

RESERVOIR EVALUATIONS GROUP

United States - Canada - Great Britain - Australia

CORE DESCRIPTION

GENERAL ATLANTIC RESOURCES

Tjaden A WIW No. 1

Section 24-30S-8W

Kingman County, Kansas

Spivey Field

Mississippian Chat Formation

RECEIVED
FEB 09 1993
OPERATIONS

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CORED INTERVALS

Five cores were taken in the Mississippian Chat Formation. A Total of 94 feet was recovered. Rig depth and core recovered for each core is as follows:

<u>Core Number</u>	<u>Rig Depth - ft.</u>	<u>Recovery - ft.</u>
Core No. 1	4316-4342	26
Core No. 2	4324-4357	15
Core No. 3	4357-4386	29
Core No. 4	4386-4394	8
Core No. 4	4394-4410	16

Tight rocks with fractures were present at the base of each core interval which probably caused core barrel jamming. The rocks at the base of each core were 'rubblized' as a result the jamming.

CORE DESCRIPTIONS

The six major stratigraphic intervals as outlined in the BHP report are adopted for the subject well. Color coded intervals are noted on the attached log section. The core was adjusted 2-3 feet uphole to agree with the log section.

Orange layer 4314-24 (log depth)

The core started in the orange layer which consists of redeposited chert conglomerate in a green clay matrix. One foot of core in this interval appears to be grain supported and permeable. The remaining interval is clay supported and not permeable. Permeability from core analysis is possibly due to dehydration cracks in the clay matrix and/or fracturing of grains. The conglomerate clasts consist of highly porous (vuggy) altered chert. All chert grains are evenly stained. Abundant slickensides bleeding oil in the clay matrix were observed.

Yellow layer 4324-38 (log depth)

The yellow layer consists of dissolution chert breccia. An oil stained highly porous chert in a white tripolitic low permeability matrix is typical of this section. Occasionally green clay matrix was observed. The porosity in the chert is filled with calcite cement making this interval less permeable and more brittle. Abundant tight and open fractures were observed which contributed to permeability on plugged core analysis. The majority of this core was highly broken up; probably due to fracturing.

Blue layer 4338-50 (log depth)

Fine to medium crystalline limestones, cherty limestones and bedded chert are indicative in this interval. Minor oil stained calcite cemented chert breccia was observed with permeability in the 1-6 md range. This section is predominantly tight with the exception of minor fracture permeability.

Green layer 4350-80 (log depth)

This is the main pay section. The rock consists of residual brown oil stained coarsely tripolitic chert enclosed in a white thin fine tripolitic matrix. Very high continuous porosity and fair permeability was typical of these dissolution chert breccias. The upper 8 feet contains irregular micro-fractures. The lower 5-10 feet grades into less dissolution of the chert to a bedded chert for the last foot of this interval.

Red layer 4380-4408 TD of core (log depth)

This section can be divided into three intervals. The upper interval (4380-90) is a green calcareous dolomite which is fractured. Oil stain and bitumen on the fracture faces is the only oil stain noted. The high porosity in this interval is due to both chalky texture and argillaceous content of the rock.

The middle interval (4390-4402) consists of nodular cherty limestones interbedded with limestones. A 4 inch crinoidal grainstone occurs which possibly gives clues to the depositional environment prior to secondary processes that formed cherts in the Chat. Large vertical fractures, some possibly core induced, and some with coarse druses are common.

The lower interval (4402-08) is a green dolomite similar to the upper interval but contains chert.

