

30-015-38611

# DEVON ENERGY

Hackberry (Nad 83)  
Eddy County, NM  
Arcturus "18" Federal #4H  
VH - Job #32K11111153

Survey: Gyro

## SDI Standard Survey Report

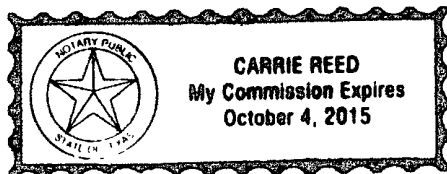
This survey is correct to the best of my knowledge and is supported by actual field data.

*Richard*

Notarized this date 12th of December, 2011.

*Carrie Reed*

Notary Signature  
County of Midland  
State of Texas



# Scientific Drilling International, Inc.

SDI Standard Survey Report



<b>Company:</b>	DEVON ENERGY	<b>Local Co-ordinate Reference:</b>	Well Arcturus "18" Federal #4H
<b>Project:</b>	Hackberry (Nad 83)	<b>TVD Reference:</b>	WELL @ 0 0usft (Original Well Elev)
<b>Site:</b>	Eddy County, NM	<b>MD Reference:</b>	WELL @ 0 0usft (Original Well Elev)
<b>Well:</b>	Arcturus "18" Federal #4H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	VH - Job #32K11111153	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	VH - Job #32K11111153	<b>Database:</b>	EDM-Regulatory

<b>Project:</b> Hackberry (Nad 83)			
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	New Mexico Eastern Zone		

<b>Site:</b> Eddy County, NM			
<b>Site Position:</b>		<b>Northing:</b>	602,783 73 usft
		<b>Latitude:</b>	32° 39' 23 058 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	669,825 44 usft
		<b>Longitude:</b>	103° 54' 57 024 W
<b>Position Uncertainty:</b>	0 0 usft	<b>Slot Radius:</b>	13-3/16"
		<b>Grid Convergence:</b>	0 23 °

<b>Well:</b> Arcturus "18" Federal #4H, Directional (Pathfinder)			
<b>Well Position</b>	<b>+N/-S</b>	0 0 usft	<b>Northing:</b> 602,733 52 usft
			<b>Latitude:</b> 32° 39' 22 561 N
	<b>+E/-W</b>	0 0 usft	<b>Easting:</b> 669,825 03 usft
			<b>Longitude:</b> 103° 54' 57 031 W
<b>Position Uncertainty</b>		0 0 usft	<b>Wellhead Elevation:</b> usft
			<b>Ground Level:</b> 0 0 usft

<b>Wellbore:</b> VH - Job #32K11111153			
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2010	11/26/2011	7 72
			<b>Dip Angle (°)</b> 60 52
			<b>Field Strength (nT)</b> 48,820

<b>Design:</b> VH - Job #32K11111153			
<b>Audit Notes:</b>			
<b>Version:</b>	1 0	<b>Phase:</b>	ACTUAL
		<b>Tie On Depth:</b>	0 0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0 0	0 0	0 0
			<b>Direction (°)</b> 99 13

<b>Survey Program:</b>		<b>Date:</b> 12/29/2011
From (usft)	To (usft)	Survey (Wellbore)
100 0	8,152 0	Gyro (VH - Job #32K11111153)
		<b>Tool Name:</b> Keeper
		<b>Description:</b> Keeper Gyro

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.0	0 00	0 00	0 0	0 0	0 0	0 00	0 0
100 0	0 67	165 46	100 0	-0 6	0 1	165 46	0 6
200 0	1 02	158 47	200 0	-2 0	0 6	162 44	2 1
300 0	0 95	163 74	300 0	-3 6	1 2	161 79	3 8
400 0	1 28	199 62	400 0	-5 4	1 0	169 20	5 5
500 0	1 41	199 17	499 9	-7 6	0 3	178 07	7 7
600 0	1 35	194 87	599 9	-9 9	-0 4	182 59	10 0
700 0	1 26	190 56	699 9	-12 2	-1 0	184 48	12 2
800 0	1 27	185 17	799 8	-14 4	-1 3	185 00	14 4
900 0	0 96	179 17	899 8	-16 3	-1 3	184 71	16 3
1,000 0	0 78	170 87	999 8	-17 8	-1 2	183 93	17 8
1,100 0	0 72	146 82	1,099 8	-19 0	-0 8	182 32	19 0

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<b>Project:</b>	Hackberry (Nad 83)	<b>TVD Reference:</b>	WELL @ 0 0usft (Original Well Elev)
<b>Site:</b>	Eddy County, NM	<b>MD Reference:</b>	WELL @ 0 0usft (Original Well Elev)
<b>Well:</b>	Arcturus "18" Federal #4H	<b>North Reference:</b>	Grid
<b>Wellbore Design:</b>	VH - Job #32K11111153 VH - Job #32K11111153	<b>Survey Calculation Method:</b>	Minimum Curvature
		<b>Database:</b>	EDM-Regulatory

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.0	0.83	97.61	1,199.8	-19.6	0.3	179.15	19.6
1,300.0	1.23	88.11	1,299.8	-19.7	2.1	173.96	19.8
1,400.0	1.68	91.01	1,399.8	-19.7	4.6	166.78	20.2
1,500.0	1.59	94.62	1,499.7	-19.8	7.5	159.34	21.2
1,600.0	1.85	89.55	1,599.7	-19.9	10.5	152.27	22.5
1,700.0	1.84	90.58	1,699.6	-19.9	13.7	145.50	24.2
1,800.0	1.88	88.64	1,799.6	-19.9	16.9	139.59	26.1
1,900.0	1.39	92.62	1,899.5	-19.9	19.8	135.18	28.1
2,000.0	1.12	100.18	1,999.5	-20.1	22.0	132.52	29.8
2,100.0	1.01	106.28	2,099.5	-20.6	23.8	130.86	31.4
2,200.0	0.97	110.40	2,199.5	-21.1	25.4	129.71	33.0
2,300.0	0.85	130.56	2,299.5	-21.9	26.8	129.26	34.6
2,400.0	0.93	131.49	2,399.4	-22.9	27.9	129.34	36.1
2,500.0	1.11	145.18	2,499.4	-24.2	29.1	129.79	37.9
2,600.0	1.24	148.48	2,599.4	-25.9	30.2	130.65	39.8
2,700.0	1.07	147.72	2,699.4	-27.7	31.3	131.49	41.7
2,800.0	0.96	153.88	2,799.4	-29.2	32.1	132.25	43.4
2,900.0	0.97	151.51	2,899.4	-30.7	32.9	133.00	45.0
3,000.0	0.96	148.34	2,999.3	-32.2	33.8	133.60	46.6
3,100.0	0.67	140.28	3,099.3	-33.3	34.6	133.94	48.0
3,200.0	0.76	136.77	3,199.3	-34.2	35.4	134.05	49.3
3,300.0	0.93	130.73	3,299.3	-35.3	36.5	134.03	50.7
3,400.0	1.09	131.30	3,399.3	-36.4	37.8	133.93	52.5
3,500.0	1.12	122.10	3,499.3	-37.6	39.3	133.68	54.4
3,600.0	1.09	124.98	3,599.3	-38.6	40.9	133.33	56.3
3,700.0	1.19	122.86	3,699.2	-39.7	42.6	133.01	58.3
3,800.0	1.14	119.27	3,799.2	-40.8	44.3	132.61	60.2
3,900.0	0.99	121.81	3,899.2	-41.7	45.9	132.25	62.1
4,000.0	0.74	120.86	3,999.2	-42.5	47.2	131.99	63.5
4,100.0	0.49	113.84	4,099.2	-43.0	48.2	131.76	64.6
4,200.0	0.39	105.59	4,199.2	-43.3	48.9	131.52	65.3
4,300.0	0.40	124.91	4,299.2	-43.6	49.5	131.35	66.0
4,400.0	0.38	151.79	4,399.2	-44.1	50.0	131.42	66.6
4,500.0	0.92	114.25	4,499.2	-44.7	50.8	131.31	67.7
4,600.0	1.30	126.69	4,599.1	-45.7	52.5	131.05	69.6
4,700.0	0.83	155.99	4,699.1	-47.0	53.7	131.22	71.4
4,800.0	0.74	187.91	4,799.1	-48.3	53.9	131.89	72.4
4,900.0	0.55	198.31	4,899.1	-49.4	53.7	132.66	73.0
5,000.0	0.61	200.81	4,999.1	-50.4	53.3	133.38	73.4
5,100.0	0.86	223.41	5,099.1	-51.4	52.6	134.35	73.6
5,200.0	0.84	220.82	5,199.1	-52.5	51.6	135.50	73.6
5,300.0	0.85	222.29	5,299.1	-53.6	50.6	136.65	73.8
5,400.0	0.90	209.76	5,399.1	-54.9	49.7	137.80	74.1
5,500.0	0.94	211.35	5,499.1	-56.2	48.9	138.98	74.5

