



A GYRO TECHNOLOGIES INC. COMPANY

PO Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

May 22, 2012

30-015-40037

Devon Energy Production Co., L.P.
20 North Broadway
Oklahoma City, OK 73102-8260

Attn: Mark Cooper

Re: Emerald PWU 20 No. 004H

Please find enclosed a copy of the survey from 0' to 7173.05' ran on the above referenced well.

If I can be of any further service please do not hesitate to call me at 800-606-4976.

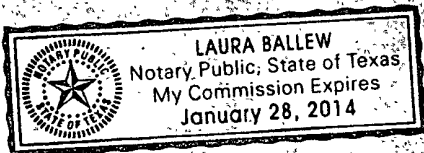
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
§
COUNTY OF NUECES §

This instrument was acknowledged before me on the 23 day of May, A.D., 2012, by Keith Havelka.

Laura Ballew
Notary Public, State of Texas





Company: Devon Energy Production Co., LP
 Lease/Well: Emerald PWU 20/No. 004H
 Location: S19 T19S R29E
 Rig Name: Cactus 126
 State/County: New Mexico/Eddy
 Latitude: 32.64
 GRID North is 0.12 Degrees East of True North
 VS-Azi: 0.00 Degrees



RKB : 25.6 feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: final survey.ut
 Minimum Curvature Method
 Report Date/Time: 5/23/2012 / 14:41

Vaughn Energy Services
 Gardendale, Texas
 432-563-5444

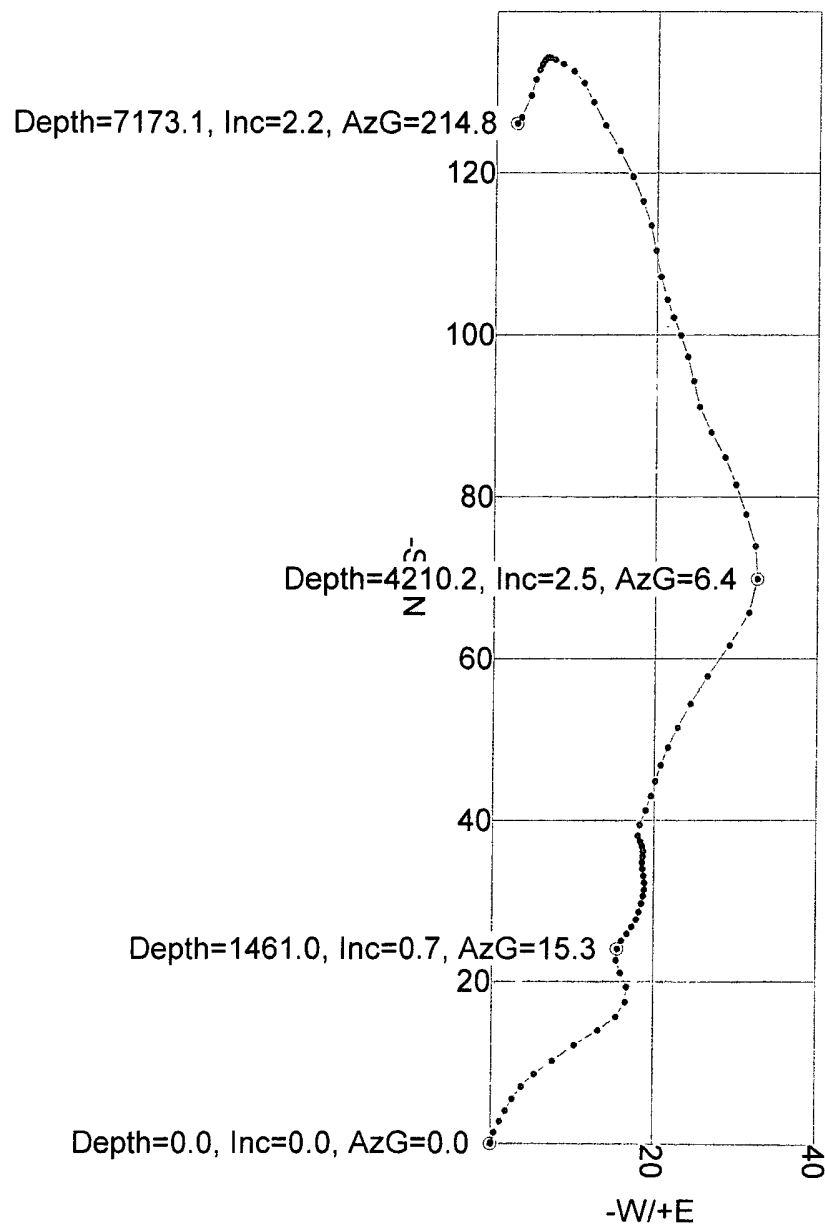
Surveyor: Ray Seago
 Emerald PWU 20 No. 004H / API 30-015-40037

