



Company: COG OPERATING, LLC (CONCHO)

Lease/Well: CARMEN FEDERAL/No. 005

Location: 2.5 MILES NE FROM LOCO HILLS

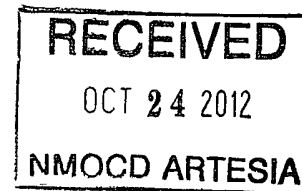
Rig Name: UI 40

State/County: NEW MEXICO/EDDY

Latitude: 32.87

GRID North is 0.20 Degrees East of True North

VS-Azi: 89.82 Degrees



30-015-39287

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: CARMEN FEDERAL-5.ut

Minimum Curvature Method

Report Date/Time: 6/14/2012 / 09:57

VAUGHN ENERGY SERVICES

CORPUS CHRISTI, TX

800-606-4976

SURVEYOR: CHRIS ALBERT

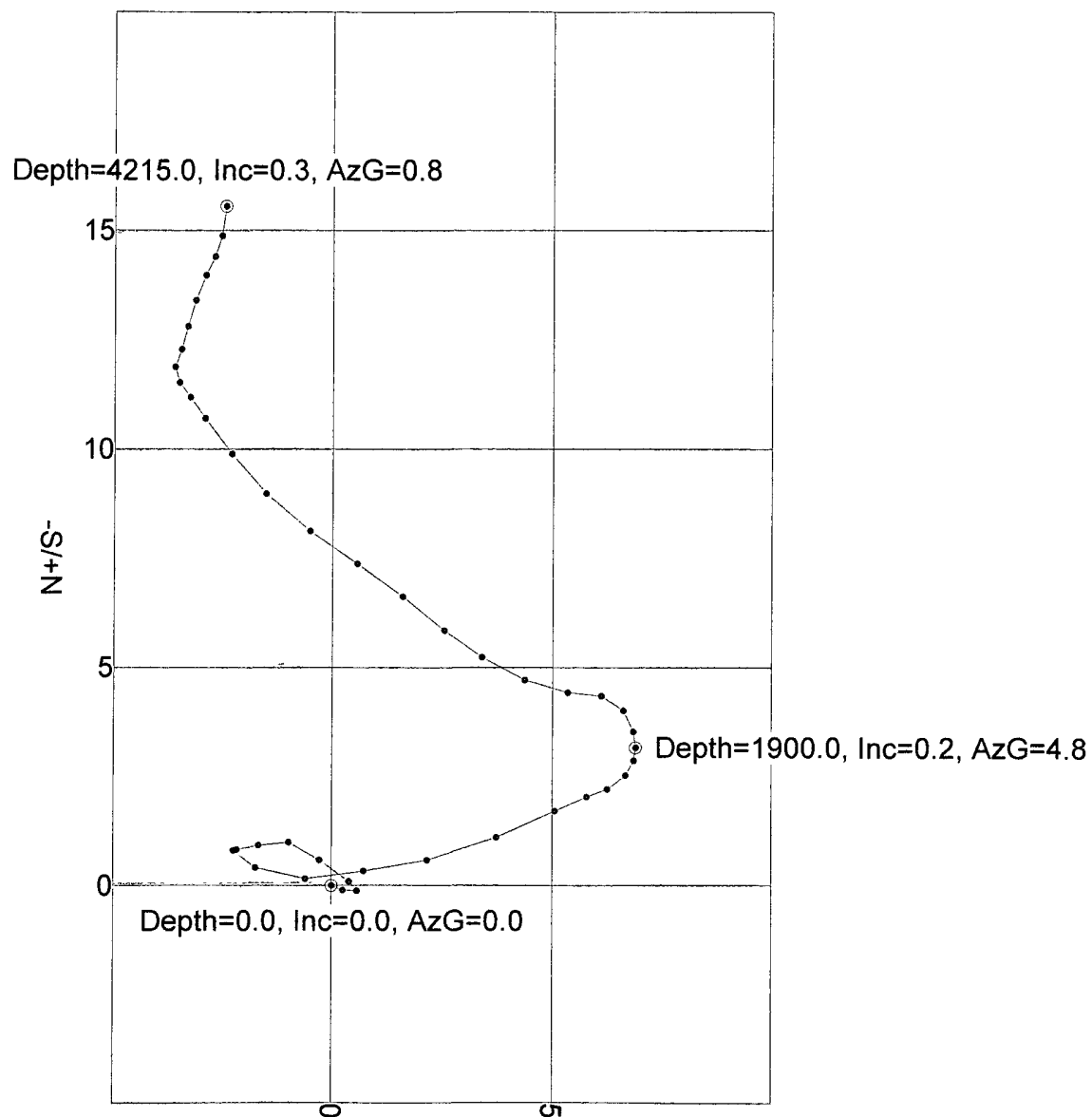
CARMEN FEDERAL NO. 005 / API 30-015-39287

