

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



Company:	DEVON ENERGY	Local Co-ordinate Reference:	Well Arcturus "18" Federal #4H
Project:	Hackberry (Nad 83)	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Arcturus "18" Federal #4H	North Reference:	Grid
Wellbore:	VH - J05#32K11111153	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111153	Database:	EDM-Regulatory

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

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

Well:	Arcturus "18" Federal #4H, Directional (Pathfinder)
Well Position +N/-S 0 0 usft	Northing: 602,733 52 usft Latitude: 32° 39' 22 561 N
+E/-W 0 0 usft	Easting: 669,825 03 usft Longitude: 103° 54' 57 031 W
Position Uncertainty 0 0 usft	Wellhead Elevation: usft Ground Level: 0.0 usft

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

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

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

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

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



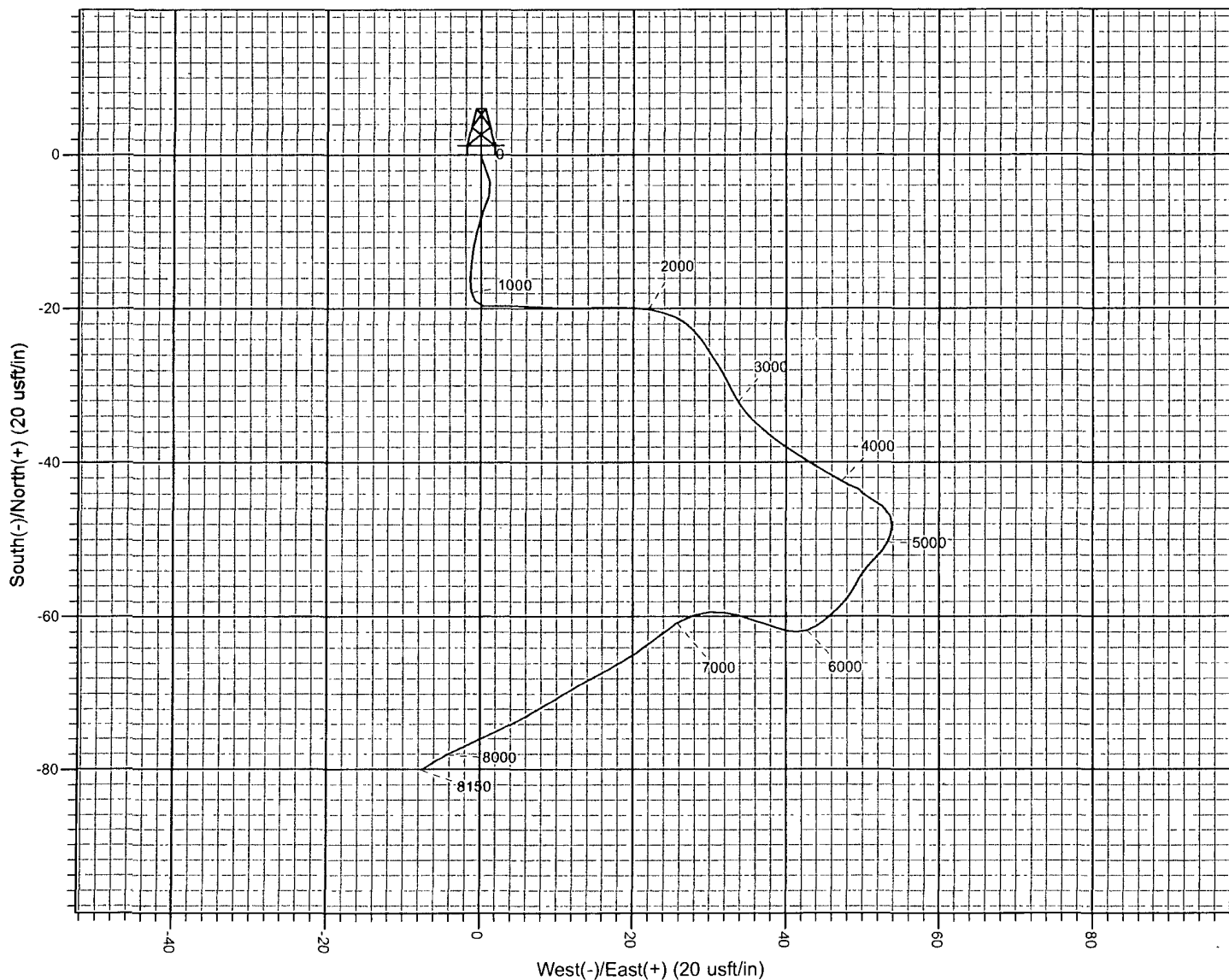
Project: Hackberry (Nad 83)
Eddy County, NM
Well: Arcturus "18" Federal #4H
Wellbore: VH - Job #32K11111153
Design: VH - Job #32K11111153



Azimuths to Grid North
True North -0 23°
Magnetic North 7 50°
Magnetic Field
Strength 48819 7nT
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

Pathfinder:

6213 WCR 112
Midland, Texas 79706
Tel: (432) 687-1647
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, appearing to read "Steve Bibb".

