

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Company:	Anadarko Petroleum Corporation	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Project:	DJ Wattenberg	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site:	Pennington Pad (S2-T2N-R67W)	North Reference:	Grid
Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	STK		
Design:	STK Plan #1		

Project	DJ Wattenberg		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		Pennington Pad (S2-T2N-R67W)			
Site Position:		Northing:	1,302,375.69 ft	Latitude:	40.161619
From:	Lat/Long	Easting:	3,179,796.01 ft	Longitude:	-104.856716
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.42 °

Well	Pennington 28N-2HZ					
Well Position	+N/-S	0.0 ft	Northing:	1,302,375.69 ft	Latitude:	40.161619
	+E/-W	0.0 ft	Easting:	3,179,796.01 ft	Longitude:	-104.856716
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,860.0 ft

Wellbore	STK				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	11/12/2013	8.57	66.76	52,742

Design	STK Plan #1				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	7,711.0	
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	359.17	

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(ft)	(ft)	Rate	Rate	Rate	(°)	
(ft)			(ft)			(°/100ft)	(°/100ft)	(°/100ft)		
7,711.0	90.60	3.60	7,183.5	84.4	-38.9	0.00	0.00	0.00	0.00	
7,800.0	91.49	3.40	7,181.9	173.2	-33.5	1.02	1.00	-0.22	-12.66	
7,950.8	88.50	0.00	7,181.9	323.9	-29.0	3.00	-1.98	-2.25	-131.36	
8,095.1	91.19	356.61	7,182.3	468.1	-33.3	3.00	1.86	-2.35	-51.59	
8,246.7	91.19	356.61	7,179.2	619.4	-42.2	0.00	0.00	0.00	0.00	
8,358.8	90.00	359.76	7,178.0	731.4	-45.8	3.00	-1.06	2.81	110.71	
11,758.8	90.00	359.76	7,178.0	4,131.4	-60.0	0.00	0.00	0.00	0.00	Pennington 28N-2HZ

