



HOBBSOCD

MAR 09 2015

RECEIVED

October 16, 2014

Devon Energy Production Co., L. P.
333 West Sheridan Ave
Oklahoma City, Oklahoma 73102-5010

Attn: David Cook

Re: Thistle Unit 51H 30-025-41896

Please find enclosed a copy of the survey from 0' to 10,500' ran on the above referenced well.

If I can be of any further service please do not hesitate to call me at 800-606-4976.

Sincerely,

Keith Havelka
Operations

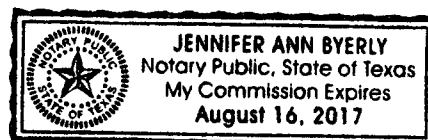
STATE OF TEXAS §

§

COUNTY OF NUECES §

This instrument was acknowledged before me on the 16 day of October, A.D., 2014, by Keith Havelka.

Jennifer Ann Byerly
Notary Public, State of Texas



AUG 20 2015



Company: Devon Energy
Lease/Well: Thistle Unit /051H

Rig Name: H&P 394
State/County: New Mexico /Lea
Latitude: 32.28, Longitude: -103.58
GRID North is 0.40 Degrees East of True North
VS-Azi: 179.40 Degrees



Depth Reference : R.K.B= 25 FT

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: thistle 051h.ut
Minimum Curvature Method
Report Date/Time: 10/16/2014 / 09:45

VES Survey International
(432) 563-5444
West Texas
Surveyor: Javier Estrada
Thistle Unit 51H / API 30-025-41896

HOBBS OGD
MAR 09 2015
RECEIVED

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.23	42.04	100.00	0.15	0.13	-0.14	0.20	42.04	0.23
200.00	0.21	140.96	200.00	0.15	0.38	-0.14	0.41	68.58	0.33
300.00	0.24	122.78	300.00	-0.11	0.67	0.12	0.68	99.22	0.08
400.00	0.24	125.45	400.00	-0.34	1.02	0.35	1.08	108.64	0.01
500.00	0.40	130.02	500.00	-0.69	1.46	0.70	1.61	115.31	0.17
600.00	0.20	284.12	600.00	-0.87	1.55	0.89	1.78	119.27	0.59
700.00	0.22	250.65	699.99	-0.89	1.20	0.90	1.50	126.60	0.12
800.00	0.25	290.93	799.99	-0.88	0.81	0.89	1.20	137.15	0.16
900.00	0.23	288.79	899.99	-0.74	0.42	0.74	0.85	150.08	0.03
1000.00	0.53	284.48	999.99	-0.56	-0.21	0.55	0.60	200.97	0.31
1100.00	0.54	270.63	1099.99	-0.44	-1.13	0.42	1.21	248.95	0.13
1200.00	0.59	272.97	1199.98	-0.40	-2.11	0.38	2.15	259.16	0.05
1300.00	0.54	293.58	1299.98	-0.19	-3.05	0.16	3.06	266.45	0.21
1400.00	0.65	292.72	1399.97	0.22	-4.00	-0.26	4.01	273.09	0.11
1500.00	0.72	295.87	1499.96	0.71	-5.08	-0.76	5.13	277.91	0.08
1600.00	0.90	290.79	1599.95	1.26	-6.38	-1.32	6.50	281.15	0.20
1700.00	0.87	282.11	1699.94	1.70	-7.85	-1.78	8.04	282.18	0.14
1800.00	0.95	303.62	1799.93	2.32	-9.29	-2.41	9.57	284.00	0.35