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	0.31	112.13	100.00	-0.10	0.25	0.25	0.27	112.13	0.31
200.00	0.12	37.04	200.00	-0.12	0.57	0.57	0.59	101.93	0.31
300.00	0.32	298.25	300.00	0.09	0.39	0.40	0.41	76.48	0.36
400.00	0.65	309.66	399.99	0.59	-0.29	-0.28	0.65	334.12	0.35
500.00	0.31	278.86	499.99	0.99	-0.99	-0.99	1.40	315.08	0.42
600.00	0.50	255.11	599.99	0.92	-1.68	-1.67	1.91	298.78	0.25
700.00	0.10	285.98	699.99	0.83	-2.18	-2.18	2.33	290.90	0.42
800.00	0.06	168.82	799.99	0.80	-2.25	-2.25	2.39	289.59	0.14
900.00	0.69	124.12	899.98	0.41	-1.75	-1.75	1.80	283.26	0.64
1000.00	0.75	82.91	999.98	0.16	-0.60	-0.60	0.62	284.58	0.51
1100.00	0.78	82.29	1099.97	0.33	0.72	0.72	0.80	65.54	0.04
1200.00	0.89	78.05	1199.96	0.58	2.16	2.16	2.24	74.93	0.12
1300.00	1.02	65.75	1299.94	1.11	3.73	3.73	3.89	73.47	0.24
1400.00	0.65	64.65	1399.93	1.72	5.05	5.06	5.34	71.25	0.37
1500.00	0.26	71.00	1499.93	2.03	5.78	5.79	6.13	70.63	0.40
1600.00	0.32	67.53	1599.93	2.21	6.25	6.26	6.63	70.51	0.06
1700.00	0.30	38.42	1699.93	2.52	6.67	6.68	7.14	69.28	0.16
1800.00	0.17	11.11	1799.93	2.87	6.86	6.87	7.44	67.30	0.17
1900.00	0.18	4.76	1899.93	3.17	6.90	6.91	7.60	65.37	0.02

