

OIL CONSERVATION ENGINEER
Department of Indian Affairs and Northern Development
112-11th Avenue S.E.
Calgary 21, Alberta

WELL HISTORY REPORT

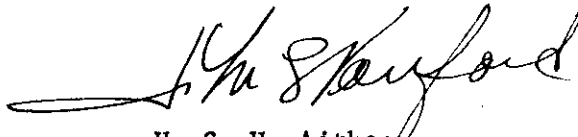
ON

MOBIL INC NCO SUN ONTADEK LK N-39

Edmonton, Alberta

Date Approved August 26, 1970

Approved By


for H. S. H. Aitken
Production Superintendent

CONFIDENTIAL

By R. Weir
W. G. Ross

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Core Descriptions

D.S.T. #1 Analysis

D.S.T. #2 Analysis

Water Analysis

ONTADEK LK.N-39
SUMMARY OF WELL DATA

SECTION I

- (a) Mobil INC NCO Sun Ontadek Lk. N-39
- (b) Permittee
Chevron Standard Limited
- (c) Operator
Mobil Oil Canada, Ltd.
Calgary Place
Post Office Box 800
Calgary, Alberta
- (d) Location
Unit N Section 39 Grid 66° 20' N - 128° 15' W
Latitude 66° 18' 45.295" Longitude 128° 21' 38.737"
Universal well location reference: Lat. 66.31258° N
Long. 128.36075° W
Unique well identifier: 300N396620128150
- (e) Coordinates
Not a development well
- (f) Permit No.
3915
- (g) Drilling Contractor
Nabors Drilling Ltd. Rig 8
- (h) Drilling Authority
435
April 3, 1970
- (i) Classification
New field wildcat
- (j) Elevations
Ground 301'
K.B. 319'
- (k) Spud Date
April 13, 1970
- (l) Completed Drilling
May 27, 1970

(m) Total Depth
5900 (-5582) Driller
5901 (-5583) Dresser Atlas

(n) Well Status
Dry and abandoned

(o) Rig Release Date
May 30, 1970 Midnight

(p) Hole Sizes
0 - 77' 20"
77 - 710' 12 1/4"
710 - T.D. 8 3/4"

(q) Casing
77' of 16" conductor
710' of 9 5/8" casing J-55 36.0 wt. 8 round short collars

SECTION IIGEOLOGICAL SUMMARY(a) Formation Tops

	<u>E-Log Tops</u>	<u>Sample Tops</u>
Hare Indian	242 (+77)	298 (+21)
Bituminous Zone	None	485 (-166)
Hume	578 (-259)	575 (-256)
Gossage	930 (-611)	None
L. Gossage	1352 (-1033)	1390 (-1071)
Ronning	2114 (-1795)	2140 (-1821)
Cambrian	4320 (-4001)	4071 (-3752)
Cambrian Salt	4512 (-4193)	None
Base Cambrian Salt	5371 (-5052)	None

(b) Cored Intervals

<u>Core</u>	<u>Interval</u>	<u>Recovery</u>	<u>% Rec.</u>	<u>Formation</u>
1	1443 - 1455	8'	66	Gossage
2	1456 - 1472	15'	94	Gossage
3	1472 - 1482	8.8'	88	Gossage
4	1482 - 1504	21'	96	Gossage
5	1505 - 1531	25.7'	99	Gossage
6	2220 - 2230	7'	70	Ronning
7	2231 - 2234	0.5'	17	Ronning
8	2234 - 2241.5	7.5'	100	Ronning
9	2243 - 2272.5	29.5'	98	Ronning
10	2274 - 2285	11'	100	Ronning
11	5880 - 5898	17'	95	Cambrian

(c) Core Descriptions

See attached.

(d) Sample Description

See attached.

(e) Paleontological Determinations

None.

CORE DESCRIPTIONS

CORE #1 1443 - 1455 - Recovery 8 feet (66%)

Dolomite medium brown, fine to medium crystalline, dense, compact. Coarsely laminated with fairly frequent stylolites parallel to bedding. Some intercrystalline and vuggy porosity. Occasional small vertical fractures.

Drilling time in minutes per foot.

24, 28, 20, 25, 25, 35, 31, 58, 33, 36, 44 & 83.

CORE #2 1456 - 1472 - Recovery 15 feet (94%)

1456 - 1459.3 - Dolomite light grey-brown, very fine to medium crystalline. Abundant large stylolites and solution breccias. Trace of intercrystalline and vuggy porosity.

1459.3 - 1459.5 - Shale, grey-green, waxy.

1459.5 - 1468.7 - Dolomite, medium brown, fine to medium crystalline, mostly composed of layered algal (stromatolitic) material. Fair intercrystalline and vuggy porosity in places. Porosity tends to be related to algal layering.

1468.7 - 1470.8 - Dolomite, light grey-brown, finely crystalline, abundant solution structures, waxy green shale intervals. Dense, compact and generally tight.

1470.8 - 1472 - Dolomite, medium brown, finely to medium crystalline, Some intercrystalline and vuggy porosity. Several small vertical fractures.

Drilling time in minutes per foot.

50, 18, 12, 15, 22, 21, 24, 28, 25, 20, 25, 30, 28, 27 & 35.

CORE #3 1472 - 1482 - Recovery 8.8 feet (88%)

1472 - 1472.3 - Dolomite, medium brown, very fine to fine crystalline, dense, compact; many small high angle fractures lined with dolomite crystals.

1472.3 - 1472.6 - Grey waxy shale and dolomite.

1472.6 - 1482 - Dolomite, light to medium brown, very fine to fine crystalline; frequent layered algal structures, small vertical fractures, stylolites. Scattered vuggy porosity, otherwise dense and compact. Vugs often pass into incipient vertical fractures and appear to be related to solution structures.

Drilling time in minutes per foot.

65, 30, 25, 25, 25, 23, 27, 30, 25 & 55.

CORE #4 1482 - 1504 - Recovery 21 feet (96%)

1482 - 1493.7 - Dolomite, light to medium grey-brown, very fine to fine crystalline, abundant stylolites with thin intervals of related grey waxy shales. Some high angle fractures. Occasional vuggy porosity.

1493.7 - 1502.5 - Dolomite, medium brown, fine to medium crystalline, some stylolites. Fair vuggy and some intercrystalline porosity. Several clean, high angle fractures.

1502.5 - 1504 - Dolomite, medium brown, very fine crystalline, abundant stylolites and green waxy shale, fractured, tight.

Drilling time in minutes per foot.

51, 23, 20, 20, 25, 27, 27, 28, 27, 28, 27, 21, 24, 24, 26, 22, 26, 27, 25, 25, 85 & 70.

CORE #5 1505 - 1531 - Recovery 25.7 feet (99%)

1505 - 1509.6 - Dolomite, medium brown, very fine to medium crystalline, algal layering, brecciated. Abundant stylolites. Trace intercrystalline porosity, generally tight.

1509.6 - 1511 - Dolomite, light grey-brown, very fine crystalline, brecciated, stylolitic, tight.

1511 - 1531 - Dolomite, light to medium grey-brown and brown, very fine to medium crystalline, layered, brecciated, much of breccia blocks clearly algal - stromatolitic. Very abundant stylolites. Dense and compact. Occasional traces of intercrystalline porosity, generally tight.

Drilling time in minutes per foot.

35, 20, 24, 23, 18, 15, 20, 17, 18, 17, 18, 18,
17, 17, 18, 18, 27, 29, 27, 27, 27, 30, 30, 42,
38, & 35.

CORE #6 2220 - 2230 - Recovery 7 feet (70%)

2220 - 2221.6 - Dolomite, light to medium grey and grey-brown, very fine crystalline, abundant fossils including horn corals, gastropods, stromatoporoids and crinoid ossicles. Abundant stylolites, tight.

2221.6 - 2224 - Dolomite, light to medium brown, fine crystalline, abundant organic material including well preserved colonial corals, Favositids and chain corals, Catenipora sp. (Upper Ordovician). Fair vuggy porosity, mainly intra-organic.

2224 - 2226.6 - Dolomite, light to medium brown, fine to medium crystalline. Sucrose. Good inter-crystalline porosity. Much of rock is dolomitized organic material, probably coelenterates.

2226.6 - 2230 - Dolomite, medium brown, fine crystalline, mainly dense with minor vuggy porosity.

Drilling time in minutes per foot.

60, 41, 24, 18, 14, 16, 17, 21, 35 & 49.

CORE #7 2231 - 2234 - Recovery 0.5 feet (17%)

Dolomite, medium brown, fine crystalline, dense. Some vuggy porosity.

Drilling time in minutes per foot.

32, 23, & 50.

CORE #8 2234 - 2241.5 - Recovery 7.5 feet (100%)

2234 - 2235.5 - Dolomite, light brown, fine to medium crystalline, even grained, mainly sucrose. Very fossiliferous, mainly corals, mottled appearance. Good intercrystalline porosity.

2235.5 - 2241.5 - Dolomite, light brown, fine crystalline, fossiliferous, silicified, some horn corals. High angle fractures, scattered vuggy and intercrystalline porosity.

Drilling time in minutes per foot.
34, 40, 42, 55, 73, 62 & 88.

MOBIL INC NCO SUN ONTADEK LK. N-39

CORE DESCRIPTIONS

CORE #9 2243 - 2273' - Recovered 29.5 feet (98%)

2243. - 2249.8 Dolomite, light brown, fine to medium crystalline dense, fossiliferous - abundant crinoid ossicles, gastropods, large orthid brachiopods and colonial corals, including chain corals (Catenipora sp.) - compact, stylolitic, large lumps of pyrite, occasional large cavities.

2249.8 - 2252.3 Dolomite, light grey, very fine crystalline, dense, compact, stylolitic.

2252.3 - 2273 Dolomite, cream and light grey, very fine to coarse crystalline, argillaceous, abundant grey-green shaly partings, silty in places, abundant stylolites, frequent crystals and lumps of pyrite, bands and nodules of reddish (iron) stained dolomite, brecciated, mud clasts amongst coarser dolomite. Dense and tight, with occasional vugs in the lower part.

Drilling time in minutes per foot.

65, 48, 58, 53, 59, 69, 73, 44, 38, 36, 32, 55, 38, 49, 49, 46, 56, 54, 65, 50, 57, 82, 31, 33, 39, 38, 42, 36, 36 & 37.

CORE #10 2274 - 2285' - Recovered 11 feet (100%)

2274 - 2280 Dolomite, light grey, fine to coarse crystalline, mottled due to burrowing, dense, compact, fractured, scattered vugs but generally tight. Occasional greenish grey waxy shale partings.

2280 - 2285 Dolomite, light grey, very fine to fine crystalline, mottled, burrowing. Red ironstained bands, dense, compact, tight.

Drilling times in minutes per foot.

68, 30, 25, 26, 22, 25, 32, 35, 35, 36 & 36.

CORE DESCRIPTION

CORE #11 5880 - 5898' Recovered 17 feet (95%)

D = 5900'

17' Dolomite, dark grey to black, cryptocrystalline, silty, only slightly argillaceous, slightly pyritic with finely disseminated pyrite crystals, siliceous in part. Bedding is in irregular wavy planes marked by thin argillaceous, somewhat carbonaceous partings inclined about 30 - 45° to axis of core. Few pyrite patches on some of the bedding planes.

Entire core is cut by thin (up to 1/8" thick) fractures filled with white crystalline dolomite. In the upper 6' fracture fillings have a red argillaceous content. Fractures show no preferred orientation but generally run at steep angles to the core and often run normal to the bedding. In the upper 6' fractures so numerous that core is brecciated. Core is badly broken along fractures and bedding planes. Bedding plane breaks often show slickensiding. Fracture plane breaks show lining of white crystalline dolomite.

No porosity (except possibly fracture porosity?). No oil staining.

SECTION III

ENGINEERING SUMMARY

(a) Report of Drill Stem Tests

DST #1 1389.5 - 1443

Good initial puff, strong blow. Water to surface in 45 mins.
Preflow 5 mins., initial shut-in 95 mins. Final shut in
140 mins. Recovery 180' mud, 1163' fresh sulphurous water.
ISIP 640 PSI, FSIP 640 PSI.
IFP 40 PSI, FFP 640 PSI.
Tool open 95 mins. Field Figures

DST #2 2170' - 2220'

Preflow 10 mins., initial shut-in 60 mins., valve open 60 mins.,
final shut-in 90 mins.
Recover: 10' mud, 700' fresh sulphurous water. Tool partially
plugged.
ISIP 980 PSI, IFP 120 PSI FFP 360 PSI, FSIP 980 PSI. Field Figures

- Also see attached.