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SDI Standard Survey Report



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<b>Project:</b>	Hackberry (Nad 83)	<b>TVD Reference:</b>	WELL @ 0 0usft (Original Well Elev)
<b>Site:</b>	Eddy County, NM	<b>MD Reference:</b>	WELL @ 0 0usft (Original Well Elev)
<b>Well:</b>	Arcturus "18" Federal #4H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	VH - Job #32K11111153	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	VH - Job #32K11111153	<b>Database:</b>	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600.0	0.97	214.39	5,599.0	-57.6	48.0	140.20	75.0
5,700.0	1.02	227.93	5,699.0	-58.9	46.9	141.50	75.3
5,800.0	1.15	229.76	5,799.0	-60.2	45.5	142.93	75.4
5,900.0	0.86	238.45	5,899.0	-61.2	44.1	144.26	75.4
6,000.0	0.71	253.72	5,999.0	-61.8	42.8	145.28	75.2
6,100.0	0.81	269.42	6,099.0	-62.0	41.5	146.18	74.6
6,200.0	0.81	282.75	6,199.0	-61.8	40.1	147.02	73.7
6,300.0	0.93	288.41	6,299.0	-61.4	38.7	147.81	72.6
6,400.0	0.95	286.85	6,398.9	-60.9	37.1	148.66	71.3
6,500.0	1.04	289.25	6,498.9	-60.4	35.4	149.58	70.0
6,600.0	0.99	285.38	6,598.9	-59.8	33.8	150.57	68.7
6,700.0	1.14	278.68	6,698.9	-59.5	31.9	151.76	67.5
6,800.0	1.07	263.69	6,798.9	-59.4	30.0	153.19	66.6
6,900.0	1.30	254.75	6,898.9	-59.8	28.0	154.91	66.1
7,000.0	1.47	238.76	6,998.8	-60.8	25.8	156.99	66.0
7,100.0	1.95	229.91	7,098.8	-62.5	23.4	159.47	66.8
7,200.0	2.33	237.09	7,198.7	-64.7	20.4	162.50	67.9
7,300.0	2.59	242.38	7,298.6	-66.9	16.7	165.98	68.9
7,400.0	2.63	241.21	7,398.5	-69.0	12.7	169.59	70.2
7,500.0	2.00	236.29	7,498.4	-71.1	9.2	172.61	71.7
7,600.0	1.79	241.91	7,598.4	-72.8	6.4	174.98	73.1
7,700.0	1.77	243.27	7,698.3	-74.3	3.6	177.19	74.3
7,800.0	1.74	244.27	7,798.3	-75.6	0.9	179.32	75.6
7,900.0	1.56	244.26	7,898.2	-76.9	-1.7	181.27	76.9
8,000.0	1.56	243.03	7,998.2	-78.1	-4.1	183.04	78.2
8,100.0	1.53	236.96	8,098.2	-79.4	-6.5	184.66	79.7
8,152.0	1.14	237.05	8,150.2	-80.1	-7.5	185.34	80.4



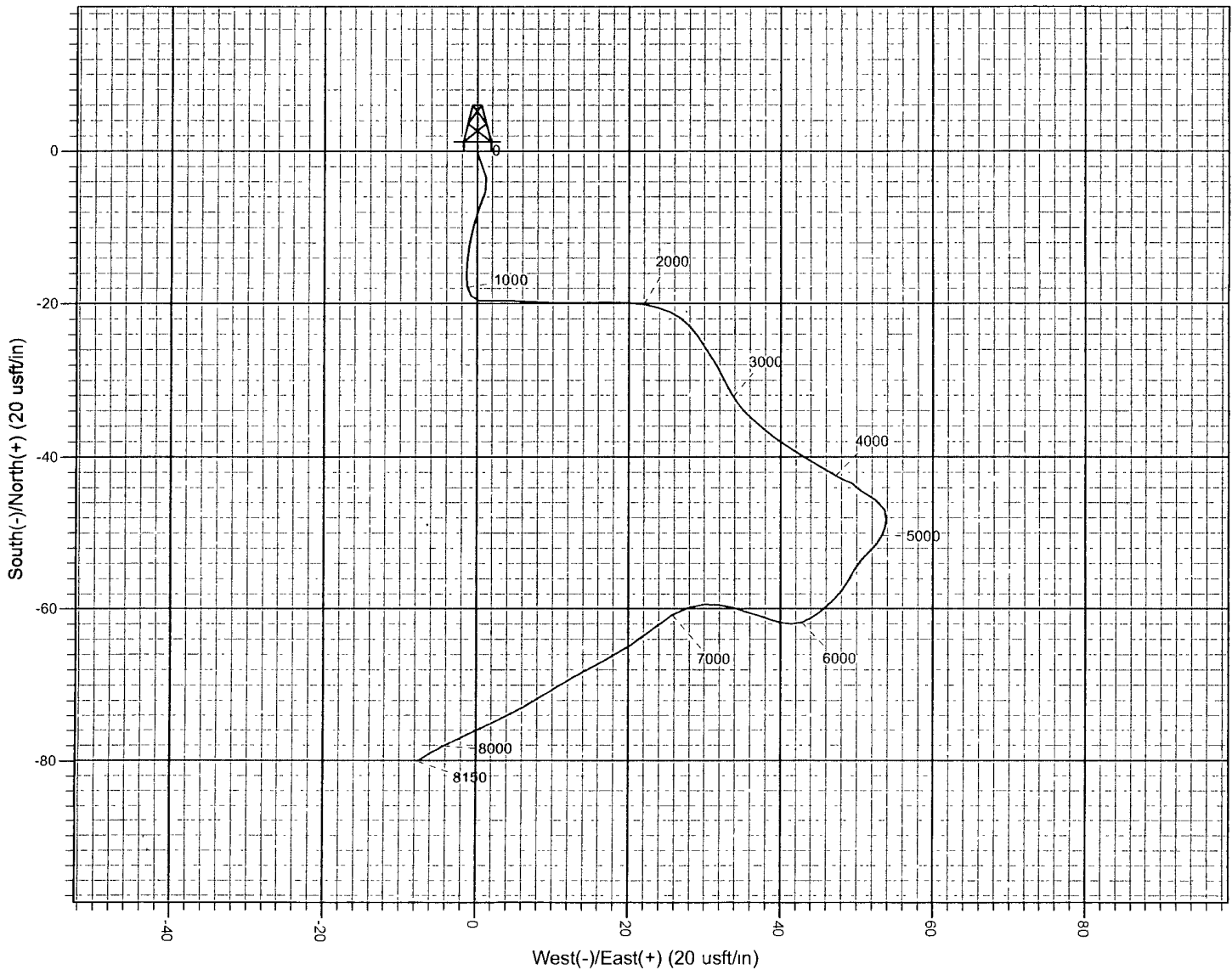
Project: Hackberry (Nad 83)  
 Eddy County, NM  
 Well: Arcturus "18" Federal #4H  
 Wellbore: VH - Job #32K11111153  
 Design: VH - Job #32K11111153



