VES
VAUGHN ENERGY SERVICES
A GYRO TECHNOLOGIES INC. COMPANY

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

30-015-39394

February 24, 2012

Devon Energy Production Company
20 North Broadway
Oklahoma City, OK 73102

Attn: Mark Cooper

Re: **Rigel 20 Fed Com 2H**

Please find enclosed a copy of the survey from 0' to 8,234.77' 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 29th day of February, A.D., 2012, by Keith Havelka.

Laura Ballew
Laura Ballew
Notary Public, State of Texas

LAURA BALLEW
Notary Public, State of Texas
My Commission Expires
January 28, 2014

Company: Devon Energy
Lease/Well: Rigel 20 Fed Com/2H
Location: S20 T19S R31E
Rig Name: McVay 10
State/County: New Mexico/Eddy
Latitude: 32.65
GRID North is 0.23 Degrees East of True North
VS-Azi: 0.00 Degrees

RKB : 20 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS
Filename: rigel20fedcom-01_ed.ut
Minimum Curvature Method
Report Date/Time: 2/24/2012 / 15:07

Vaughn Energy Services
Gardendale, Texas
817-741-3610
Surveyor: Ray Seago
Rigel 20 Fed Com 2H / API 30-015-39394

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	****
178.29	0.38	84.61	178.29	0.05	0.58	0.05	0.58	84.61	0.21
271.97	0.50	88.24	271.97	0.10	1.29	0.10	1.30	85.75	0.13
365.65	0.52	79.29	365.64	0.19	2.11	0.19	2.12	84.94	0.09
459.33	1.17	72.93	459.31	0.55	3.45	0.55	3.49	80.98	0.71
553.01	1.95	81.37	552.96	1.07	5.94	1.07	6.04	79.81	0.87
646.69	2.41	80.71	646.57	1.63	9.46	1.63	9.60	80.25	0.49
740.37	2.04	80.04	740.18	2.23	13.04	2.23	13.23	80.29	0.40
834.05	1.65	76.19	833.81	2.84	15.99	2.84	16.24	79.93	0.44
927.73	1.83	60.88	927.45	3.89	18.60	3.89	19.01	78.19	0.53
1021.41	1.70	52.40	1021.08	5.47	21.01	5.47	21.71	75.42	0.31
1115.09	1.78	32.74	1114.72	7.54	22.90	7.54	24.11	71.78	0.64
1208.77	1.87	32.04	1208.35	10.06	24.50	10.06	26.49	67.67	0.10
1302.45	1.87	27.65	1301.98	12.72	26.03	12.72	28.97	63.96	0.15
1396.13	1.95	40.22	1395.61	15.29	27.77	15.29	31.70	61.16	0.45
1489.81	3.25	38.70	1489.19	18.59	30.46	18.59	35.68	58.61	1.38
1583.49	3.01	44.21	1582.73	22.42	33.83	22.42	40.59	56.47	0.41
1677.17	3.29	52.01	1676.27	25.84	37.67	25.84	45.68	55.55	0.55
1770.85	3.74	54.01	1769.77	29.29	42.26	29.29	51.42	55.28	0.49

