

PATHFINDER

FEET	TVD
100	100
200	200
300	300
400	400
500	500
600	600
700	700
800	800
900	900
1000	1000
1100	1100
1200	1200
1300	1300
1400	1400
1500	1500
1600	1600
1700	1700
1800	1800
1900	1900
2000	2000
2100	2100
2200	2200
2300	2300
2400	2400
2500	2500
2600	2600
2700	2700
2800	2800
2900	2900
3000	3000
3100	3100
3200	3200
3300	3300
3400	3400
3500	3500
3600	3600
3700	3700
3800	3800
3900	3900
4000	4000
4100	4100
4200	4200
4300	4300
4400	4400
4500	4500
4600	4600
4700	4700
4800	4800
4900	4900
5000	5000
5100	5100
5200	5200
5300	5300
5400	5400
5500	5500
5600	5600
5700	5700
5800	5800
5900	5900
6000	6000
6100	6100
6200	6200
6300	6300
6400	6400
6500	6500
6600	6600
6700	6700
6800	6800
6900	6900
7000	7000
7100	7100
7200	7200
7300	7300
7400	7400
7500	7500
7600	7600
7700	7700
7800	7800
7900	7900
8000	8000
8100	8100
8200	8200
8300	8300
8400	8400
8500	8500
8600	8600
8700	8700
8800	8800
8900	8900
9000	9000
9100	9100
9200	9200
9300	9300
9400	9400
9500	9500
9600	9600
9700	9700
9800	9800
9900	9900
10000	10000

COMPANY : COG OPERATING, LLC.
WELL : KEYSTONE 32 FEE #1H
FIELD : BURTON FLAT; BONE SPRING.
COUNTY : EDDY
STATE : NM
COUNTRY : USA
API No. 30-015-38594

API WELL No.: 30-015-38594

SEC: 032 TWP: 20S RANGE: 28E

DIRECTIONAL
ROP

ALTITUDE : 3213.20 ft (GROUND LEVEL - MEAN SEA LEVEL)

DEVIATION RECORD

HOLE SIZE in	FROM ft	TO ft	INCLINATION deg	FROM ft	TO ft
17 1/2	0	650	00 - 31	0	6179
12 1/4	650	2660	31 - 59	6179	6434
7 7/8	2660	10835	59 - 90	6434	7002
			90 +- 2	7002	10835

