



DIRECTIONAL SURVEY REPORT

YATES PETROLEUM

COTTONWOOD KI FED COM #4H

EDDY COUNTY, NEW MEXICO

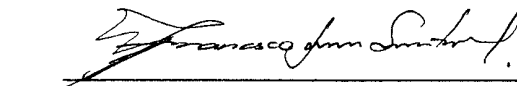
PREPARED BY: FRANCISCO SINISTERRA

DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:
A) RAFAEL DONARUMMA
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 10/16/08 TO 10/26/08
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: EDDY COUNTY, NM
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

YATES PETROLEUM
COTTONWOOD KI FED COM #4H
EDDY COUNTY, NM
RIG: JW #4
9. SURVEY CERTIFIED FROM: 4,330 TO 8,890 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 4,330.85 FEET ON A BEARING OF 270.58 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 8,954 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.



FRANCISCO SINISTERRA
M/LWD SERVICE COORDINATOR

PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 10/16/2008
Date Completed: 10/26/2008

YATES PETROLEUM
COTTONWOOD KI FED COM#4H
EDDY COUNTY, NM
Rig:JW#4
PathFinder Office Supervisor: CODY MEBANE
PathFinder Field Engineers:DONARUMMA

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.55.4.3827 N LON:104.31.1.3690 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 484963.0640 Y: 697709.8740
North Aligned To:GRID NORTH
Total Magnetic Correction: 8.48° EAST TO GRID
Vertical Section Plane: 270.03
Survey Vert. Reference: 14.00' Kelly Bushing To Ground
Altitude:3586.00' Ground To MSL

Measured Depth	8954.00	(feet)
Inclination	89.96	(deg)
Azimuth	270.54	(deg)
True Vertical Depth	4759.94	(feet)
Vertical Section	4330.64	(feet)
Survey X cord	480632.43	(feet)
Survey Y cord	697753.91	(feet)
Survey Lat	32.91798357 N	(deg)
Survey Lon	104.53115986 W	(deg)
Rectangular Corr. N/S	44.06 N	(feet)
Rectangular Corr. E/W	4330.62 W	(feet)
Closure Distance	4330.85	(feet)
Direction of Closure	270.58	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

YATES PETROLEUM

COTTONWOOD KI FED COM#4H

EDDY COUNTY, NM

Rig:JW#4

PathFinder Office Supervisor: CODY MEBANE

PathFinder Field Engineers: DONARUMMA

Survey Horiz. Reference:WELLHEAD

Ref Coordinates: LAT:32.55.4.3827 N LON:104.31.1.3690 W

Reference:NAD83 new mexico east Transverse Mercator

Ref GRID Coord: X: 484963.0640 Y: 697709.8740

North Aligned To:GRID NORTH

Total Magnetic Correction: 8.48° EAST TO GRID

Vertical Section Plane: 270.03

Survey Vert. Reference: 14.00' Kelly Bushing To Ground

Altitude:3586.00' Ground To MSL

Survey Calculations by RX5 V5.11i 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)
TIE IN TO SCIENTIFIC GYRO @ 4300' MD.										
4300.00	2.06	37.30	4299.57	0.00	-19.57	44.88 N	19.59 E	48.97@	23.58	0.00
THE FOLLOWING ARE PATHFINDER SURVEYS.										
4330.00	0.88	339.82	4329.56	30.00	-19.81	45.53 N	19.84 E	49.66@	23.54	5.84
4361.00	4.04	286.10	4360.53	31.00	-18.68	46.05 N	18.71 E	49.71@	22.11	11.58
4392.00	8.88	281.95	4391.32	31.00	-15.29	46.85 N	15.31 E	49.29@	18.10	15.68
4423.00	13.54	281.32	4421.72	31.00	-9.39	48.06 N	9.41 E	48.97@	11.08	15.04
4454.00	18.11	280.89	4451.54	31.00	-1.09	49.68 N	1.12 E	49.69@	1.29	14.75
4485.00	22.16	279.92	4480.64	31.00	9.40	51.60 N	9.38 W	52.45@	349.70	13.11
4516.00	25.59	279.05	4508.98	31.00	21.78	53.66 N	21.75 W	57.90@	337.93	11.12
4547.00	28.93	279.15	4536.54	31.00	35.80	55.91 N	35.77 W	66.37@	327.39	10.78
4578.00	32.18	278.00	4563.23	31.00	51.38	58.25 N	51.35 W	77.65@	318.60	10.65
4609.00	35.26	276.40	4589.01	31.00	68.45	60.40 N	68.42 W	91.27@	311.43	10.34
4640.00	38.87	274.20	4613.75	31.00	87.06	62.11 N	87.02 W	106.91@	305.51	12.40
4670.00	41.94	272.46	4636.59	30.00	106.47	63.23 N	106.43 W	123.80@	300.71	10.90
4702.00	45.11	272.21	4659.79	32.00	128.48	64.12 N	128.45 W	143.56@	296.53	9.92
4733.00	48.28	272.12	4681.05	31.00	151.02	64.97 N	150.99 W	164.38@	293.28	10.23
4764.00	51.62	271.62	4700.99	31.00	174.74	65.75 N	174.70 W	186.66@	290.62	10.84
4795.00	56.10	271.47	4719.27	31.00	199.76	66.42 N	199.72 W	210.48@	288.40	14.46
4826.00	58.12	270.25	4736.10	31.00	225.78	66.81 N	225.75 W	235.43@	286.49	7.31
4857.00	60.59	271.22	4751.90	31.00	252.45	67.15 N	252.41 W	261.19@	284.90	8.41
4888.00	64.19	270.96	4766.27	31.00	279.91	67.67 N	279.87 W	287.94@	283.59	11.64
4919.00	68.41	270.81	4778.73	31.00	308.29	68.11 N	308.25 W	315.69@	282.46	13.62
4950.00	71.49	270.34	4789.35	31.00	337.40	68.40 N	337.37 W	344.23@	281.46	10.04

