

COG OPERATING

Delaware River
Eddy County, NM
SRO State Com #9H
VH - Job #32K0611572

30-015-37142

Survey: Actual

SDI Standard Survey Report

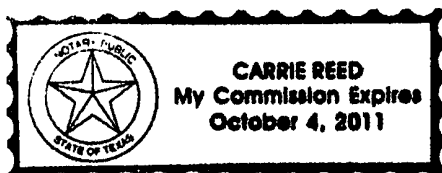
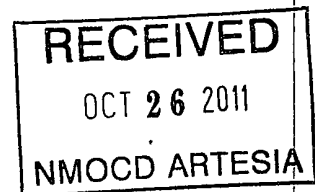
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notarized this date 22nd of July, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well SRO State Com #9H
Project:	Delaware River	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	SRO State Com #9H	North Reference:	Grid
Wellbore:	VH - Job #32K0611572	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0611572	Database:	EDM-Regulatory

Project	Delaware River		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Eddy County, NM		
Site Position:		Northing:	-334,502 85 usft
From:	Lat/Long	Easting:	574,114 78 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	30° 4' 48 000 N
		Longitude:	104° 5' 56 400 W
		Grid Convergence:	0 12 °

Well	SRO State Com #9H, Directional (Pathfinder)		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	30° 4' 48 000 N
		Longitude:	104° 5' 56 400 W
		Ground Level:	0 0 usft

Wellbore	VH - Job #32K0611572				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/16/2011	7 66	58 05	47,272

Design	VH - Job #32K0611572			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth:
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 0	0 0	0 0	1 65

Survey Program	Date 7/21/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	6,143 0	Actual (VH - Job #32K0611572)	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	0 0
100 0	0 27	202 96	100 0	-0 2	-0 1	202 96	0 2	
200 0	0 22	193 88	200 0	-0 6	-0 2	200 33	0 7	
300 0	0 29	125 17	300 0	-1 0	-0 1	184 15	1 0	
400 0	1 29	108 54	400 0	-1 5	1 2	140 39	1 9	
500 0	1 68	108 02	500 0	-2 3	3 7	121 74	4 3	
600 0	1 94	106 48	599 9	-3 2	6 7	115 59	7 4	
700 0	2 19	108 07	699 8	-4 3	10 1	112 89	11 0	
800 0	2 32	106 11	799 8	-5 4	13 9	111 35	14 9	
900 0	2 42	108 18	899 7	-6 6	17 8	110 45	19 0	
1,000 0	2 22	107 33	999 6	-7 9	21 7	109 98	23 1	
1,100 0	1 67	102 47	1,099 5	-8 8	25 0	109 37	26 5	