CASING SIZE in	FROM ft	TO ft
13 3/8	0	650
9 5/8	0	2660

TOTAL DEPTH : 10835 ft

RUN DATA

RUN NUMBER

START DATE

START TIME

END DATE

END	TIME
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80
9	90
10	100

DEPTH IN

DEPTH OUT

LOG TOP

LOG BOTTC

HOLE SIZE

100

MUD DATA @

MUD TYPE

DENSITY

VISCOSITY

pH

FLUID LOSS

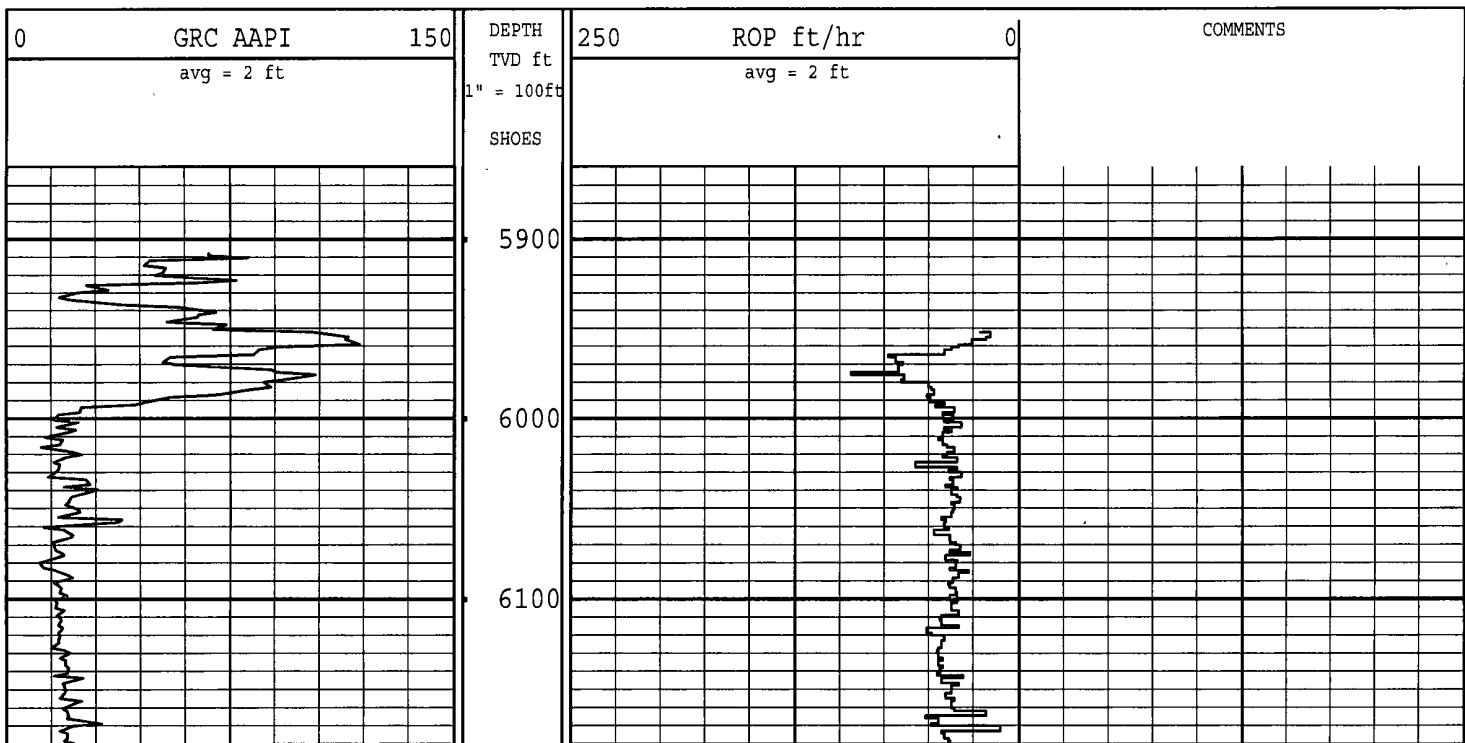
SALINITY

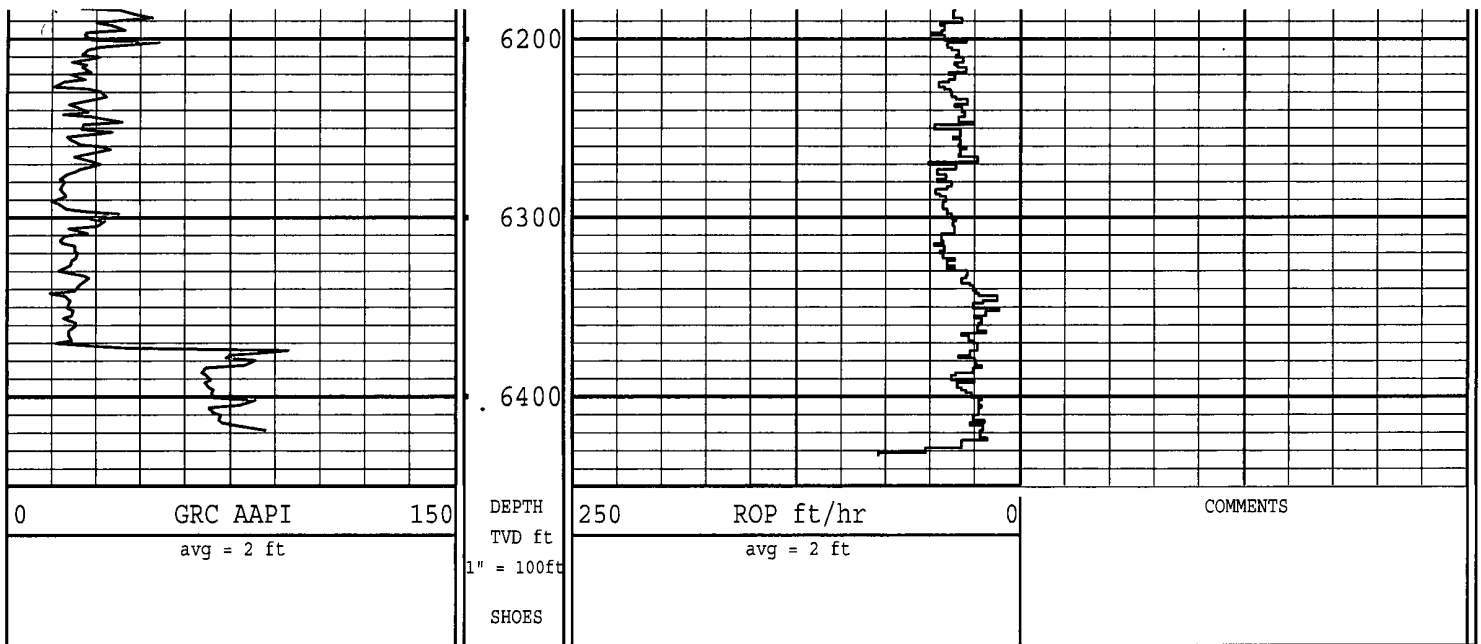
Rm ohmm

MAX REC TEMP deg F	115					
Rm @ MAX TEMP ohmm						
LWD ENGINEER #1	M.ALIYEV					
LWD ENGINEER #2	Z.VEST					
LWD ENGINEER #3						

REMARKS
COG OPERATING, LLC. AFE#: 229137.
PATHFINDER TRACKING #: 700002577-WT-WT.
ALL LOGGING DATA IS TRANSMITTED ONLY UNLESS STATED OTHERWISE.
ALL REFERENCES TO LOG TOP, LOG BOTTOM OR LOGGING TOOL DEPTH REFER TO THE GAMMA-RAY SENSOR UNLESS STATED OTHERWISE.
ALL ANNOTATIONS IN THE DEPTH TRACK ARE REFERENCED TO BIT DEPTH.
RUN #1: 6 3/4" HDS-1R/GAMMA LOGGING RUN.
RUN #2: 6 3/4" HDS-1R/DIRECTIONAL ONLY RUN. NO LOGGING DATA ACQUIRED.
RUN #3: 6 3/4" HDS-1R/DIRECTIONAL ONLY RUN. NO LOGGING DATA ACQUIRED.
RUN #4: 6 3/4" HDS-1R/DIRECTIONAL ONLY RUN. NO LOGGING DATA ACQUIRED.
NOTICE - All interpretations are opinions based on inferences from electrical or other measurements and we do not guarantee the accuracy or correctness of any interpretations. We shall not, except in the case of gross or willful negligence on our part, be liable or responsible for loss, costs, damages or expenses incurred or sustained by anyone as a result of any interpretations made by one of our officers, agents or employees. These interpretations are also subject to our General Terms and Conditions as set out in our current Price Schedule.
PATHFINDER - A Schlumberger Company