PathFinder Energy Services, Inc.

Survey Report

YATES PETROLEUM
COTTONWOOD KI FED COM#4H
EDDY COUNTY, NM
RIG:JW#4

Page 02/03

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)
4981.00	74.74	269.78	4798.35	31.00	367.06	68.43 N	367.03 W	373.35@	280.56	10.62
5012.00	78.52	269.64	4805.52	31.00	397.22	68.28 N	397.18 W	403.01@	279.75	12.20
5043.00	82.57	269.64	4810.61	31.00	427.79	68.09 N	427.75 W	433.14@	279.04	13.06
5074.00	85.03	269.97	4813.96	31.00	458.60	67.98 N	458.57 W	463.58@	278.43	8.01
5128.00	90.04	270.75	4816.28	54.00	512.54	68.32 N	512.50 W	517.03@	277.59	9.39
5190.00	90.31	271.37	4816.09	62.00	574.52	69.47 N	574.49 W	578.67@	276.89	1.09
5252.00	89.87	270.67	4816.00	62.00	636.51	70.57 N	636.48 W	640.38@	276.33	1.33
5314.00	89.78	269.76	4816.19	62.00	698.51	70.81 N	698.48 W	702.06@	275.79	1.48
5407.00	89.16	269.94	4817.05	93.00	791.51	70.56 N	791.47 W	794.61@	275.09	0.69
5500.00	89.69	269.29	4817.98	93.00	884.50	69.94 N	884.46 W	887.22@	274.52	0.90
5592.00	91.89	268.54	4816.71	92.00	976.47	68.20 N	976.43 W	978.81@	274.00	2.53
5654.00	90.92	268.01	4815.19	62.00	1038.42	66.33 N	1038.38 W	1040.50@	273.65	1.78
5749.00	88.20	266.32	4815.92	95.00	1133.29	61.63 N	1133.25 W	1134.93@	273.11	3.37
5845.00	89.69	266.28	4817.69	96.00	1229.06	55.44 N	1229.03 W	1230.28@	272.58	1.55
5940.00	90.66	266.00	4817.40	95.00	1323.84	49.04 N	1323.82 W	1324.73@	272.12	1.06
6003.00	89.25	264.98	4817.45	63.00	1386.64	44.09 N	1386.62 W	1387.32@	271.82	2.76
6067.00	91.80	265.32	4816.86	64.00	1450.40	38.68 N	1450.38 W	1450.90@	271.53	4.02
6130.00	91.98	265.49	4814.78	63.00	1513.16	33.64 N	1513.15 W	1513.52@	271.27	0.39
6194.00	90.92	265.07	4813.16	64.00	1576.92	28.37 N	1576.91 W	1577.16@	271.03	1.78
6257.00	90.04	264.71	4812.64	63.00	1639.67	22.76 N	1639.65 W	1639.81@	270.80	1.51
6289.00	89.25	264.15	4812.83	32.00	1671.51	19.65 N	1671.50 W	1671.62@	270.67	3.03
6385.00	92.24	265.34	4811.59	96.00	1767.08	10.86 N	1767.08 W	1767.11@	270.35	3.35
6448.00	91.01	264.52	4809.80	63.00	1829.81	5.30 N	1829.80 W	1829.81@	270.17	2.35
6512.00	88.99	262.85	4809.80	64.00	1893.41	1.74 S	1893.41 W	1893.41@	269.95	4.10
6607.00	92.51	263.44	4808.56	95.00	1987.70	13.08 S	1987.71 W	1987.75@	269.62	3.76
6702.00	91.36	263.23	4805.35	95.00	2082.00	24.10 S	2082.01 W	2082.15@	269.34	1.23
6798.00	93.12	265.86	4801.60	96.00	2177.47	33.22 S	2177.49 W	2177.74@	269.13	3.30

