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EARLOUGHER ENGINEERING
CORE SUMMARY

Company Kewanee Oil Company Lease Daniels Well No. 105

Location 980 feet west, 310 feet south of northeast corner.

Section 4 Twp. 21-S Rge. 21-E County Anderson State Kansas

Formation Cored Squirrel Sand Type Core No. 6 Baker Barrel

Date Cored 11/1 & 2/47 Date Shot _____ Date Completed _____

Depths:

Started coring, shale	600.0 ft.
Top of probable gas sand	600.1 "
Bottom of probable gas sand	605.0 "
Net feet of probable gas sand	4.6 "
Top of oil sand	605.0 "
Bottom of oil sand	639.4 "
Net feet of oil sand	25.5 "
Bottom of core, probable lime	640.5 "
Total cored	40.5 "
Feet analyzed	30.9 "

Shot Record:

Set Packer 610.0 Feet
Plug back to 639.0 ft.

Depth, Feet		Feet	Shell Diameter	Quarts Per Foot	Quarts Total
From	To				
613.	630.	17.	4"	2.5	42.5

Completion Data:

Hrs. well stood after coring _____; Feet Fluid in Hole _____ (Oil _____ Water _____)

Clean-out time, hrs. _____; Initial production, bbls. day _____ (Oil _____ Water _____)

Remarks:

This core shows 4.6 net feet of probable gas sand between 600.1 and 605.0 feet. Average oil saturation in this probable gas zone is 27 percent and average permeability 3.8 millidarcys.

Net feet of oil sand is 25.5 feet, located between 605.0 and 639.4 feet. The sand and shale section below 630.0 feet contains considerable soft shale and sand, and the oil saturation drops off to some extent. Because of these conditions, it was recommended that this section not be shot.

(Continued following page.)

PERMEABILITY Average permeability is 21 millidarcys and values range from 0.1 to 76 millidarcys. Permeability capacity is 530 foot millidarcys.

POROSITY Average porosity is 20.0 percent and values range from 9.4 to 25.1 percent. The wide variation in porosity results from the shaly nature of the sand section.

PERCENT SATURATION Average oil saturation is 45 percent and values range from 35 to 62 percent. Average core water saturation is 45 percent.

OIL CONTENT Average oil content is 700 barrels per acre foot and values range from 470 to 990 barrels per acre foot.

LABORATORY FLOODING TESTS Four flood samples yielded an average oil recovery of 366 barrels per acre foot in laboratory flooding tests. Average residual oil saturation after laboratory flooding was 21 percent.

CONCLUSIONS

1. Net feet of oil sand is 25.5 feet, located between 605.0 and 639.4 feet.
2. A probable gas zone lies between 600.1 and 605.0 feet and it was recommended packer be set at 610.0 feet with top of shot at 613.0 feet.
3. Also, it was recommended that the bottom broken sand and shale between 630.0 and 639.0 feet not be shot because of the somewhat lower oil saturation and the streaks of rotten shale and sand present.
4. Estimated oil recovery by water flooding is 330 barrels per acre foot, or 8,400 barrels per acre from the area of which this core is representative.

