ADVANCED CORE ANALYSIS STUDY

Youngquist Brothers Inc.
IW1 and IW2 Wells

FINAL REPORT

Submitted to:

Youngquist Brothers Inc.

May 15, 2012

Performed by:

Core Laboratories
Petroleum Services Division
6316 Windfern
Houston, Texas 77040

HOU-111534

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May 15, 2012

Youngquist Brothers Inc.
15465 Pine Ridge Road
Fort Myers, Florida 33908

Attention: Harvey Youngquist

Subject: IW1 and IW2 Wells
File: HOU-111534

Dear Mr. Harvey Youngquist,

Presented in this report are the final results of the Advanced Core Analysis measurements performed on core plug samples from the IW1 and IW2 Wells. The study was comprised of the following measurements:

Acoustic Velocity
Specific Permeability to Brine
Full Diameter Analysis by CL-Midland

We appreciate the opportunity to be of service to Youngquist Brothers Inc. with this study and look forward to working with you on future projects. If you have any questions concerning this report, if you require additional information, or if you require a hard copy of this report please do not hesitate to contact us.

Sincerely,

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Youngquist Brothers Inc.
IW1 and IW2 Wells

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Summary of Results

The Houston Advanced Technology Center of Core Laboratories received twenty-four (24) full diameter core plug samples from the Midland, Texas Core Laboratories facility. The samples were taken from the IW1 and IW2 wells, ranging in depth from 2148.10 to 2898.80 feet.

The CL-Midland facility performed full diameter analysis on the samples, which is presented in the appendix of this report. The Houston facility tested the clean and dry full diameter samples for acoustic velocity at 800 psi net confining stress. The cores were slabbed and twenty-three (23) 1.5-inch core plug samples were drilled. Permeability to brine was measured on the plugs.

Full Diameter Analysis by CL-Midland

The Midland, Texas facility performed basic properties measurements on the full diameter samples at 400 psi net confining stress.

Max horizontal permeabilities ranged from 1.28 to 4365 millidarcies. Minimum horizontal permeabilities ranged from 0.046 to 959 millidarcies. Vertical permeabilities ranged from 0.001 to 822 millidarcies. Porosity values ranged from 2.5 to 40.5 percent of pore volume. Grain densities ranged from 2.70 to 2.83 g/cm^3. Lithological descriptions have been provided.

Geomechanical Analysis

Acoustic Velocity

Twelve (12) full diameter samples from the IW1 well, taken from the depth range of 2148.10 to 2981.40 feet, were tested for Acoustic Velocity at 800 psi net confining stress. Compressional waves ranged from 8434 to 18800 ft/sec, and shear waves ranged from 5027 to 11638 ft/sec. Dynamic Young's Moduli ranged from 1.42 x 10^6 to 11.75 x 10^6 psi, and Poisson's Ratios ranged from 0.11 to 0.26.

Eleven (11) full diameter samples from the IW2 well, taken from the depth range of 2362.80 to 2898.8 feet, were tested for Acoustic Velocity at 800 psi net confining stress. Compressional waves ranged from 8431 to 16642 ft/sec, and shear waves ranged from 5109 to 10252 ft/sec. Dynamic Young's Moduli ranged from 1.31 x 10^6 to 8.73 x 10^6 psi, and Poisson's Ratios ranged from 0.11 to 0.26.

Petrophysical Properties

Permeability to Brine

The plug samples were fully saturated with 225,000 ppm NaCl, and permeability to brine was measured at ambient temperature and at 800 psi net confining stress. Specific permeabilities to brine ranged from 0.00191 to 668.599 millidarcies.

