

30-015-39103

Mack Energy Corporation

EDDY COUNTY, NEW MEXICO

Sec. 3-T18S-R31E

Razorback Federal #1

Plan A Rev 0 Sidetrack #1

Survey: Sperry MWD Surveys

Sperry Drilling Services Standard Report

15 February, 2012

Well Coordinates: 648,423 20 N, 644,446.10 E (32° 46' 54.21" N, 103° 51' 48.03" W)
Ground Level. 3,754.00 ft

Local Coordinate Origin:	Centered on Well Razorback Federal #1
Viewing Datum.	RKB 18 ft. @ 3772.00ft (Silver Oak Rig 7)
TVDs to System	N
North Reference	Grid
Unit System	API - US Survey Feet - Custom
Geodetic Scale Factor Applied	
Version 2003.16 Build 43I	

HALLIBURTON

Survey Report for Razorback Federal #1 - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
3,697.00	1.80	246.79	3,694.64	8.00	14.88	16.28	0.00
3,701.00	1.85	247.58	3,698.64	7.95	14.76	16.15	1.40
3,732.00	2.36	44.95	3,729.63	8.21	14.75	16.20	13.32
3,764.00	5.89	56.37	3,761.54	9.59	16.58	18.29	11.27
3,795.00	9.22	60.54	3,792.27	11.69	20.07	22.15	10.88
3,826.00	12.35	66.71	3,822.72	14.22	25.28	27.79	10.75
3,857.00	15.78	69.64	3,852.78	17.00	32.28	35.23	11.30
3,888.00	19.20	71.01	3,882.35	20.13	41.05	44.48	11.11
3,920.00	22.56	72.16	3,912.24	23.72	51.88	55.83	10.58
3,951.00	25.42	75.47	3,940.56	27.21	63.98	68.40	10.19
3,982.00	28.21	77.52	3,968.23	30.46	77.58	82.38	9.48
4,013.00	31.16	77.96	3,995.15	33.72	92.58	97.73	9.54
4,044.00	34.37	78.67	4,021.22	37.11	109.01	114.50	10.43
4,075.00	37.38	79.17	4,046.33	40.60	126.83	132.66	9.76
4,106.00	40.42	79.95	4,070.46	44.13	145.98	152.11	9.93
4,137.00	43.14	80.37	4,093.57	47.65	166.33	172.74	8.82
4,169.00	46.42	80.20	4,116.28	51.46	188.54	195.24	10.26
4,200.00	48.57	80.57	4,137.23	55.27	211.07	218.06	6.99
4,231.00	52.35	80.43	4,156.96	59.22	234.64	241.93	12.20
4,262.00	55.40	80.61	4,175.23	63.34	259.34	266.92	9.85
4,294.00	58.61	80.10	4,192.66	67.84	285.80	293.72	10.12
4,325.00	61.28	79.51	4,208.18	72.59	312.20	320.52	8.77
4,356.00	64.46	78.23	4,222.32	77.92	339.27	348.10	10.90
4,387.00	67.78	76.68	4,234.86	84.08	366.93	376.44	11.64
4,418.00	71.22	76.25	4,245.72	90.88	395.16	405.47	11.17
4,450.00	74.37	76.82	4,255.18	97.99	424.88	436.03	9.99
4,481.00	77.48	77.37	4,262.72	104.71	454.19	466.09	10.18
4,512.00	80.13	77.65	4,268.74	111.28	483.87	496.50	8.59
4,543.00	83.44	77.15	4,273.17	117.97	513.81	527.18	10.80
Run 600-Last Sperry MWD Build Survey							
4,574.00	87.47	76.86	4,275.62	124.92	543.92	558.07	13.03
Run 700-First Sperry MWD Lateral Survey							
4,605.00	90.49	77.02	4,276.18	131.92	574.11	589.07	9.76
4,636.00	90.99	77.10	4,275.78	138.87	604.32	620.06	1.63
4,667.00	91.42	76.94	4,275.12	145.83	634.52	651.05	1.48
4,698.00	91.67	77.05	4,274.29	152.80	664.71	682.04	0.88
4,761.00	90.00	76.48	4,273.37	167.22	726.03	745.03	2.80
4,823.00	90.12	76.30	4,273.31	181.81	786.29	807.02	0.35
4,885.00	89.82	77.02	4,273.34	196.12	846.62	869.02	1.26
4,917.00	89.01	77.45	4,273.66	203.19	877.82	901.02	2.87
4,979.00	89.14	77.34	4,274.67	216.72	938.32	963.01	0.27
5,010.00	89.26	76.81	4,275.10	223.65	968.53	994.01	1.75
5,073.00	89.63	76.40	4,275.71	238.24	1,029.81	1,057.00	0.88
5,135.00	90.12	76.33	4,275.84	252.86	1,090.07	1,118.99	0.80
5,197.00	90.62	76.20	4,275.44	267.58	1,150.29	1,180.98	0.83
5,228.00	90.93	76.12	4,275.02	274.99	1,180.39	1,211.97	1.03
5,290.00	90.86	77.63	4,274.06	289.07	1,240.76	1,273.96	2.44
5,351.00	90.68	77.38	4,273.24	302.27	1,300.31	1,334.95	0.50
5,414.00	91.42	77.40	4,272.08	316.02	1,361.78	1,397.94	1.18
5,483.00	91.17	77.34	4,270.52	331.10	1,429.09	1,466.92	0.37