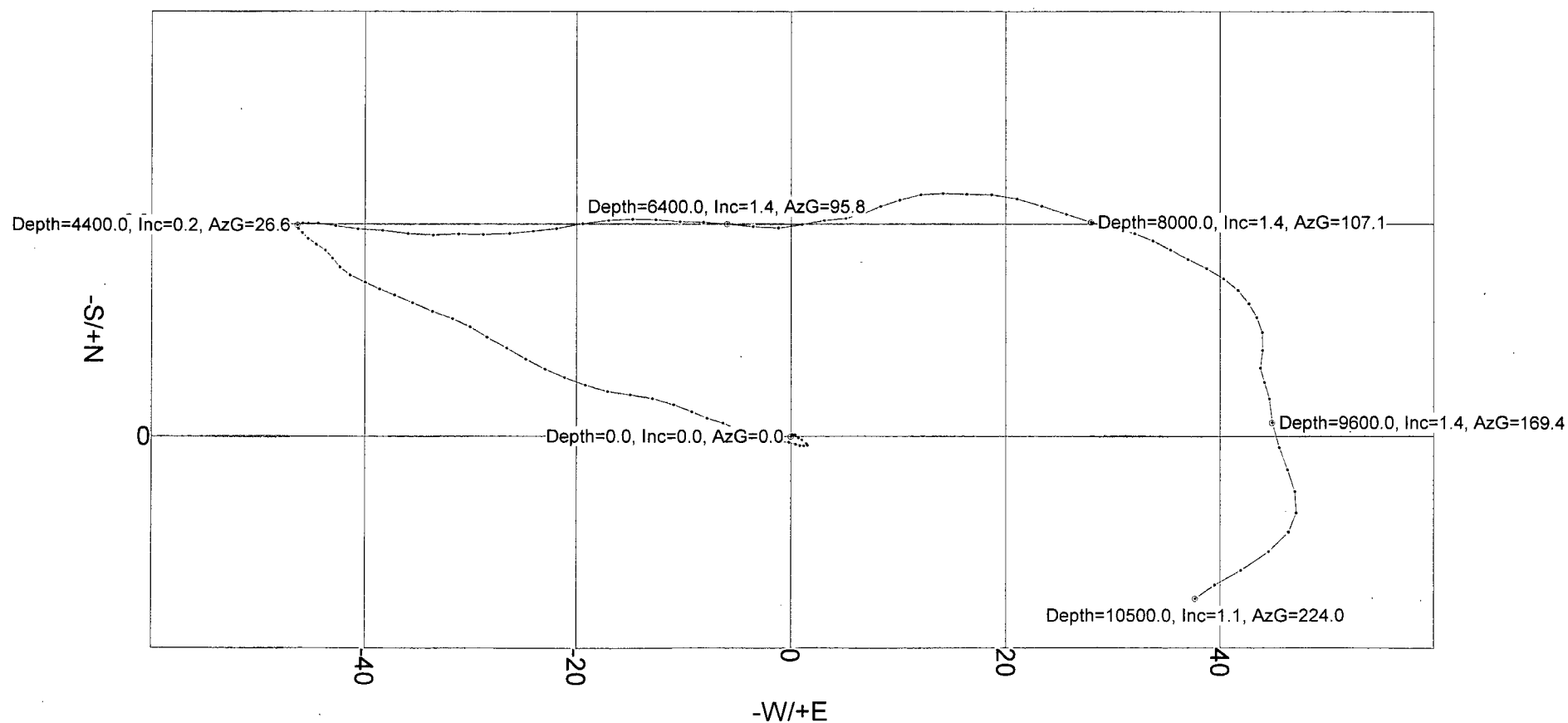
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.16	281.05	1899.91	2.97	-10.97	-3.08	11.36	285.15	0.46
2000.00	1.20	290.32	1999.89	3.53	-12.94	-3.66	13.42	285.24	0.20
2100.00	1.24	269.92	2099.87	3.89	-15.01	-4.05	15.51	284.53	0.43
2200.00	1.24	286.45	2199.85	4.19	-17.13	-4.37	17.64	283.76	0.36
2300.00	1.22	287.02	2299.82	4.81	-19.19	-5.01	19.78	284.08	0.02
2400.00	1.14	293.74	2399.80	5.52	-21.11	-5.74	21.82	284.66	0.16
2500.00	1.15	292.64	2499.78	6.31	-22.95	-6.55	23.80	285.37	0.03
2600.00	1.20	302.33	2599.76	7.25	-24.75	-7.51	25.79	286.33	0.20
2700.00	1.18	298.53	2699.74	8.30	-26.54	-8.58	27.81	287.37	0.08
2800.00	1.22	299.60	2799.72	9.32	-28.37	-9.62	29.86	288.19	0.04
2900.00	1.03	300.66	2899.70	10.30	-30.07	-10.62	31.79	288.91	0.18
3000.00	1.07	289.73	2999.68	11.08	-31.72	-11.41	33.60	289.25	0.20
3100.00	1.26	289.76	3099.66	11.76	-33.63	-12.11	35.63	289.28	0.19
3200.00	1.11	296.95	3199.64	12.57	-35.52	-12.94	37.68	289.49	0.21
3300.00	1.01	289.17	3299.62	13.30	-37.22	-13.69	39.53	289.66	0.17
3400.00	0.73	294.42	3399.61	13.86	-38.64	-14.26	41.05	289.73	0.29
3500.00	0.98	295.76	3499.60	14.49	-40.00	-14.91	42.54	289.92	0.25
3600.00	0.83	296.43	3599.59	15.19	-41.42	-15.62	44.11	290.14	0.15
3700.00	0.61	323.21	3699.58	15.94	-42.38	-16.38	45.28	290.61	0.40
3800.00	0.63	318.17	3799.58	16.77	-43.07	-17.22	46.22	291.28	0.06
3900.00	0.54	317.66	3899.57	17.53	-43.75	-17.99	47.14	291.84	0.09
4000.00	0.63	290.87	3999.56	18.08	-44.59	-18.54	48.11	292.07	0.29
4100.00	0.51	322.88	4099.56	18.63	-45.37	-19.10	49.05	292.32	0.34
4200.00	0.35	303.35	4199.56	19.15	-45.89	-19.63	49.73	292.65	0.21
4300.00	0.31	328.96	4299.56	19.55	-46.29	-20.03	50.24	292.89	0.15
4400.00	0.16	26.59	4399.55	19.90	-46.36	-20.38	50.45	293.23	0.26
4500.00	0.47	85.44	4499.55	20.06	-45.89	-20.54	50.08	293.61	0.41
4600.00	0.17	97.84	4599.55	20.07	-45.33	-20.54	49.57	293.88	0.30
4700.00	0.89	88.85	4699.55	20.06	-44.41	-20.53	48.73	294.31	0.72
4800.00	1.01	106.38	4799.53	19.83	-42.79	-20.28	47.16	294.87	0.31
4900.00	1.42	92.11	4899.51	19.54	-40.70	-19.96	45.15	295.64	0.51
5000.00	1.29	95.46	4999.48	19.38	-38.35	-19.79	42.97	296.82	0.15
5100.00	1.45	98.25	5099.45	19.10	-35.98	-19.47	40.73	297.96	0.17
5200.00	1.36	87.51	5199.42	18.97	-33.55	-19.32	38.54	299.48	0.28
5300.00	1.36	88.65	5299.40	19.05	-31.17	-19.37	36.53	301.42	0.03
5400.00	1.42	93.41	5399.37	19.00	-28.75	-19.30	34.47	303.46	0.13
5500.00	1.44	82.22	5499.34	19.10	-26.27	-19.37	32.48	306.01	0.28
5600.00	1.11	87.20	5599.31	19.32	-24.06	-19.57	30.86	308.75	0.35
5700.00	1.41	81.58	5699.29	19.54	-21.88	-19.77	29.34	311.77	0.33

