

OILFIELD RESEARCH LABORATORIES

536 NORTH HIGHLAND - CHANUTE, KANSAS 66720 - PHONE (316) 431-2650

May 19, 1982

Inco Resources, Inc.
8100 Marty, Suite 117
Overland Park, Kansas 66204

Gentlemen:

Enclosed herewith is the report of the analysis of the rotary core taken from the Davis Lease, Well No. 18, located in Franklin County, Kansas and submitted to our laboratory on May 12, 1982.

Your business is greatly appreciated.

Very truly yours,

OILFIELD RESEARCH LABORATORIES

Sanford A. Michel

SAM/kas

3 c to Overland Park, Kansas
2 c to Hutchinson, Kansas

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Inco Resources, Inc. Lease Davis Well No. 18
 Location _____
 Section 33 Twp. 17S Rge. 21E County Franklin State Kansas

Elevation, Feet
 Name of Sand..... Cattleman
 Top of Core 746.0
 Bottom of Core 766.0
 Top of Sand 747.0
 Bottom of Sand 766.0
 Total Feet of Permeable Sand 16.8
 Total Feet of Floodable Sand 16.4

Distribution of Permeable Sand: Permeability Range Millidarcys	Feet	Cum. Ft.
0 - 10	3.8	3.8
10 - 30	6.4	10.2
30 - 60	3.6	13.8
60 - 100	3.0	16.8

Average Permeability Millidarcys 31.8
 Average Percent Porosity 17.7
 Average Percent Oil Saturation 48.6
 Average Percent Water Saturation 37.6
 Average Oil Content, Bbls./A. Ft. 674.
 Total Oil Content, Bbls./Acre 12,533.
 Average Percent Oil Recovery by Laboratory Flooding Tests 17.2
 Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft. 249.
 Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre 4,079.
 Total Calculated Oil Recovery, Bbls./Acre.....

See "Calculated Recovery"
 Section

The core was sampled by a representative of Oilfield Research Laboratories. Air and KCL were used as a drilling fluid. The core was reported to be from a non-virgin area.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
746.0 - 747.0	Gray shale.
747.0 - 748.0	Grayish brown very shaly sandstone.
748.0 - 749.2	Brown sandstone.
749.2 - 749.6	Gray shale.
749.6 - 752.1	Brown sandstone.
752.1 - 752.9	Brown shaly sandstone.
752.9 - 754.2	Brown sandstone.
754.2 - 756.0	Grayish brown very shaly sandstone.
756.0 - 761.0	Brown sandstone.
761.0 - 762.0	Brown slightly shaly sandstone.
762.0 - 765.2	Brown sandstone.
765.2 - 766.0	Dark brown sandstone.

LABORATORY FLOODING TESTS

The sand in this core responded to laboratory flooding tests, as a total recovery of 4,079 barrels of oil per acre was obtained from 16.4 feet of sand. The weighted average percent oil saturation was reduced from 49.8 to 32.6, or represents an average recovery of 17.2 percent. The weighted average effective permeability of the samples is 1.35 millidarcys, while the average initial fluid production pressure is 15.9 pounds per square inch (See Table V).

By observing the data given in Table IV, you will note that of the 19 samples tested, 16 produced water and oil. This indicates that approximately 84 percent of the sand represented by these samples is floodable pay sand.

CALCULATED RECOVERY

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 4,540 barrels of oil per acre. This is an average recovery of 277 barrels per acre foot from 16.4 feet of floodable sand analyzed in this core.

These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.05
Reservoir water saturation, percent, estimated	25.0
Average porosity, percent	18.4
Oil saturation after flooding, percent	32.6
Performance factor, percent, estimated	50.0
Net floodable sand, feet	16.4

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RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Inco Resources, Inc. Lease Davis Well No. 18

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbls. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	747.5	10.1	43	52	95	337	Imp.	1.0	1.0	337	0.00
2	748.4	21.0	38	29	67	619	63.	1.2	2.2	743	75.60
3	749.8	20.8	44	37	81	710	47.	0.4	2.6	284	18.80
4	750.4	20.4	47	31	78	744	54.	1.0	3.6	744	54.00
5	751.4	18.1	52	36	88	730	24.	1.1	4.7	803	26.40
6	752.6	16.1	37	53	90	462	3.1	0.8	5.5	370	2.48
7	753.6	18.0	33	50	83	461	13.	1.3	6.8	599	16.90
8	754.5	13.1	34	64	98	346	Imp.	0.8	7.6	277	0.00
9	755.4	12.1	44	53	97	413	0.48	1.0	8.6	413	0.48
10	756.4	20.2	52	34	86	815	52.	1.0	9.6	815	52.00
11	757.4	21.3	54	31	85	892	62.	1.0	10.6	892	62.00
12	758.5	19.1	49	31	80	726	26.	1.0	11.6	726	26.00
13	759.4	19.1	57	30	87	845	25.	1.0	12.6	845	25.00
14	760.4	16.9	50	45	95	656	10.	1.0	13.6	656	10.00
15	761.5	16.6	52	43	95	670	7.5	1.0	14.6	670	7.50
16	762.4	18.2	51	29	80	720	20.	1.0	15.6	720	20.00
17	763.4	16.5	69	29	98	883	12.	1.0	16.6	883	12.00
18	764.5	18.7	61	24	85	885	39.	1.2	17.8	1062	46.80
19	765.6	20.7	54	19	73	867	97.	0.8	18.6	694	77.60