DRILL-STEM TEST DATA

Well Name <u>Mobil INC NCO SUN ONTADÉK LAKE</u>		Test No <u>ONE</u>
Well Number <u>66 20 N - 128 15 W</u>		Zone Tested
Company <u>Mobil Oil Canada Ltd.</u>		Interval <u>1390 - 1443</u>
Comp Rep <u>Harry Martinoff</u>	Tester <u>Mel Moscrip</u>	Date <u>April 26/70</u>

Type of Test Dual Bottom Hole Butch Smestad
 RFS Tool No 53 & 55

Pretlow 5 mins ISI 97 mins Flow 93 mins FSI 14.1 mins

Specify Inside or Outside	INS REC No <u>1030</u>	OUT REC No <u>2012</u>	REC No
	<u>6259</u> RANGE <u>12</u> HR CLOCK	<u>5797</u> RANGE <u>12</u> HR CLOCK	RANGE _____ HR CLOCK
DEPTH	<u>1372</u>	<u>1402</u>	
Initial Hydro Mud Press	<u>611</u>	<u>630</u>	
Initial Shut-In Press	<u>617</u>	<u>636</u>	
Initial Flow Press	<u>378</u>	<u>400</u>	
Final Flow Press	<u>617</u>	<u>636</u>	
Final Shut In Press	<u>617</u>	<u>636</u>	
Final Hydro Mud Press	<u>611</u>	<u>630</u>	

Mud Drop Nil Fluid Loss _____ Mud Weight 8.8

Viscosity 38 Temperature °F 70 Net Pay Tested _____

Top Packer Depth 1384' Bottom Packer Depth 1390' Total Depth 1443'

Drill Pipe Size 3 1/2" IF Wt. _____ Drill Collar I.D. 2 7/8" Ft. Run 623

Surface Choke Size Open Bottom Choke Size 1/2" Main Hole Size 8 1/2"

Anchor Size 4 1/2" Rat Hole Size _____ Feet of Rat Hole _____

Cushion Amount _____ Type _____ Rubber Size 7 1/2" X 2

Fluid Recovery Total Feet Fluid to surface

Recovered 180 Feet of Drilling mud

Recovered 1163 Feet of Sulphurous water

Recovered _____ Feet of _____

Recovered _____ Feet of _____

Recovered _____ Feet of _____

Gas Recovery _____ How Measured _____ Riser size: _____

_____ mins	Temp. °F	Press Rdg. _____ psi	Orifice Size _____	= _____ MCF/Day
_____ mins	Temp. °F	Press Rdg. _____ psi	Orifice Size _____	= _____ MCF/Day
_____ mins	Temp. °F	Press Rdg. _____ psi	Orifice Size _____	= _____ MCF/Day
_____ mins	Temp. °F	Press Rdg. _____ psi	Orifice Size _____	= _____ MCF/Day
_____ mins	Temp. °F	Press Rdg. _____ psi	Orifice Size _____	= _____ MCF/Day
_____ mins	Temp. °F	Press Rdg. _____ psi	Orifice Size _____	= _____ MCF/Day

Bleed Off Time for Drill Pipe _____

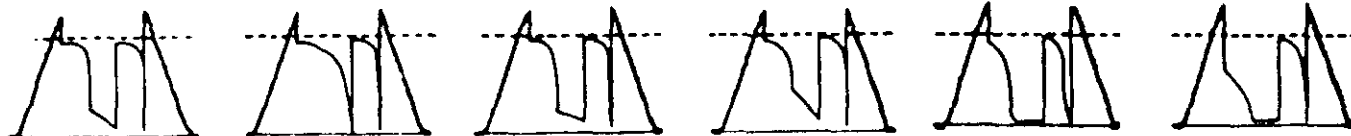
REMARKS Good initial puff. Strong air blow. Fluid to surface in 45 min.



TESTING REPORT

	45 LANDING SUB		
	45 CHAMBER		
	45 TOOL OR P.O. SUB	1.00	
	CO SUB	1.00	
	SHUT IN TOOL	5.20	
	R.F.S. No. 55	3.30	
	R.F.S. No. 53	3.30	
	HYDRAULIC TOOL	7.20	
	JARS	6.00	
	RECORDER No. 1030	5.00	DEPTH 1373
	RECORDER No.		DEPTH
	SAFETY JOINT	1.75	
	BY PASS SUB		
1. PACKER DEPTH 1384	PACKER	6.00	
2. P. R DEPTH 1390	PACKER	5.00	TOTAL TOOL ABOVE INTERVAL 44.75
		1.00	
	ANCHOR—SPECIFY		
	BLANK OFF OR BY PASS SUB		
	RECORDER No.		DEPTH
3. PACKER DEPTH	PACKER		TOTAL INTERVAL 53.84
4. PACKER DEPTH	PACKER		
	ANCHOR—SPECIFY Perf	10.00	
	RECORDER No. 2012	5.00	DEPTH 1402
	Perf	5.00	
	Single	30.84	
TOTAL DEPTH 1443	BULLNOSE	2.00	TOTAL TAIL PIPE 53.84
			TOTAL TEST TOOL 98.59

DST CHARTS FOR COMPARATIVE VISUAL ANALYSIS



B

HIGH PERMEABILITY STRONG DAMAGE EFFECT HIGH PERMEABILITY NO DAMAGE EFFECT MEDIUM PERMEABILITY STRONG DAMAGE EFFECT MEDIUM PERMEABILITY NO DAMAGE EFFECT LOW PERMEABILITY STRONG DAMAGE EFFECT LOW PERMEABILITY NO DAMAGE EFFECT



DST PRESSURE INCREMENTS

Recorder No. 1030

Depth 1372

Points	INITIAL CIP				FINAL CIP			
	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG
1	0			359	0			617
2	5			617	5			617
3	10			617	10			617
4	15			617	15			617
5	20			617	20			617
6	25			617	25			617
7	30			617	30			617
8	35			617	35			617
9	40			617	40			617
10	45			617	45			617
11	50			617	50			617
12	55			617	55			617
13	60			617	60			617
14	65			617	65			617
15	70			617	70			617
16	75			617	75			617
17	80			617	80			617
18	85			617	85			617
19	90			617	90			617
20	95			617	95			617
21	97			617	100			617
22					105			617
23					110			617
24					115			617

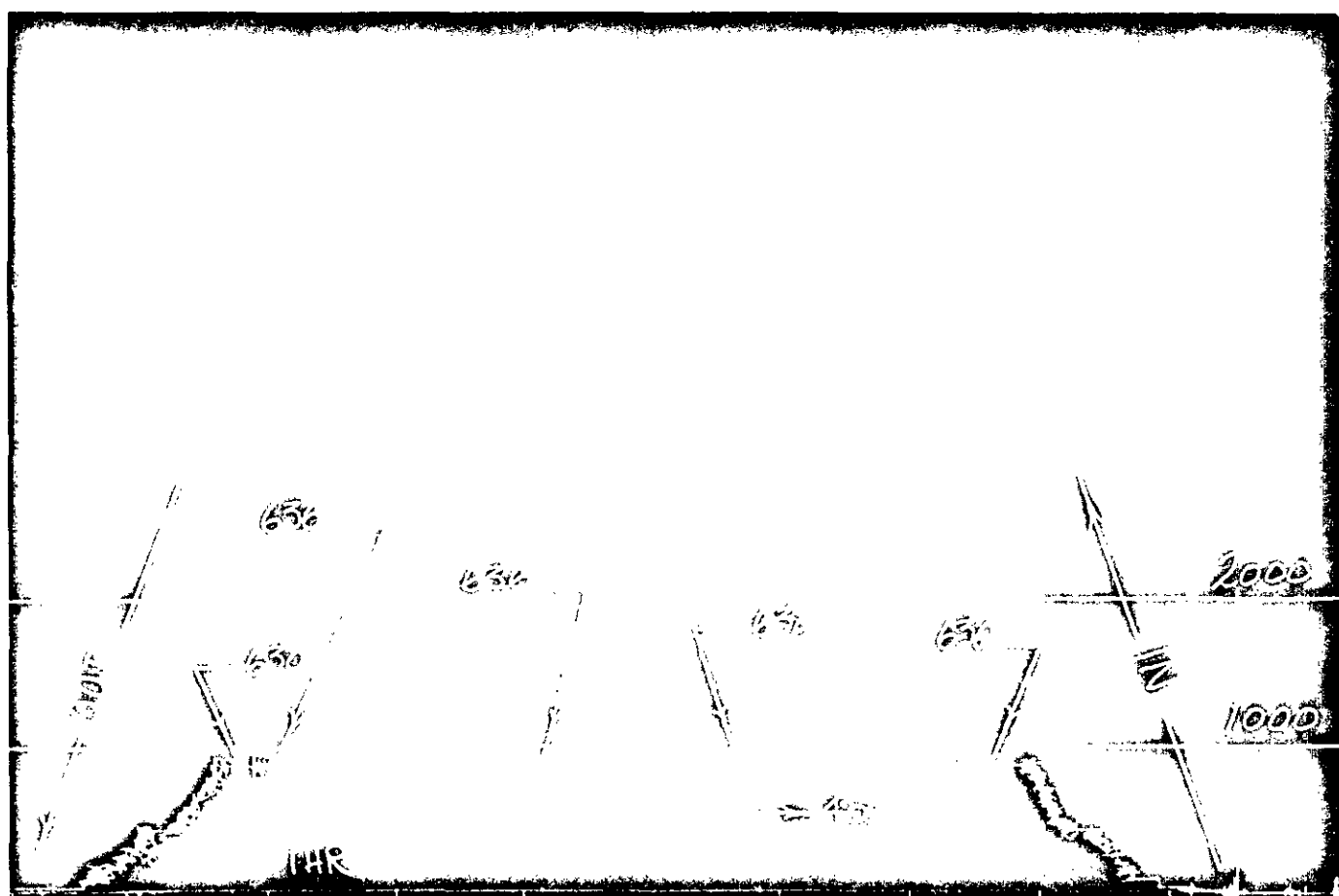
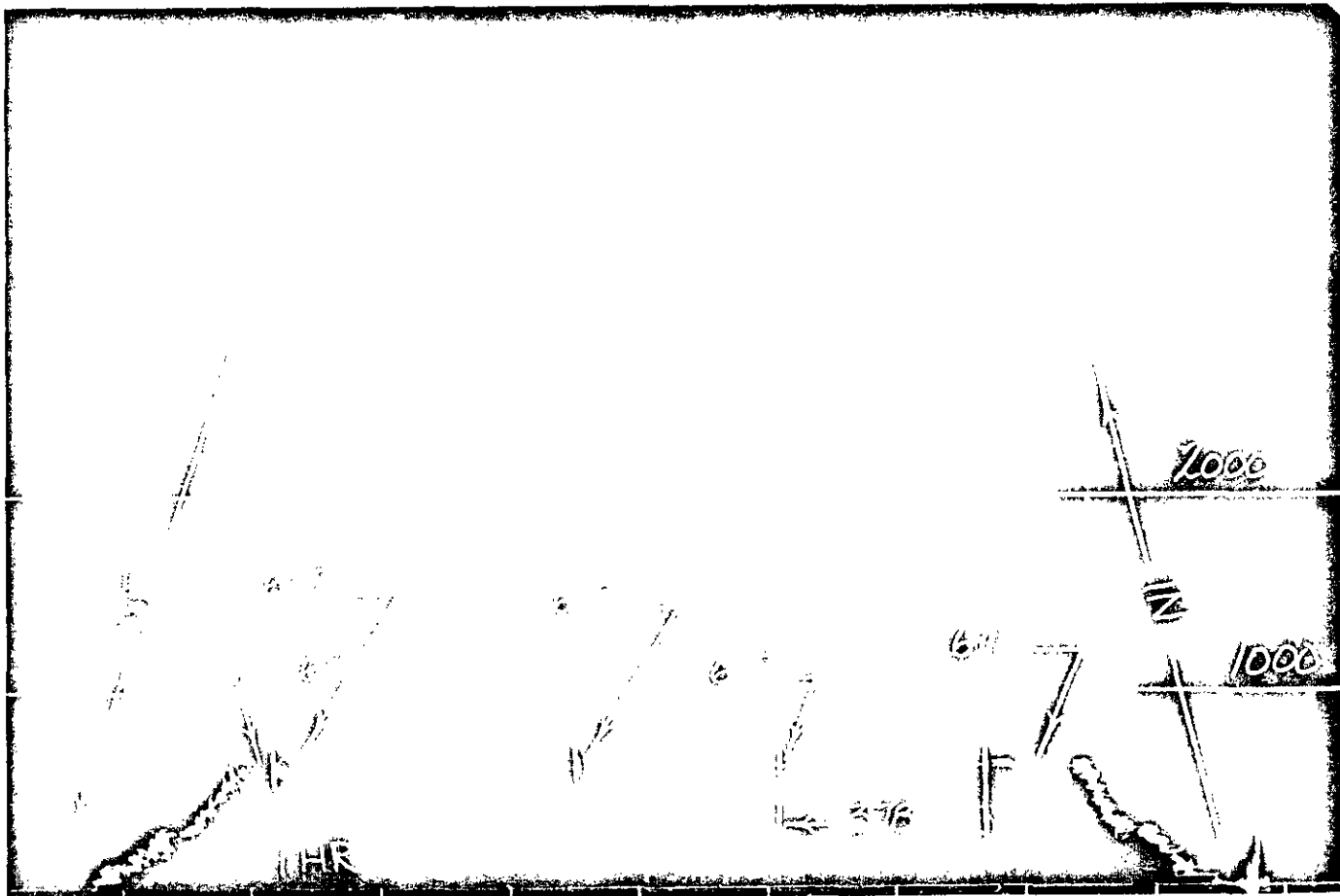


DST PRESSURE INCREMENTS

Recorder No 1030

Depth 1372

Points	INITIAL CIP				FINAL CIP			
	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG
1					120			617
2					125			617
3					130			617
4					135			617
5					140			617
6					141			617
7								
8								
9								
10								
11								
12								
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16								
17								
18								
19								
20								
21								
22								
23								
24								





DRILL-STEM TEST DATA

Client: Mobil Inc Neo Sun Ontadek Lake	Test No: Two
Location: 66 20 N - 128 15 W	Zone Tested:
Company: Mobil Oil Canada Ltd.	Interval: 2170 - 2220
Tester: Dave McDonald	Date: May 3, 1970

Type of Test: Dual Bottom Hole RFS Tool No: 53 & 55

Packer: 11 mins ISI: 57 mins Flow: 56 mins FSI: 86 mins

Specify Inside or Outside	INS REC No 1030 6259 RANGE 12 HR CLOCK	OUT REC No 2012 575 RANGE 12 HR CLOCK	REC No RANGE HR CLOCK
DEPTH	2152	2184	
Initial Hydro Mud Press	979	999	
Initial Shut-In Press	951	974	
Initial Flow Press	75	107	
Final Flow Press	359	381	
Final Shut-In Press	942	968	
Final Hydro Mud Press	979	999	

Mud Drop: NIL Fluid Loss: Mud Weight: 8.8
Viscosity: 42 Temperature °F: 82 Net Pay Tested:
Top Packer Depth: 2164 Bottom Packer Depth: 2170 Total Depth: 2220
Drill Pipe Size: 3 1/2" IF Wt: 13.3 Drill Collar ID: 2 7/8" Ft Run: 623
Surface Choke Size: Closed Bottom Choke Size: 3" Main Hole Size: 3 1/2"
Anchor Size: 4 1/2" Rat Hole Size: Feet of Rat Hole:
Cushion Amount: Type: Rubber Size: 7 1/2" X 2

Fluid Recovery Total Feet: 710
Recovered: 10 Feet of: Drilling mud
Recovered: 700 Feet of: Sulphurous
Recovered: Feet of:
Recovered: Feet of:
Recovered: Feet of:

Gas Recovery: How Measured: Riser size:

mins	Temp. F	Press Rdg	psi	Orifice Size	=	MCF Day
mins	Temp. F	Press Rdg	psi	Orifice Size	=	MCF Day
mins	Temp. F	Press Rdg	psi	Orifice Size	=	MCF Day
mins	Temp. F	Press Rdg	psi	Orifice Size	=	MCF Day
mins	Temp. F	Press Rdg	psi	Orifice Size	=	MCF Day
mins	Temp. F	Press Rdg	psi	Orifice Size	=	MCF Day

Bleed Off Time for Drill Pipe:

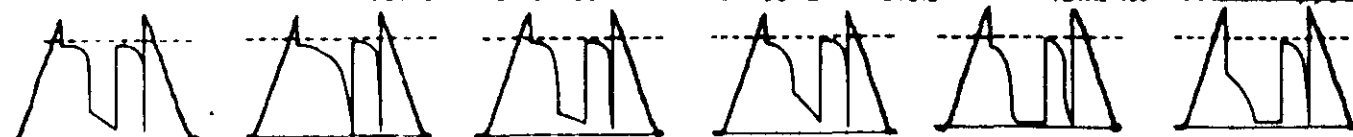
REMARKS: Weak initial puff, weak air blow increasing to fair throughout test.