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	1.43	76.36	5799.26	20.02	-19.45	-20.22	27.91	315.83	0.13
5900.00	1.36	89.13	5899.23	20.33	-17.04	-20.51	26.53	320.03	0.32
6000.00	1.21	85.38	5999.20	20.43	-14.80	-20.59	25.23	324.08	0.17
6100.00	1.27	96.87	6099.18	20.39	-12.65	-20.52	23.99	328.18	0.26
6200.00	1.32	91.78	6199.15	20.22	-10.40	-20.33	22.73	332.79	0.13
6300.00	1.18	91.77	6299.13	20.15	-8.22	-20.24	21.76	337.82	0.14
6400.00	1.39	95.83	6399.10	20.00	-5.98	-20.06	20.87	343.34	0.23
6500.00	1.36	95.75	6499.08	19.75	-3.60	-19.79	20.08	349.68	0.03
6600.00	1.38	90.20	6599.05	19.63	-1.21	-19.64	19.67	356.47	0.14
6700.00	1.25	73.33	6699.02	19.94	1.04	-19.93	19.97	2.98	0.41
6800.00	1.19	85.94	6799.00	20.32	3.11	-20.29	20.56	8.71	0.27
6900.00	1.12	83.41	6898.98	20.51	5.12	-20.45	21.14	14.01	0.09
7000.00	0.89	63.73	6998.96	20.97	6.79	-20.89	22.04	17.93	0.41
7100.00	1.08	69.00	7098.95	21.65	8.37	-21.56	23.21	21.13	0.21
7200.00	1.09	74.72	7198.93	22.24	10.17	-22.13	24.45	24.57	0.11
7300.00	1.22	75.25	7298.91	22.76	12.11	-22.63	25.78	28.02	0.13
7400.00	1.21	98.46	7398.89	22.88	14.19	-22.73	26.92	31.80	0.49
7500.00	1.31	86.39	7498.86	22.79	16.37	-22.62	28.06	35.69	0.28
7600.00	1.35	95.25	7598.84	22.75	18.69	-22.56	29.45	39.40	0.21
7700.00	1.39	103.38	7698.81	22.37	21.05	-22.14	30.71	43.26	0.20
7800.00	1.35	109.97	7798.78	21.68	23.34	-21.44	31.85	47.10	0.16
7900.00	1.44	107.69	7898.75	20.90	25.64	-20.63	33.08	50.82	0.11
8000.00	1.36	107.12	7998.72	20.17	27.97	-19.87	34.48	54.21	0.09
8100.00	1.23	102.31	8098.69	19.59	30.16	-19.27	35.96	56.99	0.16
8200.00	1.00	108.33	8198.68	19.08	32.04	-18.75	37.29	59.22	0.26
8300.00	1.11	114.63	8298.66	18.41	33.74	-18.05	38.44	61.39	0.16
8400.00	1.06	120.82	8398.64	17.53	35.41	-17.16	39.51	63.66	0.13
8500.00	1.07	116.24	8498.62	16.65	37.04	-16.26	40.61	65.80	0.09
8600.00	1.13	115.02	8598.61	15.82	38.77	-15.41	41.88	67.81	0.06
8700.00	1.00	128.50	8698.59	14.85	40.35	-14.43	43.00	69.79	0.28
8800.00	1.00	130.52	8798.57	13.74	41.70	-13.30	43.91	71.76	0.04
8900.00	0.88	153.66	8898.56	12.49	42.71	-12.04	44.49	73.70	0.40
9000.00	0.83	148.47	8998.55	11.18	43.43	-10.73	44.84	75.56	0.09
9100.00	0.93	170.37	9098.54	9.77	43.94	-9.31	45.01	77.46	0.35
9200.00	1.01	186.83	9198.52	8.10	43.97	-7.64	44.71	79.56	0.29
9300.00	0.93	186.22	9298.51	6.43	43.78	-5.97	44.25	81.65	0.08
9400.00	0.81	140.48	9398.50	5.08	44.14	-4.62	44.43	83.44	0.68
9500.00	1.15	178.48	9498.48	3.53	44.61	-3.07	44.75	85.47	0.71
9600.00	1.45	169.38	9598.46	1.29	44.87	-0.82	44.89	88.35	0.36