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SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Inco Resources, Inc.		Lease		Davis		Well No.		18	
Depth Interval, Feet		Feet of Core Analyzed		Average Permeability, Millidarcys		Permeability Capacity Ft. x Md.					
747.0 - 756.0		6.8		28.6		194.66					
756.0 - 766.0		10.0		33.9		338.90					
747.0 - 766.0		16.8		31.8		533.56					
Depth Interval, Feet		Feet of Core Analyzed		Average Percent Oil Saturation		Average Percent Water Saturation		Average Oil Content Bbl./A. Ft.		Total Oil Content Bbls./Acre	
747.0 - 756.0		8.6		16.6		41.2		44.6		531	
756.0 - 766.0		10.0		18.7		55.0		31.6		796	
747.0 - 766.0		18.6		17.7		48.6		37.6		674	
										4,570	
										7,963	
										12,533	

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RESULTS OF LABORATORY FLOODING TESTS

TABLE IV

Inco Resources, Inc.			Lease		Davis		Well No. 18					
Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc*	Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.	
			%	Bbbls./A. Ft.	%	Bbbls./A. Ft.	% Oil	% Water				Bbbls./A. Ft.
1	747.5	10.2	43	340	0	0	43	53	340	0	Imp.	-
2	748.4	21.1	38	622	4	65	34	52	557	144	1.50	15
3	749.8	20.3	45	709	0	0	45	37	709	0	Imp.	-
4	750.4	20.4	47	744	18	285	29	65	459	116	1.50	15
5	751.4	18.2	52	734	21	297	31	63	437	59	0.97	15
6	752.6	16.2	37	465	8	101	29	62	364	156	1.95	20
7	753.6	17.9	33	458	5	69	28	70	389	17	0.22	25
8	754.5	13.4	33	343	0	0	33	65	343	0	Imp.	-
9	755.4	12.2	44	416	9	85	35	55	331	11	0.15	25
10	756.4	20.0	52	807	16	248	36	57	559	103	1.50	15
11	757.4	21.5	54	901	26	434	28	58	467	218	2.40	10
12	758.5	19.1	49	726	19	282	30	65	444	241	3.00	10
13	759.4	19.0	57	840	27	398	30	63	442	66	0.97	10
14	760.4	16.9	50	656	8	105	42	54	551	52	0.82	10
15	761.5	16.6	52	670	21	270	31	65	400	3	0.08	30
16	762.4	18.1	51	716	16	225	35	58	491	6	0.15	25
17	763.4	16.6	69	889	30	386	39	59	503	23	0.30	20
18	764.5	18.8	61	890	28	408	33	54	482	234	3.07	10
19	765.6	20.8	54	871	23	371	31	58	500	280	3.67	15

Notes: cc—cubic centimeter.

*—Volume of water recovered at the time of maximum oil recovery.