Version No : RX5 V6.03E Release 1Mar2011
Plot Time : 04-Jun-2011 17:08





Survey Report												
Vertical Section Plane: 180.31°						Total Correction: 7.83° East to True						
Calculation Method: Minimum Curvature						Survey Reference: Wellhead						
North Aligned to: True North						Well: KEYSTONE 32 FEE #1H						
RKB: 18' KELLY BUSHING TO GROUND LEVEL.						FIELD: BURTON FLAT; BONE SPRING						
Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)	
THE FOLLOWING ARE SCIENTIFIC DRILLING GYRO SURVEYS												
0.00	0.00	0.00	0.01	0.00	-0.01	0.01 N	0.02 W	0.02	300.56	0.00		
100.00	0.23	139.89	100.01	100.00	0.14	0.14 S	0.11 E	0.18	142.51	0.23		
200.00	0.40	245.52	200.00	100.00	0.44	0.44 S	0.08 W	0.45	190.35	0.51		
300.00	0.62	280.06	300.00	100.00	0.49	0.49 S	0.93 W	1.05	242.27	0.37		
400.00	0.56	342.40	400.00	100.00	-0.06	0.07 N	1.61 W	1.61	272.53	0.61		
500.00	0.54	357.88	499.99	100.00	-1.00	1.01 N	1.78 W	2.04	299.57	0.15		
600.00	0.64	10.36	599.99	100.00	-2.02	2.03 N	1.69 W	2.64	320.14	0.16		
700.00	0.53	8.74	699.98	100.00	-3.03	3.03 N	1.52 W	3.40	333.36	0.11		
800.00	0.40	22.20	799.98	100.00	-3.81	3.81 N	1.32 W	4.04	340.91	0.17		
900.00	0.37	42.79	899.98	100.00	-4.37	4.38 N	0.97 W	4.48	347.51	0.14		
1000.00	0.51	117.63	999.97	100.00	-4.40	4.41 N	0.36 W	4.42	355.39	0.55		
1100.00	0.60	126.40	1099.97	100.00	-3.89	3.89 N	0.46 E	3.92	6.75	0.12		
1200.00	0.82	118.52	1199.96	100.00	-3.24	3.24 N	1.51 E	3.57	25.02	0.24		
1300.00	1.06	121.24	1299.95	100.00	-2.43	2.41 N	2.93 E	3.80	50.51	0.24		
1400.00	1.13	121.21	1399.93	100.00	-1.45	1.42 N	4.56 E	4.78	72.67	0.07		
1500.00	1.10	123.90	1499.91	100.00	-0.41	0.38 N	6.20 E	6.22	86.52	0.06		
1600.00	0.93	135.59	1599.90	100.00	0.70	0.74 S	7.57 E	7.60	95.56	0.27		
1700.00	1.16	132.51	1699.88	100.00	1.95	2.00 S	8.88 E	9.11	102.70	0.24		
1800.00	1.22	128.05	1799.86	100.00	3.28	3.34 S	10.47 E	10.99	107.70	0.11		
1900.00	1.27	108.67	1899.83	100.00	4.29	4.35 S	12.36 E	13.10	109.40	0.42		
2000.00	1.26	104.83	1999.81	100.00	4.91	4.99 S	14.47 E	15.30	109.02	0.09		
2100.00	0.88	110.45	2099.79	100.00	5.45	5.54 S	16.25 E	17.17	108.82	0.39		
2200.00	0.82	110.80	2199.78	100.00	5.96	6.06 S	17.64 E	18.65	108.96	0.06		
2300.00	0.75	113.64	2299.77	100.00	6.47	6.58 S	18.91 E	20.02	109.18	0.08		
2400.00	0.71	114.67	2399.76	100.00	6.99	7.10 S	20.07 E	21.29	109.48	0.04		
2500.00	0.71	125.26	2499.76	100.00	7.60	7.71 S	21.14 E	22.50	110.05	0.13		
2600.00	0.75	130.35	2599.75	100.00	8.38	8.50 S	22.14 E	23.72	110.99	0.08		
2700.00	0.77	126.27	2699.74	100.00	9.19	9.32 S	23.18 E	24.99	111.89	0.06		
2800.00	0.71	145.94	2799.73	100.00	10.10	10.23 S	24.07 E	26.16	113.02	0.26		
2900.00	0.72	158.45	2899.72	100.00	11.19	11.33 S	24.65 E	27.13	114.68	0.16		
3000.00	0.72	162.93	2999.71	100.00	12.37	12.51 S	25.07 E	28.01	116.52	0.06		
3100.00	0.73	162.97	3099.71	100.00	13.58	13.72 S	25.44 E	28.90	118.34	0.01		
3200.00	0.54	158.28	3199.70	100.00	14.63	14.77 S	25.80 E	29.73	119.79	0.20		
3300.00	0.51	162.69	3299.70	100.00	15.49	15.63 S	26.10 E	30.43	120.91	0.05		
3400.00	0.46	186.82	3399.69	100.00	16.31	16.45 S	26.19 E	30.93	122.14	0.21		
3500.00	0.67	220.10	3499.69	100.00	17.16	17.30 S	25.77 E	31.03	123.88	0.38		
3600.00	0.82	230.26	3599.68	100.00	18.07	18.20 S	24.84 E	30.79	126.24	0.20		
3700.00	0.89	244.03	3699.67	100.00	18.87	19.00 S	23.59 E	30.29	128.85	0.22		
3800.00	0.90	250.02	3799.66	100.00	19.49	19.61 S	22.15 E	29.59	131.51	0.09		
3900.00	1.14	279.05	3899.64	100.00	19.61	19.72 S	20.43 E	28.40	133.98	0.56		
4000.00	1.17	285.30	3999.62	100.00	19.20	19.30 S	18.47 E	26.71	136.26	0.13		
4100.00	1.33	283.77	4099.60	100.00	18.66	18.75 S	16.35 E	24.88	138.90	0.16		
4200.00	1.38	280.69	4199.57	100.00	18.17	18.25 S	14.04 E	23.03	142.42	0.09		
4300.00	1.38	281.26	4299.54	100.00	17.73	17.79 S	11.68 E	21.28	146.72	0.01		
4400.00	1.35	287.48	4399.51	100.00	17.15	17.20 S	9.37 E	19.59	151.41	0.15		
4500.00	1.41	282.76	4499.48	100.00	16.54	16.58 S	7.05 E	18.01	156.96	0.13		