STEVE BIBB
M/LWD Service Coordinator
PathFinder Energy Services

ML:sh



A Schlumberger Company

DIRECTIONAL SURVEY REPORT

DEVON ENERGY

ARCTURUS 18 FED #4H

EDDY COUNTY, NEW MEXICO

PREPARED BY: STEVE BIBB

Pathfinder

6213 WCH 112
Midland, Texas 79706
Tel (+321687-1647)
Fax (+321687 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

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

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

Page 01/06
Tie-in Date: 11/27/2011
Date Completed: 12/03/2011

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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 Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
THE FOLLOWING ARE SCIENTIFIC DRILLING GYRO SURVEYS.										
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

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
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
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EDDY COUNTY, NM
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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
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

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (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.

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets		Closure Dist Dir		DLS (dg/100ft)
(ft)	(deg)	(deg)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	(dg/100ft)
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

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
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):			
On Wall Plat:	7.52^	LWD Calculated:	Agreed Upon:
X =	669825.150000	Feet	Y = 602733.660000
		Feet	
SITE LATITUDE:	32.656267 N	SITE LONGITUDE:	103.915842 W
GRID SYSTEM:	TRUE ☐ UTM ☒ LAMBERT ☐	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 ☐	MC ☒	RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	SCIENTIFIC DRILLING		
COPY OF TIE-IN SURVEY REPORT	☐ YES ☐ 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

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

Well Notes



Survey:		FINAL OUTRUN							
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
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 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
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

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

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

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.

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

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 Degr

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 Degr.

ATS-11-124

OCD-ARTESIA

Form 3160-3
(February 2005)

SECRETARY'S POTASH

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No 1004-0137
Expires March 31, 2007

EA 210

5. Lease Serial No.
USA NMNM LC 069464-A

6. If Indian, Allottee or Tribe Name

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
Arcturus 18 Federal 4H

9. API Well No.

30-015-38611

10. Field and Pool, or Exploratory

Hackberry; Bone Spring, NW

11. Sec., T. R. M. or Blk and Survey or Area

Sec 18 T19S-R31E

1a. Type of work: ☒ DRILL ☐ REENTER1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone2. Name of Operator
Devon Energy Production Co., LP3a. Address 20 North Broadway
OKC, OK 731023b. Phone No. (include area code)
(405)-552-7802

4. Location of Well (Report location clearly and in accordance with any State requirements.)

At surface SWSW 950' FSL & 340' FWL (Lot M)

At proposed prod. zone SWSE 980' FSL & 1660' FEL Lot O

14. Distance in miles and direction from nearest town or post office*
Approximately 12 miles southwest of Loco Hills, NM.

12. County or Parish

Eddy

13. State

NM

15. Distance from proposed*
location to nearest
property or lease line, ft.
(Also to nearest drg. unit line, if any)

340'

16. No. of acres in lease

760

17. Spacing Unit dedicated to this well

120

18. Distance from proposed location*
to nearest well, drilling, completed,
applied for, on this lease, ft

SL: 50' BHL: 488'

19. Proposed Depth
TVD 8830' MD 11770'

20. BLM/BIA Bond No. on file

CO-1104

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3411.1' GL22. Approximate date work will start*
12/15/201023. Estimated duration
45 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, must be attached to this form:

1. Well plat certified by a registered surveyor.

2. A Drilling Plan.

3. A Surface Use Plan (if the location is on National Forest System Lands, the
SUPO must be filed with the appropriate Forest Service Office).4. Bond to cover the operations unless covered by an existing bond on file (see
Item 20 above).

5. Operator certification

6. Such other site specific information and/or plans as may be required by the
BLM.

25. Signature

Name (Printed/Typed)

Stephanie A. Ysaga

Date

11/01/2010

Title

Sr. Staff Engineering Technician

Approved by (Signature)

/s/ Jesse J. Juen

Name (Printed/Typed)

/s/ Jesse J. Juen

Date

MAR 17 2011

Title FOR STATE DIRECTOR

Office

NM STATE OFFICE

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to
conduct operations thereon.

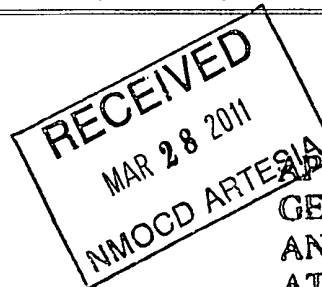
Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 USC Section 1001 and Title 43 USC Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United
States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

*(Instructions on page 2)

CAPTAN CONTROLLED WATER BASIN

SEE ATTACHED FOR
CONDITIONS OF APPROVALAPPROVAL SUBJECT TO
GENERAL REQUIREMENTS
AND SPECIAL STIPULATIONS
ATTACHED

KE 03/31/11