Respectfully submitted

EARLOUGHER ENGINEERING

J M Robinson

J. M. Robinson, Engineer

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EARLOUGH ENGINEERING

RESULTS OF SATURATION TESTS

COMPANY Keweenaw Oil Company

WELL Daniels Well No. 105

Sat. No.	Depth Feet	Porosity Per Cent	PER CENT SAT.			Avg. Oil Content Bbls./A. Ft.	FT. OF SAND		Total Oil Content Bbls./Acre
			Oil	Water	Total		Ft.	Cum.	
1- A	600.9	18.7	34.	53.	87.	490.	1.1	1.1	540.
2- A	602.1	18.7	25.	49.	74.	360.	1.1	2.2	400.
1	603.6	19.8	22.	39.	61.	340.	1.2	3.4	410.
2	604.4	19.8	28.	39.	67.	420.	1.2	4.6	500.
3	605.9	16.9	46.	54.	100.	610.	1.2	5.8	730.
4	607.1	10.6	58.	42.	100.	480.	1.3	7.1	620.
5	608.2	20.1	44.	46.	90.	690.	1.2	8.3	830.
F- 1	609.3	22.8	42.	--	--	740.	0.9	9.2	670.
6	609.9	19.6	34.	45.	79.	520.	1.0	10.2	520.
7	610.8	18.4	35.	60.	95.	500.	0.6	10.8	300.
8	612.1	23.2	34.	43.	77.	610.	1.1	11.9	670.
9	614.8	21.1	44.	50.	94.	720.	1.1	13.0	790.
10	615.4	21.1	34.	59.	93.	550.	0.6	13.6	330.
F- 2	616.6	20.5	50.	--	--	800.	0.6	14.2	480.
11	617.5	25.1	37.	52.	89.	710.	0.4	14.6	280.
12	618.8	21.6	36.	39.	75.	600.	0.7	15.3	420.
F- 3	619.7	23.9	45.	--	--	840.	1.1	16.4	920.
13	621.9	22.5	40.	50.	90.	690.	1.2	17.6	830.
14	622.9	22.2	54.	42.	96.	920.	1.1	18.7	1010.
15	623.9	20.4	53.	38.	91.	840.	1.2	19.9	1010.
16	624.9	21.7	51.	35.	86.	860.	0.5	20.4	430.
17	625.6	21.8	39.	54.	93.	650.	0.8	21.2	520.
18	626.8	20.5	48.	52.	100.	770.	1.3	22.5	1000.
19	627.6	20.1	62.	38.	100.	960.	0.8	23.3	770.
20	628.6	20.9	52.	42.	84.	840.	1.1	24.4	920.
21	629.9	21.7	59.	36.	95.	990.	0.8	25.2	790.
22	631.1	9.4	64.	36.	100.	470.	1.2	26.4	560.
23	632.1	19.9	36.	38.	74.	550.	0.4	26.8	220.
24	634.5	20.1	50.	39.	89.	780.	1.7	28.5	1330.
25	638.2	20.1	37.	53.	90.	580.	0.8	29.3	460.
26	639.1	20.1	36.	50.	86.	560.	0.8	30.1	450.

SUMMARY

	DEPTH FEET		FEET OF SAND	AVG. POROSITY	AVG. OIL SAT.	AVG. WATER SAT.	AVG. OIL CONTENT BBLs./A. FT.	TOTAL OIL CONTENT BBLs./ACRE
	FROM	TO						
1)	600.1	605.0	4.6	19.3	27.	45.	400.	1,850.
2)	605.0	630.0	20.6	20.5	46.	46.	724.	14,840.
3)	630.7	639.4	4.9	17.8	45.	43.	616.	3,020.
33)	605.0	639.4	25.5**	20.0	45.	45.	700.	17,860.

