

# SPERRY-SUN DRILLING SERVICES

## CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp.
WELL:	Parageon 10N-31HZ
FIELD:	DJ Basin
RIG:	H&P 308
LEGALS:	Sec. 6-T1N-R65W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	True N
MAG. DECL. APPLIED:	8.49
VERTICAL SEC. DIR. :	0.320

SSDS Job Number :	901047704
Start Date of Job :	1/23/2014
End Date of Job :	2/1/2014
Lead Directional Driller:	Jesse Kysar
	Brian Suanders
Other SSDS DD's :	
SSDS MWD Engineers :	Ryan White
	Greg Odonnell
	Patrick Lane

	Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>
ESS Survey		Tie On		Tie On		Tie On		Tie On	
First Survey Depth	25.00	Gyro							
Last Survey Depth	1060.00								
KOP Depth/Sidetrack MD	6591.00	KOP		KOP-ST1		KOP-ST2		KOP-ST3	KOP-ST4
First Survey Depth	1203.00	MWD		MWD		MWD		MWD	MWD
Last Survey Depth	14487.00	MWD		MWD		MWD		MWD	MWD
Bit Extrapolation to TD	14353.00	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 : <i>Jesse Kysar</i>	Print Name : <i>RYAN WHITE</i>	Print Name :
Sign Name : <i>Jesse Kysar</i>	Sign Name : <i>Ryan White</i>	Sign Name :
Print Name :	Print Name :	Print Name :
Sign Name :	Sign Name :	Sign Name :

Examples of	TieOn	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
Survey Types:	MWD	Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's
	ESS	Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's
	Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)
	SS	Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.

Project: Weld County, CO (NAD 83)  
 Site: Sec. 6-T1N-R65W  
 Well: Paragon 10N-31HZ  
 Wellbore: Plan A  
 Design: Actual Surveys

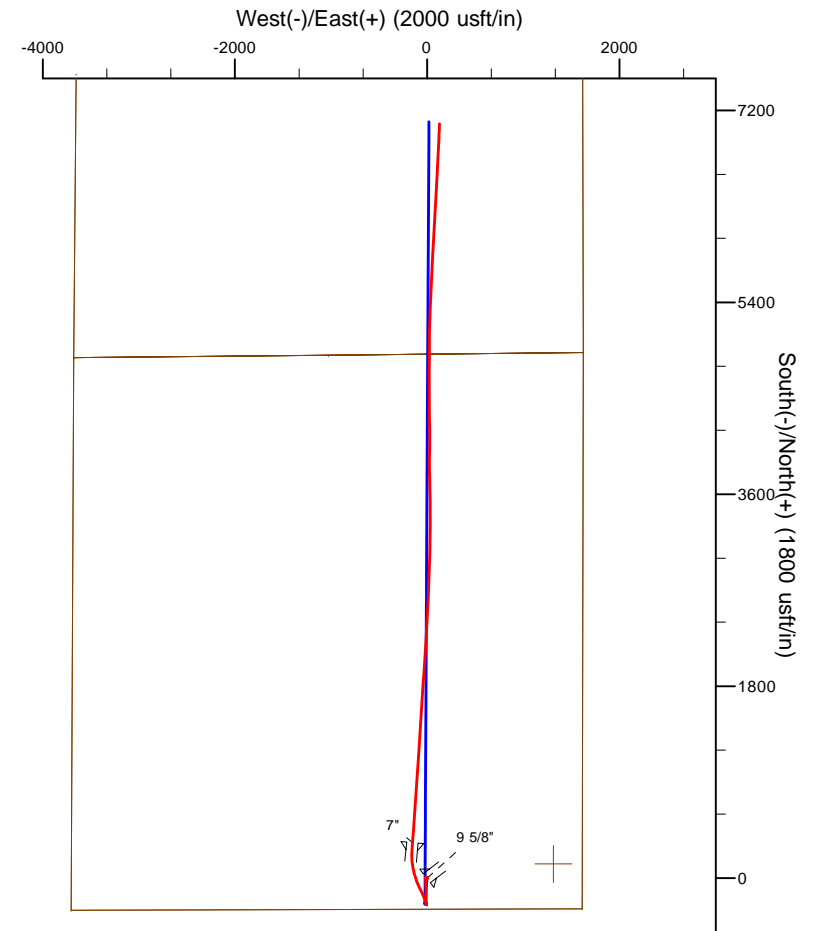
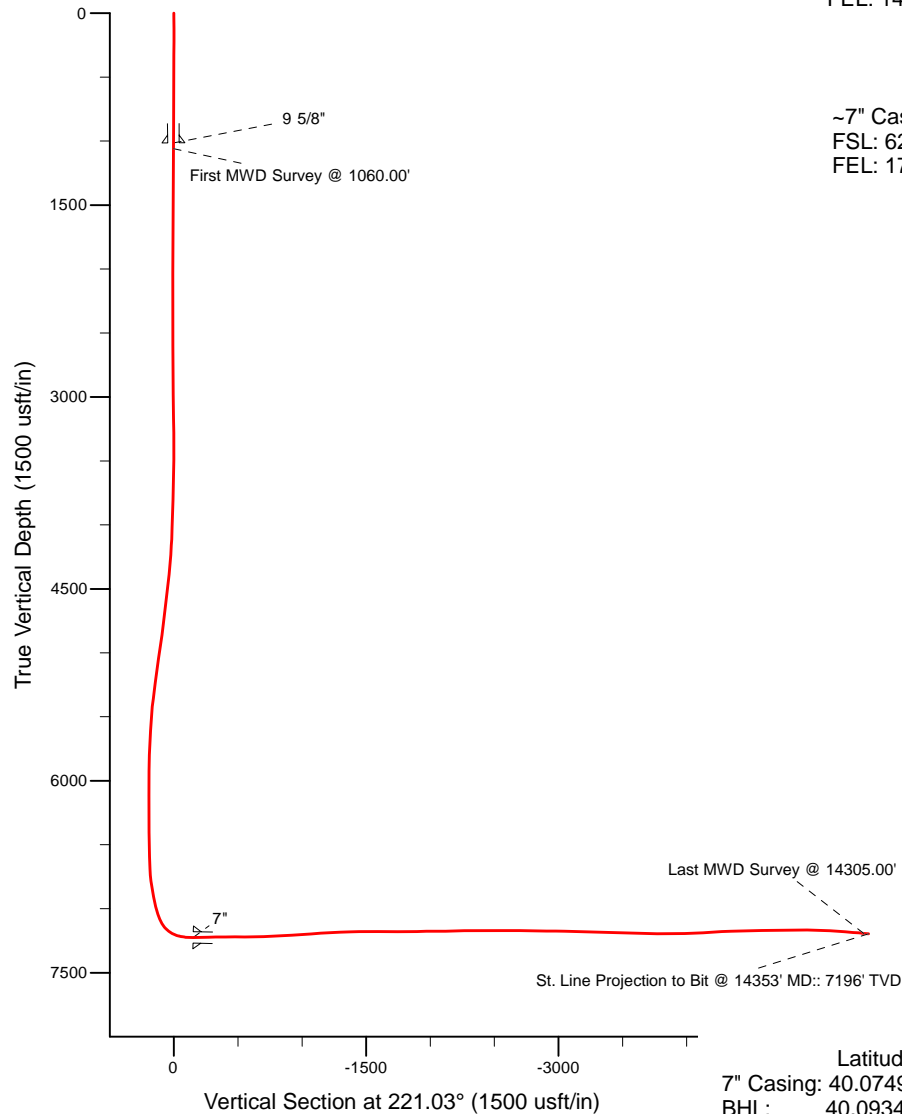


