



Directional Survey

Well Name GRAMMA RIDGE 14-24-34 001H		Lease Gramma Ridge 14-24-34		Field Name Red Hills North		Business Unit Mid-Continent	
Ground Elevation (ft) 3,492.00	Original RKB (ft) 3,517.00	Current RKB Elevation 3,517.00, 9/3/2014				Mud Line Elevation (ft)	Water Depth (ft)

Wellbore Name		Parent Wellbore		Kick Off Depth (ftKB)		Vertical Section Direction (°)	
Original Hole		Original Hole		10,629		175.61	
UTM Northing (Y) (ft)			UTM Easting (X) (ft)			UTM Grid Zone	
Date		Definitive?		Description		Planned?	
9/9/2014		Y		MWD		N	
MD Tie In (ftKB)	TVD Tie In (ftKB)	Inclination Tie In (°)		Azimuth Tie In (°)		NSTie In (ft)	EWTie In (ft)

Survey Data

MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	NS (ft)	EW (ft)	VS (ft)	DLS (°/100ft)	Method	Survey Company	Build (°/100ft)	Depart (ft)	Turn (°/100ft)	Unuse d data
105	0.40	218.60	105.00	-0.29	-0.23	0.27	0.38	Magn MWD	Rig	0.38	0.37	208.19	N
284	0.60	227.60	283.99	-1.41	-1.31	1.30	0.12	Magn MWD	Rig	0.11	1.92	5.03	N
481	0.60	220.00	480.98	-2.89	-2.74	2.67	0.04	Magn MWD	Rig	0.00	3.98	-3.86	N
627	0.20	235.00	626.98	-3.62	-3.44	3.35	0.28	Magn MWD	Rig	-0.27	4.99	10.27	N
807	0.20	33.70	806.98	-3.54	-3.52	3.26	0.22	Magn MWD	Rig	0.00	4.99	-	N
1,003	0.40	31.60	1,002.97	-2.68	-2.97	2.44	0.10	Magn MWD	Rig	0.10	4.00	-1.07	N
1,183	0.70	357.60	1,182.97	-1.04	-2.69	0.83	0.24	Magn MWD	Rig	0.17	2.88	181.11	N
1,220	0.90	327.60	1,219.96	-0.57	-2.85	0.35	1.23	Magn MWD	Rig	0.54	2.91	-81.08	N
1,376	1.11	324.82	1,375.94	1.70	-4.38	-2.03	0.14	Magn MWD	Phoenix Directional	0.13	4.70	-1.78	N
1,555	1.13	330.59	1,554.90	4.65	-6.24	-5.12	0.06	Magn MWD	Phoenix Directional	0.01	7.79	3.22	N
1,735	1.10	327.62	1,734.87	7.66	-8.04	-8.25	0.04	Magn MWD	Phoenix Directional	-0.02	11.11	-1.65	N
1,914	1.01	334.61	1,913.84	10.53	-9.64	-11.24	0.09	Magn MWD	Phoenix Directional	-0.05	14.28	3.91	N
2,093	1.25	336.41	2,092.81	13.75	-11.10	-14.56	0.14	Magn MWD	Phoenix Directional	0.13	17.67	1.01	N
2,272	1.48	328.94	2,271.75	17.52	-13.07	-18.47	0.16	Magn MWD	Phoenix Directional	0.13	21.86	-4.17	N
2,452	1.03	358.94	2,451.71	21.13	-14.30	-22.16	0.43	Magn MWD	Phoenix Directional	-0.25	25.51	16.67	N
2,631	1.26	347.09	2,630.68	24.65	-14.77	-25.71	0.18	Magn MWD	Phoenix Directional	0.13	28.74	-6.62	N
2,809	1.61	343.97	2,808.62	28.97	-15.90	-30.10	0.20	Magn MWD	Phoenix Directional	0.20	33.04	-1.75	N
2,988	1.16	31.19	2,987.57	32.93	-15.65	-34.03	0.66	Magn MWD	Phoenix Directional	-0.25	36.46	-	N
3,167	1.44	27.67	3,166.53	36.47	-13.67	-37.41	0.16	Magn MWD	Phoenix Directional	0.16	38.95	-1.97	N
3,347	1.86	23.82	3,346.45	41.15	-11.44	-41.90	0.24	Magn MWD	Phoenix Directional	0.23	42.71	-2.14	N
3,526	1.15	64.39	3,525.39	44.58	-8.65	-45.11	0.69	Magn MWD	Phoenix Directional	-0.40	45.41	22.66	N
3,705	1.52	39.68	3,704.35	47.19	-5.51	-47.47	0.38	Magn MWD	Phoenix Directional	0.21	47.51	-13.80	N
3,884	1.31	46.92	3,883.29	50.41	-2.50	-50.46	0.15	Magn MWD	Phoenix Directional	-0.12	50.47	4.04	N
4,063	1.35	41.19	4,062.24	53.40	0.38	-53.21	0.08	Magn MWD	Phoenix Directional	0.02	53.40	-3.20	N
4,242	1.12	41.59	4,241.20	56.29	2.93	-55.90	0.13	Magn MWD	Phoenix Directional	-0.13	56.37	0.22	N
4,421	1.42	39.47	4,420.16	59.31	5.50	-58.72	0.17	Magn MWD	Phoenix Directional	0.17	59.57	-1.18	N