TEST SCHEDULE SUMMARY

Company: **Youngquist Brothers Inc.** File: **HOU-111534**
Well: **IW1 and IW2**

Sample Number	Depth, feet	Well Name	Specific Permeability to Brine	Acoustic Velocity
1	2148.10-2148.70	IW1	X	
SP1	2148.10-2148.70	IW1		X
2	2150.80-2151.40	IW1	X	
SP2	2150.80-2151.40	IW1		X
3	2153.10-2153.80	IW1	X	
SP3	2153.10-2153.80	IW1		X
4	2383.60-2384.10	IW1	X	
SP4	2383.60-2384.10	IW1		X
5	2387.50-2388.30	IW1	X	
SP5	2387.50-2388.30	IW1		X
6	2388.30-2389.00	IW1	X	
SP6	2388.30-2389.00	IW1		X
7	2677.60-2678.20	IW1	X	
SP7	2677.60-2678.20	IW1		X
8	2678.20-2678.90	IW1	X	
SP8	2678.20-2678.90	IW1		X
9	2683.40-2685.10	IW1	X	
SP9	2683.40-2685.10	IW1		X
10	2684.30-2685.10	IW1	X	
SP10	2684.30-2685.10	IW1		X
11	2980.80-2981.40	IW1	X	
SP11	2980.80-2981.40	IW1		X
12	2978.20-2978.90	IW1	X	
SP12	2978.20-2978.90	IW1		X
13	2975.20-2975.80	IW2	X	
SP13	2975.20-2975.80	IW2		X
14	2364.60-2365.30	IW2	X	
SP14	2364.60-2365.30	IW2		X
15	2368.90-2369.70	IW2	X	
SP15	2368.90-2369.70	IW2		X
16	2362.80-2363.40	IW2	X	
SP16	2362.80-2363.40	IW2		X
17	2418.00-2418.80	IW2	X	
SP17	2418.00-2418.80	IW2		X
18	2421.80-2422.50	IW2	X	
SP18	2421.80-2422.50	IW2		X
19	2422.70-2423.60	IW2	X	
SP19	2422.70-2423.60	IW2		X
20	2486.10-2486.80	IW2	X	
SP20	2486.10-2486.80	IW2		X
21	2715.90-2716.70	IW2	X	

TEST SCHEDULE SUMMARY

Company: **Youngquist Brothers Inc.** File: **HOU-111534**
Well: **IW1 and IW2**

Sample Number	Depth, feet	Well Name	Specific Permeability to Brine	Acoustic Velocity
SP21	2715.90-2716.70	IW2		**X**
22	2891.80-2892.40	IW2	**X**	
SP22	2891.80-2892.40	IW2		**X**
23	2893.30-2894.30	IW2	**X**	
SP23	2893.30-2894.30	IW2		**X**
24	2897.90-2898.80	IW2	**X**	

Petrophysical Properties

Specific Permeability to Brine

LABORATORY PROCEDURES

Specific Permeability to Brine

1. Synthetic formation brine was filtered to 0.45 microns and degassed. Fluid parameters including viscosity and density were measured at ambient temperature.
2. Each sample was loaded into a hydrostatic coreholder and 800 psi net confining stress was applied.
3. The samples were flushed with synthetic formation brine using 500 psi backpressure to ensure saturation.
4. Brine was injected through each sample at a constant pressure. Produced volumes versus time were monitored, and apparent permeability to brine was determined once a stable flow rate was established.
5. Permeability to liquid data was calculated from the experimental data and measured sample and fluid parameters using Darcy's law.

SUMMARY OF LIQUID PERMEABILITY MEASUREMENTS

Temperature: 68°F
Fluid: 35K ppm NaCl Brine

Company: **Youngquist Brother Inc.** File: **HOU-111534**
Wells: **IW1 and IW2**

Sample Number	Well Name	Depth Range, feet		Net Confining Stress, psi	Length, cm	Area, cm^2	Specific Permeability to Brine, millidarcies
SP1	IW1	2148.10	2148.70	800	6.34	11.00	0.911
SP2	IW1	2150.80	2151.40	800	6.37	10.99	0.00191
SP3	IW1	2153.00	2153.80	800	6.40	11.00	0.00277
SP4	IW1	2383.60	2384.10	800	6.14	10.95	5.71
SP5	IW1	2387.50	2388.30	800	6.15	11.01	2.66
SP6	IW1	2388.30	2389.00	800	6.24	10.95	0.00424
SP7	IW1	2677.60	2678.20	800	6.20	10.90	74.5
SP8	IW1	2678.20	2678.90	800	6.17	10.93	110.
SP9	IW1	2683.40	2684.30	800	6.08	10.93	153.
SP10	IW1	2684.30	2685.10	800	6.21	10.89	180.
SP11	IW1	2980.80	2981.40	800	6.32	10.99	0.0121
SP12	IW1	2978.20	2978.90	800	6.33	10.97	0.0365
SP13	IW2	2975.20	2975.80	800	6.37	11.01	0.0142
SP14	IW2	2364.60	2665.30	800	6.30	10.93	142.
SP15	IW2	2368.90	2369.70	800	6.37	10.91	3.44
SP16	IW2	2362.80	2363.40	800	6.25	10.91	183.
SP17	IW2	2418.00	2418.80	800	6.34	10.97	23.2
SP18	IW2	2421.80	2422.50	800	6.35	10.89	12.7
SP19	IW2	2422.70	2423.60	800	6.26	10.94	18.0
SP20	IW2	2486.10	2486.80	800	6.33	10.89	36.4
SP21	IW2	2715.90	2716.70	800	6.34	10.93	182.
SP22	IW2	2891.80	2892.40	800	6.34	10.88	669.
SP23	IW2	2893.30	2894.30	800	6.30	10.88	127.