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
9700.00	1.35	159.44	9698.43	-1.05	45.52	1.53	45.53	91.32	0.26
9800.00	1.20	159.95	9798.40	-3.14	46.29	3.62	46.40	93.88	0.15
9900.00	1.27	164.23	9898.38	-5.19	46.95	5.68	47.24	96.31	0.12
10000.00	1.10	189.48	9998.36	-7.21	47.09	7.70	47.64	98.71	0.54
10100.00	1.19	213.38	10098.34	-9.03	46.36	9.52	47.23	101.02	0.48
10200.00	1.83	232.02	10198.31	-10.88	44.53	11.35	45.84	103.73	0.79
10300.00	1.78	238.86	10298.26	-12.67	41.95	13.10	43.82	106.80	0.22
10400.00	1.45	242.87	10398.22	-14.05	39.50	14.46	41.92	109.58	0.34
10500.00	1.13	223.96	10498.19	-15.33	37.68	15.73	40.68	112.14	0.53



VES Survey International
(432) 563-5444
West Texas
Surveyor: Javier Estrada
Thistle Unit 51H / API 30-025-41896





THISTLE UNIT 51H

DELAWARE BASIN UNRESTRICTED

Directional Survey

Sub-Division DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Region DELAWARE BASIN EAST	State/Province NM		
Surface Legal Location Sec. 28 T2S R33E	API/UWI 3002541896	Latitude (°) 32° 16' 56.653" N	Longitude (°) 103° 35' 3.914" W	Ground Elev M... 3,683.00	Orig KB Elev (ft) 3,708.00	Tubing Head Elevation (ft)

Wellbores

Wellbore Name OH	Parent Wellbore	SAP Well ID 37022	Vertical Section Direction (°) 179.40
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Kick Offs & Key Depths

Date 10/1/2014	Type Kick Off	Top Depth (ftKB) 10,600.0	
Actual Deviation Survey GYRO/MWD, Proposed? No	Definitive? No	Proposed? No	Proposed Deviation Survey

Deviation Survey

Date 10/1/2014		Description GYRO/MWD			
MD Tie In (ftKB) 0.00	TVD Tie In (ftKB) 0.00	Inclination Tie In (°) 0.00	Azimuth Tie In (°) 0.00	NSTie In (ft) 0.00	EW Tie In (ft) 0.00

