

COG Operating, LLC

Lea County, NM

Sec 8, T26S, R34E

Gunner 8 Federal Com #9H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

10 December, 2015



HP

Survey Report - Geographic



Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 8, T26S, R34E
Well: Gunner 8 Federal Com #9H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Gunner 8 Federal Com #9H
TVD Reference: WELL @ 3387.3usft (Scandrill Freedom)
MD Reference: WELL @ 3387.3usft (Scandrill Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass

Project	Lea County, NM		
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 Sec 8, T26S, R34E

Site Position: Northing: 383,330.50 usft Latitude: 32° 3' 3.943 N
From: Map Easting: 760,820.40 usft Longitude: 103° 29' 29.432 W
Position Uncertainty: 0.0 usft Slot Radius: 13-3/16 " Grid Convergence: 0.45 °

Well Gunner 8 Federal Com #9H

Well Position +N/-S 0.0 usft Northing: 383,327.30 usft Latitude: 32° 3' 4.044 N
 +E/-W 0.0 usft Easting: 759,085.60 usft Longitude: 103° 29' 49.588 W
Position Uncertainty 0.0 usft Wellhead Elevation: 0.0 usft Ground Level: 3,361.3 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/2/2015	7.08	59.94	48,010

Design Wellbore #1

Audit Notes:

Version: 1.0 **Phase:** ACTUAL **Tie On Depth:** 0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	359.95

Survey Program Date 12/10/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	9,170.0	GYRO (Wellbore #1)	Good_gyro	Good Gyro
9,170.0	19,727.0	MWD (Wellbore #1)	MWD default	MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	383,327.30	759,085.60	32° 3' 4.044 N	103° 29' 49.588 W
100.0	0.55	65.46	100.0	0.2	0.4	383,327.50	759,086.03	32° 3' 4.046 N	103° 29' 49.583 W
200.0	0.63	352.58	200.0	0.9	0.8	383,328.24	759,086.40	32° 3' 4.054 N	103° 29' 49.578 W
300.0	0.58	1.34	300.0	2.0	0.7	383,329.29	759,086.34	32° 3' 4.064 N	103° 29' 49.579 W
400.0	0.98	0.64	400.0	3.4	0.8	383,330.65	759,086.36	32° 3' 4.078 N	103° 29' 49.579 W
500.0	0.65	10.97	500.0	4.8	0.9	383,332.07	759,086.48	32° 3' 4.092 N	103° 29' 49.577 W
600.0	0.57	17.85	600.0	5.8	1.1	383,333.10	759,086.74	32° 3' 4.102 N	103° 29' 49.574 W
700.0	1.23	20.46	700.0	7.3	1.7	383,334.58	759,087.27	32° 3' 4.116 N	103° 29' 49.568 W
800.0	0.77	42.14	799.9	8.8	2.5	383,336.08	759,088.09	32° 3' 4.131 N	103° 29' 49.558 W
900.0	0.76	50.43	899.9	9.7	3.5	383,337.00	759,089.06	32° 3' 4.140 N	103° 29' 49.547 W
1,000.0	0.49	151.29	999.9	9.7	4.2	383,337.05	759,089.77	32° 3' 4.141 N	103° 29' 49.539 W

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.0	0.44	234.68	1,099.9	9.2	4.1	383,336.45	759,089.66	32° 3' 4.135 N	103° 29' 49.540 W
1,200.0	0.81	198.95	1,199.9	8.3	3.5	383,335.56	759,089.12	32° 3' 4.126 N	103° 29' 49.546 W
1,300.0	0.26	167.06	1,299.9	7.4	3.3	383,334.67	759,088.94	32° 3' 4.117 N	103° 29' 49.548 W
1,400.0	0.39	148.18	1,399.9	6.9	3.6	383,334.16	759,089.17	32° 3' 4.112 N	103° 29' 49.546 W
1,500.0	0.28	236.59	1,499.9	6.4	3.6	383,333.74	759,089.15	32° 3' 4.108 N	103° 29' 49.546 W
1,600.0	0.42	172.26	1,599.9	5.9	3.4	383,333.24	759,088.99	32° 3' 4.103 N	103° 29' 49.548 W
1,700.0	0.56	187.90	1,699.9	5.1	3.4	383,332.39	759,088.98	32° 3' 4.095 N	103° 29' 49.548 W
1,800.0	0.84	198.63	1,799.9	3.9	3.1	383,331.21	759,088.67	32° 3' 4.083 N	103° 29' 49.552 W
1,900.0	0.72	259.80	1,899.9	3.1	2.2	383,330.41	759,087.82	32° 3' 4.075 N	103° 29' 49.562 W
2,000.0	0.43	201.69	1,999.9	2.6	1.5	383,329.95	759,087.06	32° 3' 4.071 N	103° 29' 49.571 W
2,100.0	0.45	157.79	2,099.9	1.9	1.5	383,329.24	759,087.07	32° 3' 4.064 N	103° 29' 49.571 W
2,200.0	0.83	195.64	2,199.9	0.9	1.4	383,328.17	759,087.03	32° 3' 4.053 N	103° 29' 49.571 W
2,300.0	0.19	218.45	2,299.9	0.0	1.1	383,327.35	759,086.73	32° 3' 4.045 N	103° 29' 49.575 W
2,400.0	0.45	113.44	2,399.9	-0.2	1.4	383,327.06	759,086.99	32° 3' 4.042 N	103° 29' 49.572 W