Azimuths to Grid North  
 True North -0 23°  
 Magnetic North 7 50°  
 Magnetic Field  
 Strength 48819 7snT  
 Dip Angle 60 52°  
 Date 11/26/2011  
 Model IGRF2010

WELL DETAILS: Arcturus "18" Federal #4H  
 WELL @ 0.0usft (Original Well Elev)  
 Ground Level. 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0 0	602733.52	669825.03	32° 39' 22.561 N	103° 54' 57.031 W	



PROJECT DETAILS: Hackberry (Nad 83)  
 Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: New Mexico Eastern Zone  
 System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM  
 Site Centre Latitude: 32° 39' 23.058 N  
 Longitude: 103° 54' 57.024 W  
 Positional Uncertainty: 0.0  
 Convergence: 0.23  
 Local North: Grid

Company:

8210 W. Ch. 11,  
Midland, Texas 79706  
Tel: (432) 687-1617  
Fax: (432) 687-1544



December 15, 2011

Devon Energy  
20 N. Broadway  
Oklahoma City, OK

RE: Devon Energy  
Arcturus 18 Fed #4H  
API: 30-015-338611  
Eddy County, NM  
RIG: H & P 300  
FIELD: Hackberry; Bone Spring NW  
PES FILE NO.: 700004428-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,

A handwritten signature in black ink that reads "Steve Bibb".

STEVE BIBB  
M/LWD Service Coordinator  
PathFinder Energy Services

ML:sh

# **PATHFINDER<sup>®</sup>**

**A Schlumberger Company**

## ***DIRECTIONAL SURVEY REPORT***

**DEVON ENERGY**

***ARCTURUS 18 FED #4H***

***EDDY COUNTY, NEW MEXICO***

**PREPARED BY: STEVE BIBB**

Pathfinder

6213 WCP 112  
Midland, Texas 79706  
Tel: (432)687-1617  
Fax: (432)687-1544



DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:  
A) J. HOLMES
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 11-27-11 TO 12-03-11
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  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
RIG: H&P 300
9. SURVEY CERTIFIED FROM: 8190 TO 13169 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 4589.93 FEET ON A BEARING OF 98.75 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 13247 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

  
\_\_\_\_\_  
STEVE BIBB  
M/LWD SERVICE COORDINATOR



# PathFinder Energy Services, Inc.

## BHL Report

Page 01/01  
Tie-in Date: 11/27/2011  
Date Completed: 12/03/2011

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DEVON ENERGY  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
Rig:H&P 300  
PathFinder Office Supervisor: STEVE BIBB  
PathFinder Field Engineers:J.HOLMES  
L.BISIRIYU

Survey Horiz. Reference:WELLHEAD  
Ref Coordinates: LAT:32.39.22.5626 N LON:103.54.57.0298 W  
GRID Reference:NAD83 new mexico east Transverse Mercator  
Ref GRID Coord: X: 669825.1500 Y: 602733.6600  
North Aligned To:GRID NORTH  
Total Magnetic Correction: 7.50° EAST TO GRID  
Vertical Section Plane: 99.13  
Survey Vert. Reference: 26.00' Kelly Bushing To Ground  
Altitude:3436.40' Ground To MSL

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Measured Depth	13247.00	(feet)
Inclination	87.67	(deg)
Azimuth	90.38	(deg)
True Vertical Depth	8878.24	(feet)
Vertical Section	4589.83	(feet)
Survey X cord	674361.62	(feet)
Survey Y cord	602035.30	(feet)
Survey Lat	32.65429796 N	(deg)
Survey Lon	103.90111095 W	(deg)
Rectangular Corr. N/S	698.34 S	(feet)
Rectangular Corr. E/W	4536.49 E	(feet)
Closure Distance	4589.93	(feet)
Direction of Closure	98.75	(deg)
Dogleg Severity	0.00	(deg/100ft)

# PathFinder Energy Services, Inc.

## Survey Report

DEVON ENERGY  
 ARCTURUS 18 FED #4H  
 EDDY COUNTY, NM  
 Rig:H&P 300  
 PathFinder Office Supervisor: STEVE BIBB  
 PathFinder Field Engineers: J.HOLMES  
 L.BISIRIYU

Survey Horiz. Reference:WELLHEAD  
 Ref Coordinates: LAT:32.39.22.5626 N LON:103.54.57.0298 W  
 GRID Reference:NAD83 new mexico east Transverse Mercator  
 Ref GRID Coord: X: 669825.1500 Y: 602733.6600  
 North Aligned To:GRID NORTH  
 Total Magnetic Correction: 7.50° EAST TO GRID  
 Vertical Section Plane: 99.13  
 Survey Vert. Reference: 26.00' Kelly Bushing To Ground  
 Altitude:3436.40' Ground To MSL