TESTING REPORT

45 LANDING SUB _____
45 CHAMBER _____
45 TOOL OR P.O. SUB _____ 1.00
CO SUB _____ 1.00
SHUT IN TOOL _____ 5.20
R.F.S. No. _____ 3.30
R.F.S. No. _____ 3.30
HYDRAULIC TOOL _____ 7.20
JARS _____ 6.00
RECORDER No. 1030 _____ 5.00 DEPTH 2152
RECORDER No. _____ DEPTH _____
SAFETY JOINT _____ 1.75
BY PASS SUB _____
1. PACKER DEPTH 2164 _____ PACKER _____ 6.00
2. PACKER DEPTH 2170 _____ PACKER _____ 5.00
ANCHOR—SPECIFY _____ 1.00
TOTAL TOOL ABOVE INTERVAL 44.75
BLANK OFF OR BY PASS SUB _____
RECORDER No. _____ DEPTH _____
3. PACKER DEPTH _____ PACKER _____ TOTAL INTERVAL 50.40
4. PACKER DEPTH _____ PACKER _____
ANCHOR—SPECIFY Perf _____ 12.00
RECORDER No. 2012 _____ 5.00 DEPTH 2184
Drilling Pipe _____ 30.40
TOTAL DEPTH 2220 _____ BULLNOSE _____ 2.00
TOTAL TAIL PIPE 50.40
TOTAL TEST TOOL 95.15

DST CHARTS FOR COMPARATIVE VISUAL ANALYSIS



B HIGH PERMEABILITY STRONG DAMAGE EFFECT HIGH PERMEABILITY NO DAMAGE EFFECT MEDIUM PERMEABILITY STRONG DAMAGE EFFECT MEDIUM PERMEABILITY NO DAMAGE EFFECT LOW PERMEABILITY STRONG DAMAGE EFFECT LOW PERMEABILITY NO DAMAGE EFFECT

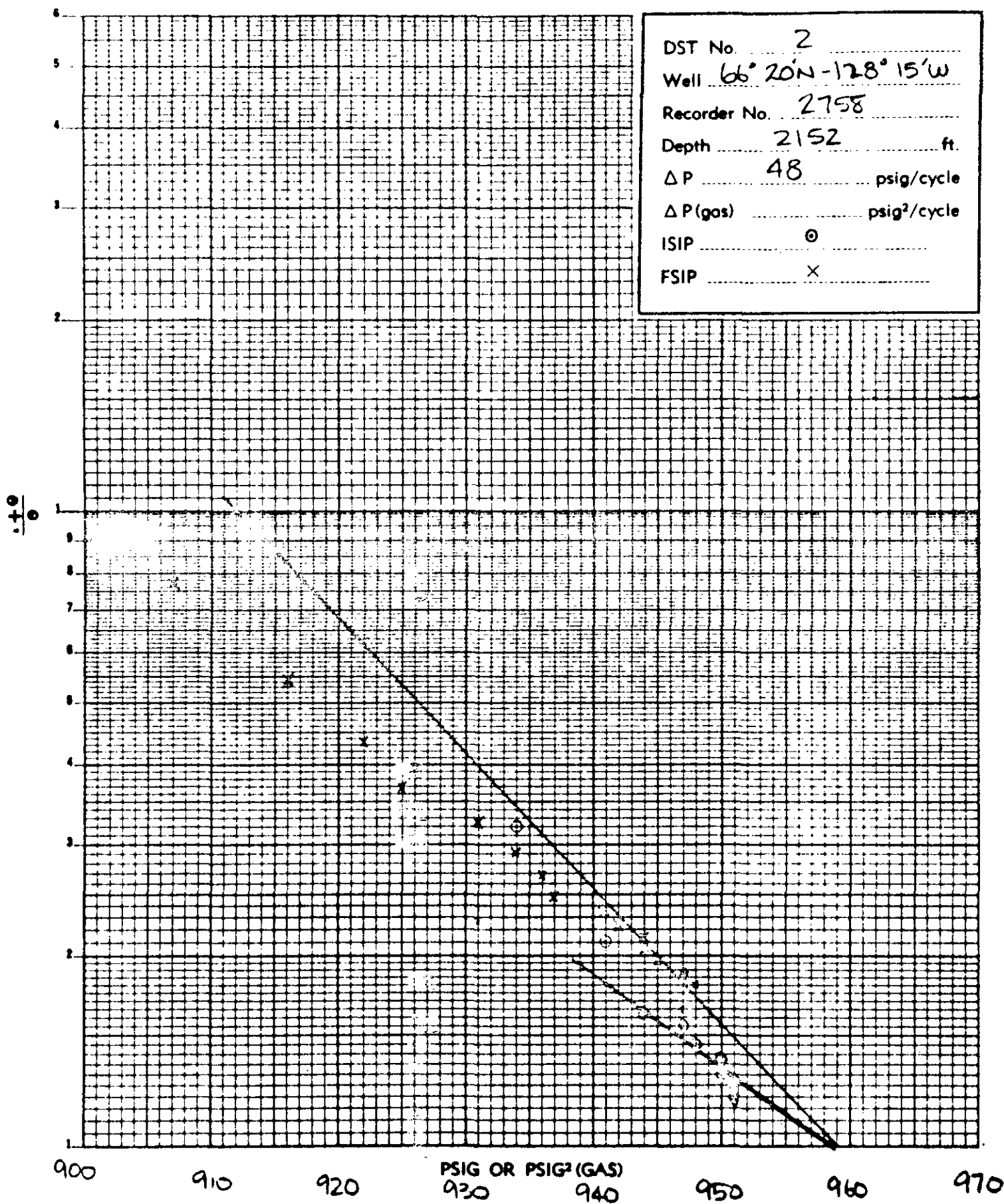


DST PRESSURE INCREMENTS

Recorder No. 1030

Depth 2152

Points	INITIAL CIP				FINAL CIP			
	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG
1	0	11	0	49	0	67	0	359
2	5	16	3.20	934	5	72	14.4	898
3	10	21	2.10	941	10	77	7.70	907
4	15	26	1.73	944	15	82	5.45	916
5	20	31	1.55	947	20	87	4.35	922
6	25	36	1.44	948	25	92	3.68	925
7	30	41	1.37	950	30	97	3.24	931
8	35	46	1.31	950	35	102	2.92	934
9	40	51	1.28	951	40	107	2.68	936
10	45	56	1.24	951	45	112	2.44	937
11	50	61	1.22	951	50	117	2.34	941
12	55	66	1.20	951	55	122	2.22	942
13	57	68	1.19	951	60	127	2.12	944
14					65	132	2.03	944
15					70	137	1.96	945
16					75	142	1.89	947
17					80	147	1.84	947
18					85	152	1.79	948
19					86	153	1.78	948
20								
21								
22								
23								
24								





CALCULATIONS FOR LIQUID RECOVERY

DATA:

Recovery	(4.61 BBLS)	623	D.C. ft.	Estimated viscosity (μ)	1	cp
	(.70 BBLS)	87	D.P. ft.	Total flowing time (t)	67	min.
Interval (h)	Est. 20		ft.	Reservoir press. (P_R)	960	psig
Wellbore radius (r_w)	.33		ft.	Final SIP (P_w)	948	psig
Cushion volume			bbl.	Final FP (P_f)	359	psig
Annular mud vol.			bbl.	Slope (ΔP)	48	psig/cycle

AVERAGE DST PRODUCTION RATE:

$$Q = \frac{1440 \text{ (Recovery in bbls.)}}{\text{Total flowing time (min.)}}$$
$$= \frac{1440}{67} (5.31) = 114 \text{ bbl./day}$$

IN SITU CAPACITY:

$$Kh = \frac{162.6 Q \mu}{\Delta P} = \frac{162.6 (114) 1}{48}$$
$$= 38.6 \text{ md.-ft.}$$

EFFECTIVE PERMEABILITY:

$$K = \frac{\text{In situ Capacity}}{h} = \frac{38.6}{20}$$
$$= 1.93 \text{ md.}$$

PRODUCTIVITY INDEX:

$$P.I. = \frac{Q}{P_R - P_f} = \frac{114}{601} = .19 \text{ bbl./day/psi}$$

APPROXIMATE DRAINAGE RADIUS:

$$b = \sqrt{K t} = \sqrt{(1.93) (67)} = 11.36 \text{ ft.}$$



CALCULATIONS FOR LIQUID RECOVERY (PAGE 2)

ESTIMATED DAMAGE RATIO:

$$\begin{aligned} \text{D.R.} &= \frac{P_o - P_i}{2 (\Delta P) \log b/r_w} = \frac{601}{2 (48) \log \frac{11.36}{.33}} \\ &= 4.05 \end{aligned}$$

PRODUCTION WITH DAMAGE REMOVED:

$$\begin{aligned} Q_{\text{No Damage}} &= Q(\text{D.R.}) = 114 \times 4.05 = 460 \text{ bbl./day} \end{aligned}$$