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Well:	SRO State Com #9H	North Reference:	Grid
Wellbore:	VH - Job #32K0611572	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0611572	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 99	69 35	1,199 5	-8 8	27 2	107 91	28 6	
1,300 0	0 81	48 90	1,299 5	-8 0	28 5	105 69	29 6	
1,400 0	1 22	30 63	1,399 5	-6 6	29 6	102 63	30 3	
1,500 0	0 67	33 48	1,499 5	-5 2	30 5	99 74	30 9	
1,600 0	0 77	39 91	1,599 5	-4 2	31 2	97 71	31 5	
1,700 0	1 59	73 19	1,699 4	-3 3	33 0	95 73	33 2	
1,800 0	2 77	87 75	1,799 4	-2 8	36 7	94 38	36 8	
1,900 0	2 80	91 00	1,899 2	-2 8	41 6	93 80	41 7	
2,000 0	3 26	93 53	1,999 1	-3 0	46 9	93 64	47 0	
2,100 0	3 41	95 53	2,098 9	-3 4	52 7	93 74	52 8	
2,200 0	3 47	96 16	2,198 8	-4 1	58 6	93 96	58 8	
2,300 0	2 07	97 51	2,298 6	-4 6	63 4	94 16	63 6	
2,400 0	0 99	100 71	2,398 6	-5 0	66 1	94 34	66 3	
2,500 0	0 65	104 49	2,498 6	-5 3	67 5	94 50	67 7	
2,600 0	0 36	94 44	2,598 6	-5 5	68 3	94 59	68 6	
2,700 0	0 37	73 56	2,698 6	-5 4	69 0	94 49	69 2	
2,800 0	0 20	32 48	2,798 6	-5 2	69 4	94 27	69 6	
2,900 0	0 20	350 22	2,898 6	-4 9	69 4	94 00	69 6	
3,000 0	0 34	323 89	2,998 6	-4 4	69 2	93 67	69 4	
3,100 0	0 39	296 13	3,098 6	-4 1	68 7	93 38	68 9	
3,200 0	0 60	295 57	3,198 6	-3 7	68 0	93 10	68 1	
3,300 0	0 77	293 91	3,298 6	-3 2	66 9	92 72	66 9	
3,400 0	0 76	290 50	3,398 6	-2 7	65 6	92 33	65 7	
3,500 0	0 74	290 91	3,498 6	-2 2	64 4	91 97	64 5	
3,600 0	0 85	294 90	3,598 5	-1 7	63 1	91 52	63 2	
3,700 0	0 85	291 30	3,698 5	-1 1	61 8	91 01	61 8	
3,800 0	1 02	293 89	3,798 5	-0 5	60 3	90 44	60 3	
3,900 0	1 02	291 64	3,898 5	0 2	58 6	89 78	58 6	
4,000 0	1 20	278 11	3,998 5	0 7	56 8	89 29	56 8	
4,100 0	1 15	263 37	4,098 5	0 7	54 7	89 23	54 7	
4,200 0	1 21	253 49	4,198 4	0 3	52 7	89 65	52 7	
4,300 0	1 09	247 73	4,298 4	-0 3	50 8	90 38	50 8	
4,400 0	1 20	246 33	4,398 4	-1 1	49 0	91 31	49 0	
4,500 0	1 08	234 71	4,498 4	-2 1	47 3	92 53	47 3	
4,600 0	1 24	209 97	4,598 4	-3 6	46 0	94 44	46 1	
4,700 0	1 34	205 40	4,698 3	-5 6	44 9	97 06	45 3	
4,800 0	1 44	200 01	4,798 3	-7 8	44 0	100 05	44 7	
4,900 0	1 33	200 18	4,898 3	-10 1	43 1	103 13	44 3	
5,000 0	1 42	208 33	4,998 2	-12 2	42 2	106 20	43 9	
5,100 0	1 53	211 68	5,098 2	-14 5	40 9	109 50	43 4	
5,200 0	1 42	211 01	5,198 2	-16 7	39 5	112 87	42 9	
5,300 0	1 36	208 66	5,298 2	-18 8	38 3	116 10	42 7	
5,400 0	1 24	204 97	5,398 1	-20 8	37 3	119 14	42 7	
5,500 0	1 26	196 92	5,498 1	-22 8	36 5	122 01	43 1	

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Design:	VH - Job #32K0611572	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	1 34	192 05	5,598 1	-25 0	36 0	124 84	43 8
5,700 0	1 56	197 84	5,698 0	-27 5	35 3	127 89	44 7
5,800 0	1 58	196 68	5,798 0	-30 1	34 5	131 10	45 8
5,900 0	1 60	201 12	5,898 0	-32 7	33 6	134 24	46 9
6,000 0	1 72	200 88	5,997 9	-35 4	32 5	137 41	48 1
6,100 0	1 55	207 73	6,097 9	-38 0	31 4	140 46	49 3
6,143 0	1 42	220 31	6,140 9	-38 9	30 8	141 68	49 6



Project: Delaware River
Eddy County, NM
Well: SRO State Com #9H
Wellbore: VH - Job #32K0611572
Design: VH - Job #32K0611572