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Survey Data

MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	NS (ft)	EW (ft)	VS (ft)	DLS (°/100ft)	Method	Survey Company	Build (°/100ft)	Depart (ft)	Turn (°/100ft)	Unuse d data
4,600	2.81	86.91	4,599.04	61.26	11.30	-60.22	1.19	Magn MWD	Phoenix Directional	0.78	62.29	26.50	N
4,779	0.96	21.32	4,777.95	62.89	16.22	-61.47	1.43	Magn MWD	Phoenix Directional	-1.03	64.95	-36.64	N
4,958	1.55	86.52	4,956.92	64.44	19.18	-62.78	0.80	Magn MWD	Phoenix Directional	0.33	67.23	36.42	N
5,136	1.89	103.80	5,134.84	63.88	24.44	-61.83	0.35	Magn MWD	Phoenix Directional	0.19	68.40	9.71	N
5,274	1.03	4.45	5,272.81	64.58	26.74	-62.34	1.66	Magn MWD	Phoenix Directional	-0.62	69.90	-71.99	N
5,420	1.29	356.12	5,418.78	67.53	26.74	-65.28	0.21	Magn MWD	Phoenix Directional	0.18	72.63	240.87	N
5,599	0.50	68.11	5,597.76	69.83	27.32	-67.53	0.69	Magn MWD	Phoenix Directional	-0.44	74.98	-	N
5,778	1.32	158.51	5,776.74	68.20	28.80	-65.80	0.79	Magn MWD	Phoenix Directional	0.46	74.03	50.50	N
5,958	0.21	136.92	5,956.72	66.03	29.79	-63.56	0.63	Magn MWD	Phoenix Directional	-0.62	72.44	-11.99	N
6,136	2.36	164.16	6,134.67	62.27	31.01	-59.71	1.22	Magn MWD	Phoenix Directional	1.21	69.56	15.30	N
6,316	1.95	167.39	6,314.54	55.71	32.69	-53.05	0.24	Magn MWD	Phoenix Directional	-0.23	64.60	1.79	N
6,494	1.65	161.28	6,492.45	50.33	34.18	-47.57	0.20	Magn MWD	Phoenix Directional	-0.17	60.84	-3.43	N
6,673	1.21	166.34	6,671.40	46.05	35.45	-43.20	0.26	Magn MWD	Phoenix Directional	-0.25	58.12	2.83	N
6,852	1.39	167.65	6,850.35	42.10	36.36	-39.19	0.10	Magn MWD	Phoenix Directional	0.10	55.62	0.73	N
7,031	1.18	159.14	7,029.30	38.25	37.48	-35.27	0.16	Magn MWD	Phoenix Directional	-0.12	53.55	-4.75	N
7,210	1.33	164.07	7,208.26	34.53	38.71	-31.47	0.10	Magn MWD	Phoenix Directional	0.08	51.87	2.75	N
7,389	0.81	170.16	7,387.23	31.29	39.49	-28.17	0.30	Magn MWD	Phoenix Directional	-0.29	50.38	3.40	N
7,568	0.70	157.79	7,566.21	29.03	40.12	-25.87	0.11	Magn MWD	Phoenix Directional	-0.06	49.52	-6.91	N
7,747	0.34	146.10	7,745.21	27.58	40.83	-24.37	0.21	Magn MWD	Phoenix Directional	-0.20	49.27	-6.53	N
7,926	0.11	331.15	7,924.21	27.29	41.05	-24.06	0.25	Magn MWD	Phoenix Directional	-0.13	49.29	103.38	N
8,165	0.60	6.64	8,163.20	28.73	41.08	-25.50	0.22	Magn MWD	Phoenix Directional	0.21	50.13	-	N
8,284	0.95	36.05	8,282.19	30.15	41.73	-26.86	0.44	Magn MWD	Phoenix Directional	0.29	51.48	24.71	N
8,462	1.32	24.86	8,460.16	33.20	43.46	-29.78	0.24	Magn MWD	Phoenix Directional	0.21	54.69	-6.29	N
8,642	1.35	313.01	8,640.12	36.53	42.78	-33.14	0.87	Magn MWD	Phoenix Directional	0.02	56.26	160.08	N
8,821	1.61	342.02	8,819.06	40.36	40.47	-37.14	0.44	Magn MWD	Phoenix Directional	0.15	57.15	16.21	N
9,000	1.30	3.45	8,998.00	44.78	39.81	-41.60	0.35	Magn MWD	Phoenix Directional	-0.17	59.92	-	N
9,179	1.73	27.82	9,176.94	49.19	41.19	-45.89	0.43	Magn MWD	Phoenix Directional	0.24	64.16	13.61	N
9,358	1.55	148.43	9,355.91	49.52	43.72	-46.03	1.59	Magn MWD	Phoenix Directional	-0.10	66.06	67.38	N
9,537	1.90	117.29	9,534.83	46.10	47.63	-42.32	0.55	Magn MWD	Phoenix Directional	0.20	66.28	-17.40	N



Directional Survey

Well Name		Lease		Field Name		Business Unit	
GRAMMA RIDGE 14-24-34 001H		Gramma Ridge 14-24-34		Red Hills North		Mid-Continent	
Ground Elevation (ft)	Original RKB (ft)	Current RKB Elevation				Mud Line Elevation (ft)	Water Depth (ft)
3,492.00	3,517.00	3,517.00, 9/3/2014					