NOMENCLATURE

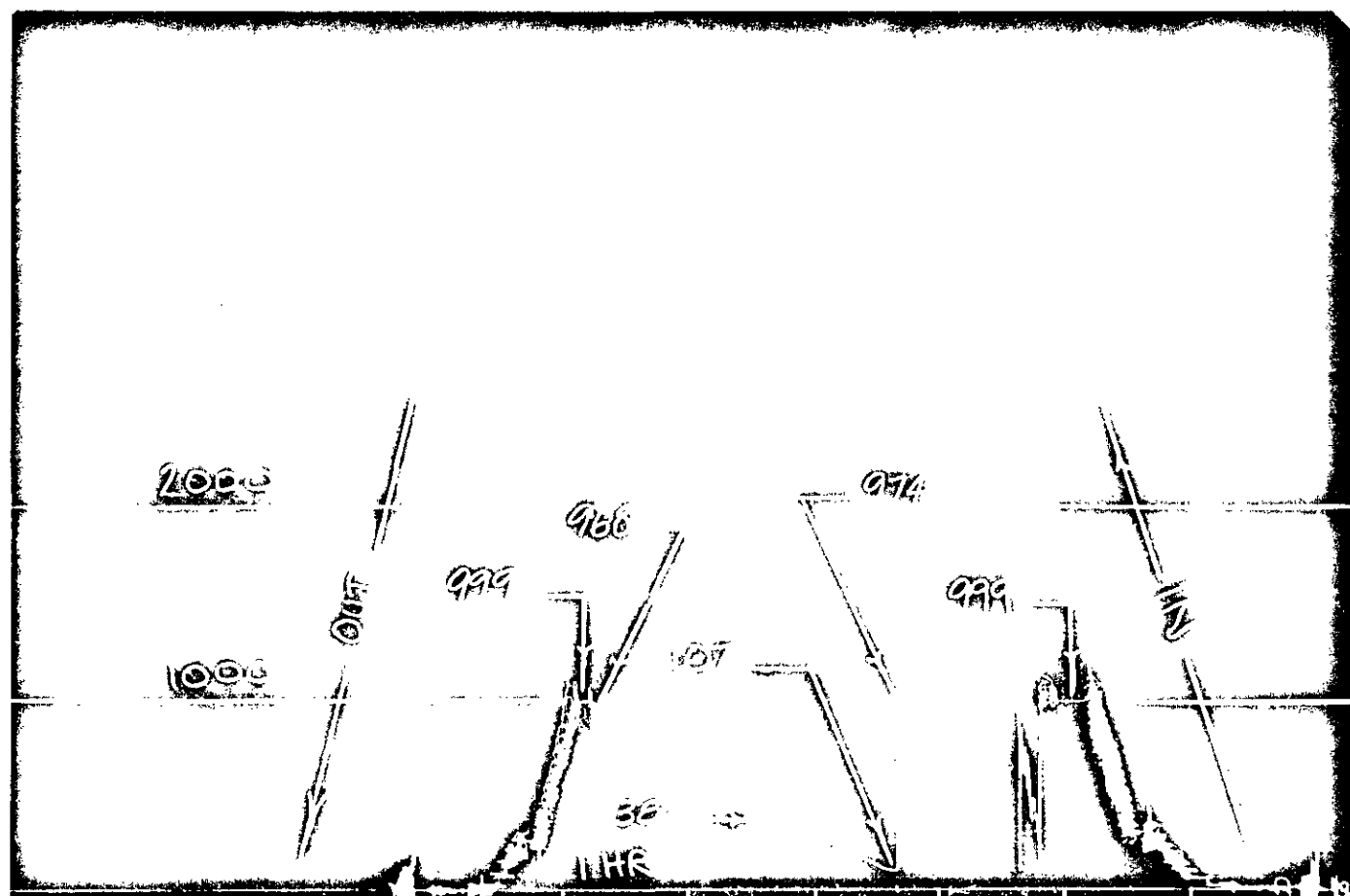
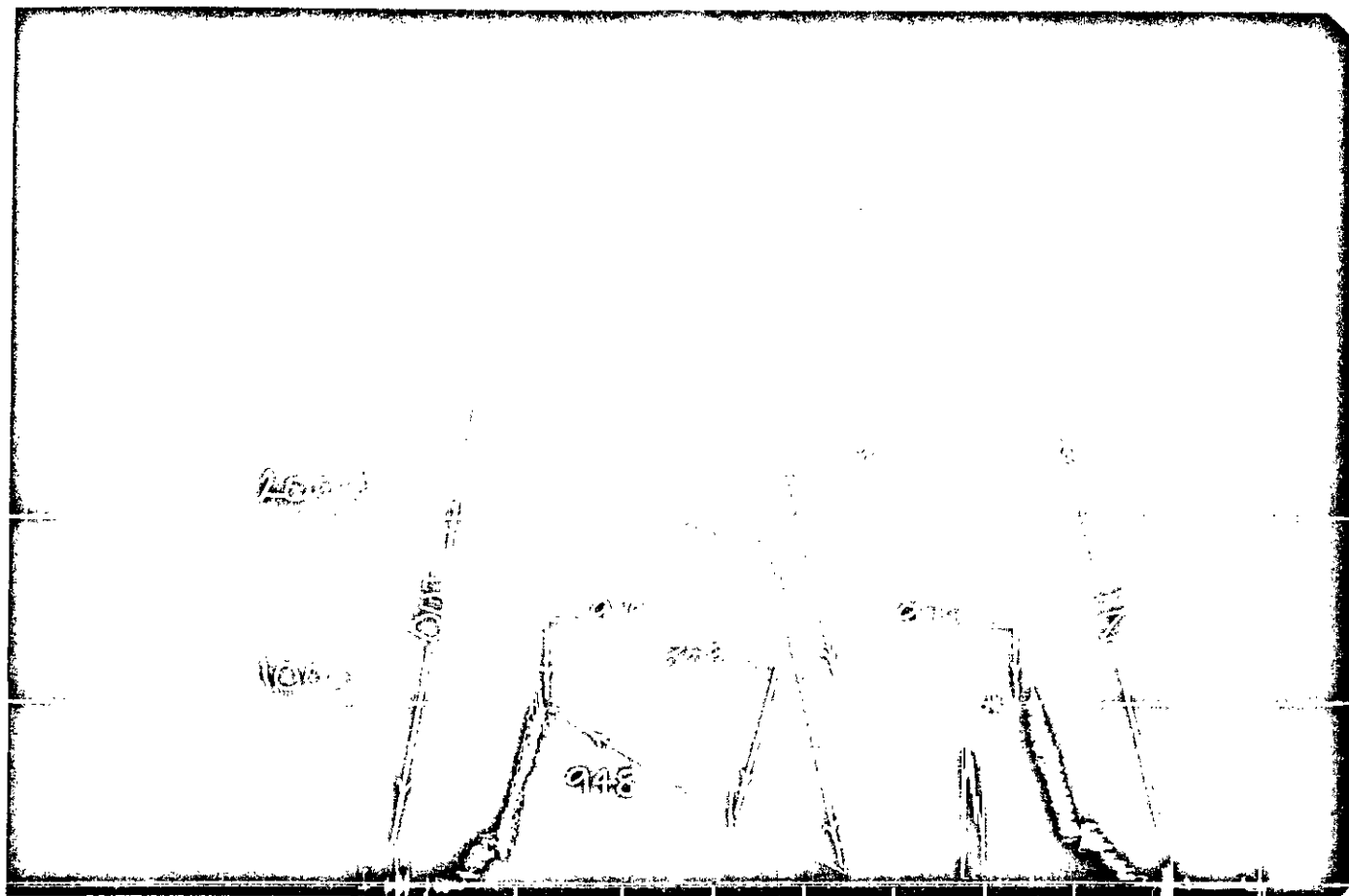
- Q** = Average DST Production (oil and/or water)—bbl/day
Q_g = Gas production rate during test corrected to 14.4 psia and 60° F—MCF/D
K = Permeability—md
h = Thickness of zone or interval tested—ft.
 μ = Viscosity—cp
Z = Deviation factor for gas—dimensionless
T = Reservoir temperature—°R
t = Total flowing time—min.
θ = Shut-in time—min.
r_w = Radius of wellbore—ft.
b = Radius of drainage or investigation (i.e. r_e)—ft.
P_o = Original Reservoir pressure (extrapolated)—psig
P_w = Final shut-in pressure—psig
P_f = Final flowing pressure—psig
P_s = Extrapolated pressure when $\frac{T+\theta}{\theta}$ is very small—psig (i.e., effect of damage is shown in build-up curve when shut-in time (θ) is very small in comparison to flowing time (t)).
ΔP = Slope of straight line portion of pressure build up plot—psig/cycle or psig²/cycle (gas)
ΔP_{Damaged Zone} = Pressure drop caused by damaged zone.
A.O.F. = Absolute open flow (estimated from DST data and using an assumed slope of 45°).

SUMMARY

Initial shut-in pressure (ISIP)	951	psi
Formation pressure (extrapolated)	460	psi
Final flowing pressure (FFP)	359	psi
Final shut-in pressure (FSIP)	948	psi
Effective permeability (K)	1.93	md
DST production rate	114	BBL/D
		MCF/D
DST production without damage	460	BBL/D
		MCF/D
Estimated A.O.F. with no damage		MCF/D

ASSUMPTIONS AND LIMITATIONS

The above DST interpretation calculations require several necessary assumptions to provide a quick estimate of many of the factors involved. As a result the information gained should be used to form an opinion or estimate only, until the assumptions of reservoir and fluid properties can be wholly or partially clarified by more complete analysis and testing.



(b) Casing Record

Conductor Pipe

Ran 77' of 16" Conductor Pipe
Cemented with 42 sacks Fondu
Landed at 77' KB

Surface Casing

Set at 710'KB

Ran 18 joints to 710' size 9 5/8 Grade J55 wt. 36.0

Threads 8 round short collars in 12 1/4 hole

Centralizers run at 691KB, 651KB, 611KB, 569KB

Cemented with 350 sacks Fondu cement (slurry wt. 16.5 lbs.)

Mix time 30 mins. and pumped down in 15 minutes at 4bbl/min.

with final pumping pressure @ 300psi. Bumped plug with 1000 psi

and float held. No returns. Ran 2 inch line pipe from top,

past 16 inch conductor pipe @ 78 ft. KB. Cemented through 2" pipe

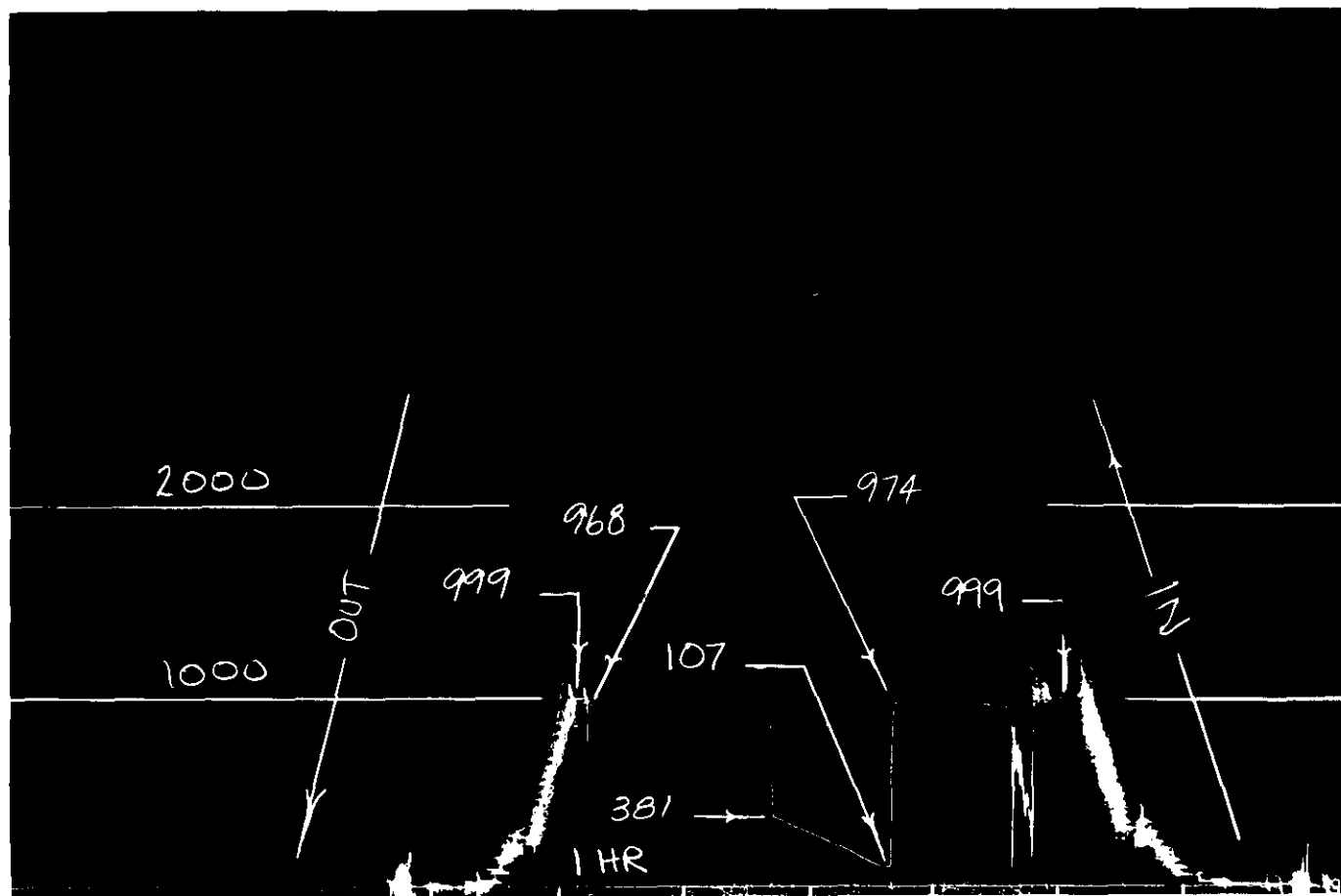
80 ft. KB till we got returns with 400 sax Fondu Cement.

(c) BIT RECORD

<u>NO.</u>	<u>LAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>HOURS</u>	<u>IN</u>	<u>OUT</u>	<u>FOOTAGE</u>	<u>COND.</u>
1	HW	OSC3	12 1/4	3 1/4			160	4-2-1
2	HW	OSCIGJ	12 1/4	5 1/4			119	4-2-1
3	HW	OSC35	8 3/4	7			201	3-2-1
4	HW	OSC3	8 3/4	12 3/4			270	2-1-1
5	HW	Pilot Reamer	12 1/4	Would not drill				
6	HW	OSCIGJ	12 1/4	21 1/4			436	2-2-1
7	HW	OSC3	8 3/4	2			56	2-2-1
8	HW	XIGJ	8 3/4	21 1/4	806	1250	444	
9	HW	XIG	8 3/4	17 3/4	1250	1443	193	
10		Diamond	6 1/8	5 3/4	1443	1455	112	
11	HW	ODV	8 4/4	1/4	1455	1456	1	
12		Diamond	6 1/8	1 3/4	1456	1458	2	
13	HW	ODV	8 3/4	2 3/4	1456	1472	16	
14		Diamond	6 1/8	5 1/4	1472	1481	9	
15	HW	ODV	8 3/4	1 1/4	1472	1477	5	
16		Diamond	6 1/8	11 1/2	1482	1504	22	
17	HW	ODV	8 3/4		1482	1505	23	
18		Diamond	6 1/8	11 1/2	1505	1531	26	
19	HW	ODV	8 3/4	2	1531	1556	25	2-3-1
20	HW	ODV	8 3/4	14 1/4	1556	1735	179	
21	HW	ODV	8 3/4	9	1735	1855	120	4-3-1
22	HW	X55R	8 3/4	30 3/4	1855	2220	365	1-1-0
23		Diamond	6 3/16	5	2220	2230	10	
24	HW	X55R	8 3/4		2230	2231	1	
25		Diamond	6 3/16	1 3/4	2231	2233	2	
26		Diamond	6 1/8	8 1/4	2234	2241	7	
27	HW	X55R	8 3/4	1 1/4	2234	2243	9	
28		Diamond	6 1/8	24	2243	2273	30	
29	HW	X55R	3 3/4	2 3/4	2243	2274	31	
30		Diamond	6 1/8	5	2274	2285	11	
31	HW	X55R	8 3/4	30	2285	2609	324	3-3-1
32	HW	X55R	8 3/4	1/2	2609	2614	5	1-1-1
33	HW	RRRG7X	8 3/4	48	2614	3120	506	4-4-1
34	HW	RRRG7X	8 3/4	22	3120	3318	196	6-4-1
35	HW	WD7	8 3/4	26 1/4	3318	3555	237	4-3-1
36	HW	ODV	8 3/4	15	3555	3674	119	4-3-1
37	HW	X55R	8 3/4	25	3674	3858	184	
38	HW	WD7	8 3/4	17	3858	3978	120	8-8-1
39	HW	X55R	8 3/4	37 3/4	3978	4278	300	8-8-1
40	HW	WD7	8 3/4	32 1/2	4278	4614	336	4-4-1
41	HW	WD7	8 3/4	16 3/4	4614	5212	598	2-1-1
42	HW	WD7	8 3/4	24 1/2	5212	5445	243	2-3-1
43	HW	WD7	8 3/4	22	5445	5587	121	
44	HW	WD7	8 3/4	22	5576	5686	110	
45	HW	WD7	8 3/4	21 1/4	5686	5791	105	6-4-1
46	HW	WD7	8 3/4	14 1/4	5791	5880	89	
47		Diamond	6 1/8	14 1/4	5880	5897	17	
48	HW	WD7	8 3/4	3 1/4	5880	5898	18	