2,500.0	0.75	141.45	2,499.9	-0.9	2.2	383,326.39	759,087.75	32° 3' 4.035 N	103° 29' 49.563 W
2,600.0	0.69	135.76	2,599.9	-1.8	3.0	383,325.45	759,088.58	32° 3' 4.026 N	103° 29' 49.553 W
2,700.0	0.97	124.70	2,699.8	-2.8	4.1	383,324.54	759,089.70	32° 3' 4.017 N	103° 29' 49.540 W
2,800.0	0.81	98.83	2,799.8	-3.4	5.5	383,323.95	759,091.09	32° 3' 4.011 N	103° 29' 49.524 W
2,900.0	1.34	102.19	2,899.8	-3.7	7.3	383,323.59	759,092.93	32° 3' 4.007 N	103° 29' 49.503 W
3,000.0	1.51	104.77	2,999.8	-4.3	9.8	383,323.01	759,095.35	32° 3' 4.001 N	103° 29' 49.475 W
3,100.0	0.17	134.78	3,099.8	-4.7	11.1	383,322.57	759,096.73	32° 3' 3.997 N	103° 29' 49.459 W
3,200.0	0.44	137.93	3,199.8	-5.1	11.5	383,322.18	759,097.09	32° 3' 3.993 N	103° 29' 49.455 W
3,300.0	0.85	86.06	3,299.8	-5.4	12.5	383,321.94	759,098.09	32° 3' 3.991 N	103° 29' 49.443 W
3,400.0	1.23	92.65	3,399.7	-5.4	14.3	383,321.94	759,099.90	32° 3' 3.990 N	103° 29' 49.422 W
3,500.0	0.52	142.96	3,499.7	-5.8	15.7	383,321.53	759,101.25	32° 3' 3.986 N	103° 29' 49.407 W
3,600.0	0.92	103.59	3,599.7	-6.3	16.7	383,320.98	759,102.30	32° 3' 3.981 N	103° 29' 49.394 W
3,700.0	0.79	97.09	3,699.7	-6.6	18.2	383,320.71	759,103.77	32° 3' 3.978 N	103° 29' 49.377 W
3,800.0	1.65	113.55	3,799.7	-7.3	20.2	383,320.05	759,105.77	32° 3' 3.971 N	103° 29' 49.354 W
3,900.0	1.27	98.32	3,899.7	-8.0	22.6	383,319.31	759,108.19	32° 3' 3.964 N	103° 29' 49.326 W
4,000.0	1.07	93.91	3,999.6	-8.2	24.6	383,319.09	759,110.21	32° 3' 3.961 N	103° 29' 49.303 W
4,100.0	1.66	87.67	4,099.6	-8.2	27.0	383,319.08	759,112.59	32° 3' 3.961 N	103° 29' 49.275 W
4,200.0	1.15	82.17	4,199.6	-8.0	29.4	383,319.28	759,115.03	32° 3' 3.963 N	103° 29' 49.247 W
4,300.0	0.30	56.50	4,299.6	-7.7	30.7	383,319.56	759,116.25	32° 3' 3.966 N	103° 29' 49.232 W
4,400.0	0.91	110.26	4,399.6	-7.9	31.6	383,319.43	759,117.21	32° 3' 3.964 N	103° 29' 49.221 W
4,500.0	0.58	87.59	4,499.6	-8.1	32.9	383,319.18	759,118.46	32° 3' 3.962 N	103° 29' 49.207 W
4,600.0	0.78	108.98	4,599.6	-8.3	34.0	383,318.98	759,119.61	32° 3' 3.960 N	103° 29' 49.193 W
4,700.0	0.54	137.71	4,699.5	-8.9	35.0	383,318.41	759,120.57	32° 3' 3.954 N	103° 29' 49.182 W
4,800.0	0.65	63.30	4,799.5	-9.0	35.8	383,318.31	759,121.40	32° 3' 3.953 N	103° 29' 49.173 W
4,900.0	1.15	81.45	4,899.5	-8.6	37.3	383,318.72	759,122.89	32° 3' 3.957 N	103° 29' 49.155 W
5,000.0	1.97	101.73	4,999.5	-8.8	40.0	383,318.52	759,125.57	32° 3' 3.954 N	103° 29' 49.124 W
5,100.0	1.39	129.73	5,099.5	-9.9	42.6	383,317.39	759,128.19	32° 3' 3.943 N	103° 29' 49.094 W
5,200.0	1.04	140.49	5,199.4	-11.4	44.1	383,315.92	759,129.70	32° 3' 3.928 N	103° 29' 49.077 W
5,300.0	0.70	125.05	5,299.4	-12.4	45.2	383,314.87	759,130.77	32° 3' 3.918 N	103° 29' 49.064 W
5,400.0	0.55	153.47	5,399.4	-13.2	45.9	383,314.09	759,131.49	32° 3' 3.910 N	103° 29' 49.056 W
5,500.0	0.77	104.03	5,499.4	-13.8	46.8	383,313.49	759,132.35	32° 3' 3.904 N	103° 29' 49.046 W
5,600.0	0.37	91.64	5,599.4	-14.0	47.7	383,313.32	759,133.33	32° 3' 3.902 N	103° 29' 49.035 W
5,700.0	0.92	129.30	5,699.4	-14.5	48.7	383,312.80	759,134.27	32° 3' 3.897 N	103° 29' 49.024 W
5,800.0	0.71	93.79	5,799.4	-15.0	49.9	383,312.25	759,135.51	32° 3' 3.892 N	103° 29' 49.009 W
5,900.0	0.54	153.82	5,899.4	-15.5	50.7	383,311.79	759,136.34	32° 3' 3.887 N	103° 29' 49.000 W
6,000.0	0.35	86.83	5,999.4	-15.9	51.3	383,311.38	759,136.85	32° 3' 3.883 N	103° 29' 48.994 W
6,100.0	0.22	156.40	6,099.4	-16.1	51.6	383,311.22	759,137.23	32° 3' 3.881 N	103° 29' 48.989 W
6,200.0	0.23	158.57	6,199.4	-16.4	51.8	383,310.86	759,137.38	32° 3' 3.878 N	103° 29' 48.988 W
6,300.0	0.51	147.83	6,299.4	-17.0	52.1	383,310.30	759,137.69	32° 3' 3.872 N	103° 29' 48.984 W
6,400.0	0.63	155.46	6,399.4	-17.9	52.6	383,309.42	759,138.16	32° 3' 3.864 N	103° 29' 48.979 W
6,500.0	0.83	134.53	6,499.4	-18.9	53.3	383,308.41	759,138.90	32° 3' 3.854 N	103° 29' 48.970 W

