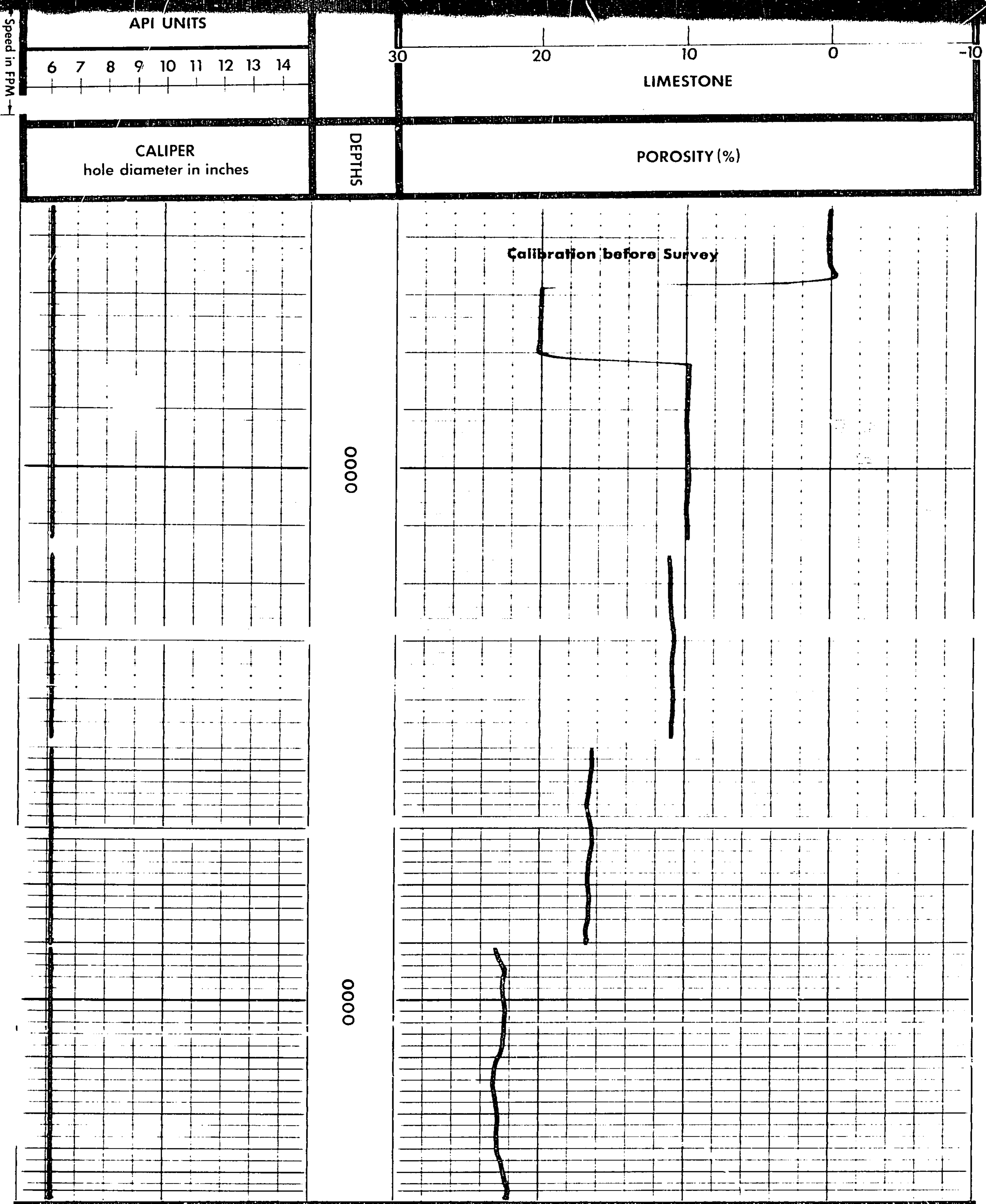

-10
0
10
20
30
LIMESTONE
POROSITY (%)
DETAIL LOG
5" = 100'
POROSITY (%)
LIMESTONE
-10
0
10
20
30
2700
2800
2900
FR
DEPTHS
DEPTHS
2300
2400
Sens. T.C.
Zero div. to left
GAMMA RAY
API UNITS
6 7 8 9 10 11 12 13 14
CALIPER
hole diameter in inches
DETAIL LOG 5" = 100'
CALIPER
hole diameter in inches
6 7 8 9 10 11 12 13 14
GAMMA RAY
API UNITS
Sens. T.C.
Zero div. to left
Speed in FPM
Speed in FPM

2 of


2500
2600
2700
2800


2900
FR
REPEAT SECTION
2800
2900
FR
-10
0
10
20
30
LIMESTONE
POROSITY (%)
Calibration before Survey
DEPTHS
Sens.
Zero
T.C.
div. to left
GAMMA RAY
API UNITS
6 7 8 9 10 11 12 13 14
CALIPER
hole diameter in inches
Speed in FPM

4 of



**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT **PROVINCE** FEDERAL WATERS

SCHLUMBERGER

SCHLUMBERGER

# THREE - ARM FOCUSED CONTINUOUS DIPMETER

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A71

FIELD WILDCAT

PROVINCE FEDERAL WATERS

LOCATION 87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: ML, SRS, SLC-GR, GR, CAL, LL, SNP, FDC-GR

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum
Drilling Measured From

ELEV: KB 32
GL 0
CBF

| | | | | |
|---|---|---|---|---|
| Date | 11 OCT 69 | | | |
| Run No. | ONE | | | |
| Depth Driller | 3729 | | | |
| Depth Logger | 3724 | | | |
| Btm. Log Interval | 3720 | | | |
| Top Log Interval | 2965 | | | |
| Casing Driller | 2965 | | | |
| Casing Logger | 2965 | | | |
| Bit Size | 8 1/2 " | | | |
| Type Fluid in Hole | SALT GEL | | | |
| | | | | |
| Dens. \| Visc. | 1.72 \| 70 | \| | \| | |
| pH \| Fluid Loss | 8.5 \| 14.4 | \| | \| | |
| Source of Sample | | | | |
| Rm @ Meas. Temp. | .103 @ 50 °F | @ °F | @ °F | |
| Rmf @ Meas. Temp. | @ °F | @ °F | @ °F | |
| Rmc @ Meas. Temp. | @ °F | @ °F | @ °F | |
| Source: Rmf Rmc | \| | \| | \| | |
| Rm @ BHT | @ °F | @ °F | @ °F | |
| Time Since Circ. | 8 HRS | | | |
| Max. Rec. Temp. | 62 °F | °F | °F | |
| Equipment | | | | |
| Truck No. | OSU-C 285 | | | |
| Location | | | | |
| Recorded By | STUEHMER | | | |
| Witnessed By | KMIECLUCK | | | |

THIS HEADING AND LOG CONFORMS TO API RP 31

FOLD HERE

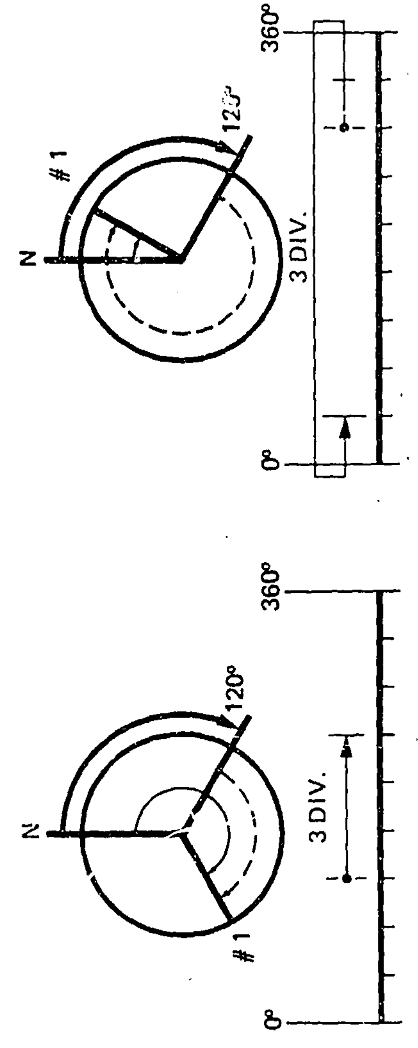
| | |
|---|---|
| Run No. | ONE |
| Tool Type | |
| PDM No. | AB789 |
| PDE No. | AB352 |
| PDP No. | AA31 |
| RDS No. | |
| PDA No. | |
| TTRNo. | |
| SAH | |
| UG | X |
| LG | |
| Magnetic Declination | 12° W |

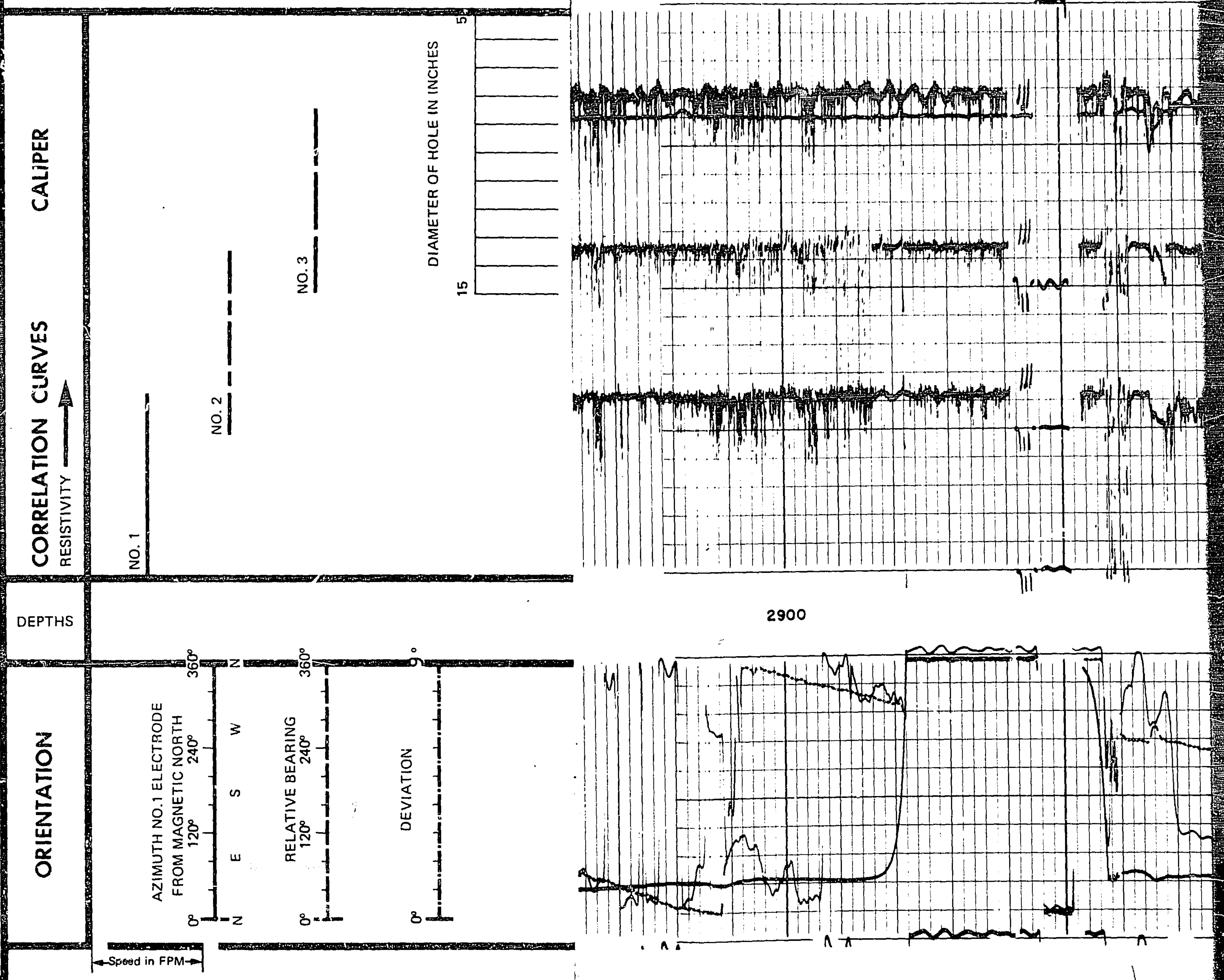
Drilling Stopped /
Circulation Stopped /
Tool on Bottom /
1st Run Service Order /
B.H.T. °F

| | |
|---|---|
| ROLL NO. | INTERVAL |

DIRECTION OF DEVIATION
REFERRED TO MAGNETIC NORTH

MEASURE TO THE RIGHT FROM DASHED TRACE (RELATIVE BEARING) TO SOLID TRACE (AZIMUTH NO. 1) COUNTING 40° PER DIVISION.
EXAMPLES: DEVIATION DIRECTION 120°





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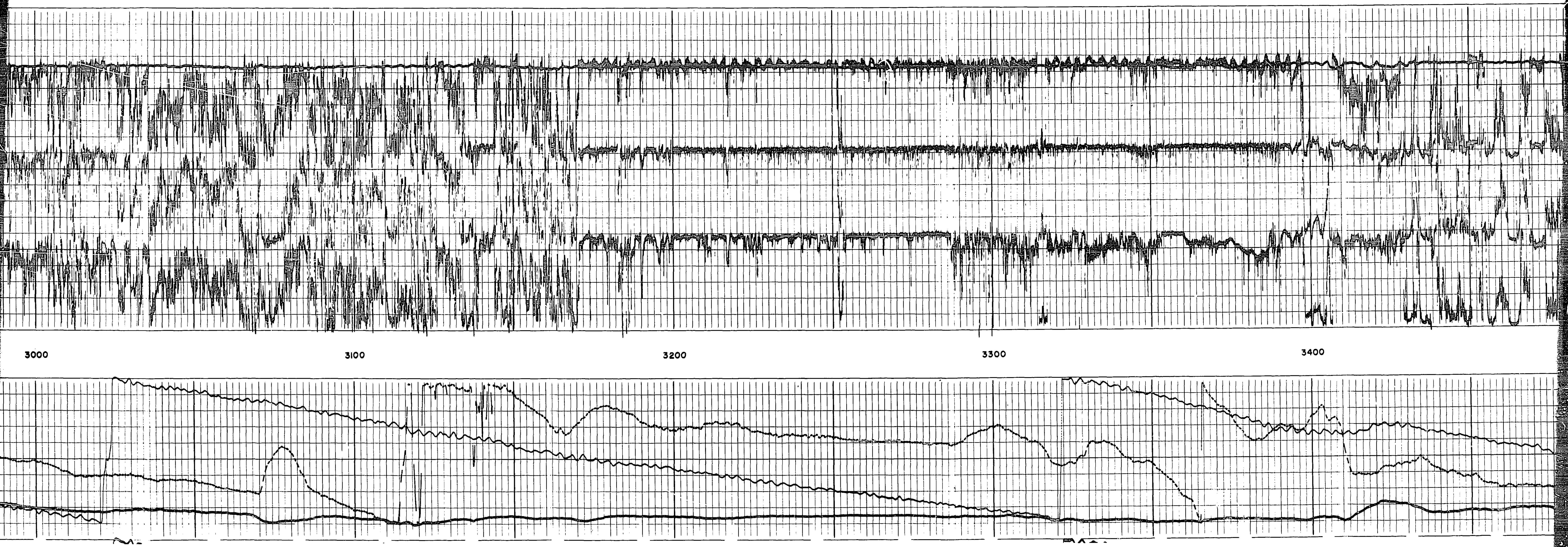

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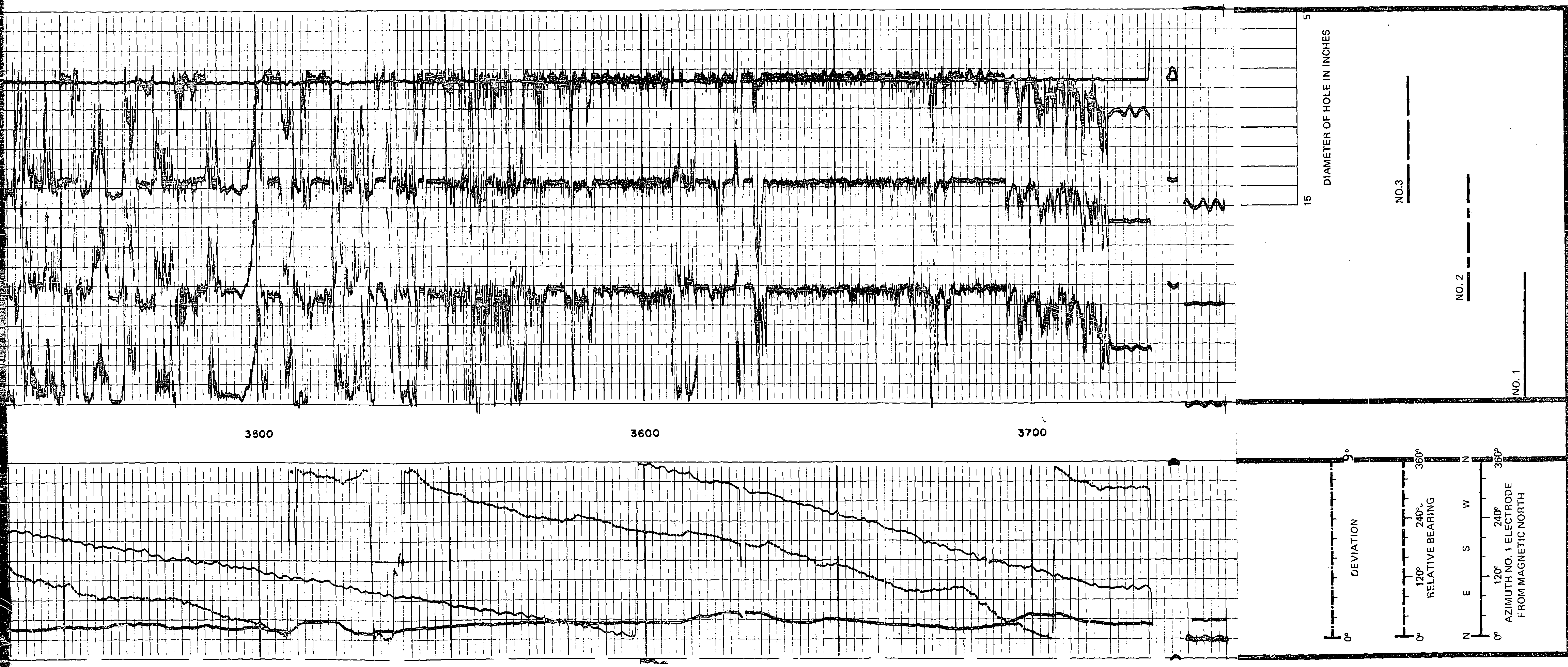


SCHLUMBERGER

CALIPER

RESISTIVITY → CORRELATION CURVES

DEPTHS

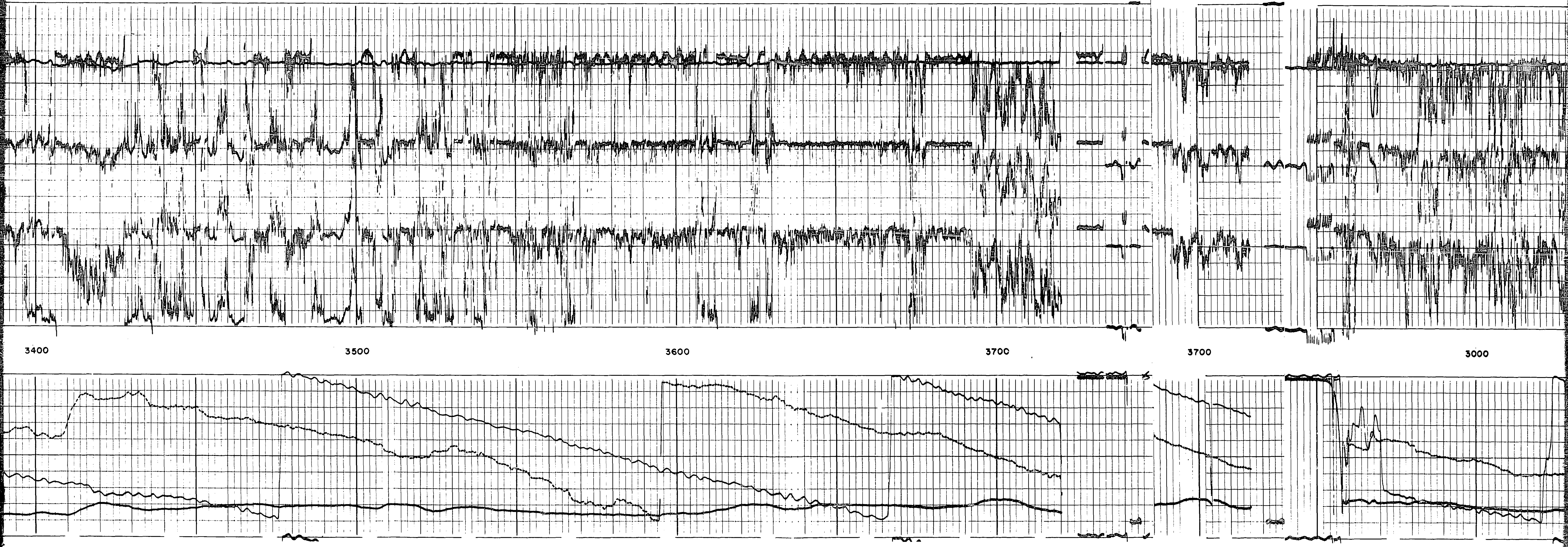
ORIENTATION

COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A 71

FIELD WILDCAT PROVINCE FEDERAL WATERS

5 of 5



3 of

SCHLUMBERGER

# BOREHOLE COMPENSATED SONIC LOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A 71

FIELD WILDCAT

PROVINCE FEDERAL WATERS

87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: SRS DIL, SNP, CAL, LL, ML, FDC-GR, GRL

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | | |
|---|---|---|---|---|
| Date | 8 SEPT 69 | 23 SEPT 69 | 11 [illegible] | 1[illegible] OCT 69 |
| Run No. | ONE | TWO | THREE | FOUR |
| First Reading | 1998 | 2957 | 3725 | [illegible] |
| Last Reading | 1108 | 1975 | 2965 | 3550 |
| Feet Measured | 890 | 982 | 760 | 273 |
| Depth Reached | 1999 | 2959 | 3728 | 3925 |
| Bottom Driller | 2000 | 2959 | 3729 | 3926 |
| Csg. SOC | 1108 | 1975 | 2965 | 2965 |
| Csg. Driller | 1106 | 1975 | 2965 | 2965 |
| Mud Nature | SALT-GEL-BARITE | SALT-GEL-BARITE | SALT-GEL | SALT-GEL |
| Dens. \| Visc. | 10.2 \| 58 | 14.0 \| [illegible] | [illegible] \| 20 | 14.5 \| 65 |
| Mud pH | 11.0 | 9.5 | 8.5 | 8.5 |
| " Water Loss | 48.0 | 14.0 | 14.4 | 20.0 |
| " Res. | 0.10 @ 70 °F | 0.07 @ [illegible] °F | .103 @ 50 °F | 0.093 @ 54 °F |
| " " @ BHT | 0.10 @ 70 °F | - @ [illegible] °F | - @ °F | - @ °F |
| " Rmf | 0.07 @ 70 °F | 0.06 @ 50 °F | - @ °F | - @ °F |
| " Rmc | 0.19 @ 70 °F | 0.10 @ 50 °F | - @ °F | - @ °F |
| Bit Size | 12 1/2" TO 1333<br>15" T TD | 12 1/4" | 8 1/2" | 8 1/2" |
| pan | 2' | 2' | 2' | 2' |
| | | | | |
| | | | | |
| Rig Time | 5 HRS. | 3 HRS. | 2 HRS | 2 HRS |
| No. | OSU-C 285 | OSU-C 285 | [illegible] | [illegible] |
| ed By | BERRY | BERRY | [illegible] | [illegible] |
| | RUEFF | RUEFF | [illegible] | RUEFF |

REMARKS

Drilling Stopped 2000 / 1100 [illegible] 19:[illegible] : Circulation Stopped 2200 / 22nd 2200 : Tool on Bottom 0600 / [illegible] 0300 23rd 1st Run Service Order # 43-1[illegible] B.H.T. [illegible] °F

Caliper No. [illegible]
Cartridge No. [illegible]
Panel No. [illegible]
Sonde No. [illegible]
Centralizer Type ECCENTERED

GAMMA RAY CALIBRATION:
Background CPS. Test Source CPS. Galv. Increase Divisions Panel Sens. Tap for Cal.

REMARKS

Drilling Stopped 2230 [illegible] : Circulation Stopped 2300 [illegible] : Tool on Bottom 0400 / 11 [illegible] 1st Run Service Order # 43[illegible] B.H.T. 93 °F

Caliper No. [illegible]
Cartridge No. -
Panel No. A114
Sonde No. -
Centralizer Type RUBBER BUMPERS

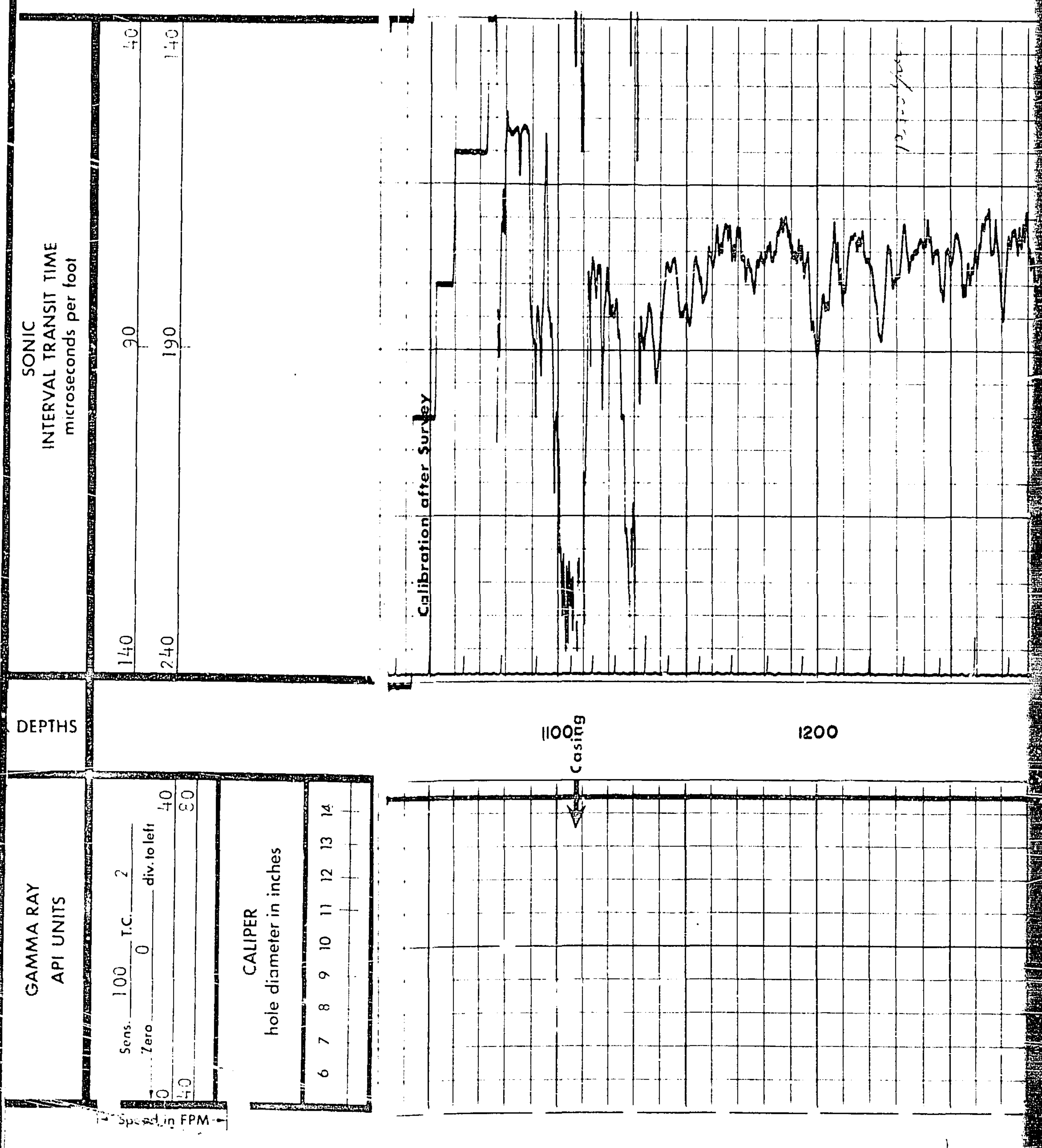
GAMMA RAY CALIBRATION:
Background CPS. 1 Test Source CPS. 460 Galv. Increase Divisions 8.25 Panel Sens. Tap for Cal. [illegible]

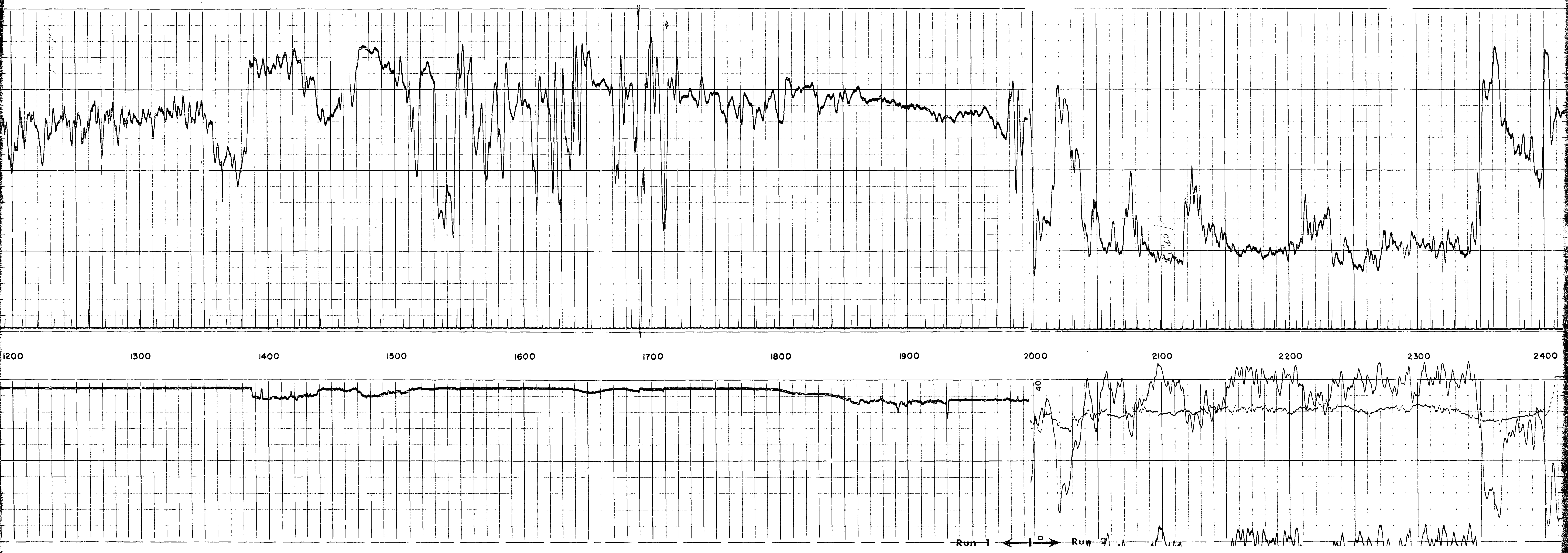
REMARKS

Drilling Stopped : Circulation Stopped : Tool on Bottom 1st Run Service Order # 43[illegible] B.H.T. 72 °F

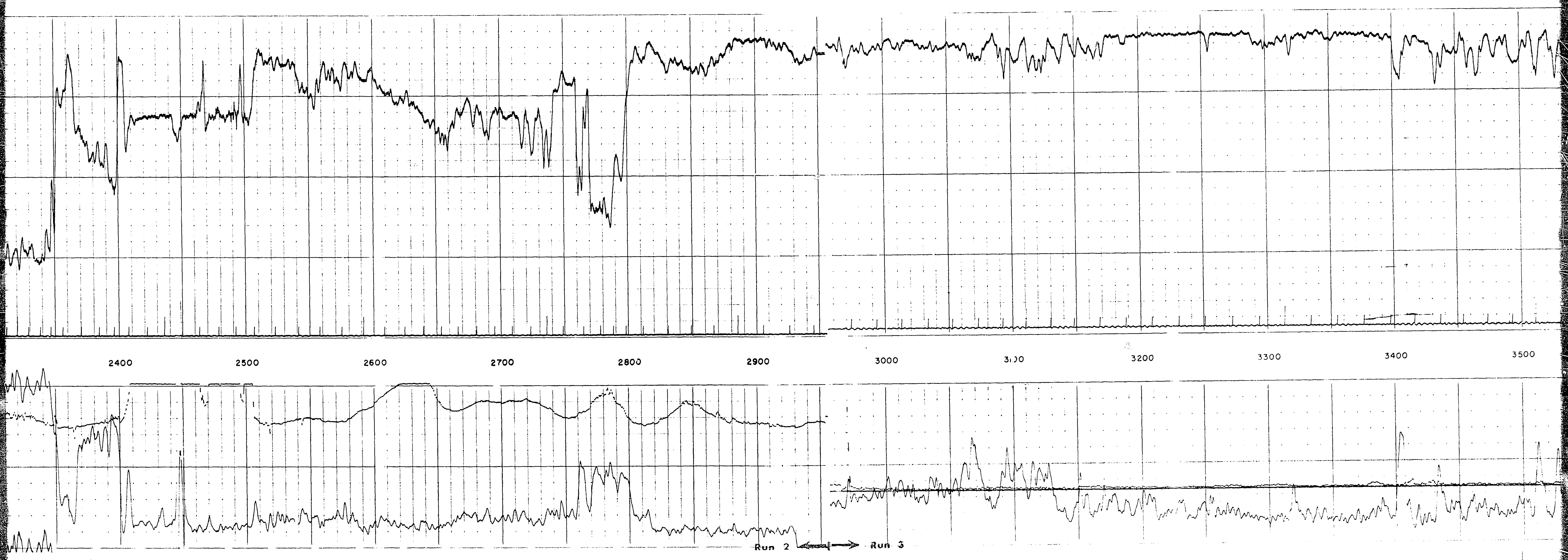
Caliper No. [illegible]
Cartridge No. -
Panel No. A114
Sonde No.
Centralizer Type RUBBER BUMPERS

GAMMA RAY CALIBRATION:
Background CPS 13 Test Source CPS. 460 Galv. Increase Divisions 8.25 Panel Sens. Tap for Cal. [illegible]