Survey Calculations by RX5 V6.03E using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)
						Rectangular (ft)	Offsets (ft)	Dist (ft)	Dir (deg)	
<b>THE FOLLOWING ARE SCIENTIFIC DRILLING GYRO SURVEYS.</b>										
100.00	0.67	165.46	99.99	0.00	0.26	0.59 S	0.16 E	0.62@	164.54	0.00
200.00	1.02	158.47	199.98	100.00	0.94	1.99 S	0.64 E	2.09@	162.21	0.36
300.00	0.95	163.74	299.97	100.00	1.75	3.61 S	1.20 E	3.80@	161.67	0.12
400.00	1.28	199.62	399.95	100.00	1.91	5.46 S	1.05 E	5.56@	169.08	0.75
500.00	1.41	199.17	499.92	100.00	1.49	7.67 S	0.27 E	7.68@	177.95	0.13
600.00	1.35	194.87	599.89	100.00	1.16	9.97 S	0.43 W	9.98@	182.48	0.12
700.00	1.26	190.56	699.87	100.00	1.01	12.19 S	0.94 W	12.23@	184.39	0.13
800.00	1.27	185.17	799.84	100.00	1.06	14.38 S	1.24 W	14.43@	184.92	0.12
900.00	0.96	179.17	899.82	100.00	1.28	16.32 S	1.32 W	16.37@	184.64	0.33
1000.00	0.78	170.87	999.81	100.00	1.64	17.83 S	1.20 W	17.87@	183.87	0.22
1100.00	0.72	146.82	1099.80	100.00	2.28	19.03 S	0.75 W	19.04@	182.27	0.32
1200.00	0.83	97.61	1199.80	100.00	3.42	19.65 S	0.31 E	19.65@	179.10	0.65
1300.00	1.23	88.11	1299.78	100.00	5.20	19.71 S	2.10 E	19.82@	173.92	0.43
1400.00	1.68	91.01	1399.75	100.00	7.71	19.70 S	4.64 E	20.24@	166.75	0.46
1500.00	1.59	94.62	1499.71	100.00	10.54	19.84 S	7.49 E	21.20@	159.32	0.14
1600.00	1.85	89.55	1599.66	100.00	13.51	19.94 S	10.48 E	22.52@	152.26	0.30
1700.00	1.84	90.58	1699.61	100.00	16.69	19.94 S	13.70 E	24.19@	145.50	0.03
1800.00	1.88	88.64	1799.56	100.00	19.89	19.92 S	16.95 E	26.15@	139.60	0.08
1900.00	1.39	92.62	1899.52	100.00	22.71	19.93 S	19.80 E	28.10@	135.19	0.50
2000.00	1.12	100.18	1999.49	100.00	24.89	20.16 S	21.97 E	29.82@	132.54	0.32
2100.00	1.01	106.28	2099.48	100.00	26.75	20.58 S	23.78 E	31.45@	130.87	0.16
2200.00	0.97	110.40	2199.46	100.00	28.45	21.12 S	25.42 E	33.05@	129.73	0.08
2300.00	0.85	130.56	2299.45	100.00	29.91	21.90 S	26.78 E	34.59@	129.28	0.34
2400.00	0.93	131.49	2399.44	100.00	31.23	22.92 S	27.95 E	36.15@	129.36	0.08
2500.00	1.11	145.18	2499.42	100.00	32.59	24.25 S	29.11 E	37.89@	129.80	0.30

# PathFinder Energy Services, Inc.

## Survey Report

DEVON ENERGY  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
RIG:H&P 300

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)
						Rectangular (ft)	Offsets (ft)	Dist (ft)	Dir (deg)	
2600.00	1.24	148.48	2599.40	100.00	33.97	25.97 S	30.23 E	39.85@	130.67	0.15
2700.00	1.07	147.72	2699.38	100.00	35.29	27.68 S	31.29 E	41.78@	131.50	0.17
2800.00	0.96	153.88	2799.36	100.00	36.39	29.22 S	32.16 E	43.46@	132.26	0.16
2900.00	0.97	151.51	2899.35	100.00	37.39	30.72 S	32.93 E	45.04@	133.01	0.04
3000.00	0.96	148.34	2999.33	100.00	38.45	32.18 S	33.78 E	46.65@	133.61	0.05
3100.00	0.67	140.28	3099.32	100.00	39.44	33.34 S	34.59 E	48.04@	133.95	0.31
3200.00	0.76	136.77	3199.32	100.00	40.41	34.27 S	35.42 E	49.29@	134.06	0.10
3300.00	0.93	130.73	3299.31	100.00	41.62	35.29 S	36.49 E	50.76@	134.04	0.19
3400.00	1.09	131.30	3399.29	100.00	43.12	36.44 S	37.82 E	52.52@	133.94	0.16
3500.00	1.12	122.10	3499.27	100.00	44.82	37.59 S	39.36 E	54.43@	133.68	0.18
3600.00	1.09	124.98	3599.25	100.00	46.58	38.66 S	40.97 E	56.32@	133.34	0.06
3700.00	1.19	122.86	3699.23	100.00	48.39	39.76 S	42.62 E	58.29@	133.02	0.11
3800.00	1.14	119.27	3799.21	100.00	50.27	40.81 S	44.36 E	60.28@	132.62	0.09
3900.00	0.99	121.81	3899.19	100.00	52.00	41.76 S	45.96 E	62.10@	132.26	0.16
4000.00	0.74	120.86	3999.18	100.00	53.40	42.54 S	47.25 E	63.58@	132.00	0.25
4100.00	0.49	113.84	4099.18	100.00	54.41	43.05 S	48.19 E	64.62@	131.77	0.26
4200.00	0.39	105.59	4199.18	100.00	55.17	43.31 S	48.91 E	65.33@	131.52	0.12
4300.00	0.40	124.91	4299.17	100.00	55.82	43.60 S	49.53 E	65.98@	131.36	0.13
4400.00	0.38	151.79	4399.17	100.00	56.33	44.09 S	49.97 E	66.64@	131.43	0.18
4500.00	0.92	114.25	4499.16	100.00	57.31	44.72 S	50.86 E	67.72@	131.32	0.66
4600.00	1.30	126.69	4599.14	100.00	59.09	45.72 S	52.50 E	69.62@	131.05	0.45
4700.00	0.83	155.99	4699.13	100.00	60.49	47.06 S	53.70 E	71.41@	131.23	0.71
4800.00	0.74	187.91	4799.12	100.00	60.90	48.36 S	53.91 E	72.42@	131.90	0.44
4900.00	0.55	198.31	4899.11	100.00	60.84	49.46 S	53.67 E	72.98@	132.66	0.22
5000.00	0.61	200.81	4999.11	100.00	60.65	50.41 S	53.33 E	73.39@	133.39	0.06
5100.00	0.86	223.41	5099.10	100.00	60.12	51.45 S	52.63 E	73.60@	134.36	0.38
5200.00	0.84	220.82	5199.09	100.00	59.32	52.55 S	51.63 E	73.67@	135.51	0.04
5300.00	0.85	222.29	5299.08	100.00	58.52	53.66 S	50.65 E	73.79@	136.65	0.02