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Site:	Pennington Pad (S2-T2N-R67W)	North Reference:	Grid
Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	STK		
Design:	STK Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
113.0	0.24	137.37	113.0	-0.2	0.2	-0.2	0.21	0.21	
213.0	0.19	13.95	213.0	-0.2	0.3	-0.2	0.38	-0.05	
313.0	0.44	358.58	313.0	0.4	0.4	0.4	0.26	0.25	
413.0	0.48	0.54	413.0	1.2	0.4	1.2	0.04	0.04	
513.0	0.28	319.98	513.0	1.8	0.2	1.8	0.32	-0.20	
613.0	0.27	250.55	613.0	1.9	-0.2	1.9	0.31	-0.01	
713.0	0.14	134.01	713.0	1.7	-0.3	1.7	0.36	-0.13	
813.0	0.31	54.99	813.0	1.8	0.0	1.8	0.31	0.17	
913.0	0.23	209.49	913.0	1.8	0.1	1.8	0.53	-0.08	
943.0	0.30	198.45	943.0	1.7	0.1	1.7	0.29	0.23	
1,077.0	0.30	201.70	1,077.0	1.0	-0.2	1.0	0.01	0.00	
1,171.0	2.70	184.60	1,170.9	-1.4	-0.4	-1.4	2.57	2.55	
1,264.0	3.70	174.40	1,263.8	-6.6	-0.3	-6.6	1.23	1.08	
1,358.0	6.60	186.90	1,357.4	-15.0	-0.7	-15.0	3.29	3.09	
1,451.0	8.10	186.20	1,449.7	-26.8	-2.0	-26.8	1.62	1.61	
1,545.0	9.10	183.30	1,542.6	-40.8	-3.2	-40.8	1.16	1.06	
1,638.0	10.10	178.50	1,634.3	-56.3	-3.4	-56.3	1.38	1.08	
1,732.0	11.00	174.90	1,726.7	-73.5	-2.4	-73.4	1.19	0.96	
1,825.0	12.00	177.30	1,817.8	-92.0	-1.1	-92.0	1.19	1.08	
1,915.0	12.90	176.80	1,905.7	-111.4	-0.1	-111.3	1.01	1.00	
2,005.0	14.30	182.50	1,993.2	-132.5	0.0	-132.5	2.15	1.56	
2,095.0	15.60	182.80	2,080.1	-155.7	-1.1	-155.7	1.45	1.44	
2,185.0	17.90	181.90	2,166.3	-181.6	-2.2	-181.5	2.57	2.56	
2,275.0	16.30	179.90	2,252.3	-208.1	-2.6	-208.0	1.89	-1.78	
2,365.0	15.10	185.50	2,339.0	-232.4	-3.7	-232.3	2.15	-1.33	
2,455.0	14.40	189.30	2,426.0	-255.1	-6.6	-254.9	1.33	-0.78	
2,546.0	15.40	184.90	2,514.0	-278.3	-9.5	-278.1	1.66	1.10	
2,636.0	15.60	186.10	2,600.7	-302.2	-11.8	-302.0	0.42	0.22	
2,726.0	14.70	185.90	2,687.6	-325.6	-14.3	-325.4	1.00	-1.00	
2,816.0	16.60	186.10	2,774.2	-349.8	-16.8	-349.5	2.11	2.11	
2,906.0	15.50	184.80	2,860.7	-374.5	-19.2	-374.2	1.29	-1.22	
2,996.0	14.00	183.70	2,947.7	-397.4	-20.9	-397.0	1.70	-1.67	
3,086.0	13.90	185.50	3,035.1	-419.0	-22.6	-418.6	0.49	-0.11	
3,176.0	12.80	184.70	3,122.7	-439.7	-24.5	-439.3	1.24	-1.22	
3,266.0	13.50	183.40	3,210.3	-460.1	-25.9	-459.7	0.84	0.78	
3,356.0	12.40	187.30	3,298.0	-480.2	-27.8	-479.7	1.56	-1.22	
3,446.0	10.40	184.60	3,386.2	-497.9	-29.6	-497.4	2.30	-2.22	
3,536.0	10.70	190.90	3,474.7	-514.2	-31.9	-513.7	1.32	0.33	
3,626.0	8.20	188.20	3,563.5	-528.7	-34.4	-528.2	2.82	-2.78	
3,716.0	9.20	195.10	3,652.4	-542.0	-37.2	-541.4	1.60	1.11	
3,806.0	9.30	192.60	3,741.3	-556.1	-40.6	-555.4	0.46	0.11	
3,896.0	7.60	186.30	3,830.3	-569.1	-42.9	-568.4	2.15	-1.89	
3,986.0	6.90	185.60	3,919.6	-580.4	-44.0	-579.7	0.78	-0.78	
4,076.0	6.20	184.90	4,009.0	-590.6	-45.0	-589.9	0.78	-0.78	
4,166.0	5.80	182.70	4,098.5	-600.0	-45.6	-599.3	0.51	-0.44	
4,256.0	4.70	177.10	4,188.1	-608.2	-45.6	-607.5	1.35	-1.22	
4,437.0	3.00	169.60	4,368.7	-620.3	-44.4	-619.6	0.98	-0.94	
4,617.0	1.70	162.60	4,548.6	-627.5	-42.8	-626.8	0.74	-0.72	
4,797.0	1.10	161.00	4,728.5	-631.6	-41.4	-631.0	0.33	-0.33	
4,977.0	1.30	182.90	4,908.5	-635.3	-40.9	-634.7	0.28	0.11	
5,157.0	1.10	191.40	5,088.4	-639.0	-41.4	-638.4	0.15	-0.11	