VES Survey Date: 02/18/2012

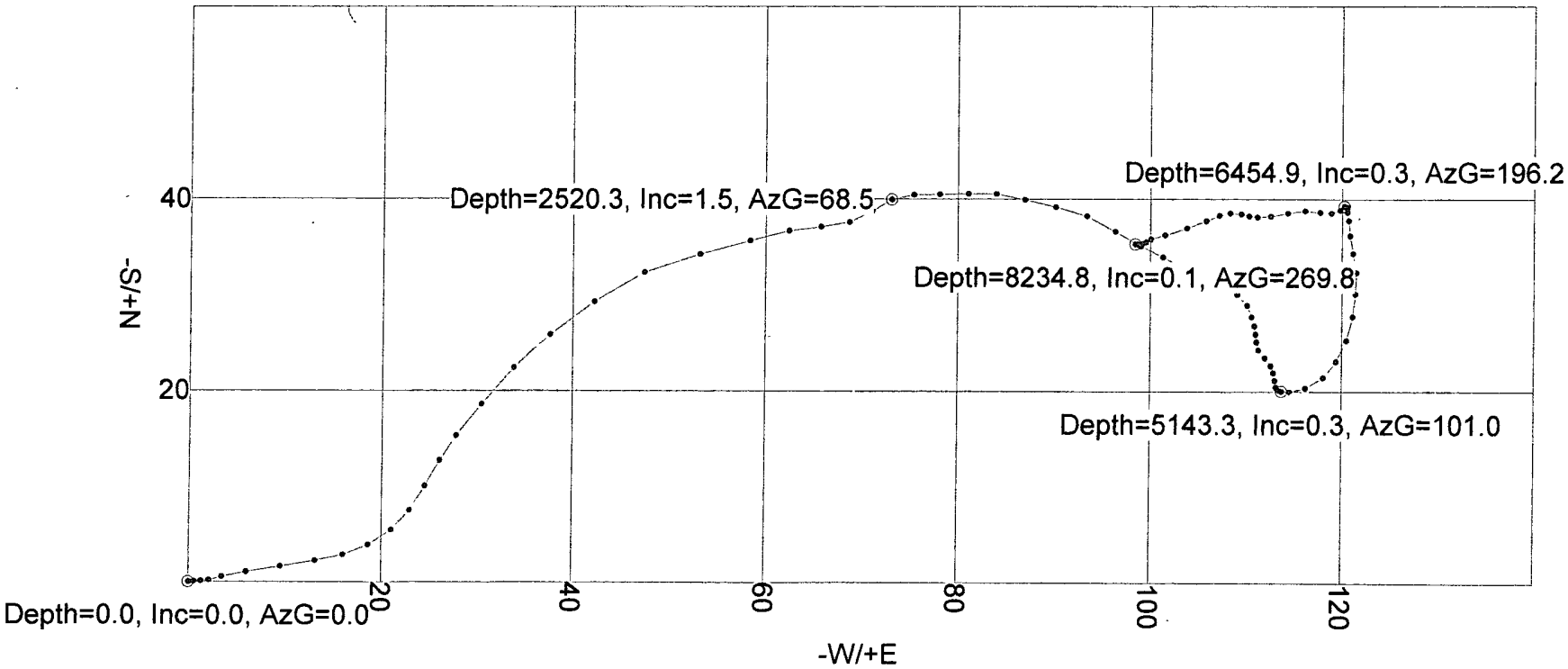
Measured Depth FT	Incl. Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Section FT	Distance FT	Direction Deg	Severity Deg/100
1864.53	3.70	65.32	1863.26	32.35	47.48	32.35	57.45	55.73	0.78
1958.21	3.71	77.76	1956.74	34.25	53.18	34.25	63.26	57.22	0.86
2051.89	2.90	71.13	2050.27	35.66	58.38	35.66	68.41	58.59	0.96
2145.57	2.22	81.19	2143.85	36.70	62.42	36.70	72.41	59.54	0.86
2239.25	1.85	84.69	2237.48	37.12	65.72	37.12	75.48	60.54	0.41
2332.93	1.79	77.17	2331.11	37.58	68.66	37.58	78.27	61.30	0.26
2426.61	1.52	49.42	2424.75	38.72	71.03	38.72	80.90	61.40	0.89
2520.29	1.45	68.55	2518.40	39.96	73.08	39.96	83.30	61.33	0.53
2613.97	1.49	87.77	2612.05	40.45	75.41	40.45	85.57	61.79	0.53
2707.65	1.80	90.17	2705.69	40.49	78.10	40.49	87.97	62.60	0.33
2801.33	1.84	87.70	2799.32	40.55	81.06	40.55	90.64	63.43	0.09
2895.01	1.73	93.32	2892.96	40.52	83.98	40.52	93.24	64.24	0.22
2988.69	2.02	108.11	2986.59	39.93	86.95	39.93	95.68	65.34	0.60
3082.37	2.05	98.54	3080.21	39.17	90.18	39.17	98.32	66.52	0.36
3176.05	2.09	113.86	3173.83	38.23	93.39	38.23	100.91	67.74	0.59
3269.73	2.03	123.62	3267.45	36.62	96.33	36.62	103.06	69.19	0.38
3363.41	1.72	113.54	3361.08	35.14	99.00	35.14	105.05	70.46	0.48
3457.09	1.49	120.88	3454.72	33.95	101.34	33.95	106.87	71.48	0.33
3550.77	1.21	112.22	3548.38	32.95	103.30	32.95	108.43	72.31	0.37
3644.45	0.67	104.57	3642.04	32.44	104.74	32.44	109.65	72.79	0.60
3738.13	1.11	115.40	3735.71	31.92	106.09	31.92	110.79	73.26	0.50
3831.81	1.06	128.02	3829.38	31.00	107.59	31.00	111.96	73.93	0.26
3925.49	1.09	117.13	3923.04	30.06	109.06	30.06	113.13	74.59	0.22
4019.17	0.92	161.28	4016.71	28.93	110.10	28.93	113.84	75.28	0.83
4112.85	0.64	153.32	4110.38	27.75	110.58	27.75	114.01	75.91	0.33
4206.53	0.60	174.87	4204.05	26.80	110.85	26.80	114.05	76.41	0.25
4300.21	0.48	163.81	4297.73	25.93	111.01	25.93	114.00	76.85	0.17
4393.89	0.53	184.26	4391.40	25.12	111.08	25.12	113.89	77.26	0.20
4487.57	0.57	149.56	4485.08	24.28	111.29	24.28	113.91	77.69	0.35
4581.25	0.74	131.51	4578.75	23.48	111.98	23.48	114.42	78.16	0.28
4674.93	0.53	159.83	4672.43	22.67	112.58	22.67	114.84	78.61	0.40
4768.61	0.42	156.16	4766.10	21.95	112.87	21.95	114.99	78.99	0.12
4862.29	0.55	178.30	4859.78	21.19	113.02	21.19	114.99	79.38	0.24
4955.97	0.32	157.30	4953.46	20.50	113.14	20.50	114.98	79.73	0.30
5049.65	0.17	122.04	5047.14	20.18	113.35	20.18	115.14	79.90	0.22
5143.33	0.34	101.02	5140.82	20.06	113.74	20.06	115.50	80.00	0.21
5237.01	0.66	90.55	5234.49	20.00	114.56	20.00	116.29	80.10	0.36
5330.69	1.46	71.04	5328.16	20.38	116.23	20.38	118.01	80.05	0.93
5424.37	1.23	47.27	5421.81	21.46	118.11	21.46	120.04	79.70	0.64