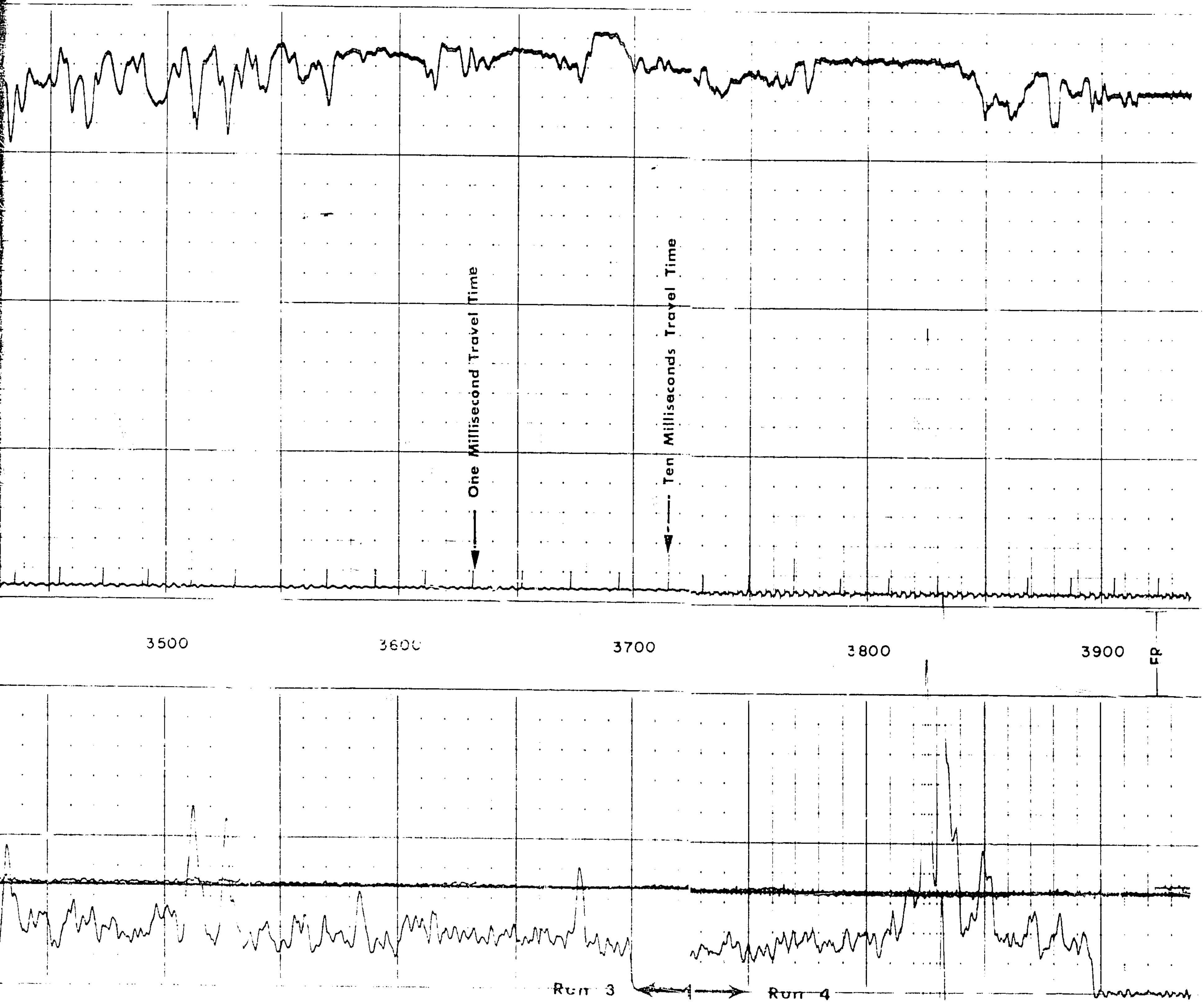



1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
40
Run 1
0
Run 2

2 of


2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
Run 2
Run 3

3 of



SONIC
INTERVAL TRANSIT TIME
microseconds per foot

140 40
190 90
240 140

DEPTHS

CALIPER
hole diameter in inches

6 7 8 9 10 11 12 13 14

Sens. Zero T.C. div. to left

Speed in FPM

GAMMA RAY
API UNITS

DETAIL LOG
5" = 100' RUN 1

SONIC
INTERVAL TRANSIT TIME
microseconds per foot

140
190
240

DEPTHS

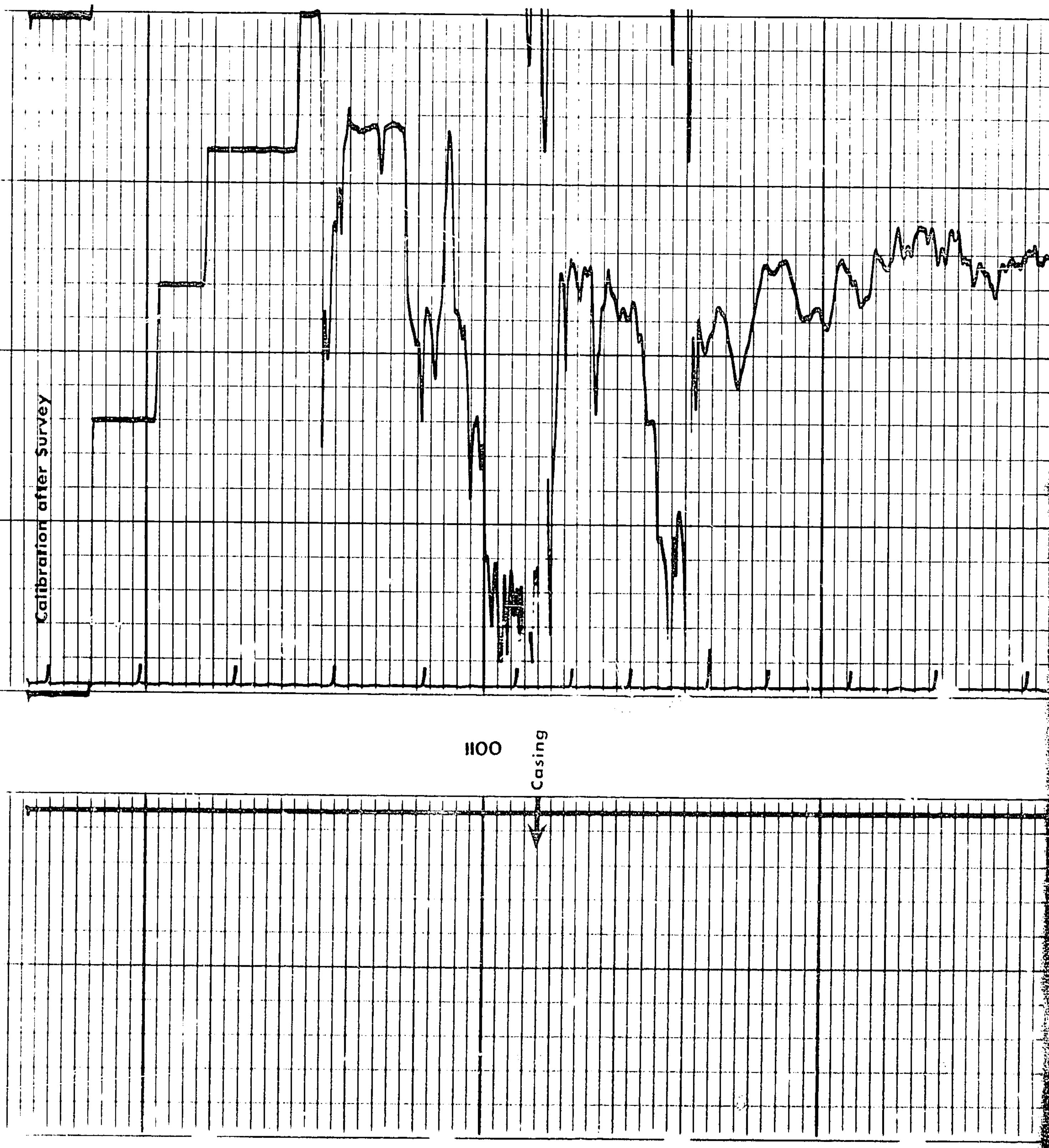
GAMMA RAY
API UNITS

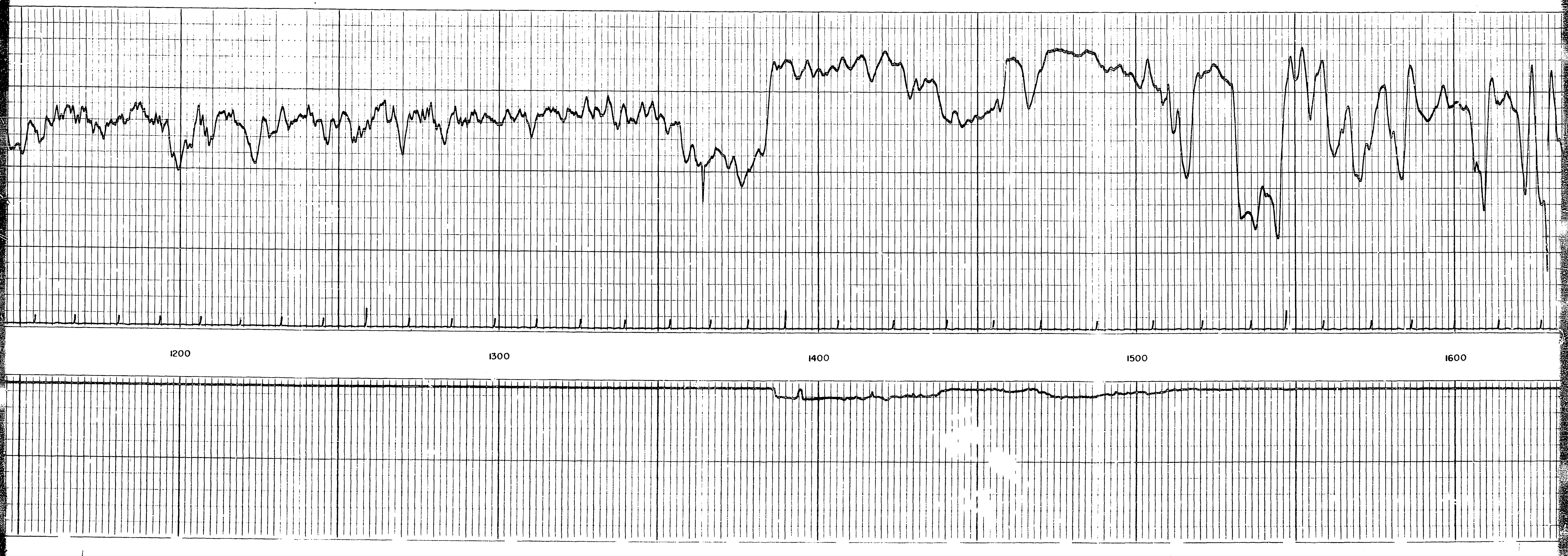
Zero div. to left

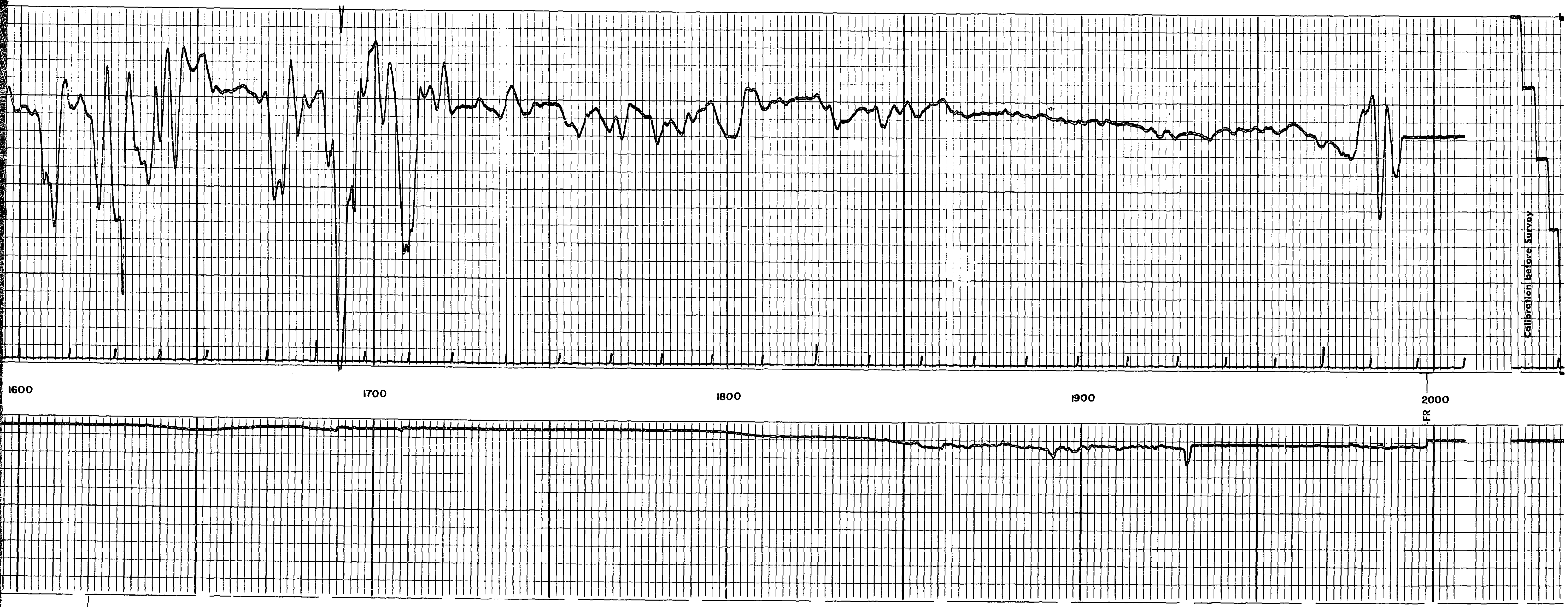
Speed in FPM

CALIPER
hole diameter in inches

6 7 8 9 10 11 12 13 14

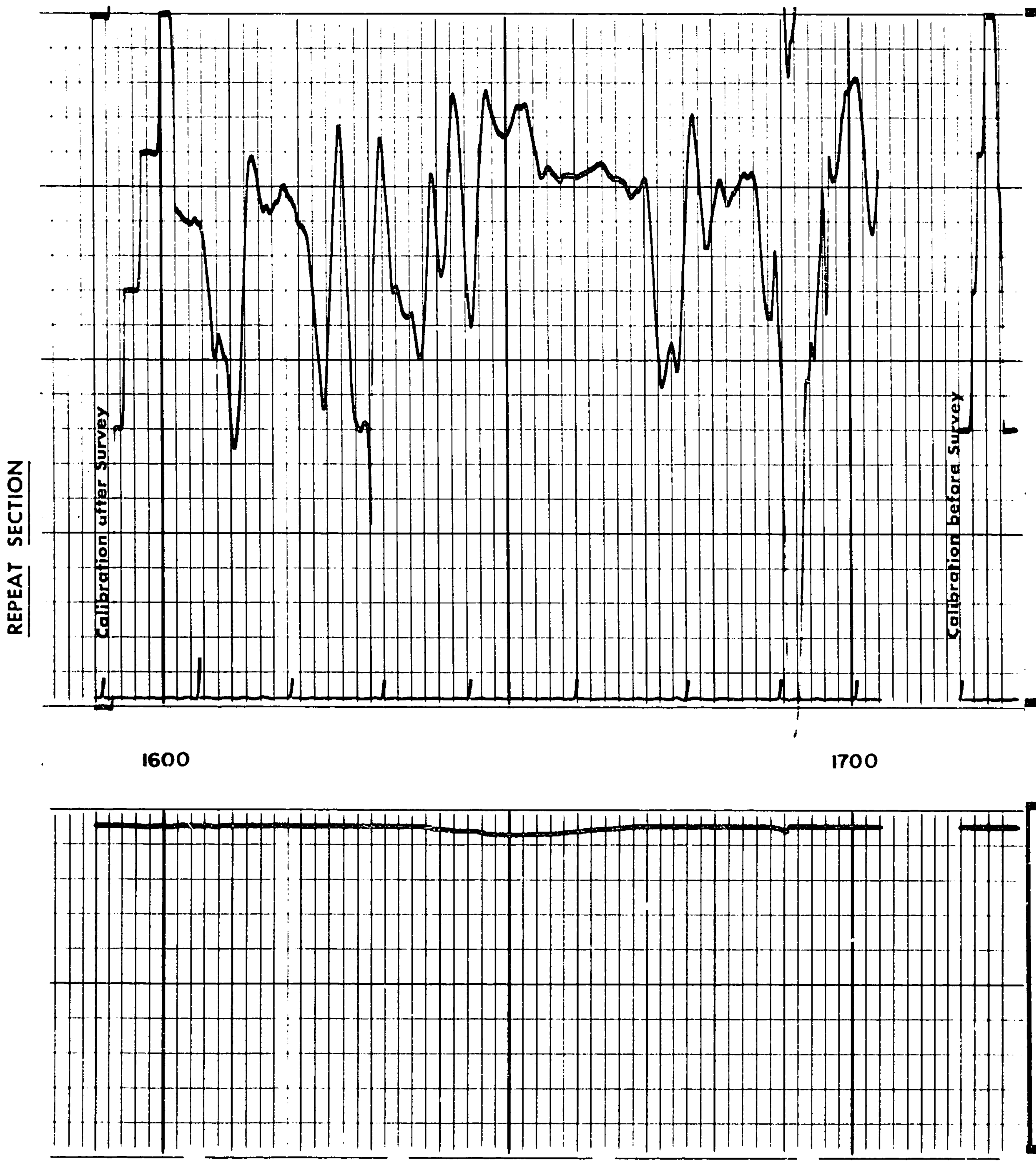



1200
1300
1400
1500
1600



REPEAT SECTION

6 of



SONIC
INTERVAL TRANSIT TIME
microseconds per foot

140 190 240

40 90 140

DEPTHS

GAMMA RAY
API UNITS

CALIPER
hole diameter in inches

6 7 8 9 10 11 12 13 14

Sens. T.C.

Zero div. to left

Speed in FPM

DETAIL LOG
5" = 100' RUN 2

SONIC
INTERVAL TRANSIT TIME
microseconds per foot

40 90 140

140 190 240

DEPTHS

GAMMA RAY
API UNITS

Sens. 00 T.C. 2

Zero 0 div. to left

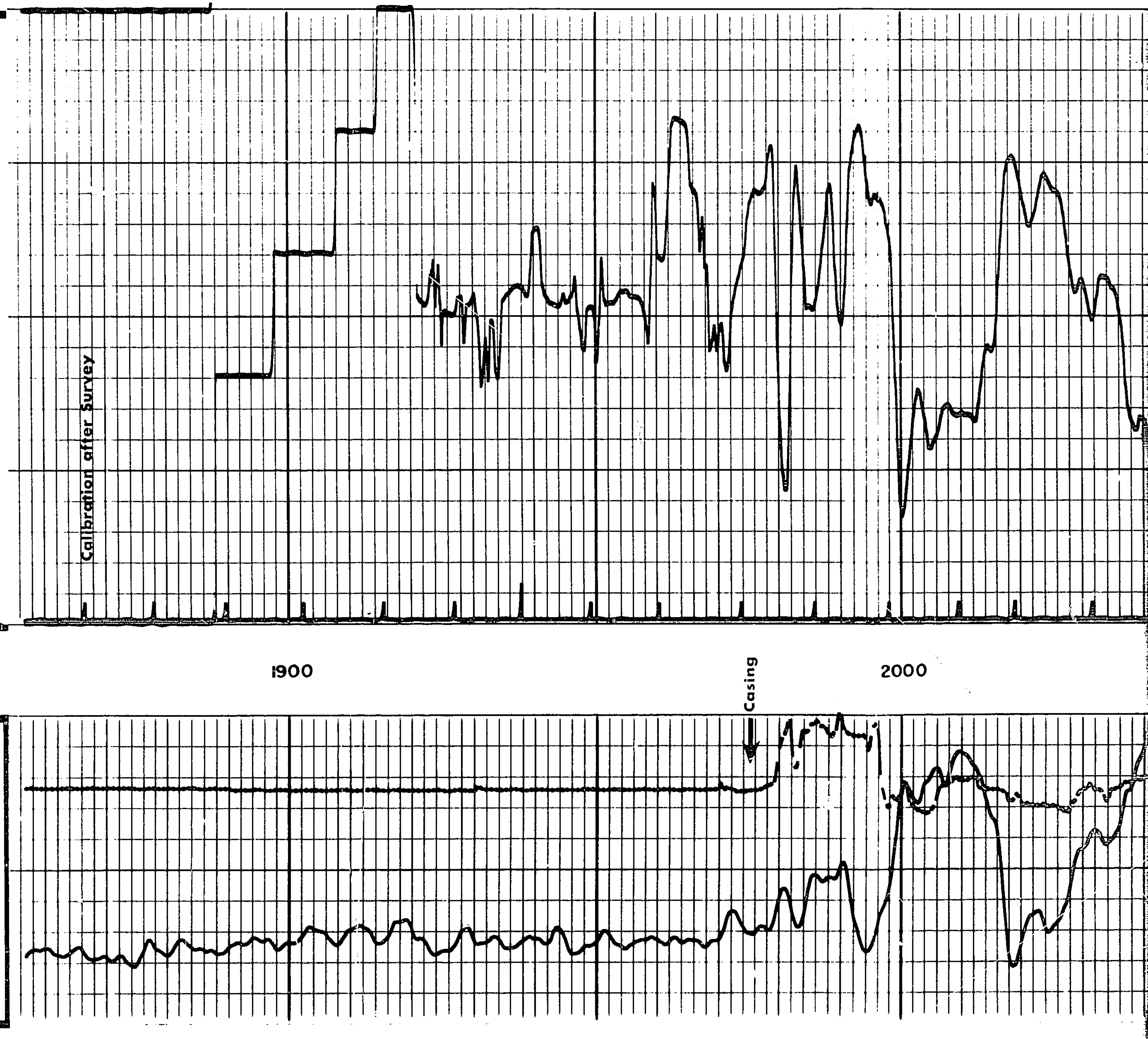
0 40

40 80

Speed in FPM

CALIPER
hole diameter in inches

6 7 8 9 10 11 12 13 14



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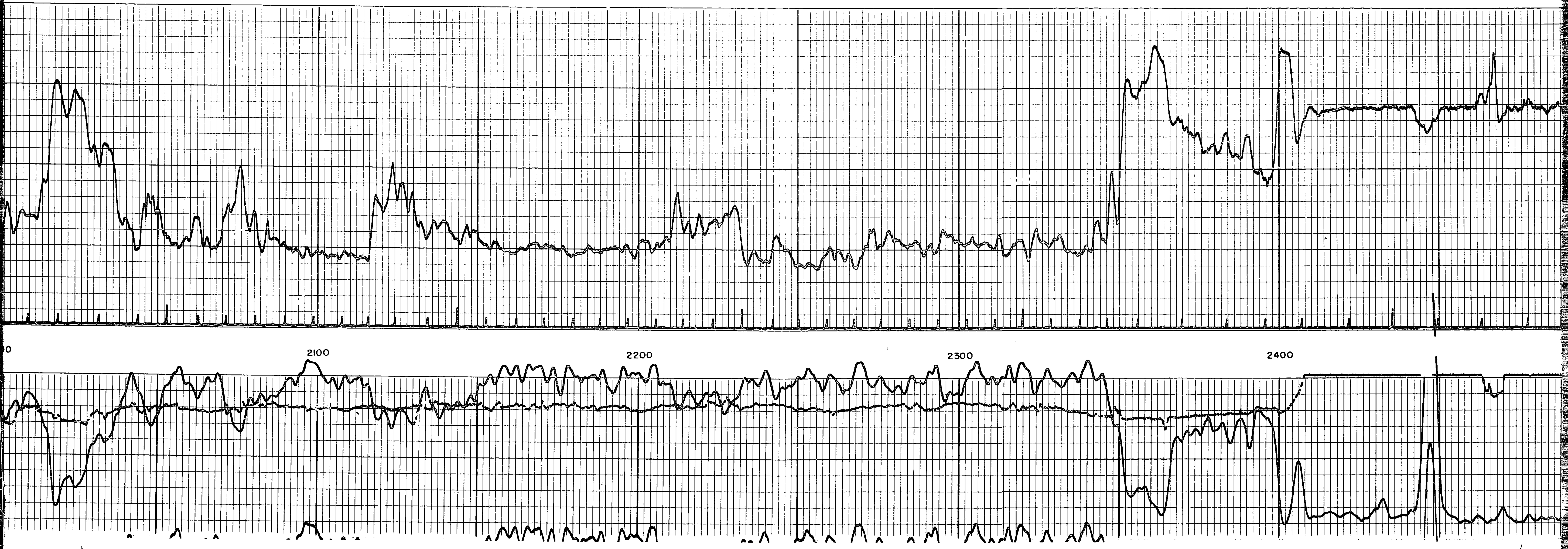

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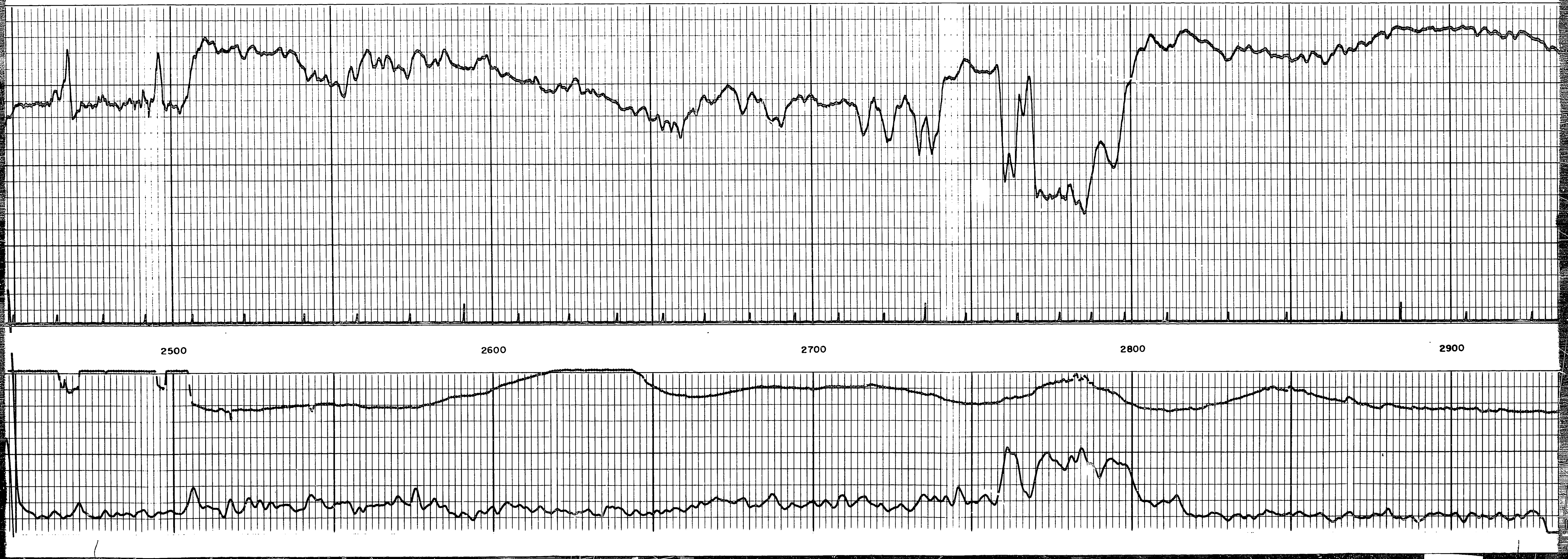

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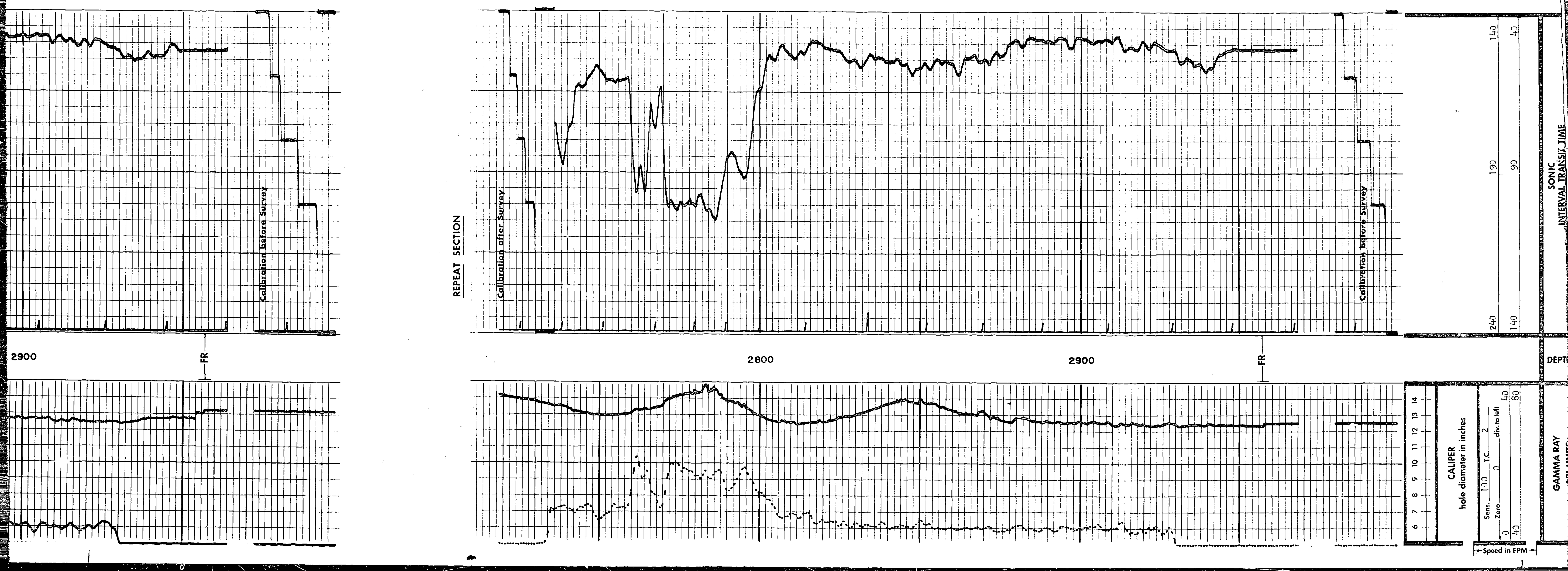
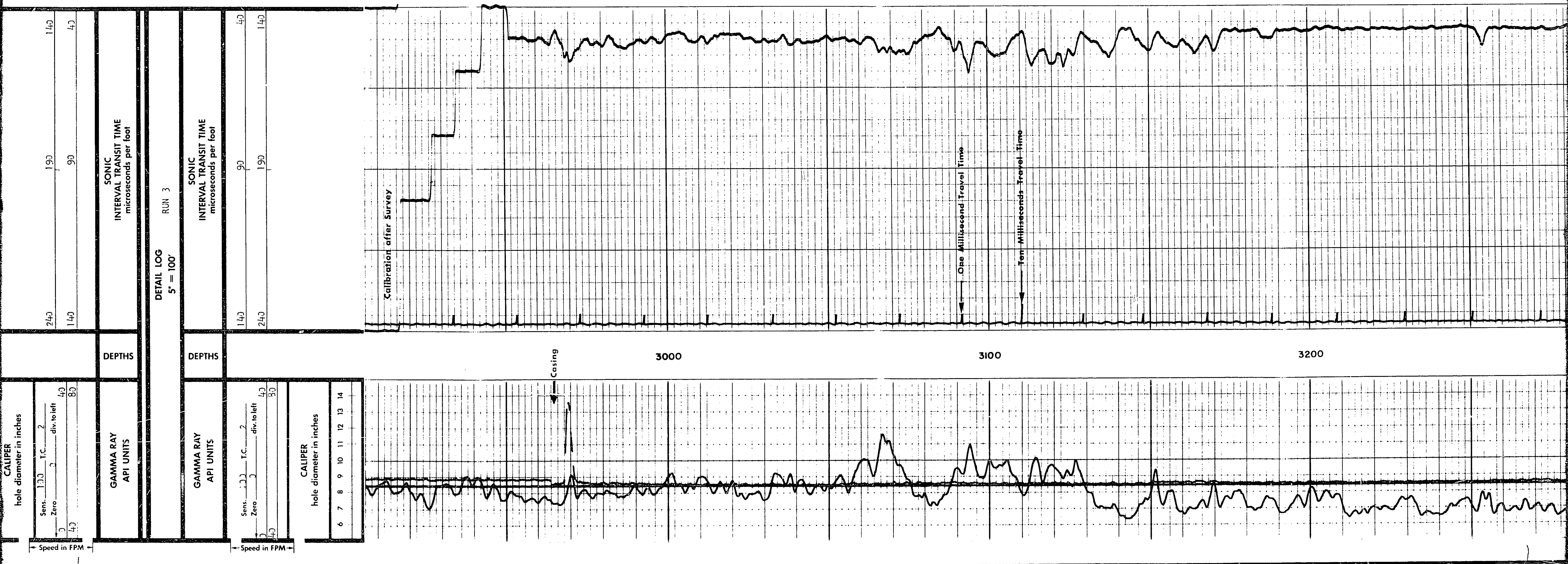
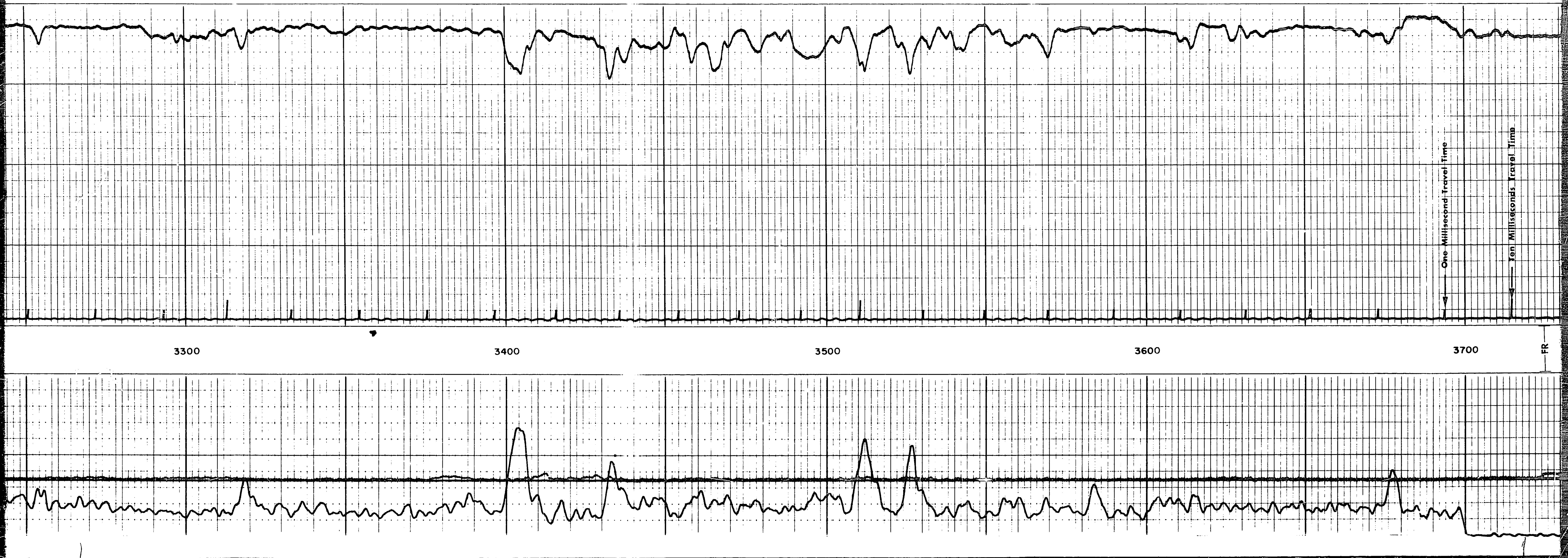
2900
FR
Calibration before Survey
REPEAT SECTION
Calibration after Survey
2800
2900
FR
Calibration before Survey
140
190
240
40
90
140
SONIC
INTERVAL TRANSIT TIME
DEPT
6 7 8 9 10 11 12 13 14
CALIPER
hole diameter in inches
Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80
Speed in FPM
GAMMA RAY

10of



240
190
140
140
90
40
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
DETAIL LOG
5' = 100'
RUN 3
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
40
90
140
140
190
240
Calibration after Survey
One Millisecond Travel Time
Ten Milliseconds Travel Time
DEPTHS
DEPTHS
Casing
3000
3100
3200
CALIPER
hole diameter in inches
Sens. 100 T.C. 2 div. to left
Zero 0
40
80
0
40
Speed in FPM
GAMMA RAY
API UNITS
GAMMA RAY
API UNITS
Sens. 100 T.C. 2 div. to left
Zero 0
40
80
0
40
Speed in FPM
CALIPER
hole diameter in inches
6
7
8
9
10
11
12
13
14