# LEGEND

- Paragon 10N-31HZ, Plan A, Rev. A0 V0
- Actual Surveys

~BHL  
 FSL: 2156'  
 FEL: 1493'

~7" Casing  
 FSL: 625'  
 FEL: 1767'



WELL DETAILS: Paragon 10N-31HZ	
Ground Level:	4985.00
Rkb=25' @	@ 5010.00usft
Design: Actual Surveys (Paragon 10N-31HZ/Plan A)	
Created By: Pari Amanlou	Date: 1/7/2014

	Latitude	Longitude	Northing	Easting
7" Casing:	40.074963	-104.703452	1,271,155.04	3,222,907.56
BHL:	40.093464	-104.702451	1,277,896.97	3,223,126.98

## Design Report for Paragon 10N-31HZ - Actual Surveys

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)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paragon 10N-31HZ SHL - Paragon 10N-31HZ_LD - PARAGON 25N-31HZ_Sec Line										
10.42	0.03	314.08	10.42	0.00	0.00	0.00	0.32	0.32	0.00	314.08
Noble 150' HL										
100.00	0.32	314.08	100.00	0.14	-0.15	-0.01	0.31	0.31	0.00	0.00
200.00	0.28	319.05	200.00	0.59	-0.58	-0.06	0.04	-0.03	4.97	142.13
300.00	0.25	260.48	300.00	0.77	-0.91	0.02	0.26	-0.04	-58.57	-126.35
400.00	0.38	195.79	400.00	0.42	-1.27	0.52	0.35	0.13	-64.69	-103.94
500.00	0.56	163.52	499.99	-0.40	-1.23	1.11	0.31	0.18	-32.28	-72.60
600.00	0.40	181.23	599.99	-1.28	-1.01	1.62	0.21	-0.16	17.72	144.96
700.00	0.34	206.27	699.99	-1.87	-1.18	2.19	0.17	-0.06	25.03	122.85
800.00	0.30	240.65	799.98	-2.29	-1.54	2.74	0.19	-0.04	34.38	118.57
900.00	0.35	228.13	899.98	-2.56	-2.03	3.26	0.09	0.05	-12.52	-60.14
1,000.00	0.42	230.81	999.98	-3.04	-2.52	3.94	0.07	0.07	2.68	16.13
1,015.00	0.43	232.34	1,014.98	-3.11	-2.61	4.05	0.10	0.07	10.25	50.42
9 5/8"										
1,060.00	0.44	232.89	1,059.98	-3.31	-2.88	4.39	0.02	0.01	1.21	32.23
First MWD Survey @ 1060.00'										
1,100.00	0.35	227.11	1,099.98	-3.49	-3.10	4.66	0.24	-0.22	-14.45	-158.84
1,200.00	0.17	187.24	1,199.98	-3.85	-3.34	5.09	0.24	-0.18	-39.87	-153.07
1,300.00	0.10	32.06	1,299.98	-3.92	-3.30	5.13	0.26	-0.08	-155.17	-171.21
1,400.00	0.06	281.52	1,399.98	-3.84	-3.29	5.06	0.13	-0.04	-110.54	-154.84
1,500.00	0.27	255.07	1,499.98	-3.85	-3.62	5.29	0.22	0.21	-26.45	-33.37
1,600.00	0.30	207.90	1,599.97	-4.24	-3.92	5.77	0.23	0.03	-47.17	-106.18
1,700.00	0.26	246.29	1,699.97	-4.51	-4.26	6.20	0.19	-0.04	38.39	121.32
1,800.00	0.31	250.12	1,799.97	-4.69	-4.72	6.64	0.06	0.05	3.83	21.41
1,900.00	0.40	254.48	1,899.97	-4.88	-5.29	7.15	0.10	0.09	4.35	18.31
2,000.00	0.55	258.33	1,999.97	-5.07	-6.10	7.83	0.15	0.15	3.85	14.30
2,100.00	0.61	267.64	2,099.96	-5.22	-7.13	8.62	0.11	0.06	9.31	62.32
2,200.00	0.64	281.14	2,199.96	-5.14	-8.20	9.26	0.15	0.03	13.50	86.32
2,300.00	0.73	309.26	2,299.95	-4.67	-9.26	9.60	0.34	0.09	28.11	88.90
2,400.00	0.99	331.46	2,399.94	-3.51	-10.17	9.32	0.42	0.27	22.20	62.97
2,500.00	0.95	338.70	2,499.92	-1.92	-10.89	8.60	0.13	-0.04	7.24	112.44
2,600.00	0.86	345.89	2,599.91	-0.42	-11.37	7.78	0.14	-0.09	7.18	131.92
2,700.00	0.75	348.76	2,699.90	0.96	-11.68	6.95	0.12	-0.11	2.87	161.45
2,800.00	0.64	351.20	2,799.89	2.15	-11.89	6.18	0.11	-0.11	2.44	165.71
2,900.00	0.59	339.08	2,899.89	3.19	-12.15	5.57	0.14	-0.06	-12.12	-120.35
3,000.00	0.58	332.02	2,999.88	4.07	-12.61	5.20	0.07	0.00	-7.06	-95.59
3,100.00	0.74	349.00	3,099.88	5.16	-12.97	4.62	0.25	0.16	16.98	59.56
3,200.00	0.87	358.26	3,199.86	6.60	-13.11	3.63	0.18	0.12	9.26	50.88
3,300.00	0.83	351.51	3,299.85	8.07	-13.09	2.50	0.09	-0.04	5.26	118.85
3,400.00	0.60	5.31	3,399.84	9.41	-12.96	1.40	0.23	-0.23	1.80	175.21
3,500.00	0.12	341.45	3,499.84	10.04	-12.94	0.92	0.49	-0.48	-23.86	-174.28
3,600.00	0.87	229.30	3,599.84	9.72	-13.34	1.42	0.93	0.75	-112.16	-119.15
3,700.00	2.27	230.78	3,699.80	7.98	-15.44	4.12	1.39	1.39	1.49	2.42
3,800.00	2.30	215.10	3,799.70	4.95	-18.62	8.49	0.62	0.03	-15.68	-94.66
3,900.00	2.09	179.85	3,899.63	1.49	-19.77	11.85	1.34	-0.21	-35.25	-116.26
4,000.00	2.73	166.25	3,999.55	-2.56	-19.04	14.43	0.85	0.64	-13.60	-48.64
4,100.00	3.50	162.52	4,099.40	-7.79	-17.56	17.40	0.80	0.77	-3.73	-16.57
4,200.00	5.06	173.23	4,199.13	-14.96	-16.02	21.80	1.75	1.56	10.71	32.55
4,300.00	6.87	180.00	4,298.58	-25.33	-15.50	29.28	1.94	1.81	6.77	24.59
4,400.00	8.06	178.48	4,397.73	-38.34	-15.33	38.99	1.20	1.19	-1.52	-10.20
4,500.00	9.15	177.18	4,496.59	-53.36	-14.75	49.93	1.11	1.09	-1.30	-10.73
4,600.00	9.31	176.01	4,595.30	-69.37	-13.80	61.39	0.24	0.16	-1.17	-50.54
4,700.00	9.56	175.38	4,693.95	-85.65	-12.51	72.83	0.27	0.25	-0.64	-22.72
4,800.00	10.21	176.75	4,792.47	-102.78	-11.34	84.98	0.69	0.65	1.37	20.57
4,900.00	10.70	178.37	4,890.79	-121.01	-10.52	98.19	0.57	0.49	1.62	31.63
5,000.00	10.83	180.86	4,989.03	-139.69	-10.40	112.20	0.48	0.13	2.50	75.72