(a) Mud Report

<u>Date</u>	<u>WT.</u>	<u>Visc.</u>	<u>WL.</u>	<u>Cake</u>	<u>PL.</u>
Apr. 15	8.4	48			
16		45			
17		82			
18		71			
19		105			
20		110			
21					
22					
23	8.8	41			
24	8.8	39			
25	8.8	40			
26	8.7	38			
27	8.7	39			
28	8.7	38			
29	8.7	50			
30	8.7	42			
May 1	8.8	38			
2	8.8	40			
3	8.8	39			
4	8.8	39			
5	8.8	38			
6	8.9	35			
7	8.8	60			
8	8.8	40			
9	8.9	43			
10	9.0	45			
11	9.0	40			
May 12	9.0	40			
13	9.0	40			
14	8.8	45			
15	8.9	45			
16	8.9	45			
17	8.9	39			
18	9.0	39			
19	9.8	62			
20	10.3	48			



(d) Mud Report (continued)

<u>Date</u>	<u>WT.</u>	<u>Visc.</u>	<u>WL.</u>	<u>Cake</u>	<u>PL.</u>
May 21	10.5	40			
22	10.6	38			
23	10.8	35			
24	10.8	36			
25	10.8	36			
26	10.8	37			

(e) Deviation Record

<u>Date</u>	<u>Depth</u>	<u>Deviation</u>
Apr. 15/70	60	1/2
	125	3/4
Apr. 16/70	185	3/4
Apr. 18/70	330	1/8
	420	1/2
	480	3/4
Apr. 19/70	635	1/2
	750	3/4
Apr. 23/70	806	1/4
Apr. 24/70	1056	1/2
	1250	1/4
Apr. 25/70	1443	3/4
Apr. 30/70	1735	1/4
May 1/70	1855	3/4
May 8/70	2600	3/4
May 10/70	3108	1
May 11/70	3312	1
May 12/70	3555	3/4
May 14/70	3858	7/8°
May 17/70	4279	7/8°
May 19/70	4600	3/4°
May 20/70	5212	3/4°
May 22/70	5570	7/8°
May 23/70	5686	3/4°

(f) Abandonment Plugs

<u>Plug</u>	<u>Position</u>	<u>Geol Formation</u>	<u>No. of Sacks</u>	<u>Remark</u>
1	5420-5200	Cambrian	100	Plug felt after 8 hr @ 5189'
2	4400-4250	Ronning Cambrian	75	Plug felt after 8 hr @ 4223'
3	2100-2000	Gossage	50	Plug felt after 8 hr @ 1996'
4	750-650	Hume Surface Csg.	775	Plug felt after 8 hr @ 640'
		Top Csg.	110	Welded on plate and erected identification marker.

(g) Lost Circulation Zones

None

(h) Report of Blowouts

None

SECTION IV

LOGS

- 1) May 26, 1970
Interval = 5897' - 707'
Induction Electrolog
- 2) May 26, 1970
Interval = 5893' - 80'
Borehole Compensated Acoustilog
Gamma Ray Log and Caliper 5893' - 708'
Gamma Ray Log in Casing 708' - 80'

SECTION V

ANALYSIS

(a) Core Analysis

None

(b) Water Analysis

See attached. C70-4985-1, C70-4985-2

(c) Gas Analysis

None

(d) Oil Analysis

None

SECTION VI - COMPLETION SUMMARY

(a) Tubing Record

None

(b) Perforation Record

None

(c) Cementation Record

Date	No.	Position	Geological Formation	Number of Sacks	Remarks
May 29/1970	1	5400-5200	Cambrian	100	Plug felt after 8 hrs. at 5189'
May 29/1970	2	4400-4250	Ronning-Cambrian	75	Plug felt after 8 hrs. at 4223'
May 29/1970	3	2100-2000	Gossage	50	Plug felt after 8 hrs. at 1996'
May 30/1970	4	750-650	Hume-Surface Casing	75	Plug felt after 8 hrs. at 640'
			Tap Casing	10	

(d) Acidization and Fracturing Record

None

(e) Back Pressure and Production Tests

None

CHEMICAL GEOLOGICAL LABORATORIES LTD.

WATER ANALYSIS

Lab No. C70-49

1

Received: May 15, 1970 Reported: May 21, 1970

Well: Location:

Mobil Inc. NCO Sun Ontadek LM39 Grid 66° 20'N-12895'W

Operator: MOBIL OIL CANADA, LTD.

Field or Area:

Unit M Section 39

Elev.: K.B.

Grd.

Zone/Formation:

Gossage

Sample Interval: 1390' - 1443'

Method of Production: D.S.T. #1

Sampled from:

Bottom

Sampled by:

Date: April 26, 1970

OTHER PERTINENT DATA

(Signed)

	Na	K	Ca	Mg		SO ₄	Cl	CO ₃	HCO ₃	
Mg./L	1410		398	209		1450	2190		386	
Meq./L	61.21		19.86	17.18		30.16	61.76		6.33	
Meq. %	31.15		10.11	8.74		15.35	31.43		3.22	

Total Solids Mg/L:

By Evaporation 6420

Fe Trace

Specific Gravity 1.009

@60°F

Observed pH

7.7

@ 75 °F

Calculated 6043

After Ignition

5520

H₂S Nil

Refractive Index 1.3338

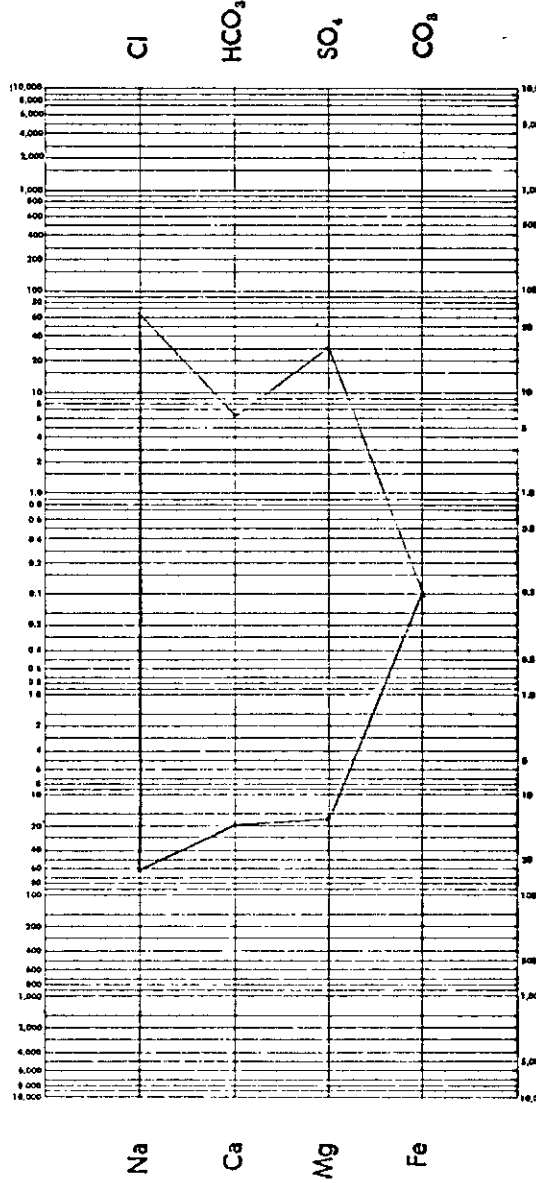
@25°C

Resistivity

1.26 ohm meters @

68 °F

Pattern Unit Meq./L



Remarks and Conclusions

The sample as received contained approximately 5% black sediment. The filtrate was clear and colorless. A trace of organic matter was present in the evaporated solids.

CHEMICAL GEOLOGICAL LABORATORIES LTD.

WATER ANALYSIS

Lab No. C70-4985-

Received: May 15, 1970 Reported: May 21, 1970

Operator: MOBIL OIL CANADA, LTD.

Elev.: K.B. Grd.

Zone/Formation: Ronning

Well: Location: Mobil Inc. NCO Sun Ontadek LM 39 Grid 66° 20' N-12895'W

Unit M Section 39

Field or Area:

Sample Interval: 2170' - 2220'

Method of Production: D.S.T. #2

Sampled from: Bottom

Sampled by: McDonald

Date: May 3, 1970

OTHER PERTINENT DATA

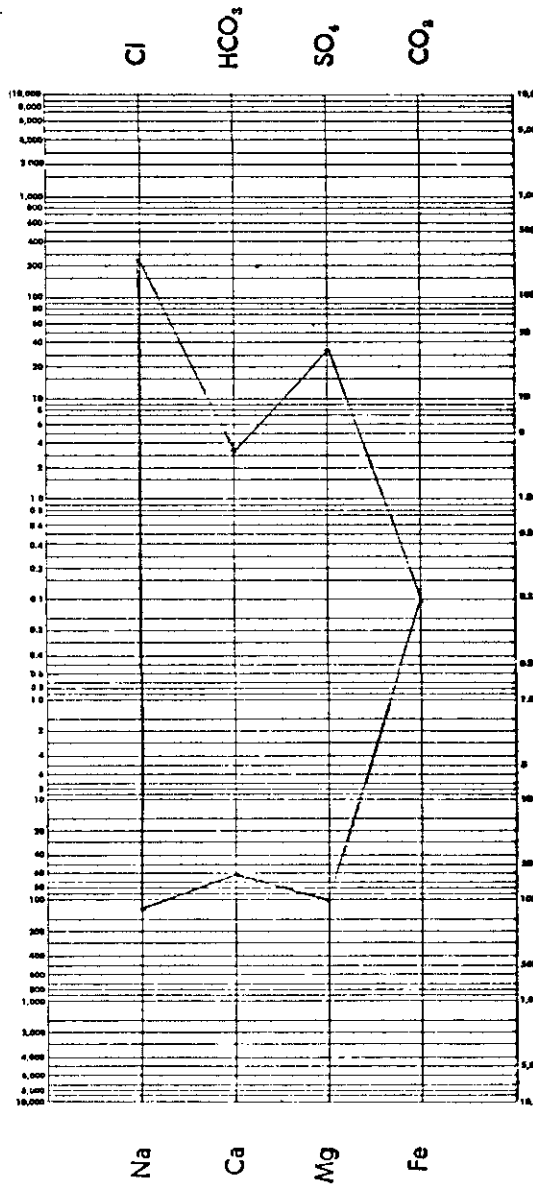
Recovery: 710'

(Signed)

	Na	K	Ca	Mg		SO ₄	Cl	CO ₃	HCO ₃	
Mg./L	2870		1230	1320		1670	9100		206	
leq./L	124.86		61.38	108.50		34.74	256.62		3.38	
eq. %	21.18		10.41	18.41		5.89	43.53		0.58	

Total Solids Mg/L: By Evaporation 19,500 Fe Trace Specific Gravity 1.017 @60°F Observed pH 7.9 @ 75 °F
 Calculated 16,396 After Ignition 15,300 H₂S Nil Refractive Index 1.3361 @25°C Resistivity 0.347 ohm meters @ 68 °F

Pattern Unit Meq./L



Remarks and Conclusions

The sample as received contained about 20% black sediment. The filtrate was clear and colorless. A trace of organic matter was present in the evaporated solids.

DATE: 90-06-06

8240-8350

ANALYSIS

66°18'24"N 128°21'42"W
5350-5510

No T_{max} Correction

DEPTH	GAS	OIL	S 2	T _{OC}	GAS P I	TOTAL P I
0	1 0	2 0	10 0	5 0	0.2 0	
4200						
4215						
4230						
4245						
4260						
4275						
4290						
4305						
4320						
4335						
4350						
4365						
4380						
4395						
4410						
4425						
4440						
4455						
4470						
4485						
4500						
4515						
4530						
0						