**-Includes 0.4 ft. core loss, probably sand.

EARLOUGH ENGINEERING

RESULTS OF PERMEABILITY TESTS

COMPANY Kovance Oil Company

WELL Daniels Well No. 105

Sample No.	Depth Feet	Permeability Millidarcys	FEET OF SAND		Capacity Ft. X Md.	Sample No.	Depth Feet	Permeability Millidarcys	FEET OF SAND		Capacity Ft. X Md.
			Ft.	Cum. Ft.					Ft.	Cum. Ft.	
1	600.4	1.2	0.5	0.5	0.6	31	619.9	50.✓	0.3	16.4	15.
2	600.7	9.1	0.6	1.1	5.5	32	621.5	41.✓	0.4	16.8	16.
3	601.7	1.7	1.1	2.2	1.9	33	621.8	23.✓	0.4	17.2	9.2
4	603.0	8.3	0.6	2.8	5.0	34	622.2	32.✓	0.4	17.6	13.
5	603.4	0.2	0.6	3.4	0.1	35	622.7	13.✓	0.6	18.2	7.8
6	604.1	3.5	0.6	4.0	2.1	36	623.2	27.✓	0.5	18.7	14.
7	604.8	3.5	0.6	4.6	2.1	37	623.7	4.5	0.4	19.1	1.8
8	605.5	0.9	0.6	5.2	0.5	38	624.2	8.8	0.4	19.5	3.5
9	606.1	2.6	0.6	5.8	1.6	39	624.6	8.4	0.4	19.9	3.4
10	606.6	0.4	0.6	6.4	0.2	40	625.1	27.✓	0.5	20.4	14.
11	607.4	0.2	0.7	7.1	0.1	41	625.5	25.✓	0.4	20.8	10.
12	607.9	10.✓	0.6	7.7	6.0	42	625.9	22.✓	0.4	21.2	8.8
13	608.4	11.✓	0.6	8.3	6.6	43	626.2	28.✓	0.4	21.6	11.
14	608.9	25.✓	0.4	8.7	10.	44	626.6	10.✓	0.4	22.0	4.0
15	609.5	36.✓	0.5	9.2	18.	45	627.1	32.✓	0.5	22.5	16.
16	609.8	11.✓	0.5	9.7	5.5	46	627.8	15.✓	0.8	23.3	12.
17	610.6	24.✓	0.5	10.2	12.	47	628.2	20.✓	0.6	23.9	12.
18	611.1	6.3	0.6	10.8	3.8	48	628.9	42.✓	0.5	24.4	21.
19	611.8	Imp.	0.2*			49	629.4	25.✓	0.4	24.8	10.
20	612.5	31.✓	1.1	11.9	34.	50	629.7	41.✓	0.4	25.2	16.
21	613.5	0.7	0.6*			51	630.8	0.1	0.6	25.8	0.1
22	614.4	23.✓	0.6	12.5	14.	52	631.5	0.2	0.6	26.4	0.1
23	615.1	4.7	0.5	13.0	2.4	53	631.9	15.✓	0.4	26.8	6.0
24	615.7	39.✓	0.6	13.6	23.	54	633.2	20.✓	0.3	27.1	6.0
25	616.2	5.0	0.4	14.0	2.0	55	634.1	11.✓	0.7	27.8	7.7
26	617.0	2.6	0.2	14.2	0.5	56	634.8	31.✓	0.7	28.5	22.
27	617.7	15.✓	0.4	14.6	30.	57	637.9	50.✓	0.8	29.3	40.
28	618.4	2.8	0.7	15.3	2.0	58	638.7	26.✓	0.4	29.7	10.
29	619.0	34.✓	0.4	15.7	14.	59	639.3	50.✓	0.4	30.1	20.
30	619.4	32.✓	0.4	16.1	13.						

*- Not included in cumulative feet of sand.

SUMMARY

	DEPTH FEET		FEET OF SAND	AVERAGE PERMEABILITY	CAPACITY FT. X MD.
	FROM	TO			
(1)	600.1	605.0	4.6	3.8	17.3
(2)	605.0	630.0	20.6	20.	417.7
(3)	630.7	639.4	4.9	23.	111.9
(2&3)	605.0	639.4	25.5**	21.	529.6

** - Includes 0.4 ft. core loss, probably sand.

COMPANY Kewanee Oil Company

PER CENT SAT.	Oil	Water	Depth Feet	Net No.
23.3	34.7	18.7	2.000	A-1
23.3	34.7	18.7	1.000	A-2
23.3	34.7	18.7	0.000	1
23.3	34.7	18.7	4.400	2
23.3	34.7	18.7	0.000	3
23.3	34.7	18.7	1.700	4
23.3	34.7	18.7	0.000	5
23.3	34.7	18.7	0.000	6
23.3	34.7	18.7	0.000	7
23.3	34.7	18.7	0.000	8
23.3	34.7	18.7	0.000	9
23.3	34.7	18.7	0.000	10
23.3	34.7	18.7	0.000	11
23.3	34.7	18.7	0.000	12
23.3	34.7	18.7	0.000	13
23.3	34.7	18.7	0.000	14
23.3	34.7	18.7	0.000	15
23.3	34.7	18.7	0.000	16
23.3	34.7	18.7	0.000	17
23.3	34.7	18.7	0.000	18
23.3	34.7	18.7	0.000	19
23.3	34.7	18.7	0.000	20
23.3	34.7	18.7	0.000	21
23.3	34.7	18.7	0.000	22
23.3	34.7	18.7	0.000	23
23.3	34.7	18.7	0.000	24
23.3	34.7	18.7	0.000	25
23.3	34.7	18.7	0.000	26
23.3	34.7	18.7	0.000	27
23.3	34.7	18.7	0.000	28
23.3	34.7	18.7	0.000	29
23.3	34.7	18.7	0.000	30