**Design Report for Paragon 10N-31HZ - Actual Surveys**

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)	Toolface Azimuth (°)
5,100.00	10.70	181.47	5,087.24	-158.50	-10.96	126.77	0.17	-0.13	0.61	139.27
5,200.00	10.18	179.30	5,185.58	-176.63	-11.09	140.52	0.65	-0.52	-2.17	-143.86
5,300.00	9.33	178.31	5,284.11	-193.71	-10.64	153.11	0.87	-0.85	-0.98	-169.45
5,400.00	8.15	178.64	5,382.95	-208.90	-10.23	164.31	1.18	-1.17	0.33	177.75
5,500.00	6.70	176.63	5,482.09	-221.91	-9.81	173.84	1.48	-1.45	-2.01	-170.87
5,600.00	5.11	171.48	5,581.56	-232.14	-8.81	180.90	1.67	-1.59	-5.15	-164.08
5,700.00	3.85	175.23	5,681.26	-239.80	-7.69	185.95	1.30	-1.26	3.75	168.80
5,800.00	2.79	188.19	5,781.09	-245.56	-7.76	190.33	1.29	-1.06	12.97	151.02
5,900.00	1.71	188.48	5,881.01	-249.45	-8.44	193.71	1.08	-1.08	0.29	179.54
6,000.00	0.63	175.96	5,980.99	-251.48	-8.62	195.36	1.11	-1.08	-12.52	-172.90
6,100.00	0.12	30.24	6,080.99	-251.92	-8.52	195.63	0.74	-0.51	-145.72	-174.54
6,200.00	0.78	4.90	6,180.98	-251.10	-8.40	194.94	0.66	0.65	-25.34	-29.95
6,300.00	0.72	359.80	6,280.97	-249.80	-8.34	193.92	0.09	-0.06	-5.10	-132.25
6,400.00	0.66	358.11	6,380.97	-248.59	-8.40	193.04	0.07	-0.06	-1.69	-162.83
6,500.00	0.59	17.75	6,480.96	-247.53	-8.27	192.16	0.22	-0.07	19.64	116.60
6,600.00	1.90	319.13	6,580.95	-246.35	-8.18	191.21	1.67	1.31	-58.62	-76.23
6,700.00	7.79	339.86	6,680.45	-238.03	-12.38	187.69	6.05	5.89	20.73	27.08
6,800.00	12.60	341.86	6,778.92	-221.95	-18.65	179.68	4.82	4.81	1.99	5.18
6,900.00	21.15	340.13	6,874.55	-194.38	-27.28	164.55	8.56	8.55	-1.73	-4.20
7,000.00	31.80	331.37	6,964.14	-154.50	-45.99	146.74	11.31	10.65	-8.76	-24.13
7,100.00	42.84	332.37	7,043.18	-100.92	-75.14	125.46	11.06	11.05	1.00	3.55
7,200.00	52.39	336.28	7,111.01	-35.47	-108.10	97.72	9.97	9.55	3.91	18.17
7,300.00	63.10	344.27	7,164.83	44.21	-134.80	55.14	12.65	10.71	7.99	34.49
7,400.00	74.31	351.37	7,200.93	134.98	-155.05	-0.04	13.01	11.21	7.10	31.92
7,500.00	83.29	1.94	7,219.87	232.70	-161.50	-69.53	13.71	8.99	10.57	50.22
7,600.00	90.91	5.53	7,224.90	332.20	-153.95	-149.54	8.42	7.62	3.59	25.31
7,601.00	90.99	5.56	7,224.89	333.20	-153.85	-150.36	7.91	7.61	2.18	16.00
<b>7"</b>										
7,700.00	90.79	5.07	7,223.30	431.73	-144.42	-230.88	0.53	-0.21	-0.49	-112.95
7,800.00	90.46	4.54	7,222.21	531.38	-136.13	-311.49	0.63	-0.33	-0.53	-121.30
7,900.00	90.35	4.39	7,221.54	631.08	-128.39	-391.78	0.19	-0.11	-0.15	-126.79
8,000.00	90.72	4.20	7,220.65	730.79	-120.89	-471.93	0.41	0.37	-0.18	-25.98
8,100.00	90.05	4.00	7,219.94	830.54	-113.75	-551.86	0.70	-0.67	-0.21	-162.80
8,200.00	89.99	4.05	7,220.09	930.29	-106.70	-631.74	0.08	-0.06	0.05	141.24
8,300.00	91.99	3.79	7,218.10	1,030.04	-100.00	-711.38	2.02	2.00	-0.26	-7.37
8,400.00	92.22	4.33	7,214.49	1,129.71	-92.83	-791.28	0.59	0.23	0.54	66.89
8,500.00	92.67	4.31	7,210.15	1,229.33	-85.29	-871.38	0.45	0.45	-0.02	-1.93
8,600.00	92.88	4.26	7,205.34	1,328.94	-77.83	-951.42	0.22	0.21	-0.06	-14.56
8,700.00	93.12	4.22	7,200.07	1,428.53	-70.45	-1,031.39	0.25	0.24	-0.04	-9.34
8,800.00	93.13	4.28	7,194.55	1,528.10	-63.11	-1,111.33	0.06	0.00	0.06	85.70
8,900.00	92.74	4.13	7,189.34	1,627.69	-55.67	-1,191.34	0.42	-0.39	-0.15	-159.41
9,000.00	92.51	3.43	7,184.88	1,727.37	-48.99	-1,270.91	0.73	-0.23	-0.69	-107.99
9,100.00	91.29	4.58	7,181.25	1,827.09	-42.52	-1,350.38	1.67	-1.22	1.15	136.66
9,200.00	90.69	4.84	7,179.76	1,926.70	-33.93	-1,431.17	0.65	-0.60	0.26	156.95
9,300.00	90.22	4.26	7,178.93	2,026.38	-25.96	-1,511.60	0.75	-0.47	-0.58	-129.23
9,400.00	90.27	4.18	7,178.57	2,126.11	-18.67	-1,591.62	0.10	0.05	-0.08	-58.98
9,500.00	89.50	2.80	7,178.71	2,225.92	-12.50	-1,670.96	1.58	-0.77	-1.38	-119.22
9,600.00	89.61	2.97	7,179.53	2,325.79	-7.51	-1,749.58	0.21	0.11	0.18	57.30
9,700.00	90.78	3.43	7,179.07	2,425.63	-1.88	-1,828.59	1.26	1.17	0.46	21.40
9,800.00	90.60	3.41	7,177.85	2,525.45	4.07	-1,907.79	0.19	-0.18	-0.02	-172.86
9,900.00	90.15	3.28	7,177.11	2,625.26	10.05	-1,987.01	0.47	-0.45	-0.13	-163.71
10,000.00	90.03	2.58	7,177.46	2,725.14	14.99	-2,065.60	0.71	-0.12	-0.70	-99.91
10,100.00	91.40	2.55	7,175.77	2,825.02	19.48	-2,143.90	1.37	1.37	-0.02	-0.97
10,200.00	91.16	2.12	7,173.56	2,924.90	23.75	-2,222.05	0.49	-0.24	-0.43	-118.85
10,300.00	90.98	1.39	7,171.70	3,024.84	26.66	-2,299.35	0.75	-0.18	-0.73	-104.05
10,400.00	90.44	0.72	7,170.30	3,124.81	28.67	-2,376.08	0.86	-0.54	-0.67	-129.00
10,500.00	89.93	0.23	7,170.15	3,224.81	29.27	-2,451.92	0.71	-0.50	-0.50	-135.50
10,600.00	90.05	0.49	7,170.26	3,324.81	29.80	-2,527.70	0.28	0.12	0.26	65.59
10,700.00	90.05	0.42	7,170.08	3,424.80	30.75	-2,603.76	0.07	0.00	-0.07	-91.73

