

# EnCana Oil & Gas (USA) Inc.

Weld County, CO

Sec. 2-T2N-R66W

lone 2G-2H

Plan C

Design: Sperry MWD Final Survey

## Sperry Drilling Services Standard Report

07 January, 2013

Well Coordinates: 1,306,796.35 N, 3,209,953.78 E (40° 10' 23.20" N, 104° 44' 55.18" W)

Ground Level: 5,046.00 ft

Local Coordinate Origin:

Centered on Well lone 2G-2H

Viewing Datum:

RKB 13' @ 5059.00ft (Ensign 124)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Version: 2003.16 Build: 43I

**HALLIBURTON**

Blank

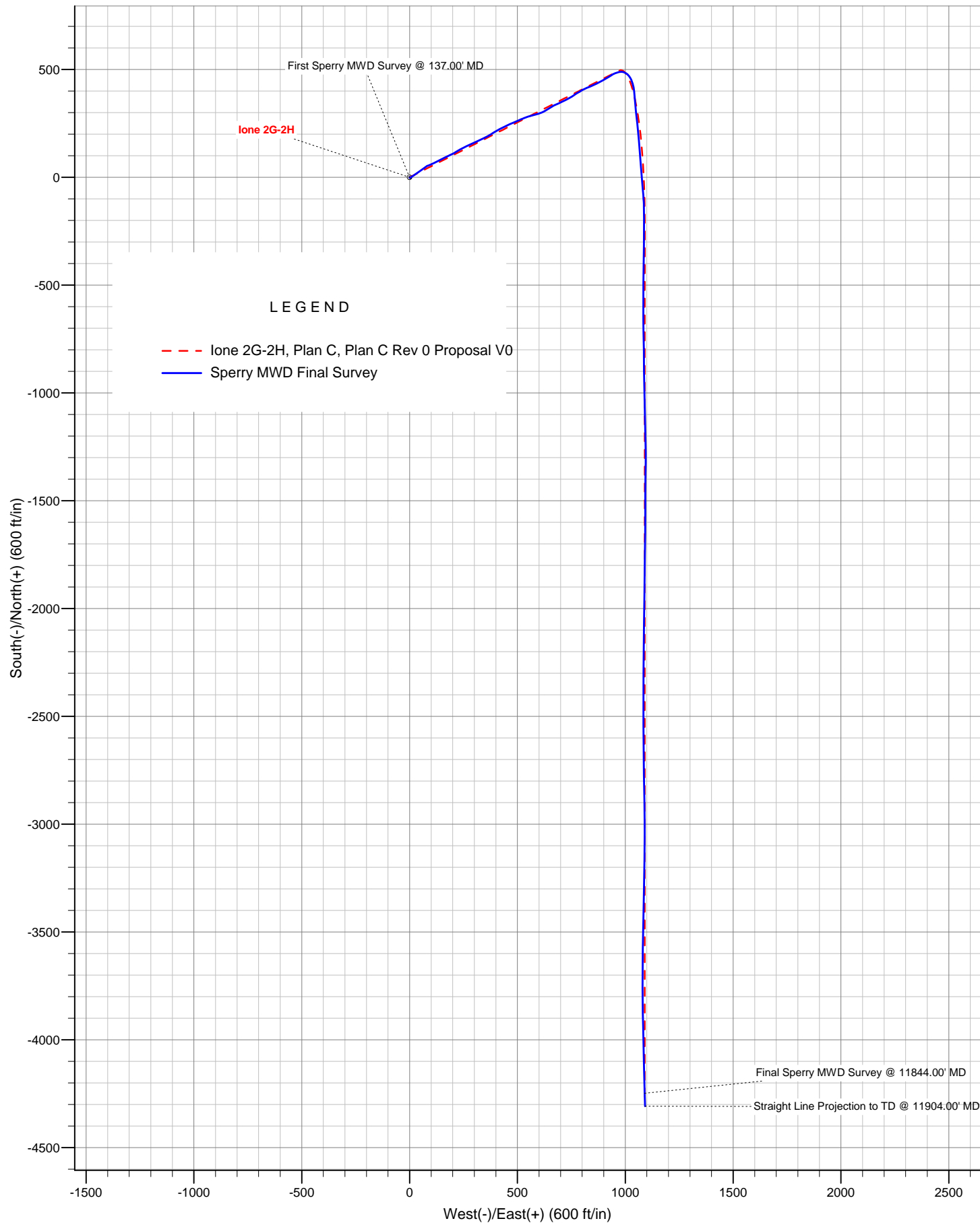
## SPERRY-SUN DRILLING SERVICES

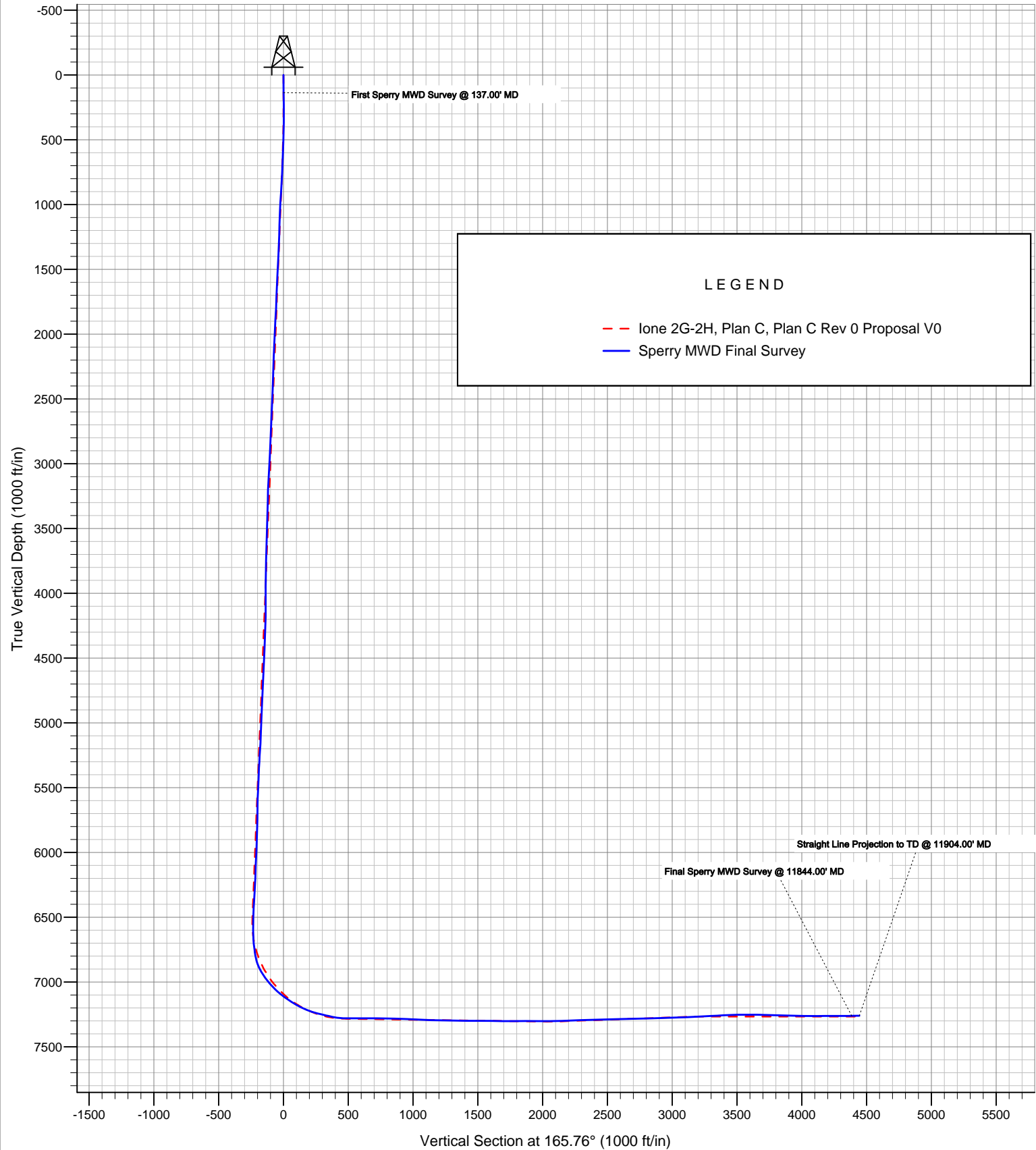
### CERTIFIED SURVEY WORK SHEET

<b>OPERATOR:</b>	Encana