DEPTH FEET	TO	FROM	AVG. POROSITY
600.1	605.0	1.000	19.3
605.0	630.0	0.000	20.5
630.7	639.4	1.000	17.8
605.0	639.4	0.000	20.0

**Includes 0.4 ft. core loss, probably sand.

COMPANY Kewanee Oil Company

LEASE Daniels

WELL NO. 105

Sample No.	Depth	Porosity	Perm. Approx.	BEFORE FLOODING 1/			Max. Press. Psi.	Water Thru c.c.	Time Min.	FLOOD POT RESIDUALS			OIL RECOVERY B./A. Ft.	
				Oil Sat.	Water Sat.	Oil Content B./A. Ft.				Oil Sat.	Water Sat.	Oil Content B./A. Ft.	Diff. 2/	Flood Pot
F-1	609.3	22.8	32.	42.	--	740.	40.	110.	492.	23.	60.	410.		333.
F-2	616.6	20.5	0.1	50.	--	800.	40.	230.	492.	24.	72.	390.		410.
F-3	619.7	23.9	42.	45.	--	840.	10.	32.	72.	27.	56.	500.		340.*
F-7	625.3	21.8	26.	34.	--	580.	40.	2345.	492.	17.	74.	300.		276.
F-8	626.5	20.5	16.	48.	--	770.	40.	653.	492.	21.	71.	330.		444.
**Sample cracked and taken down.														

SUMMARY

Sec.	DEPTH, FEET		Net Ft. of Sand	Avg. Por.	Average Core Sat.		CORE OIL CONTENT		PERMEABILITY		FLOOD POT RESIDUALS				OIL RECOVERY · Bbl./Ac.		
	From	To			Oil	Water	Avg. B./A. Ft.	Total Bbl./Ac.	Avg. Mds.	Capacity Ft. x Md.	Saturation		Oil Content		Diff.	Flood Pot	
											Oil	Water	B./A. Ft.	Bbl./Ac.			
1	600.1	605.0	4.6	19.3	27.	45.	400.	1,850.	3.8	17.	NO FLOOD SAMPLES						
2	605.0	630.0	20.6	20.5	46.	46.	724.	14,840.	20.	418.	21.	69.	334.	6,880.	7,960.	7,540.	
3	630.7	639.4	4.9	17.8	45.	43.	616.	3,020.	23.	112.	NO FLOOD SAMPLES						
2&3	605.0	639.4	25.5**	20.0	45.	45.	700.	17,860.	21.	530.	21.	69.	334.	8,520.	9,340.	9,330.	
**-Includes 0.4 ft. core loss, probably sand.																	