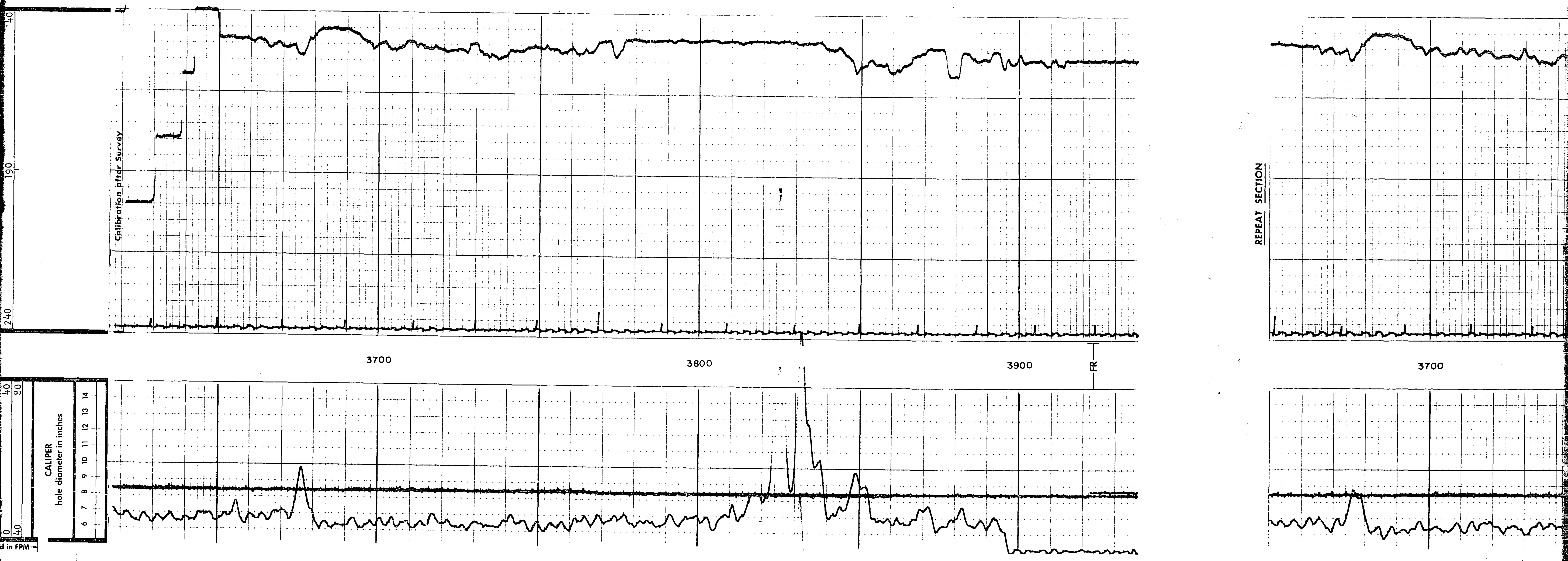


3300
3400
3500
3600
3700
FR
One Millisecond Travel Time
Ten Milliseconds Travel Time

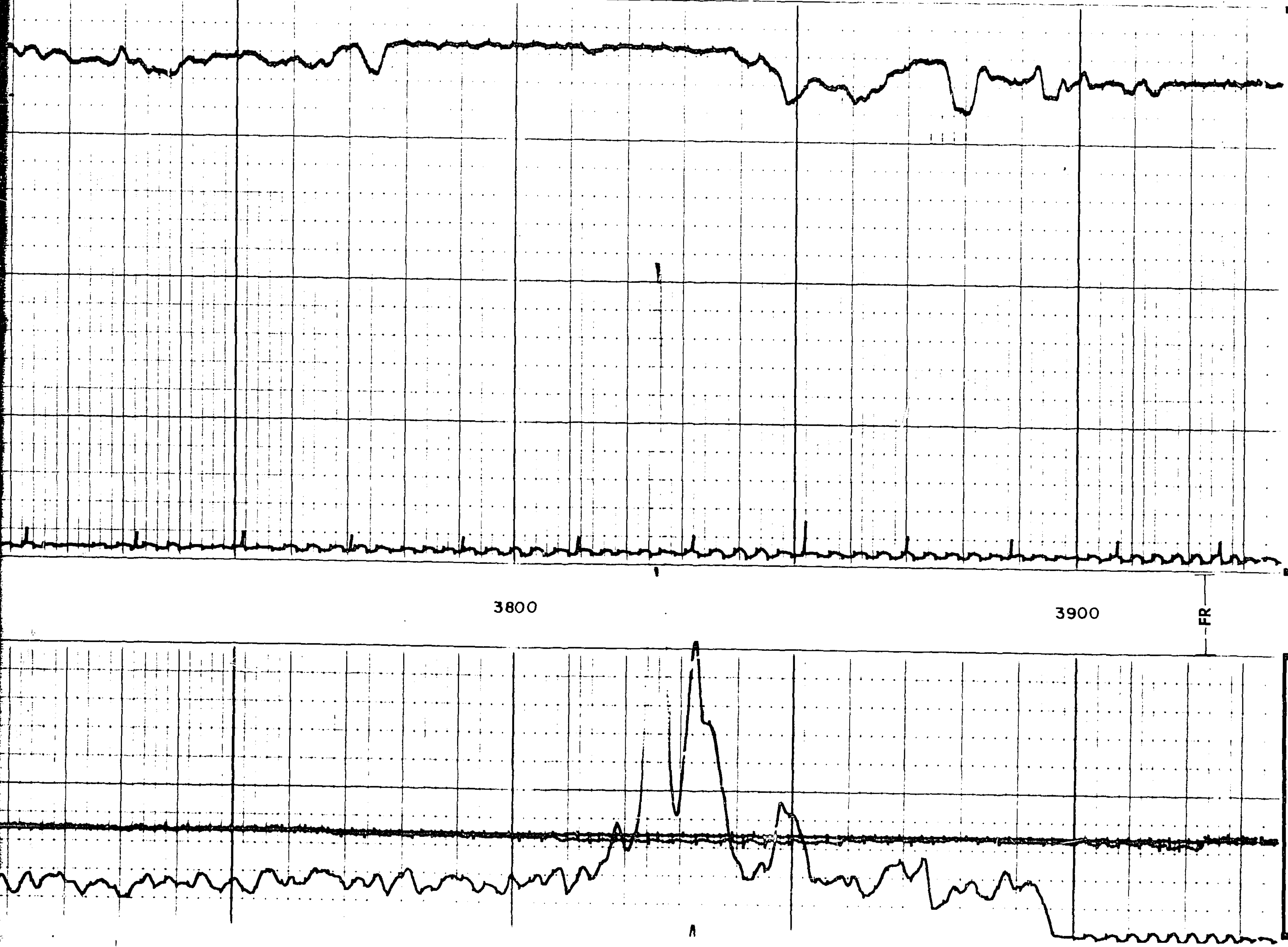
12 of


3700
FR
Ten Milliseconds Travel Time
REPEAT SECTION
Calibration after Survey
3500
3600
3700
FR
140
40
190
90
240
140
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
DEPTHS
DETAIL LOG
5" = 100' RUN 4
GAMMA RAY
API UNITS
CALIPER
hole diameter in inches
6 7 8 9 10 11 12 13 14
Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80
Speed in FPM
DEPTHS
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
40
140
90
190
140
240
GAMMA RAY
API UNITS
Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80
Speed in FPM
CALIPER
hole diameter in inches
6 7 8 9 10 11 12 13 14
Calibration after Survey

13 of



140
190
240
Calibration after Survey
REPEAT SECTION
3700
3800
3900
FR
3700
40
80
0
40
d in FPM
CALIPER
hole diameter in inches
6
7
8
9
10
11
12
13
14



140 40 190 90 240 140

**SONIC**
**INTERVAL TRANSIT TIME**
microseconds per foot

**DETAIL LOG**
2" = 100' RUN 1

DEPTHS

DEPTHS

6 7 8 9 10 11 12 13 14

**CALIPER**
hole diameter in inches

Sens. 00 T.C. 2
Zero 0 div. to left

0 40 40 90

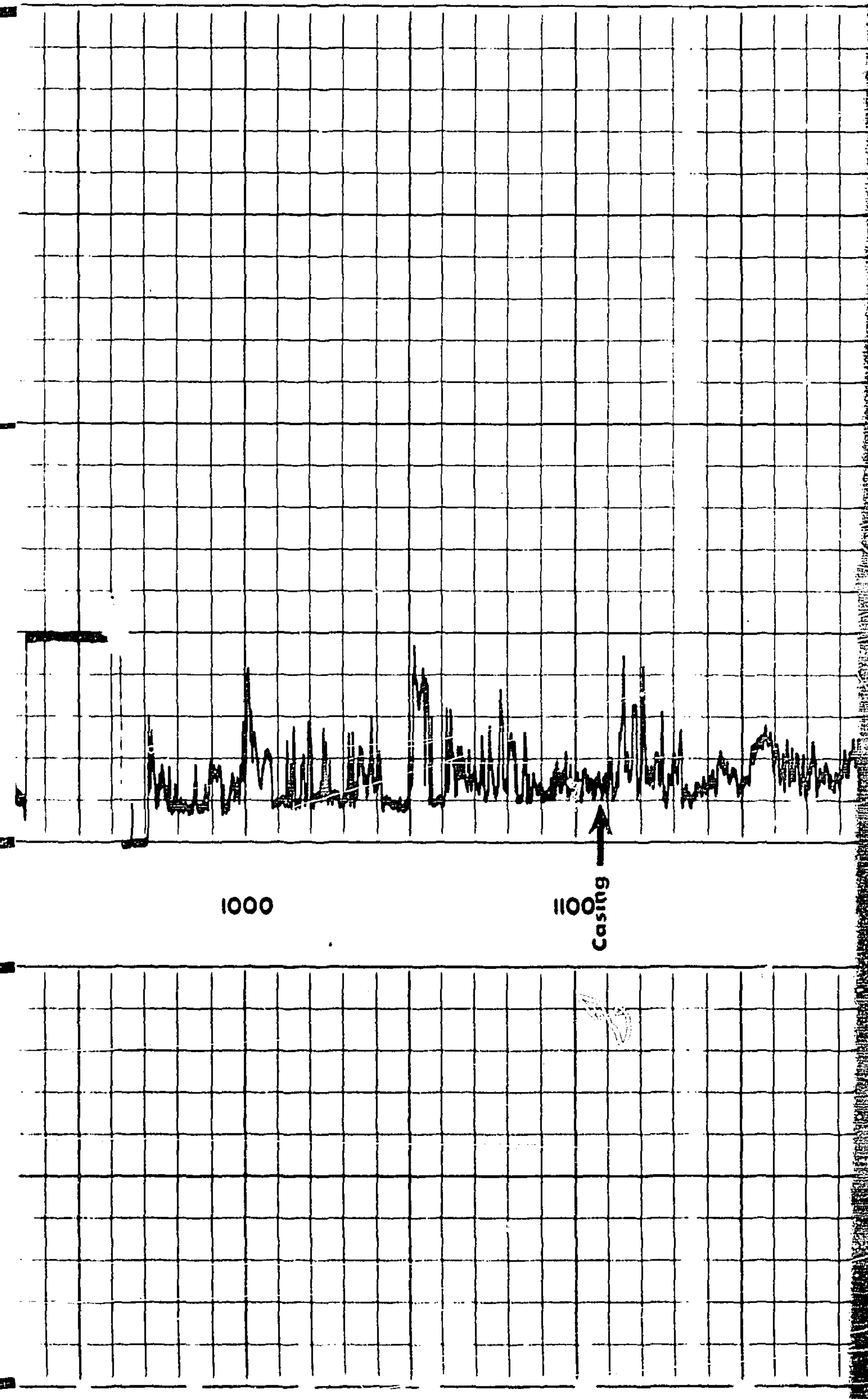
**GAMMA RAY**
**API UNITS**

Speed in FPM

Speed in FPM

**AMPLITUDE**
millivolts

0 50



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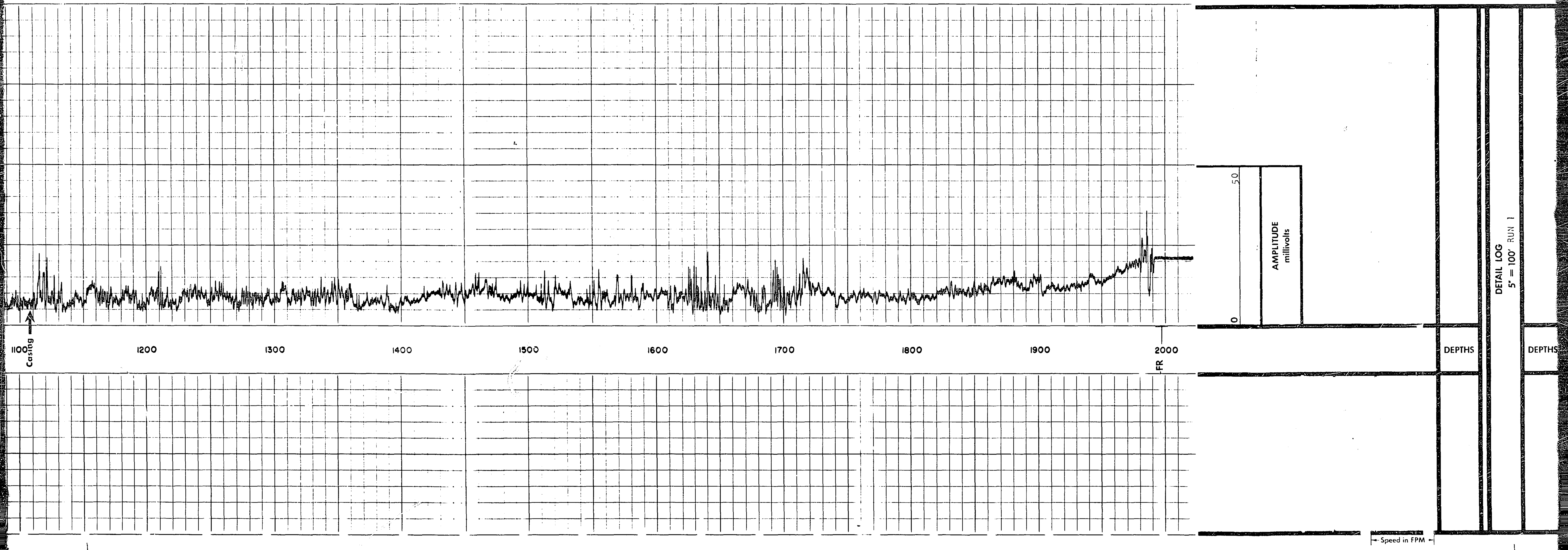
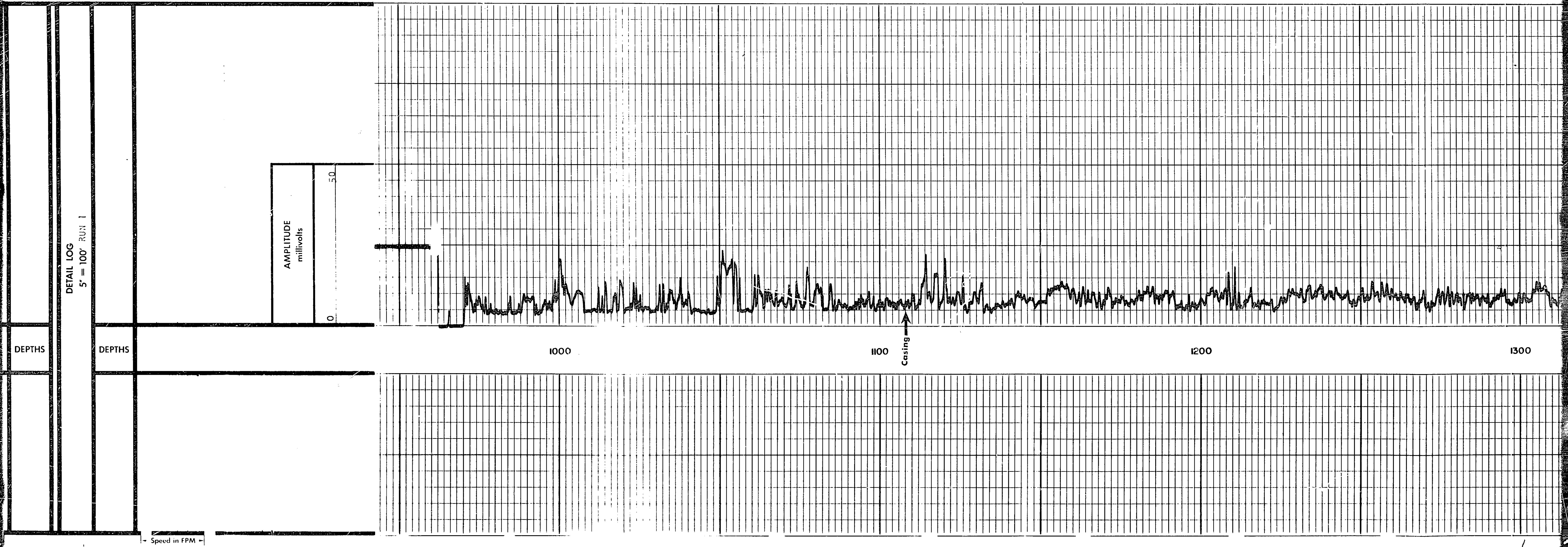
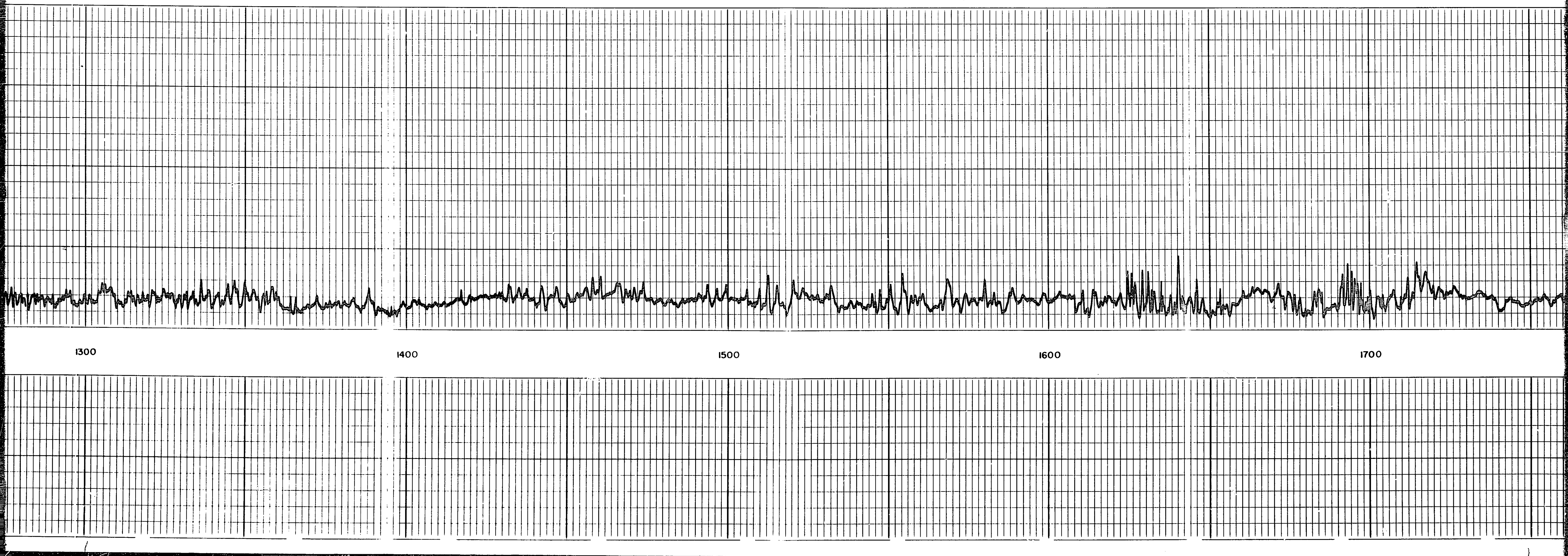
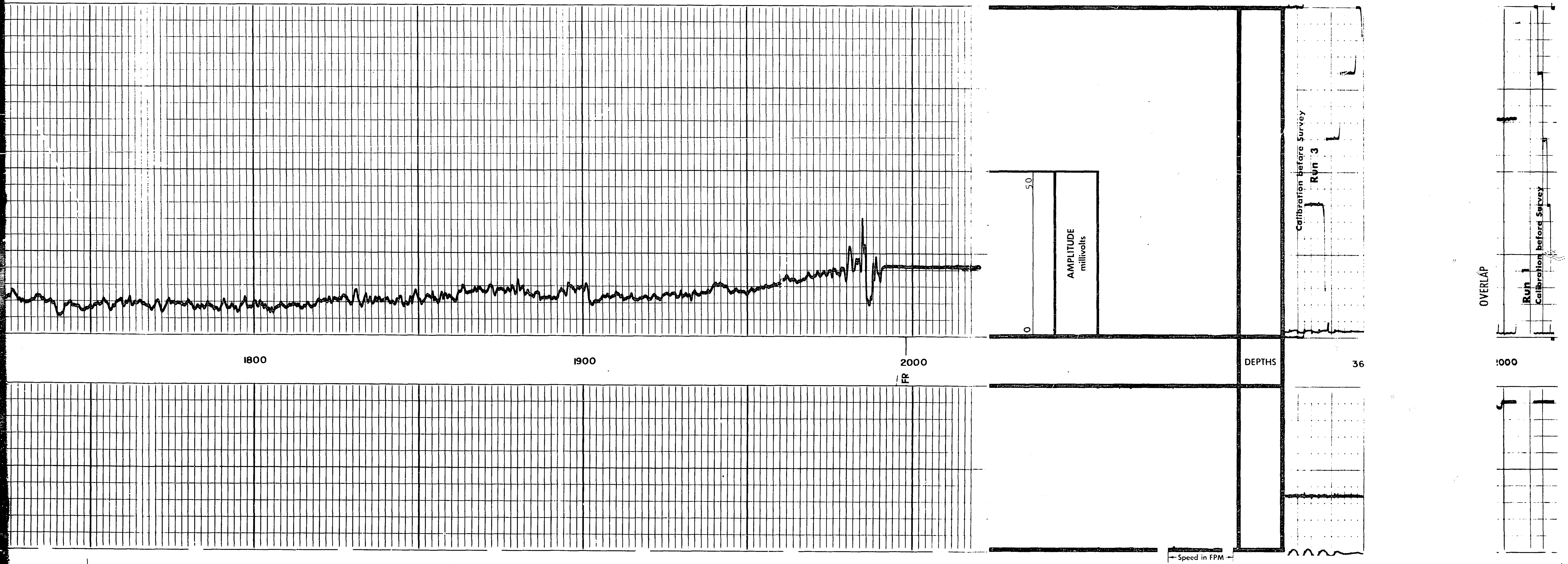

1100
Casing
1200
1300
1400
1500
1600
1700
1800
1900
2000
FR
0
50
AMPLITUDE
millivolts
DEPTHS
DETAIL LOG
5" = 100' RUN 1
DEPTHS
Speed in FPM

16 of


DEPTHS
DETAIL LOG
5' = 100' RUN 1
DEPTHS
AMPLITUDE
millivolts
0
50
1000
1100
Casing
1200
1300
Speed in FPM

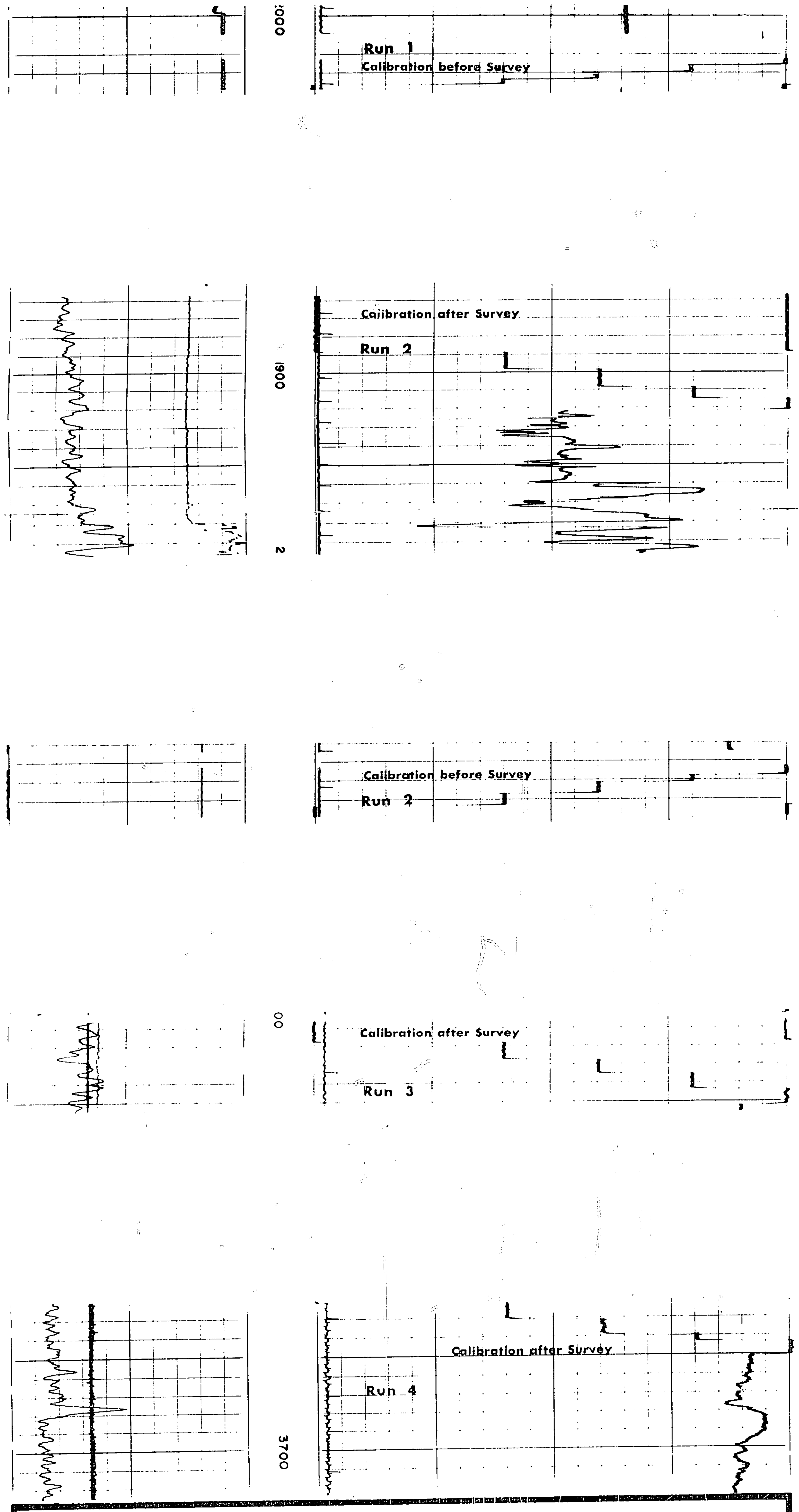
17 of


1300
1400
1500
1600
1700



1800
1900
2000
FR
50
0
AMPLITUDE
millivolts
DEPTHS
36
Speed in FPM
Calibration before Survey
Run 3
OVERLAP
Run 1
Calibration before Survey
:000

19 of



COMPANY AQUITAINE COMPANY OF CANADA LTD.

SCHLUMBERGER

WELL AQUITAINE ET AL HUDSON WALRUS A 71

FIELD WILDCAT PROVINCE FEDERAL WATERS

20 of 20

SCHLUMBERGER

# BOREHOLE COMPENSATED SONIC LOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITANE ET AL HUDSON WALRUS A 71
COMPANY AQUITANE COMPANY OF CANADA LTD.

COMPANY AQUITANE COMPANY OF CANADA LTD.

WELL AQUITANE ET AL HUDSON WALRUS A 71

FIELD WILDCAT

PROVINCE FEDERAL WATERS

87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: DIL, SNP, CAL, LL ML, FDC-GR, GRL

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 8 SEPT 69 | 23 SEPT 69 | |
| Run No. | ONE | TWO | |
| First Reading | 1998 | 2957 | |
| Last Reading | 1108 | 1975 | |
| Feet Measured | 890 | 982 | |
| Depth Reached | 1999 | 2959 | |
| Bottom Driller | 2000 | 2959 | |
| Csg. SOC | 1108 | 1975 | |
| Csg. Driller | 1106 | 1975 | |
| Mud Nature | SALT-GEL-BARITE | SALT-GEL-BARITE | |
| Dens. \| Visc. | 10.2 \| 58 | 14.0 \| 48 | \| |
| Mud pH | 11.0 | 9.5 | |
| " Water Loss | 48.0 | 14.0 | |
| " Res. | 0.10 @ 70 °F | 0.07 @ 48 °F | @ °F |
| " " @ BHT | 0.10 @ 70 °F | - @ 80 °F | @ °F |
| " Rmf | 0.07 @ 70 °F | 0.06 @ 50 °F | @ °F |
| " Rmc | 0.19 @ 70 °F | 0.10 @ 50 °F | @ °F |
| Bit Size | 17 1/2" TO 1333 | 12 1/4" | |
| | 15" TO TD | | |
| Span | 2' | 2' | 2' |
| | | | |
| | | | |
| Opr. Rig Time | 5 HRS. | 3 HRS. | |
| Truck No. | OSU-C 285 | OSU-C 285 | |
| Recorded By | BERRY | BERRY | |
| Witness | RUEFF | RUEFF | |

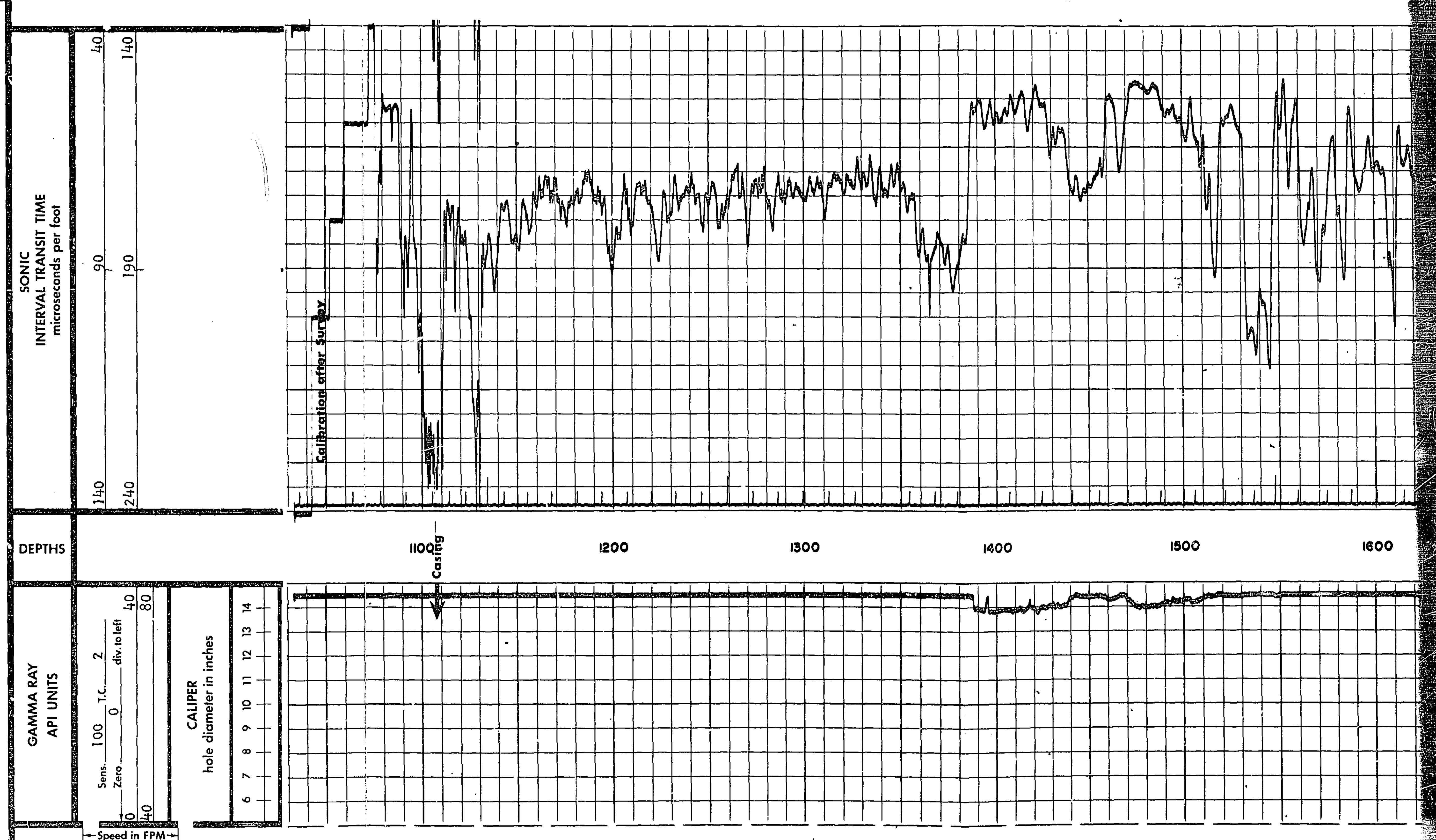
2 OCT 69 CAL RS

REMARKS

Drilling Stopped 2000 / 7th : Circulation Stopped 2200 / 7th : Tool on Bottom 0600 / 8th : 1st Run Service Order # 43818 B.H.T. 70 °F
RUN 2 1100 19th 2200 22nd 0300 23rd 80

Caliper No. D917
Cartridge No. B 28
Panel No. A 57
Sonde No. 66
Centralizer Type EXCENTERED EXCENTERED

GAMMA RAY CALIBRATION:
Background CPS. Test Source CPS. Galv. Increase Divisions Panel Sens. Tap for Cal.



