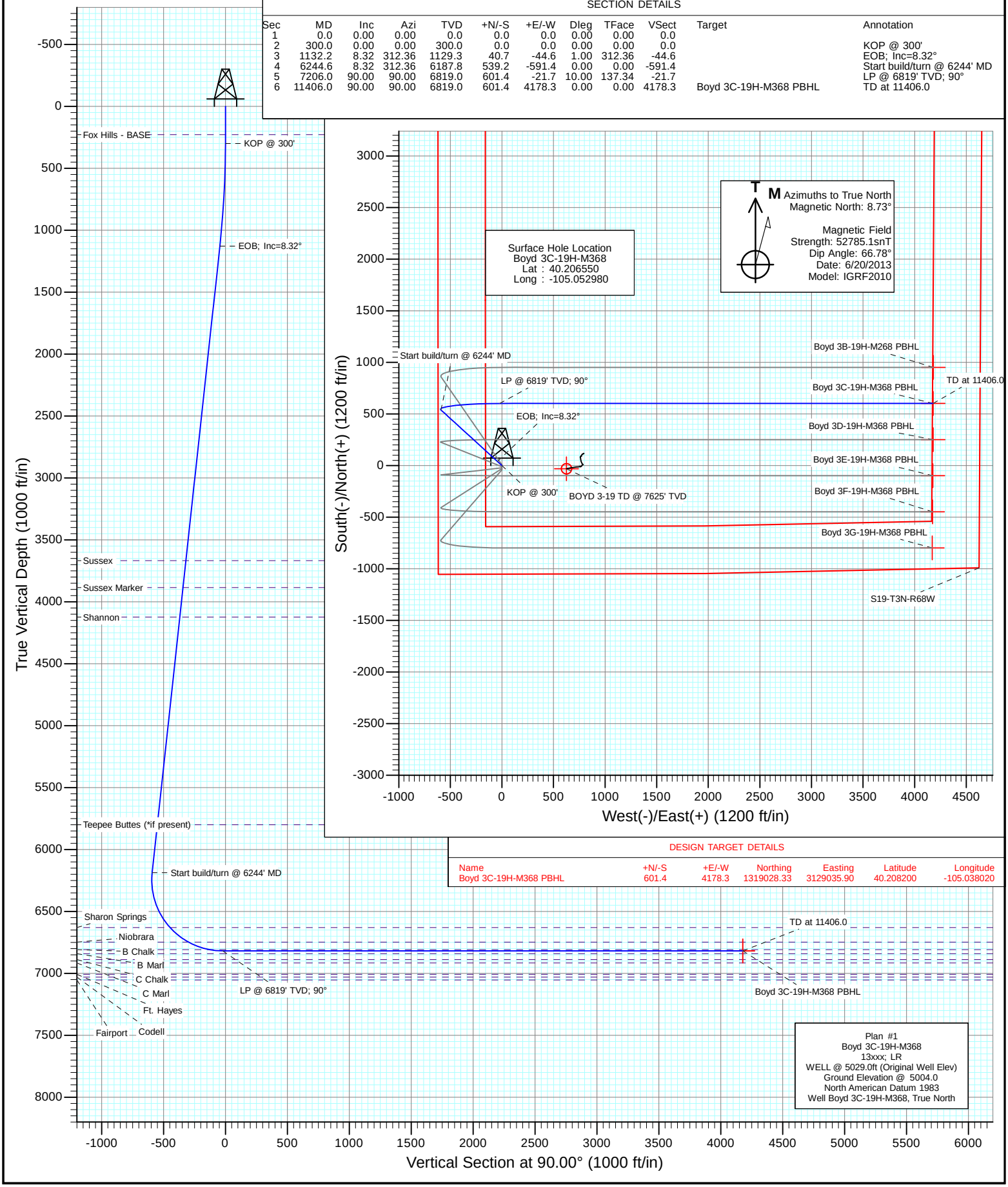
Project: DJ Wattenberg
Site: S19-T3N-R68W (Boyd)
Well: Boyd 3C-19H-M368
Wellbore: Hz
Design: Plan #1

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0		
2	300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.0		KOP @ 300'
3	1132.2	8.32	312.36	1129.3	40.7	-44.6	1.00	312.36	-44.6		EOB; Inc=8.32°
4	6244.6	8.32	312.36	6187.8	539.2	-591.4	0.00	0.00	-591.4		Start build/turn @ 6244' MD
5	7206.0	90.00	90.00	6819.0	601.4	-21.7	10.00	137.34	-21.7		LP @ 6819' TVD; 90°
6	11406.0	90.00	90.00	6819.0	601.4	4178.3	0.00	0.00	4178.3	Boyd 3C-19H-M368 PBHL	TD at 11406.0



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Boyd 3C-19H-M368 PBHL	601.4	4178.3	1319028.33	3129035.90	40.208200	-105.038020