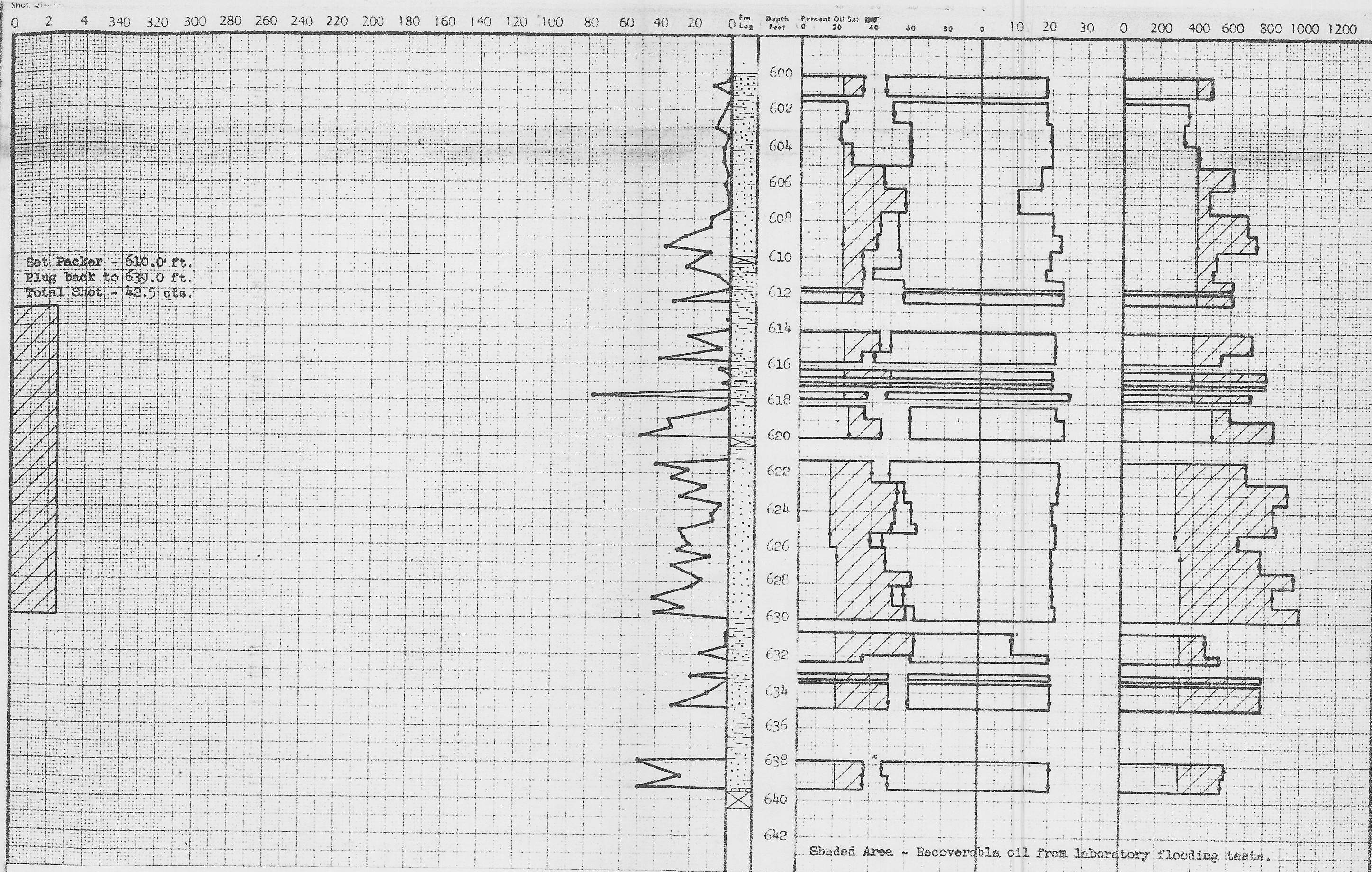
**Includes 0.4 ft. core loss, probably sand.

REMARKS: 1/ Unless otherwise noted, oil content and saturation before flooding equals flood pot oil recovery plus flood pot residual.
2/ Oil recovery as B./A. Ft. Diff. equals B./A. Ft. oil content from adjacent saturation sample minus flood pot residual oil content for flood sample.

**Includes 0.4 ft. core loss, probably sand.

COMPANY

Depth Feet	Sample No.
600.4	1
600.7	2
601.1	3
603.0	4
603.4	5
604.1	6
604.8	7
605.2	8
606.1	9
606.8	10
607.4	11
607.9	12
608.4	13
608.9	14
609.2	15
609.8	16
610.0	17
611.1	18
611.8	19
612.2	20
613.2	21
614.4	22
615.1	23
615.7	24
616.0	25
617.0	26
617.1	27
618.0	28
619.0	29
619.4	30



(1)
(2)
(3)
(4)

87A

87B