VES Survey Date: 02/18/2012

Measured Depth FT	Incl. Angle Deg	Azim. Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Section FT	Distance FT	Direction Deg	Severity Deg/100
5518.05	1.36	29.77	5515.47	23.11	119.40	23.11	121.62	79.05	0.44
5611.73	1.60	22.69	5609.12	25.28	120.46	25.28	123.08	78.15	0.32
5705.41	1.57	6.14	5702.76	27.76	121.10	27.76	124.24	77.09	0.49
5799.09	1.36	7.86	5796.41	30.13	121.39	30.13	125.07	76.06	0.22
5892.77	1.38	356.28	5890.06	32.36	121.46	32.36	125.70	75.08	0.30
5986.45	1.12	343.20	5983.72	34.36	121.13	34.36	125.91	74.16	0.41
6080.13	1.19	357.03	6077.38	36.21	120.81	36.21	126.12	73.31	0.31
6173.81	0.72	351.87	6171.05	37.77	120.68	37.77	126.45	72.62	0.51
6267.49	0.39	350.55	6264.73	38.67	120.54	38.67	126.59	72.21	0.36
6361.17	0.32	338.48	6358.40	39.23	120.39	39.23	126.62	71.95	0.11
6454.85	0.27	196.18	6452.08	39.26	120.23	39.26	126.48	71.92	0.60
6548.53	0.54	244.44	6545.76	38.86	119.77	38.86	125.92	72.03	0.44
6642.21	0.63	257.92	6639.44	38.56	118.88	38.56	124.97	72.03	0.17
6735.89	0.86	284.19	6733.11	38.62	117.69	38.62	123.87	71.83	0.43
6829.57	1.08	269.44	6826.77	38.79	116.13	38.79	122.43	71.53	0.36
6923.25	1.19	256.17	6920.44	38.55	114.30	38.55	120.63	71.36	0.30
7016.93	1.01	262.11	7014.10	38.20	112.54	38.20	118.85	71.25	0.23
7110.61	0.70	272.23	7107.77	38.11	111.15	38.11	117.50	71.07	0.36
7204.29	0.42	288.77	7201.44	38.24	110.26	38.24	116.70	70.87	0.35
7297.97	0.59	281.45	7295.12	38.45	109.46	38.45	116.02	70.65	0.20
7391.65	0.82	268.20	7388.79	38.52	108.31	38.52	114.96	70.42	0.30
7485.33	0.61	242.44	7482.47	38.27	107.20	38.27	113.83	70.35	0.40
7579.01	1.20	251.97	7576.13	37.74	105.83	37.74	112.35	70.37	0.64
7672.69	1.45	247.03	7669.79	36.97	103.81	36.97	110.20	70.40	0.29
7766.37	1.47	257.65	7763.44	36.26	101.55	36.26	107.83	70.35	0.29
7860.05	0.44	245.78	7857.11	35.85	100.05	35.85	106.28	70.29	1.11
7953.73	0.31	229.47	7950.78	35.54	99.53	35.54	105.68	70.35	0.18
8047.41	0.29	268.08	8044.46	35.37	99.09	35.37	105.21	70.36	0.21
8141.09	0.22	268.50	8138.14	35.35	98.67	35.35	104.82	70.29	0.08
8234.77	0.10	269.80	8231.82	35.35	98.41	35.35	104.57	70.24	0.12

VES Survey Date: 02/18/2012

Vaughn Energy Services
Gardendale, Texas
817-741-3610
Surveyor: Ray Seago
Rigel 20 Fed Com 2H / API 30-015-39394



VES Survey Date: 02/18/2012

Pathfinder

6213 WCR 112
Midland, Texas 79706
Tel (432)687-1647
Fax (432)687-1544

PATHFINDER
A Schlumberger Company

March 26, 2012

Devon Energy
20 N. Broadway
Oklahoma City, OK

RE: Devon Energy
Rigel 20 Fed Com #2H
API: 30-015-39394
Eddy County, NM
RIG: MCVAY 10
FIELD: Hackberry; Bone Spring, NW
PES FILE NO.: 700005143-WT-WT

To whom it may concern:

We hereby certify that the enclosed Original Field Survey Data contained in this report represents to the best of our knowledge, a true and accurate survey of the well at the time the survey was run.

DIRECTIONAL SURVEY DATA
1 – Original survey report
2 – Survey report copies

We appreciate the opportunity to work with you and we look forward to your business support. If you have any questions, I can be reached at (432) 687-1647

Sincerely,

STEVE BIBB
M/LWD Service Coordinator
PathFinder Energy Services

ML:sh

PATHFINDER®

A Schlumberger Company

DIRECTIONAL SURVEY REPORT

DEVON ENERGY

RIGEL 20 FED COM #2H

EDDY COUNTY, NEW MEXICO

PREPARED BY: ***STEVE BIBB***

Pathfinder

6213 WCR 112
Midland, Texas 79706
Tel (432)687-1647
Fax (432)687-1544

PATHFINDER®
A Schlumberger Company

DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES

2. NAME OF PERSON(S) PERFORMING SURVEY:
   A) GEORGE SAKAS

3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)

4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 02-19-12 TO 02-28-12

5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO

6. LOCATION OF WELL: EDDY COUNTY

7. TYPE OF SURVEY(S) PERFORMED: GAMMA-RAY

8. COMPLETE IDENTIFICATION OF WELL:

   DEVON ENERGY
   RIGEL 20 FEDERAL COM #2H
   EDDY COUNTY, NM
   RIG: MCVAY 10

9. SURVEY CERTIFIED FROM: 8278 TO 13032 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 4602.65 FEET ON A BEARING OF 89.43 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 13117 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