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.0	0.80	145.50	6,599.3	-20.0	54.2	383,307.33	759,139.81	32° 3' 3.843 N	103° 29' 48.960 W
6,700.0	0.19	204.60	6,699.3	-20.7	54.5	383,306.60	759,140.14	32° 3' 3.836 N	103° 29' 48.956 W
6,800.0	0.61	179.76	6,799.3	-21.4	54.5	383,305.92	759,140.07	32° 3' 3.829 N	103° 29' 48.957 W
6,900.0	0.23	115.60	6,899.3	-22.0	54.7	383,305.30	759,140.26	32° 3' 3.823 N	103° 29' 48.955 W
7,000.0	0.61	146.40	6,999.3	-22.5	55.1	383,304.77	759,140.73	32° 3' 3.817 N	103° 29' 48.949 W
7,100.0	0.25	107.10	7,099.3	-23.0	55.6	383,304.26	759,141.24	32° 3' 3.812 N	103° 29' 48.944 W
7,200.0	0.41	135.32	7,199.3	-23.4	56.1	383,303.95	759,141.70	32° 3' 3.809 N	103° 29' 48.938 W
7,300.0	0.44	158.28	7,299.3	-24.0	56.5	383,303.33	759,142.09	32° 3' 3.803 N	103° 29' 48.934 W
7,400.0	0.34	184.63	7,399.3	-24.6	56.6	383,302.68	759,142.21	32° 3' 3.797 N	103° 29' 48.932 W
7,500.0	1.02	197.55	7,499.3	-25.8	56.3	383,301.54	759,141.92	32° 3' 3.785 N	103° 29' 48.936 W
7,600.0	0.79	179.48	7,599.3	-27.3	56.1	383,300.00	759,141.65	32° 3' 3.770 N	103° 29' 48.939 W
7,700.0	0.97	181.97	7,699.3	-28.8	56.0	383,298.46	759,141.63	32° 3' 3.755 N	103° 29' 48.939 W
7,800.0	1.11	176.70	7,799.3	-30.6	56.1	383,296.65	759,141.66	32° 3' 3.737 N	103° 29' 48.939 W
7,900.0	1.20	174.49	7,899.3	-32.7	56.2	383,294.64	759,141.81	32° 3' 3.717 N	103° 29' 48.938 W
8,000.0	1.18	194.55	7,999.2	-34.7	56.1	383,292.60	759,141.66	32° 3' 3.697 N	103° 29' 48.940 W
8,100.0	1.56	201.49	8,099.2	-37.0	55.3	383,290.34	759,140.90	32° 3' 3.675 N	103° 29' 48.949 W
8,200.0	1.35	175.94	8,199.2	-39.4	54.9	383,287.90	759,140.48	32° 3' 3.650 N	103° 29' 48.954 W
8,300.0	1.57	193.30	8,299.1	-41.9	54.7	383,285.39	759,140.25	32° 3' 3.626 N	103° 29' 48.957 W
8,400.0	1.25	177.47	8,399.1	-44.3	54.4	383,282.97	759,139.98	32° 3' 3.602 N	103° 29' 48.960 W
8,500.0	1.37	190.10	8,499.1	-46.6	54.2	383,280.70	759,139.82	32° 3' 3.579 N	103° 29' 48.962 W
8,600.0	1.30	173.25	8,599.1	-48.9	54.1	383,278.40	759,139.75	32° 3' 3.556 N	103° 29' 48.963 W
8,700.0	2.06	173.13	8,699.0	-51.8	54.5	383,275.49	759,140.09	32° 3' 3.528 N	103° 29' 48.959 W
8,800.0	1.91	185.06	8,799.0	-55.3	54.6	383,272.04	759,140.16	32° 3' 3.493 N	103° 29' 48.959 W
8,900.0	2.21	191.69	8,898.9	-58.8	54.0	383,268.49	759,139.63	32° 3' 3.458 N	103° 29' 48.965 W
9,000.0	1.61	196.07	8,998.8	-62.0	53.2	383,265.26	759,138.85	32° 3' 3.426 N	103° 29' 48.975 W
9,100.0	1.31	200.55	9,098.8	-64.5	52.5	383,262.84	759,138.06	32° 3' 3.403 N	103° 29' 48.984 W
9,170.0	1.28	198.68	9,168.8	-66.0	51.9	383,261.35	759,137.52	32° 3' 3.388 N	103° 29' 48.991 W
Tie into Gyro @ 9170' MD / 9169' TVD									
9,207.0	1.50	204.90	9,205.8	-66.8	51.6	383,260.51	759,137.19	32° 3' 3.380 N	103° 29' 48.995 W
9,238.0	1.30	223.40	9,236.8	-67.4	51.2	383,259.89	759,136.78	32° 3' 3.374 N	103° 29' 48.999 W
9,270.0	1.10	302.80	9,268.8	-67.5	50.7	383,259.79	759,136.27	32° 3' 3.373 N	103° 29' 49.005 W
9,302.0	3.60	346.30	9,300.7	-66.4	50.2	383,260.94	759,135.77	32° 3' 3.384 N	103° 29' 49.011 W
9,333.0	6.20	0.80	9,331.6	-63.7	50.0	383,263.56	759,135.56	32° 3' 3.410 N	103° 29' 49.013 W
9,365.0	9.10	5.10	9,363.3	-59.5	50.2	383,267.81	759,135.81	32° 3' 3.452 N	103° 29' 49.010 W
9,397.0	12.00	2.30	9,394.8	-53.6	50.6	383,273.65	759,136.17	32° 3' 3.510 N	103° 29' 49.005 W
9,428.0	15.20	358.70	9,424.9	-46.4	50.6	383,280.94	759,136.21	32° 3' 3.582 N	103° 29' 49.004 W
9,460.0	18.10	357.10	9,455.6	-37.2	50.3	383,290.10	759,135.86	32° 3' 3.672 N	103° 29' 49.007 W
9,492.0	21.30	356.40	9,485.7	-26.4	49.6	383,300.86	759,135.25	32° 3' 3.779 N	103° 29' 49.013 W
9,523.0	24.60	357.50	9,514.2	-14.4	49.0	383,312.93	759,134.61	32° 3' 3.899 N	103° 29' 49.020 W
9,555.0	28.00	359.40	9,542.9	-0.2	48.6	383,327.10	759,134.24	32° 3' 4.039 N	103° 29' 49.023 W
9,587.0	31.20	0.10	9,570.7	15.6	48.6	383,342.91	759,134.18	32° 3' 4.195 N	103° 29' 49.022 W
9,618.0	33.70	359.60	9,596.9	32.2	48.5	383,359.54	759,134.13	32° 3' 4.360 N	103° 29' 49.021 W
9,650.0	35.90	359.40	9,623.2	50.5	48.4	383,377.80	759,133.97	32° 3' 4.541 N	103° 29' 49.021 W
9,682.0	38.70	359.30	9,648.6	69.9	48.2	383,397.19	759,133.75	32° 3' 4.732 N	103° 29' 49.022 W
9,713.0	41.20	0.50	9,672.4	89.8	48.1	383,417.09	759,133.72	32° 3' 4.929 N	103° 29' 49.021 W
9,745.0	43.20	2.40	9,696.1	111.3	48.7	383,438.58	759,134.27	32° 3' 5.142 N	103° 29' 49.012 W
9,772.8	43.29	2.75	9,716.3	130.3	49.5	383,457.60	759,135.13	32° 3' 5.330 N	103° 29' 49.001 W
Crossed Hard Line @ 9773' MD / 9716' TVD									
9,777.0	43.30	2.80	9,719.4	133.2	49.7	383,460.48	759,135.27	32° 3' 5.359 N	103° 29' 48.999 W
9,808.0	45.00	2.40	9,741.6	154.8	50.6	383,482.05	759,136.24	32° 3' 5.572 N	103° 29' 48.986 W
9,840.0	47.80	2.60	9,763.7	177.9	51.7	383,505.20	759,137.26	32° 3' 5.801 N	103° 29' 48.972 W
9,872.0	51.10	3.10	9,784.5	202.2	52.9	383,529.48	759,138.47	32° 3' 6.041 N	103° 29' 48.955 W
9,903.0	54.50	3.00	9,803.3	226.8	54.2	383,554.13	759,139.78	32° 3' 6.285 N	103° 29' 48.938 W
9,935.0	57.30	2.10	9,821.2	253.3	55.4	383,580.60	759,140.96	32° 3' 6.547 N	103° 29' 48.922 W
9,967.0	60.20	1.50	9,837.8	280.6	56.2	383,607.94	759,141.81	32° 3' 6.817 N	103° 29' 48.909 W