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
10/1/2014	100.00	0.23	42.04	100.00	-0.15	0.15	0.13	0.23	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	200.00	0.21	140.96	200.00	-0.15	0.16	0.38	0.33	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	300.00	0.24	122.78	300.00	0.11	-0.10	0.68	0.08	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	400.00	0.24	125.45	400.00	0.35	-0.33	1.02	0.01	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	500.00	0.40	130.02	500.00	0.70	-0.68	1.46	0.16	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	600.00	0.20	284.12	600.00	0.88	-0.86	1.56	0.59	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	700.00	0.22	250.65	699.99	0.90	-0.88	1.21	0.12	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	800.00	0.25	290.93	799.99	0.88	-0.87	0.82	0.16	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	900.00	0.23	288.79	899.99	0.73	-0.73	0.43	0.02	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,000.00	0.53	284.48	999.99	0.54	-0.55	-0.21	0.30	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,100.00	0.54	270.63	1,099.99	0.41	-0.43	-1.13	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,200.00	0.59	272.97	1,199.98	0.37	-0.39	-2.11	0.06	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,300.00	0.54	293.58	1,299.98	0.15	-0.18	-3.06	0.21	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,400.00	0.65	292.72	1,399.97	-0.27	0.23	-4.01	0.11	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,500.00	0.72	295.87	1,499.96	-0.78	0.72	-5.10	0.08	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,600.00	0.90	290.79	1,599.95	-1.34	1.28	-6.40	0.19	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,700.00	0.87	282.11	1,699.94	-1.80	1.71	-7.88	0.14	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,800.00	0.95	303.62	1,799.93	-2.43	2.33	-9.31	0.35	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	1,900.00	1.16	281.05	1,899.91	-3.10	2.98	-11.00	0.46	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,000.00	1.20	290.32	1,999.89	-3.68	3.54	-12.97	0.19	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,100.00	1.24	269.92	2,099.87	-4.06	3.90	-15.03	0.43	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,200.00	1.24	286.45	2,199.85	-4.39	4.21	-17.15	0.36	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,300.00	1.22	287.02	2,299.82	-5.03	4.83	-19.21	0.02	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,400.00	1.14	293.74	2,399.80	-5.76	5.54	-21.14	0.16	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,500.00	1.15	292.64	2,499.78	-6.57	6.33	-22.98	0.02	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,600.00	1.20	302.33	2,599.76	-7.53	7.27	-24.79	0.20	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,700.00	1.18	298.53	2,699.74	-8.60	8.32	-26.58	0.08	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,800.00	1.22	299.60	2,799.72	-9.64	9.34	-28.41	0.05	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	2,900.00	1.03	300.66	2,899.70	-10.64	10.33	-30.10	0.19	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,000.00	1.07	289.73	2,999.68	-11.43	11.10	-31.76	0.20	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,100.00	1.26	289.76	3,099.66	-12.14	11.79	-33.67	0.19	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,200.00	1.11	296.95	3,199.64	-12.97	12.60	-35.57	0.21	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,300.00	1.01	289.17	3,299.62	-13.71	13.33	-37.26	0.18	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,400.00	0.73	294.42	3,399.61	-14.28	13.88	-38.68	0.29	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,500.00	0.98	295.76	3,499.60	-14.93	14.51	-40.03	0.25	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,600.00	0.83	296.43	3,599.59	-15.64	15.21	-41.45	0.15	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,700.00	0.61	323.21	3,699.58	-16.40	15.96	-42.41	0.40	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,800.00	0.63	318.17	3,799.57	-17.24	16.79	-43.10	0.06	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	3,900.00	0.54	317.66	3,899.57	-18.01	17.55	-43.78	0.09	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,000.00	0.63	290.87	3,999.56	-18.56	18.09	-44.61	0.28	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,100.00	0.51	322.88	4,099.56	-19.12	18.64	-45.40	0.33	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,200.00	0.35	303.35	4,199.56	-19.65	19.17	-45.92	0.21	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,300.00	0.31	328.96	4,299.56	-20.05	19.57	-46.31	0.15	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,400.00	0.16	26.59	4,399.55	-20.41	19.92	-46.39	0.26	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,500.00	0.47	85.44	4,499.55	-20.56	20.08	-45.92	0.41	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,600.00	0.17	97.84	4,599.55	-20.57	20.09	-45.36	0.31	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,700.00	0.89	88.85	4,699.55	-20.55	20.09	-44.44	0.72	GYRO	VAUHGN ENERGY SERVICES



THISTLE UNIT 51H

DELAWARE BASIN UNRESTRICTED

Directional Survey

Sub-Division DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Region DELAWARE BASIN EAST	State/Province NM
Surface Legal Location Sec. 28 T23S R33E	API/UWI 3002541896	Latitude (°) 32° 16' 56.653" N	Longitude (°) 103° 35' 3.914" W	Ground Elev M... 3,683.00
				Orig KB Elev (ft) 3,708.00
				Tubing Head Elevation (ft)