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	****
39.05	0.64	12.33	39.05	0.21	0.05	0.21	0.22	12.33	1.64
133.85	0.91	22.42	133.84	1.42	0.45	1.42	1.49	17.38	0.31
228.65	0.91	29.06	228.63	2.77	1.10	2.77	2.98	21.58	0.11
323.45	0.89	28.21	323.42	4.08	1.81	4.08	4.46	23.93	0.03
418.25	1.16	30.58	418.20	5.55	2.65	5.55	6.15	25.48	0.30
513.05	1.16	41.35	512.98	7.10	3.77	7.10	8.04	27.96	0.23
607.85	1.48	51.45	607.76	8.59	5.36	8.59	10.12	31.99	0.42
702.65	1.88	54.99	702.52	10.24	7.59	10.24	12.75	36.56	0.43
797.45	2.18	54.42	797.26	12.18	10.33	12.18	15.98	40.31	0.32
892.25	1.94	61.89	892.00	13.99	13.22	13.99	19.25	43.38	0.38
987.05	1.44	41.66	986.75	15.64	15.43	15.64	21.97	44.62	0.82
1081.85	1.26	21.02	1081.53	17.50	16.60	17.50	24.12	43.48	0.54
1176.65	1.13	346.21	1176.31	19.38	16.75	19.38	25.61	40.83	0.77
1271.45	1.17	324.77	1271.09	21.07	15.97	21.07	26.44	37.15	0.45
1366.25	0.96	359.24	1365.88	22.66	15.40	22.66	27.40	34.19	0.70
1461.05	0.75	15.29	1460.66	24.06	15.55	24.06	28.64	32.88	0.34
1555.85	0.68	40.78	1555.46	25.08	16.08	25.08	29.79	32.67	0.34
1650.65	0.61	34.42	1650.25	25.92	16.73	25.92	30.85	32.84	0.10

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
5442.65	1.96	351.41	5440.79	110.41	19.85	110.41	112.18	10.19	0.21
5537.45	1.83	345.24	5535.54	113.47	19.23	113.47	115.09	9.62	0.26
5632.25	1.97	337.47	5630.29	116.44	18.22	116.44	117.86	8.89	0.31
5727.05	2.04	337.45	5725.03	119.51	16.94	119.51	120.70	8.07	0.07
5821.85	2.33	330.26	5819.76	122.74	15.34	122.74	123.69	7.12	0.42
5916.65	2.10	329.87	5914.49	125.91	13.51	125.91	126.64	6.13	0.25
6011.45	1.84	336.20	6009.23	128.81	12.03	128.81	129.37	5.34	0.36
6106.25	1.38	327.51	6104.00	131.16	10.80	131.16	131.60	4.71	0.54
6201.05	0.96	305.67	6198.78	132.59	9.54	132.59	132.93	4.12	0.64
6295.85	0.97	302.25	6293.56	133.48	8.21	133.48	133.73	3.52	0.06
6390.65	0.41	291.62	6388.36	134.04	7.22	134.04	134.23	3.08	0.61
6485.45	0.37	290.30	6483.15	134.27	6.62	134.27	134.43	2.82	0.04
6580.25	0.19	235.97	6577.95	134.29	6.20	134.29	134.43	2.64	0.32
6675.05	0.34	215.87	6672.75	133.97	5.91	133.97	134.10	2.52	0.19
6769.85	0.40	202.21	6767.55	133.43	5.61	133.43	133.55	2.41	0.11
6864.65	0.50	205.96	6862.35	132.75	5.31	132.75	132.86	2.29	0.10
6959.45	1.07	201.53	6957.14	131.56	4.81	131.56	131.65	2.09	0.60
7054.25	1.45	190.77	7051.91	129.56	4.26	129.56	129.63	1.88	0.48
7149.05	2.13	212.43	7146.67	126.90	3.09	126.90	126.94	1.39	0.99
7173.05	2.20	214.81	7170.65	126.14	2.59	126.14	126.17	1.18	0.50



