

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 18-T1N-R65W

Pettinger 4NE-18HZX

Job #900984318

API:05-123-38021

Plan C

Plan: Rev C0

Sperry Drilling Services

Proposal Report

07 February, 2014

Well Coordinates: 1,260,178.26 N, 3,220,491.31 E (40° 02' 41.60" N, 104° 42' 44.76" W)

Ground Level: 5,007.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Pettinger 4NE-18HZX

RKB=13' @ 5020.00usft (Ensign 123)

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)

Site: Sec. 18-T1N-R65W

Well: Pettinger 4NE-18HZX

Wellbore: Plan C

Design: Rev C0

Anadarko Petroleum Corp.

HALLIBURTON

Sperry Drilling

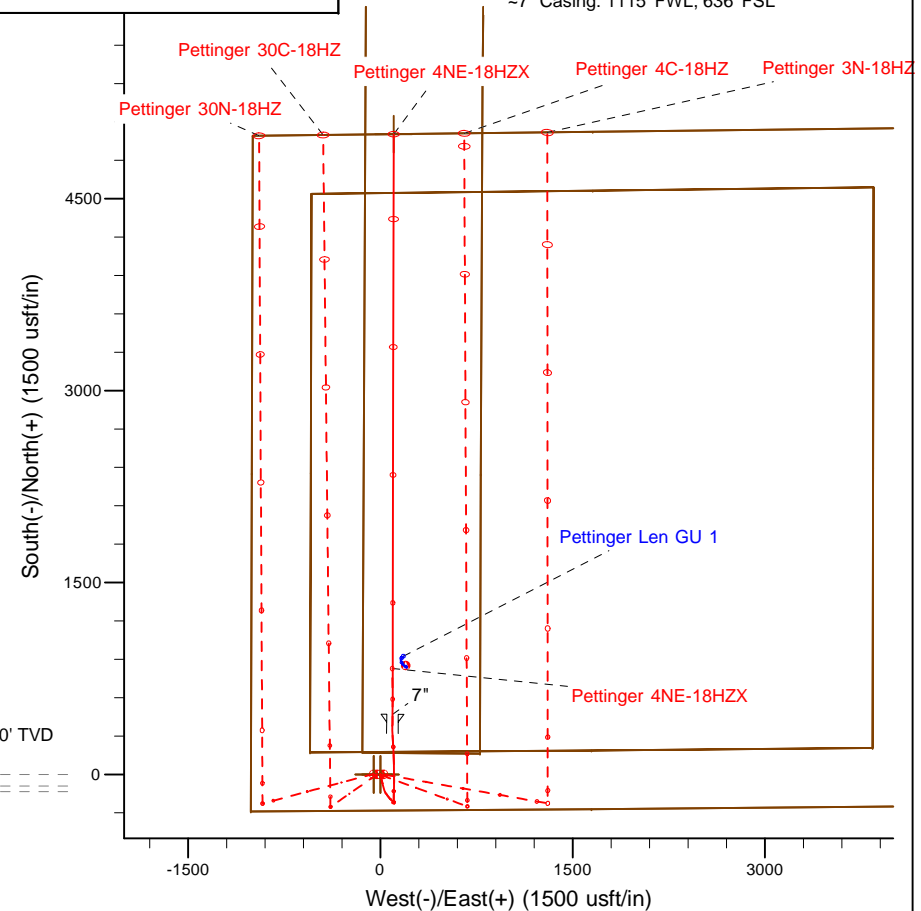
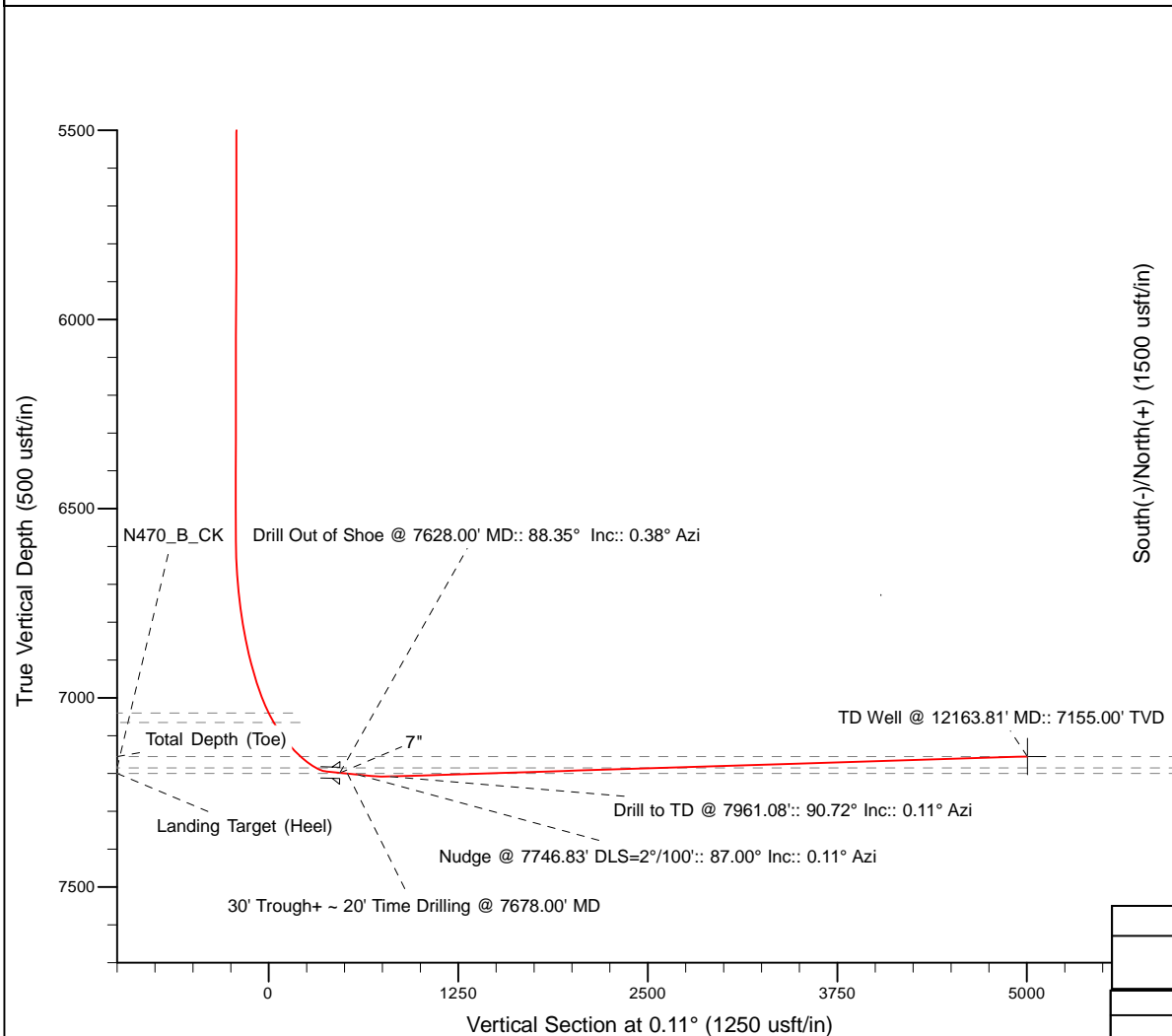
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Pettinger 4NE-18HZ_LD	0.00	0.00	0.00	1260178.26	3220491.31	40.044890	-104.712434
Pettinger 4NE-18HZ_SHL	0.00	0.00	0.00	1260178.26	3220491.31	40.044890	-104.712434
Pettinger Pad Sec_line (Sec 18-T1N-R65W)	13.00	-0.35	-52.08	1260177.45	3220439.24	40.044889	-104.712620
Pettinger Pad 460' SB_line	13.00	-0.35	-52.08	1260177.45	3220439.24	40.044889	-104.712620
Pettinger 4NE-18HZ_BHL	7155.00	5004.62	103.57	1265183.42	3220550.43	40.058628	-104.712064