STEVE BIBB
M/LWD SERVICE COORDINATOR

PathFinder Energy Services, Inc.
BHL Report

Tie-in Date: 02/18/2012
Date Completed: 02/28/2012

DEVON ENERGY
RIGEL 20 FEDERAL COM #2H
EDDY COUNTY, NM
Rig:MCVAY 10
PathFinder Office Supervisor: STEVE BIBB
PathFinder Field Engineers:G.SAKAS
S.CARRILLO

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.38.52.9225 N LON:103.53.56.2007 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coor: X: 675037.6700 Y: 599759.1400
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.46° EAST TO GRID
Vertical Section Plane: 89.68
Survey Vert. Reference: 20.00' Kelly Bushing To Ground
Altitude:3413.30' Ground To MSL

Measured Depth	13117.00	(feet)
Inclination	91.19	(deg)
Azimuth	87.56	(deg)
True Vertical Depth	8898.73	(feet)
Vertical Section	4602.60	(feet)
Survey X cord	679640.07	(feet)
Survey Y cord	599805.28	(feet)
Survey Lat	32.64810821 N	(deg)
Survey Lon	103.88399131 W	(deg)
Rectangular Corr. N/S	46.16 N	(feet)
Rectangular Corr. E/W	4602.42 E	(feet)
Closure Distance	4602.65	(feet)
Direction of Closure	89.43	(deg)
Dogleg Severity	0.00	(deg/100ft)

Tie-in Date: 02/18/2012
Date Completed: 02/28/2012

PathFinder Energy Services, Inc.
Survey Report

DEVON ENERGY
RIGEL 20 FEDERAL COM #2H
EDDY COUNTY, NM
Rig:MCVAY 10
PathFinder Office Supervisor: STEVE BIBB
PathFinder Field Engineers: G.SAKAS
S.CARRILLO

Survey Calculations by RX5 V6.03E using Minimum Curvature

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.38.52.9225 N LON:103.53.56.2007 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coor: X: 675037.6700 Y: 599759.1400
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.46° EAST TO GRID
Vertical Section Plane: 89.68
Survey Vert. Reference: 20.00' Kelly Bushing To Ground
Altitude:3413.30' Ground To MSL

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
TIED INTO MULTI SHOT GYRO SURVEY @ 8234.77'MD.										
8234.77	0.10	269.80	8231.82	0.00	98.61	35.35 N	98.41 E	104.57@	70.24	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
8278.00	1.06	128.03	8275.05	43.23	98.88	35.10 N	98.69 E	104.74@	70.42	2.64
8310.00	3.87	98.79	8307.02	32.00	100.18	34.76 N	99.99 E	105.86@	70.83	9.34
8342.00	7.30	94.77	8338.86	32.00	103.27	34.42 N	103.08 E	108.68@	71.53	10.78
8374.00	10.55	91.56	8370.47	32.00	108.23	34.17 N	108.04 E	113.31@	72.45	10.27
8405.00	13.54	88.24	8400.78	31.00	114.69	34.21 N	114.50 E	119.50@	73.37	9.90
8437.00	15.83	85.89	8431.74	32.00	122.79	34.64 N	122.60 E	127.40@	74.23	7.39
8469.00	18.73	85.75	8462.29	32.00	132.28	35.33 N	132.08 E	136.72@	75.03	9.06
8501.00	22.34	87.07	8492.25	32.00	143.48	36.02 N	143.28 E	147.74@	75.89	11.37
8533.00	26.03	88.45	8521.44	32.00	156.58	36.52 N	156.38 E	160.59@	76.85	11.67
8564.00	29.37	89.30	8548.88	31.00	170.99	36.80 N	170.78 E	174.70@	77.84	10.85
8596.00	33.06	88.58	8576.24	32.00	187.57	37.11 N	187.36 E	191.00@	78.80	11.59
8628.00	35.61	88.62	8602.66	32.00	205.61	37.55 N	205.40 E	208.81@	79.64	7.97
8660.00	38.78	89.14	8628.15	32.00	224.95	37.93 N	224.74 E	227.92@	80.42	9.95
8691.00	41.59	89.55	8651.83	31.00	244.95	38.15 N	244.74 E	247.70@	81.14	9.10
8723.00	43.79	90.03	8675.35	32.00	266.65	38.23 N	266.44 E	269.17@	81.83	6.95
8755.00	45.55	90.80	8698.11	32.00	289.14	38.07 N	288.93 E	291.43@	82.49	5.75
8786.00	48.10	91.26	8719.32	31.00	311.74	37.66 N	311.54 E	313.80@	83.11	8.30
8818.00	50.47	91.46	8740.19	32.00	335.98	37.08 N	335.78 E	337.82@	83.70	7.42
8850.00	53.38	91.80	8759.92	32.00	361.16	36.36 N	360.96 E	362.79@	84.25	9.13
8882.00	56.98	93.25	8778.19	32.00	387.39	35.20 N	387.20 E	388.79@	84.81	11.85
8914.00	60.50	94.04	8794.80	32.00	414.67	33.46 N	414.49 E	415.84@	85.39	11.20
8945.00	63.66	93.42	8809.31	31.00	441.99	31.68 N	441.82 E	442.96@	85.90	10.35
8977.00	67.36	93.17	8822.57	32.00	471.05	30.00 N	470.89 E	471.85@	86.35	11.58