**Design Report for Paragon 10N-31HZ - Actual Surveys**

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)	Toolface Azimuth (°)
10,800.00	89.49	359.50	7,170.38	3,524.80	30.84	-2,679.24	1.07	-0.55	-0.92	-121.16
10,900.00	88.80	357.72	7,171.88	3,624.76	28.54	-2,753.15	1.91	-0.69	-1.78	-111.28
11,000.00	89.45	358.40	7,173.63	3,724.67	24.72	-2,826.01	0.94	0.65	0.68	46.65
11,100.00	89.31	0.09	7,174.59	3,824.65	23.37	-2,900.54	1.69	-0.13	1.68	94.50
11,200.00	89.59	0.43	7,175.58	3,924.64	23.91	-2,976.33	0.44	0.28	0.34	50.91
11,300.00	89.14	0.30	7,176.68	4,024.64	24.57	-3,052.19	0.47	-0.46	-0.13	-164.57
11,400.00	89.01	359.95	7,178.29	4,124.62	24.79	-3,127.76	0.38	-0.13	-0.35	-110.08
11,500.00	88.76	359.58	7,180.32	4,224.60	24.37	-3,202.91	0.45	-0.25	-0.37	-123.58
11,600.00	88.95	359.24	7,182.17	4,324.58	23.36	-3,277.66	0.38	0.19	-0.33	-60.57
11,700.00	88.45	359.26	7,184.54	4,424.54	21.78	-3,352.03	0.50	-0.50	0.02	178.14
11,800.00	88.60	0.16	7,187.23	4,524.50	21.46	-3,427.23	0.91	0.14	0.90	80.91
11,900.00	88.47	359.79	7,189.43	4,624.47	21.74	-3,502.83	0.38	-0.12	-0.36	-108.78
12,000.00	88.41	359.80	7,192.73	4,724.41	20.70	-3,577.54	0.06	-0.06	0.01	173.59
12,100.00	89.50	0.85	7,194.39	4,824.39	21.61	-3,653.56	1.51	1.09	1.05	43.96
12,200.00	89.46	0.04	7,195.01	4,924.38	22.79	-3,729.76	0.81	-0.03	-0.81	-92.37
12,300.00	90.46	0.29	7,195.66	5,024.38	22.38	-3,804.93	1.02	0.99	0.26	14.53
12,400.00	90.57	1.64	7,194.15	5,124.35	24.15	-3,881.50	1.35	0.12	1.34	85.09
12,500.00	89.85	1.83	7,193.85	5,224.29	27.43	-3,959.05	0.75	-0.73	0.20	164.74
12,600.00	90.92	1.88	7,193.56	5,324.24	30.61	-4,036.54	1.07	1.07	0.05	2.44
12,700.00	92.65	2.58	7,190.45	5,424.11	34.41	-4,114.37	1.87	1.74	0.70	21.94
12,800.00	94.31	2.69	7,184.37	5,523.81	39.08	-4,192.65	1.66	1.66	0.11	3.70
12,900.00	91.57	3.44	7,178.93	5,623.51	44.36	-4,271.33	2.84	-2.74	0.75	164.58
13,000.00	90.95	3.68	7,176.80	5,723.30	50.61	-4,350.70	0.66	-0.62	0.24	158.91
13,100.00	90.80	2.93	7,175.34	5,823.12	56.30	-4,429.74	0.76	-0.15	-0.75	-101.57
13,200.00	91.45	3.22	7,173.30	5,922.96	61.69	-4,508.59	0.71	0.65	0.29	23.82
13,300.00	91.38	3.17	7,170.81	6,022.77	67.30	-4,587.57	0.08	-0.06	-0.05	-144.60
13,400.00	91.20	2.93	7,168.57	6,122.60	72.60	-4,666.36	0.30	-0.18	-0.24	-127.69
13,500.00	90.78	3.24	7,166.66	6,222.45	77.74	-4,745.06	0.52	-0.42	0.31	143.63
13,600.00	89.87	3.97	7,166.21	6,322.23	84.32	-4,824.65	1.16	-0.91	0.72	141.62
13,700.00	89.43	3.87	7,166.88	6,422.00	91.09	-4,904.35	0.45	-0.43	-0.10	-167.37
13,800.00	89.04	3.89	7,168.16	6,521.76	97.88	-4,984.07	0.40	-0.40	0.02	176.97
13,900.00	88.32	3.81	7,170.45	6,621.50	104.69	-5,063.78	0.72	-0.71	-0.09	-173.14
14,000.00	87.48	3.82	7,173.88	6,721.22	111.34	-5,143.37	0.84	-0.84	0.02	178.68
14,100.00	86.86	2.43	7,179.60	6,820.86	117.57	-5,222.62	1.53	-0.63	-1.39	-114.22
14,200.00	86.35	1.95	7,185.43	6,920.62	121.13	-5,300.22	0.70	-0.51	-0.48	-136.58
14,300.00	85.66	1.84	7,192.37	7,020.32	124.49	-5,377.64	0.70	-0.70	-0.11	-170.65
14,305.00	85.62	1.83	7,192.75	7,025.31	124.65	-5,381.50	0.82	-0.79	-0.23	-163.48
<b>Last MWD Survey @ 14305.00'</b>										
14,353.00	85.62	1.83	7,196.42	7,073.14	126.17	-5,418.59	0.00	0.00	0.00	0.00
<b>St. Line Projection to Bit @ 14353' MD:: 7196' TVD - Paragon 10N-31HZ BHL - Paragon 10N-31HZ BHL_Rev 1 - Paragon 10N-31HZ BHL_Rev 2</b>										