4600.00	1.39	285.09	4599.45	100.00	15.96	15.99 S	4.68 E	16.66	163.69	0.06
4700.00	1.61	287.09	4699.42	100.00	15.25	15.26 S	2.17 E	15.41	171.92	0.23
4800.00	1.68	280.10	4799.38	100.00	14.59	14.59 S	0.62 W	14.60	182.43	0.21
4900.00	1.80	274.10	4899.33	100.00	14.24	14.22 S	3.63 W	14.68	194.32	0.22
5000.00	1.81	276.81	4999.28	100.00	13.96	13.92 S	6.76 W	15.48	205.91	0.09
5100.00	1.64	276.83	5099.24	100.00	13.62	13.57 S	9.75 W	16.71	215.71	0.17
5200.00	1.39	286.26	5199.20	100.00	13.12	13.06 S	12.34 W	17.96	223.38	0.35
5300.00	1.14	286.18	5299.18	100.00	12.52	12.44 S	14.46 W	19.07	229.29	0.25
5400.00	1.08	283.65	5399.16	100.00	12.03	11.94 S	16.33 W	20.23	233.83	0.08
5500.00	1.29	289.50	5499.14	100.00	11.44	11.34 S	18.31 W	21.53	238.22	0.24
5600.00	1.22	312.14	5599.11	100.00	10.36	10.25 S	20.16 W	22.61	243.04	0.50
5700.00	1.29	340.49	5699.09	100.00	8.59	8.48 S	21.32 W	22.94	248.32	0.62
5800.00	1.46	26.86	5799.06	100.00	6.39	6.28 S	21.12 W	22.04	253.45	1.09
TIE INTO SCIENTIFIC DRILLING GYRO										
5890.00	1.74	36.04	5889.03		4.26	4.15 S	19.80 W	20.23	258.16	
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
5956.00	0.97	59.33	5955.01	66.00	3.16	3.05 S	18.73 W	18.98	260.74	1.41 108.25
5988.00	3.87	177.63	5986.99	32.00	4.10	4.00 S	18.45 W	18.88	257.78	13.79 108.25
6020.00	9.23	182.44	6018.77	32.00	7.74	7.64 S	18.52 W	20.03	247.57	16.82 108.25
6052.00	14.86	183.55	6050.05	32.00	14.41	14.31 S	18.88 W	23.69	232.85	17.61 108.25
6083.00	19.43	182.38	6079.67	31.00	23.53	23.43 S	19.34 W	30.38	219.54	14.78 111.87
6115.00	23.30	182.05	6109.46	32.00	35.18	35.08 S	19.79 W	40.27	209.43	12.10 111.87
6147.00	27.08	182.36	6138.41	32.00	48.79	48.68 S	20.32 W	52.75	202.65	11.82 111.87
6179.00	30.51	183.78	6166.45	32.00	64.19	64.07 S	21.15 W	67.47	198.27	10.93 111.87