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
10/1/2014	4,800.00	1.01	106.38	4,799.53	-20.30	19.86	-42.82	0.31	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	4,900.00	1.42	92.11	4,899.51	-19.99	19.56	-40.73	0.51	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,000.00	1.29	95.46	4,999.48	-19.81	19.41	-38.38	0.15	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,100.00	1.45	98.25	5,099.45	-19.50	19.12	-36.00	0.17	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,200.00	1.36	87.51	5,199.42	-19.34	18.99	-33.57	0.28	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,300.00	1.36	88.65	5,299.40	-19.40	19.07	-31.19	0.03	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,400.00	1.42	93.41	5,399.37	-19.32	19.02	-28.77	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,500.00	1.44	82.22	5,499.34	-19.39	19.12	-26.29	0.28	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,600.00	1.11	87.20	5,599.31	-19.59	19.34	-24.08	0.35	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,700.00	1.41	81.58	5,699.29	-19.79	19.57	-21.89	0.32	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,800.00	1.43	76.36	5,799.26	-20.24	20.04	-19.46	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	5,900.00	1.36	89.13	5,899.23	-20.53	20.35	-17.06	0.32	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,000.00	1.21	85.38	5,999.20	-20.61	20.46	-14.82	0.17	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,100.00	1.27	96.87	6,099.18	-20.54	20.41	-12.67	0.26	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,200.00	1.32	91.78	6,199.15	-20.35	20.24	-10.42	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,300.00	1.18	91.77	6,299.13	-20.26	20.17	-8.24	0.14	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,400.00	1.39	95.83	6,399.10	-20.08	20.02	-6.00	0.23	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,500.00	1.36	95.75	6,499.07	-19.81	19.77	-3.62	0.03	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,600.00	1.38	90.20	6,599.05	-19.66	19.65	-1.23	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,700.00	1.25	73.33	6,699.02	-19.95	19.96	1.02	0.41	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,800.00	1.19	85.94	6,799.00	-20.31	20.35	3.10	0.27	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	6,900.00	1.12	83.41	6,898.98	-20.48	20.53	5.11	0.09	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,000.00	0.89	63.73	6,998.96	-20.92	20.99	6.77	0.41	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,100.00	1.08	69.00	7,098.95	-21.58	21.67	8.35	0.21	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,200.00	1.09	74.72	7,198.93	-22.15	22.26	10.15	0.11	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,300.00	1.22	75.25	7,298.91	-22.65	22.78	12.09	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,400.00	1.21	98.46	7,398.89	-22.75	22.90	14.17	0.49	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,500.00	1.31	86.39	7,498.86	-22.64	22.81	16.35	0.28	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,600.00	1.35	95.25	7,598.84	-22.58	22.78	18.67	0.21	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,700.00	1.39	103.38	7,698.81	-22.17	22.39	21.02	0.20	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,800.00	1.35	109.97	7,798.78	-21.46	21.70	23.31	0.16	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	7,900.00	1.44	107.69	7,898.75	-20.65	20.92	25.61	0.11	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,000.00	1.36	107.12	7,998.72	-19.90	20.19	27.94	0.08	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,100.00	1.23	102.31	8,098.69	-19.30	19.61	30.12	0.17	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,200.00	1.00	108.33	8,198.68	-18.77	19.11	32.00	0.26	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,300.00	1.11	114.63	8,298.66	-18.08	18.43	33.71	0.16	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,400.00	1.06	120.82	8,398.64	-17.18	17.55	35.38	0.13	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,500.00	1.07	116.24	8,498.62	-16.28	16.67	37.02	0.09	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,600.00	1.13	115.02	8,598.60	-15.43	15.84	38.75	0.06	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,700.00	1.00	128.50	8,698.59	-14.45	14.88	40.32	0.28	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,800.00	1.00	130.52	8,798.57	-13.33	13.77	41.67	0.04	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	8,900.00	0.88	153.66	8,898.56	-12.06	12.51	42.67	0.39	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,000.00	0.83	148.47	8,998.55	-10.75	11.20	43.39	0.09	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,100.00	0.93	170.37	9,098.54	-9.33	9.79	43.91	0.35	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,200.00	1.01	186.83	9,198.52	-7.65	8.11	43.94	0.29	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,300.00	0.93	186.22	9,298.51	-5.97	6.43	43.75	0.08	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,400.00	0.81	140.48	9,398.50	-4.62	5.08	44.11	0.69	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,500.00	1.15	178.48	9,498.48	-3.06	3.53	44.58	0.71	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,600.00	1.45	169.38	9,598.46	-0.81	1.28	44.84	0.36	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,700.00	1.35	159.44	9,698.43	1.54	-1.06	45.49	0.26	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,800.00	1.20	159.95	9,798.40	3.63	-3.15	46.26	0.15	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	9,900.00	1.27	164.23	9,898.38	5.69	-5.20	46.92	0.12	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	10,000.00	1.10	189.48	9,998.36	7.71	-7.21	47.07	0.54	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	10,100.00	1.19	213.38	10,098.34	9.51	-9.03	46.34	0.48	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	10,200.00	1.83	232.02	10,198.31	11.34	-10.88	44.51	0.80	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	10,300.00	1.78	238.86	10,298.26	13.10	-12.66	41.92	0.22	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	10,400.00	1.45	242.87	10,398.22	14.46	-14.04	39.47	0.35	GYRO	VAUHGN ENERGY SERVICES
10/1/2014	10,500.00	1.13	223.96	10,498.19	15.72	-15.33	37.65	0.53	GYRO	VAUHGN ENERGY SERVICES



THISTLE UNIT 51H

DELAWARE BASIN UNRESTRICTED

Directional Survey

Sub-Division DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Region DELAWARE BASIN EAST	State/Province NM
Surface Legal Location Sec. 28 T23S R33E	API/UWI 3002541896	Latitude (°) 32° 16' 56.653" N	Longitude (°) 103° 35' 3.914" W	Ground Elev M. 3,683.00
				Ong KB Elev (ft) 3,708.00
				Tubing Head Elevation (ft)