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
1,060.00	1,059.98	-3.31	-2.88	First MWD Survey @ 1060.00'
14,305.00	7,192.75	7,025.31	124.65	Last MWD Survey @ 14305.00'
14,353.00	7,196.42	7,073.14	126.17	St. Line Projection to Bit @ 14353' MD:: 7196' TVD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	+E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	221.03	Slot	0.00	0.00	0.00



## Design Report for Paragon 10N-31HZ - Actual Surveys

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	1,060.00	Surface Gyros	NS-GYRO-MS
1,203.00	7,515.00	MWD Surveys- Intermediate	MWD+IFR1+SC
7,601.00	14,305.00	MWD Surveys-Lateral	MWD+IFR1+SC

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,015.00	1,014.98	9 5/8"	9-5/8	12-3/4
7,601.00	7,224.89	7"	7	8-3/4

### *Targets associated with this wellbore*

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Paragon 10N-31HZ_LD	0.00	0.00	0.00	Polygon
PARAGON 25N-31HZ_Sec Line	0.00	133.37	1,312.26	Polygon
Noble 150' HL	0.00	6,893.13	-360.36	Circle
Paragon 10N-31HZ SHL	0.00	0.00	0.00	Point
Paragon 10N-31HZ BHL_Rev 2	7,185.00	7,094.07	17.00	Point
Paragon 10N-31HZ BHL	7,185.00	7,112.07	-113.31	Point
Paragon 10N-31HZ BHL_Rev 1	7,185.00	7,094.07	-83.31	Point

### Directional Difficulty Index

Average Dogleg over Survey:	1.44 °/100usft	Maximum Dogleg over Survey:	14.94 °/100usft at 7,376.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.497

### Audit Info

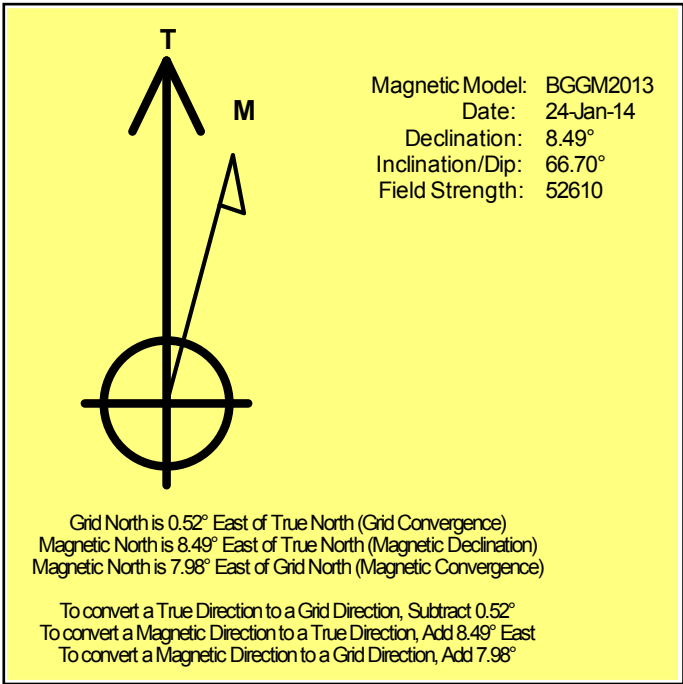
North Reference Sheet for Sec. 6-T1N-R65W - Paragon 10N-31HZ - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference .  
Vertical Depths are relative to Rkb=25' @ @ 5010.00usft. Northing and Easting are relative to Paragon 10N-31HZ  
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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°  
False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996158

Grid Coordinates of Well: 1,270,823.25 usft N, 3,223,064.40 usft E  
Geographical Coordinates of Well: 40° 04' 26.57" N, 104° 42' 10.45" W  
Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,353.00usft  
the Bottom Hole Displacement is 7,074.27usft in the Direction of 1.02° ( True).

Magnetic Convergence at surface is: -7.98° (24 January 2014, , BGGM2013)



# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 6-T1N-R65W

Paragon 10N-31HZ

Job# 901047704:: API: 05-123-38548

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Geodetic Report

13 February, 2014

Well Coordinates: 1,270,823.25 N, 3,223,064.40 E (40° 04' 26.57" N, 104° 42' 10.45" W)

Ground Level: 4,985.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Paragon 10N-31HZ