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Wellbore:	STK		
Design:	STK Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
5,337.0	1.10	175.00	5,268.4	-642.5	-41.6	-641.8	0.17	0.00	
5,517.0	0.60	298.00	5,448.4	-643.7	-42.3	-643.1	0.84	-0.28	
5,697.0	0.70	7.60	5,628.4	-642.2	-42.9	-641.5	0.41	0.06	
5,877.0	0.50	322.20	5,808.4	-640.5	-43.3	-639.8	0.28	-0.11	
6,057.0	0.70	333.50	5,988.3	-638.9	-44.3	-638.2	0.13	0.11	
6,238.0	0.10	259.50	6,169.3	-637.9	-44.9	-637.2	0.38	-0.33	
6,418.0	0.40	225.10	6,349.3	-638.4	-45.5	-637.7	0.18	0.17	
6,598.0	0.40	232.60	6,529.3	-639.2	-46.4	-638.5	0.03	0.00	
6,643.0	0.50	298.80	6,574.3	-639.2	-46.7	-638.5	1.11	0.22	
6,688.0	4.50	4.00	6,619.3	-637.4	-46.8	-636.6	9.59	8.89	
6,733.0	8.30	3.00	6,664.0	-632.4	-46.5	-631.6	8.45	8.44	
6,778.0	13.40	3.20	6,708.2	-623.9	-46.0	-623.2	11.33	11.33	
6,823.0	17.10	7.40	6,751.6	-612.1	-44.9	-611.4	8.58	8.22	
6,868.0	20.20	8.70	6,794.2	-597.9	-42.9	-597.2	6.95	6.89	
6,913.0	23.80	0.10	6,835.9	-581.1	-41.7	-580.5	10.72	8.00	
6,958.0	28.00	353.40	6,876.4	-561.5	-42.9	-560.9	11.36	9.33	
7,003.0	33.30	358.50	6,915.1	-538.7	-44.4	-538.0	13.11	11.78	
7,048.0	37.30	0.30	6,951.9	-512.7	-44.7	-512.0	9.18	8.89	
7,093.0	42.50	359.40	6,986.4	-483.8	-44.8	-483.1	11.63	11.56	
7,138.0	48.00	359.00	7,018.0	-451.9	-45.2	-451.2	12.24	12.22	
7,183.0	54.60	359.10	7,046.2	-416.8	-45.8	-416.1	14.67	14.67	
7,228.0	61.00	359.40	7,070.1	-378.7	-46.3	-378.0	14.23	14.22	
7,273.0	64.90	359.50	7,090.6	-338.7	-46.7	-338.0	8.67	8.67	
7,318.0	66.90	358.90	7,109.0	-297.6	-47.2	-296.9	4.61	4.44	
7,363.0	69.70	358.60	7,125.6	-255.8	-48.2	-255.1	6.25	6.22	
7,409.0	71.60	358.90	7,140.8	-212.4	-49.1	-211.7	4.18	4.13	
7,454.0	73.80	359.90	7,154.2	-169.5	-49.5	-168.7	5.33	4.89	
7,499.0	76.60	1.50	7,165.7	-126.0	-49.0	-125.2	7.11	6.22	
7,544.0	80.10	2.10	7,174.8	-81.9	-47.6	-81.2	7.89	7.78	
7,589.0	84.80	2.80	7,180.7	-37.4	-45.7	-36.7	10.56	10.44	
7,605.0	87.50	2.90	7,181.8	-21.4	-44.9	-20.8	16.89	16.87	
7,711.0	90.60	3.60	7,183.5	84.4	-38.9	84.9	3.00	2.92	Tie-In Survey @ 7,711' MD
7,800.0	91.49	3.40	7,181.9	173.2	-33.5	173.7	1.02	1.00	Sidetrack Point @ 7,800' MD
7,900.0	89.51	1.15	7,181.0	273.1	-29.5	273.5	3.00	-1.98	
7,950.8	88.50	0.00	7,181.9	323.9	-29.0	324.3	3.00	-1.98	Start 3° Build
8,000.0	89.42	358.85	7,182.8	373.1	-29.5	373.5	3.00	1.86	
8,095.1	91.19	356.61	7,182.3	468.1	-33.3	468.5	3.00	1.86	EOB @ Inc. = 91.19°
8,100.0	91.19	356.61	7,182.2	473.0	-33.5	473.4	0.00	0.00	
8,200.0	91.19	356.61	7,180.1	572.8	-39.5	573.3	0.00	0.00	
8,246.7	91.19	356.61	7,179.2	619.4	-42.2	619.9	0.00	0.00	Start 3° Drop
8,300.0	90.62	358.11	7,178.3	672.6	-44.7	673.2	3.00	-1.06	
8,358.8	90.00	359.76	7,178.0	731.4	-45.8	732.0	3.00	-1.06	EOD @ Inc. = 90°
8,400.0	90.00	359.76	7,178.0	772.6	-45.9	773.2	0.00	0.00	
8,500.0	90.00	359.76	7,178.0	872.6	-46.3	873.2	0.00	0.00	
8,600.0	90.00	359.76	7,178.0	972.6	-46.8	973.2	0.00	0.00	
8,700.0	90.00	359.76	7,178.0	1,072.6	-47.2	1,073.2	0.00	0.00	
8,800.0	90.00	359.76	7,178.0	1,172.6	-47.6	1,173.2	0.00	0.00	
8,900.0	90.00	359.76	7,178.0	1,272.6	-48.0	1,273.2	0.00	0.00	
9,000.0	90.00	359.76	7,178.0	1,372.6	-48.4	1,373.2	0.00	0.00	
9,100.0	90.00	359.76	7,178.0	1,472.6	-48.9	1,473.2	0.00	0.00	
9,200.0	90.00	359.76	7,178.0	1,572.6	-49.3	1,573.2	0.00	0.00	
9,300.0	90.00	359.76	7,178.0	1,672.6	-49.7	1,673.2	0.00	0.00	