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Vsect
7594.00	88.00	0.35	7197.70	435.37	94.56	0.00	435.55
7628.00	88.35	0.38	7198.78	469.35	94.78	1.03	469.53
7678.00	88.35	0.38	7200.22	519.33	95.11	0.00	519.51
7746.83	87.00	0.11	7203.01	588.10	95.40	2.00	588.28
7774.83	87.00	0.11	7204.48	616.06	95.46	0.00	616.24
7961.08	90.72	0.11	7208.17	802.24	95.81	2.00	802.42
12163.81	90.72	0.11	7155.00	5004.62	103.57	0.00	5004.81

SHL: 1010' FWL, 283' FSL

BHL: 1100' FWL, 1' FNL

~7" Casing: 1115' FWL, 636' FSL



WELL DETAILS: Pettinger 4NE-18HZX

Ground Level: 5007.00
RKB=13' @ 5020.00usft (Ensign 123)

Plan: Rev C0 (Pettinger 4NE-18HZX/Plan C)

Created By: Pari Amanlou

Date: 2-07-2014

Plan Report for Pettinger 4NE-18HZX - Rev C0

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
7,594.00	88.00	0.35	7,197.70	435.37	94.56	435.55	0.00	0.00	0.00	0.00
7,600.00	88.06	0.36	7,197.90	441.36	94.60	441.54	1.03	1.03	0.09	4.90
7,628.00	88.35	0.38	7,198.78	469.35	94.78	469.53	1.03	1.03	0.09	4.90
Drill Out of Shoe @ 7628.00' MD:: 88.35° Inc:: 0.38° Azi - 7"										
7,678.00	88.35	0.38	7,200.22	519.33	95.11	519.51	0.00	0.00	0.00	0.00
30' Trough+ ~ 20' Time Drilling @ 7678.00' MD - Landing Target (Heel)										
7,700.00	87.92	0.29	7,200.93	541.31	95.24	541.50	2.00	-1.96	-0.39	-168.70
7,746.83	87.00	0.11	7,203.01	588.10	95.40	588.28	2.00	-1.96	-0.39	-168.70
Nudge @ 7746.83' DLS=2°/100':: 87.00° Inc:: 0.11° Azi										
7,774.83	87.00	0.11	7,204.48	616.06	95.46	616.24	0.00	0.00	0.00	-168.69
7,800.00	87.50	0.11	7,205.68	641.20	95.51	641.38	2.00	2.00	0.00	-0.06
7,900.00	89.50	0.11	7,208.29	741.16	95.70	741.34	2.00	2.00	0.00	-0.06
7,961.08	90.72	0.11	7,208.17	802.24	95.81	802.42	2.00	2.00	0.00	-0.06
Drill to TD @ 7961.08':: 90.72° Inc:: 0.11° Azi										
8,000.00	90.72	0.11	7,207.68	841.16	95.88	841.34	0.00	0.00	0.00	-0.06
8,100.00	90.72	0.11	7,206.41	941.15	96.07	941.33	0.00	0.00	0.00	0.00
8,200.00	90.72	0.11	7,205.15	1,041.14	96.25	1,041.32	0.00	0.00	0.00	0.00
8,300.00	90.72	0.11	7,203.88	1,141.13	96.43	1,141.31	0.00	0.00	0.00	0.00
8,400.00	90.72	0.11	7,202.62	1,241.12	96.62	1,241.31	0.00	0.00	0.00	0.00
8,500.00	90.72	0.11	7,201.35	1,341.11	96.80	1,341.30	0.00	0.00	0.00	0.00
8,600.00	90.72	0.11	7,200.09	1,441.11	96.99	1,441.29	0.00	0.00	0.00	0.00
8,700.00	90.72	0.11	7,198.82	1,541.10	97.17	1,541.28	0.00	0.00	0.00	0.00
8,800.00	90.72	0.11	7,197.56	1,641.09	97.36	1,641.27	0.00	0.00	0.00	0.00
8,900.00	90.72	0.11	7,196.29	1,741.08	97.54	1,741.27	0.00	0.00	0.00	0.00