Geomechanical Analysis

Acoustic Velocity

LABORATORY PROCEDURES

Acoustic Velocities and Dynamic Elastic Parameters

The pulse transmission technique of velocity measurements was used with 1MHz frequency for P-waves and S-waves. The accuracy of velocity measurements is about 1%. Dynamic elastic parameters (bulk modulus, Young's modulus, shear modulus, and Poisson's ratio) were calculated using compressional-wave and shear-wave velocities (Vp and Vs, respectively) and the bulk density of the sample, based on the linear elastic theory.

ACOUSTIC VELOCITIES AND DYNAMIC ELASTIC PARAMETERS

Company: **Youngquist Brothers Inc.**
Well: **IW1**

Date: **Feb. 2012**
File: **HOU-111534**
Saturation Fluid: **As Received**
Rock Type: **Limestone**

Sample No.	Depth (ft)	Confining Pressure (psi)	Axial Pressure (psi)	Bulk Density (g/cm^3)	Acoustic Velocity				Dynamic Elastic Parameters			
					Compressional		Shear		Bulk Modulus ($x10^6$ psi)	Young's Modulus ($x10^6$ psi)	Shear Modulus ($x10^6$ psi)	Poisson's Ratio
					ft/sec	µs/ft	ft/sec	µs/ft				
1	2148.10-2148.70	800	800	2.47	16326	61.25	10464	95.57	4.02	8.41	3.65	0.15
2	2150.80-2150.40	800	800	2.60	17722	56.43	11059	90.42	5.30	10.14	4.29	0.18
3	2153.1-2153.8	800	800	2.70	18800	53.19	11638	85.92	6.30	11.74	4.94	0.19
4	2383.6-2384.1	800	800	2.03	8919	112.12	5447	183.59	1.10	1.96	0.81	0.20
5	2387.5-2388.3	800	800	2.55	17311	57.77	9881	101.21	5.84	8.46	3.36	0.26
6	2388.3-2389	800	800	2.68	17543	57.00	10782	92.75	5.53	10.07	4.21	0.20
7	2677.6-2678.2	800	800	1.66	8774	113.97	5027	198.93	0.97	1.42	0.56	0.26
8	2678.2-2678.9	800	800	1.68	8434	118.56	5168	193.49	0.80	1.45	0.61	0.20
9	2683.4-2685.1	800	800	1.77	8587	116.46	5105	195.91	0.93	1.52	0.62	0.23
10	2684.3-2685.1	800	800	1.67	8574	116.63	5220	191.56	0.84	1.48	0.62	0.21
11	2980.8-2981.4	800	800	2.64	17239	58.01	10601	94.33	5.25	9.58	4.01	0.20
12	2978.2-2978.9	800	800	2.67	16534	60.48	10930	91.49	4.10	9.54	4.29	0.11

ACOUSTIC VELOCITIES AND DYNAMIC ELASTIC PARAMETERS

Company: **Youngquist Brothers Inc.**
Well: **IW2**

Date: **Feb. 2012**
File: **HOU-111534**
Saturation Fluid: **As Received**
Rock Type: **Limestone**