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Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	STK		
Design:	STK Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
9,400.0	90.00	359.76	7,178.0	1,772.6	-50.1	1,773.2	0.00	0.00	
9,500.0	90.00	359.76	7,178.0	1,872.6	-50.5	1,873.2	0.00	0.00	
9,600.0	90.00	359.76	7,178.0	1,972.6	-51.0	1,973.1	0.00	0.00	
9,700.0	90.00	359.76	7,178.0	2,072.6	-51.4	2,073.1	0.00	0.00	
9,800.0	90.00	359.76	7,178.0	2,172.6	-51.8	2,173.1	0.00	0.00	
9,900.0	90.00	359.76	7,178.0	2,272.6	-52.2	2,273.1	0.00	0.00	
10,000.0	90.00	359.76	7,178.0	2,372.6	-52.6	2,373.1	0.00	0.00	
10,100.0	90.00	359.76	7,178.0	2,472.6	-53.1	2,473.1	0.00	0.00	
10,200.0	90.00	359.76	7,178.0	2,572.6	-53.5	2,573.1	0.00	0.00	
10,300.0	90.00	359.76	7,178.0	2,672.6	-53.9	2,673.1	0.00	0.00	
10,400.0	90.00	359.76	7,178.0	2,772.6	-54.3	2,773.1	0.00	0.00	
10,500.0	90.00	359.76	7,178.0	2,872.6	-54.7	2,873.1	0.00	0.00	
10,600.0	90.00	359.76	7,178.0	2,972.6	-55.1	2,973.1	0.00	0.00	
10,700.0	90.00	359.76	7,178.0	3,072.6	-55.6	3,073.1	0.00	0.00	
10,800.0	90.00	359.76	7,178.0	3,172.6	-56.0	3,173.1	0.00	0.00	
10,900.0	90.00	359.76	7,178.0	3,272.6	-56.4	3,273.1	0.00	0.00	
11,000.0	90.00	359.76	7,178.0	3,372.6	-56.8	3,373.1	0.00	0.00	
11,100.0	90.00	359.76	7,178.0	3,472.6	-57.2	3,473.1	0.00	0.00	
11,200.0	90.00	359.76	7,178.0	3,572.6	-57.7	3,573.1	0.00	0.00	
11,300.0	90.00	359.76	7,178.0	3,672.6	-58.1	3,673.1	0.00	0.00	
11,400.0	90.00	359.76	7,178.0	3,772.6	-58.5	3,773.1	0.00	0.00	
11,500.0	90.00	359.76	7,178.0	3,872.6	-58.9	3,873.0	0.00	0.00	
11,600.0	90.00	359.76	7,178.0	3,972.6	-59.3	3,973.0	0.00	0.00	
11,700.0	90.00	359.76	7,178.0	4,072.6	-59.8	4,073.0	0.00	0.00	
11,758.8	90.00	359.76	7,178.0	4,131.4	-60.0	4,131.8	0.00	0.00	TD @ 11,758.8' MD

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Pennington 28N-2HZ PE	0.00	0.00	7,178.0	4,131.4	-60.0	1,306,507.09	3,179,736.01	40.172961	-104.856823
- plan hits target center									
- Point									

Plan Annotations

	Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
			+N/-S (ft)	+E/-W (ft)	
	7,711.0	7,183.5	84.4	-38.9	Tie-In Survey @ 7,711' MD
	7,800.0	7,181.9	173.2	-33.5	Sidetrack Point @ 7,800' MD
	7,950.8	7,181.9	323.9	-29.0	Start 3° Build
	8,095.1	7,182.3	468.1	-33.3	EOB @ Inc. = 91.19°
	8,246.7	7,179.2	619.4	-42.2	Start 3° Drop
	8,358.8	7,178.0	731.4	-45.8	EOD @ Inc. = 90°
	11,758.8	7,178.0	4,131.4	-60.0	TD @ 11,758.8' MD

Anadarko Petroleum Corporation

DJ Wattenberg

Pennington Pad (S2-T2N-R67W)

Pennington 28N-2HZ

STK

STK Plan #1

Anticollision Report

12 November, 2013

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Reference	STK Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	7,711.0 to 99,999.0ft	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 500.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date	11/12/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
113.0	943.0	Survey #1 (HZ)	Gyro	Gyro
1,077.0	7,711.0	Survey #2 (HZ)	MWD	Geolink MWD
7,711.0	11,758.4	STK Plan #1 (STK)	MWD	Geolink MWD