9,000.00	90.72	0.11	7,195.03	1,841.07	97.73	1,841.26	0.00	0.00	0.00	0.00
9,100.00	90.72	0.11	7,193.76	1,941.07	97.91	1,941.25	0.00	0.00	0.00	0.00
9,200.00	90.72	0.11	7,192.50	2,041.06	98.10	2,041.24	0.00	0.00	0.00	0.00
9,300.00	90.72	0.11	7,191.23	2,141.05	98.28	2,141.23	0.00	0.00	0.00	0.00
9,400.00	90.72	0.11	7,189.97	2,241.04	98.47	2,241.23	0.00	0.00	0.00	0.00
9,500.00	90.72	0.11	7,188.70	2,341.03	98.65	2,341.22	0.00	0.00	0.00	0.00
9,600.00	90.72	0.11	7,187.44	2,441.02	98.84	2,441.21	0.00	0.00	0.00	0.00
9,700.00	90.72	0.11	7,186.17	2,541.02	99.02	2,541.20	0.00	0.00	0.00	0.00
9,792.63	90.72	0.11	7,185.00	2,633.63	99.19	2,633.82	0.00	0.00	0.00	0.00
N470_B_CK										
9,800.00	90.72	0.11	7,184.91	2,641.01	99.21	2,641.19	0.00	0.00	0.00	0.00
9,900.00	90.72	0.11	7,183.64	2,741.00	99.39	2,741.19	0.00	0.00	0.00	0.00
10,000.00	90.72	0.11	7,182.38	2,840.99	99.57	2,841.18	0.00	0.00	0.00	0.00
10,100.00	90.72	0.11	7,181.11	2,940.98	99.76	2,941.17	0.00	0.00	0.00	0.00
10,200.00	90.72	0.11	7,179.85	3,040.98	99.94	3,041.16	0.00	0.00	0.00	0.00
10,300.00	90.72	0.11	7,178.58	3,140.97	100.13	3,141.15	0.00	0.00	0.00	0.00
10,400.00	90.72	0.11	7,177.32	3,240.96	100.31	3,241.15	0.00	0.00	0.00	0.00
10,500.00	90.72	0.11	7,176.05	3,340.95	100.50	3,341.14	0.00	0.00	0.00	0.00
10,600.00	90.72	0.11	7,174.79	3,440.94	100.68	3,441.13	0.00	0.00	0.00	0.00
10,700.00	90.72	0.11	7,173.52	3,540.93	100.87	3,541.12	0.00	0.00	0.00	0.00
10,800.00	90.72	0.11	7,172.25	3,640.93	101.05	3,641.11	0.00	0.00	0.00	0.00
10,900.00	90.72	0.11	7,170.99	3,740.92	101.24	3,741.11	0.00	0.00	0.00	0.00
11,000.00	90.72	0.11	7,169.72	3,840.91	101.42	3,841.10	0.00	0.00	0.00	0.00
11,100.00	90.72	0.11	7,168.46	3,940.90	101.61	3,941.09	0.00	0.00	0.00	0.00
11,200.00	90.72	0.11	7,167.19	4,040.89	101.79	4,041.08	0.00	0.00	0.00	0.00
11,300.00	90.72	0.11	7,165.93	4,140.89	101.98	4,141.07	0.00	0.00	0.00	0.00
11,400.00	90.72	0.11	7,164.66	4,240.88	102.16	4,241.07	0.00	0.00	0.00	0.00
11,500.00	90.72	0.11	7,163.40	4,340.87	102.35	4,341.06	0.00	0.00	0.00	0.00
11,600.00	90.72	0.11	7,162.13	4,440.86	102.53	4,441.05	0.00	0.00	0.00	0.00
11,700.00	90.72	0.11	7,160.87	4,540.85	102.71	4,541.04	0.00	0.00	0.00	0.00
11,800.00	90.72	0.11	7,159.60	4,640.84	102.90	4,641.03	0.00	0.00	0.00	0.00
11,900.00	90.72	0.11	7,158.34	4,740.84	103.08	4,741.03	0.00	0.00	0.00	0.00
12,000.00	90.72	0.11	7,157.07	4,840.83	103.27	4,841.02	0.00	0.00	0.00	0.00
12,100.00	90.72	0.11	7,155.81	4,940.82	103.45	4,941.01	0.00	0.00	0.00	0.00