Vaughn Energy Services
Gardendale, Texas
432-563-5444
Surveyor: Ray Seago
Emerald PWU 20 No. 004H / API 30-015-40037



HALLIBURTON

3950 Interwood South Pkwy Houston, TX 77032
Phone 281-986-4416 Fax 281-986-4499

May 24, 2012

Devon Energy Production, Co
Attn: Judy Barnett
20 N. Broadway
Oklahoma City, Ok
73102

Final Survey for:
Well Name: Emerald PWU 20 4H
County: Eddy County, NM
Rig Name: Cactus 126
Sperry Job #: 9330897

Judy Barnett

Enclosed you will find the following survey information on the above referenced well:

- 0 *Survey Report(s)*
- 0 *MWD End of Well Report(s)*

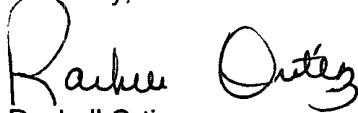
2 Certified Letters for New Mexico NMOCD

We appreciate the opportunity to serve you and welcome any comments or suggestions that you may have regarding our service. You may contact your local sales representative, **Ryan Annesley @ 405-231-1868**

Should you have any questions or require additional information regarding the enclosed information, please do not hesitate to contact me at (281) 986-4400.

Once again, we thank you for your business.

Sincerely,



Rachell Ortiz
Sperry Drilling Services

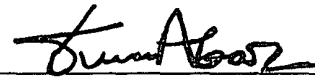
HALLIBURTON

3950 Interwood South Parkway • Houston, TX 77032

PHONE 281.986.4400 • FAX 281.986.4499

State of New Mexico, Eddy County

I, Tunde Abass, certify that I am employed by Halliburton Energy Services, Inc. (AKA Sperry Drilling) and that on the dates of May 06, 2012 through May 21, 2012, I did conduct or supervise the taking of a MWD Directional surveys for the well Emerald PWU 20 4H from 7221' MD to 12102' MD. This data is true, correct, complete and within the limitations of the tools as set forth by Halliburton Energy Services, Inc. (AKA Sperry Drilling). I am authorized and qualified to make this report and this survey was conducted at the request of Devon Energy Corporation for the Emerald PWU 20 4H well, API No. 30-015-40037 in Eddy County, New Mexico. I have reviewed this report and find that it conforms to the principles and procedures as set forth by Halliburton Energy Services, Inc. (AKA Sperry Drilling).



Tunde Abass
MWD Field Engineer

Devon Energy Corporation.

Emerald PWU 20 4H

Eddy County, New Mexico

Cactus 126

API# 30-015-40037-0000

May 06, 2012 – May 21, 2012

HD-MJ-0009330897

Sperry Drilling

MWD Survey Report

Submitted by Tunde Abass

3950 Interwood South Parkway

Houston, TX 77032

Ph: 281.986.4400

HALLIBURTON

**Drilling and Formation
Evaluation**

Survey Report for Devon Energy Corporation

Rig:	Cactus 126
Well Name:	Emerald PWU 20 4H
Field Name:	Parkway West (Bone Spring)
Country:	U.S.A
Job Number:	HD-XX-0009330897
Job Start Date:	06-May-12
API Number:	30-015-40037-0000