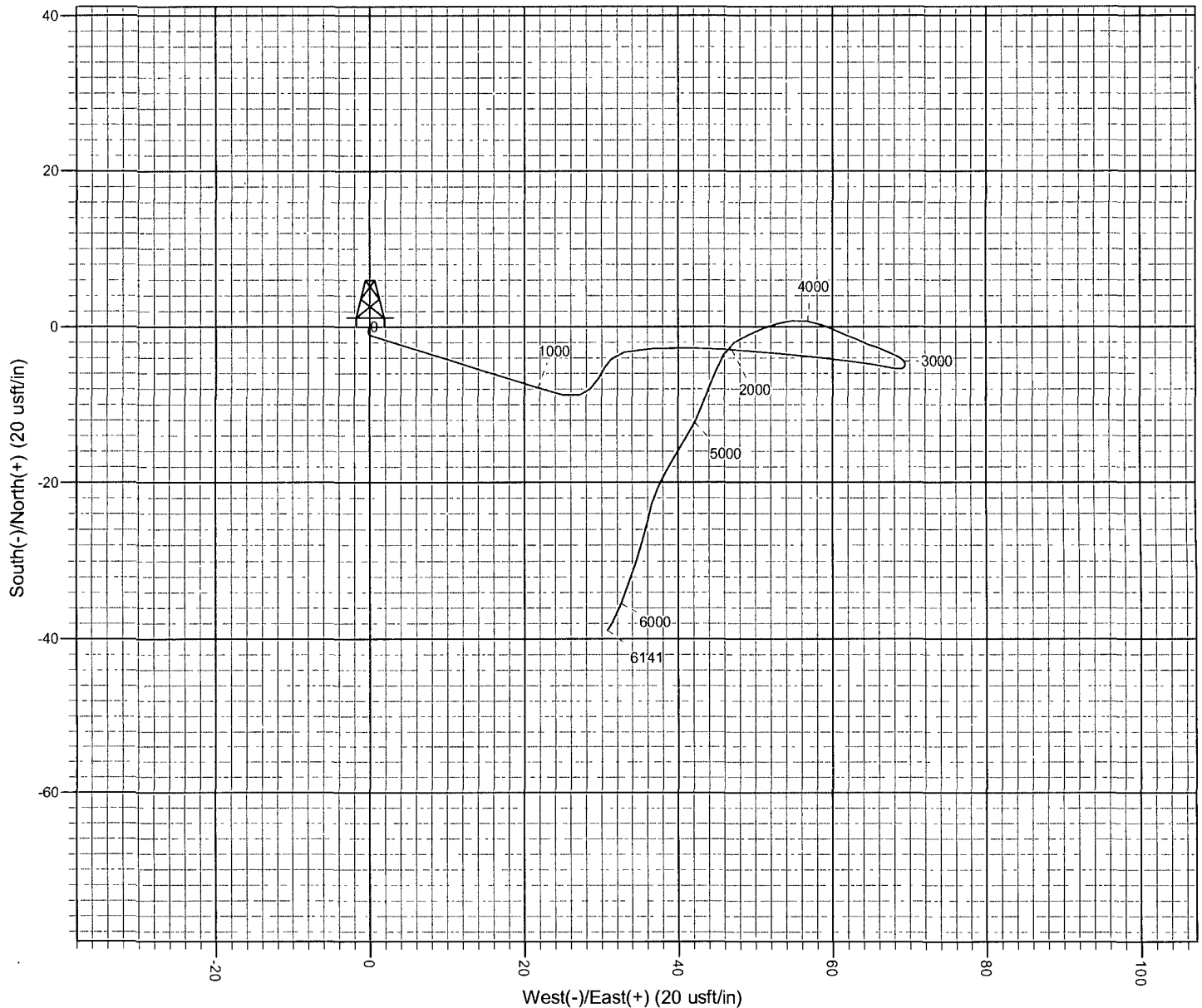


Azimuths to Grid North
True North -012°
Magnetic North 754°

Magnetic Field
Strength 47271.7nT
Dip Angle 58.05°
Date 6/16/2011
Model IGRF2010

WELL DETAILS: SRO State Com #9H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	-334502.85	574114.78	30° 4' 48.000 N	104° 5' 56.400 W	