PathFinder Energy Services, Inc.

Survey Report

YATES PETROLEUM
COTTONWOOD KI FED COM#4H
EDDY COUNTY, NM
RIG:JW#4

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)
6894.00	92.68	269.17	4796.74	96.00	2273.24	37.37 S	2273.26 W	2273.57@	269.06	3.47
6957.00	92.77	269.66	4793.74	63.00	2336.17	38.02 S	2336.19 W	2336.50@	269.07	0.79
7021.00	91.80	269.51	4791.19	64.00	2400.11	38.48 S	2400.14 W	2400.44@	269.08	1.53
7116.00	91.98	271.70	4788.06	95.00	2495.05	37.48 S	2495.07 W	2495.35@	269.14	2.31
7179.00	90.92	271.33	4786.46	63.00	2558.01	35.81 S	2558.03 W	2558.28@	269.20	1.78
7242.00	89.78	270.56	4786.08	63.00	2621.00	34.77 S	2621.02 W	2621.25@	269.24	2.18
7337.00	91.71	273.01	4784.84	95.00	2715.94	31.81 S	2715.95 W	2716.14@	269.33	3.28
7433.00	90.92	273.28	4782.64	96.00	2811.77	26.55 S	2811.78 W	2811.91@	269.46	0.87
7528.00	90.22	273.18	4781.69	95.00	2906.61	21.20 S	2906.63 W	2906.70@	269.58	0.74
7623.00	88.46	272.30	4782.79	95.00	3001.50	16.66 S	3001.51 W	3001.55@	269.68	2.07
7718.00	91.45	272.82	4782.86	95.00	3096.39	12.41 S	3096.40 W	3096.42@	269.77	3.19
7813.00	91.54	272.97	4780.38	95.00	3191.24	7.62 S	3191.25 W	3191.26@	269.86	0.18
7908.00	90.40	272.81	4778.78	95.00	3286.11	2.83 S	3286.11 W	3286.11@	269.95	1.21
7972.00	89.87	272.94	4778.63	64.00	3350.03	0.38 N	3350.03 W	3350.03@	270.01	0.85
8067.00	92.77	273.50	4776.44	95.00	3444.85	5.72 N	3444.84 W	3444.85@	270.10	3.11
8162.00	92.95	273.49	4771.70	95.00	3539.55	11.50 N	3539.55 W	3539.57@	270.19	0.19
8257.00	91.98	273.17	4767.61	95.00	3634.31	17.01 N	3634.30 W	3634.34@	270.27	1.08
8352.00	90.92	272.49	4765.21	95.00	3729.16	21.70 N	3729.15 W	3729.21@	270.33	1.33
8448.00	90.31	272.55	4764.18	96.00	3825.07	25.92 N	3825.05 W	3825.14@	270.39	0.64
8543.00	90.22	272.87	4763.74	95.00	3919.96	30.41 N	3919.95 W	3920.06@	270.44	0.35
8638.00	89.43	272.88	4764.03	95.00	4014.84	35.18 N	4014.82 W	4014.98@	270.50	0.83
8734.00	91.45	272.04	4763.29	96.00	4110.75	39.30 N	4110.73 W	4110.92@	270.55	2.28
8829.00	91.63	271.60	4760.74	95.00	4205.67	42.32 N	4205.64 W	4205.86@	270.58	0.50
8890.00	89.96	270.54	4759.89	61.00	4266.65	43.45 N	4266.62 W	4266.85@	270.58	3.24
PROJECTED SURVEY AT BIT DEPTH @ 8954'MD.										
8954.00	89.96	270.54	4759.94	64.00	4330.64	44.06 N	4330.62 W	4330.85@	270.58	0.00