# PathFinder Energy Services, Inc.

## Survey Report

DEVON ENERGY  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
RIG:H&P 300

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)
						Rectangular (ft)	Offsets (ft)	Dist (ft)	Dir (deg)	
5400.00	0.90	209.76	5399.07	100.00	57.84	54.89 S	49.76 E	74.09@	137.80	0.20
5500.00	0.94	211.35	5499.05	100.00	57.26	56.27 S	48.95 E	74.58@	138.98	0.05
5600.00	0.97	214.39	5599.04	100.00	56.58	57.67 S	48.04 E	75.06@	140.20	0.06
5700.00	1.02	227.93	5699.02	100.00	55.67	58.96 S	46.90 E	75.34@	141.50	0.24
5800.00	1.15	229.76	5799.01	100.00	54.45	60.21 S	45.48 E	75.45@	142.94	0.13
5900.00	0.86	238.45	5898.99	100.00	53.23	61.25 S	44.07 E	75.46@	144.26	0.33
6000.00	0.71	253.72	5998.98	100.00	52.10	61.82 S	42.84 E	75.21@	145.28	0.26
6100.00	0.81	269.42	6098.97	100.00	50.85	62.00 S	41.54 E	74.62@	146.18	0.23
6200.00	0.81	282.75	6198.96	100.00	49.44	61.85 S	40.14 E	73.73@	147.02	0.19
6300.00	0.93	288.41	6298.95	100.00	47.94	61.44 S	38.68 E	72.60@	147.81	0.15
6400.00	0.95	286.85	6398.94	100.00	46.32	60.94 S	37.12 E	71.35@	148.66	0.03
6500.00	1.04	289.25	6498.92	100.00	44.60	60.40 S	35.47 E	70.04@	149.58	0.10
6600.00	0.99	285.38	6598.91	100.00	42.85	59.87 S	33.78 E	68.74@	150.57	0.09
6700.00	1.14	278.68	6698.89	100.00	40.99	59.49 S	31.96 E	67.53@	151.76	0.19
6800.00	1.07	263.69	6798.87	100.00	39.10	59.45 S	30.05 E	66.61@	153.18	0.30
6900.00	1.30	254.75	6898.85	100.00	37.17	59.85 S	28.03 E	66.08@	154.91	0.30
7000.00	1.47	238.76	6998.82	100.00	35.16	60.81 S	25.83 E	66.07@	156.98	0.42
7100.00	1.95	229.91	7098.78	100.00	33.07	62.57 S	23.44 E	66.82@	159.47	0.55
7200.00	2.33	237.09	7198.71	100.00	30.45	64.77 S	20.43 E	67.92@	162.49	0.46
7300.00	2.59	242.38	7298.62	100.00	27.13	66.92 S	16.72 E	68.98@	165.97	0.35
7400.00	2.63	241.21	7398.51	100.00	23.51	69.08 S	12.71 E	70.23@	169.58	0.07
7500.00	2.00	236.29	7498.43	100.00	20.42	71.15 S	9.24 E	71.75@	172.60	0.66
7600.00	1.79	241.91	7598.37	100.00	17.89	72.85 S	6.42 E	73.13@	174.97	0.28
7700.00	1.77	243.27	7698.33	100.00	15.40	74.28 S	3.66 E	74.37@	177.18	0.05
7800.00	1.74	244.27	7798.28	100.00	12.90	75.64 S	0.91 E	75.64@	179.31	0.04
7900.00	1.56	244.26	7898.24	100.00	10.54	76.89 S	1.68 W	76.90@	181.25	0.18
8000.00	1.56	243.03	7998.20	100.00	8.32	78.09 S	4.12 W	78.20@	183.02	0.03
8100.00	1.53	236.96	8098.16	100.00	6.23	79.44 S	6.45 W	79.70@	184.64	0.17

# PathFinder Energy Services, Inc.

## Survey Report

DEVON ENERGY  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
RIG:H&P 300

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
** TIED INTO SCIENTIFIC DRILLING GYRO SURVEY @ 8152'MD.										
8152.00	1.14	237.05	8150.15	52.00	5.33	80.10 S	7.47 W	80.45@	185.33	0.75
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
8190.00	1.06	217.80	8188.14	38.00	4.89	80.58 S	8.00 W	80.98@	185.67	0.99
8222.00	2.29	160.19	8220.13	32.00	5.05	81.42 S	7.97 W	81.81@	185.59	6.07
8253.00	6.60	142.35	8251.03	31.00	6.65	83.41 S	6.67 W	83.68@	184.57	14.44
8285.00	11.17	140.20	8282.64	32.00	10.33	87.25 S	3.56 W	87.33@	182.34	14.32
8316.00	15.74	139.60	8312.78	31.00	15.80	92.76 S	1.09 E	92.77@	179.33	14.75
8348.00	18.64	138.10	8343.35	32.00	23.08	99.88 S	7.32 E	100.15@	175.81	9.17
8379.00	20.22	133.31	8372.58	31.00	31.36	107.24 S	14.53 E	108.22@	172.29	7.24
8411.00	21.19	124.01	8402.52	32.00	41.18	114.27 S	23.35 E	116.63@	168.45	10.70
8442.00	24.18	117.72	8431.13	31.00	52.29	120.36 S	33.62 E	124.97@	164.40	12.41
8474.00	26.91	117.56	8460.00	32.00	65.37	126.76 S	45.84 E	134.79@	160.12	8.53
8505.00	27.17	122.38	8487.61	31.00	78.53	133.80 S	58.04 E	145.84@	156.55	7.12
8537.00	27.61	124.28	8516.02	32.00	91.96	141.89 S	70.34 E	158.36@	153.63	3.06
8568.00	30.51	124.82	8543.12	31.00	105.55	150.43 S	82.73 E	171.68@	151.19	9.39
8600.00	34.21	124.77	8570.14	32.00	120.99	160.20 S	96.80 E	187.17@	148.86	11.56
8631.00	37.64	124.10	8595.24	31.00	137.43	170.48 S	111.80 E	203.87@	146.74	11.14
8663.00	40.54	123.00	8620.08	32.00	155.80	181.62 S	128.62 E	222.55@	144.70	9.32
8695.00	44.23	123.99	8643.71	32.00	175.45	193.53 S	146.60 E	242.79@	142.86	11.72
8726.00	47.57	124.66	8665.28	31.00	195.59	206.09 S	164.98 E	263.99@	141.32	10.89
8758.00	51.35	125.34	8686.08	32.00	217.46	220.04 S	184.89 E	287.40@	139.96	11.92
8789.00	55.75	126.10	8704.49	31.00	239.75	234.59 S	205.13 E	311.63@	138.83	14.33
8821.00	60.23	126.40	8721.45	32.00	263.90	250.64 S	227.00 E	338.16@	137.83	14.02
8852.00	64.98	126.39	8735.71	31.00	288.36	266.96 S	249.15 E	365.17@	136.98	15.32
8884.00	68.94	126.17	8748.23	32.00	314.55	284.38 S	272.89 E	394.13@	136.18	12.39
8915.00	71.93	125.29	8758.61	31.00	340.67	301.44 S	296.60 E	422.89@	135.46	10.01
8946.00	73.69	124.45	8767.77	31.00	367.35	318.37 S	320.89 E	452.03@	134.77	6.24