Directional Survey Data

Tie-in

0.00

0.00

0.00

0.00

0.00 N

0.00 E

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (%/100')
39.05	0.64	12.33	39.05	0.21 N	0.05 E	0.05	1.64
133.85	0.91	22.42	133.84	1.43 N	0.45 E	0.44	0.32
228.65	0.91	29.06	228.63	2.78 N	1.10 E	1.09	0.11
323.45	0.89	28.21	323.42	4.09 N	1.81 E	1.81	0.03
418.25	1.16	30.58	418.20	5.56 N	2.65 E	2.64	0.29
513.05	1.16	41.35	512.98	7.11 N	3.77 E	3.76	0.23
607.85	1.48	51.45	607.76	8.59 N	5.36 E	5.35	0.42
702.65	1.88	54.99	702.52	10.25 N	7.59 E	7.58	0.44
797.45	2.18	54.42	797.26	12.19 N	10.33 E	10.31	0.32
892.25	1.94	61.89	892.00	13.99 N	13.22 E	13.19	0.38
987.05	1.44	41.66	986.75	15.64 N	15.42 E	15.40	0.81
1081.85	1.26	21.02	1,081.53	17.50 N	16.59 E	16.56	0.54
1176.65	1.13	346.21	1,176.31	19.38 N	16.74 E	16.71	0.77
1271.45	1.17	324.77	1,271.09	21.08 N	15.96 E	15.92	0.45
1366.25	0.96	359.24	1,365.88	22.67 N	15.39 E	15.35	0.70
1461.05	0.75	15.29	1,460.67	24.06 N	15.54 E	15.50	0.33
1555.85	0.68	40.78	1,555.46	25.08 N	16.07 E	16.03	0.34
1650.65	0.61	34.42	1,650.25	25.93 N	16.73 E	16.68	0.11
1745.45	0.69	35.18	1,745.05	26.81 N	17.34 E	17.29	0.08
1840.25	0.57	21.68	1,839.84	27.71 N	17.84 E	17.80	0.20
1935.05	0.64	17.33	1,934.64	28.66 N	18.18 E	18.13	0.09
2029.85	0.69	14.97	2,029.43	29.71 N	18.48 E	18.43	0.06
2124.65	0.47	9.74	2,124.22	30.65 N	18.69 E	18.64	0.24
2219.45	0.49	7.19	2,219.02	31.43 N	18.81 E	18.76	0.03
2314.25	0.55	357.24	2,313.82	32.29 N	18.84 E	18.78	0.11
2409.05	0.52	349.48	2,408.61	33.17 N	18.74 E	18.68	0.08
2503.85	0.52	353.01	2,503.41	34.02 N	18.61 E	18.55	0.03
2598.65	0.43	357.13	2,598.21	34.80 N	18.54 E	18.48	0.10
2693.45	0.46	15.46	2,693.00	35.52 N	18.62 E	18.56	0.15
2788.25	0.42	350.21	2,787.80	36.23 N	18.66 E	18.60	0.21
2883.05	0.31	346.32	2,882.60	36.82 N	18.54 E	18.48	0.12
2977.85	0.46	331.54	2,977.40	37.41 N	18.30 E	18.24	0.19
3072.65	0.50	344.79	3,072.19	38.14 N	18.01 E	17.95	0.12
3167.45	1.19	20.56	3,166.98	39.46 N	18.25 E	18.18	0.88
3262.25	1.15	23.08	3,261.76	41.26 N	18.97 E	18.90	0.07
3357.05	1.11	14.28	3,356.54	43.02 N	19.57 E	19.49	0.19
3451.85	1.18	19.09	3,451.33	44.83 N	20.11 E	20.04	0.13
3546.65	1.35	18.07	3,546.10	46.82 N	20.78 E	20.70	0.18
3641.45	1.52	24.00	3,640.87	49.03 N	21.64 E	21.55	0.24
3736.25	1.79	27.84	3,735.63	51.49 N	22.84 E	22.75	0.31
3831.05	2.24	29.18	3,830.37	54.41 N	24.43 E	24.34	0.48
3925.85	2.58	32.00	3,925.09	57.84 N	26.47 E	26.37	0.38