HP

Survey Report - Geographic



Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 8, T26S, R34E
Well: Gunner 8 Federal Com #9H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Gunner 8 Federal Com #9H
TVD Reference: WELL @ 3387.3usft (Scandril Freedom)
MD Reference: WELL @ 3387.3usft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,998.0	62.80	1.00	9,852.6	307.9	56.8	383,635.18	759,142.41	32° 3' 7.087 N	103° 29' 48.900 W
10,030.0	66.00	0.70	9,866.4	336.7	57.2	383,664.03	759,142.83	32° 3' 7.372 N	103° 29' 48.893 W
10,062.0	69.80	1.20	9,878.4	366.4	57.7	383,693.67	759,143.33	32° 3' 7.665 N	103° 29' 48.884 W
10,093.0	73.30	2.30	9,888.3	395.8	58.6	383,723.06	759,144.23	32° 3' 7.956 N	103° 29' 48.871 W
10,125.0	75.00	2.10	9,897.0	426.5	59.8	383,753.82	759,145.41	32° 3' 8.261 N	103° 29' 48.855 W
10,157.0	76.80	2.80	9,904.8	457.5	61.1	383,784.82	759,146.74	32° 3' 8.567 N	103° 29' 48.836 W
10,188.0	80.00	2.60	9,911.0	487.9	62.6	383,815.15	759,148.17	32° 3' 8.867 N	103° 29' 48.817 W
10,220.0	83.40	2.10	9,915.6	519.5	63.9	383,846.78	759,149.46	32° 3' 9.180 N	103° 29' 48.799 W
10,252.0	85.70	1.90	9,918.7	551.3	65.0	383,878.62	759,150.58	32° 3' 9.495 N	103° 29' 48.783 W
10,283.0	88.80	1.90	9,920.2	582.3	66.0	383,909.56	759,151.60	32° 3' 9.801 N	103° 29' 48.769 W
10,313.0	90.70	2.10	9,920.3	612.2	67.1	383,939.54	759,152.65	32° 3' 10.098 N	103° 29' 48.754 W
10,408.0	92.20	1.50	9,917.9	707.2	70.0	384,034.46	759,155.63	32° 3' 11.037 N	103° 29' 48.711 W
10,503.0	90.50	0.10	9,915.7	802.1	71.4	384,129.42	759,156.96	32° 3' 11.976 N	103° 29' 48.687 W
10,598.0	89.90	359.80	9,915.3	897.1	71.3	384,224.42	759,156.87	32° 3' 12.917 N	103° 29' 48.679 W
10,693.0	91.30	359.30	9,914.3	992.1	70.5	384,319.41	759,156.13	32° 3' 13.857 N	103° 29' 48.679 W
10,788.0	92.30	358.70	9,911.3	1,087.0	68.9	384,414.34	759,154.47	32° 3' 14.796 N	103° 29' 48.690 W
10,883.0	92.70	0.00	9,907.2	1,181.9	67.8	384,509.25	759,153.39	32° 3' 15.735 N	103° 29' 48.694 W
10,978.0	90.50	0.70	9,904.5	1,276.9	68.4	384,604.20	759,153.97	32° 3' 16.675 N	103° 29' 48.679 W
11,073.0	90.90	0.50	9,903.4	1,371.9	69.4	384,699.19	759,154.97	32° 3' 17.615 N	103° 29' 48.658 W
11,168.0	91.50	0.00	9,901.4	1,466.9	69.8	384,794.17	759,155.38	32° 3' 18.555 N	103° 29' 48.645 W
11,263.0	92.30	359.40	9,898.2	1,561.8	69.3	384,889.11	759,154.89	32° 3' 19.494 N	103° 29' 48.642 W
11,358.0	92.20	358.90	9,894.5	1,656.7	67.9	384,984.03	759,153.48	32° 3' 20.434 N	103° 29' 48.650 W
11,453.0	92.70	357.90	9,890.5	1,751.6	65.2	385,078.90	759,150.83	32° 3' 21.373 N	103° 29' 48.672 W
11,548.0	92.90	359.60	9,885.8	1,846.5	63.2	385,173.76	759,148.76	32° 3' 22.311 N	103° 29' 48.688 W
11,643.0	92.20	0.10	9,881.6	1,941.4	62.9	385,268.67	759,148.51	32° 3' 23.251 N	103° 29' 48.682 W
11,738.0	90.80	359.80	9,879.1	2,036.3	62.8	385,363.63	759,148.43	32° 3' 24.190 N	103° 29' 48.675 W
11,833.0	91.40	359.40	9,877.3	2,131.3	62.2	385,458.61	759,147.76	32° 3' 25.130 N	103° 29' 48.674 W
11,928.0	92.80	358.50	9,873.8	2,226.2	60.4	385,553.53	759,146.03	32° 3' 26.070 N	103° 29' 48.685 W
12,023.0	94.10	358.00	9,868.1	2,321.0	57.5	385,648.31	759,143.13	32° 3' 27.008 N	103° 29' 48.711 W
12,118.0	94.30	0.30	9,861.1	2,415.7	56.1	385,743.04	759,141.72	32° 3' 27.945 N	103° 29' 48.718 W
12,212.0	92.70	1.00	9,855.4	2,509.6	57.2	385,836.85	759,142.79	32° 3' 28.874 N	103° 29' 48.697 W
12,307.0	91.60	0.70	9,851.8	2,604.5	58.6	385,931.77	759,144.20	32° 3' 29.813 N	103° 29' 48.673 W
12,401.0	90.80	359.40	9,849.9	2,698.5	58.7	386,025.75	759,144.28	32° 3' 30.743 N	103° 29' 48.663 W
12,496.0	90.50	359.10	9,848.8	2,793.4	57.4	386,120.74	759,143.04	32° 3' 31.683 N	103° 29' 48.669 W
12,591.0	90.50	359.10	9,847.9	2,888.4	55.9	386,215.72	759,141.54	32° 3' 32.623 N	103° 29' 48.678 W
12,686.0	91.90	358.70	9,846.0	2,983.4	54.1	386,310.68	759,139.72	32° 3' 33.563 N	103° 29' 48.690 W
12,781.0	91.30	359.60	9,843.3	3,078.3	52.7	386,405.63	759,138.31	32° 3' 34.502 N	103° 29' 48.698 W
12,876.0	91.20	0.00	9,841.2	3,173.3	52.4	386,500.61	759,137.98	32° 3' 35.442 N	103° 29' 48.694 W
12,971.0	90.50	359.40	9,839.8	3,268.3	51.9	386,595.59	759,137.48	32° 3' 36.382 N	103° 29' 48.691 W
13,065.0	90.20	359.40	9,839.2	3,362.3	50.9	386,689.59	759,136.50	32° 3' 37.312 N	103° 29' 48.694 W
13,160.0	88.40	359.30	9,840.4	3,457.3	49.8	386,784.57	759,135.42	32° 3' 38.252 N	103° 29' 48.698 W
13,254.0	89.90	359.10	9,841.8	3,551.2	48.5	386,878.55	759,134.11	32° 3' 39.182 N	103° 29' 48.705 W
13,349.0	89.60	359.80	9,842.2	3,646.2	47.6	386,973.54	759,133.20	32° 3' 40.123 N	103° 29' 48.707 W
13,469.0	90.30	359.80	9,842.3	3,746.2	47.2	387,068.54	759,132.78	32° 3' 41.063 N	103° 29' 48.701 W
13,564.0	90.30	0.00	9,841.8	3,841.2	47.0	387,163.54	759,132.61	32° 3' 42.003 N	103° 29' 48.694 W
13,659.0	90.20	359.80	9,841.4	3,936.2	46.8	387,258.54	759,132.45	32° 3' 42.943 N	103° 29' 48.687 W
13,753.0	90.10	359.30	9,841.2	4,031.2	46.1	387,353.53	759,131.71	32° 3' 43.883 N	103° 29' 48.688 W
13,849.0	88.10	358.70	9,842.7	4,126.2	44.4	387,448.51	759,130.03	32° 3' 44.823 N	103° 29' 48.698 W
13,944.0	87.50	358.70	9,846.3	4,221.1	42.3	387,543.51	759,127.88	32° 3' 45.763 N	103° 29' 48.715 W
14,039.0	88.50	358.90	9,849.6	4,316.0	40.3	387,638.33	759,125.89	32° 3' 46.703 N	103° 29' 48.729 W
14,134.0	89.60	359.30	9,851.2	4,411.0	38.8	387,733.30	759,124.40	32° 3' 47.643 N	103° 29' 48.738 W
14,230.0	90.70	358.70	9,851.0	4,506.0	37.1	387,828.28	759,122.72	32° 3' 48.583 N	103° 29' 48.749 W
14,325.0	91.10	359.10	9,849.5	4,601.0	35.3	387,923.25	759,120.90	32° 3' 49.523 N	103° 29' 48.762 W
14,420.0	91.40	358.90	9,847.4	4,696.0	33.6	388,018.22	759,119.24	32° 3' 50.463 N	103° 29' 48.772 W
14,514.0	90.80	358.90	9,845.6	4,791.0	31.8	388,113.18	759,117.44	32° 3' 51.403 N	103° 29' 48.785 W