<b>WELL:</b>	Ione 2G-2H
<b>FIELD:</b>	DJ Basin
<b>RIG:</b>	Ensign 124
<b>LEGALS:</b>	Sec. 2-T2N-R66W
<b>COUNTY:</b>	Weld
<b>STATE:</b>	Colorado
<b>CAL. METHOD:</b>	Minimum Curvature
<b>MAG. DECL. APPLIED:</b>	8.68
<b>VERTICAL SEC. DIR. :</b>	165.760

<b>SSDS Job Number :</b>	CA-MJ-0009758890
<b>Start Date of Job :</b>	12/14/2012
<b>End Date of Job :</b>	12/30/2012
<b>Lead Directional Driller:</b>	Shane Gilley
	Marc Keim
<b>Other SSDS DD's :</b>	
<b>SSDS MWD Engineers :</b>	Bogdan Cristian
	Robbie Barnes

	Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>	
ESS Survey	0.00	Tie On		Tie On		Tie On		Tie On		Tie On
First Survey Depth	137.00	Gyro								
Last Survey Depth	11844.00									
KOP Depth/Sidetrack MD	6519.00	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
First Survey Depth	0.00	MWD		MWD		MWD		MWD		MWD
Last Survey Depth	11844.00	MWD		MWD		MWD		MWD		MWD
Bit Extrapolation to TD	11904.00	T.D.		T.D.		T.D.		T.D.		T.D.
The following Sperry Sun Drilling Services personnel listed below, do certify the above survey information to be accurate :										
Print Name : <u>BOGDAN CRISTIAN</u>		Print Name : <u>Marc Keim</u>		Print Name :						
Sign Name : <u>BOGDAN CRISTIAN</u>		Sign Name : <u>Marc Keim</u>		Sign Name :						
Print Name : <u>Robbie Barnes</u>		Print Name :		Print Name :						
Sign Name : <u>Robbie Barnes</u>		Sign Name :		Sign Name :						