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Pennington Pad (S2-T2N-R67W)						
EXISTING - ECHEVERRIA 1-2 - EXISTING - EXISTING						Out of range
EXISTING - ECHEVERRIA 2-0-2 - EXISTING - EXISTING						Out of range
EXISTING - ECHEVERRIA 21-2 - EXISTING - EXISTING						Out of range
EXISTING - ECHEVERRIA 2-8-2 - EXISTING - EXISTING						Out of range
EXISTING - ECHEVERRIA 2A-2H - EXISTING - EXISTING						Out of range
EXISTING - ECHEVERRIA 4-4-2 - EXISTING - EXISTING	9,493.7	7,182.7	291.1	241.3	5.840	CC, ES
EXISTING - ECHEVERRIA 4-4-2 - EXISTING - EXISTING	9,511.0	7,182.7	291.6	241.5	5.817	SF
EXISTING - ECHEVERRIA C-2-320-W - EXISTING - EXISTING						Out of range
EXISTING - HSR WITTEMEYER 7-2A - EXISTING - EXISTING	10,222.7	7,156.5	180.0	118.7	2.936	CC, ES, SF
EXISTING - PANCOST 10-2 - EXISTING - EXISTING	9,104.6	7,266.5	372.9	324.5	7.712	CC
EXISTING - PANCOST 10-2 - EXISTING - EXISTING	9,111.0	7,266.4	372.9	324.5	7.697	ES, SF
EXISTING - PANCOST 36-2 - EXISTING - EXISTING						Out of range
EXISTING - PANCOST 37-2 - EXISTING - EXISTING						Out of range
EXISTING - RALPH VINCENT UNIT 2 - EXISTING - EXISTING						Out of range
EXISTING - ROLLIE J VINCENT A 1 - EXISTING - EXISTING	10,331.1	7,153.8	155.2	92.1	2.459	CC, ES, SF
EXISTING - VYNCKIER 15-2A7952 - EXISTING - EXISTING	7,711.0	7,170.7	295.9	270.6	11.707	CC, ES, SF
EXISTING - WITTEMEYER 2-2 - EXISTING - EXISTING	11,623.3	7,149.2	128.3	43.0	1.503	CC, ES, SF
EXISTING - WITTEMEYER 24-2 - EXISTING - EXISTING						Out of range
Pennington 27C-2HZ - HZ - HZ						Out of range
Pennington 27C-2HZ - HZ - Plan #2						Out of range
Pennington 28N-2HZ - HZ - HZ	7,711.0	7,711.0	0.0	0.0	10,000.000	CC
Pennington 28N-2HZ - HZ - HZ	7,811.0	7,811.0	0.0	-0.7	0.057	Level 1, ES, SF
Pennington 2N-2HZ - HZ - HZ						Out of range
Pennington 2N-2HZ - HZ - Plan #2						Out of range

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design Pennington Pad (S2-T2N-R67W) - EXISTING - ECHEVERRIA 4-4-2 - EXISTING - EXISTING													Offset Site Error:	0.0 ft
Survey Program: 840-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance		Total		Separation		Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor		
9,111.0	7,178.0	7,182.4	7,175.9	30.3	13.6	-90.38	1,865.1	-341.6	480.8	437.2	43.61	11.025		
9,211.0	7,178.0	7,182.5	7,176.0	32.0	13.6	-90.39	1,865.1	-341.6	405.8	360.5	45.22	8.973		
9,311.0	7,178.0	7,182.6	7,176.1	33.6	13.6	-90.40	1,865.1	-341.6	343.7	296.8	46.85	7.336		
9,411.0	7,178.0	7,182.6	7,176.1	35.2	13.6	-90.42	1,865.1	-341.6	302.6	254.1	48.48	6.242		
9,493.7	7,178.0	7,182.7	7,176.2	36.6	13.6	-90.43	1,865.1	-341.6	291.1	241.3	49.84	5.840 CC, ES		
9,511.0	7,178.0	7,182.7	7,176.2	36.9	13.6	-90.43	1,865.1	-341.6	291.6	241.5	50.13	5.817 SF		
9,611.0	7,178.0	7,182.8	7,176.2	38.5	13.6	-90.44	1,865.1	-341.6	313.8	262.1	51.79	6.061		
9,711.0	7,178.0	7,182.8	7,176.3	40.2	13.6	-90.45	1,865.1	-341.6	363.3	309.8	53.45	6.796		
9,811.0	7,178.0	7,182.9	7,176.4	41.9	13.6	-90.47	1,865.1	-341.6	430.6	375.5	55.12	7.812		