Mobil and Ontonagon LK-N

CONFIDENTIAL

DATE: 90-06-06

ANALYSIS

UNTIL 28/05/92

DEPTH	WEIGHT	GAS	OIL	S 2	T _{max}	G P I	O P I	T P I	T O C	H I
4200	100.1	0.00	2.64	3.58	430	0.00	0.42	0.42	3.09	115
4215	102.1	0.00	0.53	1.50	469	0.00	0.26	0.26	0.86	174
4230	100.5	0.00	0.62	1.48	446	0.00	0.30	0.30	0.93	159
4245	100.8	0.00	0.79	1.38	439	0.00	0.37	0.37	1.27	108
4260	100.9	0.00	11.91	8.89	320	0.00	0.57	0.57	5.90	150
4275	101.2	0.00	2.74	3.65	322	0.00	0.43	0.43	2.31	158
4290	100.4	0.00	0.57	1.62	464	0.00	0.26	0.26	0.97	167
4291	100.3	0.00	0.42	3.95	431	0.00	0.10	0.10	1.68	235
4305	100.3	0.00	1.04	1.00	436	0.00	0.37	0.37	1.58	111
4320	100.7	0.00	0.84	1.44	438	0.00	0.37	0.37	1.46	98
4335	100.9	0.00	0.47	1.54	388	0.00	0.39	0.39	1.54	100
4350	101.8	0.00	6.64	0.31	321	0.00	0.51	0.51	5.18	121
4365	102.1	0.00	0.48	1.40	447	0.00	0.26	0.26	0.70	200
4380	100.5	0.00	0.61	3.82	430	0.00	0.14	0.14	1.51	352
4395	101.2	0.00	0.76	8.10	430	0.00	0.09	0.09	2.48	326
4410	101.6	0.00	0.62	2.14	431	0.00	0.22	0.22	1.19	179
4425	100.8	0.00	0.64	1.74	431	0.00	0.27	0.27	1.18	147
4440	101.2	0.00	0.66	1.29	430	0.00	0.34	0.34	0.90	130
4455	100.0	0.00	0.64	2.87	429	0.00	0.18	0.18	1.40	285
4460	100.5	0.00	0.60	3.32	429	0.00	0.15	0.15	1.56	211
8240	101.3	0.00	0.30	0.15	373	0.00	0.68	0.68	0.36	41
8250	101.1	0.00	0.29	10.34	454	0.00	0.03	0.03	1.08	957
8260	100.9	0.00	0.28	0.00	448	0.00	1.00	1.00	0.14	0
8270	101.6	0.00	0.09	0.00	280	0.00	1.00	1.00	0.09	0
8290	102.6	0.00	0.13	0.00	256	0.00	1.00	1.00	0.11	0
8310	100.0	0.00	0.16	0.05	276	0.00	0.80	0.80	0.19	26
8340	100.7	0.00	0.12	0.03	268	0.00	0.86	0.86	0.13	23
8350	100.0	0.00	0.10	0.03	278	0.00	0.83	0.83	0.11	27
5350	100.4	0.00	0.04	0.00	301	0.00	1.00	1.00	0.06	0
5360	102.0	0.00	0.06	0.01	302	0.00	1.00	1.00	0.05	20
5370	101.3	0.00	0.03	0.00	291	0.00	1.00	1.00	0.05	0
5380	100.5	0.00	0.03	0.00	300	0.00	1.00	1.00	0.07	0
5390	100.3	0.00	0.03	0.00	301	0.00	1.00	1.00	0.05	0
5400	100.0	0.00	0.03	0.00	255	0.00	1.00	1.00	0.07	0
5410	101.4	0.00	0.04	0.01	255	0.00	1.00	1.00	0.07	14
5420	100.2	0.00	0.07	0.00	260	0.00	0.44	0.44	0.08	110
5430	101.3	0.00	0.09	0.04	260	0.00	0.75	0.75	0.11	36
5440	100.1	0.00	0.09	0.05	301	0.00	0.64	0.64	0.09	55
5450	100.0	0.00	0.06	0.00	287	0.00	1.00	1.00	0.06	0
5460	100.0	0.00	0.16	0.08	299	0.00	0.67	0.67	0.15	53
5470	102.0	0.00	0.21	0.17	392	0.00	0.62	0.62	0.17	76
5480	100.2	0.00	0.44	0.17	351	0.00	0.73	0.73	0.28	60
5490	101.7	0.00	0.52	0.17	388	0.00	0.76	0.76	0.30	56
5500	101.7	0.00	0.56	0.27	368	0.00	0.68	0.68	0.33	81
5510	102.8	0.00	1.26	0.47	394	0.00	0.73	0.73	0.52	90
5520	101.2	0.00	1.08	0.48	395	0.00	0.69	0.69	0.48	100
0	0.0	0.00	0.00	0.00	321	***	***	***	***	***

Attached to
Ontonagon & 4

Mobil Oil at Ontonagon, LK. N-39
66°18'24"N 128°21'42"W 5330-5880' + 12/31/5R-18W5
DATE: 90-06-07 ANALYSIS 2745-2825
Fort Good Hope. Current Well

No T _{max} Correction											
DEPTH	WEIGHT	GAS	OIL	S 2	T _{max}	G P I	O P I	T P I	T O C	H I	
5530	100.9	0.00	0.55	0.00	443	0.00	1.00	1.00	0.40	0	
5540	102.7	0.00	0.16	0.00	271	0.00	1.00	1.00	0.20	0	
5550	100.5	0.00	0.05	0.00	229	0.00	1.00	1.00	0.00	0	
5560	102.0	0.00	0.02	0.00	229	0.00	1.00	1.00	0.11	0	
5570	100.2	0.00	0.00	0.00	229	***.***	***.***	***.***	0.05	0	
5580	100.4	0.00	0.24	0.03	371	0.00	0.92	0.92	0.37	0	
5590	101.4	0.00	0.15	0.02	327	0.00	0.94	0.94	0.28	7	
5600	100.3	0.00	0.44	1.55	431	0.00	0.00	0.00	1.21	251	
5600	102.6	0.00	0.04	0.00	434	0.00	1.00	1.00	0.15	0	
5610	102.0	0.00	0.01	0.00	327	***.***	***.***	***.***	0.15	0	
5620	101.1	0.00	0.00	0.00	219	0.00	1.00	1.00	0.25	0	
5630	100.9	0.00	0.03	0.00	274	0.00	1.00	1.00	0.13	0	
5640	101.4	0.00	0.02	0.00	219	0.00	1.00	1.00	0.10	0	
5650	100.4	0.00	0.03	0.00	274	0.00	1.00	1.00	0.10	0	
5660	100.8	0.00	0.00	0.00	219	0.00	1.00	1.00	0.14	0	
5670	100.6	0.00	0.53	0.39	439	0.00	0.50	0.50	0.07	557	
5680	100.1	0.00	0.20	0.00	443	0.00	1.00	1.00	0.33	0	
5690	101.2	0.00	0.22	0.00	230	0.00	1.00	1.00	0.26	0	
5700	100.1	0.00	0.20	0.05	421	0.00	0.87	0.87	0.44	11	
5710	101.1	0.00	0.00	0.00	237	0.00	1.00	1.00	0.20	0	
5720	100.6	0.00	0.03	0.00	272	0.00	1.00	1.00	0.08	0	
5730	100.0	0.00	0.04	0.00	237	0.00	1.00	1.00	0.07	0	
5740	101.1	0.00	0.04	0.00	272	0.00	1.00	1.00	0.16	0	
5750	100.7	0.00	0.07	0.00	237	0.00	1.00	1.00	0.10	0	
5760	101.3	0.00	0.11	0.00	271	0.00	1.00	1.00	0.25	0	
5770	100.1	0.00	0.04	0.00	236	0.00	1.00	1.00	0.15	0	
5780	102.1	0.00	0.00	0.00	242	***.***	***.***	***.***	0.07	0	
5790	100.1	0.00	0.03	0.00	236	0.00	1.00	1.00	0.09	0	
5800	100.7	0.00	0.02	0.00	242	0.00	1.00	1.00	0.06	0	
5810	100.0	0.00	0.02	0.00	236	0.00	1.00	1.00	0.05	0	
5820	100.7	0.00	0.05	0.02	311	0.00	0.83	0.83	0.07	28	
5830	100.3	0.00	0.06	0.00	253	0.00	1.00	1.00	0.04	0	
5840	100.0	0.01	0.09	0.01	298	0.10	0.90	1.00	0.07	14	
5850	101.2	0.00	0.08	0.07	300	0.00	0.57	0.57	0.10	70	
5860	100.3	0.00	0.05	0.00	289	0.00	1.00	1.00	0.07	0	
5870	102.8	0.00	0.06	0.01	291	0.00	1.00	1.00	0.10	10	
5880	101.1	0.00	0.04	0.00	291	0.00	1.00	1.00	0.07	0	

CONFIDENTIAL

UNTIL 28/05/92

CONFIDENTIAL
UNTIL

DEPTH	TEMP	GRS	ALT	SZ	TEMP	PI	OP	PI	TP	PI	TO	PI	HI
1460	100.4	0.00	0.06	0.08	326	0.00	0.43	0.43	0.43	0.26	303	26	303
1470	100.6	0.00	0.10	0.05	286	0.00	0.71	0.71	0.71	0.19	26	26	26
978	100.0	0.00	0.44	1.15	415	0.00	0.28	0.28	0.28	0.54	212	212	212

Ans. ~~1470~~ 1470
26/11/77



DRILL-STEM TEST DATA

Mobil Inc Neo Dun Mtadek Lake	Test No Two
66 20 N - 12 15 W	Zone Tested
Mobil Oil Canada Ltd	Interval 2170 - 2270
Steve McDonald	Date May 3, 1970
Tester Mel Moscrip	

Tool Joint Dual Bottom Hole RFS Tool No 53 & 55
11 mins ISI 57 mins Flow 56 mins PSI 86

Specify Inside or Outside	INS REC No 1030	OUT REC No 2012	RANGE	HR	CLOCK
	6259	1151			
DEPTH	2152	2184			
Initial Hydro Mud Press	979	999			
Initial Air Press	951	974			
Initial Wax Press	75	107			
Final Air Press	359	331			
Final Hydro Mud Press	943	968			
Final Hydro Mud Press	979	999			

Mud Drop NIL Fluid Loss Mud Weight 8.8
Viscosity 42 Temperature °F 32 Net Pay Tested
Bottom Packer Depth 2170 Total Depth 2170
Drill Pipe Size 3 1/2" IF Wt 13.3 Drill Collar ID 2 7/8" Fr Rst 6.3
Bottom Choke Size Closed Bottom Choke Size 1" Main Hole Size 1 1/2"
Annulus Size 4 1/2" Rat Hole Size Feet of Rat Hole
Type Rubber Size 7 1/2" A

Flow Recovery Total Feet 710
Recovery 10 Feet of Drilling mud
Recovery 700 Feet of Sulphurous
Recovery Feet of
Recovery Feet of
Recovery Feet of

Time	Temp. F	Press Rdg.	psi	Orifice Size	MCF/Day
mins	Temp. F	Press Rdg.	psi	Orifice Size	MCF/Day
mins	Temp. F	Press Rdg.	psi	Orifice Size	MCF/Day
mins	Temp. F	Press Rdg.	psi	Orifice Size	MCF/Day
mins	Temp. F	Press Rdg.	psi	Orifice Size	MCF/Day
mins	Temp. F	Press Rdg.	psi	Orifice Size	MCF/Day

Flow Rate for Drill Pipe

REMARKS Weak initial puff, weak air blow increasing to fair throughout test.



TESTING REPORT

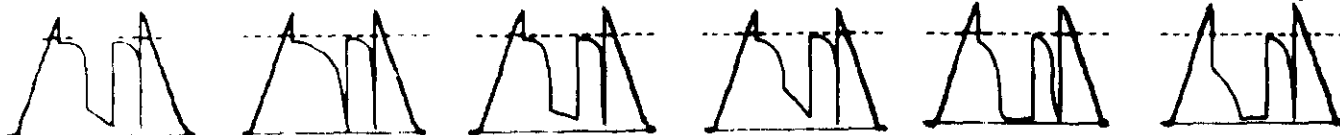
45 LANDING SUB _____
45 CHAMBER _____
45 TOOL OR P.O. SUB _____ 1.00
CO SUB _____ 1.00
SHUT IN TOOL _____ 5.20
R.F.S. No. _____ 3.30
R.F.S. No. _____ 3.30
HYDRAULIC TOOL _____ 7.20
JARS _____ 6.00
RECORDER No. 1030 _____ 5.00 DEPTH 2152
RECORDER No. _____ DEPTH _____
SAFETY JOINT _____ 1.75
BY PASS SUB _____
PACKER _____ 6.00
PACKER _____ 5.00
ANCHOR—SPECIFY _____ 1.00
BLANK OFF OR BY PASS SUB _____
RECORDER No. _____ DEPTH _____
PACKER _____ TOTAL INTERVAL 50.40
PACKER _____
ANCHOR—SPECIFY Perf _____ 12.00
RECORDER No. 2012 _____ 5.00 DEPTH 2184
Drilling Pipe _____ 30.40
BULLNOSE _____ 2.00

TOTAL DEPTH 22.0

TOTAL TAIL PIPE 50.40

TOTAL TEST TOOL 95.15

DST CHARTS FOR COMPARATIVE VISUAL ANALYSIS





DST PRESSURE INCREMENTS

Recorder No 1030

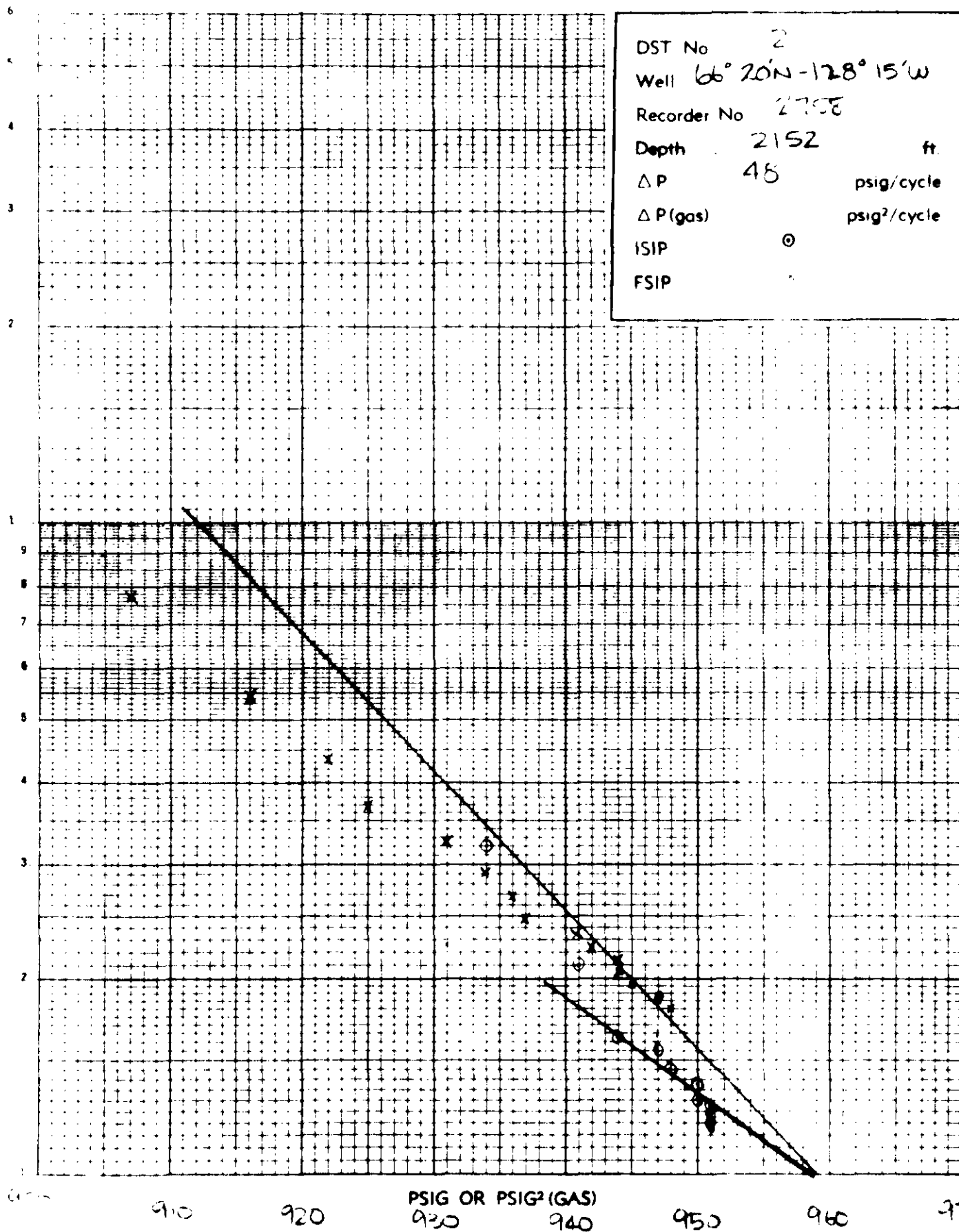
Depth 2152

Points	INITIAL CIP				FINAL CIP			
	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG
1	0	11	0	49	0	67	0	359
2	5	16	3.20	934	5	72	14.4	898
3	10	21	2.10	941	10	77	7.70	907
4	15	26	1.73	944	15	82	5.45	916
5	20	31	1.55	947	20	87	4.35	922
6	25	36	1.44	948	25	92	3.62	925
7	30	41	1.37	950	30	97	3.24	931
8	35	46	1.31	950	35	102	2.92	934
9	40	51	1.28	951	40	107	2.68	936
10	45	56	1.24	951	45	112	2.5	937
11	50	61	1.22	951	50	117	2.34	941
12	55	66	1.20	951	55	122	2.22	942
13	57	68	1.19	951	60	127	2.12	944
14					65	132	2.03	944
15					70	137	1.96	945
16					75	142	1.89	947
17					80	147	1.84	947
18					85	152	1.79	948
19					86	153	1.78	948
20								
21								
22								
23								
24								