**Design Report for Ione 2G-2H - Sperry MWD Final Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00
137.00	0.83	170.080	137.00	-0.98	0.17	0.99	0.61
<b>First Sperry MWD Survey @ 137.00' MD</b>							
230.00	0.68	135.660	229.99	-2.04	0.67	2.14	0.50
323.00	2.07	66.760	322.96	-1.77	2.60	2.35	2.08
416.00	3.62	58.510	415.85	0.43	6.65	1.22	1.72
509.00	4.87	53.570	508.59	4.31	12.33	-1.14	1.40
602.00	5.87	56.770	601.18	9.26	19.48	-4.18	1.12
695.00	8.06	56.570	693.49	15.46	28.90	-7.87	2.35
788.00	9.05	55.460	785.45	23.20	40.37	-12.55	1.08
881.00	9.24	53.660	877.27	31.77	52.41	-17.90	0.37
975.00	8.32	53.280	970.17	40.31	63.94	-23.34	0.98
992.00	8.28	53.510	986.99	41.77	65.91	-24.27	0.31
1,069.00	7.84	51.970	1,063.23	48.30	74.50	-28.49	0.64
1,162.00	8.55	72.510	1,155.30	54.29	86.10	-31.44	3.22
1,254.00	10.98	64.670	1,245.96	60.09	100.54	-33.51	3.01
1,346.00	10.13	62.020	1,336.41	67.64	115.61	-37.12	1.06
1,438.00	12.28	64.430	1,426.65	75.66	131.58	-40.96	2.39
1,533.00	12.68	64.660	1,519.40	84.48	150.12	-44.96	0.42
1,628.00	13.03	60.300	1,612.02	94.25	168.84	-49.82	1.09
1,723.00	11.68	68.850	1,704.83	103.03	187.11	-53.83	2.39
1,818.00	11.28	60.220	1,797.94	111.11	204.15	-57.48	1.85
1,913.00	10.96	57.380	1,891.15	120.59	219.82	-62.81	0.67
2,008.00	11.29	65.230	1,984.37	129.36	235.87	-67.36	1.63
2,103.00	10.79	63.400	2,077.61	137.24	252.27	-70.96	0.64
2,198.00	10.41	59.250	2,170.99	145.61	267.59	-75.30	0.90
2,293.00	10.13	65.860	2,264.48	153.41	282.59	-79.18	1.27
2,388.00	10.57	68.180	2,357.93	160.07	298.31	-81.77	0.64
2,483.00	10.06	65.430	2,451.39	166.76	313.94	-84.40	0.75
2,578.00	11.00	63.910	2,544.79	174.19	329.63	-87.75	1.03
2,673.00	9.80	61.750	2,638.23	182.01	344.89	-91.57	1.33
2,768.00	10.73	63.050	2,731.71	189.84	359.90	-95.47	1.01
2,863.00	10.21	60.770	2,825.13	197.96	375.13	-99.60	0.70
2,958.00	10.10	57.440	2,918.64	206.55	389.50	-104.39	0.63
3,053.00	11.45	59.260	3,011.96	215.86	404.62	-109.69	1.47
3,148.00	11.05	58.200	3,105.14	225.47	420.46	-115.11	0.47
3,243.00	10.53	67.830	3,198.47	233.55	436.24	-119.06	1.97
3,338.00	9.33	66.720	3,292.04	239.87	451.35	-121.47	1.28
3,433.00	10.03	66.080	3,385.69	246.27	465.99	-124.07	0.75
3,528.00	8.64	65.510	3,479.43	252.58	480.05	-126.73	1.47
3,623.00	8.75	66.000	3,573.34	258.48	493.14	-129.22	0.14
3,718.00	11.00	65.530	3,666.92	265.17	507.99	-132.06	2.37
3,812.00	8.52	67.830	3,759.56	271.51	522.61	-134.61	2.67
3,907.00	10.26	70.730	3,853.28	276.96	537.11	-136.32	1.90
4,002.00	8.35	67.990	3,947.03	282.34	551.50	-138.00	2.06
4,097.00	9.16	79.780	4,040.93	286.27	565.33	-138.40	2.07
4,193.00	10.34	75.270	4,135.54	289.81	581.19	-137.94	1.46
4,287.00	11.56	68.790	4,227.83	295.37	598.13	-139.15	1.84
4,382.00	10.39	68.270	4,321.09	301.98	614.96	-141.42	1.24
4,477.00	10.22	58.090	4,414.57	309.61	630.07	-145.10	1.92