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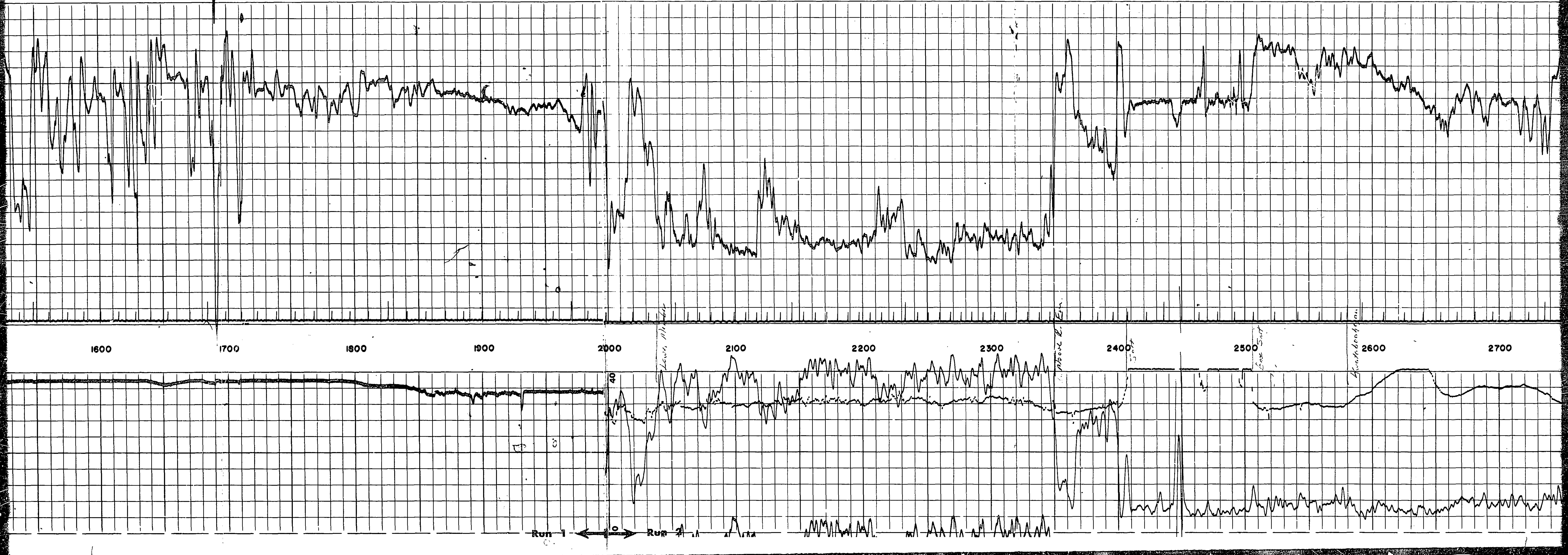
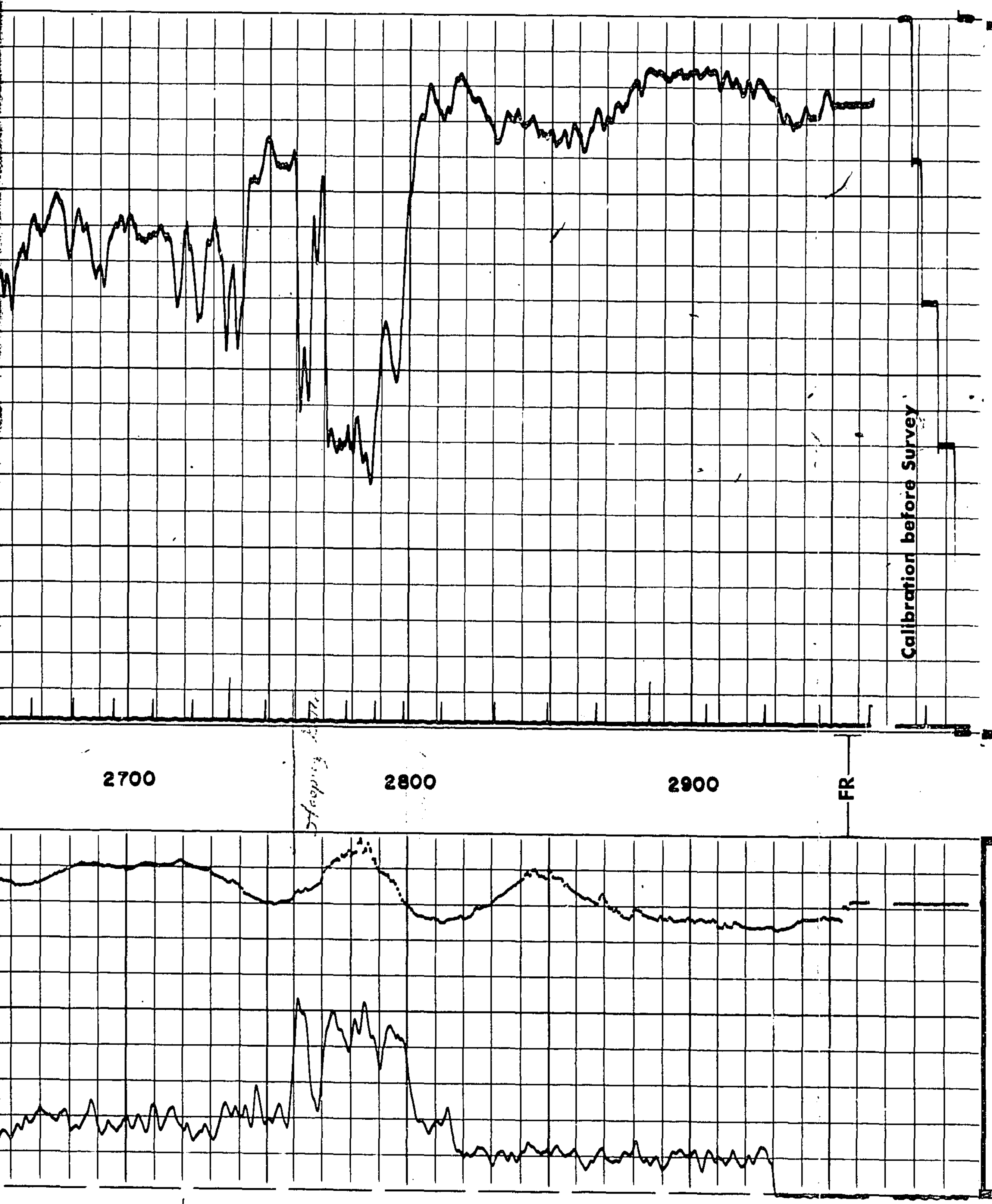


1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
40
Lewis Mkr
Campbell R. Fm.
Salt
Run 1
1°
Run 2

2 of



SONIC—
INTERVAL TRANSIT TIME
microseconds per foot

140 40
190 90
240 140

DEPTHS

CALIPER
hole diameter in inches
6 7 8 9 10 11 12 13 14

Sens. 100 T.C. 2
Zero 0 div. to left
0 40 80
40

←Speed in FPM→

GAMMA RAY
API UNITS

DETAIL LOG
5" = 100' RUN 1

SONIC
INTERVAL TRANSIT TIME
microseconds per foot

40 140
90 190
140 240

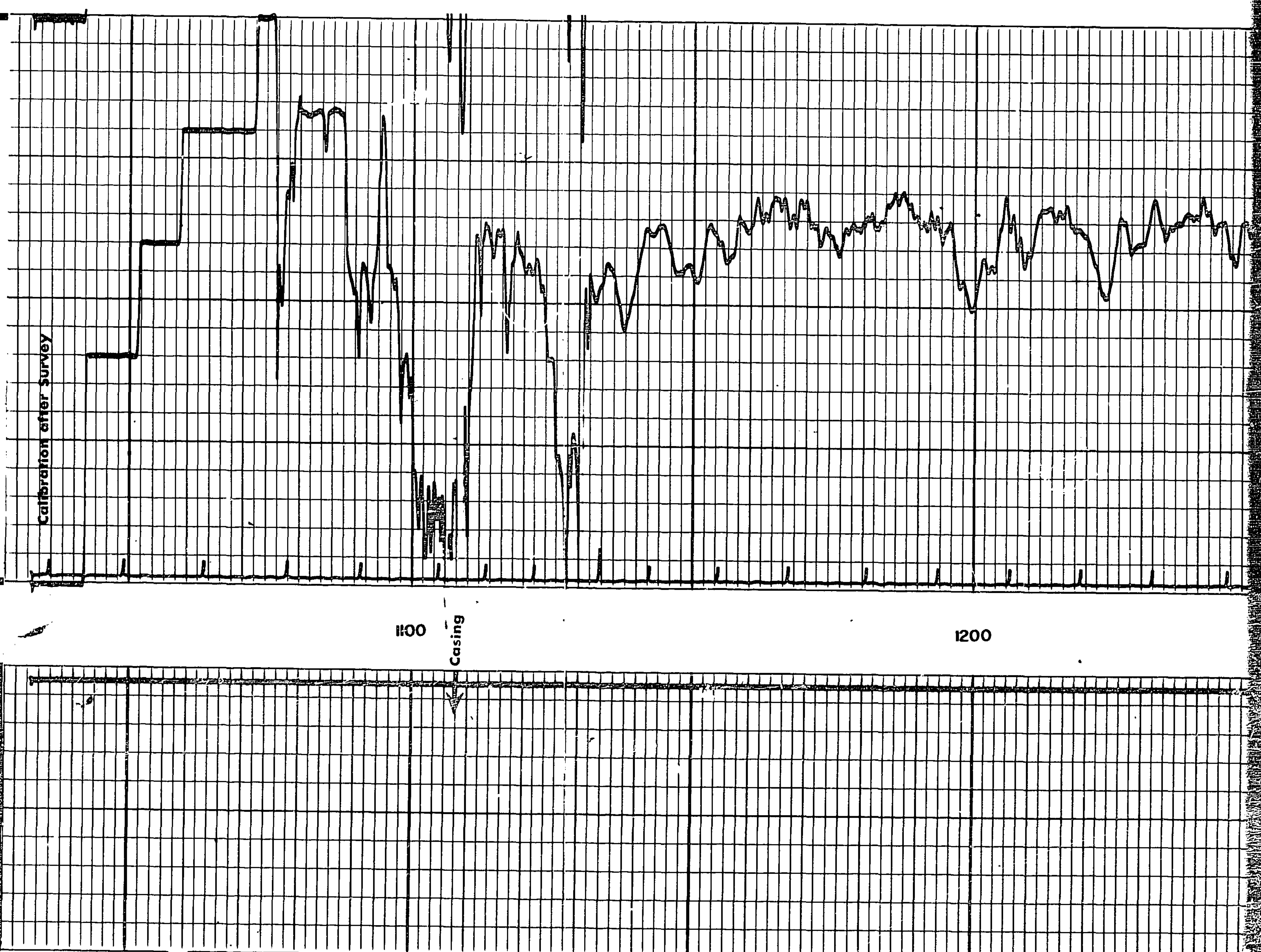
DEPTHS

GAMMA RAY
API UNITS

Sens. T.C.
Zero div. to left

←Speed in FPM→

CALIPER
hole diameter in inches
6 7 8 9 10 11 12 13 14



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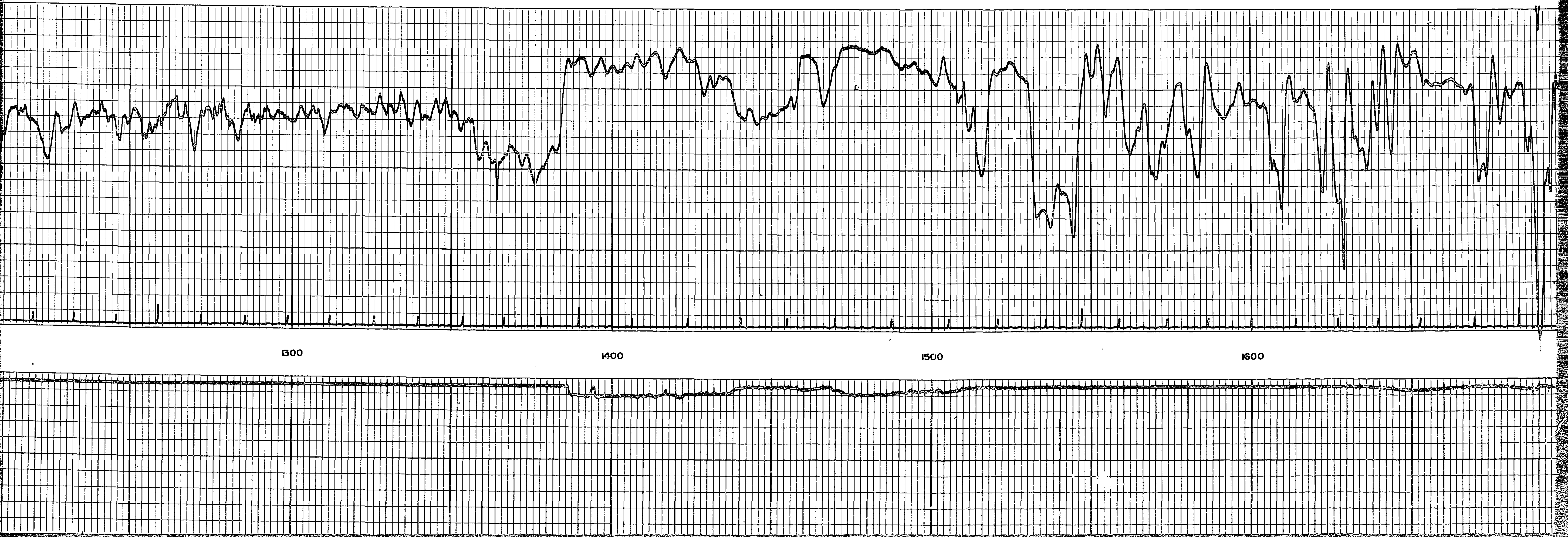

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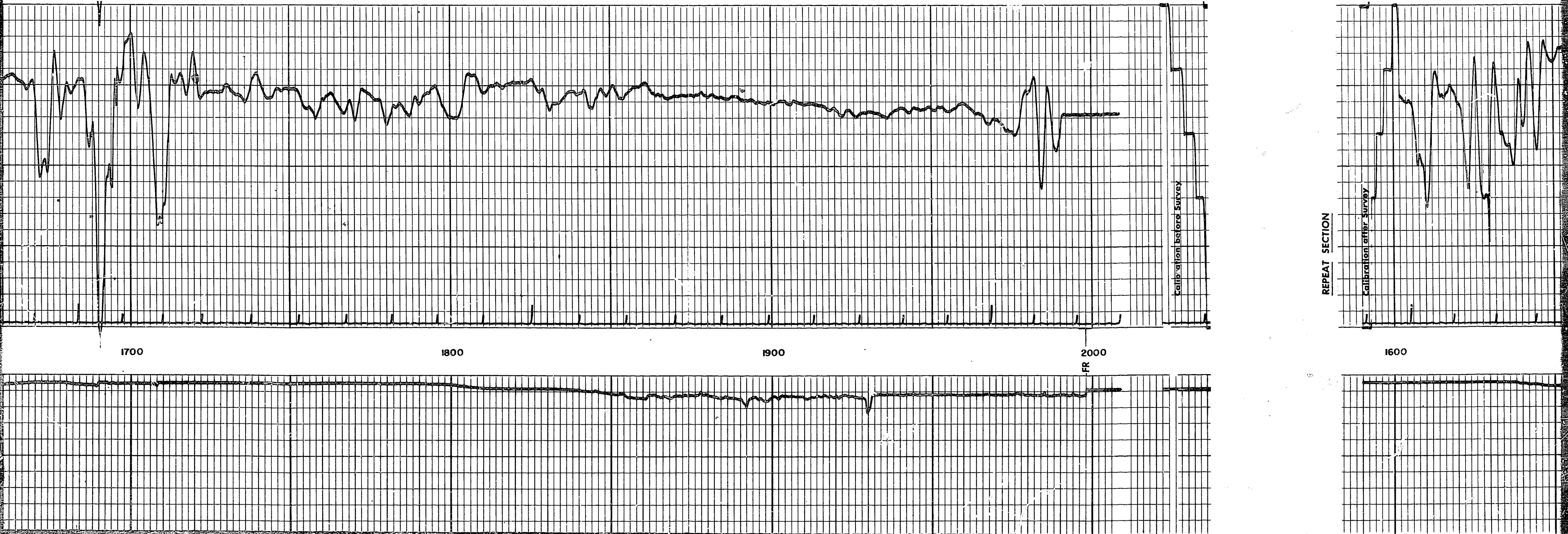
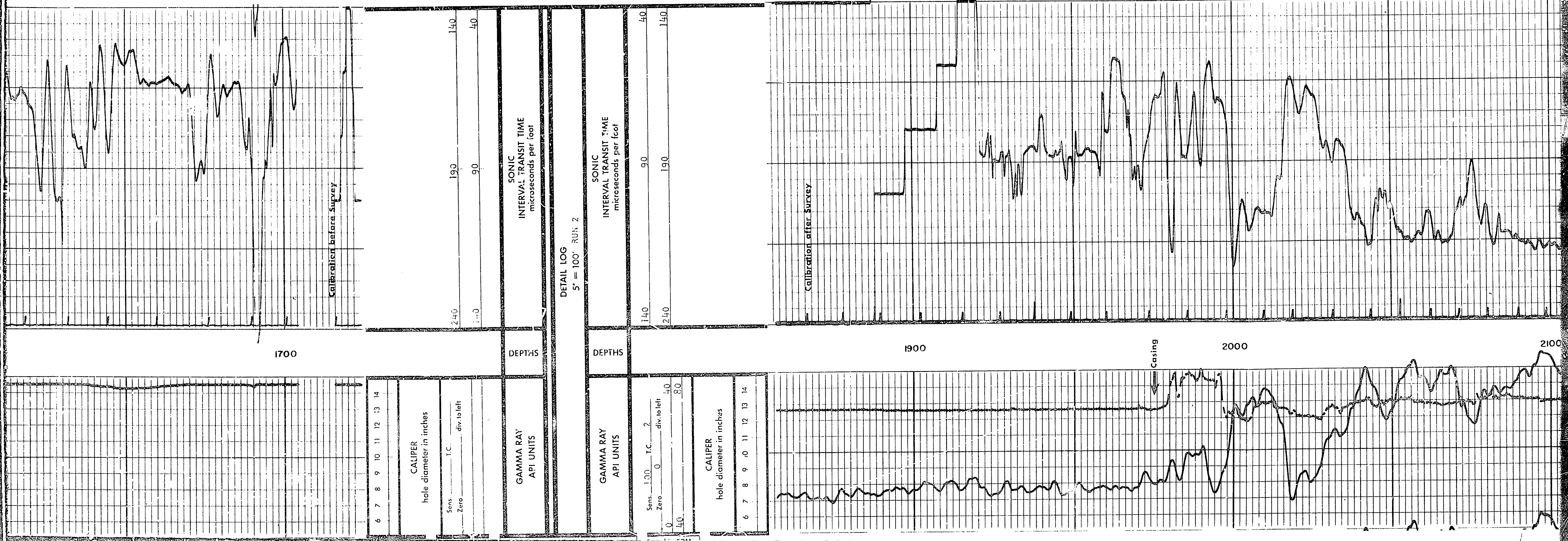
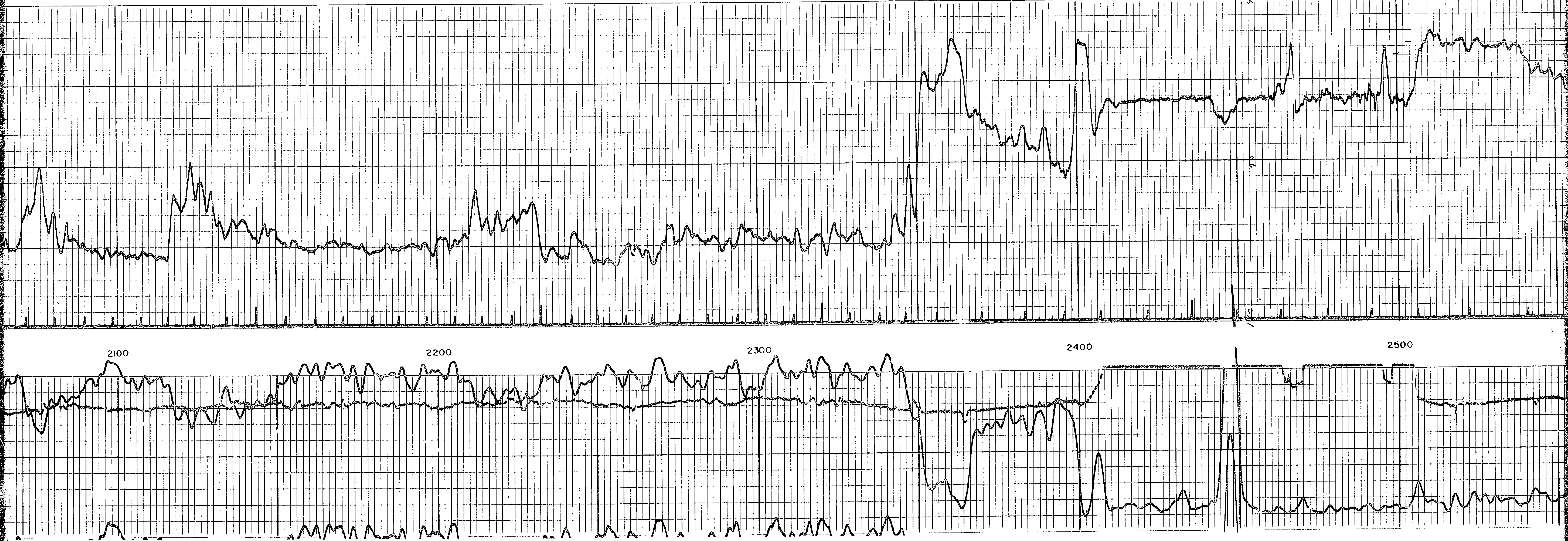
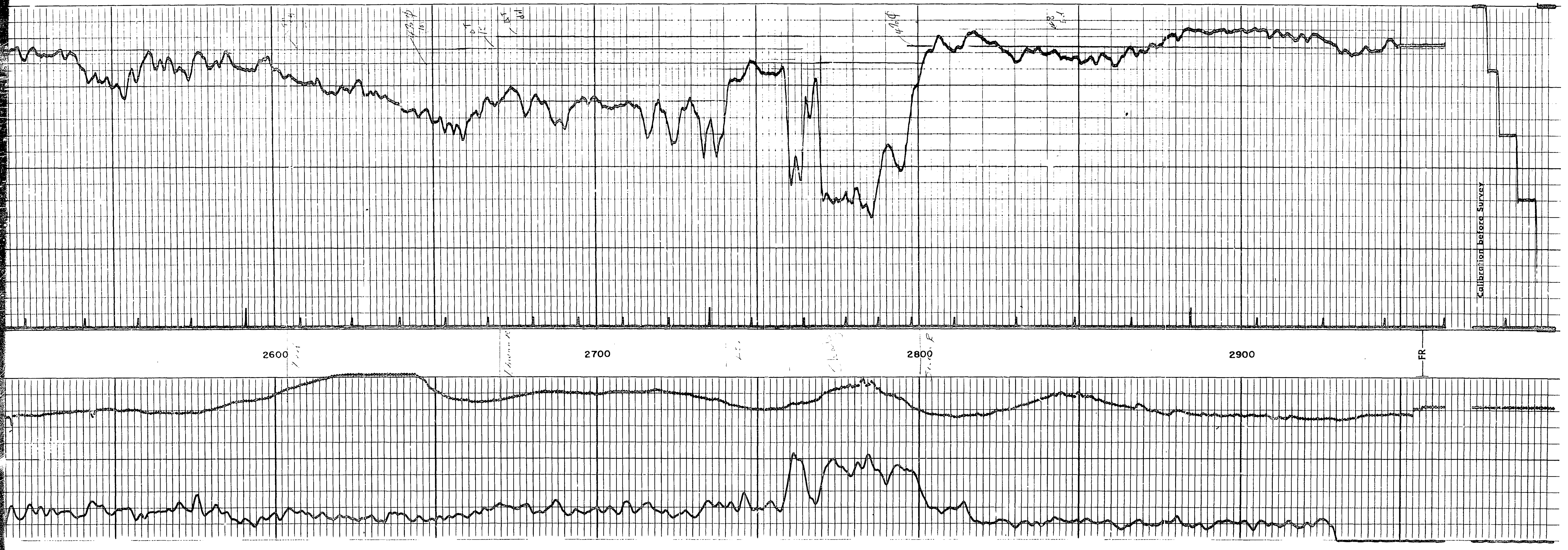

1700
1800
1900
2000
FR
Calibration before Survey
REPEAT SECTION
Calibration after Survey
1600

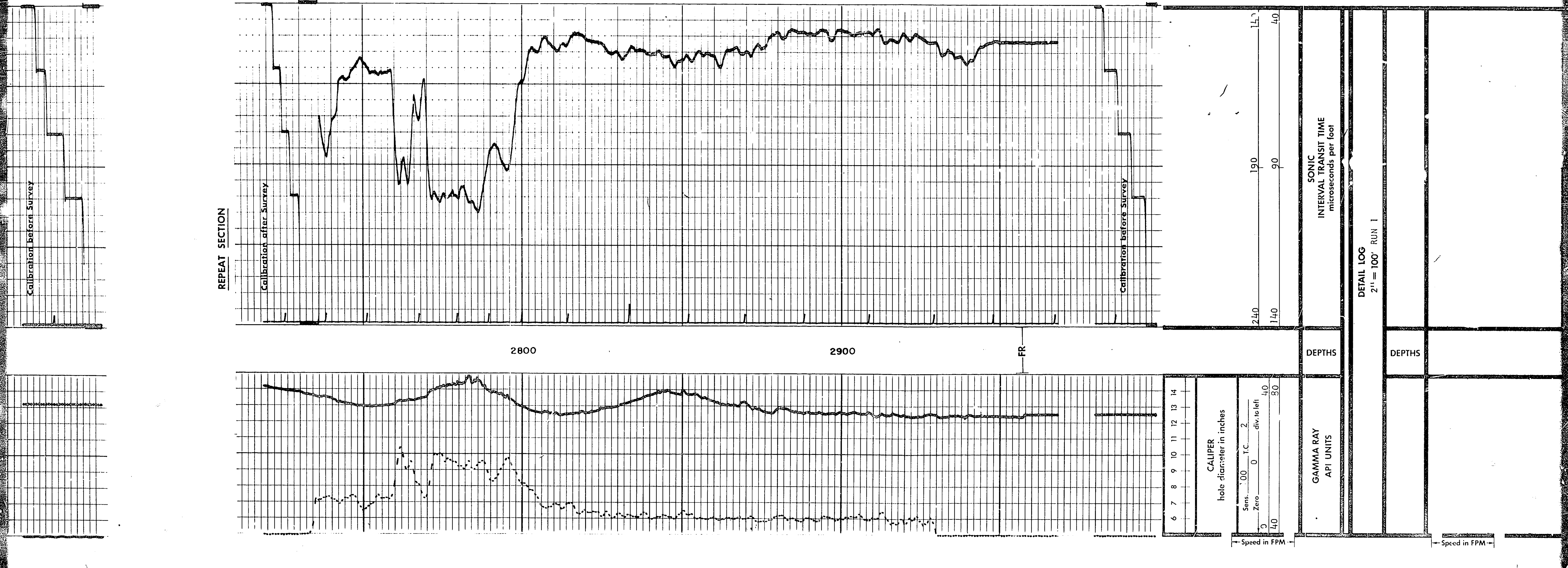
5 of


Calibration before Survey
1700
140
190
240
40
90
140
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
DEPTHS
DETAIL LOG
5' = 100' RUN 2
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
DEPTHS
40
90
140
140
190
240
6 7 8 9 10 11 12 13 14
CALIPER
hole diameter in inches
Sens.
T.C.
div. to left
Zero
GAMMA RAY
API UNITS
GAMMA RAY
API UNITS
Sens. 1.00 T.C. 2 div. to left
Zero 0
40
80
0
40
CALIPER
hole diameter in inches
6 7 8 9 10 11 12 13 14
Calibration after Survey
1900
Casing
2000
2100

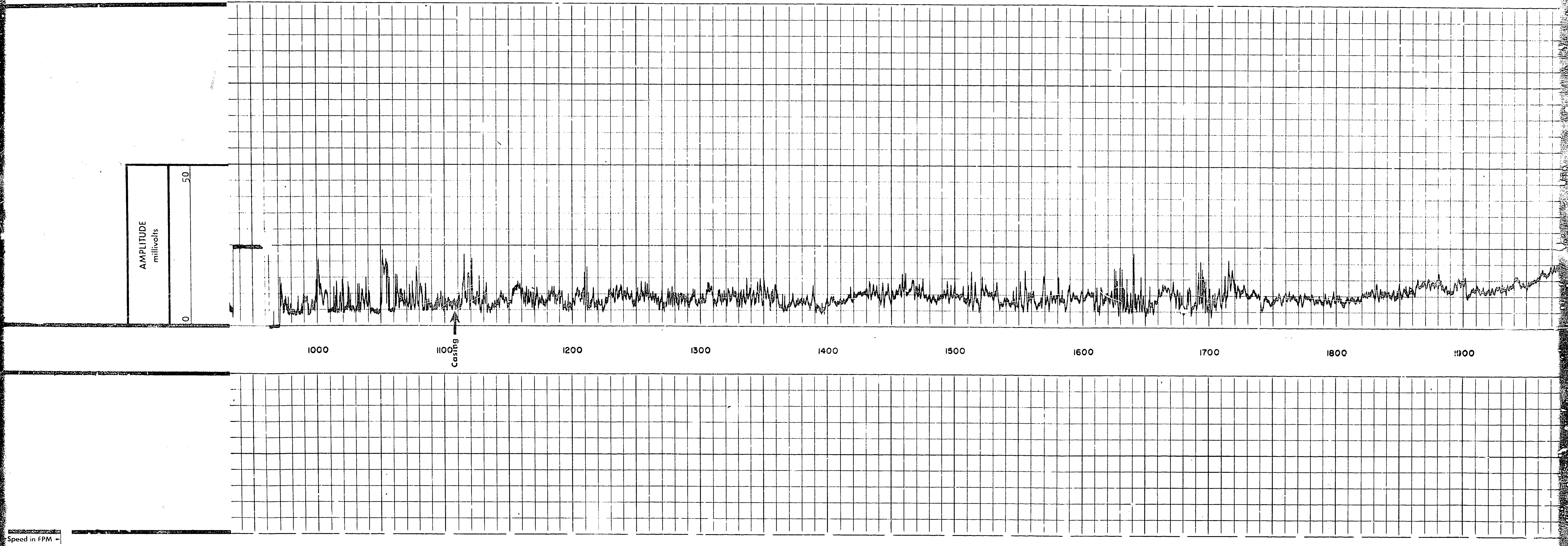
6 of


2100
2200
2300
2400
2500

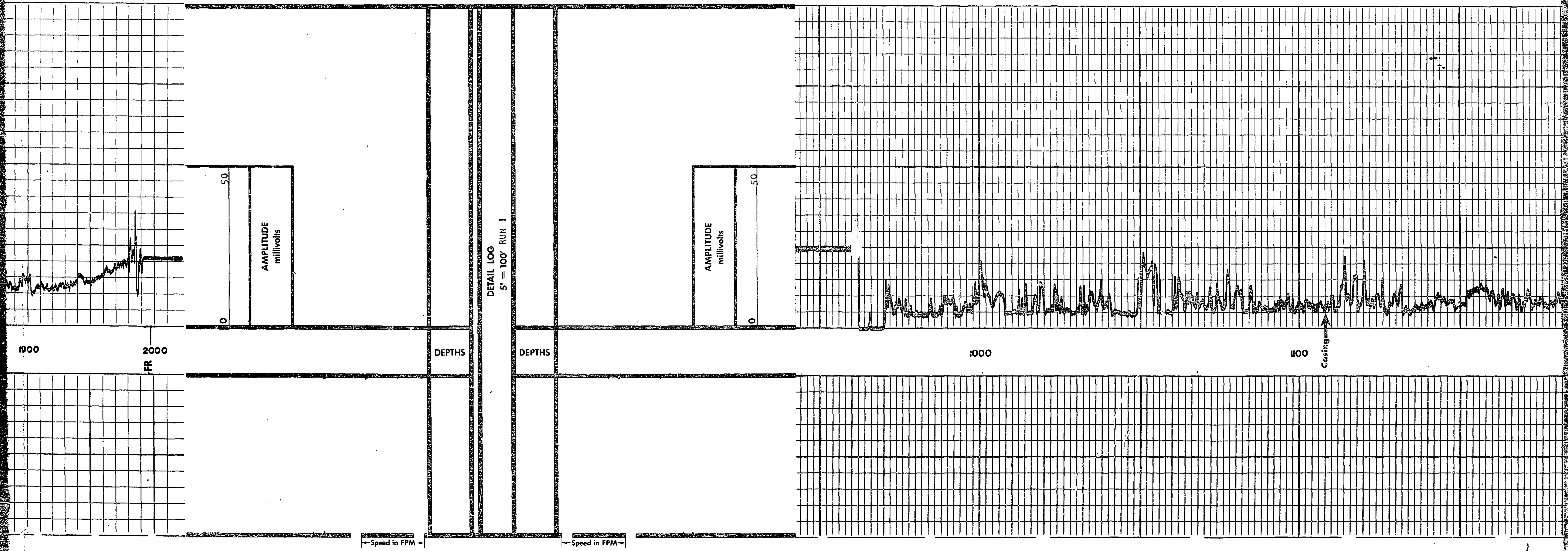
2600
2700
2800
2900
FR
Calibration before Survey


Calibration before Survey
REPEAT SECTION
Calibration after Survey
Calibration before Survey
2800
2900
FR
240
190
140
140
90
40
SONIC
INTERVAL TRANSIT TIME
microseconds per foot
DEPTHS
DETAIL LOG
2'' = 100' RUN 1
DEPTHS
6 7 8 9 10 11 12 13 14
CALIPER
hole diameter in inches
Sens. 100 T.C. 2
Zero 0 div. to left
0 40
40 80
GAMMA RAY
API UNITS
Speed in FPM
Speed in FPM

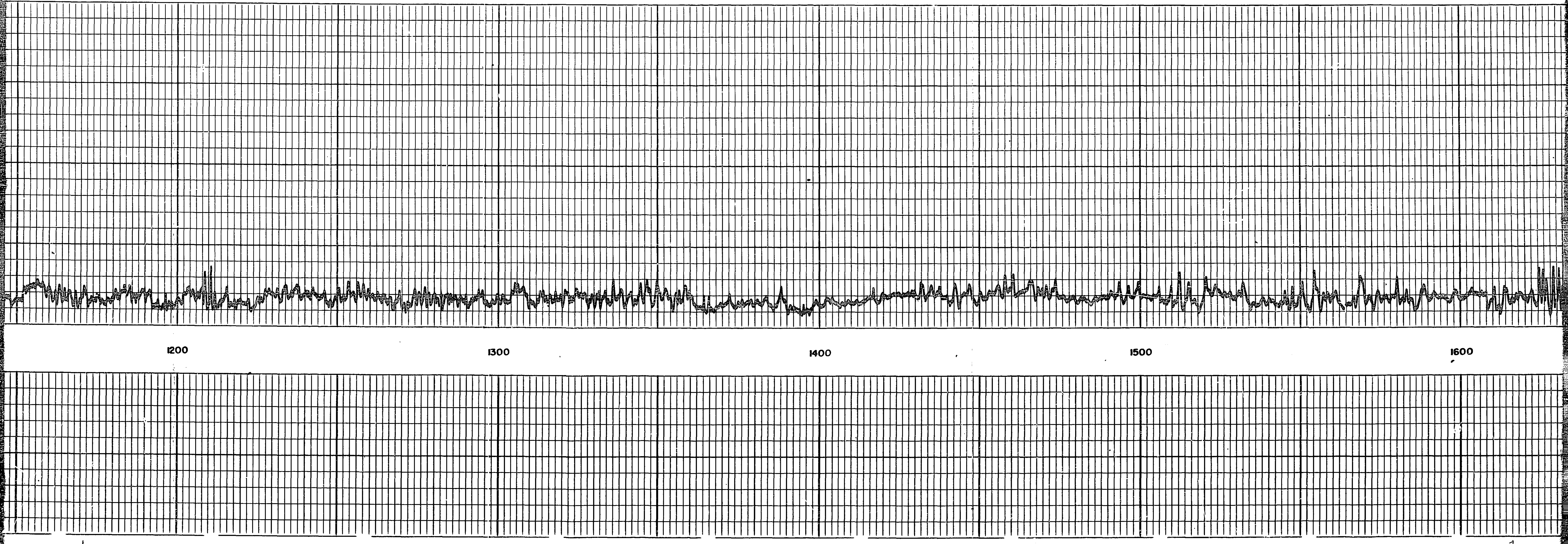
9 of


AMPLITUDE
millivolts
50
0
1000
1100
Casing
1200
1300
1400
1500
1600
1700
1800
1900
Speed in FPM →