TESTING REPORT

DST No 2
Well 66° 20' N - 128° 15' W
Recorder No 2758
Depth 2152 ft.
 ΔP 48 psig/cycle
 $\Delta P(\text{gas})$ psig²/cycle
ISIP $\odot$
FSIP $\cdot$

 $\frac{r+0}{\theta}$ 

CALCULATIONS FOR LIQUID RECOVERY

DATA:

Recovery	(4.61 BBLs)	623	D.C. ft.	Estimated viscosity (μ)	1	cp
	(.70 BBLs)	87	D.P. ft.	Total flowing time (t)	67	min.
Interval (h)	Est. 20		ft.	Reservoir press. (P_R)	960	psig
Wellbore radius (r_w)	.33		ft.	Final SIP (P_w)	948	psig
Cushion volume			bbl.	Final FP (P_f)	359	psig
Annular mud vol.			bbl.	Slope (ΔP)	48	psig/cycle

AVERAGE DST PRODUCTION RATE:

$$Q = \frac{1440 \text{ (Recovery in bbl.)}}{\text{Total flowing time (min.)}}$$

$$= \frac{1440}{67} = 114 \text{ bbl./day}$$

IN SITU CAPACITY:

$$Kh = \frac{162.6 Q \mu}{\Delta P}$$

$$= \frac{162.6 (114) 1}{48}$$

$$= 38.6 \text{ md.-ft.}$$

EFFECTIVE PERMEABILITY:

$$K = \frac{\text{In situ Capacity}}{h}$$

$$= \frac{38.6}{20}$$

$$= 1.93 \text{ md.}$$

PRODUCTIVITY INDEX:

$$P.I. = \frac{Q}{P_o - P_f}$$

$$= \frac{114}{601} = .19 \text{ bbl./day/psi}$$

APPROXIMATE DRAINAGE RADIUS:

$$b = \sqrt{K t}$$

$$= \sqrt{(1.93) (67)} = 11.36 \text{ ft.}$$



CALCULATIONS FOR LIQUID RECOVERY (PAGE 2)

ESTIMATED DAMAGE RATIO:

$$\begin{aligned} \text{D.R.} &= \frac{P_o - P_i}{2 (\Delta P) \log b/r_w} = \frac{601}{2 (48) \log \frac{11.36}{.33}} \\ &= 4.05 \end{aligned}$$

PRODUCTION WITH DAMAGE REMOVED:

$$\begin{aligned} Q_{\text{No Damage}} &= Q(\text{D.R.}) = 114 \times 4.05 = 460 \text{ bbl./day} \end{aligned}$$

NOMENCLATURE

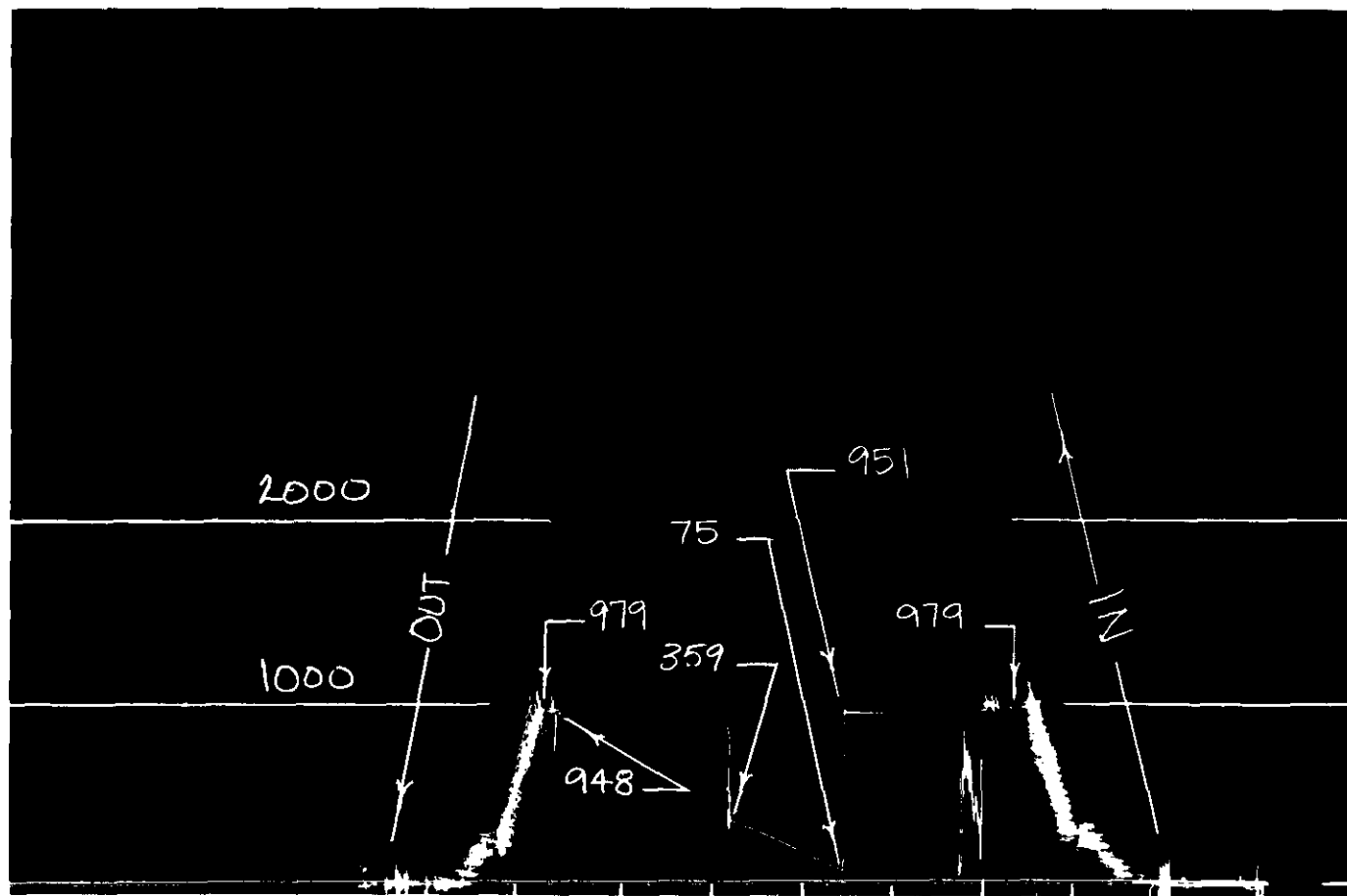
Q	=	Average DST Production (oil and/or water)—bbl/day
Q_g	=	Gas production rate during test corrected to 14.4 psia and 60° F—MCF/D
K	=	Permeability—md
h	=	Thickness of zone or interval tested—ft.
μ	=	Viscosity—cp
Z	=	Deviation factor for gas—dimensionless
T	=	Reservoir temperature—°R
t	=	Total flowing time—min.
θ	=	Shut-in time—min.
r_w	=	Radius of wellbore—ft.
b	=	Radius of drainage or investigation (i.e. r_e)—ft.
P_o	=	Original Reservoir pressure (extrapolated)—psig
P_w	=	Final shut-in pressure—psig
P_i	=	Final flowing pressure—psig
P_s	=	Extrapolated pressure when $\frac{T+\theta}{\theta}$ is very small—psig (i.e., effect of damage is shown in build-up curve when shut-in time (θ) is very small in comparison to flowing time (t)).
ΔP	=	Slope of straight line portion of pressure build up plot—psig/cycle or psig ² /cycle (gas)
$\Delta P_{\text{Damaged Zone}}$	=	Pressure drop caused by damaged zone.
A.O.F.	=	Absolute open flow (estimated from DST data and using an assumed slope of 45°).

SUMMARY

Initial shut-in pressure (ISIP)	951	psi
Formation pressure (extrapolated)	460	psi
Final flowing pressure (FFP)	359	psi
Final shut-in pressure (FSIP)	948	psi
Effective permeability (K)	1.93	md
DST production rate	114	BBL/D
		MCF/D
DST production without damage	460	BBL/D
		MCF/D
Estimated A.O.F. with no damage		MCF/D

ASSUMPTIONS AND LIMITATIONS

The above DST interpretation calculations require several necessary assumptions to provide a quick estimate of many of the factors involved. As a result the information gained should be used to form an opinion or estimate only, until the assumptions of reservoir and fluid properties can be wholly or partially clarified by more complete analysis and testing.





DRILL-STEM TEST UNIT

Well Name	Mobil INC INCO SUN ONTADOK LAKE	Test No.	ONE
Well No.	1002	Well Depth	1442
Company	Mobil	Test No.	1092 = 1442
Comp Rep	Harry Martinoff	Test No.	1092 = 1442
Test No.	1092	Date	April 26/70

Butch Smestad

Type of test Dual Bottom Hole RFS Tool No 53 & 55

Pump 5 mins ISI 97 mins Flow 97 mins FSI 142 mins

Locality Inside or Outside	INS REC No	OUT REC No	REC No
	6259 RANGE 12 HR CLOCK	5797 RANGE 12 HR CLOCK	RANGE HR CLOCK
DEPTH	1372	1402	
Initial Mud Press	611	630	
Initial Flow Press	617	636	
Initial Flow Press	378	400	
Initial Flow Press	617	636	
Initial Flow Press	617	636	
Initial Flow Press	611	630	

Mud Drilling Nil Fluid flow 8.8
Viscosity 38 Temperature 20 Max Puff Tested
Top Pressure 1384 Bottom Fucker Depth 1390 Total Depth 1443
Drill Pipe Size 3 1/2" IF Drill Collar 2 7/8" Gun 623
Surface Fucker Size Open Bottom Check Size 1" Main Hole Size 8 1/2"
Annulus 4 1/2" Rat Hole Size Feet of Rat Hole
Cushion Amount Type Rubber Size 7 1/2" X 2

Fluid Recovery Total Feet Fluid to surface
Recovered 130 Feet of Drilling mud
Recovered 1163 Feet of Sulphurous water
Recovered Feet of
Recovered Feet of
Recovered Feet of

Flow Measured	Riser size
mins Temp. Press Rdp. psi Orifice Size MCF/Day	
mins Temp. Press Rdp. psi Orifice Size MCF/Day	
mins Temp. Press Rdp. psi Orifice Size MCF/Day	
mins Temp. Press Rdp. psi Orifice Size MCF/Day	
mins Temp. Press Rdp. psi Orifice Size MCF/Day	
mins Temp. Press Rdp. psi Orifice Size MCF/Day	

Bleed Off Time for Drill Pipe

REMARKS Good initial puff. Strong air blow Fluid to surface in 45 min.

Core Log Gas Cont No Chem Gas Lab Gas Cont No



Mobil INC NCC SUN	ONTADEK LAKE	Test No	ONE
66 20 N	118 15 W	Zone tested	
North Oil Canada Ltd		139	114
Harry Martinoff	Mal Moscrip	Date	April 26/70

Butch Street		53 & 55	
Final Bottom Hole			
53	55	53	55

	IN	OUT	
Inside : Outside	6259	5797	
DEPTH	272	1000	
Press	617	636	
Press	378	414	
Press	617	636	
Press	617	636	
Press	617	636	

[illegible]

Flow log	Total flow	Fluid to surface	
Flow log	136	Flow log	Drilling mud
Flow log	1163	Flow log	Artificially created
Flow log		Flow log	
Flow log		Flow log	
Flow log		Flow log	

Case	Part	Part No.	Part Name	Part Description	Part Price	Part Qty	Part Total
1001	Part	1001	Part 1001	Part 1001 Description	1001.00	1	1001.00
1002	Part	1002	Part 1002	Part 1002 Description	1002.00	1	1002.00
1003	Part	1003	Part 1003	Part 1003 Description	1003.00	1	1003.00
1004	Part	1004	Part 1004	Part 1004 Description	1004.00	1	1004.00
1005	Part	1005	Part 1005	Part 1005 Description	1005.00	1	1005.00
1006	Part	1006	Part 1006	Part 1006 Description	1006.00	1	1006.00
1007	Part	1007	Part 1007	Part 1007 Description	1007.00	1	1007.00
1008	Part	1008	Part 1008	Part 1008 Description	1008.00	1	1008.00
1009	Part	1009	Part 1009	Part 1009 Description	1009.00	1	1009.00
1010	Part	1010	Part 1010	Part 1010 Description	1010.00	1	1010.00

REMARKS: Good initial puff. Strong air blwr. Fluid to surface in 45 min.