Survey Data

MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	NS (ft)	EW (ft)	VS (ft)	DLS (°/100ft)	Method	Survey Company	Build (°/100ft)	Depart (ft)	Turn (°/100ft)	Unuse d data
9,718	0.80	200.13	9,715.79	43.53	49.86	-39.59	1.09	Magn MWD	Phoenix Directional	-0.61	66.19	45.77	N
9,897	0.52	192.86	9,894.78	41.57	49.25	-37.68	0.16	Magn MWD	Phoenix Directional	-0.16	64.45	-4.06	N
10,076	0.56	68.45	10,073.77	41.10	49.88	-37.16	0.53	Magn MWD	Phoenix Directional	0.02	64.63	-69.50	N
10,255	0.74	32.74	10,252.76	42.39	51.32	-38.34	0.24	Magn MWD	Phoenix Directional	0.10	66.56	-19.95	N
10,429	1.06	43.04	10,426.74	44.51	53.03	-40.32	0.21	Magn MWD	Phoenix Directional	0.18	69.23	5.92	N
10,518	1.35	22.53	10,515.72	46.08	53.99	-41.82	0.58	Magn MWD	Phoenix Directional	0.33	70.98	-23.04	N
10,607	1.50	14.61	10,604.69	48.18	54.69	-43.85	0.28	Magn MWD	Phoenix Directional	0.17	72.88	-8.90	N
10,652	0.86	73.86	10,649.68	48.84	55.16	-44.48	2.87	Magn MWD	Phoenix Directional	-1.42	73.68	131.67	N
10,697	5.88	168.23	10,694.60	46.68	55.95	-42.26	13.35	Magn MWD	Phoenix Directional	11.16	72.87	209.71	N
10,742	12.48	173.47	10,739.00	39.58	56.98	-35.11	14.77	Magn MWD	Phoenix Directional	14.67	69.38	11.64	N
10,786	18.27	171.85	10,781.41	28.02	58.50	-23.46	13.19	Magn MWD	Phoenix Directional	13.16	64.86	-3.68	N
10,831	25.06	172.52	10,823.21	11.57	60.74	-6.89	15.10	Magn MWD	Phoenix Directional	15.09	61.83	1.49	N
10,876	31.24	175.99	10,862.87	-9.54	62.80	14.32	14.20	Magn MWD	Phoenix Directional	13.73	63.52	7.71	N
10,920	35.98	180.52	10,899.51	-33.86	63.48	38.62	12.18	Magn MWD	Phoenix Directional	10.77	71.95	10.30	N
10,965	40.14	180.53	10,934.93	-61.60	63.23	66.26	9.24	Magn MWD	Phoenix Directional	9.24	88.27	0.02	N
11,010	43.50	179.97	10,968.46	-91.60	63.10	96.16	7.51	Magn MWD	Phoenix Directional	7.47	111.23	-1.24	N
11,055	46.81	180.30	11,000.19	-123.50	63.02	127.96	7.37	Magn MWD	Phoenix Directional	7.36	138.65	0.73	N
11,100	50.31	182.54	11,029.97	-157.21	62.17	161.51	8.63	Magn MWD	Phoenix Directional	7.78	169.06	4.98	N
11,144	53.45	183.35	11,057.13	-191.78	60.39	195.84	7.28	Magn MWD	Phoenix Directional	7.14	201.06	1.84	N
11,189	55.12	180.40	11,083.40	-228.29	59.20	232.15	6.49	Magn MWD	Phoenix Directional	3.71	235.84	-6.56	N
11,234	58.55	176.98	11,108.02	-265.93	60.08	269.75	9.93	Magn MWD	Phoenix Directional	7.62	272.64	-7.60	N
11,278	64.39	173.69	11,129.03	-304.44	63.26	308.38	14.81	Magn MWD	Phoenix Directional	13.27	310.94	-7.48	N
11,323	69.92	174.18	11,146.50	-345.66	67.63	349.82	12.33	Magn MWD	Phoenix Directional	12.29	352.21	1.09	N
11,368	72.83	173.19	11,160.87	-388.04	72.33	392.43	6.79	Magn MWD	Phoenix Directional	6.47	394.72	-2.20	N
11,413	75.11	175.01	11,173.29	-431.05	76.77	435.67	6.39	Magn MWD	Phoenix Directional	5.07	437.84	4.04	N
11,457	78.35	175.20	11,183.39	-473.72	80.42	478.48	7.38	Magn MWD	Phoenix Directional	7.36	480.49	0.43	N
11,502	81.28	175.98	11,191.35	-517.87	83.82	522.77	6.73	Magn MWD	Phoenix Directional	6.51	524.61	1.73	N
11,547	84.59	176.60	11,196.88	-562.43	86.71	567.42	7.48	Magn MWD	Phoenix Directional	7.36	569.08	1.38	N
11,592	87.57	176.15	11,199.96	-607.23	89.55	612.30	6.70	Magn MWD	Phoenix Directional	6.62	613.80	-1.00	N