**—Determined by passing water through sample which still contains residual oil.

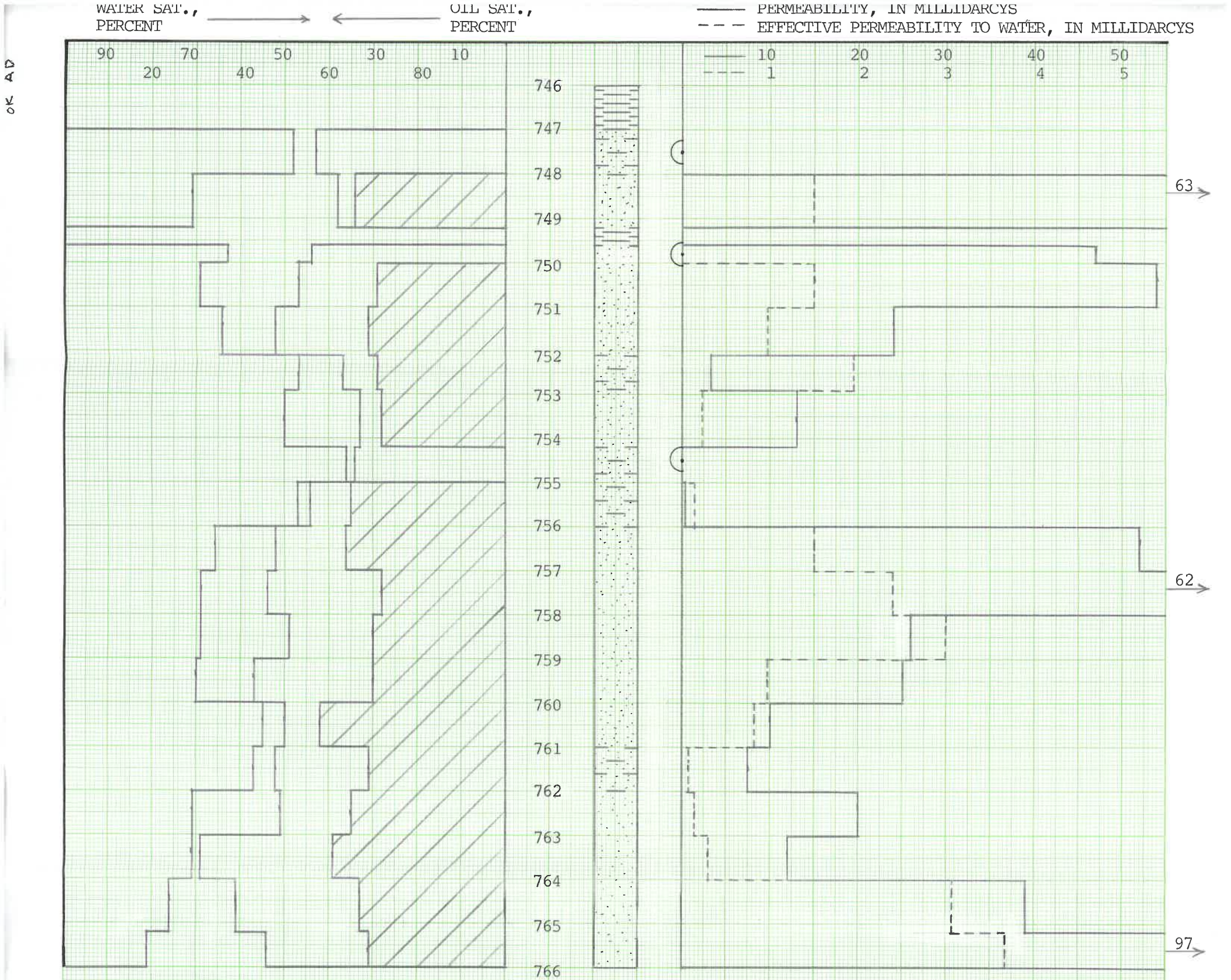
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SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Inco Resources, Inc.	Lease	Davis	Well No.	18
Depth Interval, Feet	747.0 - 756.0	756.0 - 766.0	747.0 - 766.0		
Feet of Core Analyzed	6.4	10.0	16.4		
Average Percent Porosity	17.8	18.7	18.4		
Average Percent Original Oil Saturation	41.6	55.0	49.8		
Average Percent Oil Recovery	10.6	21.5	17.2		
Average Percent Residual Oil Saturation	31.0	33.5	32.6		
Average Percent Residual Water Saturation	61.3	59.0	59.9		
Average Percent Total Residual Fluid Saturation	92.3	92.5	92.5		
Average Original Oil Content, Bbls./A. Ft.	576.	797.	711.		
Average Oil Recovery, Bbls./A. Ft.	148.	313.	249.		
Average Residual Oil Content, Bbls./A. Ft.	428.	484.	462.		
Total Original Oil Content, Bbls./Acre	3,681.	7,969.	11,650.		
Total Oil Recovery, Bbls./Acre	945.	3,134.	4,079.		
Total Residual Oil Content, Bbls./Acre	2,736.	4,835.	7,571.		
Average Effective Permeability, Millidarcys	1.00	1.58	1.35		
Average Initial Fluid Production Pressure, p.s.i.	19.2	14.0	15.9		

NOTE: Only those samples which recovered oil were used in calculating the above averages.



KEY:



SANDSTONE



IMPERMEABLE TO WATER



SHALE



SHALY SANDSTONE



FLOODPOT RESIDUAL OIL SATURATION

INCO RESOURCES, INC.

DAVIS LEASE

FRANKLIN COUNTY, KANSAS

WELL NO. 18

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY BBLs. / ACRE
747.0 - 756.0	8.6	16.6	41.2	44.6	28.6	
756.0 - 766.0	10.0	18.7	55.0	31.6	33.9	
747.0 - 766.0	18.6	17.7	48.6	37.6	31.8	4540 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MAY, 1982

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