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Reference Number	Depth (ft)	Perm Air (md)	Perm Klink (md)	Helium Porosity (%)	Saturations Water (%)	Saturations Oil (%)	Grain Density (g/cc)	Sample Description
Core No. 1								
1	4316.4	26.3	21.7	28.9	41.7	14.3	2.63	Cht wh-brn microxln
2	4319.9	17.9	14.6	26.0	45.6	12.5	2.65	Cht gry microxln
3	4320.7	2.03	1.50	10.6	57.4	16.8	2.57	Cht gry-gn microxln
4	4321.4	3.62	2.80	21.1	49.0	18.1	2.65	Cht dk gry microxln
5	4322.3	10.1	8.09	24.8	47.6	11.3	2.62	Cht dk gry microxln
6	4323.2	5.65	4.39	27.9	52.2	8.7	2.66	Cht dk gry-brn microxln
7	4324.3	24.5	20.1	25.9	39.5	14.8	2.66	Cht gn-brn microxln
8	4325.8	4.71	3.75	33.8	61.1	19.5	2.60	Cht gry-brn microxln
9	4326.5	28.3	23.3	32.4	58.8	10.3	2.66	Cht wh-brn microxln lam frac
10	4331.5	26.0	21.5	34.7	49.3	15.3	2.62	Cht gry-brn microxln
11	4337.9	1.47	1.15	17.1	44.9	20.8	2.66	Ls brn f xln slty
12	4339.1	2.89	2.29	16.1	47.2	18.4	2.66	Ls brn f xln slty
13	4341.2	0.309	0.205	5.8	60.3	21.3	2.68	Ls brn f xln slty
Core No. 2								
14	4342.8	5.74	4.60	18.6	51.4	16.9	2.65	Ls brn f xln slty
15	4343.6	26.3	21.8	37.5	43.3	7.4	2.60	Cht wh-brn microxln
16	4344.7	0.021	0.009	2.8	58.4	23.0	2.69	Ls gry-brn f xln slty
17	4345.8	0.735	0.548	12.3	50.7	20.6	2.67	Ls wh-brn f xln cht
18	4346.6	6.17	4.91	30.9	42.9	18.2	2.63	Cht gry-brn microxln v calc
19	4347.3	0.161	0.098	7.7	55.4	22.8	2.67	Ls gry-brn f xln slty
20	4348.5	1.73	1.36	25.7	53.1	13.2	2.65	Ls gry-brn f xln cht
21	4349.2	0.018	0.007	2.0	59.9	0.9	2.68	Ls gry f xln
22	4350.6	0.016	0.006	3.7	63.0	1.1	2.70	Ls lt gry f xln
23	4351.5	3.93	3.10	20.2	44.3	9.5	2.65	Ls gry-brn f xln cht
24	4354.8	29.7	24.6	40.0	37.5	11.8	2.59	Cht gry-brn microxln
25	4355.5	13.8	10.9	33.3	39.1	12.4	2.63	Cht lt gry-brn microxln
Core No. 3								
26	4357.3	17.4	14.1	41.1	41.7	16.6	2.63	Cht gry-brn microxln
27	4358.6	8.77	6.67	39.1	49.6	10.9	2.60	Cht gry-brn microxln
28	4359.8	14.1	11.3	37.4	40.7	17.7	2.60	Cht gry-brn microxln
29	4360.5	10.4	8.08	39.1	42.2	13.1	2.60	Cht gry-brn microxln
30	4361.5	10.2	7.85	27.2	34.6	15.0	2.59	Cht gry-brn microxln frac
31	4362.4	9.01	6.87	39.5	39.0	14.4	2.61	Cht gry-brn microxln