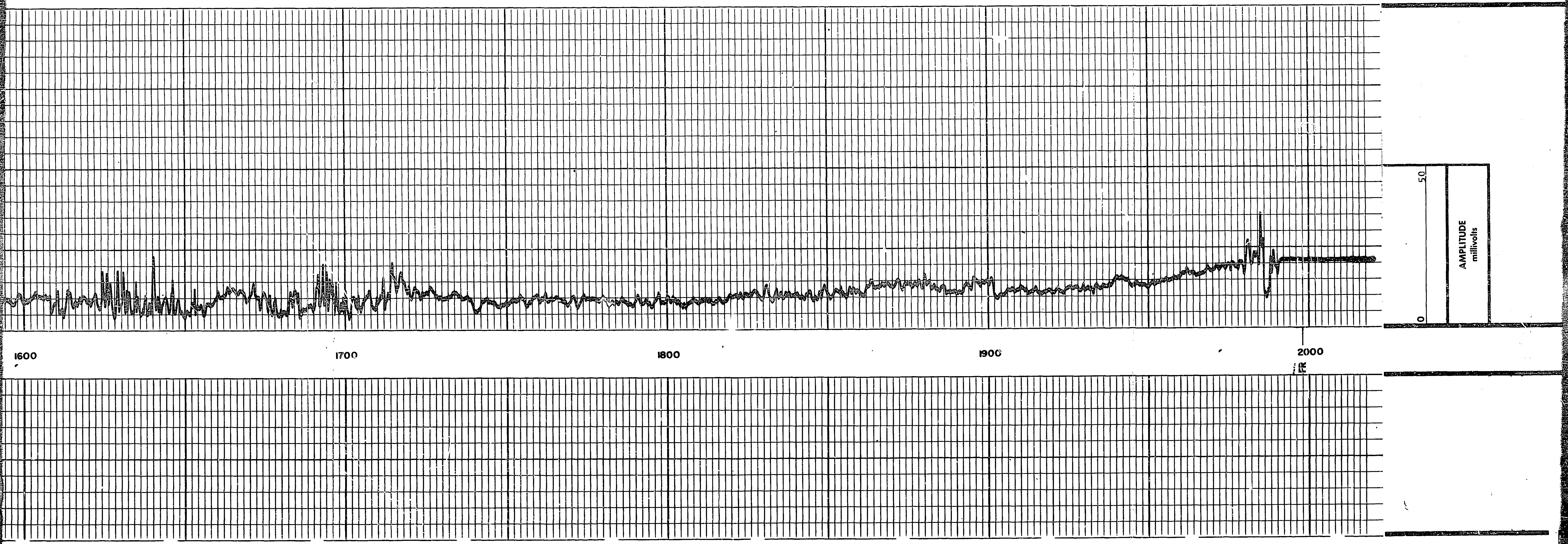
10 of


50
0
AMPLITUDE
millivolts
DETAIL LOG
5" = 100' RUN 1
DEPTHS
DEPTHS
AMPLITUDE
millivolts
50
0
1900
2000
FR
1000
1100
Casing
Speed in FPM
Speed in FPM

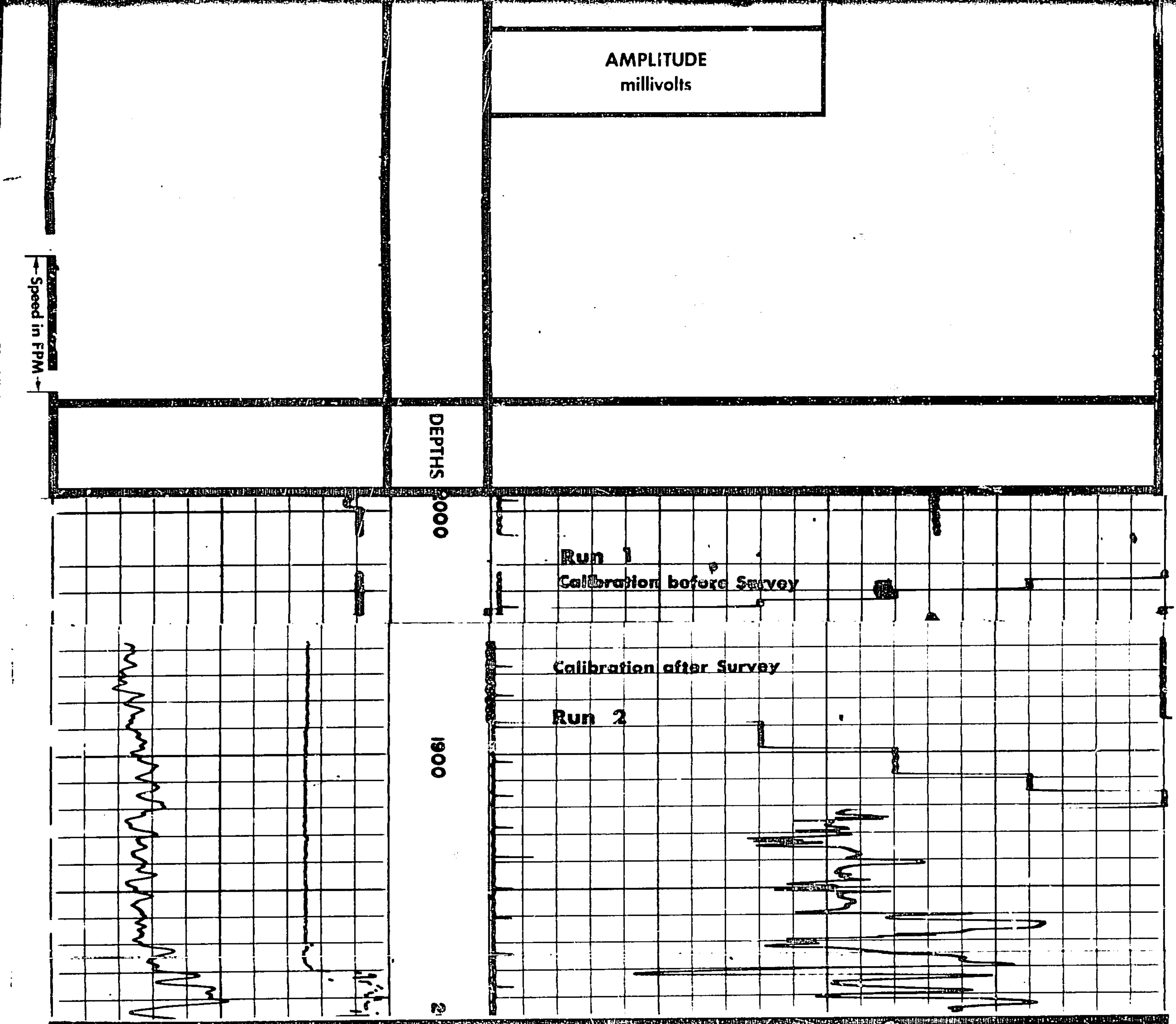
11 of



12 of



13of



**COMPANY** AQUITANE COMPANY OF CANADA LTD.

**WELL** AQUITANE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT **PROVINCE** FEDERAL WATERS

**SCHLUMBERGER**

# TEMPERATURE LOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITANE ET AL HUDSON WALRUS A-71
COMPANY AQUITANE COMPANY OF CANADA LTD.

**COMPANY** AQUITANE COMPANY OF CANADA LTD.

**WELL** AQUITANE ET AL HUDSON WALRUS A-71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

**LOCATION** 87° 10' 51" WEST LONG. 58° 30' 02" NORTH LAT.

Other Services:

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB , 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 10 AUG 69 | Bit Size—Inches | 36" |
| Run No. | ONE | Csg. Size—Inches | 30" to 770 |
| First Reading | 744 | | to |
| Last Reading | 20 | Csg. Wt.—Pounds | 330 to 770 |
| Foot Measured | 724 | | to |
| Bottom Driller | 772 | Tubing Size—Inches | |
| Depth Reached | 725 | Opr. Rig Time | 2 HRS. |
| Fluid Type | WATER | Truck No. | OSU-C-285 EST |
| Fluid Level | 32 | Recorded By | BERRY |
| Fluid Res. | @ °F | Witness | |

| | | | |
|---|---|---|---|
| Perforated Interval | to | Production Fluid | |
| | to | • Pressure | |
| Injection Fluid | | • Temp. | |
| • Pressure | | • Rate | |
| • Temp. | | | |
| • Rate | | | |

| | | | |
|---|---|---|---|
| Cementation Data | Date 8 AUG 69 | Time Started 2105 | Time Stopped 2212 |
| Circulation Data | Date | Time Started | Time Stopped |
| Cement | Quantity 1175 SACKS | Type G | Additives CACL2 |
| Calculated Top | 618 | | |
| Plug Depth | 770 | | |
| Pressure Released | Date | | |
| Drilling Stopped | Date | Time | |
| Csg. Shoe | Depth 770 | | |

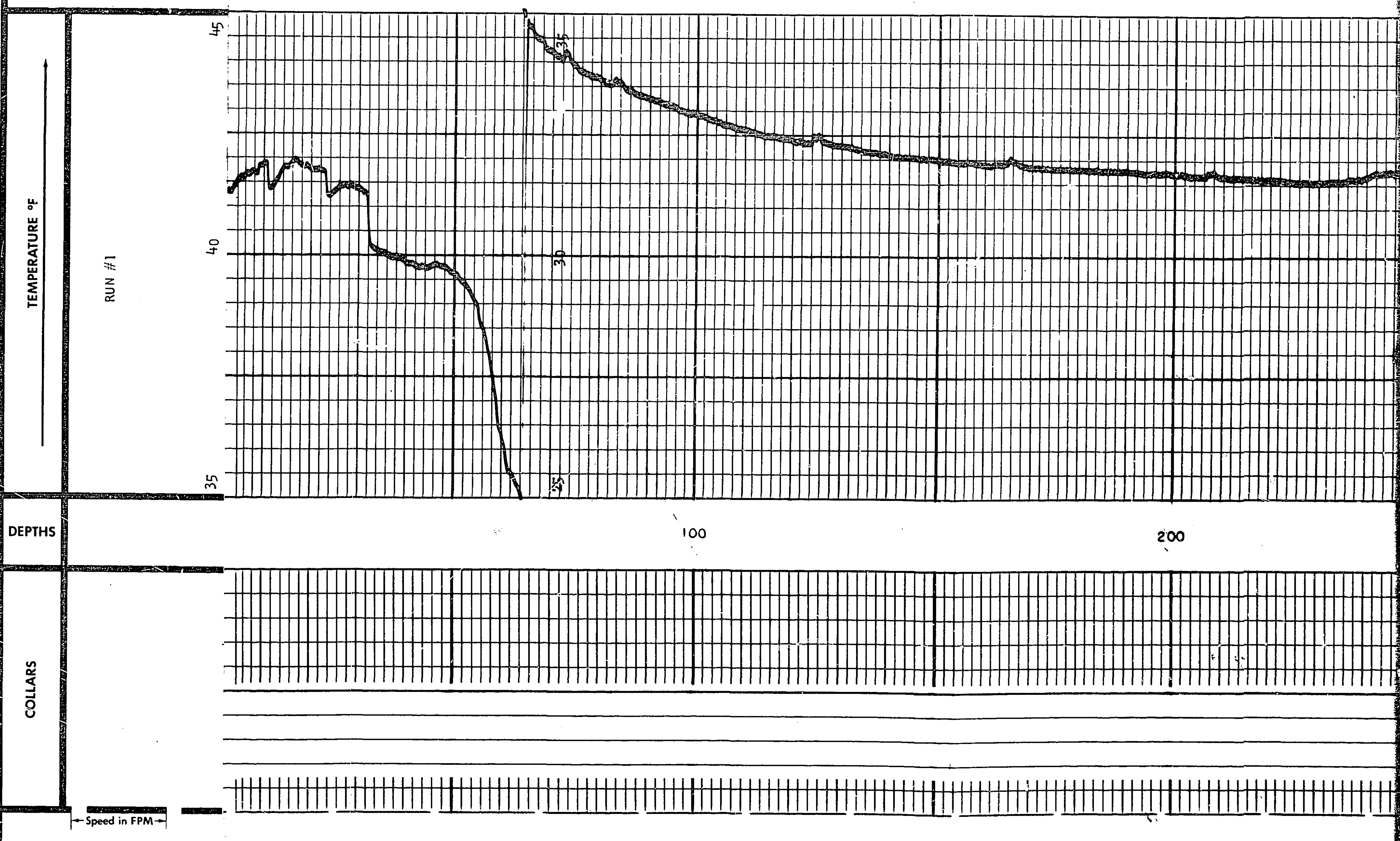
1SEP169 CAL MP

1st Run Service Order # 4387
B.H.T. °F
Tool on Bottom / :
Circulation Stopped / :
Drilling Stopped / :

**REMARKS**

RUN #1 TO DETERMINE BOTTOM HOLE TEMPERATURE AFTER BOP HAD BECOME FROZEN.
RUN AUGUST 10 1700 - 1800 HRS.
RUN #2 TO DETERMINE BOTTOM HOLE TEMPERATURE AFTER CIRCULATING HOT WATER
RUN AUGUST 11 2300 - 2400 HRS.
RUN #3 RUN TO DETERMINE BOTTOM HOLE TEMPERATURE FOR AN INDICATION OF THE PRESENCE OF PERMAFROST.
RUN AUGUST 21 1500 - 1600 HRS.

Cartridge No.
Sonde No. 8
Panel No.



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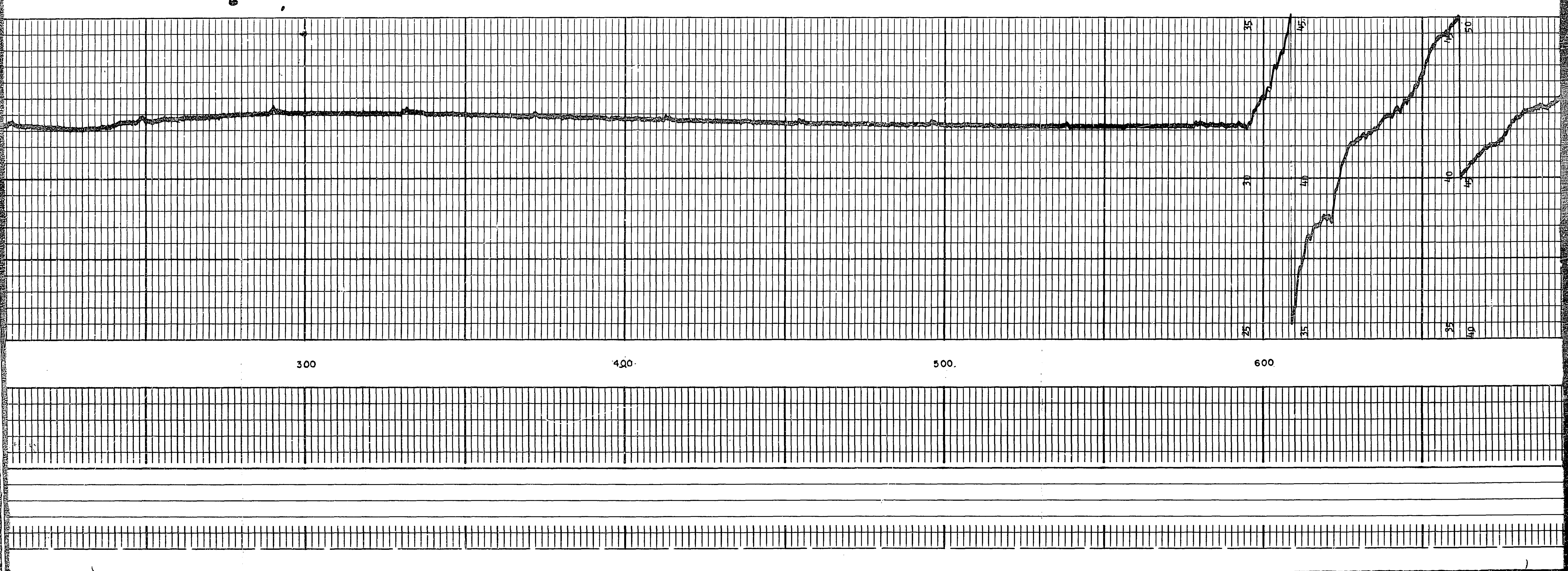

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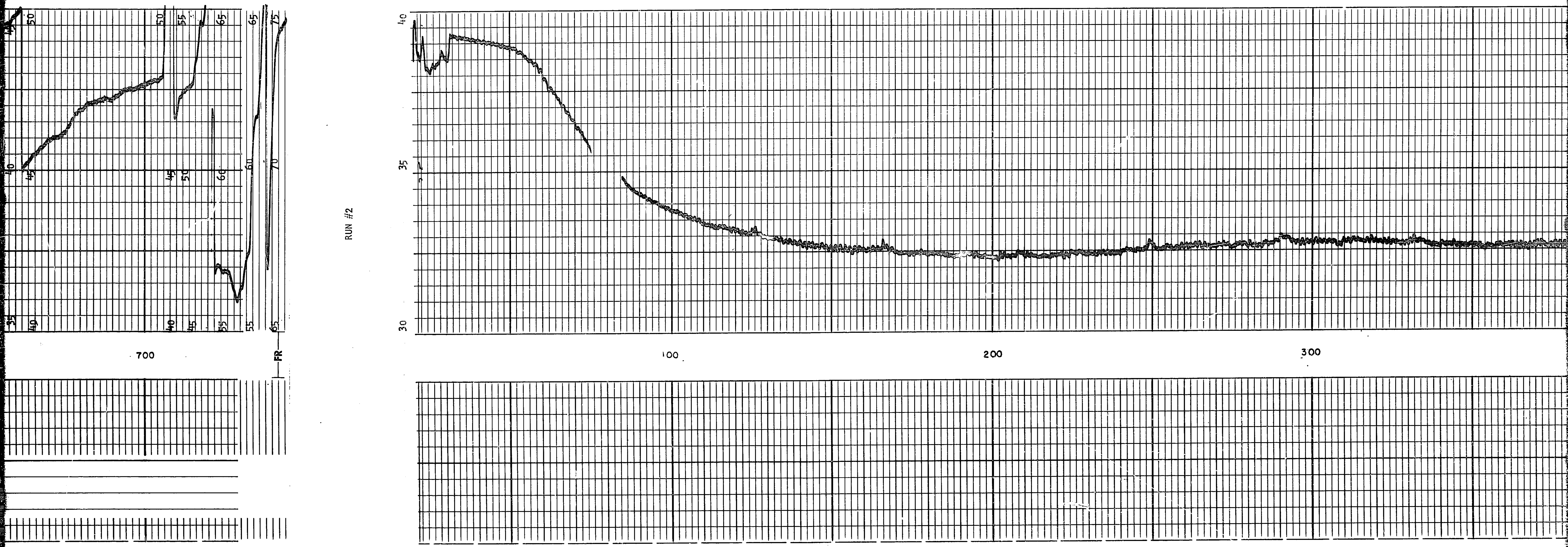
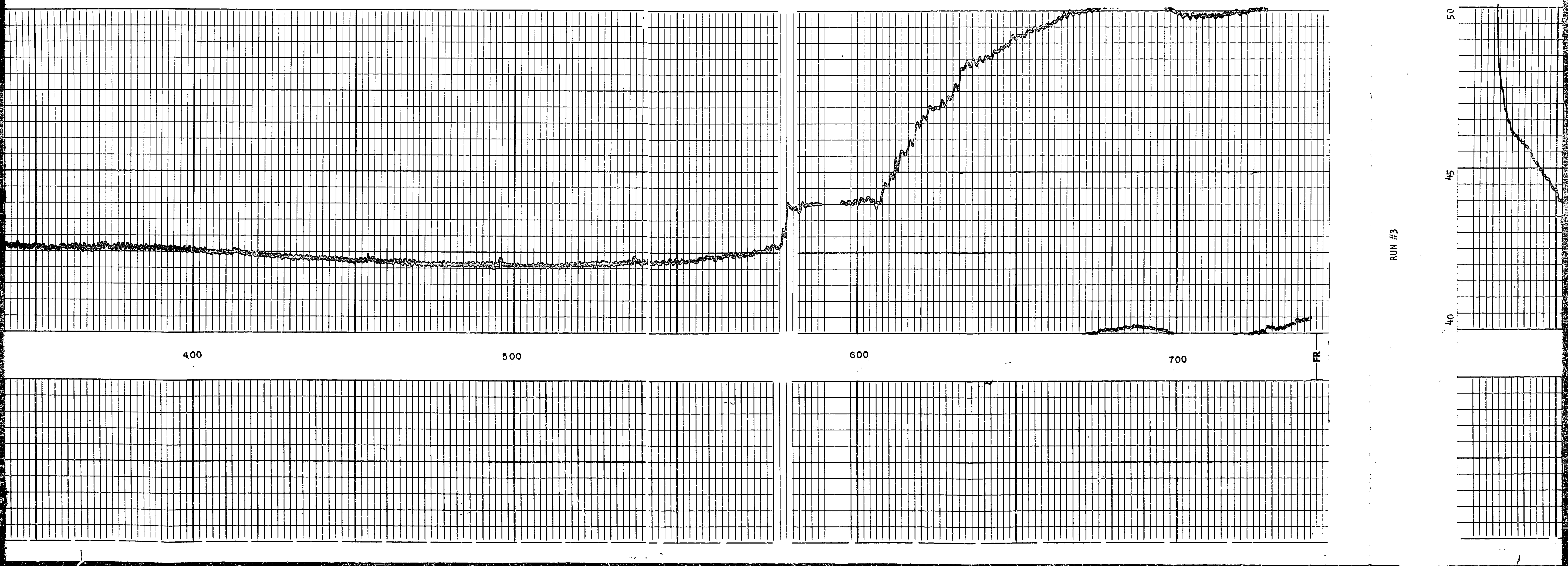
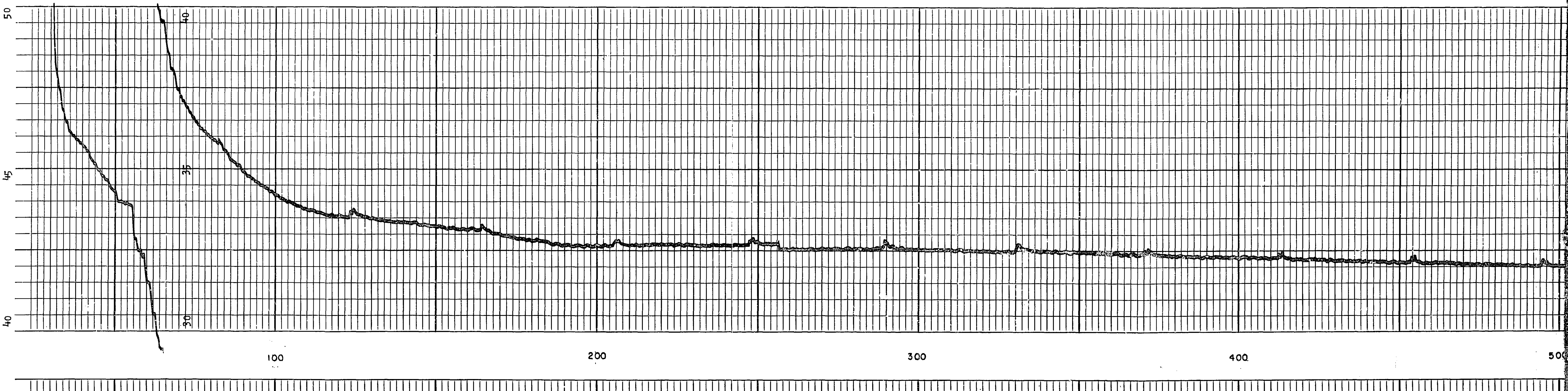

45
50
50
55
65
65
75
40
45
45
50
60
60
70
35
40
40
45
55
55
65
700
FR
RUN #2
40
35
30
100
200
300

2 of


400
500
600
700
FR
RUN #3
50
45
40



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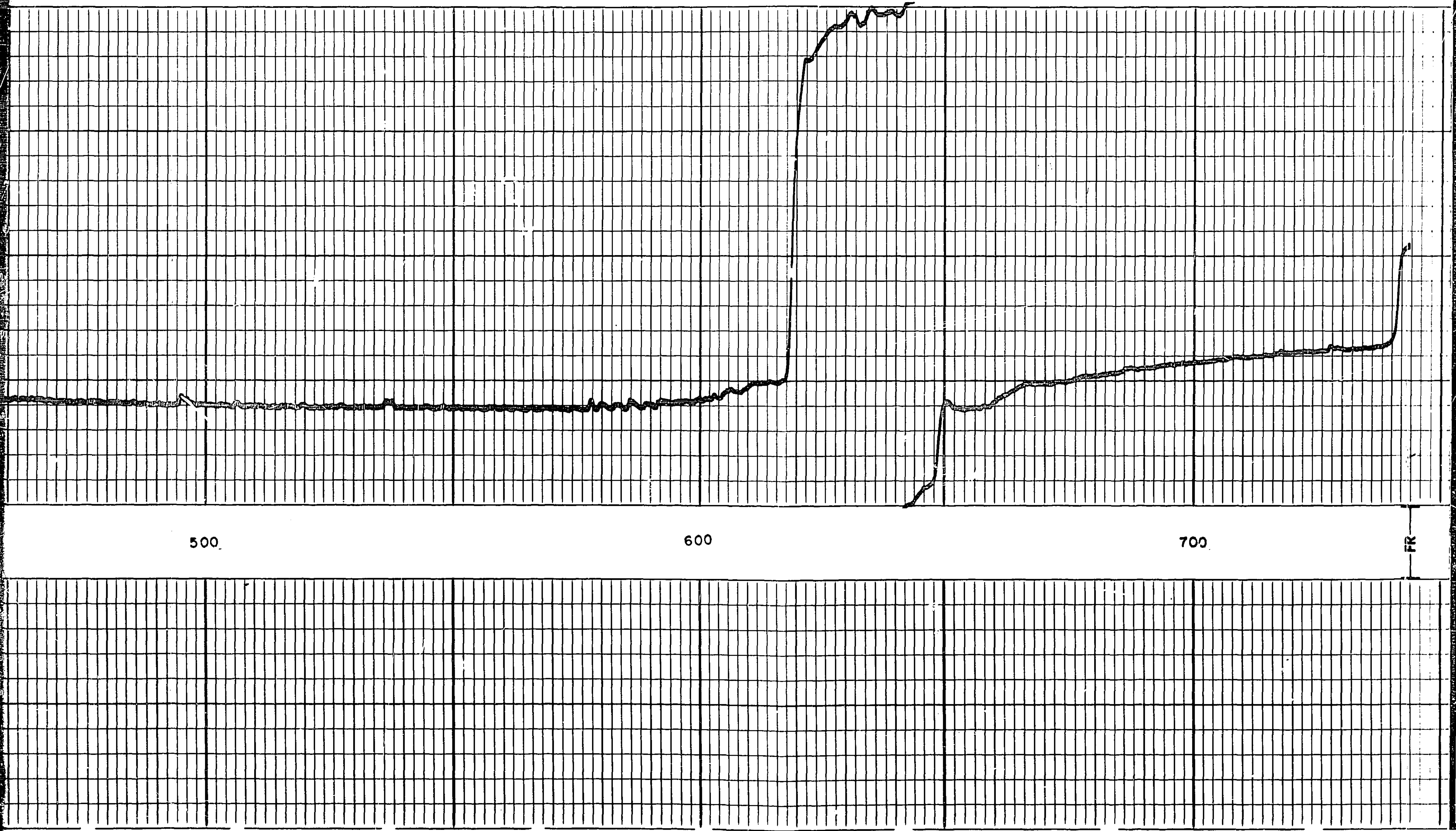


**COMPANY** AQUITANE COMPANY OF CANADA LTD.

**WELL** AQUITANE ET AL HUDSON WALRUS A-71

**FIELD** WILDCAT **PROVINCE** FEDERAL WATERS

6 of

# SCHLUMBERGER DUAL INDUCTION-LATEROLOG

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

**LOCATION** 87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: ML SRS SLC-GR, GRL, CAL, LL, SNP, FDC-GR

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

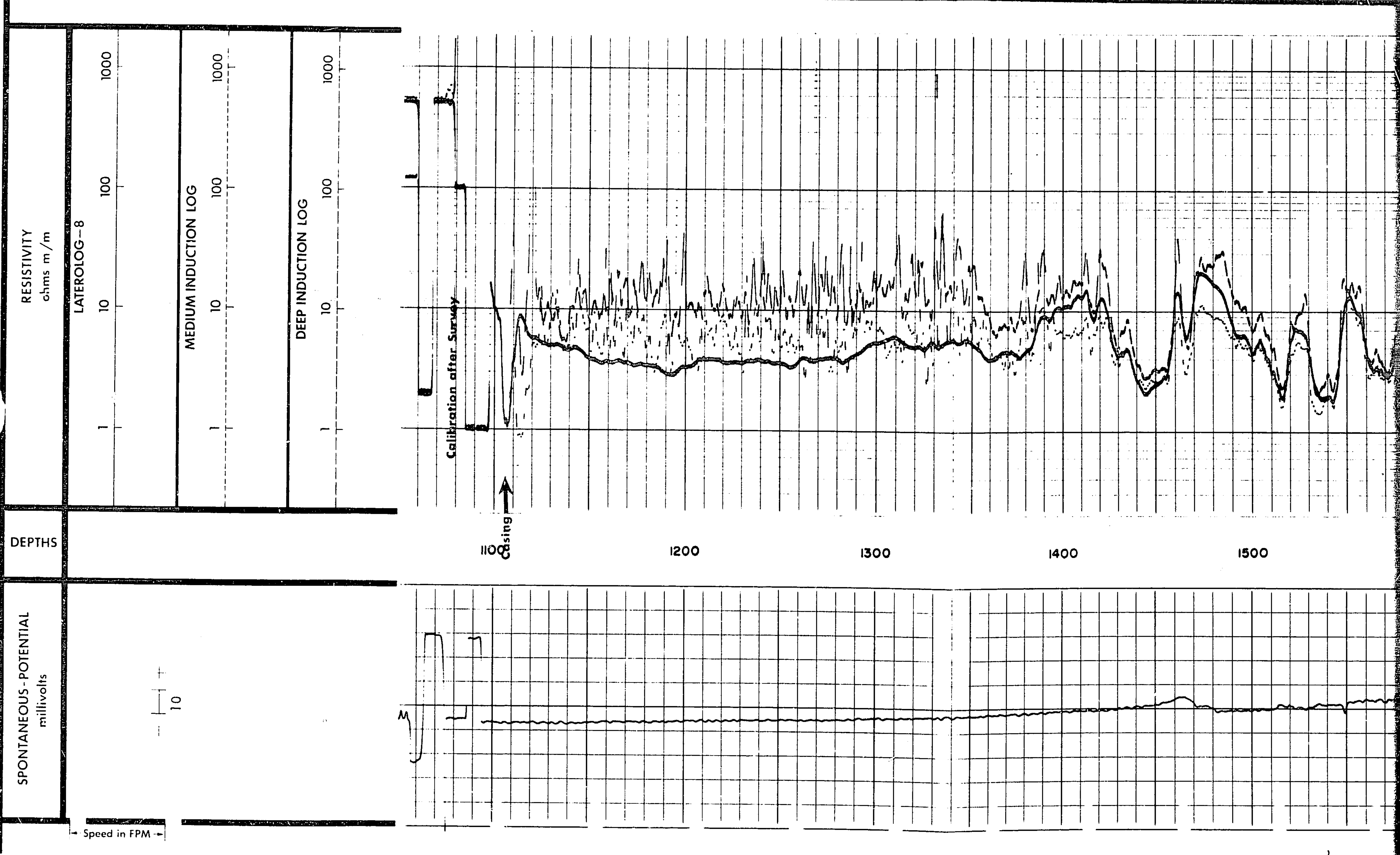
ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 8 SEPT 69 | 19 SEPT 69 | |
| Run No. | ONE | TWO | |
| First Reading | 1994 | 2954 | |
| Last Reading | 1108 | 1975 | |
| Feet Measured | 886 | 979 | |
| Depth Reached | 1998 | 2958 | |
| Bottom Driller | 2000 | 2959 | |
| Csg. SOC | 1108 | 1975 | |
| Csg. Driller | 1106 | 1975 | |
| Mud Nature | SALT-GEL BARITE | SALT-GEL-BARITE | |
| Dens. \| Visc. | 10.2 \| 58 | 11.3 \| 44 | |
| Mud pH | 11.0 | 9.5 | |
| " Water Loss | 48.0 | 13.0 | |
| " Res. | 0.100 @ 70 °F | 0.07 @ 48 °F | @ °F |
| " Rmf | 0.070 @ 70 °F | 0.06 @ 50 °F | @ °F |
| " " @ BHT | 0.074 @ 68 °F | 0.04 @ 76 °F | @ °F |
| " Rmc | 0.190 @ 70 °F | 0.10 @ 50 °F | @ °F |
| Source of Sample | CIRCULATED | CIRCULATED | |
| Bit Size | 17 1/2" TO 1333<br>15" TO TD | 12 1/4" | |
| Opr. Rig Time | 3 HRS. | 3 HRS. | |
| Truck No. | OSU-C 285 | OSU-C 285 | |
| Recorded By | BERRY | BERRY | |
| Witness | RUEFF | RUEFF | |

REMARKS

Drilling Stopped 2000 7th : Circulation Stopped 2200 7th : Tool on Bottom 0100 8th 1st Run Service Order # 43373 B.H.T. 68 °F
RUN 2 1100 19th 1300 19th 1700 19th 76

| | | |
|---|---|---|
| Stand Off = | 1.5 Inches | 1.5 |
| Cartridge No. | - | |
| Panel No. | C127 | C127 |
| Sonde No. | - | |
| IAP-D No. | 158 | 158 |
| SBR | 1 | 1 |