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
2000.00	0.26	343.02	1999.93	3.53	6.85	6.86	7.71	62.73	0.11
2100.00	0.36	328.93	2099.92	4.02	6.62	6.64	7.75	58.75	0.13
2200.00	0.40	279.69	2199.92	4.35	6.12	6.13	7.51	54.59	0.32
2300.00	0.50	273.36	2299.92	4.43	5.35	5.36	6.94	50.33	0.11
2400.00	0.69	295.26	2399.91	4.72	4.37	4.38	6.43	42.80	0.30
2500.00	0.57	302.14	2499.91	5.24	3.40	3.41	6.24	32.94	0.14
2600.00	0.64	307.72	2599.90	5.85	2.53	2.55	6.37	23.42	0.08
2700.00	0.77	310.79	2699.89	6.62	1.59	1.61	6.81	13.46	0.14
2800.00	0.69	301.35	2799.89	7.38	0.56	0.58	7.40	4.34	0.14
2900.00	0.81	307.71	2899.88	8.13	-0.52	-0.49	8.14	356.36	0.14
3000.00	0.71	313.48	2999.87	8.98	-1.53	-1.50	9.11	350.37	0.13
3100.00	0.67	324.21	3099.86	9.89	-2.32	-2.29	10.15	346.81	0.13
3200.00	0.50	321.84	3199.86	10.70	-2.93	-2.90	11.10	344.70	0.18
3300.00	0.18	332.72	3299.85	11.19	-3.27	-3.24	11.65	343.70	0.32
3400.00	0.30	319.23	3399.85	11.53	-3.51	-3.48	12.05	343.05	0.13
3500.00	0.20	21.48	3499.85	11.89	-3.62	-3.58	12.42	343.06	0.27
3600.00	0.29	19.79	3599.85	12.29	-3.47	-3.43	12.77	344.23	0.09
3700.00	0.33	11.46	3699.85	12.81	-3.33	-3.29	13.24	345.44	0.06
3800.00	0.38	20.63	3799.85	13.41	-3.15	-3.11	13.77	346.77	0.08
3900.00	0.33	24.32	3899.85	13.98	-2.92	-2.87	14.28	348.22	0.06
4000.00	0.21	26.81	3999.85	14.41	-2.71	-2.67	14.66	349.33	0.12
4100.00	0.37	14.06	4099.84	14.88	-2.55	-2.51	15.10	350.26	0.17
4215.00	0.31	0.82	4214.84	15.55	-2.46	-2.41	15.74	351.01	0.08



VAUGHN ENERGY SERVICES
CORPUS CHRISTI, TX
800-606-4976
SURVEYOR: CHRIS ALBERT
CARMEN FEDERAL NO. 005 / API 30-015-39287



-W/+E
VES SURVEY DATE. 06/05/2012

CRESCENT

DIRECTIONAL DRILLING

Minimum Curvature Calculation

Client: Concho Oil & Gas

M.W.D. OPERATORS: Dennis Scully

Well: Carmen 3 Fed Com #5H ST1

DIRECTIONAL DRILLERS: Donnie Hale/ Chris Pool

County: Eddy

Tool Azimuth to Grid North: 7.50

Rig: UDI 40

Job #: PB-12329

Verticle Section Angle: 89.20 (deg)