Sample No.	Depth (ft)	Confining Pressure (psi)	Axial Pressure (psi)	Bulk Density (g/cm^3)	Acoustic Velocity				Dynamic Elastic Parameters			
					Compressional		Shear		Bulk Modulus ($x10^6$ psi)	Young's Modulus ($x10^6$ psi)	Shear Modulus ($x10^6$ psi)	Poisson's Ratio
					ft/sec	µs/ft	ft/sec	µs/ft				
13	2975.2-2975.8	800	800	2.58	16642	60.09	10252	97.55	4.76	8.73	3.65	0.19
14	2364.6-2365.3	800	800	1.82	9055	110.44	5184	192.90	1.13	1.66	0.66	0.26
15	2368.9-2369.7	800	800	2.07	8996	111.16	5387	185.63	1.18	1.97	0.81	0.22
16	2362.8-2363.4	800	800	1.81	9049	110.51	5485	182.30	1.02	1.77	0.73	0.21
17	2418.0-2418.8	800	800	2.05	9465	105.65	6047	165.37	1.13	2.33	1.01	0.16
18	2421.8-2422.5	800	800	2.00	9692	103.18	6087	164.28	1.20	2.34	1.00	0.17
19	2422.7-2423.6	800	800	2.17	10441	95.78	6898	144.96	1.33	3.09	1.39	0.11
20	2486.1-2486.8	800	800	1.97	9655	103.58	6222	160.73	1.10	2.35	1.03	0.14
21	2715.9-2716.7	800	800	1.54	8431	118.62	5109	195.73	0.75	1.31	0.54	0.21
22	2891.8-2892.4	800	800	1.62	8562	116.80	5177	193.16	0.82	1.42	0.59	0.21
23	2893.3-2894.3	800	800	1.65	8692	115.04	5146	194.31	0.89	1.45	0.59	0.23

Appendix

Full Diameter Analysis by CL-Midland

LABORATORY PROCEDURES

Full Diameter Core

1. In our Midland laboratory, the cores were cleaned using hot refluxing toluene and methanol to remove residual hydrocarbons and salts, then oven-dried at 220°F to constant weight and cooled to room temperature in a moisture-free environment.
2. Each sample was placed in a full diameter core holder and a confining pressure of 400 psig was applied. Vertical permeability was measured by flowing air end-to-end through the sample and measuring the flow rate and pressure drop across the sample using an air permeameter. For horizontal permeability measurements the air flow was directed across the sample, perpendicular to the end-faces. For each horizontal permeability measurement the sample was rotated by 30 degrees relative to a reference point.
3. Direct grain volume measurements were made using a full diameter matrix cup and a calibrated porosimeter. This instrument utilizes the principle of gas expansion as described by Boyle's law. Helium was used as the test gas.
4. Grain density was calculated by dividing sample dry weight by grain volume. Full diameter samples were then forwarded to the Houston facility for testing.

Full Diameter Analysis
CL-Midland

Company: **Youngquist Brothers, Inc**
Well: **Town of Davie DIW System**
Co. & St.: **Florida**

CL-Midland File Number: **57181-19989**
Date: **12/27/2012**

Sample Number	Top Depth feet	Bottom Depth feet	K(max) ss, air 400 conf press md	K(90) ss, air 400 conf press md	k(vert) ss, air 400 conf press md	POR He, Ambient Meas Grn Vol % of BV	GD g/cm^3	PV cm^3	BV cm^3
1	2148.1	2148.7	2804.	137.	0.001	9.3	2.80	91.0	974.6
2	2150.8	2151.4	1.28	0.947	0.259	4.6	2.75	42.6	932.8
3	2153.0	2153.8	4365	665.	0.007	2.5	2.75	22.0	896.2
4	2383.6	2384.1	33.5	32.5	26.2	24.6	2.73	181.9	740.6
5	2387.5	2388.3	408.	8.50	2.31	10.5	2.83	94.4	902.1
6	2388.3	2389.0	2.36	0.723	0.16	7.8	2.83	72.1	930.8
7	2677.6	2678.2	206.	205.	117.	37.7	2.71	338.5	898.7
8	2678.2	2678.9	123.	117.	75.8	36.7	2.71	392.2	1067.3
9	2683.4	2684.3	1016.	959.	364.	33.0	2.71	266.0	805.0
10	2684.3	2685.1	430.	401.	166.	35.3	2.71	347.2	984.4
11	2980.8	2981.4	8.87	7.04	0.001	6.0	2.79	68.1	1127.5
12	2978.2	2978.9	22.1	0.046	0.009	5.0	2.80	59.8	1191.0
13	2975.2	2975.8	1362.	714.	0.001	5.7	2.79	55.9	980.5
14	2364.6	2665.3	208.	208.	117.	31.6	2.70	372.8	1178.8
15	2368.9	2369.7	11.5	10.9	8.61	24.2	2.74	263.2	1089.7
16	2362.8	2363.4	444.	431.	343.	32.6	2.70	310.0	952.3
17	2418.0	2418.8	18.3	17.4	9.35	23.1	2.73	301.3	1305.1
18	2421.8	2422.5	32.9	31.7	21.0	24.2	2.73	273.7	1131.2
19	2422.7	2423.6	26.7	23.0	5.55	24.2	2.72	387.1	1596.8
20	2486.1	2486.8	308.	308.	206.	26.4	2.71	239.8	908.3
21	2715.9	2716.7	568.	553.	403.	40.5	2.70	499.5	1233.4
22	2891.8	2892.4	957.	923.	822.	38.0	2.70	391.7	1030.8
23	2893.3	2894.3	346.	339.	199.	37.2	2.70	425.4	1143.9
24	2897.9	2898.8	344.	332.	286.	36.8	2.70	536.4	1457.6