Survey Report											
Vertical Section Plane: 180.31°						Total Correction: 7.83° East to True					
Calculation Method: Minimum Curvature						Survey Reference: Wellhead					
North Aligned to: True North						Well: KEYSTONE 32 FEE #1H					
RKB: 18' KELLY BUSHING TO GROUND LEVEL.						FIELD: BURTON FLAT; BONE SPRING					
Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	Rect Co-ord North (ft)	Rect Co-ord East (ft)	Closure Distance (ft)	Closure Direction (deg)	Dog-leg Severity (dg/hft)	Temp (deg F)
6211.00	33.59	184.34	6193.57	32.00	81.13	81.01 S	22.36 W	84.04	195.43	9.67	111.87
6243.00	37.02	183.80	6219.68	32.00	99.58	99.45 S	23.67 W	102.23	193.38	10.76	111.87
6274.00	40.36	182.34	6243.88	31.00	118.93	118.80 S	24.69 W	121.34	191.74	11.17	111.87
6306.00	43.88	182.20	6267.61	32.00	140.38	140.24 S	25.54 W	142.55	190.32	11.00	111.87
6338.00	47.57	182.30	6289.94	32.00	163.27	163.13 S	26.44 W	165.26	189.21	11.53	111.87
6370.00	52.06	182.59	6310.59	32.00	187.70	187.55 S	27.49 W	189.55	188.34	14.05	111.87
6402.00	56.01	183.70	6329.38	32.00	213.56	213.41 S	28.91 W	215.36	187.72	12.66	111.87
6434.00	59.44	184.98	6346.46	32.00	240.54	240.38 S	30.97 W	242.36	187.34	11.24	111.87
6465.00	62.78	185.06	6361.44	31.00	267.59	267.41 S	33.34 W	269.48	187.11	10.78	111.87
6497.00	66.39	183.81	6375.17	32.00	296.41	296.22 S	35.57 W	298.35	186.85	11.82	111.87
6529.00	70.17	182.76	6387.01	32.00	326.09	325.90 S	37.27 W	328.02	186.52	12.20	115.48
6561.00	73.86	182.76	6396.89	32.00	356.50	356.29 S	38.74 W	358.39	186.20	11.53	115.48
6593.00	75.45	182.69	6405.36	32.00	387.33	387.12 S	40.20 W	389.20	185.93	4.97	119.09
6625.00	78.35	183.40	6412.61	32.00	418.46	418.24 S	41.86 W	420.33	185.72	9.32	119.09
6656.00	80.64	183.59	6418.26	31.00	448.89	448.66 S	43.72 W	450.78	185.57	7.41	115.48
6688.00	83.62	183.57	6421.96	27.00	475.59	475.35 S	45.39 W	477.51	185.45	11.04	115.48
6715.00	85.74	183.38	6424.92	32.00	507.40	507.15 S	47.32 W	509.35	185.33	6.65	115.48
6747.00	85.65	183.37	6427.33	32.00	539.26	539.00 S	49.20 W	541.24	185.22	0.28	115.48
6811.00	88.20	180.84	6430.76	64.00	603.13	602.86 S	51.54 W	605.06	184.89	5.61	119.09
6906.00	89.34	180.24	6432.80	95.00	698.10	697.83 S	52.44 W	699.80	184.30	1.36	119.09
7002.00	90.13	180.19	6433.24	96.00	794.10	793.83 S	52.80 W	795.58	183.81	0.82	119.09
7097.00	90.66	180.34	6432.59	95.00	889.10	888.82 S	53.24 W	890.42	183.43	0.58	122.71
7192.00	91.36	180.69	6430.91	95.00	984.08	983.80 S	54.09 W	985.29	183.15	0.82	122.71
7288.00	90.04	180.12	6429.74	96.00	1080.07	1079.79 S	54.77 W	1081.18	182.90	1.50	122.71
7383.00	90.04	179.24	6429.67	95.00	1175.07	1174.79 S	54.24 W	1176.04	182.64	0.93	126.32
7479.00	90.04	178.55	6429.61	96.00	1271.04	1270.77 S	52.39 W	1271.85	182.36	0.72	126.32
7574.00	89.52	177.97	6429.97	95.00	1365.97	1365.73 S	49.50 W	1366.62	182.08	0.82	126.32
7669.00	90.04	179.05	6430.34	95.00	1460.93	1460.69 S	47.03 W	1461.45	181.84	1.26	126.32
7765.00	91.45	179.57	6429.09	96.00	1556.90	1556.67 S	45.88 W	1557.35	181.69	1.56	126.32
7860.00	90.13	179.23	6427.78	95.00	1651.88	1651.66 S	44.88 W	1652.27	181.56	1.44	126.32
7955.00	90.75	179.22	6427.05	95.00	1746.86	1746.65 S	43.60 W	1747.19	181.43	0.65	126.32
8051.00	91.10	179.71	6425.50	96.00	1842.83	1842.63 S	42.70 W	1843.12	181.33	0.63	126.32
8146.00	88.90	179.91	6425.50	95.00	1937.82	1937.62 S	42.39 W	1938.09	181.25	2.33	126.32
8241.00	88.46	178.95	6427.69	95.00	2032.79	2032.59 S	41.44 W	2033.01	181.17	1.11	129.94
8337.00	88.64	178.52	6430.12	96.00	2128.72	2128.54 S	39.32 W	2128.90	181.06	0.49	129.94
8432.00	89.43	180.98	6431.72	95.00	2223.69	2223.51 S	38.91 W	2223.85	181.00	2.72	129.94
8528.00	88.99	180.18	6433.04	96.00	2319.68	2319.50 S	39.88 W	2319.84	180.99	0.95	129.94
8623.00	89.52	179.84	6434.28	95.00	2414.67	2414.49 S	39.90 W	2414.82	180.95	0.66	129.94
8718.00	90.13	181.19	6434.57	95.00	2509.67	2509.48 S	40.75 W	2509.81	180.93	1.56	129.94
8814.00	90.66	181.48	6433.90	96.00	2605.65	2605.45 S	42.99 W	2605.81	180.95	0.63	129.94
8909.00	91.01	181.32	6432.52	95.00	2700.62	2700.42 S	45.31 W	2700.80	180.96	0.41	129.94
9005.00	89.87	180.51	6431.78	96.00	2796.61	2796.40 S	46.84 W	2796.79	180.96	1.46	129.94
9100.00	89.78	179.83	6432.07	95.00	2891.61	2891.40 S	47.12 W	2891.78	180.93	0.72	129.94
9195.00	90.92	180.92	6431.49	95.00	2986.61	2986.39 S	47.75 W	2986.77	180.92	1.66	129.94
9291.00	91.28	180.42	6429.65	96.00	3082.59	3082.37 S	48.87 W	3082.75	180.91	0.64	129.94
9386.00	91.01	181.85	6427.75	95.00	3177.55	3177.33 S	50.75 W	3177.73	180.92	1.53	129.94
9481.00	90.40	182.17	6426.58	95.00	3272.50	3272.26 S	54.08 W	3272.71	180.95	0.72	129.94
9576.00	90.75	181.95	6425.63	95.00	3367.46	3367.19 S	57.50 W	3367.68	180.98	0.43	129.94
9672.00	88.90	181.97	6425.92	96.00	3463.41	3463.13 S	60.78 W	3463.67	181.01	1.93	129.94
9767.00	89.25	182.08	6427.46	95.00	3558.36	3558.06 S	64.13 W	3558.64	181.03	0.39	129.94