PROJECT DETAILS: Delaware River
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 30° 4' 48.000 N
Longitude: 104° 5' 56.400 W
Positional Uncertainty: 0.0
Convergence: 0.12
Local North: Grid

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
SRO STATE UNIT #9H
EDDY COUNTY COUNTY, NEW MEXICO
Rig: PATRIOT # 6
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers: P.DAS
L.BISIRIYU

Page 01/03
Tie-in Date: 06/17/2011
Date Completed: 06/22/2011

Survey Horiz. Reference: WELLHEAD
Ref Coordinates: LAT: 32.4.46.9645 N LON: 104.5.56.1659 W
GRID Reference: NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 572599.4000 Y: 392802.3000
North Aligned To: GRID NORTH
Total Magnetic Correction: 7.69° EAST TO GRID
Vertical Section Plane: 0.45
Survey Vert. Reference: 17.50' Kelly Bushing To Ground

Survey Calculations by RX5 V6.03E using Minimum Curvature

30-015-37142

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 SURVEY @ 6143' MD										
6143.00	1.42	220.31	6140.87	0.00	-38.69	38.93 S	30.77 E	49.62@	141.68	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
6268.00	2.29	2.24	6265.84	125.00	-37.38	37.62 S	29.87 E	48.03@	141.55	2.82
6300.00	6.68	359.34	6297.73	32.00	-34.88	35.11 S	29.87 E	46.10@	139.61	13.73
6332.00	10.90	357.32	6329.35	32.00	-29.99	30.23 S	29.71 E	42.38@	135.50	13.22
6364.00	14.86	356.97	6360.54	32.00	-22.87	23.11 S	29.35 E	37.35@	128.21	12.38
6396.00	17.76	359.43	6391.25	32.00	-13.90	14.13 S	29.08 E	32.33@	115.91	9.31
6427.00	20.49	2.24	6420.54	31.00	-3.74	3.97 S	29.25 E	29.52@	97.74	9.29
6459.00	23.57	2.33	6450.20	32.00	8.25	8.02 N	29.73 E	30.79@	74.91	9.63
6491.00	26.29	1.98	6479.21	32.00	21.73	21.49 N	30.23 E	37.09@	54.59	8.51
6523.00	28.84	0.40	6507.58	32.00	36.54	36.30 N	30.53 E	47.43@	40.07	8.29
6555.00	31.66	358.64	6535.22	32.00	52.65	52.41 N	30.38 E	60.58@	30.10	9.24
6587.00	34.47	357.58	6562.03	32.00	70.09	69.86 N	29.80 E	75.95@	23.10	8.97
6619.00	37.55	356.97	6587.92	32.00	88.88	88.65 N	28.90 E	93.24@	18.06	9.69
6650.00	40.71	356.35	6611.96	31.00	108.39	108.18 N	27.76 E	111.68@	14.39	10.27
6682.00	43.79	356.26	6635.64	32.00	129.85	129.65 N	26.37 E	132.30@	11.50	9.63
6714.00	46.69	356.44	6658.17	32.00	152.51	152.32 N	24.93 E	154.35@	9.29	9.07
6746.00	51.79	357.41	6679.06	32.00	176.70	176.52 N	23.64 E	178.09@	7.63	16.10
6778.00	57.33	359.08	6697.61	32.00	202.74	202.56 N	22.85 E	203.85@	6.44	17.83
6809.00	62.96	0.40	6713.04	31.00	229.61	229.44 N	22.74 E	230.56@	5.66	18.53
6841.00	68.94	1.63	6726.07	32.00	258.82	258.64 N	23.26 E	259.68@	5.14	19.01
6873.00	75.62	2.15	6735.80	32.00	289.27	289.09 N	24.27 E	290.11@	4.80	20.93
6908.00	81.78	2.50	6742.66	35.00	323.56	323.37 N	25.66 E	324.38@	4.54	17.63
6940.00	82.48	2.42	6747.04	32.00	355.24	355.03 N	27.02 E	356.06@	4.35	2.20
6972.00	83.71	1.54	6750.89	32.00	386.99	386.78 N	28.12 E	387.80@	4.16	4.72