HP Survey Report - Geographic



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Survey Calculation Method: Minimum Curvature
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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,608.0	91.40	359.10	9,843.8	4,904.9	30.2	388,232.15	759,115.80	32° 3' 52.579 N	103° 29' 48.795 W
14,702.0	90.00	358.50	9,842.6	4,998.8	28.2	388,326.12	759,113.83	32° 3' 53.509 N	103° 29' 48.810 W
14,797.0	90.70	358.40	9,842.1	5,093.8	25.7	388,421.08	759,111.26	32° 3' 54.448 N	103° 29' 48.831 W
14,891.0	91.30	358.90	9,840.4	5,187.7	23.4	388,515.04	759,109.05	32° 3' 55.378 N	103° 29' 48.848 W
14,986.0	90.00	358.50	9,839.3	5,282.7	21.3	388,610.01	759,106.89	32° 3' 56.318 N	103° 29' 48.865 W
15,080.0	90.10	358.90	9,839.3	5,376.7	19.2	388,703.98	759,104.76	32° 3' 57.248 N	103° 29' 48.881 W
15,174.0	90.00	358.70	9,839.2	5,470.7	17.2	388,797.96	759,102.79	32° 3' 58.179 N	103° 29' 48.896 W
15,269.0	87.10	357.70	9,841.6	5,565.6	14.2	388,892.88	759,099.81	32° 3' 59.118 N	103° 29' 48.922 W
15,365.0	88.30	358.40	9,845.4	5,661.4	10.9	388,988.74	759,096.54	32° 4' 0.067 N	103° 29' 48.951 W
15,459.0	89.10	359.10	9,847.6	5,755.4	8.9	389,082.69	759,094.49	32° 4' 0.997 N	103° 29' 48.966 W
15,553.0	89.90	359.10	9,848.4	5,849.4	7.4	389,176.68	759,093.02	32° 4' 1.927 N	103° 29' 48.975 W
15,648.0	90.00	358.90	9,848.5	5,944.4	5.8	389,271.66	759,091.36	32° 4' 2.867 N	103° 29' 48.986 W
15,742.0	90.20	359.10	9,848.3	6,038.3	4.1	389,365.65	759,089.72	32° 4' 3.797 N	103° 29' 48.996 W
15,837.0	90.60	359.60	9,847.6	6,133.3	3.0	389,460.64	759,088.64	32° 4' 4.737 N	103° 29' 49.000 W
15,931.0	91.00	0.10	9,846.3	6,227.3	2.8	389,554.63	759,088.39	32° 4' 5.667 N	103° 29' 48.995 W
16,026.0	91.90	0.10	9,843.9	6,322.3	3.0	389,649.60	759,088.56	32° 4' 6.607 N	103° 29' 48.984 W
16,121.0	89.50	359.30	9,842.8	6,417.3	2.5	389,744.58	759,088.06	32° 4' 7.547 N	103° 29' 48.981 W
16,215.0	88.60	359.60	9,844.3	6,511.3	1.6	389,838.56	759,087.16	32° 4' 8.477 N	103° 29' 48.983 W
16,309.0	88.60	359.30	9,846.6	6,605.2	0.7	389,932.53	759,086.26	32° 4' 9.407 N	103° 29' 48.986 W
16,404.0	89.40	358.90	9,848.3	6,700.2	-0.8	390,027.50	759,084.77	32° 4' 10.347 N	103° 29' 48.994 W
16,499.0	91.00	359.60	9,847.9	6,795.2	-2.1	390,122.49	759,083.52	32° 4' 11.287 N	103° 29' 49.000 W
16,593.0	92.10	359.60	9,845.4	6,889.2	-2.7	390,216.45	759,082.87	32° 4' 12.217 N	103° 29' 48.999 W
16,687.0	91.40	359.30	9,842.5	6,983.1	-3.6	390,310.40	759,081.97	32° 4' 13.147 N	103° 29' 49.001 W
16,782.0	92.80	358.50	9,839.0	7,078.0	-5.5	390,405.32	759,080.14	32° 4' 14.086 N	103° 29' 49.014 W
16,876.0	94.30	358.20	9,833.2	7,171.8	-8.2	390,499.10	759,077.44	32° 4' 15.014 N	103° 29' 49.037 W
16,971.0	91.90	357.90	9,828.1	7,266.6	-11.4	390,593.90	759,074.21	32° 4' 15.953 N	103° 29' 49.066 W
17,066.0	91.80	357.90	9,825.0	7,361.5	-14.9	390,688.78	759,070.73	32° 4' 16.892 N	103° 29' 49.098 W
17,160.0	90.10	358.70	9,823.5	7,455.4	-17.7	390,782.72	759,067.95	32° 4' 17.822 N	103° 29' 49.122 W
17,255.0	89.20	359.60	9,824.0	7,550.4	-19.1	390,877.71	759,066.54	32° 4' 18.762 N	103° 29' 49.130 W
17,349.0	89.30	359.60	9,825.3	7,644.4	-19.7	390,971.70	759,065.88	32° 4' 19.692 N	103° 29' 49.129 W
17,444.0	89.40	359.80	9,826.4	7,739.4	-20.2	391,066.69	759,065.38	32° 4' 20.632 N	103° 29' 49.126 W
17,538.0	89.60	359.80	9,827.2	7,833.4	-20.5	391,160.69	759,065.06	32° 4' 21.562 N	103° 29' 49.121 W
17,633.0	90.30	359.80	9,827.3	7,928.4	-20.9	391,255.69	759,064.72	32° 4' 22.502 N	103° 29' 49.117 W
17,727.0	91.10	359.80	9,826.1	8,022.4	-21.2	391,349.68	759,064.40	32° 4' 23.432 N	103° 29' 49.112 W
17,821.0	91.20	359.80	9,824.2	8,116.4	-21.5	391,443.66	759,064.07	32° 4' 24.362 N	103° 29' 49.107 W
17,915.0	91.40	359.40	9,822.1	8,210.3	-22.2	391,537.63	759,063.41	32° 4' 25.292 N	103° 29' 49.106 W
18,010.0	90.30	359.80	9,820.7	8,305.3	-22.8	391,632.62	759,062.75	32° 4' 26.232 N	103° 29' 49.106 W
18,105.0	88.60	359.60	9,821.6	8,400.3	-23.3	391,727.61	759,062.25	32° 4' 27.172 N	103° 29' 49.103 W
18,199.0	89.30	359.80	9,823.3	8,494.3	-23.8	391,821.59	759,061.76	32° 4' 28.102 N	103° 29' 49.100 W
18,294.0	89.00	0.30	9,824.7	8,589.3	-23.8	391,916.58	759,061.84	32° 4' 29.042 N	103° 29' 49.091 W
18,388.0	89.30	0.70	9,826.1	8,683.3	-22.9	392,010.57	759,062.66	32° 4' 29.972 N	103° 29' 49.073 W
18,482.0	89.70	0.50	9,826.9	8,777.3	-21.9	392,104.56	759,063.65	32° 4' 30.902 N	103° 29' 49.053 W
18,576.0	89.90	0.10	9,827.3	8,871.3	-21.5	392,198.55	759,064.14	32° 4' 31.832 N	103° 29' 49.038 W
18,670.0	90.80	0.50	9,826.7	8,965.3	-21.0	392,292.55	759,064.63	32° 4' 32.762 N	103° 29' 49.024 W
18,765.0	89.00	1.00	9,826.9	9,060.2	-19.7	392,387.54	759,065.87	32° 4' 33.702 N	103° 29' 49.001 W
18,859.0	88.70	1.40	9,828.7	9,154.2	-17.8	392,481.50	759,067.84	32° 4' 34.632 N	103° 29' 48.970 W
18,954.0	88.60	1.90	9,831.0	9,249.1	-15.0	392,576.43	759,070.58	32° 4' 35.571 N	103° 29' 48.930 W
19,048.0	89.30	0.80	9,832.7	9,343.1	-12.8	392,670.39	759,072.79	32° 4' 36.501 N	103° 29' 48.895 W
19,143.0	89.30	0.70	9,833.9	9,438.1	-11.6	392,765.37	759,074.04	32° 4' 37.441 N	103° 29' 48.872 W
19,237.0	90.60	359.40	9,833.9	9,532.1	-11.5	392,859.37	759,074.12	32° 4' 38.371 N	103° 29' 48.863 W
19,331.0	91.30	359.80	9,832.4	9,626.1	-12.1	392,953.35	759,073.46	32° 4' 39.301 N	103° 29' 48.862 W
19,425.0	89.90	359.10	9,831.4	9,720.0	-13.0	393,047.34	759,072.56	32° 4' 40.231 N	103° 29' 48.864 W
19,519.0	90.50	0.00	9,831.1	9,814.0	-13.8	393,141.34	759,071.82	32° 4' 41.161 N	103° 29' 48.864 W
19,613.0	91.20	0.50	9,829.7	9,908.0	-13.4	393,235.32	759,072.23	32° 4' 42.091 N	103° 29' 48.851 W
19,668.0	91.20	0.50	9,828.5	9,963.0	-12.9	393,290.31	759,072.71	32° 4' 42.635 N	103° 29' 48.840 W

HP

Survey Report - Geographic



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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
19,727.0	91.20	0.50	9,827.3	10,022.0	-12.4	393,349.29	759,073.23	32° 4' 43 219 N	103° 29' 48.829 W
TD @ 19727' MD / 9827' TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,170.0	9,168.8	-66.0	51.9	Tie into Gyro @ 9170' MD / 9169' TVD
9,772.8	9,716.3	130.3	49.5	Crossed Hard Line @ 9773' MD / 9716' TVD
19,727.0	9,827.3	10,022.0	-12.4	TD @ 19727' MD / 9827' TVD

Checked By: _____ Approved By: _____ Date: _____

**Gunner 8 Federal Com #9H (30-025-42905)
Sec 8-T26S-R34E**

<u>Stages</u>	<u>7 1/2% Acid (Gals)</u>	<u>Proppant (#)</u>	<u>Clean Fluid (Gals)</u>
1	7014	299682	487662
2	3024	303728	309834
3	3024	302240	313908
4	3024	300977	309750
5	2982	299129	305550
6	3024	300258	302358
7	3066	301908	301140
8	3108	300599	297654
9	3108	299836	297948
10	3066	300694	297528
11	2982	297864	300552
12	3024	300032	295806
13	3024	299759	295638
14	2898	301095	292656
15	2982	300515	292656
16	2982	300002	288036
17	3024	300719	290766
18	2982	299688	288498
19	7560	298512	382830
20	3024	298791	284550
21	3024	300187	289254
22	3024	297928	299670
23	3024	299841	283416
24	2982	303742	285432
25	2772	301631	280854
26	2772	299868	280434
27	4032	299706	314370
28	2688	299893	279888
29	2772	299867	277998
30	2772	299842	278586
31	2772	300058	302778
32	2772	300704	276696
33	2772	299360	273840
34	3234	299986	276654
35	3024	299869	273966
36	2982	298761	283500
37	2730	300261	276360
38	2772	301473	275772
39	2772	299977	274848
40	2772	298147	275226
41	2772	300721	274974
42	3024	300728	276780
43	3024	301781	277368
44	3024	301408	274848
45	3024	300155	276234
46	3024	303038	274302
47	3024	300027	272244
Totals	148,302	14,114,987	13,821,612

Date 3/14/2018
Pressure test 6500
Well Name/Number: Garner 8 Prod Com #291
Casing 1 size 5 1/2
Capacity-544bbl/in. ft. 0.0237
Top of Casing 0
TD of casing 10,588
TVD 8630
AFC 8630
Shallowest Plug 10,394