Survey Report for Razorback Federal #1 - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
Run 800-First Sperry MWD Lateral Survey							
5,545.00	91.61	76.94	4,269.02	344.90	1,489.52	1,528.91	0.96
5,607.00	91.91	77.30	4,267.11	358.71	1,549.93	1,590.88	0.76
5,628.00	92.10	77.55	4,266.38	363.28	1,570.42	1,611.86	1.49
5,692.00	92.10	77.55	4,264.03	377.07	1,632.87	1,675.82	0.00
TD Projection							

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,543.00	4,273.17	117.97	513.81	Run 600-Last Sperry MWD Build Survey
4,574.00	4,275.62	124.92	543.92	Run 700-First Sperry MWD Lateral Survey
5,483.00	4,270.52	331.10	1,429.09	Run 800-First Sperry MWD Lateral Survey
5,692.00	4,264.03	377.07	1,632.87	TD Projection

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Razorback Federal #1 Plan A (BHL)	77.28	Slot	0.00	0.00	0.00
3,701.00	5,692.00	Sperry MWD Surveys			MWD	

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
803.00		13 3/8"	13-3/8	17-1/2
2,070.00		9 5/8"	9-5/8	12-1/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	TVDSS (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
720.00	720.00	-3,052.00	Rustler		0.00	
910.00	910.00	-2,862.00	Top Salt		0.00	
2,040.98	2,040.00	-1,732.00	Base Salt	3Y6ITeLIHT2YrVhT	0.00	
2,476.73	2,475.00	-1,297.00	Seven Rivers		0.00	
3,142.07	3,140.00	-632.00	Queen		0.00	
3,579.30	3,577.00	-195.00	Grayburg		0.00	
4,159.96	4,110.00	338.00	San Andres		0.00	

Survey Report for Razorback Federal #1 - Sperry MWD Surveys

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Plan @ 4275.84 (Ra - survey hits target center - Point			4,275.84	128.34	559.23	648,551.53	645,005.30	32° 46' 55.454 N	103° 51' 41.472 W
Razorback Federal # - survey misses target center by 13.39ft at 5679.37ft MD (4264.50 TVD, 374.35 N, 1620.54 E) - Point	0.00	0.00	4,275.00	366.32	1,622.71	648,789.50	646,068.70	32° 46' 57.762 N	103° 51' 29.004 W
Razorback Federal # - survey misses target center by 3694.68ft at 3697.00ft MD (3694.64 TVD, 8.00 N, 14.88 E) - Polygon	0.00	0.00	0.00	0.00	0.00	648,423.20	644,446.10	32° 46' 54.209 N	103° 51' 48.029 W
Razorback Federal # - survey misses target center by 3694.68ft at 3697.00ft MD (3694.64 TVD, 8.00 N, 14.88 E) - Polygon	0.00	0.00	0.00	0.00	0.00	648,423.20	644,446.10	32° 46' 54.209 N	103° 51' 48.029 W

**North Reference Sheet for Sec. 3-T18S-R31E - Razorback Federal #1 - Plan A Rev
0 Sidetrack #1**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 18 ft. @ 3772.00ft (Silver Oak Rig 7). Northing and Easting are relative to Razorback Federal #1

Coordinate System is US State Plane.1927 (Exact solution), New Mexico East 3001 using datum NAD 1927 (NADCON CONUS), ellipsoid Clarke 1866 .