PathFinder Energy Services, Inc.
Survey Report

DEVON ENERGY
RIGEL 20 FEDERAL COM #2H
EDDY COUNTY, NM
RIG:MCVAY 10

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
9009.00	70.26	92.50	8834.14	32.00	500.84	28.53 N	500.69 E	501.50@	86.74	9.27
9041.00	72.98	92.58	8844.23	32.00	531.16	27.18 N	531.02 E	531.72@	87.07	8.50
9072.00	76.68	91.80	8852.34	31.00	561.05	26.04 N	560.91 E	561.52@	87.34	12.18
9104.00	79.84	92.33	8858.85	32.00	592.35	24.91 N	592.22 E	592.74@	87.59	10.01
9136.00	82.04	92.06	8863.89	32.00	623.92	23.70 N	623.80 E	624.25@	87.82	6.93
9168.00	85.30	91.48	8867.41	32.00	655.70	22.72 N	655.58 E	655.97@	88.01	10.35
9199.00	87.23	91.89	8869.43	31.00	686.61	21.81 N	686.50 E	686.85@	88.18	6.36
9231.00	89.69	91.23	8870.29	32.00	718.58	20.94 N	718.47 E	718.78@	88.33	7.96
9327.00	92.07	90.94	8868.82	96.00	814.53	19.12 N	814.44 E	814.66@	88.65	2.50
9422.00	91.98	88.38	8865.46	95.00	909.47	19.69 N	909.37 E	909.58@	88.76	2.69
9517.00	91.63	87.69	8862.47	95.00	1004.38	22.94 N	1004.27 E	1004.53@	88.69	0.81
9613.00	90.84	88.85	8860.40	96.00	1100.32	25.84 N	1100.20 E	1100.50@	88.65	1.46
9707.00	89.52	88.37	8860.11	94.00	1194.31	28.12 N	1194.17 E	1194.50@	88.65	1.49
9803.00	87.85	88.77	8862.31	96.00	1290.26	30.52 N	1290.11 E	1290.47@	88.65	1.79
9899.00	89.16	87.81	8864.81	96.00	1386.19	33.38 N	1386.03 E	1386.43@	88.62	1.69
9994.00	88.90	87.56	8866.42	95.00	1481.12	37.22 N	1480.94 E	1481.41@	88.56	0.38
10089.00	88.29	88.84	8868.75	95.00	1576.06	40.20 N	1575.86 E	1576.37@	88.54	1.49
10185.00	87.49	88.63	8872.28	96.00	1671.98	42.32 N	1671.77 E	1672.31@	88.55	0.86
10280.00	86.88	90.29	8876.95	95.00	1766.86	43.21 N	1766.65 E	1767.18@	88.60	1.86
10375.00	87.49	90.61	8881.62	95.00	1861.74	42.47 N	1861.53 E	1862.01@	88.69	0.72
10471.00	88.46	90.02	8885.01	96.00	1957.67	41.94 N	1957.47 E	1957.92@	88.77	1.18
10566.00	87.93	90.65	8888.00	95.00	2052.62	41.38 N	2052.42 E	2052.84@	88.84	0.87
10661.00	88.90	90.27	8890.63	95.00	2147.57	40.62 N	2147.38 E	2147.76@	88.92	1.10
10757.00	87.41	91.83	8893.72	96.00	2243.49	38.86 N	2243.31 E	2243.64@	89.01	2.25
10852.00	88.64	91.08	8896.99	95.00	2338.38	36.45 N	2338.22 E	2338.50@	89.11	1.52
10948.00	89.69	90.62	8898.39	96.00	2434.35	35.03 N	2434.19 E	2434.45@	89.18	1.19
11043.00	90.84	90.20	8897.95	95.00	2529.34	34.35 N	2529.19 E	2529.42@	89.22	1.29
11137.00	90.40	89.88	8896.94	94.00	2623.33	34.28 N	2623.18 E	2623.41@	89.25	0.58