**Design Report for Ione 2G-2H - Sperry MWD Final Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,573.00	11.37	58.620	4,508.87	319.04	645.38	-150.47	1.20
4,668.00	10.11	59.500	4,602.20	328.15	660.56	-155.57	1.34
4,762.00	11.03	65.920	4,694.61	336.00	675.88	-159.41	1.59
4,857.00	10.53	64.890	4,787.93	343.39	692.04	-162.60	0.56
4,951.00	9.81	63.180	4,880.45	350.65	706.96	-165.97	0.83
5,046.00	11.35	63.730	4,973.83	358.44	722.57	-169.68	1.62
5,141.00	10.45	62.440	5,067.12	366.57	738.59	-173.61	0.98
5,236.00	10.36	57.450	5,160.56	375.15	753.43	-178.28	0.95
5,331.00	9.47	55.680	5,254.14	384.15	767.08	-183.65	0.99
5,426.00	10.88	59.710	5,347.64	393.08	781.28	-188.81	1.66
5,521.00	9.11	58.490	5,441.20	401.53	795.43	-193.52	1.88
5,616.00	9.49	64.510	5,534.95	408.83	808.92	-197.28	1.10
5,711.00	8.36	64.860	5,628.80	415.14	822.24	-200.11	1.19
5,806.00	8.26	70.480	5,722.80	420.35	834.92	-202.05	0.86
5,901.00	8.43	69.250	5,816.80	425.10	847.87	-203.46	0.26
5,996.00	9.10	59.060	5,910.69	431.43	860.82	-206.41	1.78
6,090.00	9.55	63.910	6,003.45	438.68	874.20	-210.15	0.96
6,185.00	9.47	62.000	6,097.15	445.82	888.18	-213.63	0.34
6,280.00	10.27	62.430	6,190.74	453.41	902.59	-217.44	0.85
6,375.00	10.76	59.090	6,284.15	461.88	917.70	-221.93	0.82
6,470.00	9.65	56.470	6,377.64	470.83	931.95	-227.11	1.27
6,519.00	9.47	54.120	6,425.96	475.47	938.64	-229.95	0.88
6,567.00	10.84	66.250	6,473.22	479.60	945.97	-232.15	5.28
6,614.00	11.04	70.910	6,519.36	482.85	954.27	-233.26	1.93
6,662.00	10.98	70.030	6,566.48	485.91	962.91	-234.11	0.37
6,709.00	12.64	80.050	6,612.49	488.33	972.18	-234.17	5.60
6,758.00	11.84	91.750	6,660.38	489.11	982.49	-232.39	5.31
6,805.00	10.54	106.900	6,706.50	487.71	991.42	-228.83	6.81
6,853.00	10.92	116.990	6,753.66	484.37	999.68	-223.57	3.99
6,900.00	13.29	128.960	6,799.62	478.95	1,007.85	-216.30	7.32
6,948.00	18.66	140.610	6,845.76	469.54	1,017.02	-204.92	12.98
6,995.00	25.79	153.800	6,889.27	454.52	1,026.32	-188.08	18.43
7,043.00	32.04	164.190	6,931.29	432.87	1,034.41	-165.10	16.66
7,090.00	36.43	171.800	6,970.15	407.04	1,039.81	-138.74	13.03
7,106.00	37.53	173.130	6,982.94	397.49	1,041.07	-129.18	8.50
7,137.00	40.47	175.340	7,007.03	378.09	1,043.01	-109.89	10.49
7,169.00	43.06	175.430	7,030.89	356.84	1,044.73	-88.88	8.10
7,200.00	46.40	174.920	7,052.91	335.11	1,046.57	-67.36	10.84
7,232.00	48.84	174.080	7,074.48	311.58	1,048.83	-44.00	7.87
7,264.00	51.65	173.510	7,094.94	287.13	1,051.50	-19.64	8.89
7,295.00	54.19	173.150	7,113.63	262.57	1,054.37	4.88	8.25
7,327.00	56.00	174.040	7,131.94	236.49	1,057.29	30.87	6.10
7,359.00	57.44	174.770	7,149.50	209.86	1,059.90	57.32	4.89
7,390.00	58.06	175.560	7,166.04	183.74	1,062.11	83.18	2.94
7,422.00	60.66	176.000	7,182.35	156.28	1,064.13	110.29	8.21
7,454.00	64.82	175.260	7,197.00	127.93	1,066.31	138.31	13.16
7,486.00	68.33	175.710	7,209.72	98.66	1,068.61	167.25	11.04
7,517.00	70.74	175.620	7,220.56	69.70	1,070.81	195.86	7.78
7,549.00	72.59	175.420	7,230.63	39.42	1,073.18	225.79	5.81
7,581.00	74.85	175.310	7,239.60	8.81	1,075.67	256.07	7.07
7,612.00	75.75	175.060	7,247.46	-21.07	1,078.18	285.65	3.01