Rkb=25' @ @ 5010.00usft

N

True

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**



## Design Report for Paragon 10N-31HZ - Actual Surveys

Measured			Vertical	Local Coordinates		Geographic Coordinates		UTM Coordinates	
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Latitude	Longitude	Northing	Easting
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.074048	-104.702902	1,270,823.25	3,223,064.40
10.42	0.03	314.08	10.42	0.00	0.00	40.074048	-104.702902	1,270,823.25	3,223,064.39
100.00	0.32	314.08	100.00	0.14	-0.15	40.074048	-104.702903	1,270,823.39	3,223,064.25
200.00	0.28	319.05	200.00	0.59	-0.58	40.074050	-104.702904	1,270,823.83	3,223,063.81
300.00	0.25	260.48	300.00	0.77	-0.91	40.074050	-104.702906	1,270,824.01	3,223,063.48
400.00	0.38	195.79	400.00	0.42	-1.27	40.074049	-104.702907	1,270,823.66	3,223,063.12
500.00	0.56	163.52	499.99	-0.40	-1.23	40.074047	-104.702907	1,270,822.84	3,223,063.17
600.00	0.40	181.23	599.99	-1.28	-1.01	40.074045	-104.702906	1,270,821.96	3,223,063.40
700.00	0.34	206.27	699.99	-1.87	-1.18	40.074043	-104.702906	1,270,821.37	3,223,063.23
800.00	0.30	240.65	799.98	-2.29	-1.54	40.074042	-104.702908	1,270,820.95	3,223,062.88
900.00	0.35	228.13	899.98	-2.56	-2.03	40.074041	-104.702910	1,270,820.67	3,223,062.39
1,000.00	0.42	230.81	999.98	-3.04	-2.52	40.074040	-104.702911	1,270,820.19	3,223,061.90
1,015.00	0.43	232.34	1,014.98	-3.11	-2.61	40.074040	-104.702912	1,270,820.12	3,223,061.82
1,060.00	0.44	232.89	1,059.98	-3.31	-2.88	40.074039	-104.702913	1,270,819.91	3,223,061.54
1,100.00	0.35	227.11	1,099.98	-3.49	-3.10	40.074038	-104.702913	1,270,819.73	3,223,061.33
1,200.00	0.17	187.24	1,199.98	-3.85	-3.34	40.074038	-104.702914	1,270,819.37	3,223,061.09
1,300.00	0.10	32.06	1,299.98	-3.92	-3.30	40.074037	-104.702914	1,270,819.30	3,223,061.13
1,400.00	0.06	281.52	1,399.98	-3.84	-3.29	40.074038	-104.702914	1,270,819.38	3,223,061.14
1,500.00	0.27	255.07	1,499.98	-3.85	-3.62	40.074037	-104.702915	1,270,819.36	3,223,060.81
1,600.00	0.30	207.90	1,599.97	-4.24	-3.92	40.074036	-104.702916	1,270,818.98	3,223,060.51
1,700.00	0.26	246.29	1,699.97	-4.51	-4.26	40.074036	-104.702917	1,270,818.70	3,223,060.18
1,800.00	0.31	250.12	1,799.97	-4.69	-4.72	40.074035	-104.702919	1,270,818.51	3,223,059.72
1,900.00	0.40	254.48	1,899.97	-4.88	-5.29	40.074035	-104.702921	1,270,818.32	3,223,059.15
2,000.00	0.55	258.33	1,999.97	-5.07	-6.10	40.074034	-104.702924	1,270,818.12	3,223,058.34
2,100.00	0.61	267.64	2,099.96	-5.22	-7.13	40.074034	-104.702928	1,270,817.96	3,223,057.32
2,200.00	0.64	281.14	2,199.96	-5.14	-8.20	40.074034	-104.702932	1,270,818.04	3,223,056.24
2,300.00	0.73	309.26	2,299.95	-4.67	-9.26	40.074035	-104.702935	1,270,818.49	3,223,055.18
2,400.00	0.99	331.46	2,399.94	-3.51	-10.17	40.074038	-104.702939	1,270,819.65	3,223,054.26
2,500.00	0.95	338.70	2,499.92	-1.92	-10.89	40.074043	-104.702941	1,270,821.23	3,223,053.53
2,600.00	0.86	345.89	2,599.91	-0.42	-11.37	40.074047	-104.702943	1,270,822.73	3,223,053.03
2,700.00	0.75	348.76	2,699.90	0.96	-11.68	40.074051	-104.702944	1,270,824.10	3,223,052.70
2,800.00	0.64	351.20	2,799.89	2.15	-11.89	40.074054	-104.702945	1,270,825.29	3,223,052.49
2,900.00	0.59	339.08	2,899.89	3.19	-12.15	40.074057	-104.702946	1,270,826.33	3,223,052.21
3,000.00	0.58	332.02	2,999.88	4.07	-12.61	40.074059	-104.702947	1,270,827.21	3,223,051.75
3,100.00	0.74	349.00	3,099.88	5.16	-12.97	40.074062	-104.702949	1,270,828.29	3,223,051.38
3,200.00	0.87	358.26	3,199.86	6.60	-13.11	40.074066	-104.702949	1,270,829.73	3,223,051.23
3,300.00	0.83	3.51	3,299.85	8.07	-13.09	40.074070	-104.702949	1,270,831.20	3,223,051.24
3,400.00	0.60	5.31	3,399.84	9.41	-12.96	40.074074	-104.702949	1,270,832.55	3,223,051.36
3,500.00	0.12	341.45	3,499.84	10.04	-12.94	40.074076	-104.702949	1,270,833.17	3,223,051.37
3,600.00	0.87	229.30	3,599.84	9.72	-13.34	40.074075	-104.702950	1,270,832.85	3,223,050.97
3,700.00	2.27	230.78	3,699.80	7.98	-15.44	40.074070	-104.702957	1,270,831.09	3,223,048.88
3,800.00	2.30	215.10	3,799.70	4.95	-18.62	40.074062	-104.702969	1,270,828.03	3,223,045.73

## Design Report for Paragon 10N-31HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
3,900.00	2.09	179.85	3,899.63	1.49	-19.77	40.074052	-104.702973	1,270,824.56	3,223,044.61
4,000.00	2.73	166.25	3,999.55	-2.56	-19.04	40.074041	-104.702970	1,270,820.51	3,223,045.38
4,100.00	3.50	162.52	4,099.40	-7.79	-17.56	40.074027	-104.702965	1,270,815.30	3,223,046.91
4,200.00	5.06	173.23	4,199.13	-14.96	-16.02	40.074007	-104.702960	1,270,808.15	3,223,048.51
4,300.00	6.87	180.00	4,298.58	-25.33	-15.50	40.073979	-104.702958	1,270,797.79	3,223,049.13
4,400.00	8.06	178.48	4,397.73	-38.34	-15.33	40.073943	-104.702957	1,270,784.78	3,223,049.41
4,500.00	9.15	177.18	4,496.59	-53.36	-14.75	40.073902	-104.702955	1,270,769.76	3,223,050.12
4,600.00	9.31	176.01	4,595.30	-69.37	-13.80	40.073858	-104.702952	1,270,753.76	3,223,051.22
4,700.00	9.56	175.38	4,693.95	-85.65	-12.51	40.073813	-104.702947	1,270,737.49	3,223,052.65
4,800.00	10.21	176.75	4,792.47	-102.78	-11.34	40.073766	-104.702943	1,270,720.38	3,223,053.98
4,900.00	10.70	178.37	4,890.79	-121.01	-10.52	40.073716	-104.702940	1,270,702.16	3,223,054.96
5,000.00	10.83	180.86	4,989.03	-139.69	-10.40	40.073665	-104.702939	1,270,683.48	3,223,055.25
5,100.00	10.70	181.47	5,087.24	-158.50	-10.96	40.073613	-104.702941	1,270,664.66	3,223,054.86
5,200.00	10.18	179.30	5,185.58	-176.63	-11.09	40.073563	-104.702942	1,270,646.54	3,223,054.89
5,300.00	9.33	178.31	5,284.11	-193.71	-10.64	40.073516	-104.702940	1,270,629.46	3,223,055.50
5,400.00	8.15	178.64	5,382.95	-208.90	-10.23	40.073475	-104.702939	1,270,614.27	3,223,056.04
5,500.00	6.70	176.63	5,482.09	-221.91	-9.81	40.073439	-104.702937	1,270,601.27	3,223,056.58
5,600.00	5.11	171.48	5,581.56	-232.14	-8.81	40.073411	-104.702934	1,270,591.05	3,223,057.67
5,700.00	3.85	175.23	5,681.26	-239.80	-7.69	40.073390	-104.702930	1,270,583.40	3,223,058.86
5,800.00	2.79	188.19	5,781.09	-245.56	-7.76	40.073374	-104.702930	1,270,577.64	3,223,058.85
5,900.00	1.71	188.48	5,881.01	-249.45	-8.44	40.073363	-104.702932	1,270,573.75	3,223,058.20
6,000.00	0.63	175.96	5,980.99	-251.48	-8.62	40.073358	-104.702933	1,270,571.72	3,223,058.04
6,100.00	0.12	30.24	6,080.99	-251.92	-8.52	40.073357	-104.702933	1,270,571.27	3,223,058.14
6,200.00	0.78	4.90	6,180.98	-251.10	-8.40	40.073359	-104.702932	1,270,572.09	3,223,058.25
6,300.00	0.72	359.80	6,280.97	-249.80	-8.34	40.073362	-104.702932	1,270,573.39	3,223,058.30
6,400.00	0.66	358.11	6,380.97	-248.59	-8.40	40.073366	-104.702932	1,270,574.60	3,223,058.23
6,500.00	0.59	17.75	6,480.96	-247.53	-8.27	40.073369	-104.702932	1,270,575.66	3,223,058.35
6,600.00	1.90	319.13	6,580.95	-246.35	-8.18	40.073372	-104.702932	1,270,576.84	3,223,058.43
6,700.00	7.79	339.86	6,680.45	-238.03	-12.38	40.073395	-104.702946	1,270,585.13	3,223,054.16
6,800.00	12.60	341.86	6,778.92	-221.95	-18.65	40.073439	-104.702969	1,270,601.14	3,223,047.74
6,900.00	21.15	340.13	6,874.55	-194.38	-27.28	40.073514	-104.703000	1,270,628.63	3,223,038.86
7,000.00	31.80	331.37	6,964.14	-154.50	-45.99	40.073624	-104.703067	1,270,668.35	3,223,019.80
7,100.00	42.84	332.37	7,043.18	-100.92	-75.14	40.073771	-104.703171	1,270,721.66	3,222,990.17
7,200.00	52.39	336.28	7,111.01	-35.47	-108.10	40.073951	-104.703289	1,270,786.81	3,222,956.62
7,300.00	63.10	344.27	7,164.83	44.21	-134.80	40.074169	-104.703384	1,270,866.24	3,222,929.21
7,400.00	74.31	351.37	7,200.93	134.98	-155.05	40.074419	-104.703456	1,270,956.82	3,222,908.14
7,500.00	83.29	1.94	7,219.87	232.70	-161.50	40.074687	-104.703479	1,271,054.48	3,222,900.82
7,600.00	90.91	5.53	7,224.90	332.20	-153.95	40.074960	-104.703452	1,271,154.04	3,222,907.47
7,601.00	90.99	5.56	7,224.89	333.20	-153.85	40.074963	-104.703452	1,271,155.04	3,222,907.56
7,700.00	90.79	5.07	7,223.30	431.73	-144.42	40.075233	-104.703418	1,271,253.65	3,222,916.11
7,800.00	90.46	4.54	7,222.21	531.38	-136.13	40.075507	-104.703389	1,271,353.37	3,222,923.50
7,900.00	90.35	4.39	7,221.54	631.08	-128.39	40.075780	-104.703361	1,271,453.12	3,222,930.34