Survey Number	Measured Depth-ft	Drift (Deg.)	Azimuth (Deg.)	Course Length	TVD (Ft.)	Vertical Section	N/S (Ft.)	E/W (Ft.)	DLS
0	4,215	0.3	0.8	4214.8	4,214.84	-2.41	15.55	-2.46	0.00
1	4,261	0.4	60.6	46.0	4,260.84	-2.10	15.75	-2.32	0.79
2	4,293	1.7	91.9	32.0	4,292.83	-1.53	15.79	-1.75	4.29
3	4,325	5.1	94.6	32.0	4,324.77	0.36	15.66	0.15	10.63
4	4,356	8.5	91.9	31.0	4,355.55	4.03	15.48	3.81	11.01
5	4,386	11.1	91.5	30.0	4,385.11	9.13	15.33	8.91	8.67
6	4,420	14.6	87.8	34.0	4,418.25	16.68	15.41	16.47	10.57
7	4,452	18.2	84.4	32.0	4,448.95	25.70	16.05	25.48	11.64
8	4,483	21.6	81.9	31.0	4,478.09	36.19	17.33	35.95	11.30
9	4,515	25.8	81.6	32.0	4,507.39	48.94	19.17	48.67	13.13
10	4,547	28.2	82.6	32.0	4,535.90	63.35	21.16	63.06	7.63
11	4,578	30.9	85.0	31.0	4,562.86	78.57	22.80	78.26	9.51
12	4,610	34.7	86.3	32.0	4,589.76	95.87	24.11	95.54	12.08
13	4,642	39.0	85.7	32.0	4,615.36	115.02	25.45	114.68	13.48
14	4,674	43.1	84.9	32.0	4,639.49	135.98	27.18	135.62	12.92
15	4,705	46.8	83.9	31.0	4,661.42	157.80	29.32	157.41	12.15
16	4,737	50.1	82.8	32.0	4,682.64	181.62	32.10	181.19	10.63
17	4,769	54.0	82.1	32.0	4,702.32	206.68	35.42	206.20	12.31
18	4,801	58.2	82.8	32.0	4,720.16	233.05	38.90	232.53	13.25
19	4,832	62.2	83.7	31.0	4,735.57	259.80	42.06	259.24	13.15
20	4,864	66.0	84.5	32.0	4,749.54	288.46	45.01	287.86	12.09
21	4,896	69.2	85.9	32.0	4,761.73	317.97	47.49	317.34	10.79
22	4,928	72.4	87.8	32.0	4,772.26	348.16	49.14	347.51	11.46
23	4,959	75.5	89.4	31.0	4,780.83	377.95	49.87	377.29	11.16
24	4,991	79.8	90.2	32.0	4,787.67	409.20	49.97	408.54	13.66
25	5,023	83.4	90.4	32.0	4,792.34	440.84	49.81	440.19	11.27
26	5,053	87.1	87.5	30.0	4,794.83	470.73	50.36	470.07	15.65
27	5,084	90.1	87.3	31.0	4,795.59	501.70	51.76	501.03	9.70
28	5,116	90.5	87.7	32.0	4,795.42	533.69	53.16	533.00	1.77
29	5,211	89.5	88.8	95.0	4,795.42	628.67	56.06	627.95	1.56
30	5,307	89.5	88.8	96.0	4,796.26	724.66	58.07	723.92	0.00
31	5,402	91.3	92.3	95.0	4,795.59	819.61	57.16	818.90	4.14
32	5,497	91.5	89.3	95.0	4,793.27	914.54	55.83	913.85	3.16
33	5,592	91.2	89.3	95.0	4,791.03	1,009.51	56.99	1,008.81	0.32
34	5,687	91.0	89.4	95.0	4,789.21	1,104.49	58.07	1,103.79	0.24
35	5,782	90.6	89.2	95.0	4,787.88	1,199.48	59.23	1,198.77	0.47
36	5,878	91.3	90.5	96.0	4,786.29	1,295.46	59.48	1,294.76	1.54
37	5,973	90.5	90.3	95.0	4,784.80	1,390.43	58.82	1,389.74	0.87
38	6,068	90.2	90.2	95.0	4,784.22	1,485.41	58.40	1,484.74	0.33
39	6,163	91.0	90.3	95.0	4,783.22	1,580.39	57.99	1,579.73	0.85
40	6,258	91.1	90.5	95.0	4,781.48	1,675.35	57.33	1,674.71	0.24
41	6,355	90.7	89.7	97.0	4,779.96	1,772.32	57.16	1,771.70	0.92
42	6,387	91.0	88.4	32.0	4,779.48	1,804.32	57.69	1,803.69	4.17