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design Pennington Pad (S2-T2N-R67W) - EXISTING - HSR WITTEMEYER 7-2A - EXISTING - EXISTING													Offset Site Error:	0.0 ft
Survey Program: 100-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
9,811.0	7,178.0	7,151.6	7,150.7	41.9	12.5	88.32	2,596.0	126.4	449.3	395.0	54.32	8.273		
9,911.0	7,178.0	7,152.7	7,151.9	43.5	12.5	88.68	2,596.1	126.4	359.9	303.9	56.00	6.427		
10,011.0	7,178.0	7,153.9	7,153.0	45.2	12.5	89.05	2,596.1	126.4	277.9	220.2	57.70	4.816		
10,111.0	7,178.0	7,155.1	7,154.2	46.9	12.5	89.43	2,596.1	126.4	211.8	152.4	59.39	3.566		
10,211.0	7,178.0	7,156.3	7,155.4	48.6	12.5	89.82	2,596.1	126.4	180.3	119.2	61.09	2.952		
10,222.7	7,178.0	7,156.5	7,155.6	48.8	12.6	89.87	2,596.1	126.4	180.0	118.7	61.29	2.936 CC, ES, SF		
10,311.0	7,178.0	7,157.6	7,156.7	50.3	12.6	90.21	2,596.1	126.4	200.4	137.6	62.79	3.192		
10,411.0	7,178.0	7,158.8	7,157.9	52.0	12.6	90.62	2,596.1	126.4	260.4	195.9	64.49	4.038		
10,511.0	7,178.0	7,160.1	7,159.2	53.7	12.6	91.03	2,596.2	126.4	339.8	273.6	66.20	5.133		
10,611.0	7,178.0	7,161.5	7,160.6	55.4	12.6	91.46	2,596.2	126.4	427.9	360.0	67.90	6.302		

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design Pennington Pad (S2-T2N-R67W) - EXISTING - PANCOST 10-2 - EXISTING - EXISTING													Offset Site Error:	0.0 ft
Survey Program: 261-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
8,811.0	7,178.0	7,268.2	7,170.6	25.6	19.8	90.86	1,478.8	324.0	474.6	430.9	43.74	10.851		
8,911.0	7,178.0	7,267.6	7,170.0	27.2	19.8	90.77	1,478.8	324.0	420.2	374.9	45.29	9.278		
9,011.0	7,178.0	7,267.0	7,169.4	28.8	19.8	90.68	1,478.8	324.0	384.5	337.6	46.86	8.205		
9,104.6	7,178.0	7,266.5	7,168.9	30.2	19.8	90.60	1,478.8	324.0	372.9	324.5	48.35	7.712 CC		
9,111.0	7,178.0	7,266.4	7,168.8	30.3	19.8	90.59	1,478.8	324.0	372.9	324.5	48.45	7.697 ES, SF		
9,211.0	7,178.0	7,265.9	7,168.3	32.0	19.8	90.50	1,478.8	324.0	387.8	337.7	50.06	7.746		
9,311.0	7,178.0	7,265.3	7,167.7	33.6	19.8	90.42	1,478.8	324.0	426.2	374.5	51.68	8.246		
9,411.0	7,178.0	7,264.8	7,167.2	35.2	19.8	90.33	1,478.8	324.0	482.6	429.3	53.32	9.051		

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design Pennington Pad (S2-T2N-R67W) - EXISTING - ROLLIE J VINCENT A 1 - EXISTING - EXISTING													Offset Site Error:	0.0 ft
Survey Program: 100-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
9,911.0	7,178.0	7,152.3	7,151.4	43.5	12.6	89.04	2,704.3	101.2	447.8	391.8	56.00	7.996		
10,011.0	7,178.0	7,152.6	7,151.7	45.2	12.6	89.17	2,704.3	101.2	355.7	298.0	57.69	6.166		
10,111.0	7,178.0	7,153.0	7,152.1	46.9	12.6	89.30	2,704.3	101.2	269.3	209.9	59.38	4.535		
10,211.0	7,178.0	7,153.4	7,152.5	48.6	12.6	89.44	2,704.3	101.2	196.2	135.1	61.08	3.212		
10,311.0	7,178.0	7,153.7	7,152.8	50.3	12.6	89.58	2,704.3	101.2	156.5	93.7	62.78	2.493		
10,331.1	7,178.0	7,153.8	7,152.9	50.6	12.6	89.60	2,704.3	101.2	155.2	92.1	63.12	2.459	CC, ES, SF	
10,411.0	7,178.0	7,154.1	7,153.2	52.0	12.6	89.71	2,704.3	101.2	174.6	110.1	64.48	2.707		
10,511.0	7,178.0	7,154.5	7,153.6	53.7	12.6	89.86	2,704.3	101.2	237.6	171.4	66.19	3.590		
10,611.0	7,178.0	7,154.9	7,154.0	55.4	12.6	90.00	2,704.3	101.2	320.1	252.2	67.90	4.714		
10,711.0	7,178.0	7,155.3	7,154.4	57.1	12.6	90.14	2,704.3	101.2	410.4	340.8	69.61	5.896		