Directional Survey Data

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100')
4020.65	3.08	38.18	4,019.77	61.65 N	29.17 E	29.07	0.62
4115.45	2.69	21.27	4,114.46	65.73 N	31.55 E	31.44	0.98
4210.25	2.51	6.44	4,209.16	69.86 N	32.59 E	32.47	0.73
4305.05	2.51	345.77	4,303.87	73.94 N	32.32 E	32.19	0.95
4399.85	2.48	340.88	4,398.58	77.89 N	31.13 E	31.00	0.23
4494.65	2.20	341.09	4,493.30	81.55 N	29.87 E	29.73	0.30
4589.45	2.18	334.75	4,588.03	84.90 N	28.51 E	28.37	0.26
4684.25	2.14	325.93	4,682.76	88.00 N	26.75 E	26.60	0.35
4779.05	2.09	345.75	4,777.50	91.14 N	25.34 E	25.18	0.77
4873.85	1.87	347.45	4,872.25	94.32 N	24.58 E	24.41	0.24
4968.65	1.86	345.09	4,966.99	97.32 N	23.84 E	23.67	0.08
5063.45	1.54	336.66	5,061.75	99.98 N	22.94 E	22.77	0.43
5158.25	1.32	338.90	5,156.52	102.16 N	22.04 E	21.87	0.24
5253.05	1.48	342.00	5,251.29	104.35 N	21.27 E	21.09	0.19
5347.85	2.05	346.47	5,346.05	107.16 N	20.50 E	20.31	0.62
5442.65	1.96	351.41	5,440.79	110.41 N	19.86 E	19.67	0.21
5537.45	1.83	345.24	5,535.54	113.48 N	19.23 E	19.03	0.26
5632.25	1.97	337.47	5,630.29	116.45 N	18.22 E	18.02	0.31
5727.05	2.04	337.45	5,725.03	119.51 N	16.95 E	16.74	0.07
5821.85	2.33	330.26	5,819.76	122.74 N	15.35 E	15.13	0.42
5916.65	2.10	329.87	5,914.49	125.92 N	13.52 E	13.30	0.24
6011.45	1.84	336.20	6,009.23	128.81 N	12.03 E	11.81	0.36
6106.25	1.38	327.51	6,104.00	131.17 N	10.81 E	10.58	0.55
6201.05	0.96	305.67	6,198.78	132.59 N	9.55 E	9.32	0.64
6295.85	0.97	302.25	6,293.56	133.49 N	8.22 E	7.99	0.06
6390.65	0.41	291.62	6,388.36	134.04 N	7.23 E	7.00	0.60
6485.45	0.37	290.30	6,483.15	134.27 N	6.63 E	6.39	0.04
6580.25	0.19	235.97	6,577.95	134.29 N	6.21 E	5.98	0.32
6675.05	0.34	215.87	6,672.75	133.97 N	5.92 E	5.68	0.18
6769.85	0.40	202.21	6,767.55	133.44 N	5.63 E	5.39	0.11
6864.65	0.50	205.96	6,862.35	132.76 N	5.32 E	5.09	0.11
6959.45	1.07	201.53	6,957.14	131.56 N	4.81 E	4.58	0.60
7054.25	1.45	190.77	7,051.92	129.56 N	4.26 E	4.04	0.47
7149.05	2.13	212.43	7,146.67	126.90 N	3.10 E	2.87	1.00
7173.05	2.20	214.81	7,170.65	126.14 N	2.59 E	2.37	0.47
7221.00	1.84	166.91	7,218.58	124.64 N	2.24 E	2.02	3.49
7253.00	1.64	185.27	7,250.56	123.68 N	2.32 E	2.10	1.84
7285.00	3.23	136.11	7,282.53	122.58 N	2.90 E	2.69	7.79
7317.00	6.73	103.81	7,314.41	121.48 N	5.35 E	5.14	13.60
7348.00	11.96	94.19	7,344.99	120.81 N	10.32 E	10.11	17.57
7380.00	16.28	94.32	7,376.02	120.23 N	18.10 E	17.89	13.49
7411.00	19.40	98.04	7,405.53	119.18 N	27.54 E	27.33	10.72
7443.00	22.39	96.18	7,435.42	117.78 N	38.86 E	38.66	9.57
7474.00	26.59	94.86	7,463.62	116.56 N	51.65 E	51.45	13.66
7506.00	30.17	92.48	7,491.77	115.60 N	66.83 E	66.63	11.72

