

FORMATION LOG

WENDELL S. JOHNS

Deep Rock #4 Strait
SW/4NW/4; 33-26S-13W
Pratt County, Kansas
Elevation: 1964 derrick floor

10 3/4" surface casing 775; 500 sacks
7" casing 4431
Spudded: 10/7/50

Note: All measurements are taken from the top of the rotary bushing which is two feet above the derrick floor.

Depth	Formation Description	Remarks
0 - 40	Surface	Drillers log 0 - 3500'
40 - 315	Shale & shells	
315 - 790	Shale & sand	
790 - 1205	Red bed, shale & sand	
1205 - 1280	Shale & shells	
1280 - 1460	Salt	
1460 - 1605	Shale & shells	
1605 - 1855	Shale & limestone	
1855 - 2095	Shale	
2095 - 2290	Sand & limestone	
2290 - 2490	Limestone & shale	
2490 - 2580	Shale	
2580 - 2740	Limestone & shale	
2740 - 2975	Shale	
2975 - 3070	Limestone	
3070 - 3180	Shale	
3180 - 3390	Limestone & shale	
3390 - 3470	Shale	
3470 - 3500	Limestone	
3500 - 3510	Limestone, tan, finely crystalline	Sample log starts 3500'
3510 - 3530	Limestone, as above; trace dark gray shale; some green & brown shale	Fair vugular porosity
3530 - 3576	Limestone, as above, white	Porous
3576 - 3596	Limestone, very oolitic	
3596 - 3614	Limestone, as above; trace very black shale.	
3614 - 3619	Shale, gray & black	Heebner
3619 - 3624	Limestone, dark gray-brown, dense	Leavenworth
3624 - 3632	Shale, gray, brown, silty	Snyderville
3632 - 3646	Limestone, white, clear, crystalline	Dodge
3646 - 3649	Limestone, as above	Porous
3649 - 3658	Limestone, as above	Base Oread 3658
3658 - 3661	Shale, gray, silty	Douglas
3661 - 3663	Limestone, white, crystalline & tan, finely crystalline.	Some oil stain
3663 - 3699	Shale, as above	
3699 - 3720	Sand, fine, gray to white, medium angular	
3720 - 3771	Shale, gray; trace fine gray sand	
3771 - 3778	Limestone, dark brown to gray, dense	Brown Lansing
3778 - 3788	Shale, gray	
3788 - 3792	Limestone, as above, blocky	
3792 - 3796	Shale, gray	
3796 - 3814	Limestone, tan to brown, finely crystalline to dense.	Lansing

<u>Depth</u>	<u>Formation Description</u>	<u>Remarks</u>
3814 - 3818	Limestone, as above; shale, gray	
3818 - 3821	Limestone, as above	Trace porosity
3821 - 3824	Limestone, as above	
3824 - 3339	Limestone, tan to brown, sub-crystalline to finely crystalline.	Some vugular porosity, good odor; trace free oil; slight stain, gas.
3339 - 3848	Limestone, brown to gray, sub-crystalline to dense.	
3848 - 3851	Streak gray shale	
3851 - 3861	Limestone, tan to brown & gray, finely crystalline to sub-crystalline.	Fair vugular porosity; fair odor & stain; some free oil; many gas bubbles.
3861 - 3868	Limestone, tan-gray to brown, finely crystalline to sub-crystalline; some chert, gray, opaque to translucent.	
3868 - 3869	Shale, gray	
3869 - 3876	Limestone & chert, as above	
3876 - 3878	Shale, gray	
3878 - 3887	Limestone, as above; much chert, dark brown, mottled, opaque.	
3887 - 3889	Shale, gray	
3889 - 3892	Limestone, as above; less chert	
3892 - 3893	Shale, gray	
3893 - 3900	Limestone, dirty, brown-gray, sub-crystalline	Medium fine vugular porosity; fair odor, slight stain.
3900 - 3907	Limestone, as above	No porosity
3907 - 3912	Limestone, gray-brown, sub-crystalline	Pin-point & fine vugular porosity, good odor, possible trace free oil.
3912 - 3916	Limestone, gray, sub-crystalline to finely crystalline; trace gray opaque chert	
3916 - 3918	Shale, gray and brown	Trace pin-point porosity; fair odor, no oil stain.
3918 - 3929	Limestone, as above	
3929 - 3933	Limestone, gray, sub-crystalline to finely crystalline; much chert, blue-gray opaque, non-vitreous.	
3933 - 3936	Limestone, as above	Slight trace porosity
3936 - 3943	Limestone, as above	
3943 - 3949	Shale, gray	
3949 - 3953	Limestone, gray to brown, sub-crystalline.	Fair vugular porosity, fair stain.
3953 - 3956	Limestone, as above	No porosity.
3956 - 3964	Limestone, as above, streaks gray shale	
3964 - 3969	Limestone, tan to gray, sub-crystalline.	Pin-point porosity, slight odor & a little free oil.
3969 - 3983	Limestone, tan, dense to sub-crystalline, many irregular oolites; streaks gray shale.	
3983 - 3989	Limestone, brown sucrose	Good stain, fair vugular and pin-point porosity; fair odor
3989 - 3996	Limestone, dense to sub-crystalline, as above.	

(3) Formation log; Deep Rock #4 Strait

<u>Depth</u>	<u>Formation Description</u>	<u>Remarks</u>
3996 - 4004	Limestone, light gray to light brown, sub-crystalline.	Fair vugular & pin-point porosity; fair odor & fair show free oil.
4004 - 4013	Limestone, as above	No porosity
4013 - 4018	Limestone, as above	Trace porosity
4018 - 4022	Limestone, as above	No porosity
4022 - 4023	Shale, gray	
4023 - 4030	Limestone, as above	Trace porosity
4030 - 4045	Limestone, gray, dense, some brown sucrose	
4045 - 4051	Limestone, as above; chert, white to gray, opaque to translucent, vitreous.	
4051 - 4057	Limestone, as above; chert, as above.	Possible trace porosity.
4057 - 4063	Limestone, as above; less chert	
4063 - 4066	Shale, green, gray	
4066 - 4072	Limestone & chert, as above	
4072 - 4075	Limestone & chert, as above	Trace porosity
4075 - 4085	Limestone & chert, as above	
4085 - 4089	Shale, green-gray	
4089 - 4092	Limestone & chert, as above	
4092 - 4096	Limestone & chert, as above	Trace porosity
4096 - 4103	Limestone & chert, as above	
4103 - 4107	Shale, as above	
4107 - 4110	Limestone & chert, as above	Possible trace porosity
4110 - 4115	Limestone & chert, as above	
4115 - 4120	Shale, as above	
4120 - 4131	Limestone & chert, as above	Trace spotted porosity
4131 - 4136	Limestone & chert, as above	
4136 - 4138	Shale, as above	
4138 - 4141	Limestone & chert, as above	Trace porosity
4141 - 4144	Limestone, dark gray to brown, sub-crystalline; chert, light gray, opaque, some green & gray chert.	
4144 - 4147	Shale, gray & green	
4147 - 4152	Limestone & chert, as above	
4152 - 4162	Limestone, white, sub-crystalline; decrease in chert.	Streaks spotted porosity
4162 - 4165	Shale, gray, green & brown	
4165 - 4169	Limestone, as above; much white, opaque, devitrified chert.	Spotted porosity
4169 - 4179	Limestone & chert, as above	
4179 - 4182	Shale, as above	
4182 - 4187	Limestone & chert, as above	
4187 - 4195	Shale, green & gray; limestone, as above.	
4195 - 4230	Chert, white to citrine, opaque to translucent, vitreous	Conglomerate
4230 - 4254	Shale, brown, gray, green-gray and green; Limestone, green, shaly & gray, dense.	Kinderhook
4254 - 4274	Chert, light brown to white, translucent to opaque, vitreous.	Viola
4274 - 4314	Limestone, gray to brown, sub-crystalline; dark gray, finely crystalline, argillaceous dolomite; shale, gray-green; chert, as above.	
4314 - 4324	Chert, white, opaque, non-vitreous to sub-vitreous	Spotted porosity
4324 - 4344	Chert, as above; some white to brown, devitrified chert.	Fair porosity & show oil, good odor.

(4) Formation log; Deep Rock #4 Strait

<u>Depth</u>	<u>Formation Description</u>	<u>Remarks</u>
4344 - 4349	Shale, gray, green; Limestone, red-brown finely crystalline & white, crystalline with fine rounded white sand grains	
4349 - 4352	Shale, bright green	Simpson
4352 - 4373	Cored 5' good sand; 13' shale & sand, dolomite & sand, limestone & sand	Good show oil
4373 - 4380	Dolomite, dark, brown, finely crystalline, shale, green.	
4380 - 4385	Sand, white to greenish to light brown, glossy, sub-angular, some cementation.	Slight trace spotted stain
4385 - 4415	Shale, green, gray & brown.	
4415 - 4418	Streak brown, dolomitic sand	Saturated
4418 - 4429	Shale, bright green	
4429 - 4430	Sand, white to brown, medium, sub-angular much pyrite.	
4430 - 4432	Dolomite, tan to brown, finely crystalline to sucrose.	Arbuckle; fair odor; trace free oil & stain.
4432	Rotary total depth	
4432 - 4434	Dolomite, brown, sucrose to finely crystalline; trace light green Arbuckle shale.	Very porous; some fair stain
4434	TOTAL DEPTH	

Swab 203 B.O. and trace water/6 hours/on bottom

Swab 14 B.O.P.M. at end of test.

D.S.T. 3847-62/1 hr/good blow throughout/rec. 240' gas cut mud and formation water, no free oil, slight rainbow;
B.H.P. 0

D.S.T. 3960-70/ 1 hr/ good blow throughout/ rec. 30' mud, slightly gas cut, no oil or water;
B.H.P. 0

D.S.T. 3980-4006/1 hr/ rec 61' gas cut mud/
B.H.P. 0

D.S.T. 4313-40/1 hr/ very good blow; blew gas in 24 min./ rec. 30' very gas cut & slightly oil cut mud; 180' oily mud & muddy oil; very gas cut; 90' clean oil
B.H.P. 1050# (10 min.)

CORED: 4352-4364; Recovered 12'
4352-4358; sand, medium, sub-rounded to sub-angular, thin green shale streaks & inclusions; good porosity. Good odor & good stain.

4358-4359; Shale, green with streaks & inclusions of sand, as above; good oil show in sand.

4359-4360; Sand, as at top, slightly tighter; good saturation.

4360-4364; Sand, as at top, intercalated with approximately equal parts of green shale; streaks white sand, cemented with white to green calcareous or dolomitic cement; no porosity or oil show.

CONCD: 4364-75; Recovered 10'

4364-65; Shale, green & sand, white, fair oil stain & odor.

4365-4366; Sand, brown & white, dolomitic, coarse, angular
fair porosity, much black oil residue, some live oil.

4366-4367; Dolomite, brown & gray, some brown, dense limestone
inclusions & sand, grains; fair porosity & show oil.

4367-4370; Dolomite, hard, dark brown, finely crystalline with
dark brown dense limestone inclusions, some coarse vugs with
free oil, very little permeability.

4370-4374; Dolomite, hard brown, finely crystalline, very tight,
limestone inclusions, as above; no oil show.

D.S.T. 4350-73; 1 hr/ good blow throughout/ rec. 180' oil cut mud;

450' salt water with little oil breaking out/initial flowing
pressure 90#

Max. flow pressure 315#

B.H.P. 1275# (10 min.)

WENDELL S. JOHNS

Deep Rock Oil Corporation - Rine Drilling Company
#4 Strait - SW SW NW - Section 33-26S-13W
Pratt County, Kansas

Contractor: The R. W. Rine Drilling Company
Commenced: 10/13/50
Completed: 11/15/50

Casing Record:
10" 787'
7" 4430'

Elevation: 1966' K.B.
1964'

	<u>DRILLING</u>	<u>TIME</u>	
<u>DEPTH</u>		<u>TIME</u>	<u>REMARKS</u>
3500 - 3510	3,3,3,3,4,4,5,3,3,5		
20	4,3,3,5,4,4,4,3,3,3		
30	3,2,3,4,4,3,3,3,4,5		
40	3,3,3,3,3,4,3,3,3,4		
50	2,3,3,3,4,3,3,2,4,3		
60	3,3,3,2,2,2,2,2,2,2		
70	3,3,2,3,3,3,3,3,4,4		
80	3,2,2,3,4,4,3,2,2,1		
90	2,2,1,1,2,2,2,2,2,3		
3590 - 3600	2,2,4,3,4,4,5,4,5,6		
10	4,5,4,6,5,6,5,5,4,5		
20	6,6,6,7,6,5,5,5,4,4		
30	4,5,8,9,8,7,6,6,5,5		
40	5,5,6,7,6,7,7,6,7,6		
50	6,6,8,8,8,8,6,4,5,6		
60	7,7,7,7,7,7,7,7,6,6		
70	6,7,7,5,4,4,4,3,4,4		
80	4,4,5,5,5,5,5,5,5,5		
90	3,3,4,4,4,5,6,4,5,5		
3690 - 3700	4,4,4,4,4,4,6,5,6,5		
10	3,2,2,2,3,2,2,3,3,3		
20	3,3,3,3,3,3,2,2,2,2		
30	6,6,6,7,6,6,6,7,6,7		
40	6,7,7,7,8,4,4,7,5,6		
50	7,6,10,7,2,6,6,7,8,7		Trip @ 3735'
60	8,7,7,7,6,6,7,7,7,7		
70	6,6,7,7,6,6,6,7,6,6		
80	6,11,13,6,9,6,6,8,5,6		
90	8,6,6,7,5,7,7,6,5,8		
3790 - 3800	6,9,6,5,6,7,5,6,8,4		
10	7,7,10,9,6,9,6,7,7,8		
20	7,6,10,9,8,6,7,7,6,6		
30	5,8,10,9,8,6,6,6,6,6		
40	4,5,4,5,5,4,5,6,5,?		
50	6,6,9,9,10,12,10,10,8,5		
60	7,5,2,2,2,3,4,4,4,3		
70	2,7,3,3,7,5,5,7,9,6		Circ. 3862'; D.S.T.
80	12,8,13,12,12,13,13,12,11,12		
90	13,11,18,18,11,18,18,14,14		
3890 - 3900	18,18,12,14,12,12,12,9,8,8		
10	12,12,11,10,10,10,10,9,8,6		
20	8,12,14,15,12,10,9,7,7,8		
30	12,9,11,10,10,10,7,9,6,10		
40	12,12,14,7,6,7,9,10,11,10		
50	12,12,12,8,9,8,8,8,6,4		
60	6,7,7,10,8,9,9,5,7,10		
70	7,7,5,4,5,6,5,7,10,9		
80	6,5,8,7,8,8,8,8,9,9		
90	8,7,5,5,4,3,6,6,5,7		
3990 - 4000	8,7,7,7,5,7,4,3,3,3		Odor in 3880' samples; Odor 3885'
10	5,4,5,5,8,8,7,8,9,8		
20	9,9,7,5,4,3,5,6,7,10		Circ. 4006'; D.S.T.
30	10,10,7,7,5,5,7,7,4,3		
40	5,9,9,9,9,8,10,9,9,9		
50	11,11,10,10,10,10,10,11,11,8		
60	9,8,9,11,10,10,11,10,12,9		
70	9,8,7,9,8,8,10,11,11,10		

Page 2 - Drilling Time
Deep Rock-Rine #4 Strait

4070 - 4080	10,9,9,10,10,11,12,12,12	
90	10,11,10,12,12,16,14,12,11,11	
4090 - 4100	13,11,10,6,6,10,10,10,9,13	
10	10,13,13,11,5,6,6,6,7,7	Trip @ 4104'
20	5,5,5,5,6,6,6,7,7,7	
30	6,6,6,6,6,5,5,5,7,5	
40	5,7,6,7,7,7,7,6,6	
50	7,8,9,9,10,11,11,10,10,8	
60	12,8,12,9,10,13,9,11,10,7	
70	11,13,9,10,11,13,7,5,9,8	
80	11,10,10,12,12,11,12,12,11,10	
90	10,12,14,14,16,9,10,9,7,5	Trip @ 4185'
4190 - 4200	6,5,8,7,8,6,7,3,2,2	
10	3,3,6,3,4,5,4,4,4,4	
20	3,4,5,4,4,4,4,4,4,3	
30	4,4,4,4,4,5,4,4,5,5	
40	8,16,16,15,17,6,8,9,9,11	
50	9,8,9,9,8,12,7,10,8,9	
60	10,9,8,8,5,6,4,4,4,3	
70	4,3,3,3,4,3,3,3,2,4	
80	4,4,4,4,5,7,8,16,22,10	Trip @ 4279'
90	10,9,10,9,9,9,11,10,11,10	
4290 - 4300	9,10,10,10,8,9,9,8,9,9	
10	9,9,9,9,9,9,9,5,5,7	
20	8,9,9,8,6,4,3,3,3,3	
30	3,4,3,2,3,4,5,5,4,4	
40	4,4,4,4,4,4,4,4,4,4	
50	3,3,3,3,5,8,10,9,8,6	Trip @ 4340'
60	5,5,11,9,10,10,10,10,10,12	Circ; @ 4352'
70	12,12,12,10,14,18,14,13,12,18	
80	17,15,25,6,6,7,7,6,6,7	
90	6,5,4,4,4,10,8,8,8,8	
4390 - 4400	9,8,9,8,9,9,9,10,10,10	
10	9,10,9,9,9,9,9,10,10,9	
20	9,8,8,8,8,6,7,7,10,9	
30	10,10,8,9,10,11,10,10,9,5	
4432	9,12 Total Depth	Circ. 4425'; Circ. 4429'