ENERGY SERVICES

TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	YATES PETROLEUM		
LEASE / WELL No.:	COTTONWOOD KI FED COM	#4H	
WELL LOCATION:	EDDY COUNTY		
COUNTY / STATE / COUNTRY:	EDDY COUNTY	NM	USA
RIG:	JW#4		
API WELL No:	30-015-36404		
JOB No:	101007951-WT-WT		
P.O. / AFE No.			
DIRECTIONAL COMPANY:	PATHFINDER		

WELL SITE INFORMATION

MAGNETIC DECLINATION:					
On Wall Plat:	8.5	LWD Calculated:	8.479	Agreed Upon:	8.48
X = 484963.060400		Feet	Y = 697709.874000		Feet
SITE LATITUDE:	32.917884 N	SITE LONGITUDE:	104.517047 W		
GRID SYSTEM:	TRUE ☐ UTM ☒ LAMBERT ☐	ZONE:	NEW MEXICO EAST		
PROPOSED DRIFT DIRECTION:	270.03				
KELLY BUSHING ELEVATION:					
ALTITUDE:	3586	Feet	WATER DEPTH:	Feet	

TIE-IN SURVEY

MEASURED DEPTH:	4300
DRIFT ANGLE:	2.06
DRIFT DIRECTION:	37.3
TRUE VERTICAL DEPTH:	4299.57
VERTICAL SECTION:	-19.57
RECTANGULAR COORDINATE (N / S) :	44.88
RECTANGULAR COORDINATE (E / W) :	19.59
CLOSURE DISTANCE / DIRECTION:	
SURVEY CALCULATION METHOD:	AA ☐ MC ☒ RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	SCIENTIFIC GYRO
COPY OF TIE-IN SURVEY REPORT	☒ YES ☐ NO

WELL PLAN

KICKOFF DEPTH:	4330	TOTAL DEPTH:	
KICKOFF ANGLE:	2.06	MAX ANGLE:	91.12

PES Engineers: Donarumma

**Signature of both field engineers required if applicable

Directional Driller: Pedro Gonzalez

DATE: 16-Oct-2008

S C I E N T I F I C D R I L L I N G C O N T R O L S

Outrun Survey
for
YATES PETROLEUM

Page 2

Well No.: COTTONWOOD "KI" FED CO

Date : 14-OCT-2008

Job No. : 32K1008813

GRID

Proposal : 270.03

Depth (Feet)	T.V.D. (Feet)	V.S. (Feet)	Inc Deg.	Azimuth Deg.	Latitude (Feet)	Departure (Feet)	D-leg /100
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4000.00	3999.64	-15.59	0.94	33.50	40.10	15.61	0.19
4100.00	4099.63	-16.55	0.96	37.58	41.45	16.57	0.07
4200.00	4199.61	-17.77	1.12	46.69	42.78	17.79	0.23
4300.00	4299.57	-19.57	2.06	37.30	44.88	19.59	0.97
4400.00	4399.53	-21.52	1.20	56.07	46.90	21.55	1.00

4500.00	4499.51	-23.22	1.32	45.76	48.28	23.24	0.26
4600.00	4599.49	-24.78	1.08	51.86	49.67	24.81	0.27
4700.00	4699.47	-26.25	1.06	52.03	50.82	26.28	0.02
4800.00	4799.46	-27.64	0.90	57.05	51.82	27.67	0.18
4900.00	4899.44	-28.94	0.95	50.39	52.77	28.97	0.12

4970.00	4969.44	-29.74	0.65	64.32	53.31	29.77	0.51
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The Horizontal Displacement (in Feet) at
Measured Depth 4970.00 is 61.06 in a Direction of 29.18 Degrees

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

YATES PETROLEUM
COTTONWOOD KI FED COM # 4H
EDDY COUNTY, NEW MEXICO
Rig:JW 4

Thu Oct 09 11:41:13 2008

Coordinates

Latitude: 32.917884 N (32 deg. 55 min. 4.3827 sec.)
Longitude: 104.517047 W (-104 deg. 31 min. 1.3690 sec.)
Elevation: 3586.00 feet.
Calculation Date: Oct/09/2008

Magnetic Calculations

Model: IGRF2005
Dip Angle: 60.7402 degrees
Total Magnetic Field: 0.49219 gauss
Magnetic Declination: 8.379342 degrees
Horizontal Intensity: 0.240566 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 8.379342 Degr

Transverse Mercator Grid Calculations NAD83

Grid System: Transverse Mercator: new mexico east
Ellipsoid: GRS80
X: 484963.0640 feet
Y: 697709.8740 feet
True to Grid: (convergence) 0.099837 degrees
Magnetic to Grid: 8.479179 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 8.479179 Degr.