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Survey Data

MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	NS (ft)	EW (ft)	VS (ft)	DLS (°/100ft)	Method	Survey Company	Build (°/100ft)	Depart (ft)	Turn (°/100ft)	Unused data
11,681	90.98	177.68	11,201.08	-696.08	94.34	701.26	4.20	Magn MWD	Phoenix Directional	3.83	702.44	1.72	N
11,770	92.91	178.32	11,198.06	-784.97	97.44	790.12	2.28	Magn MWD	Phoenix Directional	2.17	790.99	0.72	N
11,860	92.99	178.02	11,193.43	-874.80	100.31	879.91	0.34	Magn MWD	Phoenix Directional	0.09	880.54	-0.33	N
11,949	93.08	177.39	11,188.72	-963.61	103.87	968.73	0.71	Magn MWD	Phoenix Directional	0.10	969.19	-0.71	N
12,039	92.88	178.13	11,184.04	-1,053.41	107.39	1,058.54	0.85	Magn MWD	Phoenix Directional	-0.22	1,058.87	0.82	N
12,128	90.11	178.03	11,181.72	-1,142.33	110.37	1,147.42	3.11	Magn MWD	Phoenix Directional	-3.11	1,147.65	-0.11	N
12,217	88.71	177.97	11,182.64	-1,231.26	113.47	1,236.34	1.57	Magn MWD	Phoenix Directional	-1.57	1,236.48	-0.07	N
12,307	88.04	178.17	11,185.19	-1,321.18	116.50	1,326.22	0.78	Magn MWD	Phoenix Directional	-0.74	1,326.30	0.22	N
12,397	86.50	177.97	11,189.47	-1,411.02	119.53	1,416.03	1.73	Magn MWD	Phoenix Directional	-1.71	1,416.07	-0.22	N
12,486	88.55	178.36	11,193.32	-1,499.89	122.38	1,504.85	2.34	Magn MWD	Phoenix Directional	2.30	1,504.87	0.44	N
12,576	87.74	178.65	11,196.23	-1,589.81	124.72	1,594.69	0.96	Magn MWD	Phoenix Directional	-0.90	1,594.69	0.32	N
12,665	88.21	178.10	11,199.38	-1,678.72	127.25	1,683.53	0.81	Magn MWD	Phoenix Directional	0.53	1,683.53	-0.62	N
12,755	88.24	176.60	11,202.16	-1,768.58	131.40	1,773.44	1.67	Magn MWD	Phoenix Directional	0.03	1,773.45	-1.67	N
12,844	87.01	176.89	11,205.85	-1,857.35	136.45	1,862.35	1.42	Magn MWD	Phoenix Directional	-1.38	1,862.36	0.33	N
12,934	87.23	176.23	11,210.37	-1,947.08	141.85	1,952.22	0.77	Magn MWD	Phoenix Directional	0.24	1,952.24	-0.73	N
13,023	89.08	176.28	11,213.24	-2,035.84	147.66	2,041.17	2.08	Magn MWD	Phoenix Directional	2.08	2,041.18	0.06	N
13,113	89.52	174.93	11,214.34	-2,125.56	154.55	2,131.16	1.58	Magn MWD	Phoenix Directional	0.49	2,131.18	-1.50	N
13,202	88.60	174.71	11,215.80	-2,214.19	162.59	2,220.14	1.06	Magn MWD	Phoenix Directional	-1.03	2,220.15	-0.25	N
13,292	89.69	173.22	11,217.14	-2,303.67	172.05	2,310.09	2.05	Magn MWD	Phoenix Directional	1.21	2,310.09	-1.66	N
13,381	88.74	176.25	11,218.36	-2,392.28	180.21	2,399.06	3.57	Magn MWD	Phoenix Directional	-1.07	2,399.06	3.40	N
13,471	87.93	176.30	11,220.98	-2,482.05	186.06	2,489.01	0.90	Magn MWD	Phoenix Directional	-0.90	2,489.01	0.06	N
13,560	90.20	175.22	11,222.43	-2,570.79	192.64	2,577.99	2.82	Magn MWD	Phoenix Directional	2.55	2,578.00	-1.21	N
13,649	89.47	174.99	11,222.69	-2,659.46	200.23	2,666.99	0.86	Magn MWD	Phoenix Directional	-0.82	2,666.99	-0.26	N
13,739	87.96	175.71	11,224.70	-2,749.14	207.53	2,756.96	1.86	Magn MWD	Phoenix Directional	-1.68	2,756.96	0.80	N
13,828	89.38	174.39	11,226.77	-2,837.78	215.20	2,845.93	2.18	Magn MWD	Phoenix Directional	1.60	2,845.93	-1.48	N
13,918	88.97	175.70	11,228.07	-2,927.43	222.98	2,935.91	1.53	Magn MWD	Phoenix Directional	-0.46	2,935.91	1.46	N
14,007	87.71	175.44	11,230.64	-3,016.13	229.85	3,024.87	1.45	Magn MWD	Phoenix Directional	-1.42	3,024.87	-0.29	N
14,097	88.63	175.44	11,233.52	-3,105.80	237.00	3,114.83	1.02	Magn MWD	Phoenix Directional	1.02	3,114.83	0.00	N
14,186	90.14	174.45	11,234.47	-3,194.44	244.84	3,203.81	2.03	Magn MWD	Phoenix Directional	1.70	3,203.81	-1.11	N



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Ground Elevation (ft) 3,492.00	Original RKB (ft) 3,517.00	Current RKB Elevation 3,517.00, 9/3/2014				Mud Line Elevation (ft)	Water Depth (ft)