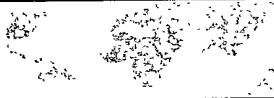


Directional Survey Data

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100)
7537.00	33.82	89.98	7,518.06	115.27 N	83.24 E	83.04	12.53
7569.00	36.19	87.53	7,544.27	115.68 N	101.59 E	101.39	8.62
7600.00	38.36	87.54	7,568.94	116.49 N	120.35 E	120.14	6.99
7632.00	41.60	86.81	7,593.46	117.50 N	140.88 E	140.67	10.23
7664.00	44.23	88.42	7,616.89	118.40 N	162.65 E	162.44	8.91
7695.00	48.05	88.71	7,638.37	118.96 N	184.99 E	184.78	12.33
7727.00	52.54	88.01	7,658.80	119.67 N	209.59 E	209.38	14.15
7758.00	55.34	88.34	7,677.05	120.46 N	234.63 E	234.42	9.08
7790.00	58.53	88.53	7,694.51	121.19 N	261.44 E	261.23	9.96
7822.00	60.73	87.92	7,710.68	122.05 N	289.03 E	288.82	7.07
7854.00	62.59	87.65	7,725.88	123.13 N	317.17 E	316.96	5.86
7886.00	63.46	89.89	7,740.39	123.74 N	345.68 E	345.47	6.79
7917.00	66.05	91.53	7,753.61	123.39 N	373.72 E	373.50	9.62
7949.00	69.45	92.03	7,765.73	122.47 N	403.31 E	403.10	10.73
7980.00	71.70	93.99	7,776.04	120.93 N	432.51 E	432.29	9.39
8012.00	73.46	95.31	7,785.62	118.46 N	462.94 E	462.73	6.77
8044.00	75.34	95.22	7,794.22	115.63 N	493.63 E	493.42	5.86
8077.00	76.92	95.82	7,802.13	112.55 N	525.51 E	525.32	5.13
8108.00	80.25	95.81	7,808.27	109.47 N	555.74 E	555.55	10.73
8140.00	82.75	95.80	7,813.00	106.27 N	587.22 E	587.04	7.83
8172.00	84.58	96.88	7,816.53	102.76 N	618.83 E	618.65	6.64
8203.00	86.28	95.17	7,819.00	99.51 N	649.56 E	649.39	7.78
8298.00	85.89	96.02	7,825.48	90.27 N	743.89 E	743.73	0.99
8393.00	85.46	96.94	7,832.64	79.58 N	838.01 E	837.87	1.06
8488.00	85.92	95.83	7,839.79	69.05 N	932.15 E	932.03	1.26
8582.00	86.26	95.65	7,846.20	59.67 N	1,025.46 E	1025.36	0.41
8677.00	87.29	93.89	7,851.55	51.78 N	1,119.98 E	1119.89	2.15
8772.00	90.09	90.04	7,853.72	48.53 N	1,214.87 E	1214.78	5.01
8867.00	89.88	88.97	7,853.74	49.35 N	1,309.86 E	1309.78	1.15
8962.00	90.57	88.95	7,853.37	51.07 N	1,404.85 E	1404.76	0.73
9056.00	92.49	86.67	7,850.86	54.66 N	1,498.74 E	1498.64	3.18
9152.00	92.78	87.19	7,846.44	59.79 N	1,594.50 E	1594.39	0.62
9246.00	91.63	87.54	7,842.83	64.11 N	1,688.33 E	1688.21	1.27
9341.00	90.92	87.97	7,840.72	67.83 N	1,783.23 E	1783.11	0.87
9436.00	90.40	90.83	7,839.62	68.82 N	1,878.21 E	1878.08	3.06
9529.00	90.50	91.09	7,838.89	67.27 N	1,971.19 E	1971.07	0.29
9623.00	89.72	90.35	7,838.71	66.09 N	2,065.18 E	2065.06	1.14
9718.00	89.69	91.96	7,839.20	64.18 N	2,160.16 E	2160.04	1.70
9813.00	90.49	93.32	7,839.04	59.81 N	2,255.05 E	2254.95	1.66
9907.00	89.35	93.51	7,839.17	54.21 N	2,348.89 E	2348.79	1.23
10002.00	90.43	91.84	7,839.35	49.77 N	2,443.78 E	2443.69	2.09
10096.00	90.12	91.51	7,838.89	47.02 N	2,537.74 E	2537.65	0.49
10191.00	88.11	91.60	7,840.36	44.45 N	2,632.68 E	2632.60	2.13
10285.00	87.67	92.13	7,843.83	41.40 N	2,726.57 E	2726.49	0.73
10380.00	89.08	91.89	7,846.53	38.07 N	2,821.47 E	2821.40	1.51