Fluid Database

1	Treated Water
2	7.5 W. Acid
3	Slickwater
4	Water Phase G-2 (11)
5	
6	
7	
8	
9	
10	
11	
12	

Proppant Database

1	100 Mesh
2	40/70 White
3	
4	
5	
6	
7	
8	

Chemical Database

1	LowSurf-360
2	Clay Web
3	HPH Breaker
4	DOA-29003
5	ScaleSol
6	OptiSeal-WF
7	OptiSeal H.T.E.
8	Parasorb
9	Scalesorb 12
10	WQ-38

	Stage 1	Distance Between Perfs	Shots	Stage 2	Distance Between Perfs	Shots	Stage 3	Distance Between Perfs	Shots	Stage 4	Distance Between Perfs	Shots	Stage 5	Distance Between Perfs	Shots
From Bottom to Top	10,548	31	11	10,503	51	11	10,161	51	11	10,057	57	11	10,757	51	11
	10,519	51	10	10,315	51	10	10,111	51	10	10,009	51	10	10,707	48	10
	10,484	50	8	10,082	50	8	10,060	48	8	10,054	50	8	10,681	57	8
	10,414		7	10,212		7	10,014		7	10,008		7	10,604		7
	Plug to Plug	170	38	Plug to Plug	204	38	Plug to Plug	290	38	Plug to Plug	162	38	Plug to Plug	211	38
	Free Plug	10,654	Total Shots	Free Plug	10,388	Total Shots	Free Plug	10,154	Total Shots	Free Plug	10,064	Total Shots	Free Plug	10,712	Total Shots
	Stage 6	Distance Between Perfs	Shots	Stage 7	Distance Between Perfs	Shots	Stage 8	Distance Between Perfs	Shots	Stage 9	Distance Between Perfs	Shots	Stage 10	Distance Between Perfs	Shots
From Bottom to Top	10,500	49	11	10,303	41	11	10,102	41	11	10,050	50	11	10,748	49	11
	10,505	51	10	10,304	50	10	10,101	50	10	10,097	48	10	10,697	50	10
	10,454	50	8	10,248	51	8	10,081	51	8	10,047	54	8	10,647	51	8
	10,404		7	10,197		7	10,000		7	10,007		7	10,596		7
	Plug to Plug	209	38	Plug to Plug	195	38	Plug to Plug	207	38	Plug to Plug	187	38	Plug to Plug	211	38
	Free Plug	10,601	Total Shots	Free Plug	10,378	Total Shots	Free Plug	10,177	Total Shots	Free Plug	10,079	Total Shots	Free Plug	10,723	Total Shots
	Stage 11	Distance Between Perfs	Shots	Stage 12	Distance Between Perfs	Shots	Stage 13	Distance Between Perfs	Shots	Stage 14	Distance Between Perfs	Shots	Stage 15	Distance Between Perfs	Shots
From Bottom to Top	10,548	50	11	10,341	50	11	10,143	50	11	10,078	45	11	10,738	51	11
	10,438	50	10	10,293	50	10	10,091	50	10	10,090	51	10	10,688	51	10
	10,445	50	8	10,243	51	8	10,041	50	8	10,039	50	8	10,637	50	8
	10,399		7	10,190		7	10,087		7	10,083		7	10,587		7
	Plug to Plug	193	38	Plug to Plug	195	38	Plug to Plug	209	38	Plug to Plug	185	38	Plug to Plug	209	38
	Free Plug	10,592	Total Shots	Free Plug	10,389	Total Shots	Free Plug	10,174	Total Shots	Free Plug	10,081	Total Shots	Free Plug	10,728	Total Shots
	Stage 16	Distance Between Perfs	Shots	Stage 17	Distance Between Perfs	Shots	Stage 18	Distance Between Perfs	Shots	Stage 19	Distance Between Perfs	Shots	Stage 20	Distance Between Perfs	Shots
From Bottom to Top	10,537	50	11	10,334	51	11	10,132	51	11	10,058		11	10,728	51	11
	10,461	48	10	10,284	51	10	10,093	51	10	10,080	51	10	10,678	51	10
	10,433	50	8	10,233	50	8	10,031	47	8	10,029	50	8	10,627	50	8
	10,386		7	10,183		7	10,084		7	10,079		7	10,577		7
	Plug to Plug	203	38	Plug to Plug	206	38	Plug to Plug	195	38	Plug to Plug	189	38	Plug to Plug	207	38
	Free Plug	10,541	Total Shots	Free Plug	10,386	Total Shots	Free Plug	10,151	Total Shots	Free Plug	10,058	Total Shots	Free Plug	10,708	Total Shots
	Stage 21	Distance Between Perfs	Shots	Stage 22	Distance Between Perfs	Shots	Stage 23	Distance Between Perfs	Shots	Stage 24	Distance Between Perfs	Shots	Stage 25	Distance Between Perfs	Shots
From Bottom to Top	10,537	50	11	10,324	50	11	10,125	50	11	10,073	48	11	10,718	50	11
	10,476	48	10	10,274	50	10	10,072	50	10	10,067	47	10	10,668	50	10
	10,427	48	8	10,224	51	8	10,022	51	8	10,020	51	8	10,618	51	8
	10,371		7	10,175		7	10,071		7	10,066		7	10,567		7
	Plug to Plug	201	38	Plug to Plug	194	38	Plug to Plug	197	38	Plug to Plug	182	38	Plug to Plug	204	38
	Free Plug	10,531	Total Shots	Free Plug	10,380	Total Shots	Free Plug	10,168	Total Shots	Free Plug	10,048	Total Shots	Free Plug	10,704	Total Shots
	Stage 26	Distance Between Perfs	Shots	Stage 27	Distance Between Perfs	Shots	Stage 28	Distance Between Perfs	Shots	Stage 29	Distance Between Perfs	Shots	Stage 30	Distance Between Perfs	Shots
From Bottom to Top	10,517	50	11	10,304	50	11	10,113	51	11	10,011	48	11	10,706	51	11
	10,488	50	10	10,254	50	10	10,063	51	10	10,051	51	10	10,659	51	10
	10,418	52	8	10,214	50	8	10,012	55	8	10,010	50	8	10,608	50	8
	10,364		7	10,164		7	10,067		7	10,060		7	10,558		7
	Plug to Plug	227	38	Plug to Plug	190	38	Plug to Plug	197	38	Plug to Plug	194	38	Plug to Plug	209	38
	Free Plug	10,640	Total Shots	Free Plug	10,351	Total Shots	Free Plug	10,153	Total Shots	Free Plug	10,038	Total Shots	Free Plug	10,702	Total Shots
	Stage 31	Distance Between Perfs	Shots	Stage 32	Distance Between Perfs	Shots	Stage 33	Distance Between Perfs	Shots	Stage 34	Distance Between Perfs	Shots	Stage 35	Distance Between Perfs	Shots
From Bottom to Top	10,509	49	11	10,305	51	11	10,107	47	11	10,009	50	11	10,702	50	11
	10,458	50	10	10,255	51	10	10,055	51	10	10,051	50	10	10,645	47	10
	10,405	50	8	10,204	50	8	10,002	50	8	10,001	48	8	10,598	50	8
	10,359		7	10,154		7	10,052		7	10,047		7	10,548		7
	Plug to Plug	203	38	Plug to Plug	204	38	Plug to Plug	207	38	Plug to Plug	191	38	Plug to Plug	200	38
	Free Plug	10,603	Total Shots	Free Plug	10,351	Total Shots	Free Plug	10,157	Total Shots	Free Plug	10,029	Total Shots	Free Plug	10,725	Total Shots
	Stage 36	Distance Between Perfs	Shots	Stage 37	Distance Between Perfs	Shots	Stage 38	Distance Between Perfs	Shots	Stage 39	Distance Between Perfs	Shots	Stage 40	Distance Between Perfs	Shots
From Bottom to Top	10,498	50	11	10,298	50	11	10,094	47	11	10,080	50	11	10,693	47	11
	10,417	50	10	10,245	48	10	10,043	50	10	10,041	50	10	10,637	48	10
	10,397	51	8	10,187	50	8	10,093	51	8	10,091	51	8	10,608	50	8
	10,348		7	10,141		7	10,042		7	10,040		7	10,559		7
	Plug to Plug	212	38	Plug to Plug	194	38	Plug to Plug	210	38	Plug to Plug	194	38	Plug to Plug	198	38
	Free Plug	10,523	Total Shots	Free Plug	10,343	Total Shots	Free Plug	10,118	Total Shots	Free Plug	10,089	Total Shots	Free Plug	10,719	Total Shots
	Stage 41	Distance Between Perfs	Shots	Stage 42	Distance Between Perfs	Shots	Stage 43	Distance Between Perfs	Shots	Stage 44	Distance Between Perfs	Shots	Stage 45	Distance Between Perfs	Shots
From Bottom to Top	10,488	51	11	10,280	51	11	10,084	51	11	10,082	51	11	10,680	51	11
	10,438	51	10	10,230	51	10	10,037	57	10	10,037	51	10	10,630	49	10
	10,387	50	8	10,179	50	8	10,080	47	8	10,078	50	8	10,581	55	8
	10,337		7	10,129		7	10,033		7	10,031		7	10,538		7
	Plug to Plug	208	38	Plug to Plug	203	38	Plug to Plug	201	38	Plug to Plug	203	38	Plug to Plug	201	38
	Free Plug	10,517	Total Shots	Free Plug	10,311	Total Shots	Free Plug	10,109	Total Shots	Free Plug	10,080	Total Shots	Free Plug	10,708	Total Shots
	Stage 46	Distance Between Perfs	Shots	Stage 47	Distance Between Perfs	Shots	Stage 48	Distance Between Perfs	Shots	Stage 49	Distance Between Perfs	Shots	Stage 50	Distance Between Perfs	Shots
From Bottom to Top	10,478	48	11	10,270	51	11									
	10,428	51	10	10,220	50	10									
	10,377	50	8	10,170	51	8									
	10,327		7	10,120		7									
	Plug to Plug	210	38	Plug to Plug	189	38	Plug to Plug	0	0	Plug to Plug	0	0	Plug to Plug	0	0
	Free Plug	10,504	Total Shots	Free Plug	10,304	Total Shots	Free Plug			Free Plug			Free Plug		