## Design Report for Paragon 10N-31HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
8,000.00	90.72	4.20	7,220.65	730.79	-120.89	40.076054	-104.703334	1,271,552.90	3,222,936.94
8,100.00	90.05	4.00	7,219.94	830.54	-113.75	40.076328	-104.703309	1,271,652.70	3,222,943.19
8,200.00	89.99	4.05	7,220.09	930.29	-106.70	40.076602	-104.703284	1,271,752.50	3,222,949.34
8,300.00	91.99	3.79	7,218.10	1,030.04	-100.00	40.076876	-104.703260	1,271,852.30	3,222,955.14
8,400.00	92.22	4.33	7,214.49	1,129.71	-92.83	40.077149	-104.703234	1,271,952.04	3,222,961.42
8,500.00	92.67	4.31	7,210.15	1,229.33	-85.29	40.077423	-104.703207	1,272,051.72	3,222,968.07
8,600.00	92.88	4.26	7,205.34	1,328.94	-77.83	40.077696	-104.703180	1,272,151.38	3,222,974.62
8,700.00	93.12	4.22	7,200.07	1,428.53	-70.45	40.077969	-104.703154	1,272,251.03	3,222,981.11
8,800.00	93.13	4.28	7,194.55	1,528.10	-63.11	40.078243	-104.703128	1,272,350.66	3,222,987.56
8,900.00	92.74	4.13	7,189.34	1,627.69	-55.67	40.078516	-104.703101	1,272,450.31	3,222,994.10
9,000.00	92.51	3.43	7,184.88	1,727.37	-48.99	40.078790	-104.703077	1,272,550.04	3,222,999.89
9,100.00	91.29	4.58	7,181.25	1,827.09	-42.52	40.079064	-104.703054	1,272,649.81	3,223,005.45
9,200.00	90.69	4.84	7,179.76	1,926.70	-33.93	40.079337	-104.703024	1,272,749.50	3,223,013.15
9,300.00	90.22	4.26	7,178.93	2,026.38	-25.96	40.079611	-104.702995	1,272,849.24	3,223,020.22
9,400.00	90.27	4.18	7,178.57	2,126.11	-18.67	40.079884	-104.702969	1,272,949.03	3,223,026.61
9,500.00	89.50	2.80	7,178.71	2,225.92	-12.50	40.080158	-104.702947	1,273,048.88	3,223,031.89
9,600.00	89.61	2.97	7,179.53	2,325.79	-7.51	40.080433	-104.702929	1,273,148.79	3,223,035.98
9,700.00	90.78	3.43	7,179.07	2,425.63	-1.88	40.080707	-104.702909	1,273,248.67	3,223,040.71
9,800.00	90.60	3.41	7,177.85	2,525.45	4.07	40.080981	-104.702888	1,273,348.53	3,223,045.77
9,900.00	90.15	3.28	7,177.11	2,625.26	10.05	40.081255	-104.702866	1,273,448.40	3,223,050.85
10,000.00	90.03	2.58	7,177.46	2,725.14	14.99	40.081529	-104.702849	1,273,548.31	3,223,054.89
10,100.00	91.40	2.55	7,175.77	2,825.02	19.48	40.081803	-104.702833	1,273,648.22	3,223,058.48
10,200.00	91.16	2.12	7,173.56	2,924.90	23.75	40.082077	-104.702817	1,273,748.14	3,223,061.85
10,300.00	90.98	1.39	7,171.70	3,024.84	26.66	40.082351	-104.702807	1,273,848.09	3,223,063.86
10,400.00	90.44	0.72	7,170.30	3,124.81	28.67	40.082626	-104.702800	1,273,948.07	3,223,064.98
10,500.00	89.93	0.23	7,170.15	3,224.81	29.27	40.082900	-104.702798	1,274,048.07	3,223,064.68
10,600.00	90.05	0.49	7,170.26	3,324.81	29.80	40.083175	-104.702796	1,274,148.06	3,223,064.31
10,700.00	90.05	0.42	7,170.08	3,424.80	30.75	40.083449	-104.702792	1,274,248.06	3,223,064.36
10,800.00	89.49	359.50	7,170.38	3,524.80	30.84	40.083724	-104.702792	1,274,348.05	3,223,063.55
10,900.00	88.80	357.72	7,171.88	3,624.76	28.54	40.083998	-104.702800	1,274,447.98	3,223,060.36
11,000.00	89.45	358.40	7,173.63	3,724.67	24.72	40.084272	-104.702814	1,274,547.85	3,223,055.64
11,100.00	89.31	0.09	7,174.59	3,824.65	23.37	40.084547	-104.702819	1,274,647.81	3,223,053.38
11,200.00	89.59	0.43	7,175.58	3,924.64	23.91	40.084821	-104.702817	1,274,747.80	3,223,053.03
11,300.00	89.14	0.30	7,176.68	4,024.64	24.57	40.085096	-104.702814	1,274,847.79	3,223,052.78
11,400.00	89.01	359.95	7,178.29	4,124.62	24.79	40.085370	-104.702814	1,274,947.77	3,223,052.11
11,500.00	88.76	359.58	7,180.32	4,224.60	24.37	40.085645	-104.702815	1,275,047.74	3,223,050.79
11,600.00	88.95	359.24	7,182.17	4,324.58	23.36	40.085919	-104.702819	1,275,147.70	3,223,048.88
11,700.00	88.45	359.26	7,184.54	4,424.54	21.78	40.086194	-104.702824	1,275,247.63	3,223,046.40
11,800.00	88.60	0.16	7,187.23	4,524.50	21.46	40.086468	-104.702826	1,275,347.58	3,223,045.18
11,900.00	88.47	359.79	7,189.43	4,624.47	21.74	40.086743	-104.702825	1,275,447.55	3,223,044.56
12,000.00	88.41	359.80	7,192.73	4,724.41	20.70	40.087017	-104.702828	1,275,547.48	3,223,042.63
12,100.00	89.50	0.85	7,194.39	4,824.39	21.61	40.087291	-104.702825	1,275,647.45	3,223,042.64