Directional Survey Data

Measured Depth (ft)	Inclination (deg)	Direction (deg)	Vertical Depth (ft)	Latitude (ft)	Departure (ft)	Vertical Section (ft)	Dogleg (°/100')
10474.00	88.52	91.87	7,848.50	34.99 N	2,915.40 E	2915.33	0.59
10569.00	88.99	89.48	7,850.56	33.87 N	3,010.36 E	3010.30	2.56
10663.00	88.36	90.73	7,852.74	33.69 N	3,104.34 E	3104.27	1.49
10757.00	89.23	91.04	7,854.71	32.24 N	3,198.30 E	3198.24	0.98
10851.00	90.89	90.37	7,854.61	31.08 N	3,292.29 E	3292.23	1.91
10946.00	91.23	90.91	7,852.85	30.02 N	3,387.27 E	3387.21	0.68
11039.00	90.93	90.27	7,851.10	29.05 N	3,480.25 E	3480.19	0.76
11134.00	90.80	89.05	7,849.67	29.61 N	3,575.23 E	3575.18	1.29
11229.00	89.35	90.13	7,849.54	30.29 N	3,670.23 E	3670.17	1.90
11323.00	87.58	92.83	7,852.06	27.86 N	3,764.15 E	3764.09	3.43
11419.00	86.87	93.53	7,856.71	22.54 N	3,859.89 E	3859.84	1.04
11513.00	88.40	92.82	7,860.59	17.33 N	3,953.66 E	3953.62	1.79
11608.00	89.94	92.98	7,861.97	12.54 N	4,048.52 E	4048.50	1.63
11703.00	89.94	93.22	7,862.07	7.40 N	4,143.39 E	4143.37	0.26
11798.00	90.83	92.34	7,861.43	2.79 N	4,238.27 E	4238.26	1.32
11893.00	89.16	90.01	7,861.44	0.84 N	4,333.24 E	4333.23	3.02
11987.00	88.37	91.60	7,863.46	0.48 S	4,427.20 E	4427.20	1.89
12082.00	86.95	91.04	7,867.34	2.66 S	4,522.10 E	4522.10	1.60
12102.00	87.22	90.72	7,868.35	2.97 S	4,542.07 E	4542.07	2.12
12186.00	87.22	90.72	7,872.43	4.02 S	4,625.96 E	4625.96	0.01



DIRECTIONAL SURVEY DATA NOTES

- Calculation based on minimum curvature method.
- Survey coordinates relative to well system reference point.
- TVD values given relative to drilling measurement point.
- Vertical section relative to well head.
- Vertical section is computed along a direction of 90.10 degrees (Grid)
- A total correction of 7.72 deg from Magnetic north to Grid north has been applied
- Horizontal displacement is relative to the well head.
- Horizontal displacement (closure) at 12,186.00 feet is 4,625.97 feet along 90.05 degrees (Grid)

SURVEYS CALCULATED USING THE LONG COLLAR METHOD.

TIE ON SURVEY ASSUMED VERTICAL AT WELLHEAD.

SURVEYS FROM 39.05' MD TO 7173.05' MD PROVIDED BY VAUGHN ENERGY SERVICES.

SURVEYS FROM 7221' MD TO 12102' MD PROVIDED BY SPERRY DRILLING MWD.

SURVEY AT 12102' MD HAS BEEN PROJECTED TO TD AT 12186' MD.

SPERRY DRILLING ENGINEERS : TUNDE ABASS, CHRIS NWUZO

WARRANTY

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Sperry Drilling



HALLIBURTON / SPERRY DRILLING
3950 INTERWOOD SOUTH PARKWAY
HOUSTON, TEXAS 77032-3346

PHONE : 281-986-4400

FAX : 281-986-4498

Job No: HD-XX-0009330897

Well Name: Emerald PWU 20 4H

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