Plan #1
Boyd 3C-19H-M368
13xxx; LR
WELL @ 5029.0ft (Original Well Elev)
Ground Elevation @ 5004.0
North American Datum 1983
Well Boyd 3C-19H-M368, True North

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Boyd 3C-19H-M368
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Project:	DJ Wattenberg	**MD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Site:	S19-T3N-R68W (Boyd)	**North Reference:**	True
Well:	Boyd 3C-19H-M368	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	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 S19-T3N-R68W (Boyd)

Site Position:		**Northing:**	1,318,413.14 ft	**Latitude:**	40.206570
From:	Lat/Long	**Easting:**	3,124,860.64 ft	**Longitude:**	-105.052980
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.29 °

Well Boyd 3C-19H-M368

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,318,405.85 ft	**Latitude:**	40.206550
	+E/-W	0.0 ft	**Easting:**	3,124,860.68 ft	**Longitude:**	-105.052980
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	5,004.0 ft

Wellbore Hz

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/20/2013	8.73	66.78	52,785

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	90.00

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,132.2	8.32	312.36	1,129.3	40.7	-44.6	1.00	1.00	0.00	312.36	
6,244.6	8.32	312.36	6,187.8	539.2	-591.4	0.00	0.00	0.00	0.00	
7,206.0	90.00	90.00	6,819.0	601.4	-21.7	10.00	8.50	14.32	137.34	
11,406.0	90.00	90.00	6,819.0	601.4	4,178.3	0.00	0.00	0.00	0.00	Boyd 3C-19H-M368 F

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Boyd 3C-19H-M368
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Project:	DJ Wattenberg	**MD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Site:	S19-T3N-R68W (Boyd)	**North Reference:**	True
Well:	Boyd 3C-19H-M368	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	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	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
229.0	0.00	0.00	229.0	0.0	0.0	0.0	0.00	0.00	Fox Hills - BASE
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	KOP @ 300'
400.0	1.00	312.36	400.0	0.6	-0.6	-0.6	1.00	1.00	
500.0	2.00	312.36	500.0	2.4	-2.6	-2.6	1.00	1.00	
600.0	3.00	312.36	599.9	5.3	-5.8	-5.8	1.00	1.00	
700.0	4.00	312.36	699.7	9.4	-10.3	-10.3	1.00	1.00	
800.0	5.00	312.36	799.4	14.7	-16.1	-16.1	1.00	1.00	
900.0	6.00	312.36	898.9	21.1	-23.2	-23.2	1.00	1.00	
1,000.0	7.00	312.36	998.3	28.8	-31.6	-31.6	1.00	1.00	
1,100.0	8.00	312.36	1,097.4	37.6	-41.2	-41.2	1.00	1.00	
1,132.2	8.32	312.36	1,129.3	40.7	-44.6	-44.6	1.00	1.00	EOB; Inc=8.32°
1,200.0	8.32	312.36	1,196.4	47.3	-51.8	-51.8	0.00	0.00	
1,300.0	8.32	312.36	1,295.3	57.0	-62.5	-62.5	0.00	0.00	
1,400.0	8.32	312.36	1,394.3	66.8	-73.2	-73.2	0.00	0.00	
1,500.0	8.32	312.36	1,493.2	76.5	-83.9	-83.9	0.00	0.00	
1,600.0	8.32	312.36	1,592.2	86.3	-94.6	-94.6	0.00	0.00	
1,700.0	8.32	312.36	1,691.1	96.0	-105.3	-105.3	0.00	0.00	
1,800.0	8.32	312.36	1,790.0	105.8	-116.0	-116.0	0.00	0.00	
1,900.0	8.32	312.36	1,889.0	115.5	-126.7	-126.7	0.00	0.00	
2,000.0	8.32	312.36	1,987.9	125.3	-137.4	-137.4	0.00	0.00	
2,100.0	8.32	312.36	2,086.9	135.0	-148.1	-148.1	0.00	0.00	
2,200.0	8.32	312.36	2,185.8	144.8	-158.8	-158.8	0.00	0.00	
2,300.0	8.32	312.36	2,284.8	154.5	-169.5	-169.5	0.00	0.00	
2,400.0	8.32	312.36	2,383.7	164.3	-180.2	-180.2	0.00	0.00	
2,500.0	8.32	312.36	2,482.7	174.0	-190.9	-190.9	0.00	0.00	
2,600.0	8.32	312.36	2,581.6	183.8	-201.6	-201.6	0.00	0.00	
2,700.0	8.32	312.36	2,680.6	193.5	-212.3	-212.3	0.00	0.00	
2,800.0	8.32	312.36	2,779.5	203.3	-223.0	-223.0	0.00	0.00	
2,900.0	8.32	312.36	2,878.5	213.0	-233.7	-233.7	0.00	0.00	
3,000.0	8.32	312.36	2,977.4	222.8	-244.3	-244.3	0.00	0.00	
3,100.0	8.32	312.36	3,076.4	232.6	-255.0	-255.0	0.00	0.00	
3,200.0	8.32	312.36	3,175.3	242.3	-265.7	-265.7	0.00	0.00	
3,300.0	8.32	312.36	3,274.2	252.1	-276.4	-276.4	0.00	0.00	
3,400.0	8.32	312.36	3,373.2	261.8	-287.1	-287.1	0.00	0.00	
3,500.0	8.32	312.36	3,472.1	271.6	-297.8	-297.8	0.00	0.00	
3,600.0	8.32	312.36	3,571.1	281.3	-308.5	-308.5	0.00	0.00	
3,697.9	8.32	312.36	3,668.0	290.9	-319.0	-319.0	0.00	0.00	Sussex
3,700.0	8.32	312.36	3,670.0	291.1	-319.2	-319.2	0.00	0.00	
3,800.0	8.32	312.36	3,769.0	300.8	-329.9	-329.9	0.00	0.00	
3,900.0	8.32	312.36	3,867.9	310.6	-340.6	-340.6	0.00	0.00	
3,917.2	8.32	312.36	3,885.0	312.3	-342.4	-342.4	0.00	0.00	Sussex Marker
4,000.0	8.32	312.36	3,966.9	320.3	-351.3	-351.3	0.00	0.00	
4,100.0	8.32	312.36	4,065.8	330.1	-362.0	-362.0	0.00	0.00	
4,158.8	8.32	312.36	4,124.0	335.8	-368.3	-368.3	0.00	0.00	Shannon
4,200.0	8.32	312.36	4,164.8	339.8	-372.7	-372.7	0.00	0.00	
4,300.0	8.32	312.36	4,263.7	349.6	-383.4	-383.4	0.00	0.00	
4,400.0	8.32	312.36	4,362.7	359.3	-394.1	-394.1	0.00	0.00	
4,500.0	8.32	312.36	4,461.6	369.1	-404.8	-404.8	0.00	0.00	
4,600.0	8.32	312.36	4,560.6	378.8	-415.5	-415.5	0.00	0.00	