## Design Report for Paragon 10N-31HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
12,200.00	89.46	0.04	7,195.01	4,924.38	22.79	40.087566	-104.702821	1,275,747.45	3,223,042.92
12,300.00	90.46	0.29	7,195.66	5,024.38	22.38	40.087840	-104.702822	1,275,847.43	3,223,041.62
12,400.00	90.57	1.64	7,194.15	5,124.35	24.15	40.088115	-104.702816	1,275,947.41	3,223,042.48
12,500.00	89.85	1.83	7,193.85	5,224.29	27.43	40.088389	-104.702804	1,276,047.37	3,223,044.87
12,600.00	90.92	1.88	7,193.56	5,324.24	30.61	40.088663	-104.702793	1,276,147.34	3,223,047.15
12,700.00	92.65	2.58	7,190.45	5,424.11	34.41	40.088938	-104.702779	1,276,247.24	3,223,050.04
12,800.00	94.31	2.69	7,184.37	5,523.81	39.08	40.089211	-104.702763	1,276,346.98	3,223,053.82
12,900.00	91.57	3.44	7,178.93	5,623.51	44.36	40.089485	-104.702744	1,276,446.72	3,223,058.21
13,000.00	90.95	3.68	7,176.80	5,723.30	50.61	40.089759	-104.702721	1,276,546.55	3,223,063.56
13,100.00	90.80	2.93	7,175.34	5,823.12	56.30	40.090033	-104.702701	1,276,646.42	3,223,068.35
13,200.00	91.45	3.22	7,173.30	5,922.96	61.69	40.090307	-104.702682	1,276,746.29	3,223,072.85
13,300.00	91.38	3.17	7,170.81	6,022.77	67.30	40.090581	-104.702662	1,276,846.15	3,223,077.56
13,400.00	91.20	2.93	7,168.57	6,122.60	72.60	40.090855	-104.702643	1,276,946.02	3,223,081.95
13,500.00	90.78	3.24	7,166.66	6,222.45	77.74	40.091129	-104.702624	1,277,045.91	3,223,086.20
13,600.00	89.87	3.97	7,166.21	6,322.23	84.32	40.091403	-104.702601	1,277,145.74	3,223,091.88
13,700.00	89.43	3.87	7,166.88	6,422.00	91.09	40.091677	-104.702577	1,277,245.56	3,223,097.75
13,800.00	89.04	3.89	7,168.16	6,521.76	97.88	40.091951	-104.702552	1,277,345.37	3,223,103.65
13,900.00	88.32	3.81	7,170.45	6,621.50	104.69	40.092224	-104.702528	1,277,445.17	3,223,109.56
14,000.00	87.48	3.82	7,173.88	6,721.22	111.34	40.092498	-104.702504	1,277,544.94	3,223,115.32
14,100.00	86.86	2.43	7,179.60	6,820.86	117.57	40.092772	-104.702482	1,277,644.62	3,223,120.65
14,200.00	86.35	1.95	7,185.43	6,920.62	121.13	40.093046	-104.702469	1,277,744.41	3,223,123.31
14,300.00	85.66	1.84	7,192.37	7,020.32	124.49	40.093319	-104.702457	1,277,844.14	3,223,125.77
14,305.00	85.62	1.83	7,192.75	7,025.31	124.65	40.093333	-104.702457	1,277,849.12	3,223,125.89
14,353.00	85.62	1.83	7,196.42	7,073.14	126.17	40.093464	-104.702451	1,277,896.97	3,223,126.98

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,060.00	1,059.98	-3.31	-2.88	First MWD Survey @ 1060.00'
14,305.00	7,192.75	7,025.31	124.65	Last MWD Survey @ 14305.00'
14,353.00	7,196.42	7,073.14	126.17	St. Line Projection to Bit @ 14353' MD:: 7196' TVD

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
User	No Target (Freehand)	221.03	Slot	0.00	0.00	0.00

## Design Report for Paragon 10N-31HZ - Actual Surveys

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	1,060.00	Surface Gyros	NS-GYRO-MS
1,203.00	7,515.00	MWD Surveys- Intermediate	MWD+IFR1+SC
7,601.00	14,305.00	MWD Surveys-Lateral	MWD+IFR1+SC

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,015.00	1,014.98	9 5/8"	9-5/8	12-3/4
7,601.00	7,224.89	7"	7	8-3/4

### Design Targets

Shape	Target Name	TVD (usft)	Northing (usft)	Easting (usft)	+N/-S usft	+E/-W usft	Created	Updated
Polygon	PARAGON 25N-31HZ_Ser	0.00	1,270,968.40	3,224,375.35	133.37	1,312.26	12/14/2012	1/21/2014

### Directional Difficulty Index

Average Dogleg over Survey:	1.44 °/100usft	Maximum Dogleg over Survey:	14.94 °/100usft at 7,376.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.497

### Audit Info

**North Reference Sheet for Sec. 6-T1N-R65W - Paragon 10N-31HZ - Plan A**

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

Vertical Depths are relative to Rkb=25' @ @ 5010.00usft. Northing and Easting are relative to Paragon 10N-31HZ

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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996158

Grid Coordinates of Well: 1,270,823.25 usft N, 3,223,064.40 usft E

Geographical Coordinates of Well: 40° 04' 26.57" N, 104° 42' 10.45" W

Grid Convergence at Surface is: 0.52°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,353.00usft

the Bottom Hole Displacement is 7,074.27usft in the Direction of 1.02° (True).

Magnetic Convergence at surface is: -7.98° (24 January 2014, , BGGM2013)