Survey Data

Date	MD (ftKB)	Incl (°)	Azin (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
10/1/2014	10,532.00	1.70	217.90	10,530.18	16.32	-15.93	37.14	1.84	GYRO	VAUHGN ENERGY SERVICES
10/2/2014	10,564.00	1.50	214.40	10,562.17	17.03	-16.65	36.62	0.70	GYRO	VAUHGN ENERGY SERVICES
10/2/2014	10,595.00	1.20	207.50	10,593.16	17.65	-17.27	36.24	1.10	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,627.00	3.10	171.80	10,625.14	18.81	-18.43	36.21	6.99	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,658.00	6.20	172.50	10,656.03	21.30	-20.92	36.54	10.00	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,690.00	9.30	170.10	10,687.74	25.57	-25.18	37.21	9.74	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,722.00	12.30	171.30	10,719.17	31.49	-31.10	38.17	9.40	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,753.00	15.50	170.40	10,749.25	38.86	-38.45	39.36	10.35	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,785.00	19.30	170.10	10,779.78	48.30	-47.88	40.99	11.88	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,816.00	23.00	171.50	10,808.69	59.36	-58.92	42.76	12.05	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,848.00	27.20	175.40	10,837.66	72.86	-72.40	44.28	14.10	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,880.00	30.40	179.60	10,865.71	88.25	-87.79	44.92	11.83	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,911.00	34.00	182.00	10,891.93	104.76	-104.30	44.67	12.32	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,943.00	37.30	183.60	10,917.93	123.38	-122.92	43.75	10.72	MWD	LEAM DRILLING SYSTEMS
10/2/2014	10,974.00	40.30	182.90	10,942.09	142.75	-142.32	42.65	9.78	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,006.00	43.80	182.00	10,965.85	164.15	-163.72	41.74	11.10	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,037.00	47.50	182.20	10,987.52	186.29	-185.87	40.93	11.94	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,068.00	50.90	182.00	11,007.77	209.73	-209.32	40.07	10.98	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,100.00	54.30	182.60	11,027.20	235.11	-234.72	39.05	10.73	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,132.00	57.30	182.40	11,045.19	261.54	-261.16	37.89	9.39	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,163.00	60.10	181.30	11,061.29	288.00	-287.63	37.04	9.53	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,195.00	62.90	180.80	11,076.56	316.11	-315.74	36.53	8.86	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,226.00	65.70	182.60	11,090.00	344.01	-343.66	35.69	10.44	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,258.00	67.00	183.30	11,102.84	373.27	-372.93	34.19	4.53	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,289.00	70.30	180.80	11,114.12	402.10	-401.78	33.16	13.03	MWD	LEAM DRILLING SYSTEMS
10/2/2014	11,321.00	73.60	180.10	11,124.04	432.52	-432.20	32.92	10.52	MWD	LEAM DRILLING SYSTEMS
10/3/2014	11,353.00	76.90	178.70	11,132.18	463.46	-463.14	33.25	11.15	MWD	LEAM DRILLING SYSTEMS
10/3/2014	11,384.00	79.70	178.50	11,138.47	493.81	-493.48	33.99	9.05	MWD	LEAM DRILLING SYSTEMS
10/3/2014	11,415.00	82.70	177.10	11,143.21	524.43	-524.09	35.17	10.66	MWD	LEAM DRILLING SYSTEMS
10/3/2014	11,446.00	85.30	177.30	11,146.45	555.23	-554.88	36.67	8.41	MWD	LEAM DRILLING SYSTEMS
10/4/2014	11,478.00	87.20	177.10	11,148.55	587.14	-586.77	38.23	5.97	MWD	LEAM DRILLING SYSTEMS
10/4/2014	11,509.00	88.50	177.10	11,149.71	618.09	-617.71	39.80	4.19	MWD	LEAM DRILLING SYSTEMS
10/4/2014	11,603.00	88.80	177.60	11,151.92	712.01	-711.58	44.15	0.62	MWD	LEAM DRILLING SYSTEMS
10/4/2014	11,698.00	89.30	177.60	11,153.50	806.95	-806.49	48.12	0.53	MWD	LEAM DRILLING SYSTEMS
10/4/2014	11,792.00	89.20	178.20	11,154.73	900.91	-900.41	51.57	0.65	MWD	LEAM DRILLING SYSTEMS
10/5/2014	11,886.00	88.80	178.30	11,156.37	994.87	-994.36	54.44	0.44	MWD	LEAM DRILLING SYSTEMS
10/5/2014	11,981.00	88.30	179.60	11,158.77	1,089.84	-1,089.31	56.18	1.47	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,075.00	87.60	180.10	11,162.14	1,183.77	-1,183.25	56.42	0.91	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,170.00	87.10	180.60	11,166.53	1,278.66	-1,278.14	55.85	0.74	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,264.00	86.80	181.30	11,171.53	1,372.49	-1,372.00	54.29	0.81	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,358.00	87.30	181.90	11,176.37	1,466.29	-1,465.83	51.67	0.83	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,453.00	87.40	181.30	11,180.76	1,561.12	-1,560.69	49.02	0.64	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,547.00	88.20	181.20	11,184.37	1,655.00	-1,654.60	46.97	0.86	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,642.00	88.90	181.20	11,186.77	1,749.93	-1,749.55	44.98	0.74	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,736.00	88.50	181.50	11,188.90	1,843.85	-1,843.50	42.77	0.53	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,830.00	88.90	181.20	11,191.04	1,937.77	-1,937.45	40.55	0.53	MWD	LEAM DRILLING SYSTEMS
10/5/2014	12,925.00	89.30	181.70	11,192.53	2,032.69	-2,032.41	38.15	0.67	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,019.00	89.70	181.30	11,193.35	2,126.63	-2,126.37	35.69	0.60	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,114.00	90.00	181.90	11,193.60	2,221.56	-2,221.33	33.04	0.71	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,208.00	89.60	182.40	11,193.93	2,315.45	-2,315.26	29.51	0.68	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,302.00	89.60	180.30	11,194.58	2,409.39	-2,409.23	27.29	2.23	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,397.00	89.60	179.90	11,195.25	2,504.38	-2,504.23	27.13	0.42	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,491.00	89.00	180.80	11,196.39	2,598.35	-2,598.22	26.55	1.15	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,586.00	88.10	180.10	11,198.80	2,693.31	-2,693.18	25.81	1.20	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,680.00	88.50	180.10	11,201.59	2,787.26	-2,787.14	25.64	0.43	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,775.00	88.80	179.40	11,203.82	2,882.23	-2,882.11	26.06	0.80	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,869.00	89.00	179.40	11,205.63	2,976.21	-2,976.09	27.04	0.21	MWD	LEAM DRILLING SYSTEMS
10/5/2014	13,963.00	90.30	178.90	11,206.20	3,070.21	-3,070.08	28.44	1.48	MWD	LEAM DRILLING SYSTEMS