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Project:	DJ Wattenberg	**MD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Site:	S19-T3N-R68W (Boyd)	**North Reference:**	True
Well:	Boyd 3C-19H-M368	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	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
4,700.0	8.32	312.36	4,659.5	388.6	-426.2	-426.2	0.00	0.00	
4,800.0	8.32	312.36	4,758.5	398.3	-436.9	-436.9	0.00	0.00	
4,900.0	8.32	312.36	4,857.4	408.1	-447.6	-447.6	0.00	0.00	
5,000.0	8.32	312.36	4,956.3	417.8	-458.3	-458.3	0.00	0.00	
5,100.0	8.32	312.36	5,055.3	427.6	-468.9	-468.9	0.00	0.00	
5,200.0	8.32	312.36	5,154.2	437.4	-479.6	-479.6	0.00	0.00	
5,300.0	8.32	312.36	5,253.2	447.1	-490.3	-490.3	0.00	0.00	
5,400.0	8.32	312.36	5,352.1	456.9	-501.0	-501.0	0.00	0.00	
5,500.0	8.32	312.36	5,451.1	466.6	-511.7	-511.7	0.00	0.00	
5,600.0	8.32	312.36	5,550.0	476.4	-522.4	-522.4	0.00	0.00	
5,700.0	8.32	312.36	5,649.0	486.1	-533.1	-533.1	0.00	0.00	
5,800.0	8.32	312.36	5,747.9	495.9	-543.8	-543.8	0.00	0.00	
5,852.6	8.32	312.36	5,800.0	501.0	-549.4	-549.4	0.00	0.00	Teepee Buttes (*if present)
5,900.0	8.32	312.36	5,846.9	505.6	-554.5	-554.5	0.00	0.00	
6,000.0	8.32	312.36	5,945.8	515.4	-565.2	-565.2	0.00	0.00	
6,100.0	8.32	312.36	6,044.8	525.1	-575.9	-575.9	0.00	0.00	
6,200.0	8.32	312.36	6,143.7	534.9	-586.6	-586.6	0.00	0.00	
6,244.6	8.32	312.36	6,187.8	539.2	-591.4	-591.4	0.00	0.00	Start build/turn @ 6244' MD
6,300.0	5.66	353.93	6,242.9	544.6	-594.6	-594.6	10.00	-4.80	
6,400.0	10.95	59.36	6,342.0	554.4	-586.9	-586.9	10.00	5.29	
6,500.0	20.17	74.44	6,438.2	563.9	-562.1	-562.1	10.00	9.23	
6,600.0	29.89	80.13	6,528.7	572.8	-520.8	-520.8	10.00	9.72	
6,700.0	39.74	83.19	6,610.7	580.9	-464.4	-464.4	10.00	9.85	
6,725.5	42.26	83.77	6,630.0	582.8	-447.8	-447.8	10.00	9.89	Sharon Springs
6,800.0	49.64	85.19	6,681.8	587.9	-394.5	-394.5	10.00	9.91	
6,900.0	59.57	86.68	6,739.6	593.6	-313.3	-313.3	10.00	9.93	
6,917.0	61.25	86.90	6,748.0	594.4	-298.6	-298.6	10.00	9.94	Niobrara
7,000.0	69.51	87.89	6,782.6	597.8	-223.3	-223.3	10.00	9.94	
7,098.5	79.31	88.93	6,809.0	600.4	-128.5	-128.5	10.00	9.95	B Chalk
7,100.0	79.45	88.95	6,809.3	600.5	-127.1	-127.1	10.00	9.95	
7,200.0	89.41	89.94	6,819.0	601.4	-27.7	-27.7	10.00	9.95	
7,206.0	90.00	90.00	6,819.0	601.4	-21.7	-21.7	10.00	9.95	LP @ 6819' TVD; 90°
7,300.0	90.00	90.00	6,819.0	601.4	72.3	72.3	0.00	0.00	
7,400.0	90.00	90.00	6,819.0	601.4	172.3	172.3	0.00	0.00	
7,500.0	90.00	90.00	6,819.0	601.4	272.3	272.3	0.00	0.00	
7,600.0	90.00	90.00	6,819.0	601.4	372.3	372.3	0.00	0.00	
7,700.0	90.00	90.00	6,819.0	601.4	472.3	472.3	0.00	0.00	
7,800.0	90.00	90.00	6,819.0	601.4	572.3	572.3	0.00	0.00	
7,900.0	90.00	90.00	6,819.0	601.4	672.3	672.3	0.00	0.00	
8,000.0	90.00	90.00	6,819.0	601.4	772.3	772.3	0.00	0.00	
8,100.0	90.00	90.00	6,819.0	601.4	872.3	872.3	0.00	0.00	
8,200.0	90.00	90.00	6,819.0	601.4	972.3	972.3	0.00	0.00	
8,300.0	90.00	90.00	6,819.0	601.4	1,072.3	1,072.3	0.00	0.00	
8,400.0	90.00	90.00	6,819.0	601.4	1,172.3	1,172.3	0.00	0.00	
8,500.0	90.00	90.00	6,819.0	601.4	1,272.3	1,272.3	0.00	0.00	
8,600.0	90.00	90.00	6,819.0	601.4	1,372.3	1,372.3	0.00	0.00	
8,700.0	90.00	90.00	6,819.0	601.4	1,472.3	1,472.3	0.00	0.00	
8,800.0	90.00	90.00	6,819.0	601.4	1,572.3	1,572.3	0.00	0.00	
8,900.0	90.00	90.00	6,819.0	601.4	1,672.3	1,672.3	0.00	0.00	
9,000.0	90.00	90.00	6,819.0	601.4	1,772.3	1,772.3	0.00	0.00	
9,100.0	90.00	90.00	6,819.0	601.4	1,872.3	1,872.3	0.00	0.00	
9,200.0	90.00	90.00	6,819.0	601.4	1,972.3	1,972.3	0.00	0.00	