**Design Report for Ione 2G-2H - Sperry MWD Final Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,644.00	76.52	175.140	7,255.13	-52.03	1,080.84	316.31	2.42
7,676.00	78.31	175.420	7,262.11	-83.15	1,083.41	347.11	5.66
7,707.00	78.25	177.190	7,268.40	-113.44	1,085.36	376.95	5.59
7,739.00	80.63	178.620	7,274.27	-144.87	1,086.51	407.70	8.64
7,765.00	85.22	179.660	7,277.47	-170.67	1,086.90	432.79	18.09
7,828.00	90.06	180.280	7,280.06	-233.59	1,086.93	493.80	7.75
7,922.00	90.22	180.730	7,279.83	-327.59	1,086.10	584.70	0.51
8,017.00	90.09	180.580	7,279.58	-422.58	1,085.01	676.51	0.21
8,112.00	88.40	180.270	7,280.83	-517.57	1,084.31	768.40	1.81
8,207.00	88.89	180.320	7,283.07	-612.54	1,083.82	860.33	0.52
8,303.00	88.18	178.830	7,285.53	-708.50	1,084.53	953.52	1.72
8,398.00	87.35	179.530	7,289.23	-803.42	1,085.89	1,045.86	1.14
8,492.00	87.84	179.230	7,293.18	-897.33	1,086.91	1,137.13	0.61
8,587.00	88.64	178.540	7,296.10	-992.27	1,088.75	1,229.60	1.11
8,683.00	89.23	178.920	7,297.88	-1,088.22	1,090.88	1,323.14	0.73
8,778.00	89.75	178.640	7,298.73	-1,183.20	1,092.90	1,415.69	0.62
8,872.00	89.94	179.660	7,298.98	-1,277.19	1,094.30	1,507.13	1.10
8,967.00	88.76	180.850	7,300.06	-1,372.18	1,093.88	1,599.10	1.76
9,061.00	89.60	180.340	7,301.40	-1,466.16	1,092.90	1,689.96	1.05
9,156.00	90.46	179.990	7,301.35	-1,561.16	1,092.63	1,781.97	0.98
9,251.00	90.00	180.570	7,300.97	-1,656.16	1,092.16	1,873.93	0.78
9,346.00	89.57	180.920	7,301.33	-1,751.15	1,090.93	1,965.70	0.58
9,441.00	90.52	180.650	7,301.25	-1,846.14	1,089.63	2,057.45	1.04
9,536.00	91.36	181.030	7,299.69	-1,941.11	1,088.23	2,149.17	0.97
9,631.00	91.48	180.780	7,297.34	-2,036.07	1,086.73	2,240.84	0.29
9,726.00	92.56	180.030	7,293.99	-2,131.01	1,086.06	2,332.69	1.38
9,821.00	92.19	180.370	7,290.06	-2,225.93	1,085.73	2,424.61	0.53
9,916.00	91.45	180.740	7,287.04	-2,320.87	1,084.81	2,516.41	0.87
10,011.00	91.32	180.510	7,284.74	-2,415.84	1,083.77	2,608.21	0.28
10,107.00	90.62	179.290	7,283.12	-2,511.82	1,083.94	2,701.28	1.46
10,202.00	90.74	179.510	7,281.99	-2,606.81	1,084.94	2,793.60	0.26
10,297.00	91.57	179.290	7,280.07	-2,701.79	1,085.93	2,885.90	0.90
10,392.00	92.07	179.470	7,277.06	-2,796.73	1,086.96	2,978.18	0.56
10,487.00	92.78	178.620	7,273.04	-2,891.63	1,088.54	3,070.55	1.17
10,582.00	92.96	180.190	7,268.28	-2,986.51	1,089.53	3,162.75	1.66
10,677.00	92.19	180.700	7,264.01	-3,081.41	1,088.79	3,254.55	0.97
10,772.00	93.41	179.960	7,259.37	-3,176.29	1,088.24	3,346.39	1.50
10,867.00	92.28	180.570	7,254.66	-3,271.17	1,087.80	3,438.24	1.35
10,963.00	91.02	181.500	7,251.89	-3,367.11	1,086.07	3,530.81	1.63
11,057.00	88.40	181.820	7,252.37	-3,461.06	1,083.35	3,621.20	2.81
11,152.00	88.52	180.820	7,254.92	-3,556.00	1,081.16	3,712.69	1.06
11,247.00	89.32	180.270	7,256.71	-3,650.98	1,080.26	3,804.52	1.02
11,342.00	88.64	179.450	7,258.40	-3,745.96	1,080.49	3,896.65	1.12
11,437.00	89.23	179.390	7,260.17	-3,840.94	1,081.45	3,988.94	0.62
11,532.00	89.17	179.040	7,261.50	-3,935.92	1,082.75	4,081.33	0.37
11,627.00	90.06	178.630	7,262.13	-4,030.90	1,084.68	4,173.86	1.03
11,722.00	90.00	178.970	7,262.08	-4,125.88	1,086.67	4,266.41	0.36
11,817.00	91.05	178.330	7,261.21	-4,220.84	1,088.91	4,359.01	1.29
11,844.00	91.14	178.450	7,260.70	-4,247.83	1,089.67	4,385.35	0.56
<b>Final Sperry MWD Survey @ 11844.00' MD</b>							
11,904.00	91.14	178.450	7,259.50	-4,307.80	1,091.29	4,443.87	0.00