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OCT 26 2011
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PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
SRO STATE UNIT #9H
EDDY COUNTY COUNTY, NEW MEXICO
RIG: PATRIOT # 6

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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)
7004.00	85.82	0.31	6753.81	32.00	418.85	418.64 N	28.64 E	419.62@	3.91	7.62
7036.00	88.46	0.40	6755.40	32.00	450.81	450.60 N	28.83 E	451.52@	3.66	8.26
7067.00	88.72	0.75	6756.17	31.00	481.80	481.59 N	29.14 E	482.47@	3.46	1.41
7131.00	90.84	0.92	6756.41	64.00	545.80	545.58 N	30.08 E	546.41@	3.16	3.32
7195.00	91.98	1.80	6754.84	64.00	609.77	609.54 N	31.60 E	610.36@	2.97	2.25
7258.00	90.22	2.24	6753.63	63.00	672.73	672.48 N	33.82 E	673.33@	2.88	2.88
7353.00	89.69	1.54	6753.70	95.00	767.70	767.43 N	36.95 E	768.32@	2.76	0.92
7448.00	89.87	0.48	6754.07	95.00	862.69	862.42 N	38.62 E	863.28@	2.56	1.13
7543.00	90.13	359.87	6754.07	95.00	957.69	957.41 N	38.91 E	958.20@	2.33	0.70
7639.00	90.57	359.87	6753.48	96.00	1053.68	1053.41 N	38.70 E	1054.12@	2.10	0.46
7734.00	90.75	359.43	6752.39	95.00	1148.67	1148.40 N	38.12 E	1149.04@	1.90	0.50
7830.00	88.55	358.99	6752.97	96.00	1244.64	1244.39 N	36.79 E	1244.93@	1.69	2.34
7925.00	89.78	0.31	6754.36	95.00	1339.61	1339.37 N	36.21 E	1339.86@	1.55	1.90
8021.00	90.31	0.22	6754.28	96.00	1435.61	1435.37 N	36.66 E	1435.84@	1.46	0.56
8116.00	90.92	0.48	6753.26	95.00	1530.61	1530.36 N	37.24 E	1530.81@	1.39	0.70
8211.00	89.34	359.52	6753.05	95.00	1625.60	1625.36 N	37.24 E	1625.78@	1.31	1.95
8307.00	89.25	358.90	6754.23	96.00	1721.57	1721.34 N	35.91 E	1721.72@	1.20	0.65
8402.00	89.16	358.46	6755.55	95.00	1816.51	1816.31 N	33.72 E	1816.62@	1.06	0.47
8497.00	95.23	1.89	6751.91	95.00	1911.38	1911.18 N	34.01 E	1911.48@	1.02	7.34
8593.00	92.07	1.01	6745.80	96.00	2007.16	2006.94 N	36.43 E	2007.27@	1.04	3.42
8760.00	88.29	359.08	6745.27	167.00	2174.12	2173.90 N	36.56 E	2174.21@	0.96	2.54
8815.00	89.60	358.99	6746.29	55.00	2229.09	2228.88 N	35.64 E	2229.17@	0.92	2.39
8879.00	90.40	359.43	6746.29	64.00	2293.08	2292.87 N	34.75 E	2293.14@	0.87	1.43
8942.00	90.40	358.73	6745.85	63.00	2356.06	2355.86 N	33.74 E	2356.11@	0.82	1.11
9005.00	90.57	358.81	6745.31	63.00	2419.03	2418.85 N	32.39 E	2419.06@	0.77	0.30
9069.00	90.84	359.08	6744.53	64.00	2483.00	2482.83 N	31.21 E	2483.03@	0.72	0.60
9133.00	88.02	357.14	6745.16	64.00	2546.93	2546.78 N	29.10 E	2546.95@	0.65	5.35
9228.00	88.99	357.96	6747.64	95.00	2641.78	2641.66 N	25.04 E	2641.78@	0.54	1.34

PathFinder Energy Services, Inc.