43	6,418	90.9	88.1	31 0	4,778 97	1,835 31	58 63	1,834 67	1 02
44	6,450	90.1	86 6	32 0	4,778 69	1,867 29	60 11	1,866 63	5 31
45	6,482	90 1	86.3	32 0	4,778 64	1,899 25	62 10	1,898 57	0 94
46	6,513	90.0	86 9	31 0	4,778 61	1,930 22	63 93	1,929 51	1 96
47	6,545	90.4	86.5	32 0	4,778 50	1,962 19	65 78	1,961 46	1 77
48	6,577	90.5	86 6	32 0	4,778 25	1,994 15	67 70	1,993 40	0 44
49	6,609	89.7	87 2	32 0	4,778 19	2,026 13	69 43	2,025 35	3 12
50	6,640	89 5	87 7	31 0	4,778 41	2,057 11	70 81	2,056 32	1 74
51	6,672	89 5	87.4	32 0	4,778 69	2,089 09	72 18	2,088 29	0 94
52	6,704	90.1	87.6	32 0	4,778 80	2,121 08	73 57	2,120 26	1 98
53	6,735	90 3	87.8	31 0	4,778 69	2,152 07	74 82	2,151 23	0 91
54	6,767	90 5	88.8	32 0	4,778 47	2,184 06	75 77	2,183 22	3 19
55	6,799	90.8	89 0	32 0	4,778 10	2,216 06	76 38	2,215 21	1 13
56	6,831	91.2	90 3	32 0	4,777 54	2,248 06	76 58	2,247 21	4 25
57	6,863	92 0	90.9	32 0	4,776 65	2,280 03	76 24	2,279 19	3 12
58	6,894	92.0	91 3	31 0	4,775 57	2,311 00	75 65	2,310 17	1 29
59	6,926	92 1	91.1	32 0	4,774 42	2,342 96	74 98	2,342 14	0 70
60	7,021	92.0	90 3	95 0	4,771 03	2,437 86	73 82	2,437 07	0 85
61	7,116	91.8	89.9	95 0	4,767 88	2,532 80	73 65	2,532 01	0 47
62	7,211	91.8	90 5	95 0	4,764 89	2,627 73	73 32	2,626 97	0 63
63	7,307	91.6	90.2	96 0	4,762 04	2,723 67	72 74	2,722 92	0 38
64	7,402	90.7	90.9	95 0	4,760 14	2,818 62	71 82	2,817 89	1 20
65	7,497	90.2	90.4	95 0	4,759 39	2,913 59	70 75	2,912 88	0 74
66	7,592	91.0	91.1	95 0	4,758 40	3,008 55	69 50	3,007 87	1 12
67	7,687	92 1	91.2	95 0	4,755 83	3,103 45	67 60	3,102 81	1 16
68	7,783	92 1	90 8	96 0	4,752 31	3,199 34	65 92	3,198 73	0 42
69	7,878	92.3	90.7	95 0	4,748 66	3,294 24	64 68	3,293 65	0 24
70	7,973	91.5	90.1	95 0	4,745 51	3,389 16	64 02	3,388 60	1 05
71	8,068	91 1	90.0	95 0	4,743 36	3,484 12	63 93	3,483 57	0 43
72	8,163	90.9	89.3	95 0	4,741 70	3,579 11	64 51	3,578 55	0 77
73	8,258	90 8	90.1	95 0	4,740 29	3,674 09	65 01	3,673 54	0 85
74	8,353	90 6	90 1	95 0	4,739 13	3,769 07	64 85	3,768 53	0 21
75	8,447	90.6	89.9	94 0	4,738 15	3,863 06	64 85	3,862 53	0 21
76	8,542	90.9	90 3	95 0	4,736 90	3,958 04	64 68	3,957 52	0 53
77	8,638	91.1	89.9	96 0	4,735 23	4,054 01	64 51	4,053 50	0 47
78	8,733	90.9	89 1	95 0	4,733 57	4,148 99	65 34	4,148 48	0 87
79	8,828	90.3	89.4	95 0	4,732 57	4,243 98	66 59	4,243 47	0 71
80	8,923	90.4	89.3	95 0	4,731 99	4,338 98	67 66	4,338 46	0 15
81	9,020	90.7	90.5	97 0	4,731 06	4,435 97	67 83	4,435 45	1 28
82	9,113	90.6	90.2	93 0	4,730 01	4,528 94	67 26	4,528 44	0 34
PTB	9,168	90.6	90 2	55 0	4,729 43	4,583 93	67 07	4,583 44	0 00
PTD	9,195	90.6	90.5	27 0	4,729 15	4,610 92	66 91	4,610 44	1 11