**Design Report for lone 2G-2H - Sperry MWD Final Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
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Straight Line Projection to TD @ 11904.00' MD

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
137.00	137.00	-0.98	0.17	First Sperry MWD Survey @ 137.00' MD
11,844.00	7,260.70	-4,247.83	1,089.67	Final Sperry MWD Survey @ 11844.00' MD
11,904.00	7,259.50	-4,307.80	1,091.29	Straight Line Projection to TD @ 11904.00' MD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	lone 2G-2H_Plan C BHL Tgt	165.759	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
137.00	11,904.00	Sperry MWD Final Surveys	MWD



**Design Report for lone 2G-2H - Sperry MWD Final Survey****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
lone 2G-2H_SHL - actual wellpath hits target center - Point	0.00	0.49	0.00	0.03	0.00	1,306,796.37	3,209,953.78	40° 10' 23.196 N	104° 44' 55.176 W
lone 2 Pad_Section - actual wellpath hits target center - Polygon	0.00	0.49	0.00	0.03	0.00	1,306,796.37	3,209,953.78	40° 10' 23.196 N	104° 44' 55.176 W
Point 1			3,857.10	-4,725.79		1,302,103.40	3,213,850.78		
Point 2			3,836.57	-2,076.81		1,304,752.11	3,213,807.81		
Point 3			3,815.87	555.34		1,307,383.99	3,213,764.81		
Point 4			1,194.05	523.28		1,307,329.72	3,211,143.35		
Point 5			-1,428.10	490.66		1,307,274.88	3,208,521.57		
Point 6			-1,431.50	-2,141.06		1,304,643.23	3,208,540.47		
Point 7			-1,434.96	-4,784.59		1,301,999.76	3,208,559.41		
Point 8			1,211.13	-4,755.19		1,302,051.58	3,211,205.16		
Point 9			3,857.10	-4,725.79		1,302,103.40	3,213,850.78		
lone 2 Pad_Setback - actual wellpath hits target center - Polygon	0.00	0.49	0.00	0.03	0.00	1,306,796.37	3,209,953.78	40° 10' 23.196 N	104° 44' 55.176 W
Point 1			3,393.55	-4,270.92		1,302,554.33	3,213,383.40		
Point 2			3,359.52	89.72		1,306,914.52	3,213,312.42		
Point 3			-968.70	36.34		1,306,824.47	3,208,984.81		
Point 4			-974.35	-4,319.45		1,302,468.79	3,209,016.06		
Point 5			3,393.55	-4,270.92		1,302,554.33	3,213,383.40		
lone 2G-2H_Plan C - actual wellpath misses target center by 3.52ft at 9379.80ft MD (7301.48 TVD, -1784.94 N, 1090.41 E) - Point	0.00		7,305.00	-1,784.94	1,090.39	1,305,020.71	3,211,059.26	40° 10' 5.556 N	104° 44' 41.130 W
lone 2G-2H_Plan C - actual wellpath misses target center by 7.30ft at 11890.85ft MD (7259.77 TVD, -4294.65 N, 1090.94 E) - Point	0.00	0.00	7,267.00	-4,294.82	1,090.01	1,302,510.92	3,211,080.14	40° 9' 40.752 N	104° 44' 41.136 W
lone 2G-2H_Plan C - actual wellpath hits target center - Point	0.00		7,267.00	-3,021.11	1,090.19	1,303,784.58	3,211,069.53	40° 9' 53.339 N	104° 44' 41.133 W

**North Reference Sheet for Sec. 2-T2N-R66W - Ione 2G-2H - Plan C**

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

Vertical Depths are relative to RKB 13' @ 5059.00ft (Ensign 124). Northing and Easting are relative to Ione 2G-2H

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995776

Grid Coordinates of Well: 1,306,796.35 ft N, 3,209,953.78 ft E

Geographical Coordinates of Well: 40° 10' 23.20" N, 104° 44' 55.18" W

Grid Convergence at Surface is: 0.49°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,904.00ft  
the Bottom Hole Displacement is 4,443.87ft in the Direction of 165.78° (True).

Magnetic Convergence at surface is: -8.20° (15 December 2012, , BGGM2012)