9863.00	89.78	181.52	6428.27	96.00	3654.32	3654.01 S	67.15 W	3654.63	181.05	0.80	133.55
9958.00	88.81	179.95	6429.44	95.00	3749.31	3748.99 S	68.37 W	3749.61	181.04	1.94	133.55
10053.00	88.64	178.89	6431.55	95.00	3844.27	3843.96 S	67.41 W	3844.55	181.00	1.13	133.55
10149.00	89.52	179.67	6433.09	96.00	3940.24	3939.94 S	66.20 W	3940.49	180.96	1.22	133.55
10244.00	90.75	180.44	6432.87	95.00	4035.23	4034.94 S	66.29 W	4035.48	180.94	1.53	129.94
10339.00	91.45	181.43	6431.04	95.00	4130.21	4129.90 S	67.84 W	4130.46	180.94	1.28	133.55
10435.00	89.78	182.14	6430.01	96.00	4226.17	4225.85 S	70.83 W	4226.44	180.96	1.89	133.55
10594.00	88.72	180.73	6432.10	159.00	4385.12	4384.78 S	74.81 W	4385.42	180.98	1.11	126.32
10689.00	88.99	181.30	6433.99	95.00	4480.09	4479.74 S	76.50 W	4480.40	180.98	0.66	129.94
STRAIGHT LINE PROJECTION TO BIT AT 10835'MD											
10835.00	88.99	181.30	6436.57	146.00	4626.05	4625.68 S	79.81 W	4626.37	180.99	0.00	

PATHFINDER ENERGY SERVICES - TOOL CODES & DESCRIPTIONS

HDS1M	HIGH SPEED DIRECTIONAL SURVEY MULTILINK TOOL	CLSSM	COMPENSATED LONG SPACE SONIC TOOL
HDS1L	HIGH SPEED DIRECTIONAL SURVEY GAMMA TOOL	SCLSS	SLIM COMPENSATED LONG SPACE SONIC MULTILINK TOOL
HDS1R	HIGH SPEED DIRECTIONAL SURVEY GAMMA RETRIEVABLE TOOL	DPM	DYNAMIC PRESSURE MODULE
AWR	ARRAY WAVE RESISTIVITY GAMMA MULTILINK TOOL	PZIG	AT-BIT INCLINATION AND GAMMA RAY
CWRGM	COMPENSATED WAVE RESISTIVITY GAMMA MULTILINK TOOL	2DRS	2D ROTARY STEERING TOOL
SCWR	SLIM COMPENSATED WAVE RESISTIVITY TOOL	3DRS	3D ROTARY STEERING TOOL
DNSCM	DENSITY NEUTRON STANDOFF CALIPER MULTILINK TOOL	DFT	DRILLING FORMATION TESTER

PATHFINDER ENERGY SERVICES - MNEMONICS LIST

GENERAL

AHV	ANNULAR HOLE VOLUME TICKS	ROP	RATE OF PENETRATION
AHVT	ANNULAR HOLE VOLUME-ACCUMULATIVE TOTAL	GRW	RAW GAMMA RAY
BHV	BOREHOLE VOLUME TICKS	GRC	CALIBRATED GAMMA RAY
BHVT	BOREHOLE VOLUME-ACCUMULATIVE TOTAL	GREC	ENVIRONMENTALLY CORRECTED GAMMA RAY
DEPT	MEASURED DEPTH	RM	RESISTIVITY OF MUD
MTVD	MEASURED TRUE VERTICAL DEPTH	RMF	RESISTIVITY OF MUD FILTRATE
INC	INCLINATION	SHOES	CASING SHOE SYMBOLS
AZI	AZIMUTH	SURVS	SURVEY TEXT SYMBOLS

4 3/4" SCWR

C15A	CWR ATTENUATION CONDUCTIVITY (15")	R35A	CWR ATTENUATION RESISTIVITY (35")
C15P	CWR PHASE CONDUCTIVITY (15")	R35P	CWR PHASE RESISTIVITY (35")
C35A	CWR ATTENUATION CONDUCTIVITY (35")	UL1A	UNCOMPENSATED 15" ATTENUATION RESISTIVITY LOWER
C35P	CWR PHASE CONDUCTIVITY (35")	UL1P	UNCOMPENSATED 15" PHASE RESISTIVITY LOWER
CWRFET	CWR FORMATION EXPOSURE TIME	UL3A	UNCOMPENSATED 35" ATTENUATION RESISTIVITY LOWER
GRC	CALIBRATED GAMMA RAY	UL3P	UNCOMPENSATED 35" PHASE RESISTIVITY LOWER
GREC	ENVIRONMENTALLY CORRECTED GAMMA RAY	UU1A	UNCOMPENSATED 15" ATTENUATION RESISTIVITY UPPER
GRFET	GAMMA RAY FORMATION EXPOSURE TIME	UU1P	UNCOMPENSATED 15" PHASE RESISTIVITY UPPER
R15A	CWR ATTENUATION RESISTIVITY (15")	UU3A	UNCOMPENSATED 35" ATTENUATION RESISTIVITY UPPER
R15P	CWR PHASE RESISTIVITY (15")	UU3P	UNCOMPENSATED 35" PHASE RESISTIVITY UPPER