Plan Report for Pettinger 4NE-18HZX - Rev C0

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
12,163.81	90.72	0.11	7,155.00	5,004.62	103.57	5,004.81	0.00	0.00	0.00	0.00
TD Well @ 12163.81' MD:: 7155.00' TVD - Total Depth (Toe)										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
7,628.00	7,198.78	469.35	94.78	Drill Out of Shoe @ 7628.00' MD:: 88.35° Inc:: 0.38° Azi
7,678.00	7,200.22	519.33	95.11	30' Trough+ ~ 20' Time Drilling @ 7678.00' MD
7,746.83	7,203.01	588.10	95.40	Nudge @ 7746.83' DLS=2°/100:: 87.00° Inc:: 0.11° Azi
7,961.08	7,208.17	802.24	95.81	Drill to TD @ 7961.08:: 90.72° Inc:: 0.11° Azi
12,163.81	7,155.00	5,004.62	103.57	TD Well @ 12163.81' MD:: 7155.00' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	+E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	0.11	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
13.00	1,124.00	Surface Gyro Surveys	NS-GYRO-MS
1,305.00	7,594.00	MWD Surveys- Intermediate	MWD+IFR1+SC
7,594.00	12,163.81	Rev C0	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,628.00	7,198.78	7"	7	8-3/4

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,126.01	1,126.00	Fox Hills Base			
4,195.75	4,178.00	Parkman			
4,573.81	4,556.00	Sussex			
7,122.71	7,040.00	SPGG			
7,163.96	7,065.00	NBRR			
7,467.25	7,185.00	N470_B_CK			
7,678.00	7,200.22	Landing Target (Heel)		0.00	
12,163.81	7,155.00	Total Depth (Toe)		0.00	

Plan Report for Pettinger 4NE-18HZX - Rev C0

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Pettinger 4NE-18HZ_LD	0.00	0.00	0.00	Polygon
Pettinger 4NE-18HZ_SHL	0.00	0.00	0.00	Point
Pettinger Pad 460' SB_line	13.00	-0.35	-52.08	Polygon
Pettinger Pad Sec_line (Sec 18-T1N-R65W)	13.00	-0.35	-52.08	Polygon
Pettinger 4NE-18HZ_BHL	7,155.00	5,004.62	103.57	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.12 °/100usft	Maximum Dogleg over Survey:	2.00 °/100usft at 7,961.08 usft
Net Tortousity applicable to Plans:	0.12 °/100usft	Directional Difficulty Index:	6.218

Audit Info

North Reference Sheet for Sec. 18-T1N-R65W - Pettinger 4NE-18HZX - Plan C

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference .
Vertical Depths are relative to RKB=13' @ 5020.00usft (Ensign 123). Northing and Easting are relative to Pettinger 4NE-18HZX
Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980
Projection method is Lambert Conformal Conic (2 parallel)
Central Meridian is -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°
False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996327

Grid Coordinates of Well: 1,260,178.26 usft N, 3,220,491.31 usft E
Geographical Coordinates of Well: 40° 02' 41.60" N, 104° 42' 44.76" W
Grid Convergence at Surface is: 0.51°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,163.81usft
the Bottom Hole Displacement is 5,005.69usft in the Direction of 1.19° (True).
Magnetic Convergence at surface is: -7.98° (7 February 2014, , BGGM2013)

