



An Operating Unit of Smith International, Inc.

DIRECTIONAL SURVEY REPORT

OXY PETROLEUM

FEDERAL 29 #1

EDDY COUNTY, NEW MEXICO

PREPARED BY: FRANCISCO SINISTERRA

Pathfinder Energy Services, Inc.
6213 W. Interstate 20 • Midland, TX • 79706
(432) 681-6000

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: 11/15/09 TO 11/23/09
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:

OXY PETROLEUM
FEDERAL 29 #1
EDDY COUNTY, NM
RIG: H & P 340

9. SURVEY CERTIFIED FROM: 437 TO 8075 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 75.30 FEET ON A BEARING OF 179.51 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 8130 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: 11/15/2009
Date Completed: 11/23/2009

OXY PETROLEUM
FEDERAL 29 #1
EDDY COUNTY, NM
Rig:H&P #340
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers:RAFAEL DONARUMMA
DANIEL VASQUEZ

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.16.54.0013 N LON:103.47.59.1267 W
GRID Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 664899.1000 Y: 466597.9000
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.59° EAST TO GRID
Vertical Section Plane: 0.00
Survey Vert. Reference: 17.00' Kelly Bushing To Ground
Altitude:3356.10' Ground To MSL

Measured Depth	8130.00	(feet)
Inclination	1.32	(deg)
Azimuth	182.25	(deg)
True Vertical Depth	8128.86	(feet)
Vertical Section	-75.29	(feet)
Survey X cord	664899.74	(feet)
Survey Y cord	466522.61	(feet)
Survey Lat	32.28146004 N	(deg)
Survey Lon	103.79975655 W	(deg)
Rectangular Corr. N/S	75.29 S	(feet)
Rectangular Corr. E/W	0.64 E	(feet)
Closure Distance	75.30	(feet)
Direction of Closure	179.51	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

OXY PETROLEUM
FEDERAL 29 #1
EDDY COUNTY, NM
Rig:H&P #340

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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.										
357.00	0.76	237.82	356.98	0.00	-0.37	0.37 S	2.89 W	2.91@ 262.70	0.00	
THE FOLLOWING ARE PATHFINDER SURVEYS.										
437.00	0.62	258.09	436.97	80.00	-0.74	0.74 S	3.76 W	3.84@ 258.85	0.35	
560.00	0.88	249.59	559.96	123.00	-1.21	1.21 S	5.30 W	5.44@ 257.15	0.23	
682.00	1.14	172.58	681.95	122.00	-2.74	2.74 S	6.02 W	6.61@ 245.54	1.04	
804.00	1.32	144.87	803.92	122.00	-5.09	5.09 S	5.05 W	7.17@ 224.79	0.50	
984.00	1.14	114.52	983.88	180.00	-7.53	7.53 S	2.23 W	7.85@ 196.52	0.37	
1164.00	1.32	118.11	1163.84	180.00	-9.25	9.25 S	1.23 E	9.33@ 172.46	0.11	
1345.00	0.44	123.31	1344.82	181.00	-10.61	10.61 S	3.64 E	11.22@ 161.05	0.49	
1525.00	0.62	101.64	1524.81	180.00	-11.19	11.19 S	5.18 E	12.33@ 155.18	0.15	
1706.00	0.70	106.46	1705.80	181.00	-11.70	11.70 S	7.20 E	13.74@ 148.41	0.05	
1886.00	0.88	81.70	1885.78	180.00	-11.81	11.81 S	9.62 E	15.23@ 140.85	0.21	
2066.00	1.32	115.88	2065.75	180.00	-12.52	12.52 S	12.85 E	17.94@ 134.25	0.43	
2246.00	1.41	103.22	2245.70	180.00	-13.93	13.93 S	16.87 E	21.88@ 129.54	0.17	
2427.00	0.79	140.31	2426.67	181.00	-15.40	15.40 S	19.84 E	25.11@ 127.82	0.50	
2607.00	0.88	125.46	2606.65	180.00	-17.16	17.16 S	21.76 E	27.71@ 128.26	0.13	
2788.00	0.97	123.13	2787.62	181.00	-18.80	18.80 S	24.17 E	30.62@ 127.88	0.05	
2968.00	1.14	208.49	2967.60	180.00	-21.21	21.21 S	24.59 E	32.47@ 130.77	0.80	
3149.00	0.88	173.46	3148.58	181.00	-24.17	24.17 S	23.89 E	33.99@ 135.33	0.36	
3329.00	1.32	147.62	3328.54	180.00	-27.29	27.29 S	25.16 E	37.12@ 137.33	0.36	
3509.00	0.62	125.53	3508.52	180.00	-29.61	29.61 S	27.06 E	40.11@ 137.57	0.43	
3690.00	1.14	141.01	3689.50	181.00	-31.58	31.58 S	28.99 E	42.87@ 137.45	0.31	
3870.00	0.70	136.52	3869.47	180.00	-33.77	33.77 S	30.88 E	45.76@ 137.56	0.25	

PathFinder Energy Services, Inc.