6 3/4", 8", & 9 1/2" CWR

C25A	CWR ATTENUATION CONDUCTIVITY (25")	R55A	CWR ATTENUATION RESISTIVITY (55")
C25P	CWR PHASE CONDUCTIVITY (25")	R55P	CWR PHASE RESISTIVITY (55")
C55A	CWR ATTENUATION CONDUCTIVITY (55")	UL2A	UNCOMPENSATED 25" ATTENUATION RESISTIVITY LOWER
C55P	CWR PHASE CONDUCTIVITY (55")	UL2P	UNCOMPENSATED 25" PHASE RESISTIVITY LOWER
CWRFET	CWR FORMATION EXPOSURE TIME	UL5A	UNCOMPENSATED 55" ATTENUATION RESISTIVITY LOWER
GRC	CALIBRATED GAMMA RAY	UL5P	UNCOMPENSATED 55" PHASE RESISTIVITY LOWER
GREC	ENVIRONMENTALLY CORRECTED GAMMA RAY	UU2A	UNCOMPENSATED 25" ATTENUATION RESISTIVITY UPPER
GRFET	GAMMA RAY FORMATION EXPOSURE TIME	UU2P	UNCOMPENSATED 25" PHASE RESISTIVITY UPPER
R25A	CWR ATTENUATION RESISTIVITY (25")	UU5A	UNCOMPENSATED 55" ATTENUATION RESISTIVITY UPPER
R25P	CWR PHASE RESISTIVITY (25")	UU5P	UNCOMPENSATED 55" PHASE RESISTIVITY UPPER

4 3/4", 6 3/4", 8", & 9 1/2" AWR

GRCA	AWR CALIBRATED GAMMA RAY	RDPH	DEEP PHASE RESISTIVITY FROM 2 MHZ FREQUENCY
GRWA	AWR RAW GAMMA RAY	RSAH	SHALLOW ATTENUATION RESISTIVITY FROM 2 MHZ FREQUENCY
TEMP_A	TEMPERATURE FROM AWR TOOL	RMAH	MEDIUM ATTENUATION RESISTIVITY FROM 2 MHZ FREQUENCY

INC_A	AWR STATIC INCLINATION	RDAH	DEEP ATTENUATION RESISTIVITY FROM 2 MHZ FREQUENCY
INCD_A	AWR DYNAMIC INCLINATION	CSPL	SHALLOW PHASE CONDUCTIVITY FROM 500 KHZ FREQUENCY
RSPL	SHALLOW PHASE RESISTIVITY FROM 500 KHZ FREQUENCY	CMPL	MEDIUM PHASE CONDUCTIVITY FROM 500 KHZ FREQUENCY
RMPL	MEDIUM PHASE RESISTIVITY FROM 500 KHZ FREQUENCY	CDPL	DEEP PHASE CONDUCTIVITY FROM 500 KHZ FREQUENCY
RDPL	DEEP PHASE RESISTIVITY FROM 500 KHZ FREQUENCY	CSPH	SHALLOW PHASE CONDUCTIVITY FROM 2 MHZ FREQUENCY
RSAL	SHALLOW ATTENUATION RESISTIVITY FROM 500 KHZ FREQUENCY	CMPH	MEDIUM PHASE CONDUCTIVITY FROM 2 MHZ FREQUENCY
RMAL	MEDIUM ATTENUATION RESISTIVITY FROM 500 KHZ FREQUENCY	CDPH	DEEP PHASE CONDUCTIVITY FROM 2 MHZ FREQUENCY
RDAL	DEEP ATTENUATION RESISTIVITY FROM 500 KHZ FREQUENCY	ARFET	AWR FORMATION EXPOSURE TIME
RSPH	SHALLOW PHASE RESISTIVITY FROM 2 MHZ FREQUENCY	GAFET	AWR GAMMA RAY FORMATION EXPOSURE TIME
RMPH	MEDIUM PHASE RESISTIVITY FROM 2 MHZ FREQUENCY		

4 3/4", 6 3/4", 8" DNSC

BS	BIT SIZE	NLJM	NEUTRON POROSITY (LIMESTONE MATRIX)
CALI	CALIPER	NNEAR	NEAR NEUTRON COUNT RATE
DDDN	DNSC DATA DENSITY (0 - 4 SAMPLES/FT)	NRAT	NEUTRON RATIO
DGAM	DENSITY GAMMA (NATURAL)	NSAC	ENVIRONMENTALLY CORRECTED NEUTRON
DNPH	NEUTRON POROSITY CORRECTION		
DNSFET	DNSC FORMATION EXPOSURE TIME	NSAN	NEUTRON POROSITY (SANDSTONE MATRIX)
DPE	PE CORRECTION	PE	PHOTOELECTRIC INDEX