Full Diameter Analysis
CL-Midland

Company: **Youngquist Brothers, Inc**
Well: **Town of Davie DIW System**
Co. & St.: **Florida**

CL-Midland File Number: **57181-19989**
Date: **12/27/2012**

Sample Number	Top Depth feet	Bottom Depth feet	Description	Dry WT gms	Horizontal Length cm	Sample Diameter	Sample Length
1	2148.1	2148.7	Dol, m xln, ixp sl ppm, dissol vug poro stk	2473.1	12.3	10.056	12.261
2	2150.8	2151.4	Dol, f xln, sl ppm	2450.6	6.5	10.080	11.657
3	2153.0	2153.8	Dol, f-vf xln, sl ppm sl dissol rootlet vug, sl frac, lam	2400.5	11	10.106	11.083
4	2383.6	2384.1	Lim, tr dol, chk-slt xln, ipp	1524.3	9.5	9.953	9.485
5	2387.5	2388.3	Dol, tr calc, m xln, sl ixp pp sl vug	2286.4	11.6	9.913	11.723
6	2388.3	2389.0	Dol, tr calc, m xln, sl ixp tr vug	2431.4	11.7	10.085	11.797
7	2677.6	2678.2	Lim, slt xln, ppm sl ipp	1516.3	11.9	9.723	11.851
8	2678.2	2678.9	Lim, slt xln, ppm sl ipp	1827.3	10.1	9.810	13.749
9	2683.4	2684.3	Lim, slt xln, ppm ipp	1460.7	10.2	9.895	10.458
10	2684.3	2685.1	Lim, slt xln, ppm ipp	1725.3	10.2	9.811	12.642
11	2980.8	2981.4	Dol, f-c xln, sl pp, sl frac	2953.7	14	10.088	14.072
12	2978.2	2978.9	Dol, f-c xln, sl pp tr vug	3170.7	15	10.082	14.999
13	2975.2	2975.8	Dol, f-c xln, sl pp sl vug, sl dissol frac dissol lam	2582.4	12.2	10.049	12.320
14	2364.6	2665.3	Lim, tr dol, slt-chk xln, ppm sl ipp	2175.1	12.7	9.865	14.973
15	2368.9	2369.7	Lim, sl dol, slt xln, sl pp	2261.8	13.7	10.028	13.734
16	2362.8	2363.4	Lim, slt xln, ppm ipp	1734.8	12.1	9.966	12.099
17	2418.0	2418.8	Lim, sl dol, slt xln, ppm sl ipp	2739.0	16.5	10.001	16.502
18	2421.8	2422.5	Lim, dol, slt xln, ppm sl ipp, vert brec w/ shr	2343.3	9.4	10.038	14.369
19	2422.7	2423.6	Lim, sl dol, slt xln, ppm sl ipp, wavy discont brec w/ shr	3295.4	18	10.049	20.210
20	2486.1	2486.8	Lim, tr dol, slt xln, ppm ipp	1809.8	11.2	9.992	11.656
21	2715.9	2716.7	Lim, slt xln, pp sl ppm	1983.5	15.9	9.862	16.001
22	2891.8	2892.4	Lim, slt xln, pp sl ppm	1725.7	13.4	9.683	13.423
23	2893.3	2894.3	Lim, slt xln, pp sl ppm	1939.2	11.8	9.893	14.724
24	2897.9	2898.8	Lim, slt xln, pp sl ppm	2488.1	18.7	9.933	18.719