Projection method is Transverse Mercator (Gauss-Kruger)

Central Meridian is 104° 20' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin 0° 0' 0.000 N°

False Easting 500,000.00ft, False Northing: 0.00ft, Scale Reduction: 0.99993298

Grid Coordinates of Well: 648,423.20 ft N, 644,446 10 ft E

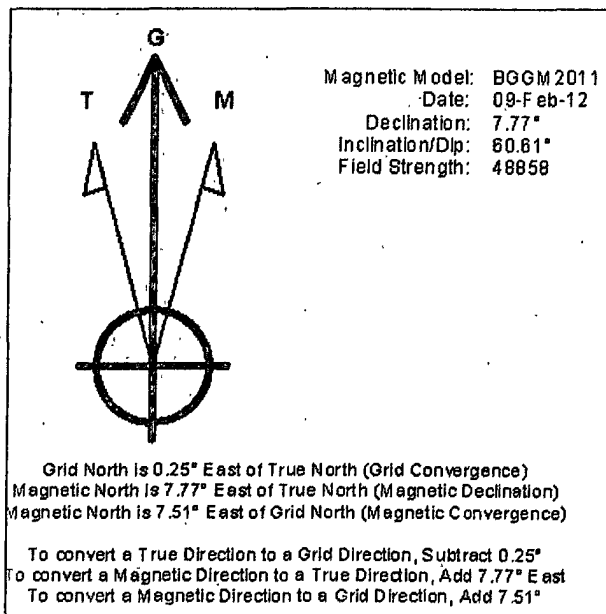
Geographical Coordinates of Well 32° 46' 54.21" N, 103° 51' 48.03" W

Grid Convergence at Surface is: 0.25°

Based upon Minimum Curvature type calculations, at a Measured Depth of 5,692.00ft

the Bottom Hole Displacement is 1,675.84ft in the Direction of 77.00° (Grid).

Magnetic Convergence at surface is -7.51° (9 February 2012, , BGGM2011)





PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

February 19, 2012

Mack Energy Corporation
PO Box 960
Artesia, NM 88211-0960

RE: Razorback Federal Com #1
710' FNL & 660' FWL
Sec. 3, T18S, R31E
Eddy County, New Mexico

Dear Sir,

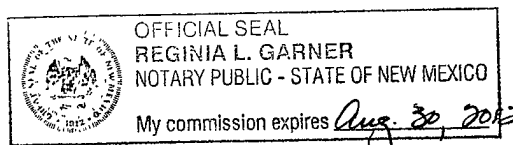
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 19th day of February, 2012.

Notary Public

Pason DataHub Deviation Survey

Well Dossier 1326936860 - Razorback Fed #1 SO 7

#

# Date	Depth	Deviation	Direction	TVD
1/19/2012	126	0.40	105.00	0.00
1/19/2012	246	0.03	195.70	0.00
1/19/2012	388	0.30	105.70	0.00
1/19/2012	583	0.10	310.70	0.00
1/20/2012	744	0.10	48.70	0.00
1/22/2012	890	0.10	116.70	0.00
1/22/2012	1077	0.50	69.70	0.00
1/23/2012	1260	0.80	80.70	1307.00
1/23/2012	1445	1.60	63.70	1492.00
1/23/2012	1631	2.10	74.70	1676.00
1/23/2012	1693	2.60	71.70	0.00
1/23/2012	1786	2.80	76.70	0.00
1/23/2012	1843	3.60	72.70	0.00
1/23/2012	1968	4.60	67.70	0.00
1/26/2012	2100	5.48	72.68	2149.72
1/26/2012	2132	4.80	76.00	0.00
1/26/2012	2163	3.91	79.30	0.00
1/26/2012	2194	3.04	86.05	0.00
1/26/2012	2226	2.35	99.27	0.00
1/26/2012	2257	1.89	112.49	0.00
1/26/2012	2288	1.68	134.30	0.00
1/26/2012	2319	1.54	164.67	0.00
1/26/2012	2350	1.88	186.92	0.00
1/26/2012	2381	2.37	208.12	0.00
1/27/2012	2444	2.75	218.77	2442.31
1/27/2012	2475	2.75	299.11	2473.27
1/27/2012	2537	3.09	238.24	2535.18
1/27/2012	2568	2.62	251.48	2566.15
1/27/2012	2599	2.05	262.07	2597.12
1/27/2012	2630	1.71	274.90	2628.10
1/27/2012	2723	1.46	296.43	0.00
1/27/2012	2755	1.53	303.16	0.00
1/27/2012	2817	1.11	281.62	0.00
1/27/2012	2879	1.33	280.48	0.00
1/27/2012	2942	1.65	288.06	0.00
1/27/2012	3004	1.54	293.77	0.00
1/27/2012	3129	1.81	284.60	0.00
1/27/2012	3160	2.03	282.88	0.00
1/27/2012	3222	2.16	283.48	0.00
1/27/2012	3285	2.01	293.05	0.00
1/27/2012	3347	1.76	279.88	0.00