PathFinder Energy Services, Inc.
Survey Report

DEVON ENERGY
RIGEL 20 FEDERAL COM #2H
EDDY COUNTY, NM
RIG:MCVAY 10

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
11230.00	90.04	91.10	8896.58	93.00	2716.32	33.49 N	2716.18 E	2716.38@	89.29	1.37
11322.00	91.45	90.53	8895.38	92.00	2808.29	32.18 N	2808.16 E	2808.34@	89.34	1.65
11416.00	89.52	90.90	8894.59	94.00	2902.27	31.01 N	2902.14 E	2902.31@	89.39	2.09
11510.00	89.16	90.81	8895.67	94.00	2996.24	29.61 N	2996.12 E	2996.27@	89.43	0.39
11603.00	90.13	90.88	8896.25	93.00	3089.22	28.23 N	3089.11 E	3089.24@	89.48	1.05
11719.00	90.40	90.81	8895.71	116.00	3205.20	26.52 N	3205.10 E	3205.21@	89.53	0.24
11813.00	87.85	90.61	8897.14	94.00	3299.16	25.36 N	3299.07 E	3299.17@	89.56	2.72
11907.00	88.02	90.57	8900.53	94.00	3393.09	24.39 N	3393.01 E	3393.09@	89.59	0.19
12001.00	88.20	90.40	8903.63	94.00	3487.03	23.60 N	3486.95 E	3487.03@	89.61	0.26
12096.00	88.11	90.00	8906.69	95.00	3581.98	23.26 N	3581.90 E	3581.98@	89.63	0.43
12191.00	89.25	89.76	8908.88	95.00	3676.95	23.46 N	3676.87 E	3676.95@	89.63	1.23
12284.00	89.16	89.23	8910.17	93.00	3769.94	24.28 N	3769.86 E	3769.94@	89.63	0.58
12378.00	89.78	88.63	8911.04	94.00	3863.93	26.04 N	3863.84 E	3863.93@	89.61	0.92
12471.00	90.84	89.22	8910.54	93.00	3956.91	27.78 N	3956.82 E	3956.92@	89.60	1.30
12565.00	90.92	88.98	8909.09	94.00	4050.90	29.26 N	4050.80 E	4050.90@	89.59	0.27
12659.00	91.01	89.02	8907.51	94.00	4144.88	30.90 N	4144.77 E	4144.88@	89.57	0.10
12752.00	91.10	88.48	8905.80	93.00	4237.85	32.93 N	4237.73 E	4237.86@	89.55	0.59
12845.00	91.10	88.08	8904.01	93.00	4330.80	35.72 N	4330.67 E	4330.82@	89.53	0.43
12938.00	91.01	88.00	8902.30	93.00	4423.75	38.90 N	4423.60 E	4423.77@	89.50	0.13
13032.00	91.19	87.56	8900.49	94.00	4517.68	42.54 N	4517.51 E	4517.71@	89.46	0.51
STRAIGHT LINE PROJECTION TO BIT @ 13117' MD.										
13117.00	91.19	87.56	8898.73	85.00	4602.60	46.16 N	4602.42 E	4602.65@	89.43	0.00

FINDER

A Schlumberger Company

TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	DEVON ENERGY		
LEASE / WELL No.:	RIGEL 20 FEDERAL COM	2H	
WELL LOCATION:	EDDY COUNTY		
COUNTY / STATE / COUNTRY:	EDDY COUNTY	NM	USA
RIG:	McVAY 10		
API WELL No:	30-015-39394		
JOB No:	700005143-WT-WT		
P.O. / AFE No.	158210		
DIRECTIONAL COMPANY:	PATHFINDER ENERGY SERVICES		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):					
On Wall Plat:	7.459936	*LWD Calculated:*	7.451189	**Agreed Upon:**	7.45
X =	675037 670000	Feet	Y =	599759.140000	Feet
SITE LATITUDE:	32.648034	SITE LONGITUDE:	103.898945		
GRID SYSTEM:	TRUE ☐ UTM ☑ LAMBERT ☐	ZONE: NEW MEXICO EAST NAD 83			
PROPOSED DRIFT DIRECTION:	89.68				
KELLY BUSHING ELEVATION:	20				
ALTITUDE:	3413.3	Feet	WATER DEPTH:	N/A	Feet

TIE-IN SURVEY

MEASURED DEPTH:	8234.77			
DRIFT ANGLE:	0.1			
DRIFT DIRECTION:	269.80			
TRUE VERTICAL DEPTH:	8231.82			
VERTICAL SECTION:	35.35			
RECTANGULAR COORDINATE (N / S) :	35.35			
RECTANGULAR COORDINATE (E / W) :	98.41			
CLOSURE DISTANCE / DIRECTION:				
SURVEY CALCULATION METHOD:	AA ☐	MC ☑	RC ☐	BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	VAUGHN ENERGY SERVICES			
COPY OF TIE-IN SURVEY REPORT	☑YES		☐ NO	

WELL PLAN

KICKOFF DEPTH:	8291'	TOTAL DEPTH:	13357'
KICKOFF ANGLE:	0°	MAX ANGLE:	90

PES Engineers: GEORGE SAKAS

SAUL CARRILLO

**Signature of both field engineers required if applicable

Directional Driller: _____

DATE: 18-Feb-2012

Company: Devon Energy
Lease/Well: Rigel 20 Fed Com/2H
Location: S20 T19S R31E
Rig Name: McVay 10
State/County: New Mexico/Eddy
Latitude: 32.65, Longitude: -103.90
GRID North is 0.23 Degrees East of True North
VS-Azi: 0.00 Degrees

devon

VES
VAUGHN ENERGY SER

FIELD COPY ONLY (NOT DEFINITIVE)

RKB · 20 feet

DRILLOG MS GYRO SURVEY CALCULATIONS
Filename: rigel20fedcom-01_ed.ut
Minimum Curvature Method
Report Date/Time: 2/19/2012 / 23:11