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Pennington Pad (S2-T2N-R67W) - EXISTING - VYNCKIER 15-2A7952 - EXISTING - EXISTING												Offset Well Error:	0.0 ft
Survey Program: 100-MWD													
Reference		Offset		Semi Major Axis		Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre +N/-S	+E/-W	Between Centres	Between Ellipses	Total Uncertainty Axis	Separation Factor	Warning
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)			
7,711.0	7,183.5	7,170.7	7,169.8	12.8	12.6	89.73	10.1	247.5	295.9	270.6	25.27	11.707	CC, ES, SF
7,765.3	7,182.8	7,169.0	7,168.1	13.1	12.6	89.29	10.1	247.5	310.9	285.3	25.57	12.161	
7,811.0	7,181.6	7,167.0	7,166.1	13.3	12.6	88.80	10.2	247.5	330.0	304.2	25.81	12.784	
7,911.0	7,181.2	7,164.7	7,163.8	14.1	12.6	89.80	10.2	247.5	389.4	362.9	26.55	14.666	
8,011.0	7,182.9	7,164.7	7,163.8	15.0	12.6	89.22	10.2	247.5	465.5	438.0	27.47	16.943	

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design Pennington Pad (S2-T2N-R67W) - EXISTING - WITTEMEYER 2-2 - EXISTING - EXISTING													Offset Site Error:	0.0 ft
Survey Program: 100-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
11,211.0	7,178.0	7,143.6	7,142.5	65.7	12.5	87.56	3,996.4	68.8	431.7	353.6	78.11	5.527		
11,311.0	7,178.0	7,144.9	7,143.8	67.4	12.5	88.14	3,996.4	68.8	337.6	257.7	79.87	4.227		
11,411.0	7,178.0	7,146.2	7,145.2	69.2	12.5	88.74	3,996.4	68.8	248.0	166.4	81.62	3.039		
11,511.0	7,178.0	7,147.6	7,146.5	70.9	12.5	89.35	3,996.4	68.8	170.5	87.1	83.36	2.045		
11,611.0	7,178.0	7,149.0	7,147.9	72.6	12.5	89.98	3,996.4	68.8	128.8	43.8	85.09	1.514		
11,623.3	7,178.0	7,149.2	7,148.1	72.8	12.5	90.06	3,996.4	68.8	128.3	43.0	85.31	1.503 CC, ES, SF		
11,711.0	7,178.0	7,150.4	7,149.4	74.3	12.5	90.62	3,996.5	68.8	155.4	68.5	86.82	1.790		

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Offset Design Pennington Pad (S2-T2N-R67W) - Pennington 28N-2HZ - HZ - HZ												Offset Site Error:	0.0 ft
Survey Program: 113-Gyro, 1077-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance		Total		Separation		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor	
7,711.0	7,183.5	7,711.0	7,183.5	0.0	0.0	0.00	84.4	-38.9	0.0	0.0	0.00	N/A CC	
7,777.6	7,182.6	7,777.6	7,182.5	0.4	0.4	34.50	150.9	-34.8	0.2	-0.3	0.45	0.345 Level 1	
7,811.0	7,181.6	7,811.0	7,181.6	0.6	0.6	42.16	184.2	-32.8	0.0	-0.7	0.76	0.057 Level 1, ES, SF	
7,911.0	7,181.2	7,910.8	7,177.8	1.3	1.3	40.40	283.7	-26.5	4.4	2.6	1.86	2.385	
8,011.0	7,182.9	8,009.6	7,170.0	2.2	2.2	37.72	382.0	-19.7	16.5	13.5	3.01	5.493	
8,111.0	7,182.0	8,055.0	7,164.4	3.3	2.6	37.10	426.9	-16.6	62.3	58.3	3.93	15.844	
8,211.0	7,179.9	8,055.0	7,164.4	4.5	2.6	37.10	426.9	-16.6	159.4	154.7	4.66	34.221	
8,311.0	7,178.2	8,055.0	7,164.4	5.7	2.6	52.96	426.9	-16.6	258.7	251.8	6.83	37.852	
8,411.0	7,178.0	8,055.0	7,164.4	7.1	2.6	64.03	426.9	-16.6	358.2	349.4	8.76	40.880	
8,511.0	7,178.0	8,055.0	7,164.4	8.4	2.6	64.03	426.9	-16.6	457.9	447.9	10.02	45.698	