Directional Survey

Sub-Division DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Region DELAWARE BASIN EAST	State/Province NM
Surface Legal Location Sec. 28 T23S R33E	API/UWI 3002541896	Latitude (°) 32° 16' 56.653" N	Longitude (°) 103° 35' 3.914" W	Ground Elev M... 3,683.00
				Orig KB Elev (ft) 3,708.00
				Tubing Head Elevation (ft)

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
10/5/2014	14,058.00	90.60	178.90	11,205.46	3,165.20	-3,165.06	30.26	0.32	MWD	LEAM DRILLING SYSTEMS
10/5/2014	14,152.00	89.00	179.80	11,205.79	3,259.20	-3,259.05	31.33	1.95	MWD	LEAM DRILLING SYSTEMS
10/5/2014	14,246.00	89.70	180.60	11,206.85	3,353.18	-3,353.04	31.00	1.13	MWD	LEAM DRILLING SYSTEMS
10/5/2014	14,341.00	90.30	180.60	11,206.85	3,448.16	-3,448.03	30.00	0.63	MWD	LEAM DRILLING SYSTEMS
10/6/2014	14,436.00	91.40	181.30	11,205.44	3,543.11	-3,543.01	28.43	1.37	MWD	LEAM DRILLING SYSTEMS
10/6/2014	14,530.00	91.80	181.50	11,202.82	3,637.02	-3,636.94	26.13	0.48	MWD	LEAM DRILLING SYSTEMS
10/7/2014	14,624.00	89.70	182.60	11,201.59	3,730.90	-3,730.87	22.77	2.52	MWD	LEAM DRILLING SYSTEMS
10/7/2014	14,719.00	89.00	182.70	11,202.67	3,825.74	-3,825.76	18.38	0.74	MWD	LEAM DRILLING SYSTEMS
10/7/2014	14,813.00	88.50	181.90	11,204.72	3,919.60	-3,919.66	14.61	1.00	MWD	LEAM DRILLING SYSTEMS
10/7/2014	14,908.00	89.40	181.20	11,206.46	4,014.51	-4,014.61	12.04	1.20	MWD	LEAM DRILLING SYSTEMS
10/7/2014	15,002.00	88.60	180.30	11,208.10	4,108.47	-4,108.58	10.81	1.28	MWD	LEAM DRILLING SYSTEMS
10/7/2014	15,097.00	91.50	179.00	11,208.01	4,203.46	-4,203.57	11.39	3.35	MWD	LEAM DRILLING SYSTEMS
10/7/2014	15,191.00	94.40	179.80	11,203.18	4,297.32	-4,297.43	12.37	3.20	MWD	LEAM DRILLING SYSTEMS
10/7/2014	15,285.00	92.80	179.60	11,197.28	4,391.13	-4,391.24	12.86	1.72	MWD	LEAM DRILLING SYSTEMS
10/7/2014	15,380.00	91.30	179.90	11,193.88	4,486.07	-4,486.17	13.28	1.61	MWD	LEAM DRILLING SYSTEMS
10/8/2014	15,475.00	91.00	180.10	11,191.97	4,581.04	-4,581.15	13.28	0.38	MWD	LEAM DRILLING SYSTEMS
10/8/2014	15,569.00	90.90	180.50	11,190.41	4,675.02	-4,675.14	12.79	0.44	MWD	LEAM DRILLING SYSTEMS
10/8/2014	15,582.00	90.80	180.50	11,190.22	4,688.01	-4,688.14	12.67	0.77	MWD	LEAM DRILLING SYSTEMS
10/8/2014	15,636.00	90.80	180.50	11,189.46	4,742.00	-4,742.13	12.20	0.00	BIT	LEAM DRILLING SYSTEMS