Company: Concho
Lease/Well: Gunner 8 Federal No/009H



Rig Name: Scan Freedom
State/County: New Mexico/Lea
VS-Azi: 0.00 Degrees
Latitude: 32.05112, Longitude: -103.49711
Grid North = True North -0.44 degs (NAD 27)
Grid Correction Applied = -0.44 degs



Depth Reference : RKB = 27 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 11/23/2015 / 14:27
VES Survey International
Midland, TX
432-563-5444
Surveyor: Andrew Askew
Gunner 8 Federal No 009H / API 30-025-42905

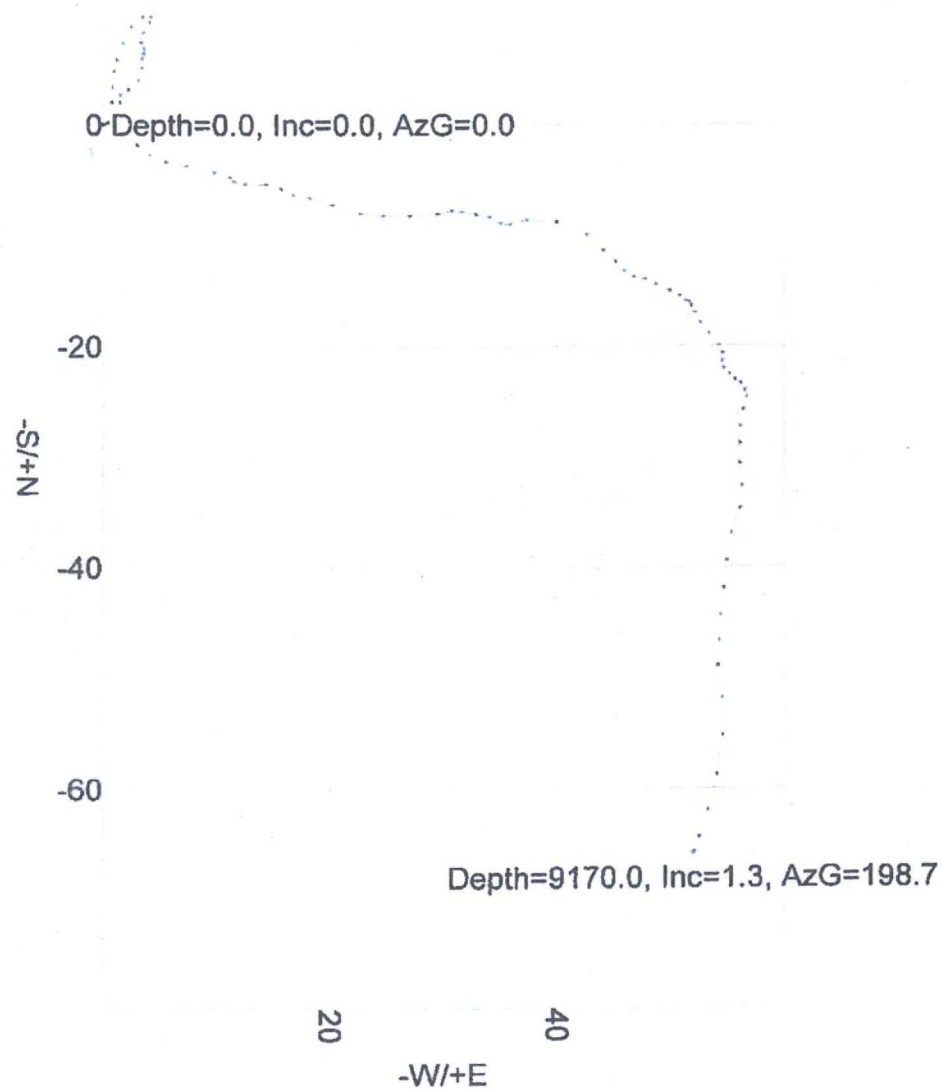
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.55	65.46	100.00	0.20	0.44	0.20	0.48	65.46	0.55
200.00	0.63	352.58	199.99	0.94	0.80	0.94	1.24	40.29	0.70
300.00	0.58	1.34	299.99	2.00	0.74	2.00	2.13	20.34	0.10
400.00	0.98	0.64	399.98	3.36	0.76	3.36	3.45	12.78	0.40
500.00	0.65	10.97	499.97	4.78	0.88	4.78	4.86	10.44	0.36
600.00	0.57	17.85	599.96	5.81	1.14	5.81	5.92	11.11	0.11
700.00	1.23	20.46	699.95	7.29	1.67	7.29	7.47	12.89	0.66
800.00	0.77	42.14	799.94	8.78	2.49	8.78	9.13	15.83	0.59
900.00	0.76	50.43	899.93	9.70	3.45	9.70	10.30	19.57	0.11
1000.00	0.49	151.29	999.92	9.75	4.17	9.75	10.60	23.14	0.98
1100.00	0.44	234.68	1099.92	9.15	4.06	9.15	10.01	23.92	0.62
1200.00	0.81	198.95	1199.91	8.26	3.52	8.26	8.98	23.06	0.52
1300.00	0.26	167.06	1299.91	7.37	3.34	7.37	8.09	24.38	0.60
1400.00	0.39	148.18	1399.91	6.85	3.57	6.85	7.73	27.51	0.16
1500.00	0.28	236.59	1499.91	6.43	3.55	6.43	7.34	28.87	0.47
1600.00	0.42	172.26	1599.91	5.94	3.39	5.94	6.84	29.75	0.39