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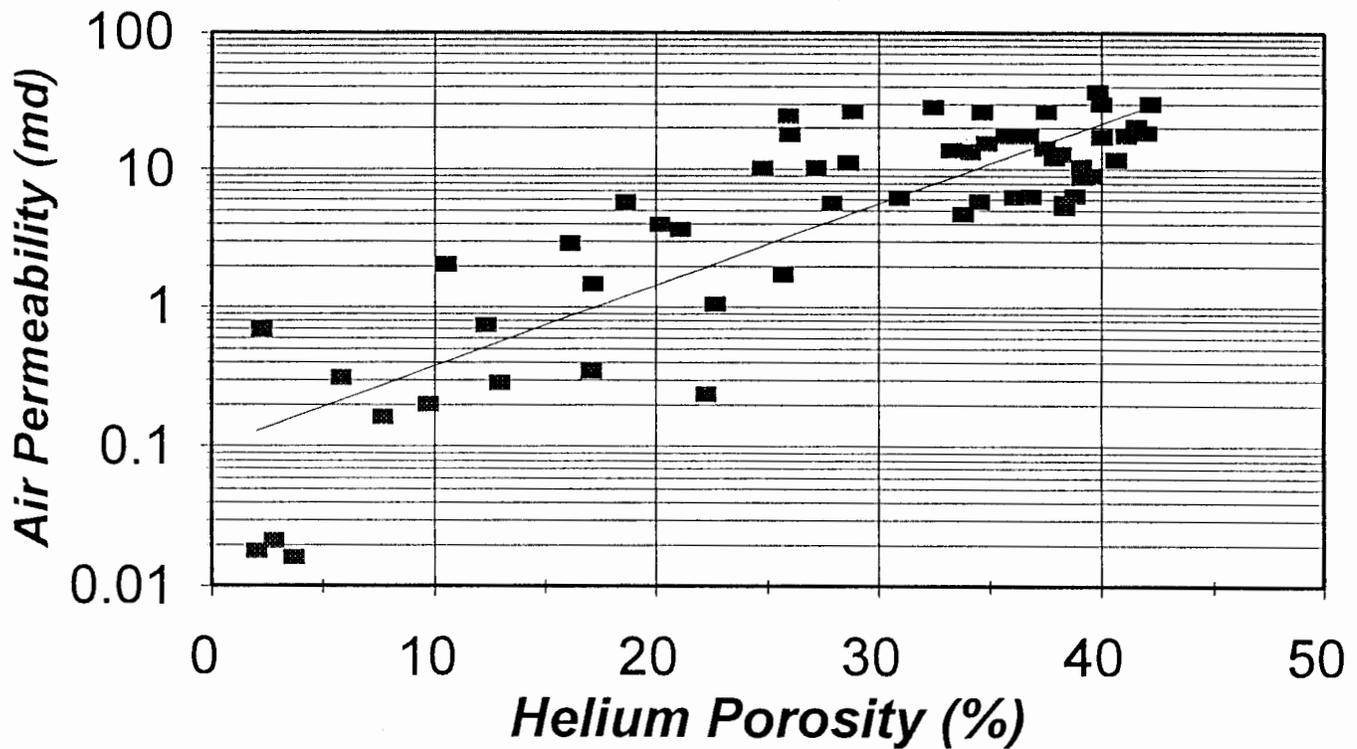
Reference Number	Depth (ft)	Perm Air (md)	Perm Klink (md)	Helium Porosity (%)	Saturations Water (%)	Saturations Oil (%)	Grain Density (g/cc)	Sample Description
32	4363.4	17.4	14.1	35.7	43.3	8.8	2.60	Cht gry-brn microxln
33	4364.5	18.3	14.9	42.0	50.1	11.1	2.60	Cht gry-brn microxln
34	4365.6	20.4	16.7	41.6	41.8	16.2	2.60	Cht wh-brn microxln frac
35	4366.6	36.7	30.7	39.8	39.3	6.0	2.60	Cht wh-brn microxln frac
36	4367.8	13.4	10.6	34.1	46.5	12.9	2.59	Cht gry-brn microxln
37	4368.7	17.3	14.0	36.7	48.3	15.2	2.60	Cht gry-brn microxln
38	4369.5	17.1	13.8	40.0	52.1	14.7	2.60	Cht gry-brn microxln
39	4370.4	11.2	8.70	28.6	43.5	19.3	2.59	Cht gry-brn microxln frac
40	4371.3	5.71	4.44	38.3	39.1	10.6	2.61	Cht wh-brn microxln
41	4372.6	6.24	4.89	36.1	48.6	13.7	2.61	Cht gry-brn microxln
42	4373.2	5.28	4.08	38.3	43.7	11.5	2.59	Cht gry-brn microxln
43	4374.2	15.5	12.4	34.8	40.3	9.6	2.60	Cht wh-brn microxln
44	4375.7	12.1	9.72	37.9	38.9	8.3	2.60	Cht wh-brn microxln
45	4376.4	12.9	10.2	38.2	46.6	14.0	2.61	Cht wh-brn microxln
46	4377.4	29.9	24.8	42.2	51.1	15.7	2.61	Cht wh-brn microxln
47	4378.3	5.83	4.61	34.5	49.5	10.2	2.60	Cht wh-brn microxln
48	4379.4	11.8	9.23	40.6	56.9	7.1	2.57	Cht wh-brn microxln frac
49	4380.2	6.29	4.94	36.8	52.1	10.6	2.53	Cht wh-brn microxln
50	4381.1	6.38	5.02	38.8	48.0	8.5	2.61	Cht wh-brn microxln
Core No. 4								
51	4386.7	0.201	0.126	9.7	65.3	3.6	2.68	Dol lt gry vf xln cht
52	4387.4	0.286	0.188	13.0	58.2	1.0	2.75	Dol lt gry vf xln cht
53	4388.5	0.350	0.236	17.1	54.7	2.1	2.72	Dol lt gry vf xln cht
54	4389.6	1.05	0.812	22.7	69.3	0.7	2.76	Dol lt gry vf xln cht
55	4391.0	0.236	0.152	22.2	66.1	0.9	2.79	Dol lt gry vf xln cht
Core No. 5								
56	4396.5	0.684	0.506	2.2	71.6	1.8	2.67	Ls lt gry f xln frac

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Air Permeability vs Helium Porosity



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Zone1 Air Permeability Regression

Regression Output:

Constant	-1.013626
Std Err of Y Est	0.445775
R Squared	0.724610
No. of Observations	56.000000
Degrees of Freedom	54.000000
X Coefficient(s)	0.058660
Std Err of Coef.	0.004921

Zone1 Klinkenberg Permeability Regression

Regression Output:

Constant	-1.255456
Std Err of Y Est	0.489260
R Squared	0.714536
No. of Observations	56.000000
Degrees of Freedom	54.000000
X Coefficient(s)	0.062795
Std Err of Coef.	0.005401

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PETRO-LOG

Scale 1:240