Survey Report

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SRO STATE UNIT #9H
EDDY COUNTY COUNTY, NEW MEXICO
RIG: PATRIOT # 6

Page 03/03

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)
9292.00	88.11	356.75	6749.26	64.00	2705.66	2705.57 N	22.09 E	2705.66@	0.47	2.34
9355.00	89.25	358.01	6750.71	63.00	2768.55	2768.49 N	19.21 E	2768.55@	0.40	2.70
9419.00	90.04	0.14	6751.11	64.00	2832.53	2832.47 N	18.18 E	2832.53@	0.37	3.55
9482.00	89.96	0.33	6751.11	63.00	2895.53	2895.47 N	18.44 E	2895.53@	0.36	0.33
9546.00	90.40	0.58	6750.91	64.00	2959.53	2959.47 N	18.94 E	2959.53@	0.37	0.79
9641.00	91.36	0.59	6749.45	95.00	3054.52	3054.45 N	19.91 E	3054.52@	0.37	1.01
9737.00	91.28	359.79	6747.24	96.00	3150.49	3150.43 N	20.23 E	3150.49@	0.37	0.84
9832.00	91.10	359.59	6745.26	95.00	3245.46	3245.40 N	19.72 E	3245.46@	0.35	0.28
9928.00	91.89	0.08	6742.76	96.00	3341.42	3341.37 N	19.44 E	3341.43@	0.33	0.97
9991.00	91.89	359.45	6740.68	63.00	3404.38	3404.34 N	19.18 E	3404.39@	0.32	1.00
10055.00	90.04	358.83	6739.60	64.00	3468.35	3468.32 N	18.22 E	3468.36@	0.30	3.05
10119.00	89.69	359.07	6739.75	64.00	3532.33	3532.31 N	17.05 E	3532.35@	0.28	0.66
10182.00	89.08	358.93	6740.43	63.00	3595.31	3595.29 N	15.95 E	3595.33@	0.25	0.99
10246.00	90.40	358.39	6740.72	64.00	3659.27	3659.27 N	14.45 E	3659.30@	0.23	2.23
10309.00	90.40	358.46	6740.28	63.00	3722.23	3722.25 N	12.72 E	3722.27@	0.20	0.11
10405.00	90.22	357.61	6739.76	96.00	3818.14	3818.19 N	9.43 E	3818.20@	0.14	0.90
10500.00	89.69	357.57	6739.84	95.00	3913.03	3913.10 N	5.44 E	3913.11@	0.08	0.56
10596.00	90.13	358.19	6739.99	96.00	4008.93	4009.04 N	1.88 E	4009.04@	0.03	0.79
10691.00	89.69	357.67	6740.14	95.00	4103.84	4103.97 N	1.55 W	4103.97@	359.98	0.72
10787.00	90.84	357.27	6739.69	96.00	4199.70	4199.88 N	5.78 W	4199.88@	359.92	1.27
10882.00	90.84	357.37	6738.30	95.00	4294.55	4294.76 N	10.23 W	4294.78@	359.86	0.10
10977.00	91.19	357.46	6736.62	95.00	4389.40	4389.65 N	14.51 W	4389.68@	359.81	0.38
11073.00	91.80	356.82	6734.11	96.00	4485.21	4485.50 N	19.30 W	4485.54@	359.75	0.92
STRAIGHT-LINE PROJECTION TO BIT @ 11150' MD										
11150.00	91.80	356.82	6731.69	77.00	4562.02	4562.34 N	23.57 W	4562.40@	359.70	0.00