Survey Data

MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	NS (ft)	EW (ft)	VS (ft)	DLS (°/100ft)	Method	Survey Company	Build (°/100ft)	Depart (ft)	Turn (°/100ft)	Unuse d data
14,276	88.74	175.03	11,235.35	-3,284.06	253.09	3,293.79	1.68	Magn MWD	Phoenix Directional	-1.56	3,293. 79	0.64	N
14,365	87.31	176.83	11,238.42	-3,372.77	259.40	3,382.73	2.58	Magn MWD	Phoenix Directional	-1.61	3,382. 73	2.02	N
14,455	88.46	176.31	11,241.74	-3,462.55	264.78	3,472.66	1.40	Magn MWD	Phoenix Directional	1.28	3,472. 66	-0.58	N
14,544	89.13	175.34	11,243.61	-3,551.29	271.26	3,561.64	1.32	Magn MWD	Phoenix Directional	0.75	3,561. 64	-1.09	N
14,633	90.59	173.85	11,243.83	-3,639.89	279.65	3,650.62	2.34	Magn MWD	Phoenix Directional	1.64	3,650. 62	-1.67	N
14,723	91.23	172.92	11,242.40	-3,729.28	290.01	3,740.54	1.25	Magn MWD	Phoenix Directional	0.71	3,740. 54	-1.03	N
14,813	89.75	174.79	11,241.63	-3,818.75	299.64	3,830.48	2.65	Magn MWD	Phoenix Directional	-1.64	3,830. 49	2.08	N
14,902	88.99	176.45	11,242.61	-3,907.48	306.44	3,919.47	2.05	Magn MWD	Phoenix Directional	-0.85	3,919. 48	1.87	N
14,992	88.04	176.64	11,244.94	-3,997.29	311.86	4,009.43	1.08	Magn MWD	Phoenix Directional	-1.06	4,009. 43	0.21	N
15,081	88.97	175.66	11,247.26	-4,086.05	317.84	4,098.39	1.52	Magn MWD	Phoenix Directional	1.04	4,098. 40	-1.10	N
15,171	89.41	174.56	11,248.54	-4,175.72	325.51	4,188.38	1.32	Magn MWD	Phoenix Directional	0.49	4,188. 38	-1.22	N
15,260	87.32	175.19	11,251.08	-4,264.32	333.45	4,277.33	2.45	Magn MWD	Phoenix Directional	-2.35	4,277. 34	0.71	N
15,350	87.99	173.93	11,254.76	-4,353.84	341.98	4,367.24	1.58	Magn MWD	Phoenix Directional	0.74	4,367. 25	-1.40	N
15,439	89.38	173.73	11,256.80	-4,442.29	351.54	4,456.17	1.58	Magn MWD	Phoenix Directional	1.56	4,456. 18	-0.22	N
15,544	91.31	172.74	11,256.17	-4,546.56	363.91	4,561.07	2.07	Magn MWD	Phoenix Directional	1.84	4,561. 10	-0.94	N
15,611	93.11	171.24	11,253.58	-4,612.85	373.24	4,627.88	3.50	Magn MWD	Phoenix Directional	2.69	4,627. 92	-2.24	N
15,663	93.11	171.24	11,250.76	-4,664.17	381.15	4,679.66	0.00	Magn MWD	Phoenix Directional	0.00	4,679. 71	0.00	N

Chevron

Lea County NM (NAD27 NME)

Gamma Ridge 14-24-34

#1H

WB1/Job #1411672

Survey: Phoenix MWD Survey

Standard Survey Report

27 October, 2014

Phoenix Survey Report

Company:	Chevron	Local Co-ordinate Reference:	Well #1H
Project:	Lea County NM (NAD27 NME)	TVD Reference:	KB @ 3516.50usft (Ensign 153)
Site:	Gramma Ridge 14-24-34	MD Reference:	KB @ 3516.50usft (Ensign 153)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1/Job #1411672	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 153)	Database:	Compass 5000 GCR epdm

Project	Lea County NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Gramma Ridge 14-24-34		
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Site Position:		Northing:	446,243.20 usft	Latitude:	32° 13' 25.45288 N
From:	Map	Easting:	773,870.90 usft	Longitude:	103° 26' 51.79837 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.47 °

Well	#1H				
Well Position	+N/-S	0.00 usft	Northing:	446,271.80 usft	Latitude: 32° 13' 25.51902 N
	+E/-W	0.00 usft	Easting:	776,517.00 usft	Longitude: 103° 26' 20.99488 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level: 3,492.00 usft

Wellbore	WB1/Job #1411672				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	9/2/2014	7.13	60.13	48,308

Design	Surveys (Ensign 153)				
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	175.61

Survey Program		Date 10/27/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
1,377.00	15,663.00	Phoenix MWD Survey (WB1/Job #141167	PHX+MWD+BGGM	PHX+MWD+BGGM v3:standard declination	

Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	1,220.00	0.90	327.60	1,219.96	-0.85	-3.11	0.61	0.00	0.00	0.00
Tie In	1,377.00	1.11	324.82	1,376.94	1.43	-4.65	-1.78	0.14	0.13	-1.77
First Phoenix MWD Survey	1,556.00	1.13	330.59	1,555.90	4.38	-6.52	-4.87	0.06	0.01	3.22
	1,735.00	1.10	327.62	1,734.87	7.37	-8.30	-7.99	0.04	-0.02	-1.66
	1,914.00	1.01	334.61	1,913.84	10.25	-9.90	-10.98	0.09	-0.05	3.91
	2,093.00	1.25	336.41	2,092.81	13.46	-11.36	-14.29	0.14	0.13	1.01
	2,272.00	1.48	328.94	2,271.75	17.23	-13.33	-18.20	0.16	0.13	-4.17
	2,452.00	1.03	358.49	2,451.71	20.84	-14.57	-21.90	0.43	-0.25	16.42