#	Date	Depth	Deviation	Direction	TVD
1/28/2012	3409	1.66	270.49	3406.78	
1/28/2012	3472	1.81	256.56	3465.75	
1/28/2012	3534	1.69	243.81	3531.72	
1/28/2012	3596	1.91	242.49	3593.59	
1/28/2012	3697	1.80	246.79	0.00	
1/28/2012	3759	1.90	250.04	0.00	
1/28/2012	3852	1.95	256.33	0.00	
1/28/2012	3946	2.07	259.49	0.00	
1/28/2012	4039	1.94	250.67	0.00	
1/28/2012	4122	1.23	245.09	0.00	
1/29/2012	4227	1.00	243.80	4224.38	
1/29/2012	4320	0.95	240.62	0.00	
1/29/2012	4413	0.91	253.90	4410.36	
1/29/2012	4507	1.21	268.91	0.00	
1/29/2012	4599	1.43	276.26	0.00	
1/29/2012	4693	1.57	277.61	0.00	
1/29/2012	4786	1.21	315.83	0.00	
1/29/2012	4880	1.34	330.95	0.00	
1/29/2012	4937	1.50	331.86	0.00	
1/29/2012	5067	2.10	8.11	0.00	
1/30/2012	5160	2.28	34.30	5157.10	
1/30/2012	5253	1.72	64.18	0.00	
1/30/2012	5346	1.40	88.46	0.00	
1/30/2012	5439	1.57	75.99	0.00	
1/30/2012	5522	1.82	62.82	0.00	
2/9/2012	3701	1.85	247.58	0.00	
2/9/2012	3732	2.36	44.95	0.00	
2/9/2012	3764	5.89	56.37	0.00	
2/9/2012	3795	9.22	60.54	3792.27	
2/9/2012	3826	12.35	66.71	3822.72	
2/9/2012	3857	15.78	69.64	3852.79	
2/9/2012	3888	19.20	71.01	3882.35	
2/9/2012	3920	22.56	72.16	3912.25	
2/9/2012	3951	25.42	75.47	3940.57	
2/9/2012	3982	28.21	77.52	3968.23	
2/10/2012	4013	31.16	77.69	3995.16	
2/10/2012	4044	34.37	78.67	4021.22	
2/10/2012	4075	37.38	79.17	4046.33	
2/10/2012	4106	40.42	79.95	4070.46	
2/10/2012	4169	46.42	80.20	4116.29	
2/10/2012	4200	48.57	80.57	4137.22	
2/10/2012	4231	52.35	80.43	4156.96	
2/10/2012	4262	55.40	80.61	4178.18	
2/10/2012	4294	58.61	80.10	4192.65	
2/10/2012	4325	61.28	79.51	4208.18	

#	Date	Depth	Deviation	Direction	TVD
	2/10/2012	4356	64.46	78.23	4222.31
	2/10/2012	4387	67.78	76.68	4234.86
	2/10/2012	4418	71.22	76.25	4245.72
	2/10/2012	4450	74.37	76.82	4255.17
	2/10/2012	4481	77.48	77.37	4262.71
	2/11/2012	4512	80.13	77.65	4268.73
	2/11/2012	4543	83.44	77.15	4273.17
	2/11/2012	4574	90.49	77.02	4276.18
	2/11/2012	4575	87.47	76.86	4275.62
	2/11/2012	4636	90.99	77.20	4275.77
	2/11/2012	4667	91.42	76.94	4275.12
	2/11/2012	4698	91.67	77.05	4274.28
	2/11/2012	4761	90.00	76.48	4273.37
	2/11/2012	4823	90.12	76.30	4273.30
	2/11/2012	4885	89.82	77.02	4273.34
	2/12/2012	4917	89.01	77.45	4273.66
	2/12/2012	4979	89.14	77.34	4274.66
	2/12/2012	5010	89.26	76.81	4275.09
	2/12/2012	5073	89.63	76.40	4275.70
	2/12/2012	5135	90.12	76.33	4275.85
	2/12/2012	5197	90.62	76.20	4275.44
	2/12/2012	5228	90.93	76.06	4275.03
	2/12/2012	5290	90.86	77.63	4274.06
	2/12/2012	5351	90.68	77.38	4273.22
	2/12/2012	5414	91.42	77.40	4272.07
	2/15/2012	5483	91.17	77.34	4270.51
	2/15/2012	5545	91.61	76.94	4269.01
	2/15/2012	5607	91.91	77.30	4267.11
	2/15/2012	5628	92.10	77.55	4266.37

EOF