Cathedral Energy Services

Anticollision Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pennington 28N-2HZ
Project:	DJ Wattenberg	TVD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Reference Site:	Pennington Pad (S2-T2N-R67W)	MD Reference:	KB=13' @ 4873.0ft (Ensign #123)
Site Error:	0.0ft	North Reference:	Grid
Reference Well:	Pennington 28N-2HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	STK	Database:	USA EDM 5000 Multi Users DB
Reference Design:	STK Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=13' @ 4873.0ft (Ensign #123)

Offset Depths are relative to Offset Datum

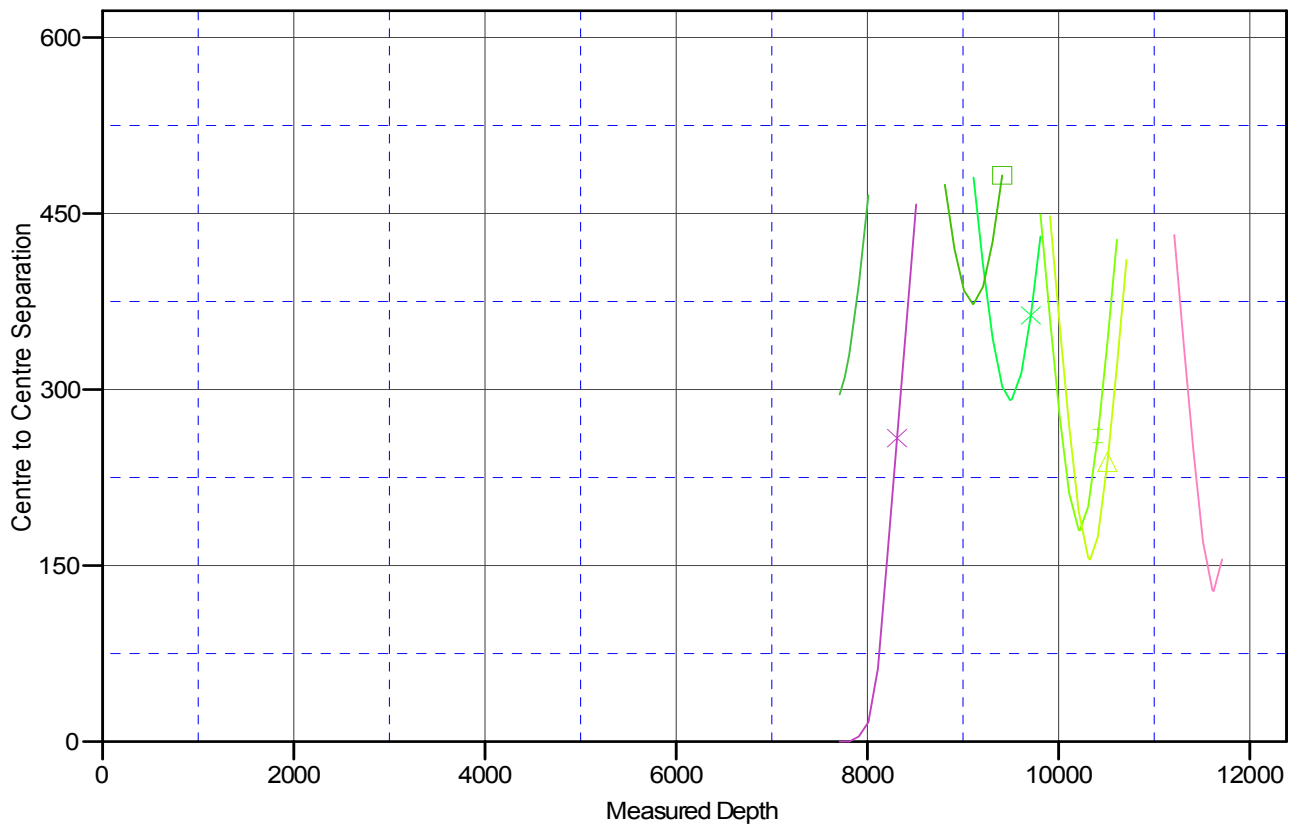
Central Meridian is -105.500000 °

Coordinates are relative to: Pennington 28N-2HZ

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.42°

Ladder Plot



LEGEND

ERRIA 4-4-2, EXISTING, EXISTING V0	EXISTING - ROLLIE J VINCENT A 1, EXISTING, EXISTING V0	Pennington 28N-2HZ, HZ, HZ V0
WITTEMEYER 7-2A, EXISTING, EXISTING V0	EXISTING - VYNCKIER 15-2A7952, EXISTING, EXISTING V0	
ST 10-2, EXISTING, EXISTING V0	EXISTING - WITTEMEYER 2-2, EXISTING, EXISTING V0	