Phoenix

Survey Report

Company:	Chevron	Local Co-ordinate Reference:	Well #1H
Project:	Lea County NM (NAD27 NME)	TVD Reference:	KB @ 3516.50usft (Ensign 153)
Site:	Gramma Ridge 14-24-34	MD Reference:	KB @ 3516.50usft (Ensign 153)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1/Job #1411672	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 153)	Database:	Compass 5000 GCR epdm

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,631.00	1.26	347.09	2,630.68	24.37	-15.06	-25.45	0.18	0.13	-6.37
2,809.00	1.61	343.97	2,808.62	28.68	-16.18	-29.83	0.20	0.20	-1.75
2,988.00	1.16	31.19	2,987.57	32.65	-15.94	-33.77	0.66	-0.25	26.38
3,167.00	1.44	27.67	3,166.53	36.19	-13.96	-37.15	0.16	0.16	-1.97
3,347.00	1.86	23.82	3,346.45	40.86	-11.73	-41.64	0.24	0.23	-2.14
3,526.00	1.15	64.39	3,525.39	44.30	-8.93	-44.85	0.69	-0.40	22.66
3,705.00	1.52	39.68	3,704.35	46.90	-5.80	-47.21	0.38	0.21	-13.80
3,884.00	1.31	46.92	3,883.29	50.13	-2.79	-50.19	0.15	-0.12	4.04
4,063.00	1.35	41.19	4,062.24	53.11	0.10	-52.95	0.08	0.02	-3.20
4,242.00	1.12	41.59	4,241.20	56.01	2.64	-55.64	0.13	-0.13	0.22
4,421.00	1.42	39.47	4,420.16	59.03	5.22	-58.45	0.17	0.17	-1.18
4,600.00	2.81	86.91	4,599.04	60.98	11.01	-59.95	1.19	0.78	26.50
4,779.00	0.96	21.32	4,777.95	62.61	15.94	-61.21	1.43	-1.03	-36.64
4,958.00	1.55	86.52	4,956.92	64.15	18.90	-62.52	0.80	0.33	36.42
5,136.00	1.89	103.80	5,134.84	63.60	24.15	-61.56	0.35	0.19	9.71
5,274.00	1.03	4.45	5,272.81	64.29	26.46	-62.08	1.66	-0.62	-71.99
5,420.00	1.29	356.12	5,418.78	67.24	26.45	-65.02	0.21	0.18	-5.71
5,599.00	0.54	68.11	5,597.76	69.57	27.09	-67.29	0.69	-0.42	40.22
5,778.00	1.32	158.51	5,776.74	67.96	28.63	-65.57	0.80	0.44	50.50
5,958.00	0.81	136.92	5,956.71	65.10	30.26	-62.60	0.36	-0.28	-11.99
6,136.00	2.36	164.16	6,134.64	60.66	32.12	-58.02	0.94	0.87	15.30
6,316.00	1.95	167.39	6,314.51	54.10	33.80	-51.36	0.24	-0.23	1.79
6,494.00	1.65	161.28	6,492.42	48.72	35.28	-45.88	0.20	-0.17	-3.43
6,673.00	1.21	166.34	6,671.37	44.44	36.56	-41.52	0.26	-0.25	2.83
6,852.00	1.39	167.65	6,850.32	40.49	37.47	-37.50	0.10	0.10	0.73
7,031.00	1.18	159.14	7,029.27	36.64	38.59	-33.58	0.16	-0.12	-4.75
7,210.00	1.33	164.07	7,208.23	32.92	39.82	-29.78	0.10	0.08	2.75
7,389.00	0.81	170.16	7,387.20	29.68	40.60	-26.48	0.30	-0.29	3.40
7,568.00	0.70	157.79	7,566.18	27.42	41.23	-24.18	0.11	-0.06	-6.91
7,747.00	0.34	146.10	7,745.18	25.97	41.94	-22.68	0.21	-0.20	-6.53
7,926.00	0.11	331.15	7,924.18	25.68	42.15	-22.38	0.25	-0.13	-97.74
8,105.00	0.64	6.64	8,103.17	26.82	42.19	-23.51	0.31	0.30	19.83
8,284.00	0.95	26.95	8,282.15	29.14	42.98	-25.76	0.23	0.17	11.35
8,462.00	1.32	24.86	8,460.12	32.31	44.51	-28.81	0.21	0.21	-1.17
8,642.00	1.35	313.01	8,640.08	35.64	43.83	-32.18	0.87	0.02	-39.92
8,821.00	1.61	342.02	8,819.02	39.47	41.51	-36.18	0.44	0.15	16.21
9,000.00	1.30	3.45	8,997.97	43.89	40.85	-40.63	0.35	-0.17	11.97
9,179.00	1.73	27.82	9,176.91	48.31	42.24	-44.93	0.43	0.24	13.61
9,358.00	1.55	148.43	9,355.87	48.63	44.77	-45.06	1.59	-0.10	67.38
9,537.00	1.90	117.29	9,534.79	45.21	48.67	-41.35	0.55	0.20	-17.40
9,718.00	0.80	200.13	9,715.75	42.65	50.90	-38.63	1.09	-0.61	45.77
9,897.00	0.52	192.87	9,894.74	40.68	50.29	-36.71	0.16	-0.16	-4.06
10,076.00	0.56	68.45	10,073.74	40.21	50.93	-36.20	0.53	0.02	-69.51

Phoenix

Survey Report

Company:	Chevron	Local Co-ordinate Reference:	Well #1H
Project:	Lea County NM (NAD27 NME)	TVD Reference:	KB @ 3516.50usft (Ensign 153)
Site:	Gramma Ridge 14-24-34	MD Reference:	KB @ 3516.50usft (Ensign 153)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1/Job #1411672	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 153)	Database:	Compass 5000 GCR epdm