Survey Report

OXY PETROLEUM
FEDERAL 29 #1
EDDY COUNTY, NM
RIG:H&P #340

Page 02/02

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)
3917.00	0.26	104.35	3916.47	47.00	-34.00	34.00 S	31.18 E	46.13@	137.48	1.06
4060.00	0.18	277.19	4059.47	143.00	-34.06	34.06 S	31.27 E	46.23@	137.44	0.31
4240.00	0.26	287.56	4239.47	180.00	-33.90	33.90 S	30.60 E	45.66@	137.93	0.05
4420.00	0.35	320.32	4419.47	180.00	-33.35	33.35 S	29.86 E	44.76@	138.16	0.11
4601.00	0.26	309.26	4600.46	181.00	-32.67	32.67 S	29.19 E	43.81@	138.22	0.06
4781.00	0.44	292.23	4780.46	180.00	-32.15	32.15 S	28.23 E	42.78@	138.71	0.12
4962.00	0.62	270.49	4961.45	181.00	-31.87	31.87 S	26.61 E	41.52@	140.15	0.15
5142.00	0.79	268.40	5141.44	180.00	-31.90	31.90 S	24.39 E	40.16@	142.60	0.10
5322.00	0.62	263.12	5321.43	180.00	-32.05	32.05 S	22.19 E	38.98@	145.31	0.10
5503.00	0.70	265.82	5502.41	181.00	-32.25	32.25 S	20.11 E	38.01@	148.05	0.05
5682.00	0.70	254.44	5681.40	179.00	-32.62	32.62 S	17.97 E	37.24@	151.16	0.08
5862.00	0.79	234.94	5861.39	180.00	-33.63	33.63 S	15.89 E	37.20@	154.71	0.15
6042.00	0.97	240.83	6041.36	180.00	-35.09	35.09 S	13.55 E	37.61@	158.89	0.11
6223.00	0.97	230.45	6222.34	181.00	-36.81	36.81 S	11.03 E	38.43@	163.32	0.10
6403.00	1.32	232.58	6402.30	180.00	-39.04	39.04 S	8.21 E	39.89@	168.13	0.20
6583.00	0.88	196.41	6582.27	180.00	-41.62	41.62 S	6.17 E	42.08@	171.57	0.45
6764.00	0.88	211.40	6763.25	181.00	-44.14	44.14 S	5.05 E	44.43@	173.47	0.13
6944.00	0.70	186.42	6943.23	180.00	-46.42	46.42 S	4.21 E	46.61@	174.82	0.21
7125.00	1.14	183.53	7124.21	181.00	-49.31	49.31 S	3.97 E	49.47@	175.39	0.24
7305.00	1.14	185.06	7304.17	180.00	-52.88	52.88 S	3.71 E	53.01@	175.99	0.02
7486.00	1.58	188.17	7485.12	181.00	-57.15	57.15 S	3.19 E	57.24@	176.80	0.25
7666.00	1.76	187.96	7665.05	180.00	-62.34	62.34 S	2.46 E	62.39@	177.74	0.10
7866.00	1.67	189.70	7864.96	200.00	-68.26	68.26 S	1.54 E	68.27@	178.71	0.05
8046.00	1.58	187.84	8044.88	180.00	-73.30	73.30 S	0.76 E	73.30@	179.41	0.06
8075.00	1.32	182.25	8073.87	29.00	-74.03	74.03 S	0.69 E	74.03@	179.46	1.02
STRAIGHT LINE PROJECTION TO BIT @ 8130'MD.										
8130.00	1.32	182.25	8128.86	55.00	-75.29	75.29 S	0.64 E	75.30@	179.51	0.00



TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	OXY PETROLEUM		
LEASE / WELL No.:	FEDERAL 29	#1	
WELL LOCATION:	EDDY COUNTY, NEW MEXICO		
COUNTY / STATE / COUNTRY:	EDDY	NM	USA
RIG:	101009248-WT-WT		
API WELL No:	30-015-37330		
JOB No:	101009248-WT-WT		
P.O. / AFE No.			
DIRECTIONAL COMPANY:	PES		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
On Wall Plat:	7.59	LWD Calculated:	7.589373
Agreed Upon:		7.59	
X =	664899.100000	Feet	Y = 466597.900000
		Feet	
SITE LATITUDE:	32.281667 N	SITE LONGITUDE:	103.799757 W
GRID SYSTEM:	TRUE ☐ UTM ☒ LAMBERT ☐	ZONE:	NEW MEXICO EAST
PROPOSED DRIFT DIRECTION:	0		
KELLY BUSHING ELEVATION:	17		
ALTITUDE:	3356.1	Feet	WATER DEPTH:
		Feet	

TIE-IN SURVEY

MEASURED DEPTH:	357
DRIFT ANGLE:	0.76
DRIFT DIRECTION:	237.82
TRUE VERTICAL DEPTH:	356.98
VERTICAL SECTION:	
RECTANGULAR COORDINATE (N / S) :	-0.37
RECTANGULAR COORDINATE (E / W) :	-2.89
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:	357	TOTAL DEPTH:	7970
KICKOFF ANGLE:	0.76	MAX ANGLE:	0

PES Engineers:

RAFAEL DONARUMMA

DANIEL VASQUEZ

**Signature of both field engineers required if applicable

Directional Driller:

SCOT BRANDT / WILLIAM GILLESPIE

DATE: 15-Nov-2009

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

OXY POETROLEUM
FEDERAL 29 #1
EDDY COUNTY, NEW MEXICO
Rig:HP 340

Tue Nov 10 13:54:41 2009

Coordinates

Latitude: 32.281667 N (32 deg. 16 min. 54.0013 sec.)
Longitude: 103.799757 W (-103 deg. 47 min. 59.1267 sec.)
Elevation: 3356.10 feet.
Calculation Date: Nov/10/2009

Magnetic Calculations

Model: IGRF2005
Dip Angle: 60.2577 degrees
Total Magnetic Field: 0.48816 gauss
Magnetic Declination: 7.874353 degrees
Horizontal Intensity: 0.242177 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 7.874353 Degr

Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east
Ellipsoid: Clarke 1866
X: 664899.1000 feet
Y: 466597.9000 feet
True to Grid: (convergence) -0.284979 degrees
Magnetic to Grid: 7.589373 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.589373 Degr.