# PathFinder Energy Services, Inc.

## Survey Report

DEVON ENERGY  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
RIG:H&P 300

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)
						Rectangular (ft)	Offsets (ft)	Dist (ft)	Dir (deg)	
8978.00	77.38	123.57	8775.76	32.00	395.45	335.69 S	346.58 E	482.50@	134.09	11.84
9009.00	81.34	123.01	8781.49	31.00	423.24	352.41 S	372.04 E	512.45@	133.45	12.90
9041.00	84.33	123.02	8785.48	32.00	452.27	369.71 S	398.66 E	543.70@	132.84	9.34
9135.00	90.40	119.42	8789.80	94.00	539.23	418.34 S	478.91 E	635.90@	131.14	7.50
9182.00	91.45	118.33	8789.04	47.00	583.46	441.04 S	520.06 E	681.89@	130.30	3.22
9277.00	89.60	117.98	8788.17	95.00	673.26	485.86 S	603.82 E	775.02@	128.82	1.98
9371.00	88.99	115.52	8789.33	94.00	762.84	528.16 S	687.74 E	867.15@	127.52	2.70
9466.00	89.08	113.94	8790.93	95.00	854.32	567.90 S	774.02 E	960.00@	126.27	1.67
9560.00	87.23	107.26	8793.96	94.00	946.34	600.93 S	861.91 E	1050.72@	124.88	7.37
9655.00	86.44	105.23	8799.20	95.00	1040.46	627.47 S	952.97 E	1140.99@	123.36	2.29
9749.00	87.14	103.04	8804.47	94.00	1133.95	650.39 S	1043.97 E	1229.99@	121.92	2.44
9844.00	87.23	101.10	8809.13	95.00	1228.70	670.23 S	1136.76 E	1319.63@	120.52	2.04
9938.00	89.16	97.76	8812.09	94.00	1322.64	685.62 S	1229.42 E	1407.67@	119.15	4.10
10033.00	89.78	94.16	8812.97	95.00	1417.47	695.48 S	1323.89 E	1495.45@	117.71	3.85
10127.00	90.31	92.58	8812.90	94.00	1510.99	701.00 S	1417.72 E	1581.56@	116.31	1.77
10222.00	89.60	90.03	8812.97	95.00	1605.10	703.17 S	1512.69 E	1668.13@	114.93	2.79
10316.00	89.25	88.45	8813.92	94.00	1697.70	701.92 S	1606.67 E	1753.31@	113.60	1.72
10410.00	88.72	89.41	8815.58	94.00	1790.19	700.16 S	1700.64 E	1839.13@	112.38	1.17
10505.00	89.34	89.41	8817.19	95.00	1883.82	699.19 S	1795.62 E	1926.95@	111.28	0.65
10599.00	89.43	89.15	8818.20	94.00	1976.43	698.01 S	1889.61 E	2014.41@	110.27	0.29
10694.00	88.55	90.21	8819.87	95.00	2070.12	697.48 S	1984.59 E	2103.59@	109.36	1.45
10788.00	88.81	90.03	8822.04	94.00	2162.93	697.67 S	2078.56 E	2192.53@	108.55	0.34
10883.00	86.70	91.17	8825.76	95.00	2256.80	698.67 S	2173.48 E	2283.01@	107.82	2.52
10977.00	86.79	91.44	8831.10	94.00	2349.78	700.80 S	2267.30 E	2373.14@	107.18	0.30
11072.00	88.02	90.56	8835.40	95.00	2443.73	702.46 S	2362.19 E	2464.42@	106.56	1.59
11166.00	88.02	90.64	8838.65	94.00	2536.63	703.44 S	2456.13 E	2554.88@	105.98	0.09
11261.00	88.72	90.73	8841.35	95.00	2630.56	704.58 S	2551.08 E	2646.59@	105.44	0.74
11356.00	88.37	91.08	8843.76	95.00	2724.55	706.08 S	2646.04 E	2738.63@	104.94	0.52

# PathFinder Energy Services, Inc.

## Survey Report

DEVON ENERGY  
ARCTURUS 18 FED #4H  
EDDY COUNTY, NM  
RIG:H&P 300

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)
						Rectangular	Offsets	Dist	Dir	
						(ft)	(ft)	(ft)	(deg)	
11450.00	88.90	88.62	8846.00	94.00	2817.29	705.83 S	2740.00 E	2829.46@	104.45	2.68
11545.00	88.99	88.36	8847.75	95.00	2910.64	703.33 S	2834.96 E	2920.90@	103.93	0.29
11639.00	89.87	88.45	8848.68	94.00	3002.99	700.71 S	2928.91 E	3011.57@	103.45	0.94
11734.00	89.87	89.94	8848.90	95.00	3096.56	699.38 S	3023.90 E	3103.72@	103.02	1.57
11828.00	90.13	90.03	8848.90	94.00	3189.37	699.35 S	3117.90 E	3195.37@	102.64	0.29
11923.00	89.69	90.03	8849.05	95.00	3283.17	699.40 S	3212.90 E	3288.14@	102.28	0.46
12017.00	89.60	89.77	8849.63	94.00	3375.95	699.24 S	3306.90 E	3380.02@	101.94	0.29
12112.00	89.34	89.59	8850.51	95.00	3469.66	698.71 S	3401.89 E	3472.90@	101.61	0.33
12206.00	89.25	90.03	8851.67	94.00	3562.41	698.40 S	3495.88 E	3564.96@	101.30	0.48
12301.00	89.25	90.03	8852.91	95.00	3656.21	698.45 S	3590.88 E	3658.17@	101.01	0.00
12395.00	89.08	89.85	8854.28	94.00	3748.99	698.35 S	3684.87 E	3750.46@	100.73	0.26
12490.00	89.16	89.94	8855.74	95.00	3842.75	698.17 S	3779.86 E	3843.79@	100.47	0.13
12584.00	88.90	90.03	8857.33	94.00	3935.54	698.15 S	3873.84 E	3936.25@	100.22	0.29
12679.00	88.55	89.94	8859.44	95.00	4029.31	698.12 S	3968.82 E	4029.75@	99.98	0.38
12774.00	88.64	89.77	8861.77	95.00	4123.04	697.88 S	4063.79 E	4123.28@	99.74	0.20
12868.00	88.20	89.68	8864.37	94.00	4215.74	697.43 S	4157.75 E	4215.84@	99.52	0.48
12963.00	87.93	89.77	8867.57	95.00	4309.41	696.98 S	4252.70 E	4309.43@	99.31	0.30
13057.00	88.02	90.47	8870.90	94.00	4402.19	697.17 S	4346.64 E	4402.19@	99.11	0.75
13152.00	87.76	90.21	8874.39	95.00	4496.01	697.74 S	4441.57 E	4496.04@	98.93	0.39
13169.00	87.67	90.38	8875.07	17.00	4512.80	697.82 S	4458.56 E	4512.84@	98.90	1.13
STRAIGHT LINE PROJECTION TO BIT @ 13247 ' MD.										
13247.00	87.67	90.38	8878.24	78.00	4589.83	698.34 S	4536.49 E	4589.93@	98.75	0.00

\*\* The survey data at tie-in point was furnished by a recognized survey company and entered as submitted. Survey stations above the tie-in point represent recalculated data by PathFinder Energy Services, Inc. and may reflect minor changes due to rounding differences between survey programs. Only survey stations taken by qualified PathFinder personnel are subject to certification.