Vaughn Energy Services
Gardendale, Texas
817-741-3610
Ray Seago

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	****
178 29	0.38	84.61	178.29	0.05	0.58	0.05	0.58	84.61	0 21
271.97	0.50	88 24	271.97	0.10	1.29	0.10	1.30	85.75	0.13
365 65	0.52	79.29	365.64	0.19	2.11	0.19	2.12	84.94	0.09
459 33	1.17	72.93	459.31	0.55	3.45	0 55	3.49	80.98	0.71
553.01	1.95	81.37	552.96	1.07	5.94	1.07	6.04	79.81	0.87
646.69	2.41	80.71	646.57	1.63	9.46	1.63	9.60	80.25	0.49
740.37	2.04	80.04	740.18	2.23	13.04	2.23	13.23	80.29	0.40
834.05	1.65	76.19	833.81	2.84	15.99	2.84	16.24	79.93	0 44
927.73	1.83	60.88	927.45	3.89	18.60	3.89	19.01	78.19	0.53
1021.41	1.70	52.40	1021.08	5.47	21.01	5.47	21.71	75.42	0.31
1115 09	1.78	32.74	1114 72	7.54	22 90	7.54	24.11	71.78	0.64
1208 77	1.87	32.04	1208.35	10.06	24.50	10.06	26.49	67.67	0.10
1302.45	1.87	27.65	1301.98	12.72	26.03	12.72	28.97	63.96	0.15
1396.13	1.95	40.22	1395.61	15.29	27.77	15.29	31.70	61.16	0.45
1489.81	3.25	38 70	1489.19	18.59	30.46	18.59	35.68	58.61	1.38
1583.49	3.01	44.21	1582.73	22.42	33.83	22.42	40.59	56.47	0.41
1677.17	3 29	52.01	1676.27	25.84	37.67	25.84	45.68	55.55	0.55
1770.85	3.74	54.01	1769.77	29.29	42.26	29.29	51.42	55 28	0.49
1864 53	3.70	65.32	1863.26	32.35	47.48	32.35	57.45	55.73	0.78
1958 21	3.71	77.76	1956.74	34.25	53.18	34.25	63.26	57.22	0.86
2051.89	2.90	71.13	2050.27	35.66	58.38	35.66	68.41	58.59	0.96
2145 57	2.22	81.19	2143.85	36.70	62.42	36.70	72 41	59.54	0 86
2239.25	1.85	84.69	2237.48	37.12	65.72	37.12	75.48	60.54	0.41
2332.93	1.79	77.17	2331.11	37.58	68.66	37.58	78.27	61 30	0.26
2426.61	1.52	49 42	2424.75	38.72	71.03	38.72	80.90	61.40	0.89
2520.29	1.45	68.55	2518.40	39.96	73.08	39.96	83.30	61.33	0.53
2613.97	1.49	87.77	2612.05	40.45	75.41	40.45	85.57	61.79	0.53
2707.65	1.80	90.17	2705.69	40.49	78.10	40.49	87.97	62.60	0.33
2801.33	1.84	87.70	2799.32	40.55	81.06	40.55	90.64	63.43	0.09
2895.01	1.73	93.32	2892.96	40.52	83.98	40.52	93 24	64.24	0 22
2988.69	2.02	108.11	2986.59	39.93	86 95	39.93	95.68	65.34	0.60
3082.37	2.05	98.54	3080.21	39.17	90.18	39.17	98.32	66.52	0.36
3176.05	2.09	113.86	3173.83	38.23	93.39	38.23	100.91	67.74	0.59
3269.73	2.03	123.62	3267.45	36.62	96.33	36.62	103.06	69 19	0.38
3363.41	1.72	113.54	3361.08	35.14	99.00	35.14	105.05	70.46	0.48