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,255.00	0.74	32.74	10,252.72	41.50	52.36	-37.37	0.24	0.10	-19.95	
10,429.00	1.06	43.04	10,426.70	43.63	54.07	-39.36	0.21	0.18	5.92	
10,518.00	1.35	22.53	10,515.68	45.20	55.03	-40.85	0.58	0.33	-23.04	
10,607.00	1.50	14.61	10,604.66	47.29	55.73	-42.89	0.28	0.17	-8.90	
10,652.00	0.86	73.86	10,649.65	47.96	56.20	-43.51	2.87	-1.42	131.67	
10,697.00	5.88	168.23	10,694.57	45.79	57.00	-41.29	13.35	11.16	209.71	
10,742.00	12.48	173.47	10,738.97	38.70	58.02	-34.14	14.77	14.67	11.64	
10,786.00	18.27	171.85	10,781.38	27.14	59.54	-22.50	13.19	13.16	-3.68	
10,831.00	25.06	172.52	10,823.17	10.68	61.78	-5.92	15.10	15.09	1.49	
10,876.00	31.24	175.99	10,862.83	-10.43	63.84	15.28	14.20	13.73	7.71	
10,920.00	35.98	180.52	10,899.47	-34.75	64.52	39.59	12.18	10.77	10.30	
10,965.00	40.14	180.53	10,934.90	-62.49	64.27	67.22	9.24	9.24	0.02	
11,010.00	43.50	179.97	10,968.43	-92.49	64.14	97.13	7.51	7.47	-1.24	
11,055.00	46.81	180.30	11,000.16	-124.39	64.07	128.93	7.37	7.36	0.73	
11,100.00	50.31	182.54	11,029.94	-158.10	63.21	162.48	8.63	7.78	4.98	
11,144.00	53.45	183.35	11,057.10	-192.67	61.43	196.80	7.28	7.14	1.84	
11,189.00	55.12	180.40	11,083.37	-229.18	60.24	233.12	6.49	3.71	-6.56	
11,234.00	58.55	176.98	11,107.99	-266.82	61.13	270.72	9.93	7.62	-7.60	
11,278.00	64.39	173.69	11,129.00	-305.32	64.30	309.35	14.81	13.27	-7.48	
11,323.00	69.92	174.18	11,146.46	-346.55	68.68	350.79	12.33	12.29	1.09	
11,368.00	72.83	173.19	11,160.83	-388.92	73.37	393.40	6.79	6.47	-2.20	
11,413.00	75.11	175.01	11,173.26	-431.94	77.81	436.63	6.39	5.07	4.04	
11,457.00	78.35	175.20	11,183.36	-474.60	81.46	479.45	7.38	7.36	0.43	
11,502.00	81.28	175.98	11,191.31	-518.76	84.87	523.73	6.73	6.51	1.73	
11,547.00	84.59	176.60	11,196.85	-563.32	87.76	568.38	7.48	7.36	1.38	
11,592.00	87.57	176.15	11,199.92	-608.12	90.59	613.27	6.70	6.62	-1.00	
11,681.00	90.98	177.68	11,201.05	-696.97	95.38	702.22	4.20	3.83	1.72	
11,770.00	92.91	178.32	11,198.03	-785.85	98.49	791.09	2.28	2.17	0.72	
11,860.00	92.99	178.02	11,193.40	-875.69	101.36	880.88	0.34	0.09	-0.33	
11,949.00	93.08	177.39	11,188.68	-964.49	104.92	969.69	0.71	0.10	-0.71	
12,039.00	92.88	178.13	11,184.01	-1,054.30	108.43	1,059.51	0.85	-0.22	0.82	
12,128.00	90.11	178.03	11,181.68	-1,143.21	111.41	1,148.39	3.11	-3.11	-0.11	
12,217.00	88.71	177.97	11,182.60	-1,232.15	114.52	1,237.30	1.57	-1.57	-0.07	
12,307.00	88.04	178.17	11,185.15	-1,322.06	117.55	1,327.18	0.78	-0.74	0.22	
12,397.00	86.50	177.97	11,189.44	-1,411.91	120.57	1,417.00	1.73	-1.71	-0.22	
12,486.00	88.55	178.36	11,193.28	-1,500.77	123.42	1,505.82	2.34	2.30	0.44	
12,576.00	87.74	178.65	11,196.19	-1,590.70	125.77	1,595.66	0.96	-0.90	0.32	
12,665.00	88.21	178.10	11,199.34	-1,679.60	128.29	1,684.50	0.81	0.53	-0.62	
12,755.00	88.24	176.60	11,202.13	-1,769.46	132.45	1,774.41	1.67	0.03	-1.67	
12,844.00	87.01	176.89	11,205.82	-1,858.24	137.50	1,863.31	1.42	-1.38	0.33	
12,934.00	87.23	176.23	11,210.34	-1,947.96	142.89	1,953.19	0.77	0.24	-0.73	
13,023.00	89.08	176.28	11,213.20	-2,036.72	148.70	2,042.13	2.08	2.08	0.06	
13,113.00	89.52	174.93	11,214.30	-2,126.45	155.60	2,132.12	1.58	0.49	-1.50	
13,202.00	88.60	174.71	11,215.76	-2,215.07	163.63	2,221.10	1.06	-1.03	-0.25	