A Schlumberger Company

# TIE-IN SURVEY INFORMATION SHEET

## CLIENT INFORMATION

CLIENT:	Devon Energy Production Co.		
LEASE / WELL No.:	ARCTURUS 18 FED	#4H	
WELL LOCATION:	EDDY COUNTY		
COUNTY / STATE / COUNTRY:	EDDY COUNTY	NEW MEXICO	USA
RIG:	H & P 300		
API WELL No:	30-015-38611		
JOB No:	700004428 WT-WT		
P.O. / AFE No.	157247		
DIRECTIONAL COMPANY:	PATHFINDER		

## WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
<i>On Wall Plat:</i>	7.52°	<i>LWD Calculated:</i>	<i>Agreed Upon:</i>
X =	669825.150000	Feet	Y = 602733.660000
			Feet
SITE LATITUDE:	32.656267 N	SITE LONGITUDE:	103.915842 W
GRID SYSTEM:	TRUE <input type="checkbox"/> UTM <input checked="" type="checkbox"/> LAMBERT <input type="checkbox"/>	ZONE:	
PROPOSED DRIFT DIRECTION:	99.13		
KELLY BUSHING ELEVATION:	26		
ALTITUDE:	Feet	WATER DEPTH:	Feet

## TIE-IN SURVEY

MEASURED DEPTH:	8152		
DRIFT ANGLE:	1.14		
DRIFT DIRECTION:	237.05		
TRUE VERTICAL DEPTH:	8150.15		
VERTICAL SECTION:	5.34		
RECTANGULAR COORDINATE ( N / S ):	-80.1		
RECTANGULAR COORDINATE ( E / W ):	-7.47		
CLOSURE DISTANCE / DIRECTION:	80.45	185.32	
SURVEY CALCULATION METHOD:	AA <input type="checkbox"/>	MC <input checked="" type="checkbox"/>	RC <input type="checkbox"/> BT <input type="checkbox"/>
SOURCE OF TIE-IN DATA ( COMPANY ):	SCIENTIFIC DRILLING		
COPY OF TIE-IN SURVEY REPORT	<input type="checkbox"/> YES		<input type="checkbox"/> NO

## WELL PLAN

KICKOFF DEPTH:	8220	TOTAL DEPTH:	13285
KICKOFF ANGLE:	0	MAX ANGLE:	90

PES Engineers: JEREMY HOLMES  
LUQMAN BISIRIYU

\*\*Signature of both field engineers required if applicable

Directional Driller: JCB

DATE: 12/3





# Scientific Drilling

Gyroscopic Survey Report  
for  
DEVON

<b>Well Location</b>	EDDY COUNTY, NEW MEXICO
<b>Well Name</b>	ARCTURUS 18 FED #4H
<b>Rig Name</b>	H & P 300
<b>Survey Date</b>	11/26/2011
<b>Latitude</b>	32.6570000°N
<b>North Reference</b>	Grid North
<b>Grid Correction</b>	-0.28 deg
<b>Depth Reference</b>	RKB (26.20 ft)
<b>Calculation Method</b>	Minimum Curvature
<b>Section (VS) Ref</b>	0.00N (ft), 0.00E (ft), 99.13Azim (deg)
<b>Definitive Survey</b>	FINAL OUTFUN
<b>Operator(s)</b>	L GARZA

**Well Notes**



Survey:		FINAL OTRUN								
Survey Date:		11/26/2011								
MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	Closure Direction	Dogleg Severity	Closure Distance	
ft	deg	deg	ft	ft	ft	ft	deg	100ft	ft	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	
100.00	0.67	165.46	100.00	0.24	-0.57	0.15	165.46	0.67	0.59	
200.00	1.02	158.47	199.99	0.92	-1.96	0.62	162.44	0.36	2.06	
300.00	0.95	163.74	299.97	1.73	-3.58	1.18	161.79	0.11	3.77	
400.00	1.28	199.62	399.95	1.88	-5.43	1.03	169.22	0.76	5.53	
500.00	1.41	199.17	499.93	1.46	-7.65	0.25	178.10	0.13	7.66	
600.00	1.35	194.87	599.90	1.13	-9.96	-0.45	182.62	0.12	9.97	
700.00	1.26	190.56	699.87	0.99	-12.18	-0.96	184.50	0.14	12.22	
800.00	1.27	185.17	799.85	1.03	-14.36	-1.26	185.02	0.12	14.42	
900.00	0.96	179.17	899.83	1.26	-16.30	-1.35	184.73	0.32	16.36	
1000.00	0.78	170.87	999.82	1.62	-17.82	-1.23	183.94	0.22	17.86	
1100.00	0.72	146.82	1099.81	2.25	-19.02	-0.77	182.33	0.32	19.04	
1200.00	0.83	97.61	1199.80	3.40	-19.64	0.28	179.17	0.65	19.64	
1300.00	1.23	88.11	1299.78	5.17	-19.70	2.07	174.01	0.43	19.81	
1400.00	1.68	91.01	1399.75	7.67	-19.69	4.60	166.84	0.46	20.22	
1500.00	1.59	94.62	1499.71	10.50	-19.83	7.45	159.40	0.14	21.18	
1600.00	1.85	89.55	1599.67	13.48	-19.93	10.45	152.32	0.30	22.50	
1700.00	1.84	90.58	1699.61	16.67	-19.93	13.68	145.54	0.03	24.17	
1800.00	1.88	88.64	1799.56	19.87	-19.91	16.92	139.64	0.07	26.13	
1900.00	1.39	92.62	1899.52	22.68	-19.93	19.77	135.23	0.50	28.07	
2000.00	1.12	100.18	1999.50	24.86	-20.15	21.94	132.57	0.32	29.79	
2100.00	1.01	106.28	2099.48	26.70	-20.57	23.74	130.91	0.16	31.41	
2200.00	0.97	110.40	2199.46	28.41	-21.11	25.38	129.76	0.08	33.01	
2300.00	0.85	130.56	2299.45	29.87	-21.89	26.74	129.31	0.34	34.56	
2400.00	0.93	131.49	2399.44	31.20	-22.92	27.92	129.39	0.08	36.12	
2500.00	1.11	145.18	2499.42	32.56	-24.26	29.08	129.83	0.30	37.87	
2600.00	1.24	148.48	2599.40	33.94	-25.97	30.20	130.70	0.14	39.83	
2700.00	1.07	147.72	2699.38	35.26	-27.68	31.26	131.52	0.17	41.76	
2800.00	0.96	153.88	2799.37	36.36	-29.23	32.13	132.29	0.15	43.44	
2900.00	0.97	151.51	2899.35	37.36	-30.72	32.90	133.04	0.04	45.02	
3000.00	0.96	148.34	2999.34	38.43	-32.18	33.75	133.64	0.05	46.63	
3100.00	0.67	140.28	3099.33	39.42	-33.35	34.56	133.97	0.32	48.03	
3200.00	0.76	136.77	3199.32	40.38	-34.28	35.39	134.08	0.10	49.27	
3300.00	0.93	130.73	3299.31	41.60	-35.29	36.46	134.07	0.19	50.74	
3400.00	1.09	131.30	3399.29	43.09	-36.45	37.79	133.97	0.17	52.50	
3500.00	1.12	122.10	3499.28	44.80	-37.59	39.33	133.71	0.18	54.41	
3600.00	1.09	124.98	3599.26	46.55	-38.66	40.94	133.36	0.06	56.31	
3700.00	1.19	122.86	3699.24	48.36	-39.77	42.59	133.04	0.11	58.27	
3800.00	1.14	119.27	3799.22	50.25	-40.82	44.33	132.64	0.09	60.26	
3900.00	0.99	121.81	3899.20	51.97	-41.76	45.93	132.28	0.16	62.07	