DPHI	DENSITY POROSITY (GIVEN MATRIX)	PEMI	PHOTOELECTRIC INDEX (MINIMUM FILTER)
DHRM	DENSITY CORRECTION MINUS	RHOB	BULK DENSITY
DRHO	DENSITY CORRECTION	SDNP	STANDARD DEVIATION NEUTRON POROSITY
DRHP	DENSITY CORRECTION PLUS	SDPE	STANDARD DEVIATION PE COMPUTATION
EDPH	DENSITY POROSITY-EVR PROCESSED	SDRH	STANDARD DEVIATION DENSITY
ENPH	NEUTRON POROSITY-EVR PROCESSED	SOA	UNWEIGHTED DENSITY STANDOFF
ERHO	BULK DENSITY-EVR PROCESSED	TBDN	TIME BEHIND DNSC
NDOL	NEUTRON POROSITY (DOLOMITE MATRIX)	WSOD	WEIGHTED STANDOFF DENSITY
NFAR	FAR NEUTRON COUNT RATE	WSON	WEIGHTED STANDOFF NEUTRON

4 3/4" SCLSS, 6 3/4" & 8" CLSS

ACFET	ACOUSTIC FORMATION EXPOSURE TIME	SHS1	MAX SHEAR SEMBLANCE , UPPER XMTR
SO	ACOUSTIC TOOL STANDOFF	SHS2	MAX SHEAR SEMBLANCE , LOWER XMTR
SOFF	STANDOFF	SLS1	SHEAR SEMBLANCE MIN CUTOFF , UPPER XMTR
DTCU	DELTA T COMP , UPPER XMTR-FIELD PROCESSED	SLS2	SHEAR SEMBLANCE MIN CUTOFF , LOWER XMTR
DTCL	DELTA T COMP , LOWER XMTR-FIELD PROCESSED	WFT1	WAVEFORM XMTR1 , ALL 4 RCVR (NON-PARSED)
DTP1	DELTA T COMP , UPPER XMTR-POST PROCESSED	WFT2	WAVEFORM XMTR2 , ALL 4 RCVR (NON-PARSED)
DTP2	DELTA T COMP , LOWER XMTR-POST PROCESSED	W11C	PARSED WAVEFORM , XMTR 1 , RCVR 1
DTS1	DELTA T SHEAR , UPPER XMTR-POST PROCESSED	W12C	PARSED WAVEFORM , XMTR 1 , RCVR 2
DTS2	DELTA T SHEAR , LOWER XMTR-POST PROCESSED	W13C	PARSED WAVEFORM , XMTR 1 , RCVR 3
SEM1	SEMBLANCE , UPPER XMTR-POST PROCESSED	W14C	PARSED WAVEFORM , XMTR 1 , RCVR 4
SEM2	SEMBLANCE , LOWER XMTR-POST PROCESSED	W21C	PARSED WAVEFORM , XMTR 2 , RCVR 1
SMX1	MAX COMP SEMBLANCE , UPPER XMTR	W22C	PARSED WAVEFORM , XMTR 2 , RCVR 2
SMX2	MAX COMP SEMBLANCE , LOWER XMTR	W23C	PARSED WAVEFORM , XMTR 2 , RCVR 3
SMN1	COMP SEMBLANCE MIN CUTOFF , UPPER XMTR	W24C	PARSED WAVEFORM , XMTR 2 , RCVR 4
SMN2	COMP SEMBLANCE MIN CUTOFF , LOWER XMTR		

4 3/4" , 6 3/4" , 8" & 9 1/2" DPM & QPM

ANPR	ANNULAR PRESSURE	KPOS	KELLY POSITION
BDEPS	BIT DEPTH STAMP	MWC	MUD WEIGHT CALCULATED
DAPR	PRESSURE TOOL DIFFERENTIAL PRESSURE	MWI_P	MUD WEIGHT IN
DPPR	PRESSURE TOOL DRILL PIPE PRESSURE	SPP_I	STANDPIPE PRESSURE
ECDM	EQUIVALENT CIRCULATING DENSITY	SWOB	SURFACE WEIGHT ON BIT
HDEPS	HOLE DEPTH STAMP	TDPM	PRESSURE TOOL ANNULAR TEMPERATURE

6 3/4" DFT

DFGR	DFT GAMMA RAW	HYDA	HYDROSTATIC PRESSURE -- AFTER
DFGRC	DFT GAMMA CALIBRATED	HYDB	HYDROSTATIC PRESSURE -- BEFORE
DFANPR	DFT ANNULAR PRESSURE	FPRES	FORMATION PRESSURE
DFECD	DFT EQUIVALENT CIRCULATING DENSITY OF THE MUD		

4 3/4", 6 3/4" PZIG

NBDINC NEAR BIT DYNAMIC INCLINATION
NBSINC NEAR BIT STATIC INCLINATION
NBGR NEAR BIT GAMMA RAW

NBGRC NEAR BIT GAMMA CALIBRATED
NBTMP NEAR BIT TEMPERATURE
NBIFET NEAR BIT FORMATION EXPOSURE TIME

BOTTOM HOLE ASSEMBLY RECORD

1 ft							
7 7/8" ROCK BIT	1.00						
2.12° MUD MOTOR	19.75						
FLOAT SUB	2.00						
ORIENTING SUB	3.00						
HDS-1R (DIR/GR)	30.24						
NM FLEX DC	30.32						
=====							
TOTAL BHA LENGTH	86.31						
SENSOR OFFSETS:							
=====							
DIRECTIONAL	38.55						
GAMMA-RAY	41.39						

GAMMA-RAY

PATHFINDER

1" = 100'

FEET TVD