Phoenix Survey Report

Company:	Chevron	Local Co-ordinate Reference:	Well #1H
Project:	Lea County NM (NAD27 NME)	TVD Reference:	KB @ 3516.50usft (Ensign 153)
Site:	Gramma Ridge 14-24-34	MD Reference:	KB @ 3516.50usft (Ensign 153)
Well:	#1H	North Reference:	Grid
Wellbore:	WB1/Job #1411672	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 153)	Database:	Compass 5000 GCR epdm

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,292.00	89.69	173.22	11,217.11	-2,304.56	173.09	2,311.05	2.05	1.21	-1.66
13,381.00	88.74	176.25	11,218.33	-2,393.17	181.26	2,400.02	3.57	-1.07	3.40
13,471.00	87.93	176.30	11,220.94	-2,482.94	187.10	2,489.97	0.90	-0.90	0.06
13,560.00	90.20	175.22	11,222.39	-2,571.68	193.68	2,578.96	2.82	2.55	-1.21
13,649.00	89.47	174.99	11,222.65	-2,660.35	201.27	2,667.95	0.86	-0.82	-0.26
13,739.00	87.96	175.71	11,224.67	-2,750.03	208.57	2,757.92	1.86	-1.68	0.80
13,828.00	89.38	174.39	11,226.73	-2,838.67	216.25	2,846.89	2.18	1.60	-1.48
13,918.00	88.97	175.70	11,228.03	-2,928.32	224.02	2,936.88	1.53	-0.46	1.46
14,007.00	87.71	175.44	11,230.61	-3,017.01	230.89	3,025.84	1.45	-1.42	-0.29
14,097.00	88.63	175.44	11,233.48	-3,106.68	238.04	3,115.79	1.02	1.02	0.00
14,186.00	90.14	174.45	11,234.44	-3,195.33	245.88	3,204.77	2.03	1.70	-1.11
14,276.00	88.74	175.03	11,235.32	-3,284.94	254.13	3,294.76	1.68	-1.56	0.64
14,365.00	87.31	176.83	11,238.38	-3,373.66	260.45	3,383.70	2.58	-1.61	2.02
14,455.00	88.46	176.31	11,241.70	-3,463.43	265.83	3,473.62	1.40	1.28	-0.58
14,544.00	89.13	175.34	11,243.58	-3,552.18	272.31	3,562.60	1.32	0.75	-1.09
14,633.00	90.59	173.85	11,243.79	-3,640.78	280.69	3,651.58	2.34	1.64	-1.67
14,723.00	91.23	172.92	11,242.36	-3,730.16	291.05	3,741.50	1.25	0.71	-1.03
14,813.00	89.75	174.79	11,241.59	-3,819.64	300.69	3,831.45	2.65	-1.64	2.08
14,902.00	88.99	176.45	11,242.57	-3,908.37	307.48	3,920.44	2.05	-0.85	1.87
14,992.00	88.04	176.64	11,244.91	-3,998.17	312.91	4,010.40	1.08	-1.06	0.21
15,081.00	88.97	175.66	11,247.23	-4,086.94	318.88	4,099.36	1.52	1.04	-1.10
15,171.00	89.41	174.56	11,248.50	-4,176.60	326.55	4,189.34	1.32	0.49	-1.22
15,260.00	87.32	175.19	11,251.04	-4,265.21	334.50	4,278.30	2.45	-2.35	0.71
15,350.00	87.99	173.93	11,254.72	-4,354.72	343.02	4,368.20	1.58	0.74	-1.40
15,439.00	89.38	173.73	11,256.76	-4,443.18	352.59	4,457.13	1.58	1.56	-0.22
15,544.00	91.31	172.40	11,256.13	-4,547.40	365.26	4,562.02	2.23	1.84	-1.27
15,611.00	92.77	171.79	11,253.75	-4,613.72	374.47	4,628.85	2.36	2.18	-0.91
Last Phoenix MWD Survey									
15,663.00	92.77	171.79	11,251.23	-4,665.13	381.89	4,680.68	0.00	0.00	0.00
Projection to TD									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,220.00	1,219.96	-0.85	-3.11	Tie In
1,377.00	1,376.94	1.43	-4.65	First Phoenix MWD Survey
15,611.00	11,253.75	-4,613.72	374.47	Last Phoenix MWD Survey
15,663.00	11,251.23	-4,665.13	381.89	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Phoenix Technology Services
SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1411672

OPERATOR Chevron

WELL NAME

Gramma Ridge 14-24-34 #1H

COUNTY & STATE

Lea County, NM

API WELL NUMBER

30-025-41811

PROPOSED DIRECTION

175.61°

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
1,220 ft	1,219.96 ft	0.90	327.60	-.85 ft	-3.11 ft	TeleDrift

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
13-Sep-14	1,377 ft	1.11°	324.82°

SURVEY INSTRUMENT

TYPE

APS / QDT

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
30-Sep-14	15,611 ft	92.77°	171.79°

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED	PROJECTED		
TD SURVEY	TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
30-Sep-14	15,663 ft	92.77°	171.79°

Zak Dawson

PRINT YOUR NAME ABOVE

Zak Dawson

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	6.65
DECLINATION OR GRID	GRID

9/30/2014

TODAY'S DATE

MWD SUPERVISOR 1

Zak Dawson

DIRECTIONAL DRILLER 1

Keith Scheppler

MWD SUPERVISOR 2

Brian Pina

DIRECTIONAL DRILLER 2

Craig Cannon