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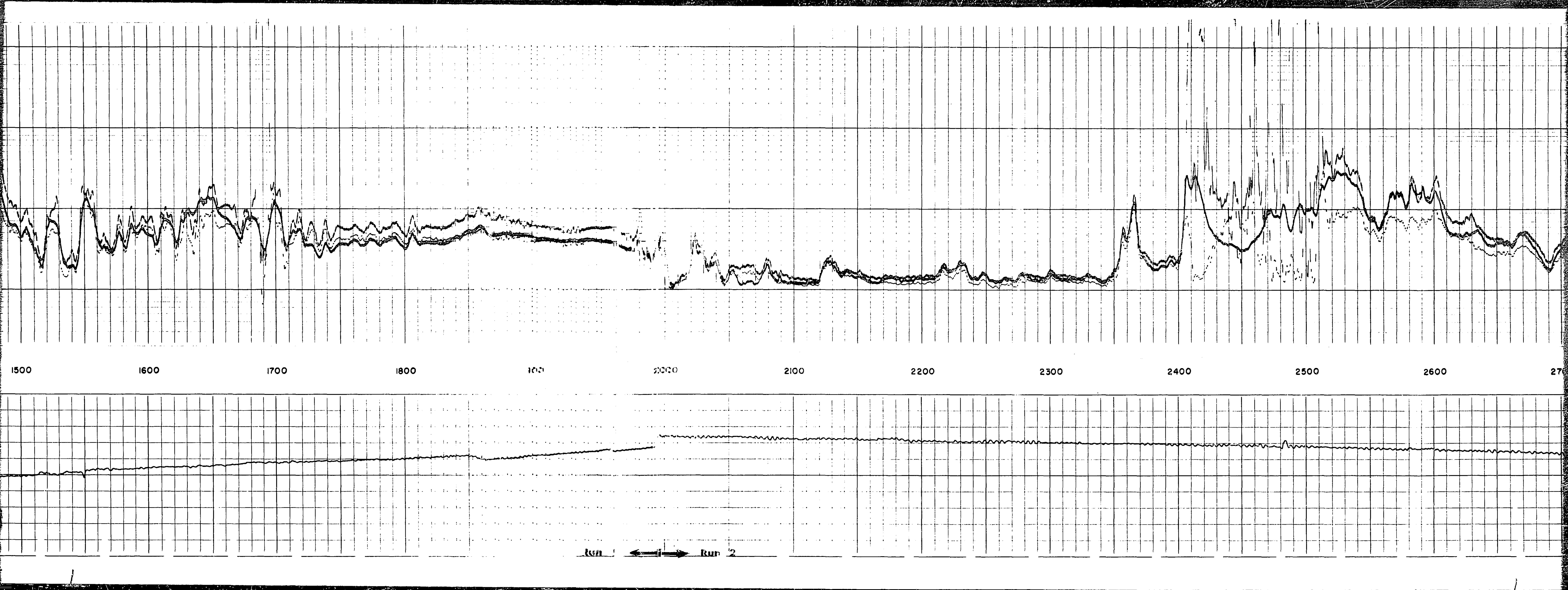
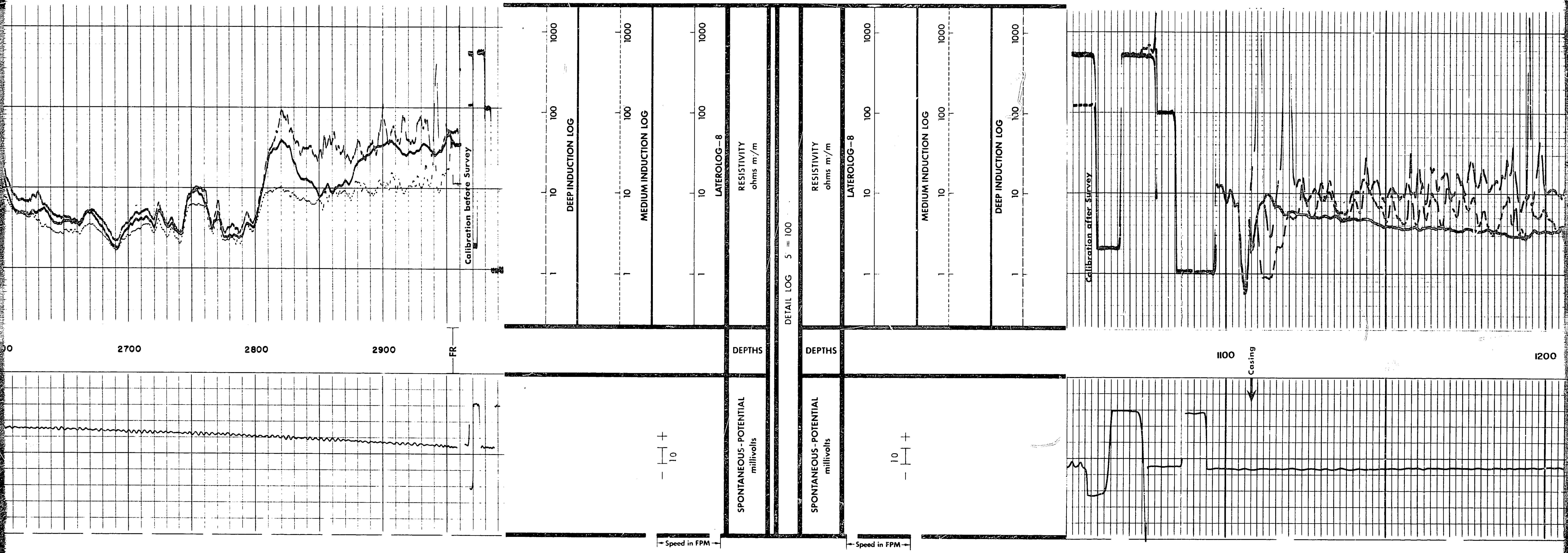
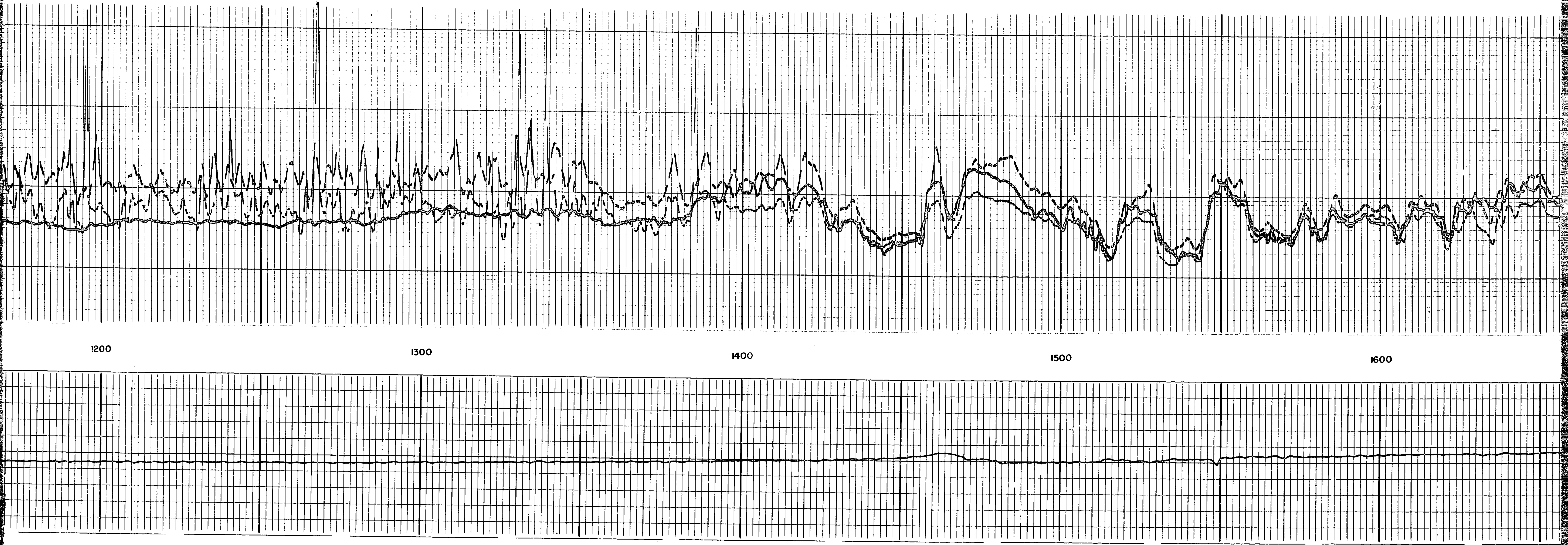

1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
27
Run 1
Run 2

2 of


2700
2800
2900
FR
Calibration before Survey
1000
100
10
1
DEEP INDUCTION LOG
MEDIUM INDUCTION LOG
LATEROLOG-8
RESISTIVITY
ohms m/m
DEPTHS
SPONTANEOUS-POTENTIAL
millivolts
+
10
−
Speed in FPM
DETAIL LOG 5" = 100
RESISTIVITY
ohms m/m
LATEROLOG-8
MEDIUM INDUCTION LOG
DEEP INDUCTION LOG
DEPTHS
SPONTANEOUS-POTENTIAL
millivolts
Speed in FPM
Calibration after Survey
1100
Casing
1200

2 of



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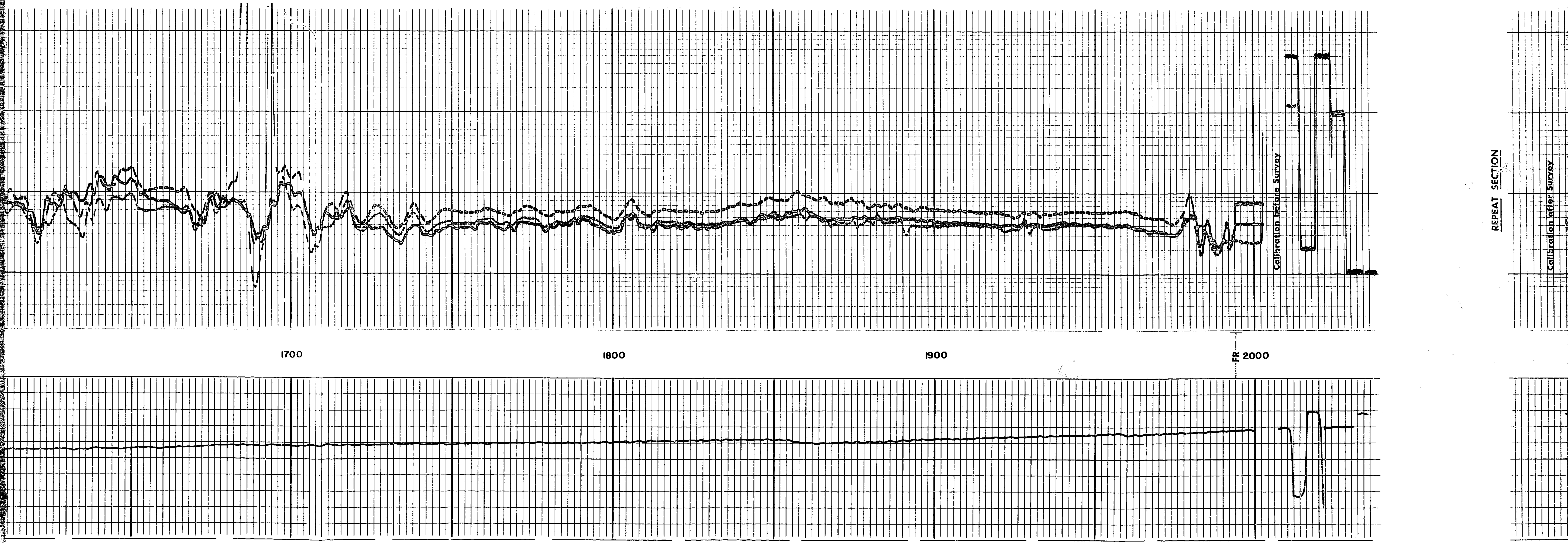
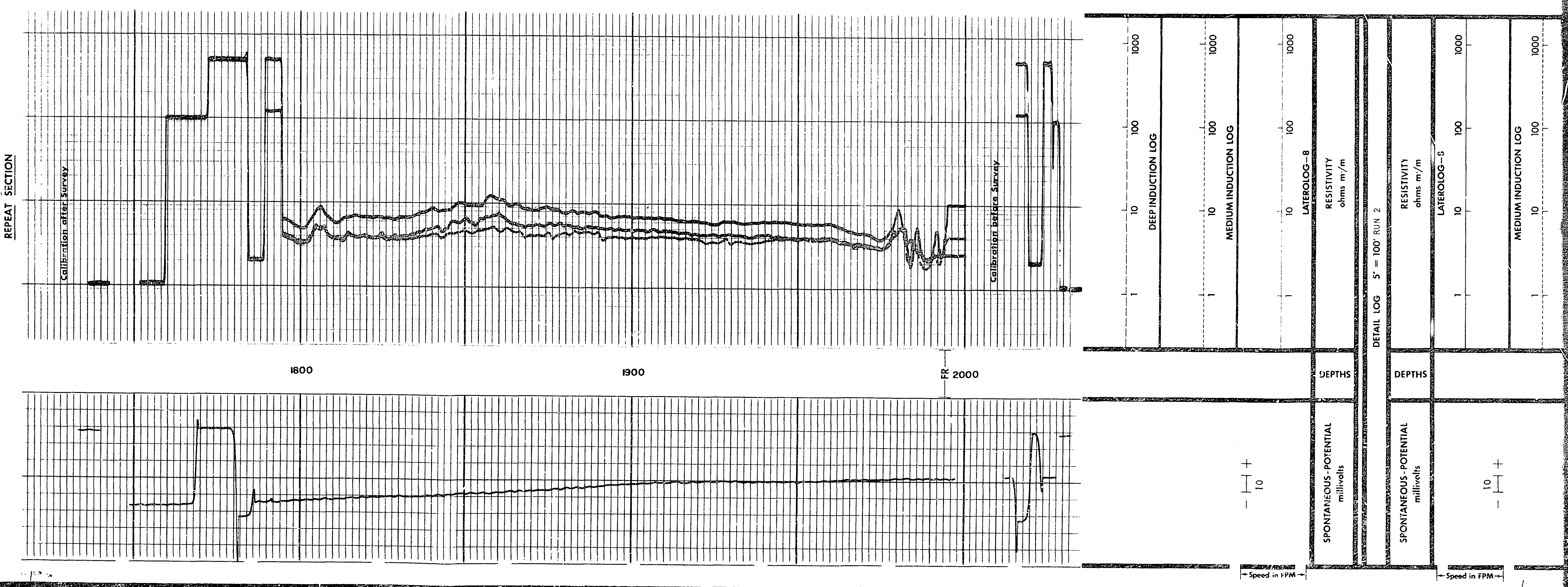
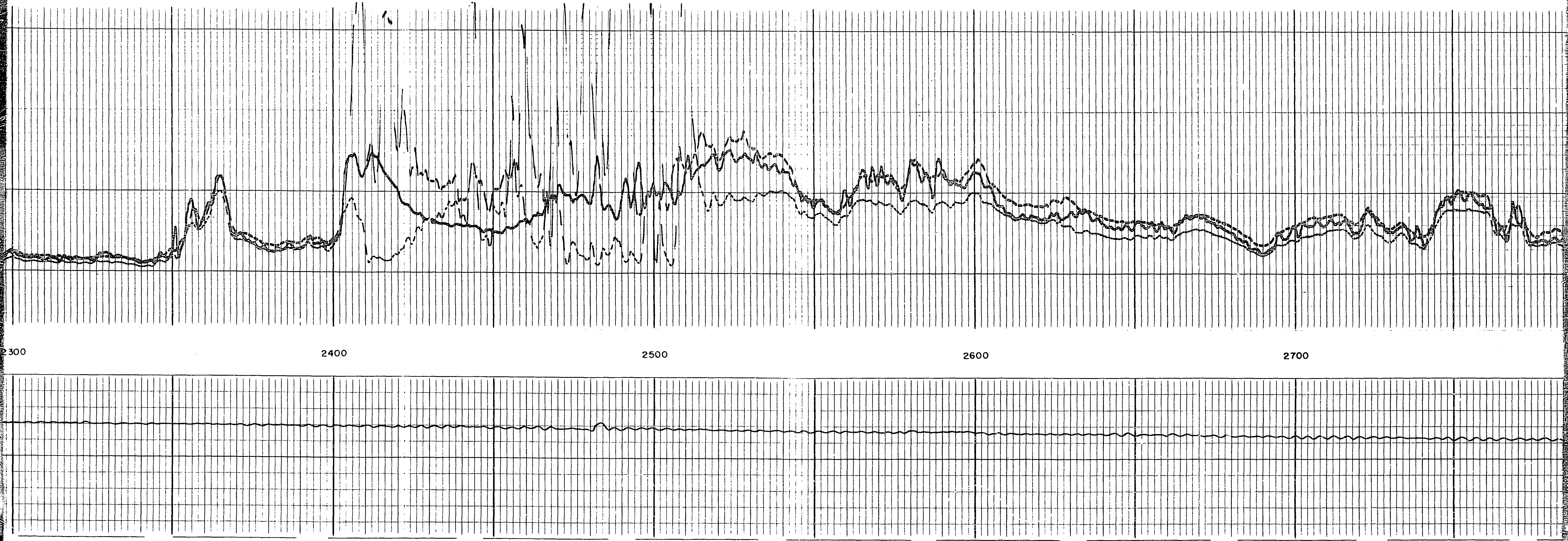

1700
1800
1900
FR 2000
Calibration before Survey
REPEAT SECTION
Calibration after Survey

5 of

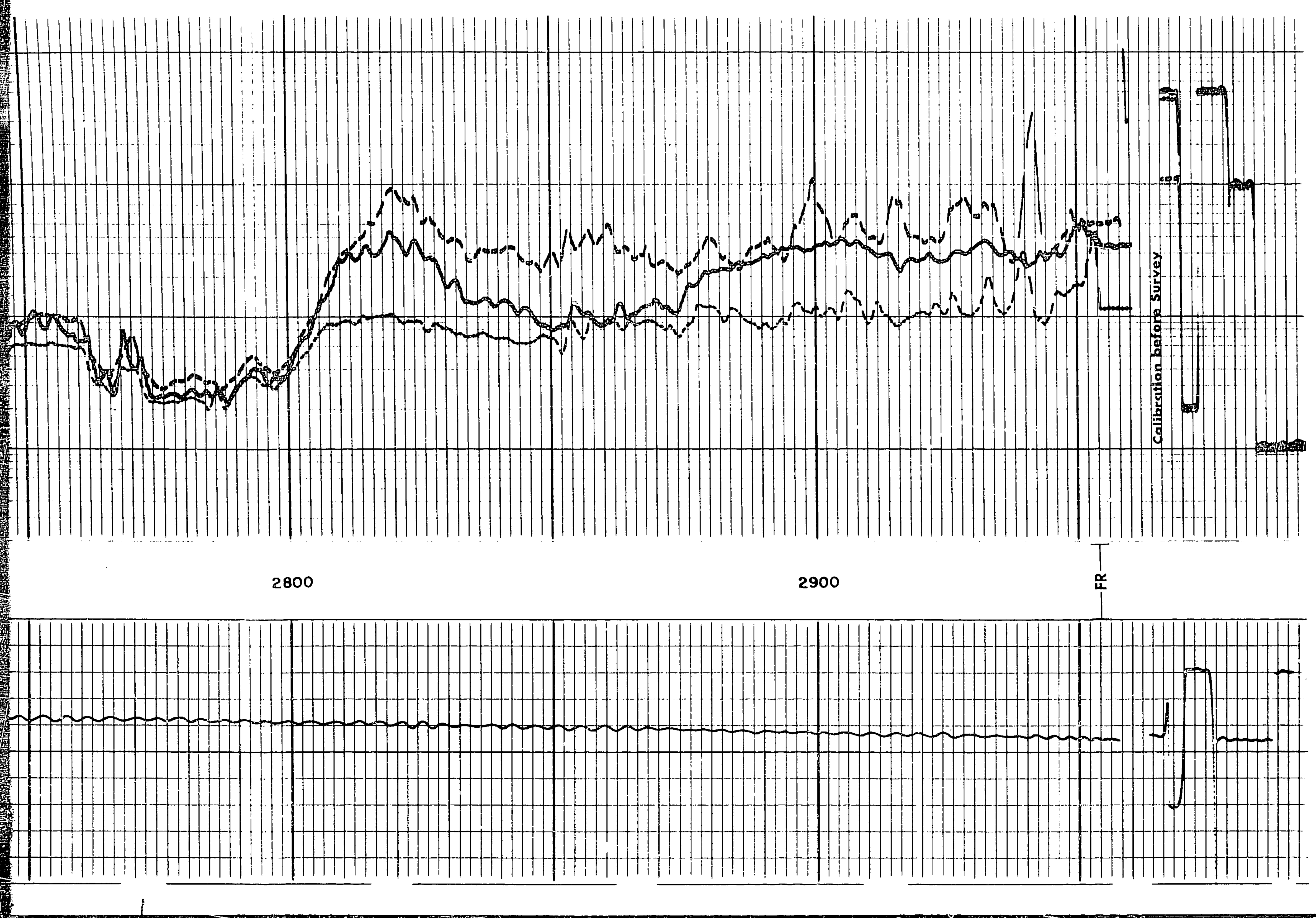

REPEAT SECTION
Calibration after Survey
Calibration before Survey
1600
1900
FR 2000
1
10
100
1000
DEEP INDUCTION LOG
MEDIUM INDUCTION LOG
LATEROLOG-8
RESISTIVITY
ohms m/m
DETAIL LOG 5" = 100' RUN 2
DEPTHS
SPONTANEOUS-POTENTIAL
millivolts
- 10 +
Speed in FPM

6 of

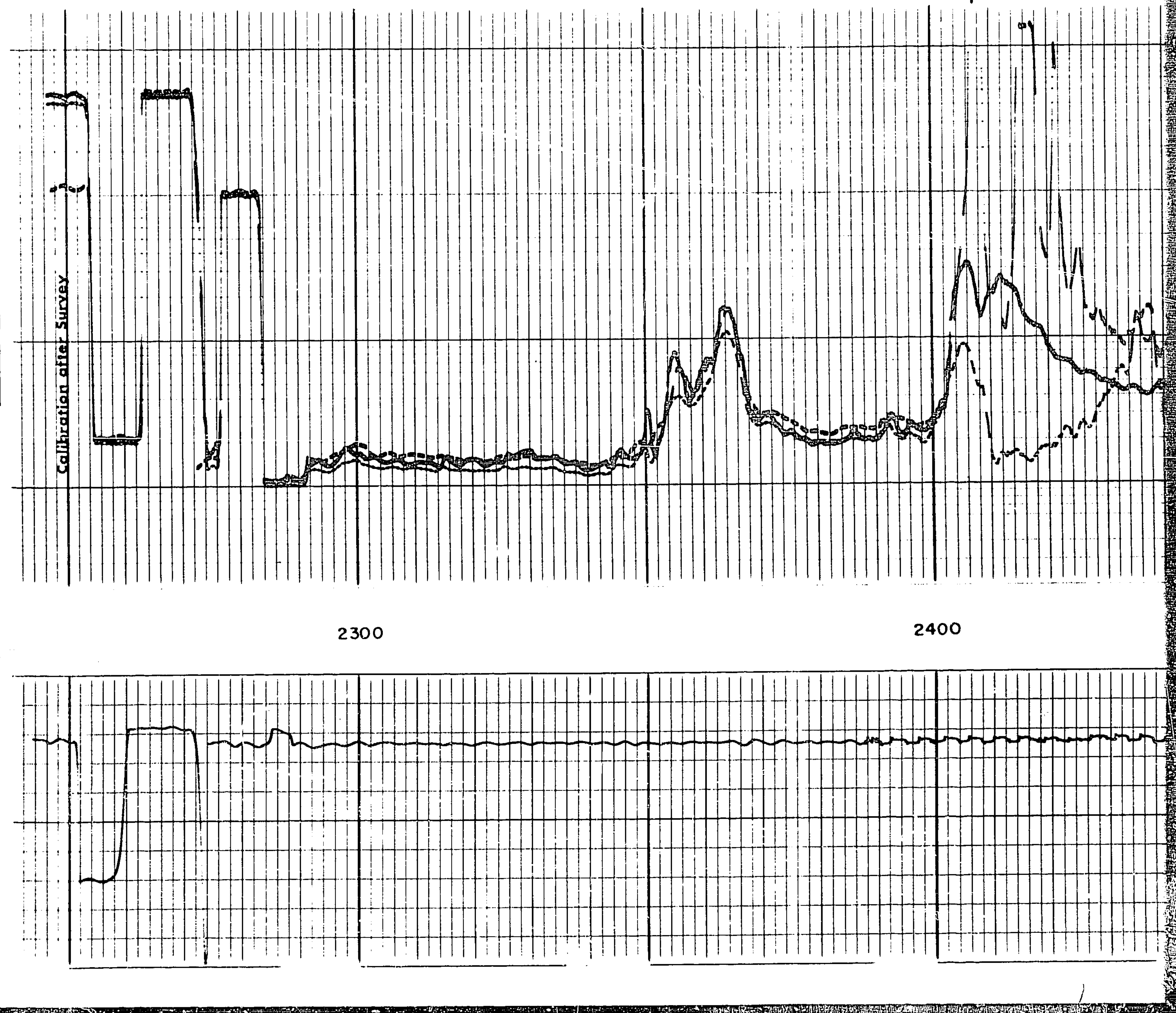

LATEROLOG-8
MEDIUM INDUCTION LOG
DEEP INDUCTION LOG
1000
100
10
1
Calibration after Survey
Casing
2000
2100
2200
2300
10
+
-
Speed in FPM

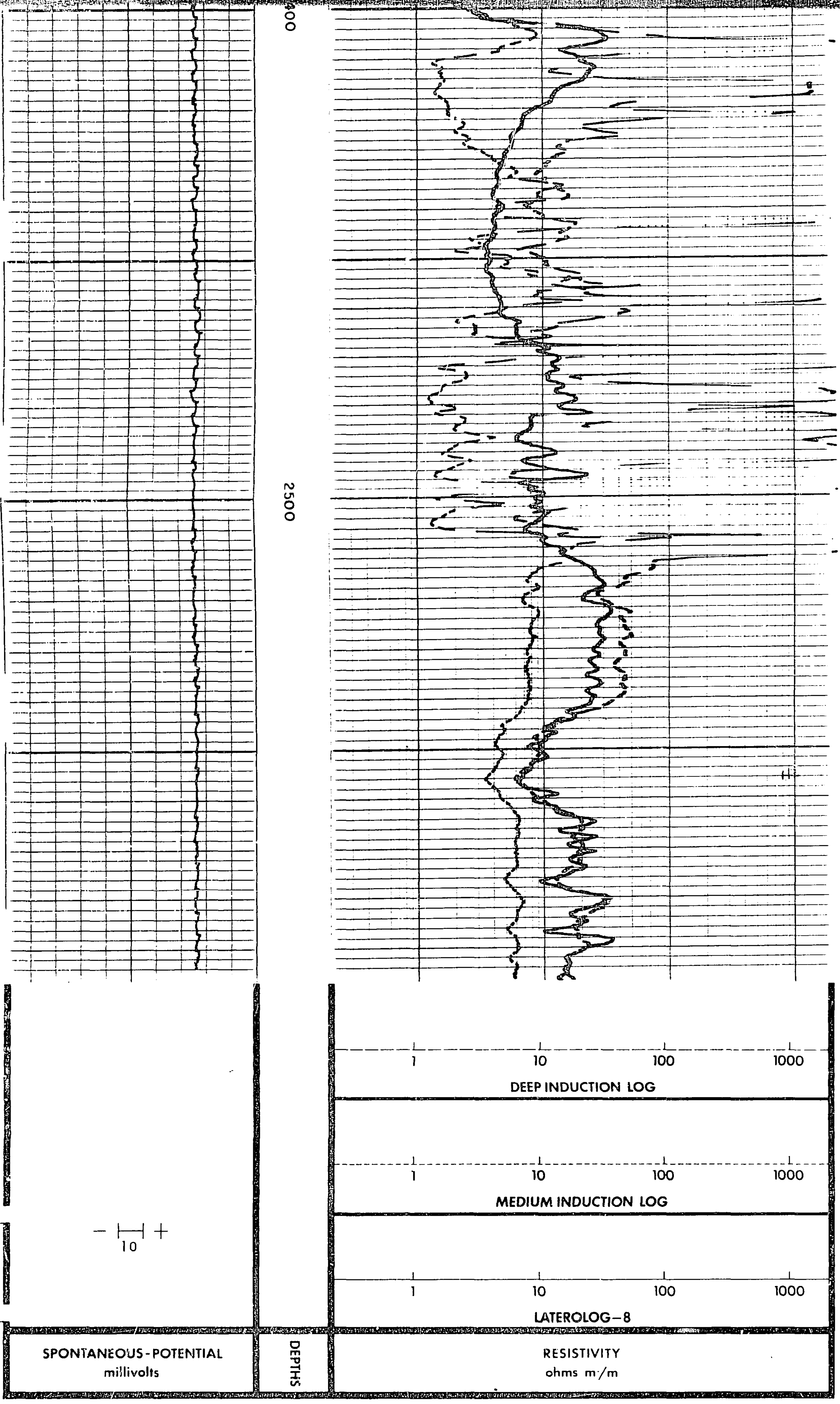


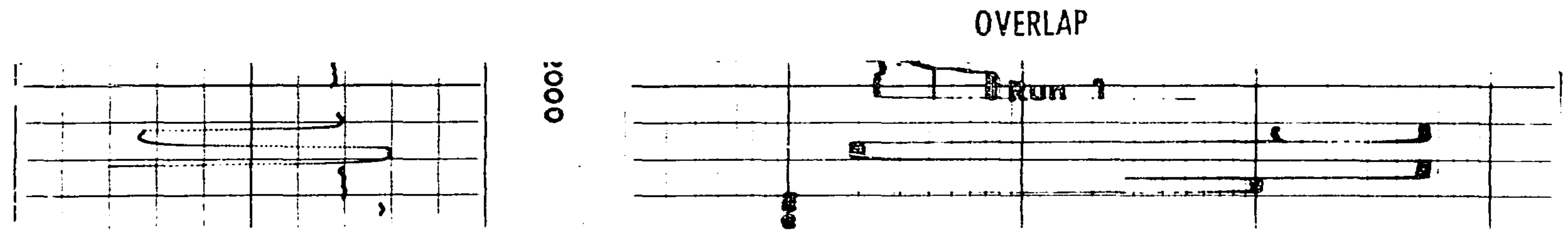
8 of

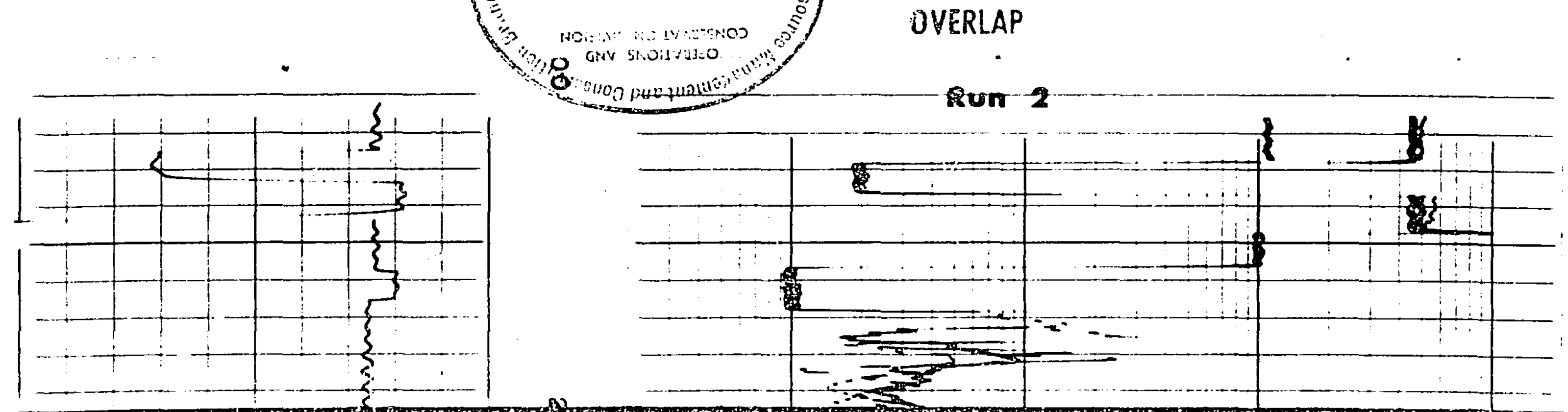


## REPEAT SECTION









COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A 71

FIELD WILDCAT PROVINCE FEDERAL WATERS

SCHLUMBERGER

10 of 10

SCHLUMBERGER

# COMPENSATED FORMATION DENSITY LOG

SCHLUMBERGER OF CANADA Calgary Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A71

FIELD WILDCAT

PROVINCE FEDERAL WATERS

8̦° 10' 51'' WEST LONG
58° 30' 02'' NORTH LAT

Other Services: LL SRS DIL, SNP, GRL, SLC-GR, CAL, ML

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 23 SEPT 69 | | |
| Run No. | ONE | | |
| First Reading | 2959 | | |
| Last Reading | 2300 | | |
| Feet Measured | 659 | | |
| ~~Depth Reached~~ | 2960 | | |
| Bottom Driller | 2959 | | |
| Csg. SOC | 1975 | | |
| Csg. Driller | 1975 | | |
| Mud Nature | SALT-GEL-BARITE | | |
| Dens. \| Visc. | 14.0 \| 48 | \| | \| |
| Mud pH | 9.5 | | |
| " Water Loss | 13.0 | | |
| " Res. | 0.07 @ 48 °F | @ °F | @ °F |
| " Rmf | 0.06 @ 50 °F | @ °F | @ °F |
| " " @ BHT | 0.04 @ 80 °F | @ °F | @ °F |
| " Rmc | 0.10 @ 50 °F | @ °F | @ °F |
| " ppm-Cl. | - | | |
| Bit Size | 12 1/4'' | | |
| Source to Detector Spacing | 16'' | | |
| Equipment Type | PGT-D | | |
| Opr. Rig Time | 3 HRS. | | |
| Truck No. | OSU-C 285 | | |
| Recorded By | BERRY | | |
| Witness | RUEFF | | |

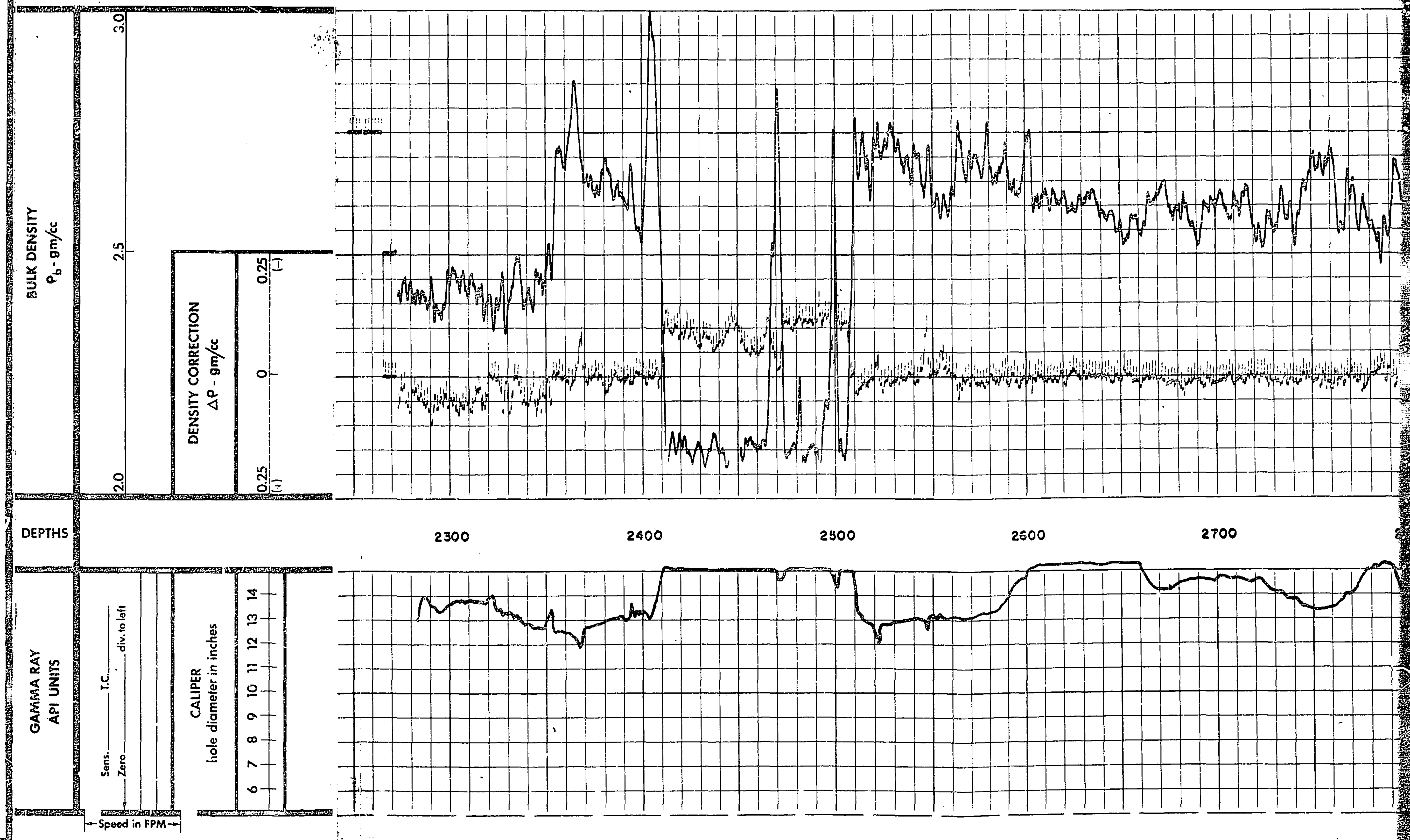
1 OCT 69 CAL RS

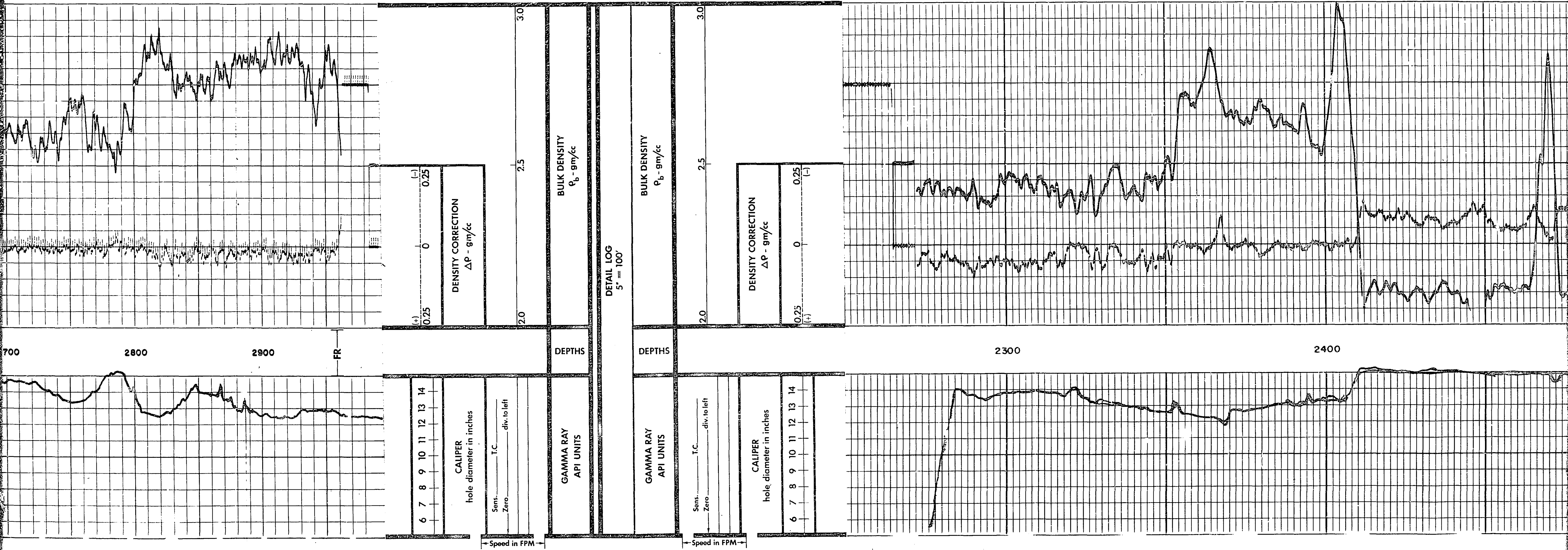
REMARKS

Drilling Stopped 1100 / 19th : Circulation Stopped 2200 / 22nd : Tool on Bottom 0900 / 23rd: 1st Run Service Order # 43878 B.H.T. 80 °F