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
3457.09	1.49	120.88	3454.72	33.95	101.34	33.95	106.87	71.48	0.33
3550.77	1.21	112.22	3548.38	32.95	103.30	32.95	108.43	72.31	0.37
3644.45	0.67	104.57	3642.04	32.44	104.74	32.44	109.65	72.79	0.60
3738.13	1.11	115.40	3735.71	31.92	106.09	31.92	110.79	73.26	0.50
3831.81	1.06	128.02	3829.38	31.00	107.59	31.00	111.96	73.93	0.26
3925.49	1.09	117.13	3923.04	30.06	109.06	30.06	113.13	74.59	0.22
4019.17	0 92	161.28	4016.71	28.93	110.10	28.93	113.84	75.28	0.83
4112.85	0.64	153.32	4110.38	27.75	110.58	27.75	114.01	75 91	0.33
4206.53	0.60	174.87	4204.05	26.80	110.85	26.80	114.05	76.41	0 25
4300.21	0.48	163.81	4297.73	25.93	111.01	25.93	114.00	76.85	0.17
4393.89	0.53	184.26	4391.40	25.12	111.08	25.12	113.89	77.26	0.20
4487.57	0.57	149 56	4485.08	24 28	111.29	24.28	113.91	77.69	0.35
4581.25	0.74	131.51	4578.75	23.48	111.98	23.48	114.42	78.16	0.28
4674.93	0.53	159.83	4672.43	22.67	112.58	22.67	114.84	78.61	0.40
4768.61	0.42	156.16	4766.10	21.95	112.87	21.95	114.99	78.99	0.12
4862.29	0.55	178.30	4859.78	21.19	113.02	21.19	114.99	79.38	0.24
4955.97	0.32	157.30	4953.46	20.50	113.14	20.50	114.98	79.73	0.30
5049.65	0.17	122.04	5047.14	20.18	113.35	20.18	115.14	79.90	0.22
5143.33	0.34	101.02	5140.82	20.06	113.74	20.06	115.50	80.00	0.21
5237.01	0.66	90.55	5234.49	20.00	114.56	20.00	116 29	80.10	0.36
5330.69	1.46	71.04	5328.16	20.38	116.23	20.38	118.01	80.05	0.93
5424.37	1.23	47.27	5421.81	21.46	118.11	21.46	120.04	79.70	0.64
5518.05	1.36	29.77	5515.47	23.11	119.40	23.11	121.62	79.05	0.44
5611.73	1.60	22.69	5609.12	25.28	120.46	25.28	123.08	78.15	0.32
5705.41	1.57	6.14	5702.76	27.76	121.10	27.76	124.24	77.09	0.49
5799.09	1.36	7.86	5796.41	30.13	121.39	30.13	125.07	76.06	0 22
5892.77	1.38	356.28	5890.06	32.36	121.46	32.36	125.70	75 08	0.30
5986.45	1.12	343.20	5983.72	34.36	121.13	34.36	125.91	74.16	0.41
6080.13	1.19	357.03	6077.38	36.21	120.81	36.21	126.12	73.31	0.31
6173.81	0.72	351.87	6171.05	37.77	120.68	37.77	126.45	72.62	0.51
6267.49	0.39	350.55	6264.73	38.67	120.54	38.67	126.59	72.21	0.36
6361.17	0.32	338.48	6358.40	39.23	120.39	39.23	126.62	71 95	0.11
6454 85	0.27	196.18	6452.08	39.26	120.23	39.26	126 48	71.92	0.60
6548 53	0.54	244.44	6545.76	38.86	119 77	38.86	125.92	72 03	0.44
6642.21	0.63	257.92	6639.44	38.56	118.88	38.56	124.97	72.03	0.17
6735.89	0.86	284.19	6733.11	38.62	117.69	38.62	123.87	71.83	0.43
6829.57	1.08	269.44	6826.77	38.79	116.13	38.79	122.43	71.53	0 36
6923.25	1.19	256.17	6920.44	38.55	114.30	38.55	120.63	71.36	0.30
7016.93	1.01	262.11	7014.10	38.20	112.54	38.20	118.85	71.25	0.23
7110 61	0.70	272.23	7107.77	38.11	111.15	38 11	117.50	71.07	0 36
7204 29	0.42	288.77	7201.44	38.24	110.26	38.24	116.70	70.87	0.35
7297.97	0.59	281.45	7295.12	38.45	109.46	38.45	116.02	70.65	0.20
7391.65	0.82	268.20	7388.79	38.52	108.31	38.52	114.96	70.42	0.30
7485.33	0.61	242.44	7482.47	38.27	107.20	38.27	113.83	70.35	0.40
7579.01	1.20	251.97	7576.13	37.74	105.83	37.74	112.35	70.37	0.64
7672.69	1.45	247.03	7669.79	36.97	103.81	36 97	110.20	70.40	0 29
7766.37	1.47	257.65	7763.44	36.26	101.55	36.26	107.83	70.35	0 29
7860.05	0.44	245.78	7857.11	35.85	100 05	35.85	106.28	70.29	1.11
7953.73	0.31	229.47	7950.78	35.54	99.53	35.54	105.68	70.35	0.18
8047.41	0.29	268.08	8044.46	35.37	99.09	35.37	105.21	70.36	0 21
8141.09	0.22	268.50	8138.14	35.35	98.67	35.35	104.82	70.29	0.08
8234.77	0.10	269.80	8231.82	35.35	98.41	35.35	104.57	70.24	0.12

HORIZONTAL DISPLACEMENT IS
104.57 FEET AT 70.24 DEGREES

33 7/8 5.
21 84 39

PATHFINDER®
A Schlumberger Company

PathFinder Energy Services, Inc.
Magnetic & Grid Calculations

Devon Energy
Rigel 20 Federal Com #2H
Eddy County, NM
Rig:McVay 10

Mon Jan 23 15:02:22 2012

Coordinates

Latitude:	32.648034 N (32 deg. 38 min. 52.9225 sec.)
Longitude:	103.898945 W (-103 deg. 53 min. 56.2007 sec.)
Elevation:	3433.30 feet.
Calculation Date:	Jan/23/2012

20 -
3433.30
3413.3 Gnd

Magnetic Calculations

Model:	IGRF2010
Dip Angle:	60.5080 degrees
Total Magnetic Field:	0.48775 gauss
Magnetic Declination:	7.694282 degrees
Horizontal Intensity:	0.240119 gauss

To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.694282 Degs

Transverse Mercator Grid Calculations NAD83

Grid System:	Transverse Mercator: new mexico east
Ellipsoid:	GRS80
X:	675037.6700 feet
Y:	599759.1400 feet
True to Grid: (convergence)	-0.234346 degrees
Magnetic to Grid:	7.459936 degrees

To Convert a Magnetic Dir. to a GRID dir. Add 7.459936 Degs.

OFFICE CALCULATION

PathFinder Energy Services, Inc.
Magnetic & Grid Calculations

DEVON ENERGY
RIGEL 20 FEDERAL COM #2H
HACKBERRY

Field Calculation

Sat Feb 18 17:06:20 2012

Coordinates

Latitude:	**32.648034 N (32 deg. 38 min. 52.9225 sec.)**
Longitude:	**103.898945 W (-103 deg. 53 min. 56.2007 sec.)**
Elevation:	**3433.30 feet.**
Calculation Date:	**Feb/18/2012**

Magnetic Calculations

Model:	**IGRF2010**
Dip Angle:	**60.5063 degrees**
Total Magnetic Field:	**0.48768 gauss**
Magnetic Declination:	**7.685535 degrees**
Horizontal Intensity:	**0.240097 gauss**

To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.685535 Degs

Transverse Mercator Grid Calculations NAD83

Grid System:	**Transverse Mercator: new mexico east**
Ellipsoid:	**GRS80**
X:	**675037.6700 feet**
Y:	**599759.1400 feet**
True to Grid: (convergence)	**-0.234346 degrees**
Magnetic to Grid:	**7.451189 degrees**

To Convert a Magnetic Dir. to a GRID dir. Add 7.451189 Degs.