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
1700.00	0.66	187.90	1699.90	5.10	3.38	5.10	6.11	33.62	0.19
1800.00	0.84	198.63	1799.89	3.92	3.07	3.92	4.98	38.11	0.31
1900.00	0.72	259.80	1899.89	3.11	2.22	3.11	3.82	35.60	0.80
2000.00	0.43	201.69	1999.88	2.65	1.46	2.65	3.03	28.86	0.61
2100.00	0.46	157.79	2099.88	1.95	1.47	1.95	2.44	37.11	0.33
2200.00	0.83	195.64	2199.87	0.89	1.43	0.89	1.68	58.01	0.55
2300.00	0.19	218.45	2299.87	0.06	1.13	0.06	1.13	86.73	0.65
2400.00	0.45	113.44	2399.87	-0.22	1.38	-0.22	1.40	99.16	0.53
2500.00	0.75	141.45	2499.86	-0.89	2.15	-0.89	2.33	112.49	0.41
2600.00	0.69	135.76	2599.86	-1.84	2.98	-1.84	3.50	121.63	0.09
2700.00	0.97	124.70	2699.84	-2.75	4.10	-2.75	4.94	123.87	0.31
2800.00	0.81	98.83	2799.83	-3.34	5.49	-3.34	6.42	121.32	0.43
2900.00	1.34	102.19	2899.82	-3.69	7.33	-3.69	8.21	116.75	0.54
3000.00	1.51	104.77	2999.78	-4.28	9.75	-4.28	10.65	113.69	0.18
3100.00	0.17	134.78	3099.77	-4.72	11.13	-4.72	12.09	112.98	1.36
3200.00	0.44	137.93	3199.77	-5.11	11.50	-5.11	12.59	113.98	0.27
3300.00	0.85	86.06	3299.76	-5.35	12.50	-5.35	13.60	113.17	0.67
3400.00	1.23	92.65	3399.75	-5.35	14.32	-5.35	15.28	110.49	0.40
3500.00	0.52	142.96	3499.74	-5.76	15.67	-5.76	16.69	110.19	0.99
3600.00	0.92	103.59	3599.73	-6.32	16.72	-6.32	17.87	110.69	0.61
3700.00	0.79	97.09	3699.72	-6.59	18.19	-6.59	19.35	109.91	0.16
3800.00	1.65	113.55	3799.69	-7.25	20.20	-7.25	21.46	109.75	0.92
3900.00	1.27	98.32	3899.66	-7.99	22.61	-7.99	23.98	109.46	0.54
4000.00	1.07	93.91	3999.64	-8.21	24.64	-8.21	25.97	108.43	0.22
4100.00	1.66	87.67	4099.61	-8.22	27.01	-8.22	28.23	106.92	0.61
4200.00	1.15	82.17	4199.58	-8.02	29.46	-8.02	30.53	105.23	0.52
4300.00	0.30	56.50	4299.57	-7.74	30.67	-7.74	31.63	104.16	0.89
4400.00	0.91	110.26	4399.57	-7.86	31.64	-7.86	32.60	103.96	0.77
4500.00	0.58	87.59	4499.56	-8.12	32.88	-8.12	33.87	103.87	0.43
4600.00	0.78	108.98	4599.55	-8.32	34.03	-8.32	35.03	103.73	0.32
4700.00	0.54	137.71	4699.55	-8.89	34.99	-8.89	36.10	104.25	0.40
4800.00	0.65	63.30	4799.54	-8.99	35.81	-8.99	36.92	104.09	0.73
4900.00	1.15	81.45	4899.53	-8.58	37.31	-8.58	38.29	102.96	0.57
5000.00	1.97	101.73	4999.49	-8.78	39.99	-8.78	40.94	102.39	0.98
5100.00	1.39	129.73	5099.45	-9.91	42.61	-9.91	43.75	103.09	0.99
5200.00	1.04	140.49	5199.43	-11.39	44.12	-11.39	45.57	104.47	0.42
5300.00	0.70	125.05	5299.42	-12.44	45.20	-12.44	46.88	105.39	0.41
5400.00	0.55	153.47	5399.41	-13.22	45.92	-13.22	47.78	106.06	0.34
5500.00	0.77	104.03	5499.40	-13.81	46.78	-13.81	48.78	106.45	0.59

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
5600.00	0.37	91.64	5599.40	-13.98	47.76	-13.98	49.76	106.32	0.42
5700.00	0.92	129.30	5699.39	-14.50	48.70	-14.50	50.81	106.58	0.66
5800.00	0.71	93.79	5799.38	-15.04	49.94	-15.04	52.16	106.77	0.53
5900.00	0.54	153.82	5899.38	-15.51	50.77	-15.51	53.08	106.99	0.64
6000.00	0.35	86.83	5999.38	-15.91	51.28	-15.91	53.69	107.24	0.52
6100.00	0.22	156.40	6099.37	-16.07	51.66	-16.07	54.10	107.28	0.34
6200.00	0.23	158.57	6199.37	-16.43	51.81	-16.43	54.35	107.59	0.01
6300.00	0.51	147.83	6299.37	-16.99	52.12	-16.99	54.82	108.06	0.29
6400.00	0.63	155.46	6399.37	-17.87	52.59	-17.87	55.54	108.77	0.14
6500.00	0.83	134.53	6499.36	-18.88	53.33	-18.88	56.58	109.49	0.33
6600.00	0.80	145.50	6599.35	-19.97	54.25	-19.97	57.81	110.21	0.16
6700.00	0.19	204.60	6699.34	-20.70	54.58	-20.70	58.37	110.77	0.72
6800.00	0.61	179.76	6799.34	-21.38	54.51	-21.38	58.55	111.42	0.45
6900.00	0.23	115.60	6899.34	-22.00	54.69	-22.00	58.95	111.91	0.55
7000.00	0.61	146.40	6999.34	-22.53	55.17	-22.53	59.59	112.21	0.43
7100.00	0.25	107.10	7099.33	-23.03	55.67	-23.03	60.24	112.48	0.44
7200.00	0.41	135.32	7199.33	-23.35	56.13	-23.35	60.79	112.59	0.23
7300.00	0.44	158.28	7299.33	-23.96	56.52	-23.96	61.39	112.97	0.17
7400.00	0.34	184.63	7399.33	-24.61	56.64	-24.61	61.75	113.49	0.20
7500.00	1.02	197.55	7499.32	-25.75	56.35	-25.75	61.95	114.56	0.69
7600.00	0.79	179.48	7599.31	-27.29	56.09	-27.29	62.37	115.95	0.36
7700.00	0.97	181.97	7699.30	-28.83	56.06	-28.83	63.04	117.21	0.19
7800.00	1.11	176.70	7799.28	-30.65	56.09	-30.65	63.92	118.65	0.17
7900.00	1.20	174.49	7899.26	-32.66	56.25	-32.66	65.04	120.14	0.10
8000.00	1.18	194.55	7999.24	-34.70	56.09	-34.70	65.95	121.75	0.42
8100.00	1.56	201.49	8099.21	-36.97	55.33	-36.97	66.54	123.75	0.41
8200.00	1.35	175.94	8199.18	-39.41	54.91	-39.41	67.59	125.67	0.68
8300.00	1.57	193.30	8299.15	-41.93	54.68	-41.93	68.90	127.48	0.49
8400.00	1.25	177.47	8399.12	-44.35	54.41	-44.35	70.20	129.18	0.50
8500.00	1.37	190.10	8499.09	-46.61	54.25	-46.61	71.53	130.67	0.31
8600.00	1.30	173.25	8599.06	-48.92	54.18	-48.92	72.99	132.08	0.40
8700.00	2.06	173.13	8699.02	-51.82	54.53	-51.82	75.23	133.55	0.76
8800.00	1.91	185.06	8798.96	-55.27	54.59	-55.27	77.68	135.35	0.44
8900.00	2.21	191.69	8898.89	-58.81	54.06	-58.81	79.88	137.41	0.38
9000.00	1.61	196.07	8998.84	-62.04	53.28	-62.04	81.78	139.35	0.62
9100.00	1.31	200.55	9098.81	-64.46	52.49	-64.46	83.13	140.84	0.32
9170.00	1.28	198.68	9168.79	-65.95	51.96	-65.95	83.96	141.77	0.07



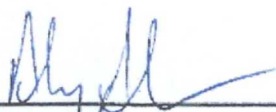
VES Survey International
Midland, TX
432-563-5444
Surveyor: Andrew Askew
Gunner 8 Federal No 009H / API 30-025-42905



V.E.S. Survey Date: 11/17/2015



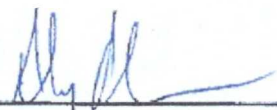
I Andy Askew certify that I am employed by VES Survey International. That I did on the day(s) of 11/18/15 through 11/18/15 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 9,170.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Gunner 8 Federal Com Well # 9H API # 30-025-42905 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Vaughn Energy Services



Andy Askew
Service Technician
Vaughn Energy Services



I Andy Askew certify that I am employed by VES Survey International. That I did on the day(s) of 11/18/15 through 11/18/15 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 9,170.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Gunner 8 Federal Com Well # 9H API # 30-025-42905 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Vaughn Energy Services



Andy Askew
Service Technician
Vaughn Energy Services

November 23, 2015

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo

RE: Gunner 8 Federal No 009H

Please find enclosed a copy of the survey from 0' to 9170' ran on the above referenced well.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 23 day of November
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas