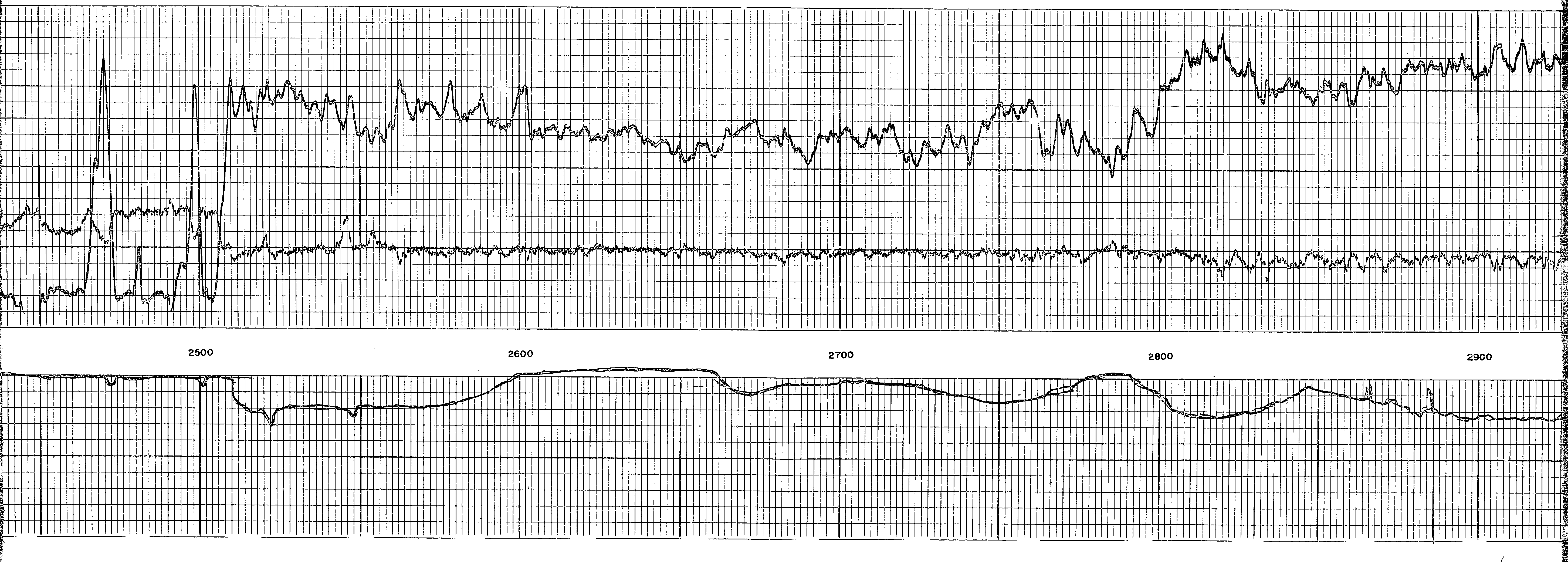
Panel No. 363
Cartridge No. 13
Sonde No. 310
Detector No. -

CALIBRATION: Background CPS Test Source CPS Galvanometer Deflection Div. Panel Sens. Tap for Cal.
Gamma Ray

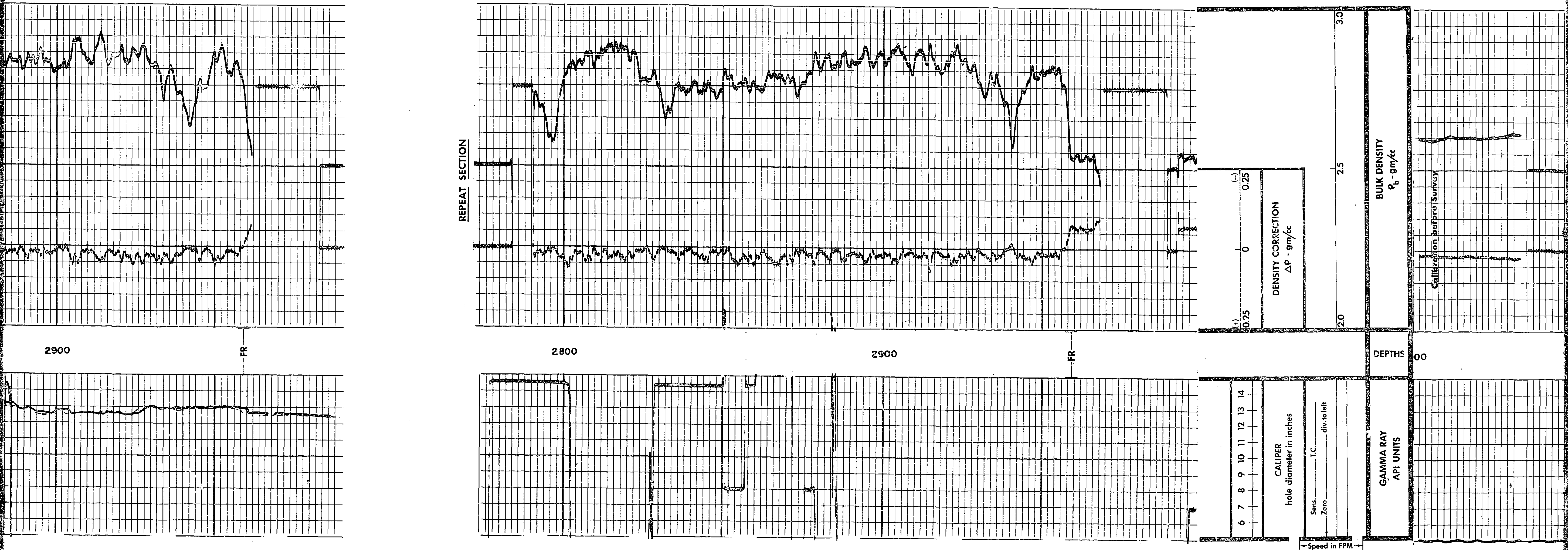


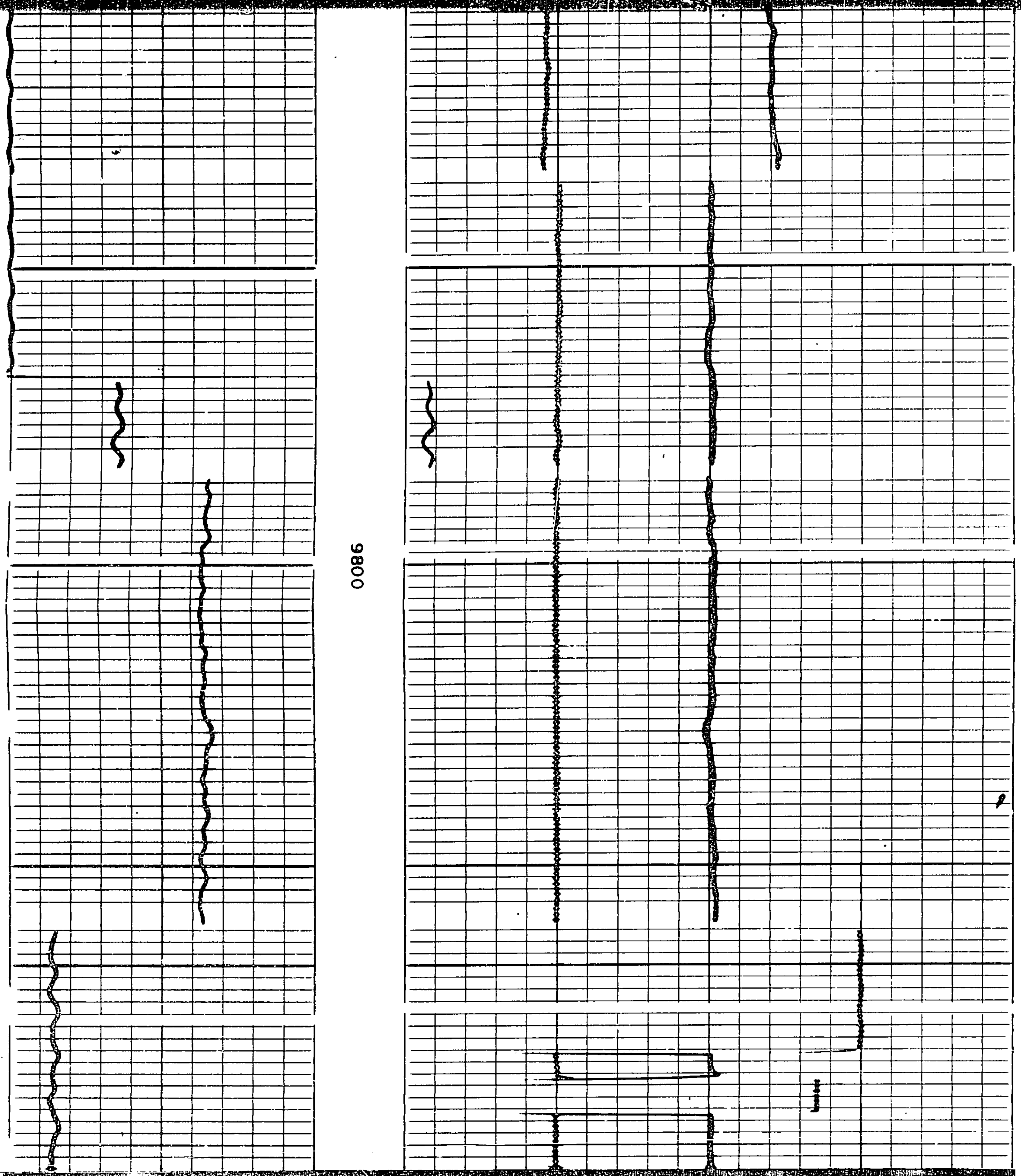

700
2800
2900
FR
DENSITY CORRECTION
Δρ - gm/cc
(-) 0.25
0
(+) 0.25
BULK DENSITY
ρb - gm/cc
2.0
2.5
3.0
DETAIL LOG
5' = 100'
DEPTHS
GAMMA RAY
API UNITS
CALIPER
hole diameter in inches
6
7
8
9
10
11
12
13
14
Sens.
T.C.
Zero
div. to left
Speed in FPM
DEPTHS
GAMMA RAY
API UNITS
Sens.
T.C.
Zero
div. to left
Speed in FPM
BULK DENSITY
ρb - gm/cc
2.0
2.5
3.0
DENSITY CORRECTION
Δρ - gm/cc
0.25 (-)
0
0.25 (+)
CALIPER
hole diameter in inches
6
7
8
9
10
11
12
13
14
2300
2400

2 of



3 of


REPEAT SECTION
2900
FR
2800
2900
FR
DEPTHS
00
(+) 0.25
0
(-) 0.25
DENSITY CORRECTION
ΔP - gm/cc
2.0
2.5
3.0
BULK DENSITY
ρb - gm/cc
Calibration before Survey
6 7 8 9 10 11 12 13 14
CALIPER
hole diameter in inches
Sens. T.C.
Zero div. to left
Speed in FPM
GAMMA RAY
API UNITS



COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A 71

FIELD WILDCAT PROVINCE FEDERAL WATERS

SCHLUMBERGER

**SCHLUMBERGER**

# MICROLOG CALIPER

SCHLUMBERGER OF CANADA Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WALRUS A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

87° 10' 51'' WEST LONG
58° 30' 02'' NORTH LAT

Other Services: SRS DIL, SLC-GR, CAL FDC-GR, SNP, GRL, LL

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 8 SEPT 69 | | |
| Run No. | ONE | | |
| First Reading | 1998 | | |
| Last Reading | 1108 | | |
| Feet Measured | 890 | | |
| Depth Reached | 1999 | | |
| Bottom Driller | 2000 | | |
| Csg. SOC | 1108 | | |
| Csg. Driller | 1106 | | |
| Mud Nature | SALT-GEL-BARITE | | |
| Dens. \| Visc. | 10.2 \| 58 | \| | \| |
| Mud pH | 11.0 | | |
| " Water Loss | 48.0 | | |
| " Res. | 0.10 @ 70 °F | @ °F | @ °F |
| " " @ BHT | 0.09 @ 72 °F | @ °F | @ °F |
| " Rmf | 0.07 @ 70 °F | @ °F | @ °F |
| " Rmc | 0.19 @ 70 °F | @ °F | @ °F |
| Bit Size | RMKS | | |
| Mud Log: | | | |
| Rm | 0.1 | | |
| Limit | PROBABLE | | |
| Depth | 1320 | | |
| Opr. Rig Time | 3 HRS. | | |
| Truck No. | USU-C 285 | | |
| Recorded By | BERRY | | |
| Witness | RULFF | | |

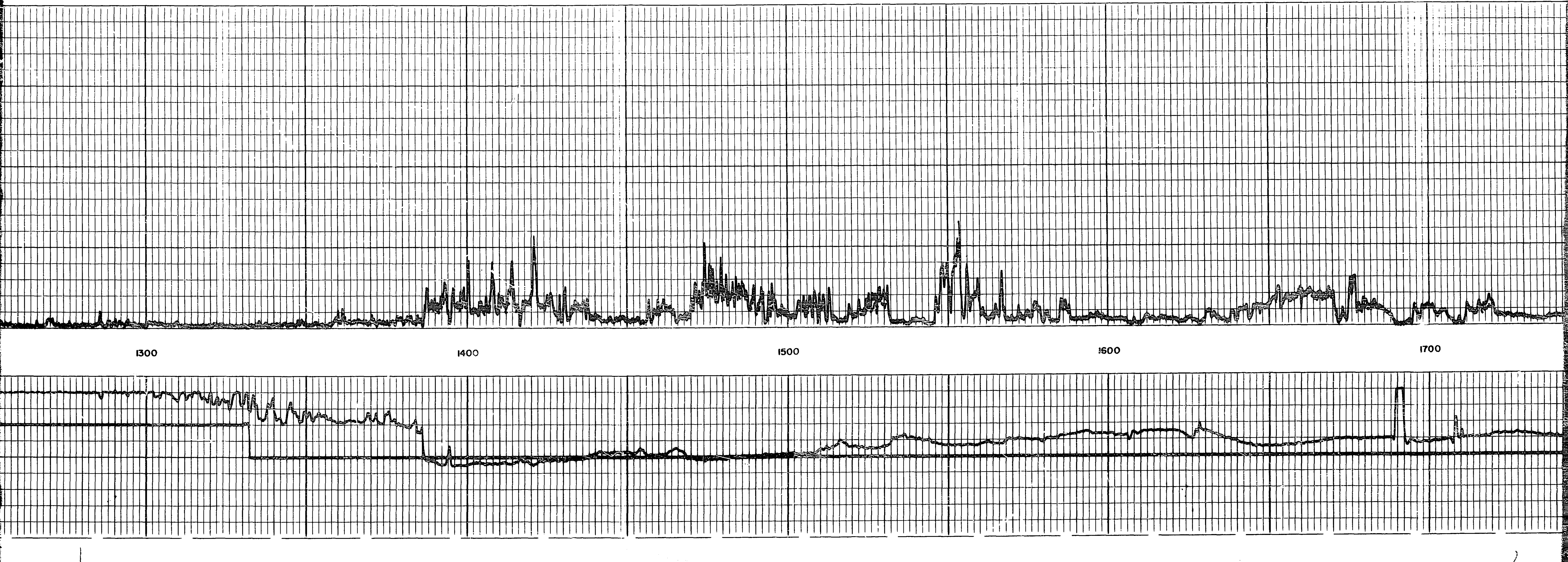
REMARKS

Drilling Stopped 2000 / 7th : Circulation Stopped 2200 / 7th : Tool on Bottom 1200 8th : 1st Run Service Order # 43873 B.H.T. 72 °F

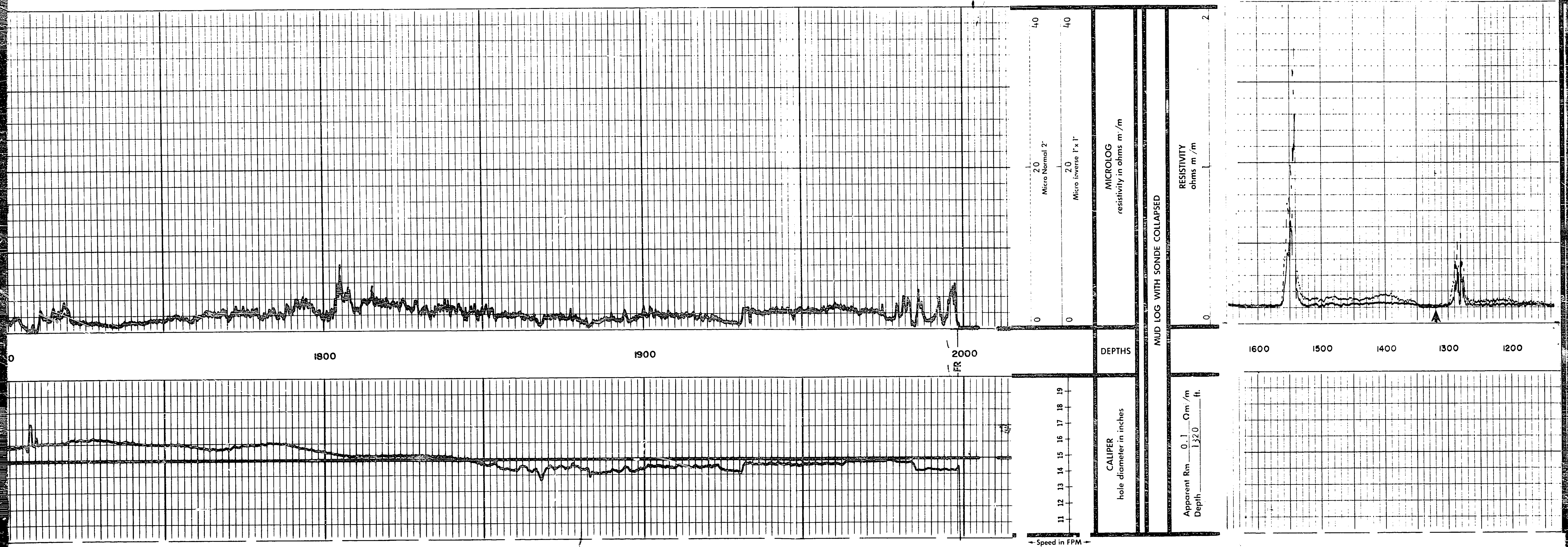
BIT SIZE: 17 1/2" TO 1333
15" TO TD

MCP # 507
PMS # B
Pad Type – Hydraulic

1 of



2 of



0
1800
1900
2000
FR
40
40
20
Micro Normal 2"
20
Micro inverse 1"x1"
0
0
MICROLOG
resistivity in ohms m²/m
DEPTHS
MUD LOG WITH SONDE COLLAPSED
RESISTIVITY
ohms m²/m
2
1
0
19
18
17
16
15
14
13
12
11
CALIPER
hole diameter in inches
← Speed in FPM →
Apparent Rm 0.1 Ωm²/m
Depth 1320 ft.
1600
1500
1400
1300
1200

2 of

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT **PROVINCE** FEDERAL WATERS

SCHLUMBERGER

**SCHLUMBERGER**

# LATEROLOG

SCHLUMBERGER OF CANADA — Calgary, Alberta

PROVINCE FEDERAL WATERS
FIELD WILDCAT
WELL AQUITAINE ET AL HUDSON WAL. . A 71
COMPANY AQUITAINE COMPANY OF CANADA LTD.

**COMPANY** AQUITAINE COMPANY OF CANADA LTD.

**WELL** AQUITAINE ET AL HUDSON WALRUS A 71

**FIELD** WILDCAT

**PROVINCE** FEDERAL WATERS

87° 10' 51" WEST LONG
58° 30' 02" NORTH LAT

Other Services: FDC SRS SNP, CAL, ML, SLC-GR, GRL, DIL

Permanent Datum SEA LEVEL Elev. 0
Log Measured From KB, 32 Ft. Above Perm. Datum

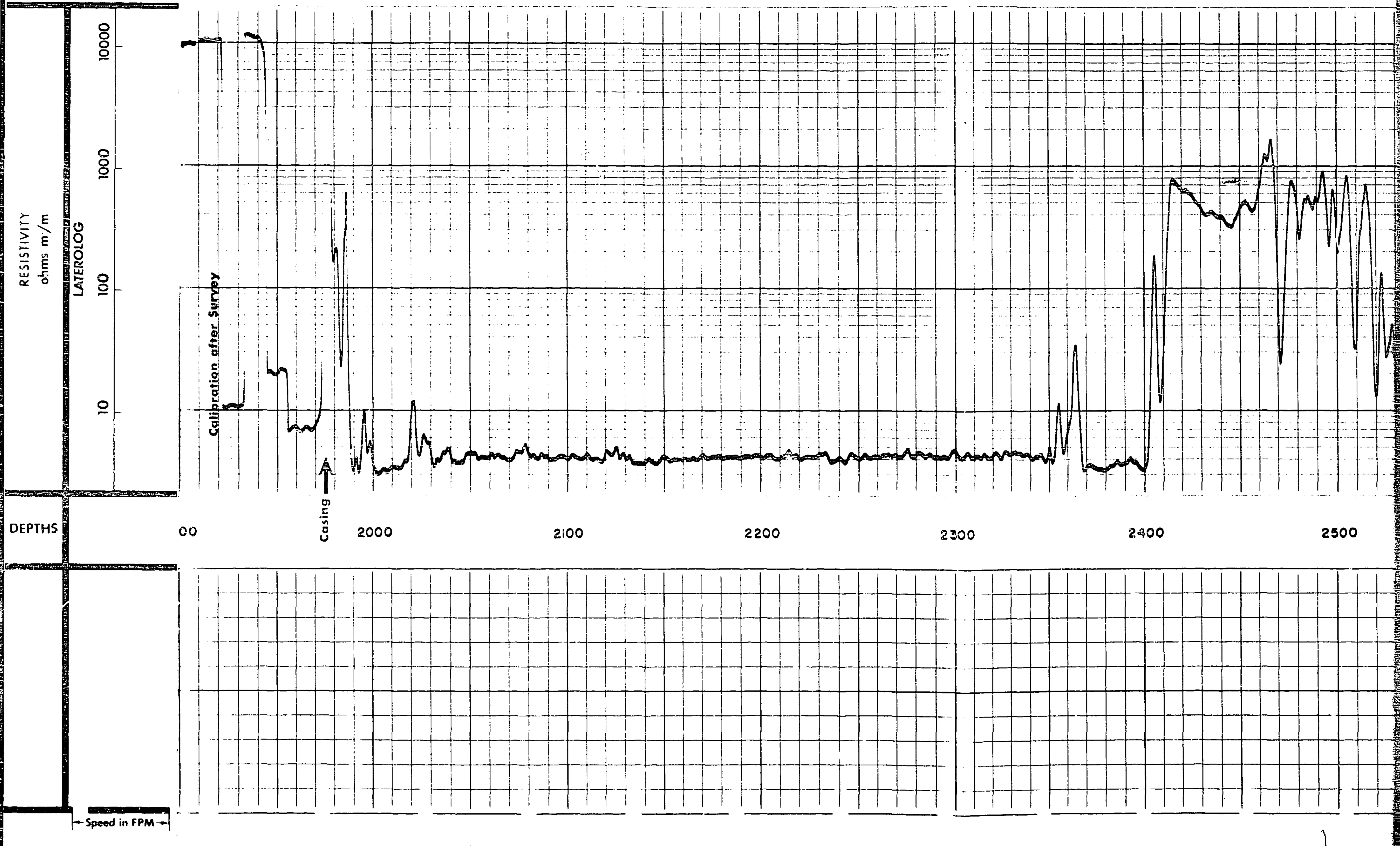
ELEV: KB 32
GL 0
CBF

| | | | |
|---|---|---|---|
| Date | 22 SEPT 69 | 11 OCT 69 | 15 OCT 69 |
| Run No. | ONE | TWO | THREE |
| First Reading | 2956 | 3723 | 3920 |
| Last Reading | 1975 | 2965 | 3650 |
| Feet Measured | 981 | 758 | 370 |
| Depth Reached | 2960 | 3728 | 3925 |
| Bottom Driller | 2959 | 3729 | 3926 |
| Csg. SOC | 1975 | 2965 | 2965 |
| Csg. Driller | 1975 | 2965 | 2965 |
| Mud Nature | SALT-GEL-BARITE | SALT-GEL-BARITE | SALT-GEL |
| Dens. \| Visc. | 14.0 \| 48 | 1.72 5.6 \| 70 | 14.5 \| 65 |
| Mud pH | 9.5 | 8.5 | 8.5 |
| " Water Loss | 13.0 | 14.4 | 29.0 |
| " Rm | 0.070 @ 48 °F | .103 @ 50 °F | .093 @ 54 °F |
| " Rmf | 0.044 @ 76 °F | – @ °F | – @ °F |
| " " @ BHT | 0.060 @ 50 °F | – @ °F | – @ °F |
| " Rmc | 0.100 @ 50 °F | – @ °F | – @ °F |
| Bit Size | 12 1/4" | 8 1/2" | 8 1/2" |
| | | | |
| Equipment Type | CLT-B | MPT | CLT-B |
| | | | |
| | | | |
| Opr. Rig Time | 3 HRS. | 1.5 HRS. | 2 HRS. |
| Truck No. | OSU-C 285 | OSU-C285 | OSU-C285 |
| Recorded By | BERRY | STUEHMER | STUEHMER |
| Witness | RUEFF | RUEFF | RUEFF |

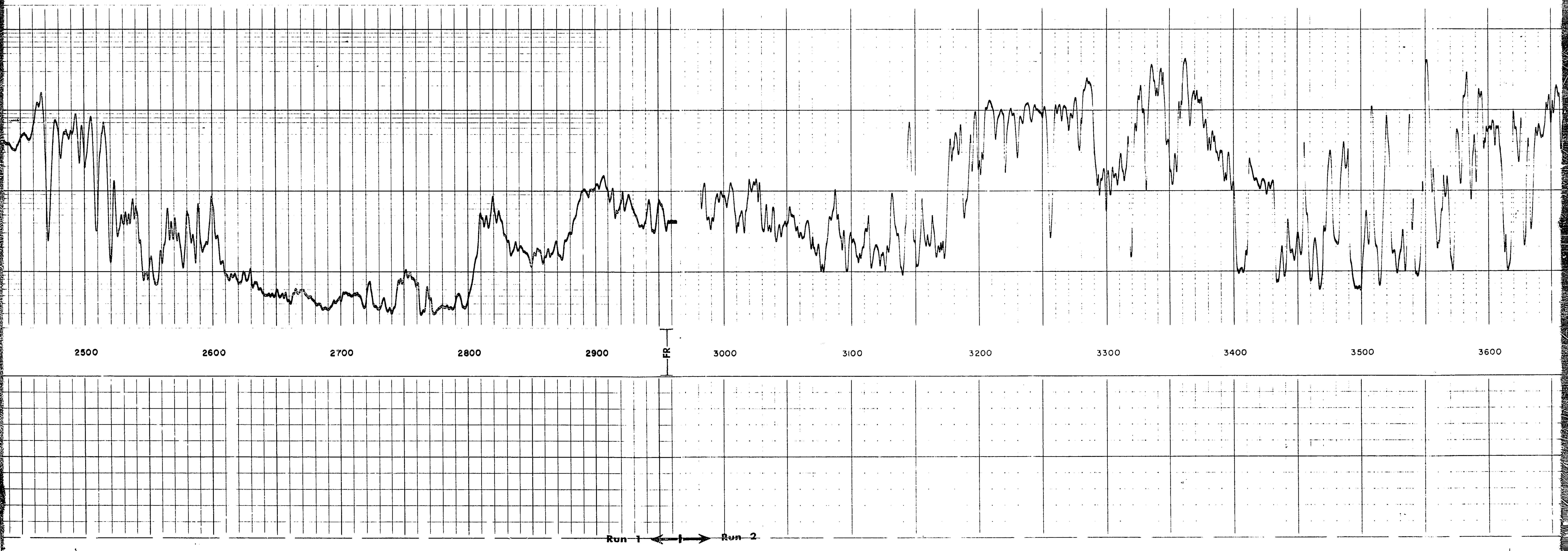
1st Run Service Order # 43878
B.H.T. 70° °F

REMARKS RUN 2 2 OCT 69 CAL RS
Drilling Stopped RUN 3 / : Circulation Stopped 2300 / 10th : Tool on Bottom 0200 / 11th : 1700 15th

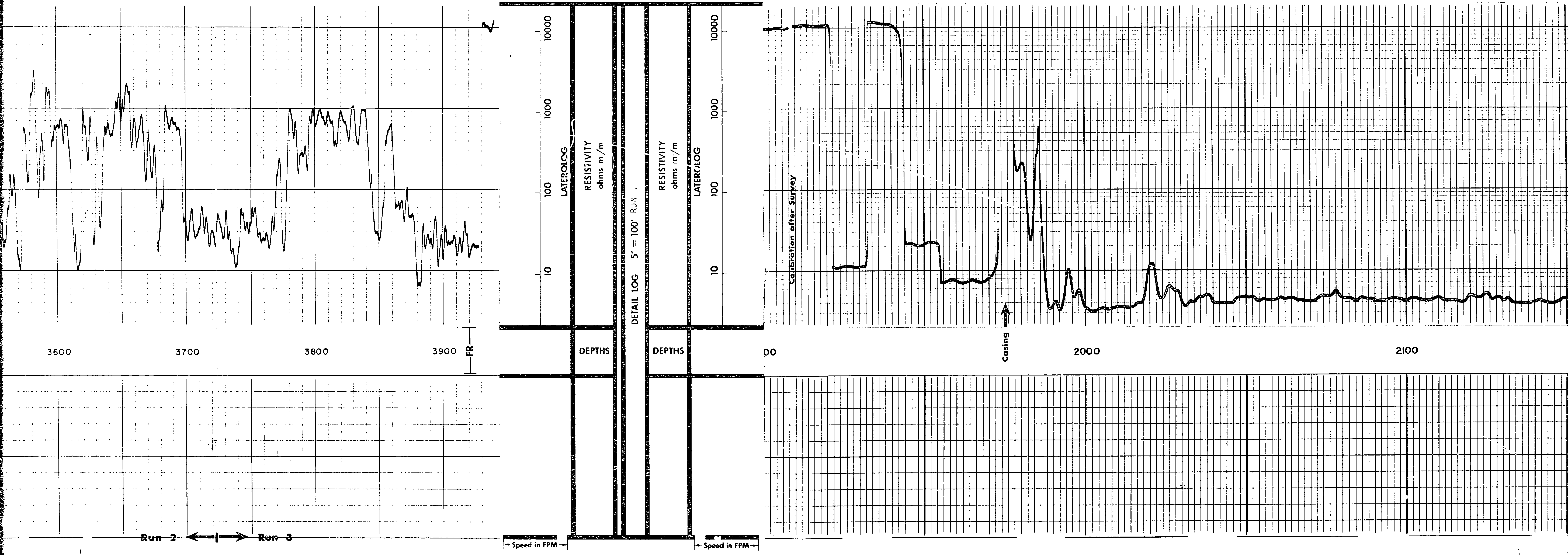
Cartridge No.
Panel No. MPP-H138 MPP-B138
Sonde No.