1. The above information was obtained from the following sources:



TESTING REPORT

45 LANDING SUB _____
45 CHAMBER _____
45 TOOL OR P.O. SUB _____ 1.00
CO SUB _____ 1.00
SHUT IN TOOL _____ 5.20
R.F.S. No. 55 _____ 3.30
R.F.S. No. 53 _____ 3.30
HYDRAULIC TOOL _____ 7.20
JARS _____ 6.00
RECORDER No. 1030 _____ 5.00 DEPTH 1373
RECORDER No. _____ DEPTH _____
SAFETY JOINT _____ 1.75
BY PASS SUB _____

1. PACKER DEPTH 1384

PACKER _____ 6.00

2. PACKER DEPTH 1390

PACKER _____ 5.00
ANCHOR—SPECIFY _____ 1.00
TOTAL TOOL ABOVE INTERVAL 44.75

ANCHOR—SPECIFY _____

BLANK OFF OR BY PASS SUB _____

RECORDER No. _____ DEPTH _____

3. PACKER DEPTH _____

PACKER _____ TOTAL INTERVAL 53.84

4. PACKER DEPTH _____

PACKER _____

ANCHOR—SPECIFY Perf _____ 10.00

RECORDER No. 2012 _____ 5.00 DEPTH 1402

Perf _____ 5.00

Single _____ 30.84

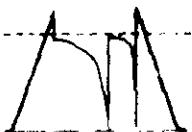
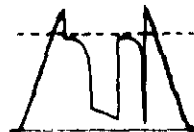
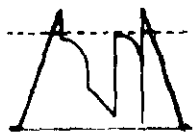
TOTAL DEPTH 1443

BULLNOSE _____ 2.00

TOTAL TAIL PIPE 53.84

TOTAL TEST TOOL 98.59

DST CHARTS FOR COMPARATIVE VISUAL ANALYSIS

HIGH PERMEABILITY
STRONG DAMAGE EFFECTHIGH PERMEABILITY
NO DAMAGE EFFECTMEDIUM PERMEABILITY
STRONG DAMAGE EFFECTMEDIUM PERMEABILITY
NO DAMAGE EFFECTLOW PERMEABILITY
STRONG DAMAGE EFFECTLOW PERMEABILITY
NO DAMAGE EFFECT



DST PRESSURE INCREMENTS

Recorder No 1030

Depth 1372

Points	INITIAL CIP				FINAL CIP			
	Time Defl "	T + θ	$\frac{T + \theta}{\theta}$	PSIG	Time Defl "	T + θ	$\frac{T + \theta}{\theta}$	PSIG
1	0			359	0			617
2	5			617	5			617
3	10			617	10			617
4	15			617	15			617
5	20			617	20			617
6	25			617	25			617
7	30			617	30			617
8	35			617	35			617
9	40			617	40			617
10	45			617	45			617
11	50			617	50			617
12	55			617	55			617
13	60			617	60			617
14	65			617	65			617
15	70			617	70			617
16	75			617	75			617
17	80			617	80			617
18	85			617	85			617
19	90			617	90			617
20	95			617	95			617
21	97			617	100			617
22					105			617
23					110			617
24					115			617

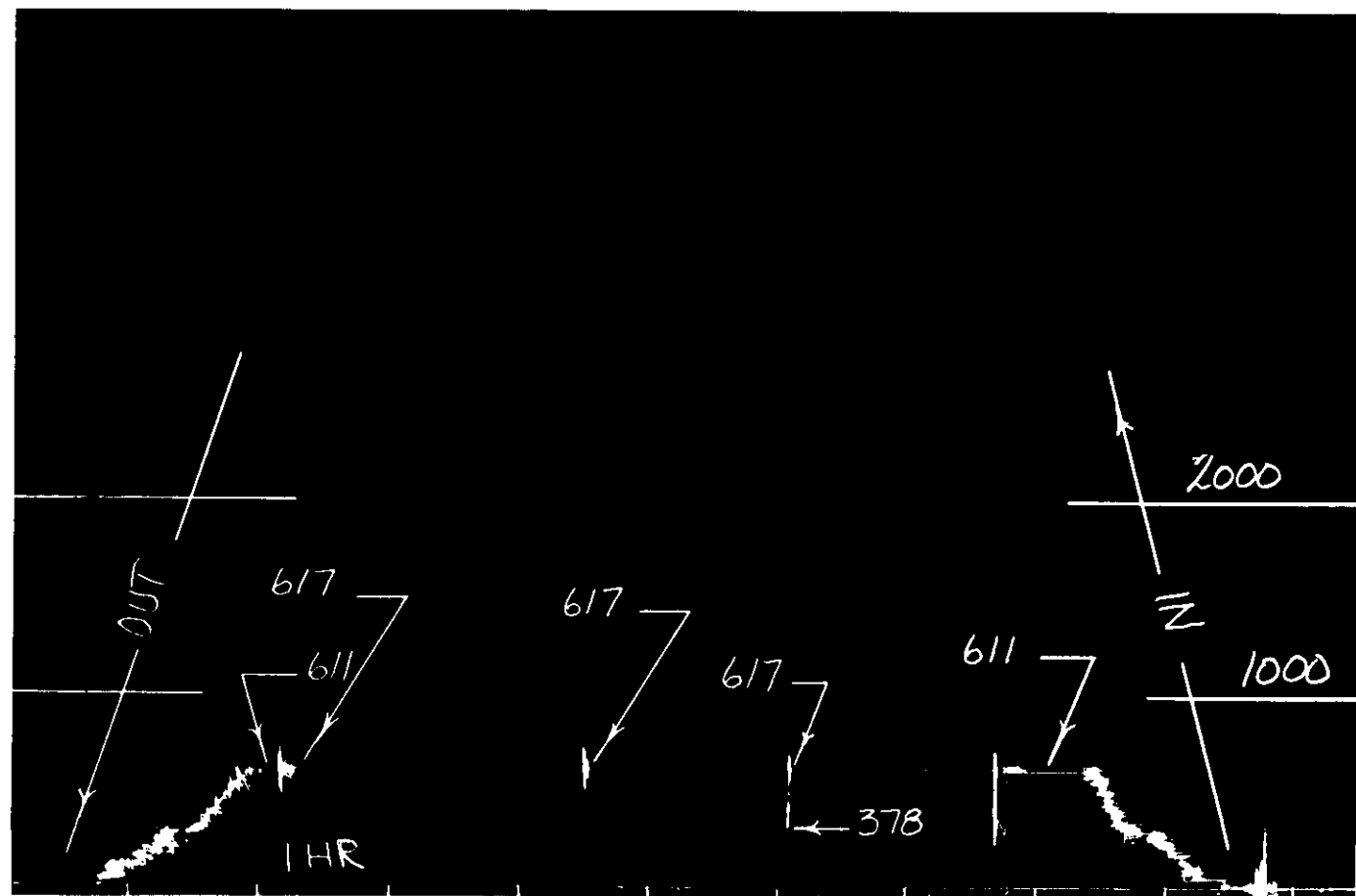


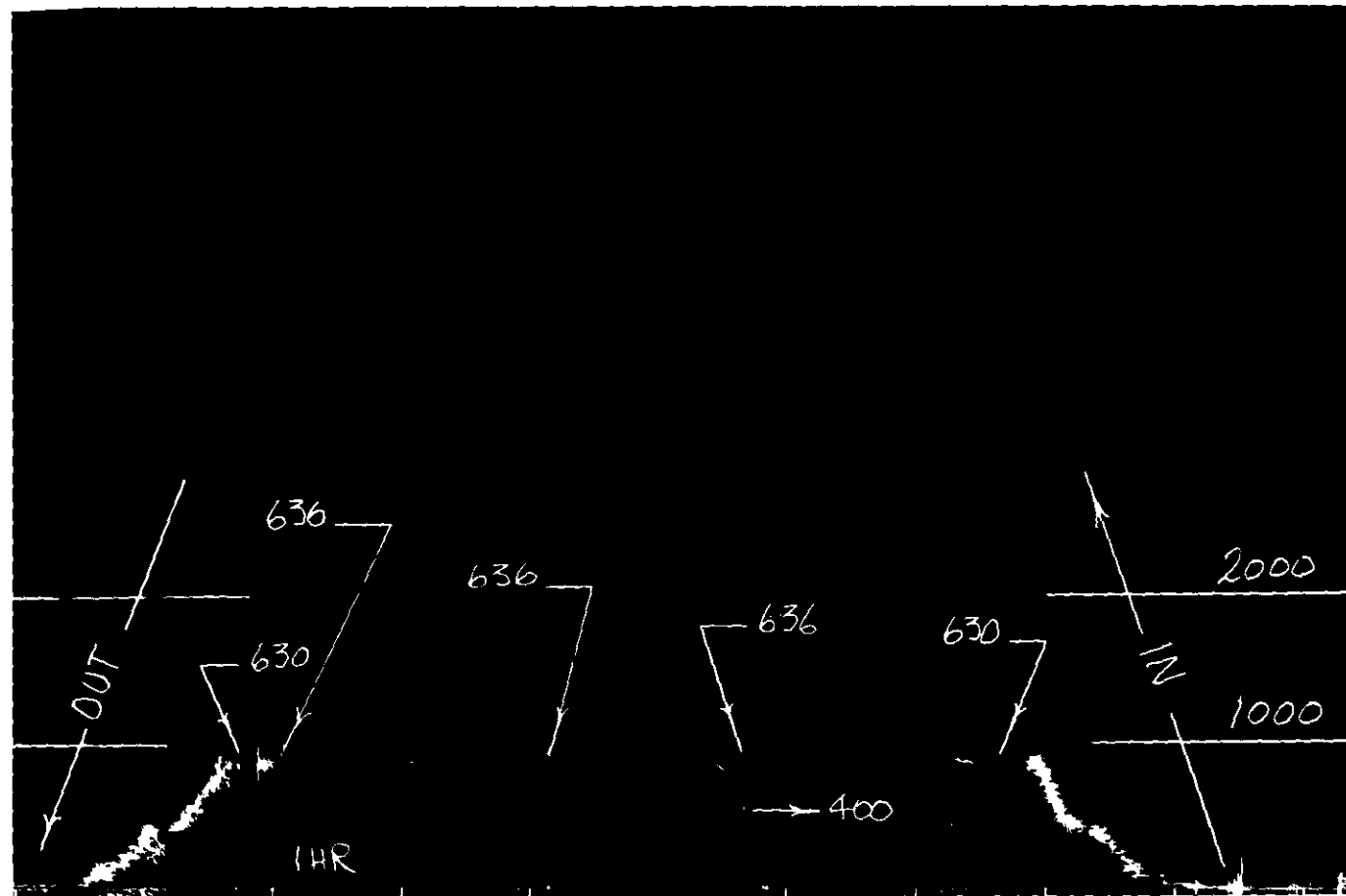
DST PRESSURE INCREMENTS

Recorder No 1030

Depth 1372

Points	INITIAL CIP				FINAL CIP			
	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG	Time Defl. "	T + θ	$\frac{T + \theta}{\theta}$	PSIG
1					120			617
2					125			617
3					130			617
4					135			617
5					140			617
6					141			617
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								





ISPG CORE AND SAMPLE REPOSITORY

NOTE: ADDITIONAL GEOCHEMICAL DATA EXISTS FOR THIS WELL BUT IS
CONFIDENTIAL UNTIL Feb 22/92.

AT THIS TIME THE DATA WILL BE INCORPORATED INTO THE WELL FILE.

IF THIS DATE HAS PASSED AND THE MATERIAL DOES NOT APPEAR TO BE HERE IN
THE FILE, PLEASE ASK ONE OF THE STAFF FOR IT SO THAT IS MAY BE
INCORPORATED.

THANK YOU.

ISPG CORE & SAMPLE REPOSITORY:

The following is a list of core or samples, and the results of a pyrolysis and palynology study performed by Chevron Canada Resources in February 1990:

<u>Well</u>	<u>Location</u>	<u>Depth (ft)</u>	<u>S1</u>	<u>S2</u>	<u>TOC</u>	<u>HI</u>	<u>Micro-organic Analysis</u>
Aquit. Old Ft. Pt. E-30	64° 50' N 124° 45' W	2570, 2582	0.00	0.00	0.00	0	100% amorphous
		2571.5	0.01	0.00	0.06	0	
		2573	0.00	0.01	0.00	0	
Candel Police Is. L-66	64° 50' N 125° 00' W	4287	0.13	0.08	0.50	16	100% amorphous
Candel Ft. Norman K-14	65° 00' N 125° 15' W	2805.5, 2808	0.03	0.03	0.08	37	70% amorphous
							30% bitumin
Imp. Vermilion Ridge #1 N-28	65° 10' N 126° 00' W	2660, 2665	0.11	0.06	0.10	60	100% bitumin
		2806	0.03	0.15	0.16	93	100% amorphous
		2807.5	0.09	0.20	0.37	54	
		5955	0.02	0.35	0.04	875	
		5962	0.07	0.48	0.05	960	no recovery
Aquit. Dodo Canyon K-03	65° 02' N 126° 46' W	8863, 8870	0.04	0.00	0.03	0	no recovery
Imp. Loon Creek #2 G-78	65° 10' N 126° 15' W	4587, 4589, 4592	0.02	0.00	0.10	0	100% bitumin
B.P. Lost Lake G-22	66° 00' N 123° 15' W	3725	0.01	0.49	0.13	376	80% cellular matter
Mobil Ontadek Lake N-39	66° 20' N 128° 15' W	5882	0.09	0.00	0.03	0	?
Atl. Colar Manitou Lake L-61	66° 30' N 128° 45' W	5572.5	0.67	1.09	0.16	681	no recovery

The thin sections from the palynology study are also enclosed.