Survey:		FINAL OUTFUN								
Survey Date:		11/26/2011								
MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	Closure Direction	Dogleg Severity	Closure Distance	
ft	deg	deg	ft	ft	ft	ft	deg	7100ft	ft	
4000.00	0.74	120.86	3999.19	53.37	-42.54	47.22	132.02	0.24	63.56	
4100.00	0.49	113.84	4099.18	54.39	-43.05	48.17	131.79	0.26	64.61	
4200.00	0.39	105.59	4199.18	55.15	-43.32	48.89	131.54	0.12	65.32	
4300.00	0.40	124.91	4299.18	55.80	-43.61	49.50	131.38	0.13	65.97	
4400.00	0.38	151.79	4399.17	56.31	-44.10	49.95	131.44	0.18	66.63	
4500.00	0.92	114.25	4499.17	57.29	-44.73	50.84	131.34	0.66	67.71	
4600.00	1.30	126.69	4599.15	59.08	-45.74	52.48	131.07	0.45	69.62	
4700.00	0.83	155.99	4699.13	60.48	-47.08	53.69	131.25	0.71	71.41	
4800.00	0.74	187.91	4799.12	60.89	-48.38	53.90	131.91	0.44	72.42	
4900.00	0.55	198.31	4899.12	60.83	-49.47	53.66	132.68	0.22	72.98	
5000.00	0.61	200.81	4999.11	60.64	-50.42	53.32	133.40	0.07	73.38	
5100.00	0.86	223.41	5099.10	60.11	-51.46	52.61	134.37	0.37	73.60	
5200.00	0.84	220.82	5199.09	59.31	-52.56	51.62	135.51	0.04	73.67	
5300.00	0.85	222.29	5299.08	58.52	-53.66	50.65	136.66	0.03	73.79	
5400.00	0.90	209.76	5399.07	57.84	-54.89	49.76	137.81	0.20	74.09	
5500.00	0.94	211.35	5499.06	57.25	-56.27	48.94	138.98	0.05	74.58	
5600.00	0.97	214.39	5599.04	56.58	-57.67	48.04	140.20	0.06	75.05	
5700.00	1.02	227.93	5699.03	55.66	-58.96	46.90	141.50	0.24	75.34	
5800.00	1.15	229.76	5799.01	54.45	-60.20	45.48	142.93	0.14	75.45	
5900.00	0.86	238.45	5898.99	53.23	-61.24	44.07	144.26	0.33	75.45	
6000.00	0.71	253.72	5998.99	52.10	-61.81	42.84	145.28	0.26	75.20	
6100.00	0.81	269.42	6098.98	50.84	-61.99	41.53	146.18	0.23	74.62	
6200.00	0.81	282.75	6198.97	49.44	-61.84	40.14	147.01	0.19	73.73	
6300.00	0.93	288.41	6298.96	47.95	-61.43	38.69	147.80	0.15	72.60	
6400.00	0.95	286.85	6398.94	46.33	-60.94	37.13	148.65	0.04	71.36	
6500.00	1.04	289.25	6498.93	44.61	-60.40	35.48	149.57	0.10	70.05	
6600.00	0.99	285.38	6598.91	42.86	-59.87	33.79	150.56	0.08	68.74	
6700.00	1.14	278.68	6698.89	41.00	-59.49	31.97	151.75	0.19	67.53	
6800.00	1.07	263.69	6798.88	39.11	-59.44	30.06	153.17	0.30	66.61	
6900.00	1.30	254.75	6898.85	37.18	-59.84	28.04	154.89	0.30	66.09	
7000.00	1.47	238.76	6998.83	35.17	-60.81	25.85	156.97	0.42	66.07	
7100.00	1.95	229.91	7098.78	33.08	-62.57	23.45	159.45	0.55	66.82	
7200.00	2.33	237.09	7198.71	30.46	-64.77	20.44	162.48	0.46	67.92	
7300.00	2.59	242.38	7298.62	27.14	-66.92	16.73	165.96	0.35	68.98	
7400.00	2.63	241.21	7398.52	23.52	-69.08	12.72	169.57	0.07	70.24	
7500.00	2.00	236.29	7498.43	20.43	-71.15	9.25	172.59	0.66	71.75	
7600.00	1.79	241.91	7598.38	17.90	-72.86	6.42	174.96	0.28	73.14	
7700.00	1.77	243.27	7698.33	15.40	-74.29	3.66	177.18	0.05	74.38	
7800.00	1.74	244.27	7798.28	12.91	-75.64	0.92	179.31	0.04	75.65	
7900.00	1.56	244.26	7898.24	10.54	-76.89	-1.68	181.25	0.17	76.91	



Survey: FINAL OTRUN  
Survey Date: 11/26/2011

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	Closure Direction deg	Dogleg Severity 100ft	Closure Distance ft
8000.00	1.56	243.03	7998.20	8.32	-78.10	-4.12	183.02	0.03	78.21
8100.00	1.53	236.96	8098.17	6.24	-79.44	-6.45	184.64	0.17	79.71
8152.00	1.14	237.05	8150.15	5.34	-80.10	-7.47	185.32	0.74	80.45



A Schlumberger Company

# PathFinder Energy Services, Inc.

## Magnetic & Grid Calculations

Devon Energy  
Arcturus 18 Fed #4H  
Eddy County, NM  
Rig:HP 300

Mon Nov 21 14:48:37 2011

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### Coordinates

Latitude: 32.656267 N ( 32 deg. 39 min. 22.5626 sec.)  
Longitude: 103.915842 W (-103 deg. 54 min. 57.0298 sec.)  
Elevation: 3436.40 feet.  
Calculation Date: Nov/21/2011

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### Magnetic Calculations

Model: IGRF2010  
Dip Angle: 60.5170 degrees  
Total Magnetic Field: 0.48795 gauss  
Magnetic Declination: 7.723853 degrees  
Horizontal Intensity: 0.240153 gauss  
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.723853 Degr

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### Transverse Mercator Grid Calculations NAD83

Grid System: Transverse-Mercator: new mexico east  
Ellipsoid: GRS80  
X: 669825.1500 feet  
Y: 602733.6600 feet  
True to Grid: (convergence) -0.225281 degrees  
Magnetic to Grid: 7.498572 degrees

To Convert a Magnetic Dir. to a GRID dir. Add 7.498572 Degr.

# PathFinder Energy Services, Inc.

## Magnetic & Grid Calculations

DEVON ENERGY  
ARCTURUS 18 FED #4H  
HACKBERRY; BONE SPRING  
Rig:HP 300

Fri Nov 25 10:33:44 2011

FIELD CALC.

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### Coordinates

Latitude: 32.656267 N (32 deg. 39 min. 22.5626 sec.)  
Longitude: 103.915842 W (-103 deg. 54 min. 57.0298 sec.)  
Elevation: 3436.40 feet.  
Calculation Date: Nov/25/2011

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### Magnetic Calculations

Model: IGRF2010  
Dip Angle: 60.5166 degrees  
Total Magnetic Field: 0.48820 gauss  
Magnetic Declination: 7.724274 degrees  
Horizontal Intensity: 0.240277 gauss  
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.724274 Degs

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### Transverse Mercator Grid Calculations NAD83

Grid System: Transverse Mercator: new mexico east  
Ellipsoid: GRS80  
X: 669825.1500 feet  
Y: 602733.6600 feet  
True to Grid: (convergence) -0.225281 degrees  
Magnetic to Grid: 7.498994 degrees  
To Convert a Magnetic Dir. to a GRID dir. Add 7.498994 Degs.