1 of

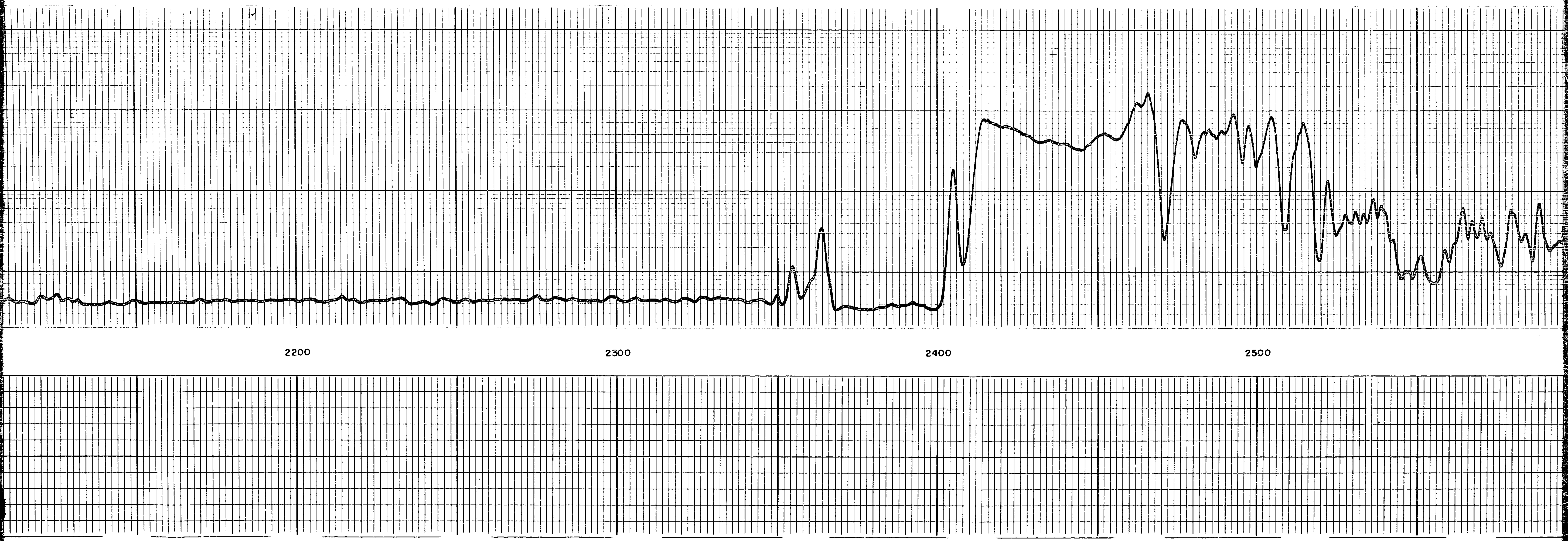

2500
2600
2700
2800
2900
FR
3000
3100
3200
3300
3400
3500
3600
Run 1
Run 2

2 of

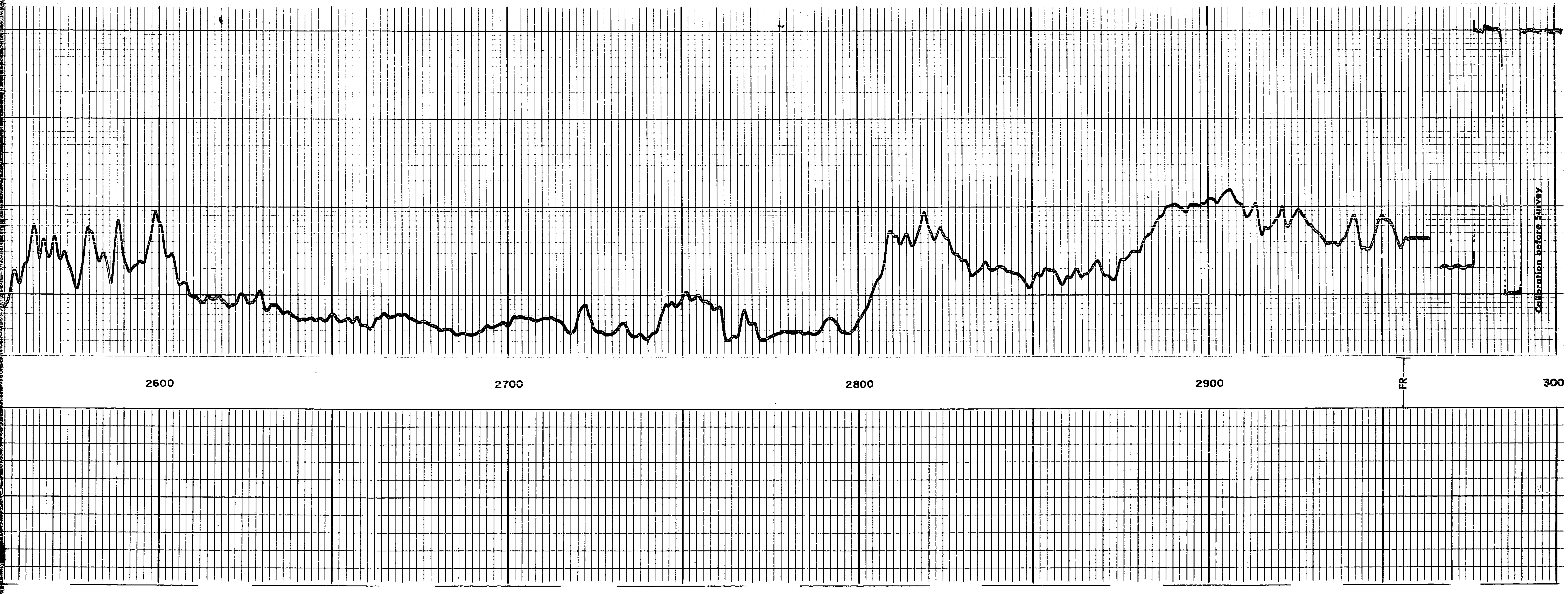


3600
3700
3800
3900
FR
Run 2
Run 3
10000
1000
100
10
LATEROLOG
RESISTIVITY
ohms m/m
DETAIL LOG 5" = 100' RUN
DEPTHS
Speed in FPM
Calibration after Survey
Casing
00
2000
2100

2 of

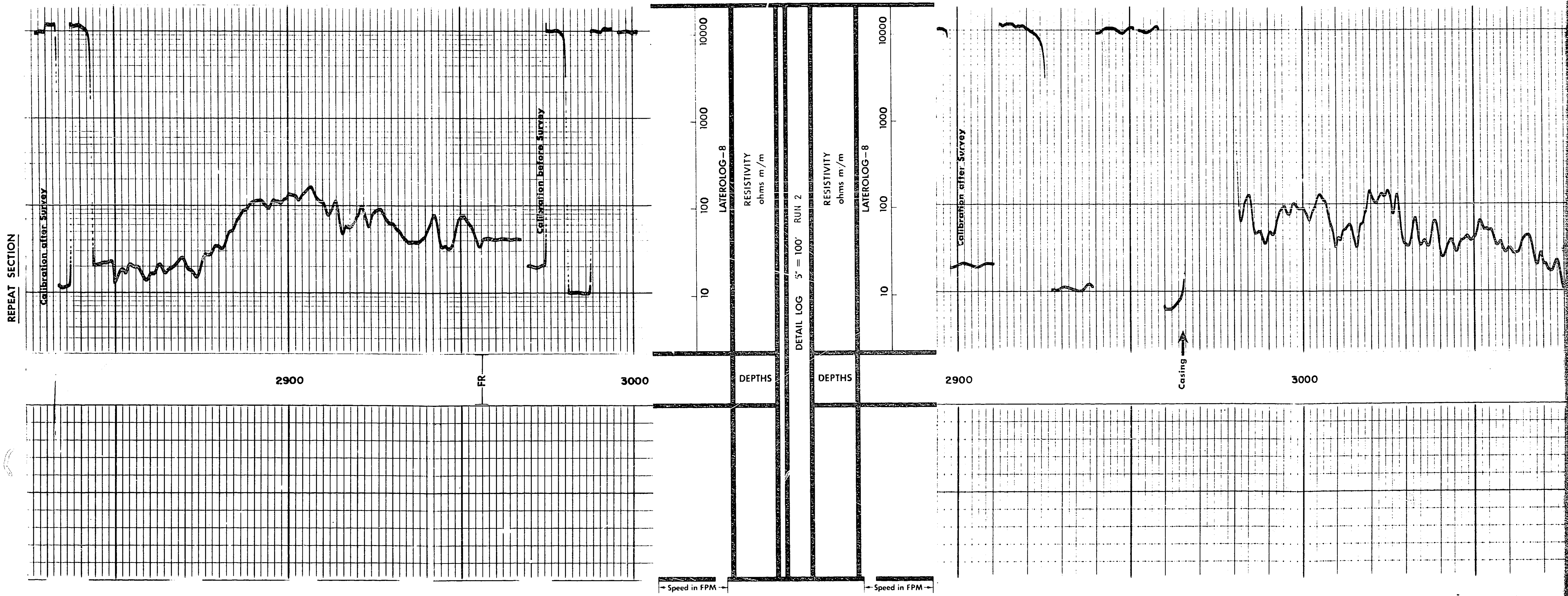


H %

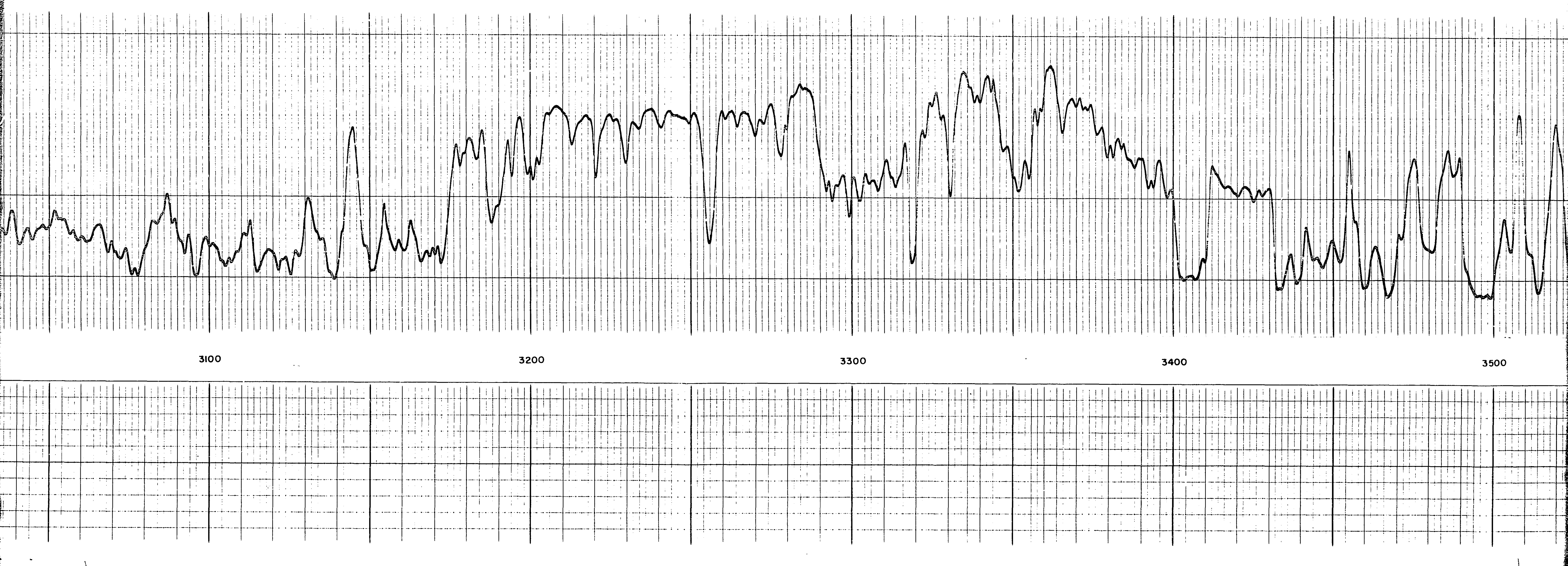


REPEAT SECTION

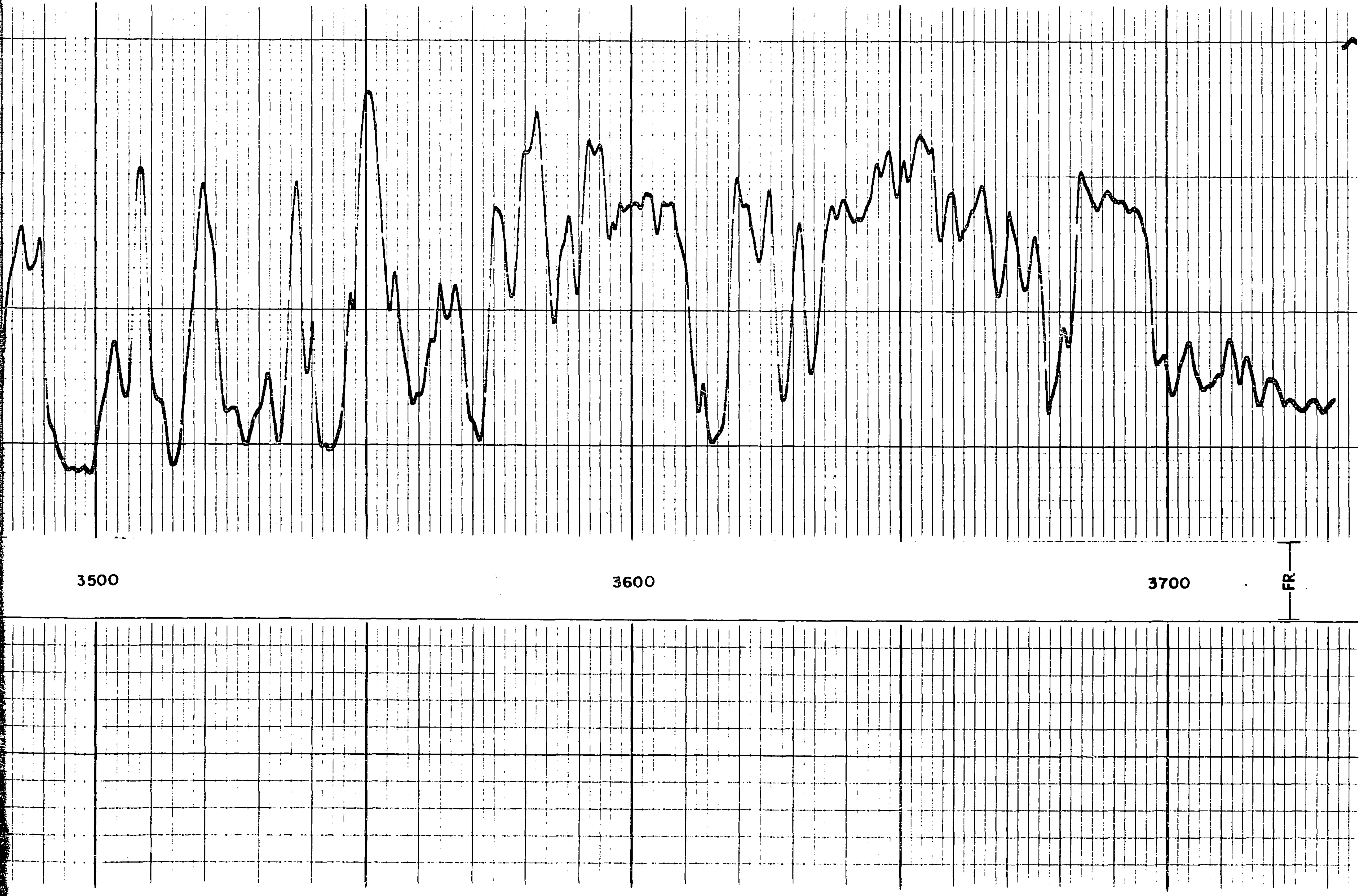
5 of

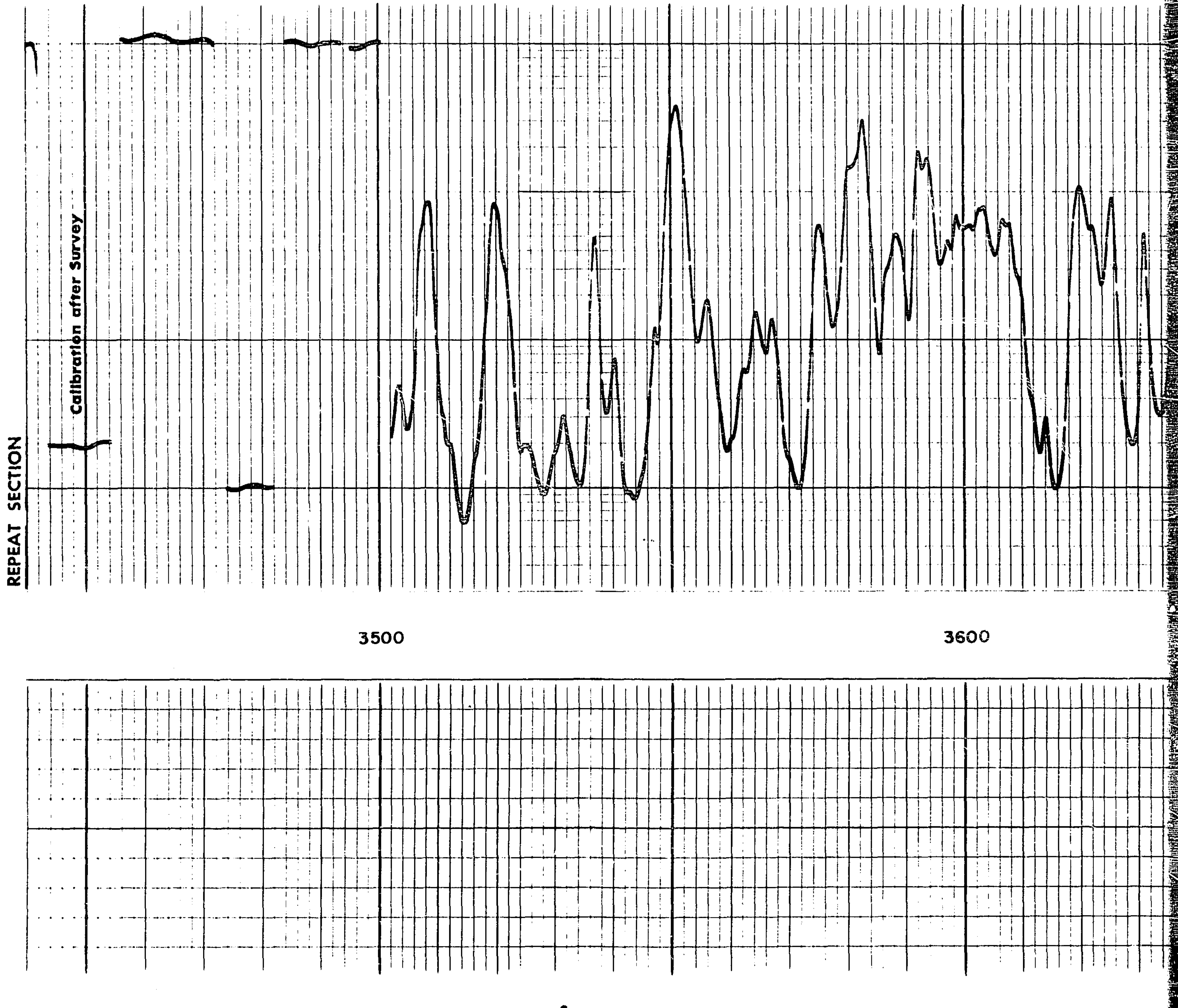

REPEAT SECTION
Calibration after Survey
Calibration before Survey
2900
FR
3000
10000
1000
100
10
LATEROLOG-8
RESISTIVITY
ohms m/m
DETAIL LOG 5" = 100' RUN 2
DEPTHS
DEPTHS
RESISTIVITY
ohms m/m
LATEROLOG-8
10000
1000
100
10
Speed in FPM
Speed in FPM
Calibration after Survey
Casing
2900
3000

6 of

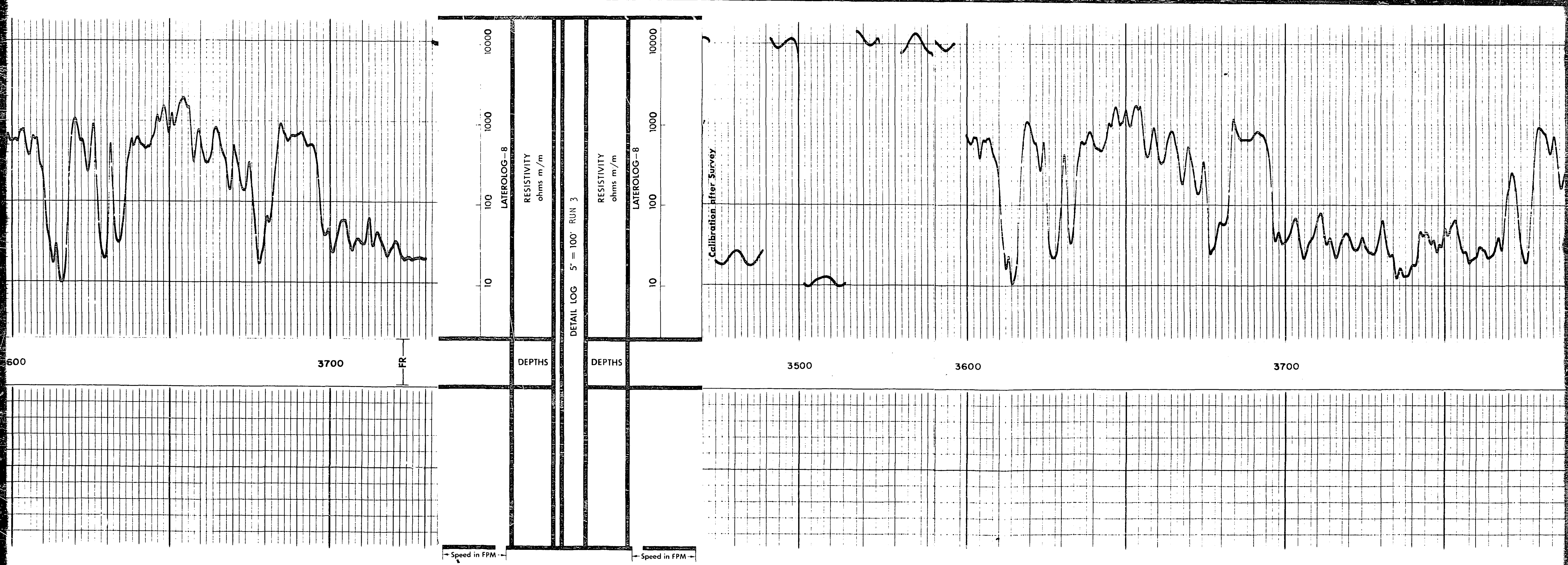


707

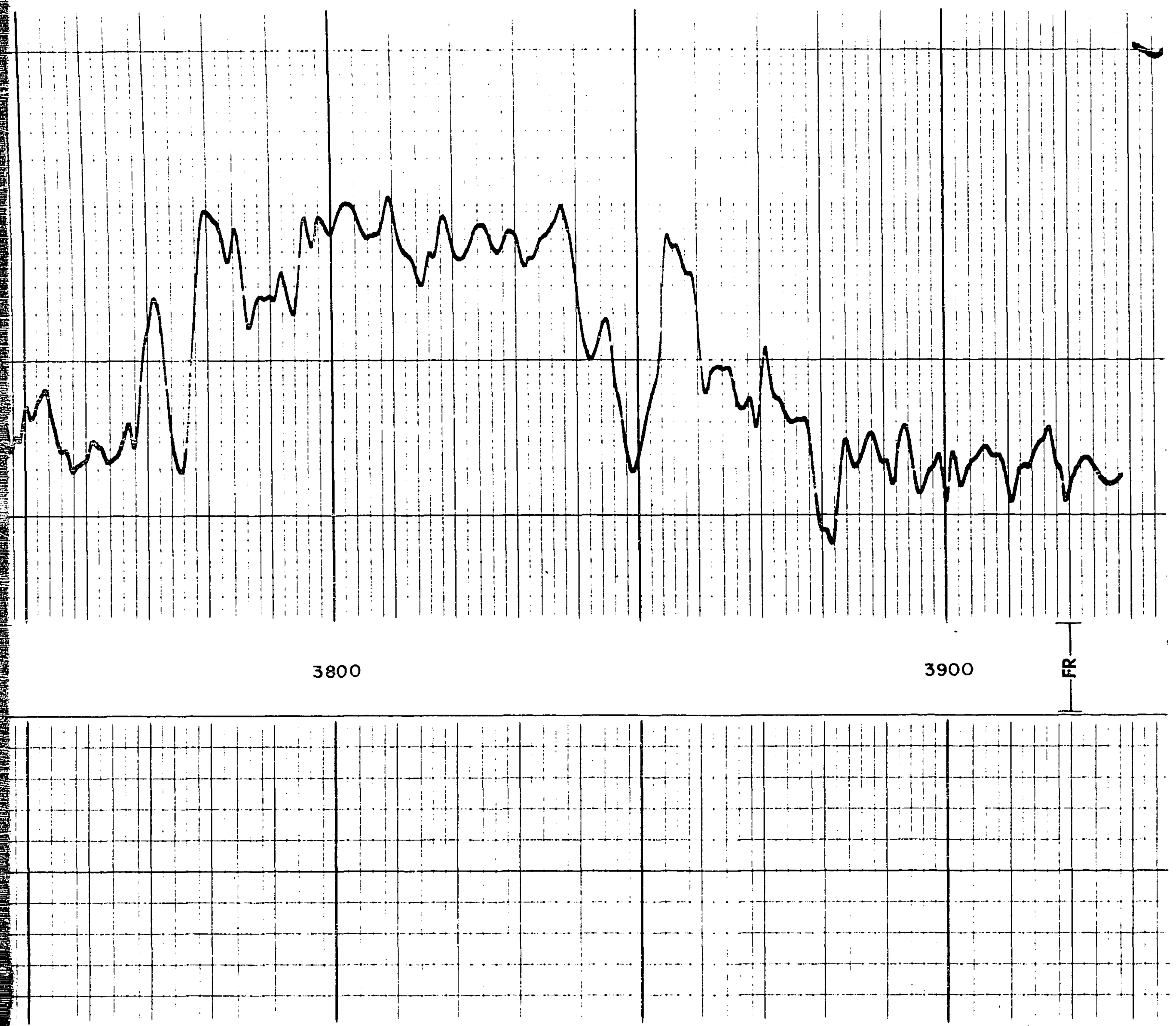

3500
3600
3700
FR

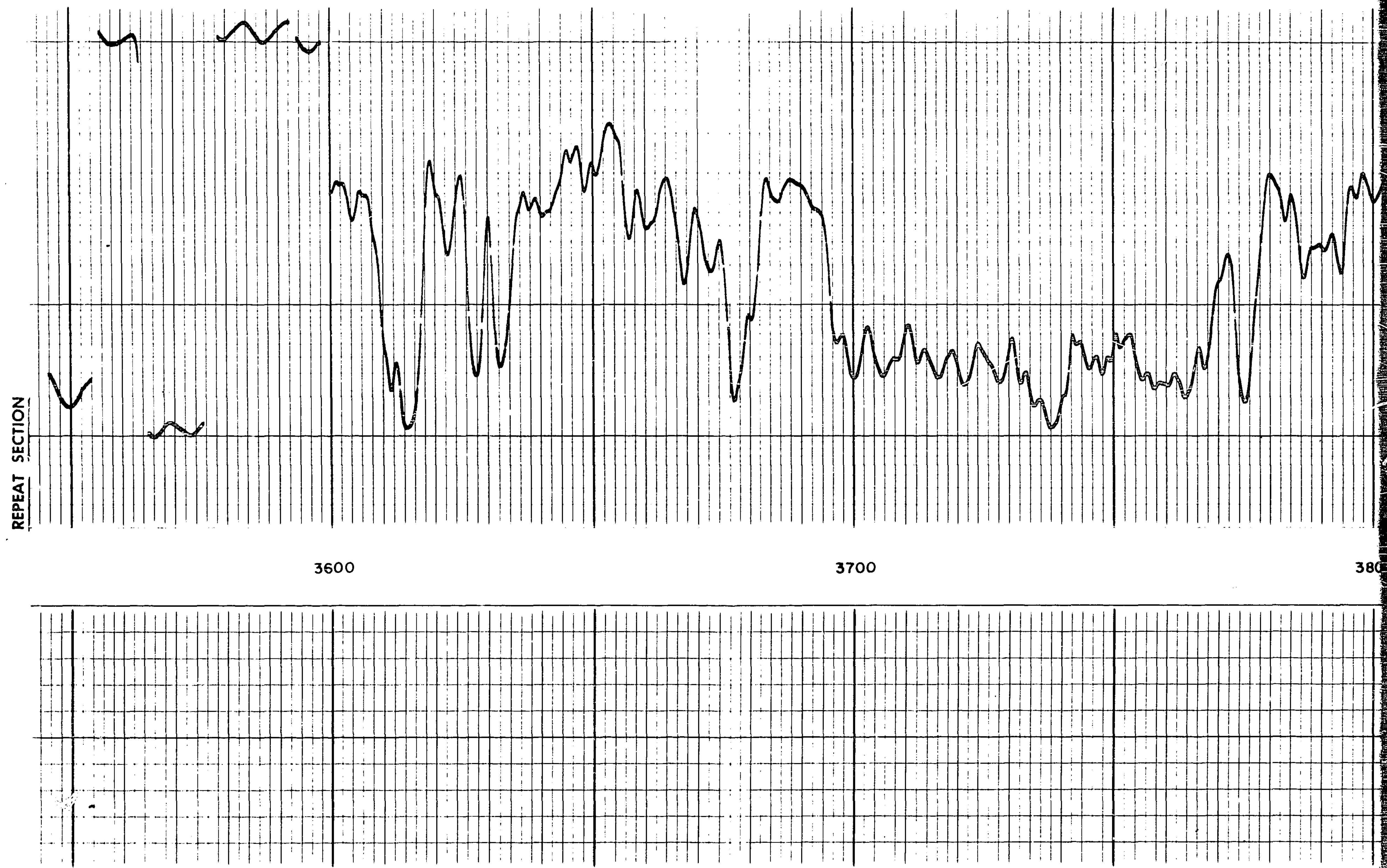

REPEAT SECTION
Calibration after Survey
3500
3600

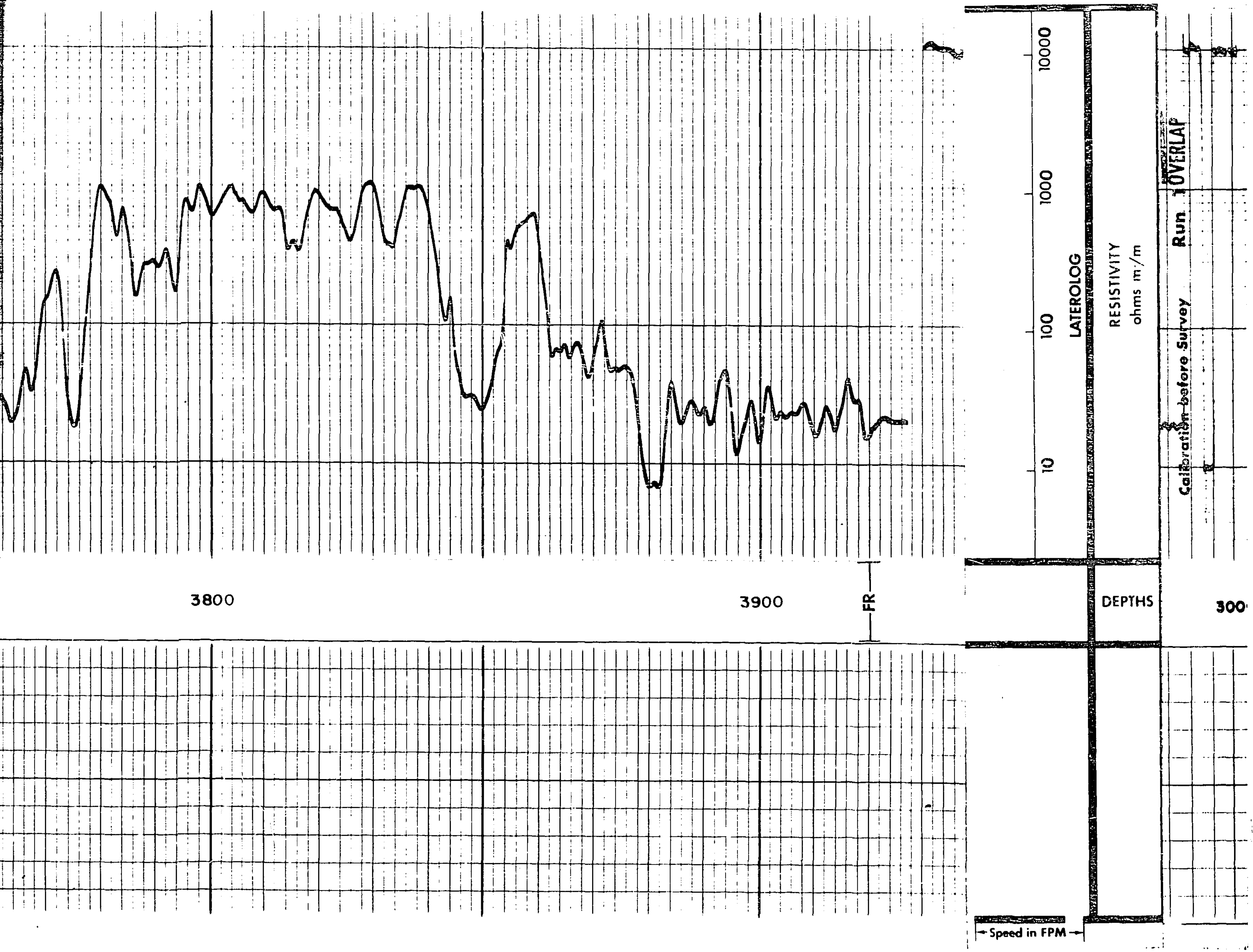
8 of

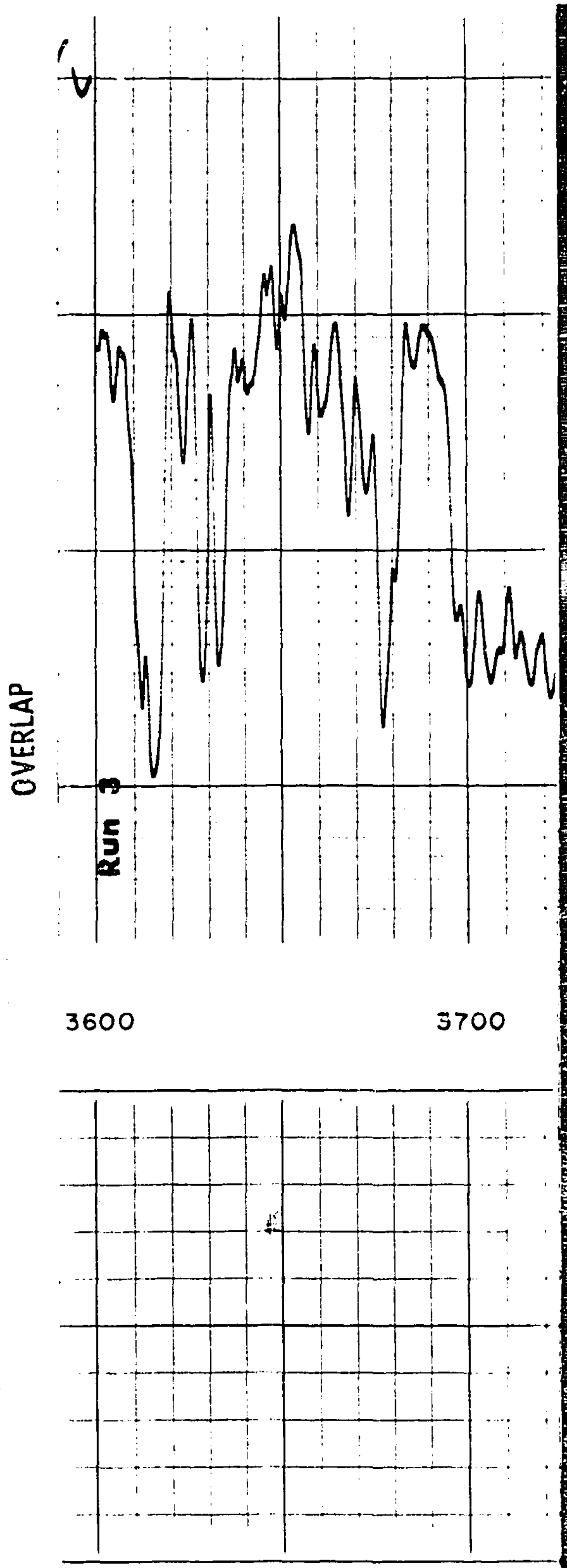

600
3700
FR
10000
1000
100
10
LATEROLOG-8
RESISTIVITY
ohms m/m
DEPTHS
DETAIL LOG 5' = 100' RUN 3
DEPTHS
RESISTIVITY
ohms m/m
LATEROLOG-8
10000
1000
100
10
Speed in FPM
Speed in FPM
Calibration after Survey
3500
3600
3700

9 of


3800
3900
FR


REPEAT SECTION
3600
3700
380





SCHLUMBERGER

COMPANY AQUITAINE COMPANY OF CANADA LTD.

WELL AQUITAINE ET AL HUDSON WALRUS A 71

FIELD WILDCAT PROVINCE FEDERAL WATERS