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Site:	S19-T3N-R68W (Boyd)	**North Reference:**	True
Well:	Boyd 3C-19H-M368	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	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
9,300.0	90.00	90.00	6,819.0	601.4	2,072.3	2,072.3	0.00	0.00	
9,400.0	90.00	90.00	6,819.0	601.4	2,172.3	2,172.3	0.00	0.00	
9,500.0	90.00	90.00	6,819.0	601.4	2,272.3	2,272.3	0.00	0.00	
9,600.0	90.00	90.00	6,819.0	601.4	2,372.3	2,372.3	0.00	0.00	
9,700.0	90.00	90.00	6,819.0	601.4	2,472.3	2,472.3	0.00	0.00	
9,800.0	90.00	90.00	6,819.0	601.4	2,572.3	2,572.3	0.00	0.00	
9,900.0	90.00	90.00	6,819.0	601.4	2,672.3	2,672.3	0.00	0.00	
10,000.0	90.00	90.00	6,819.0	601.4	2,772.3	2,772.3	0.00	0.00	
10,100.0	90.00	90.00	6,819.0	601.4	2,872.3	2,872.3	0.00	0.00	
10,200.0	90.00	90.00	6,819.0	601.4	2,972.3	2,972.3	0.00	0.00	
10,300.0	90.00	90.00	6,819.0	601.4	3,072.3	3,072.3	0.00	0.00	
10,400.0	90.00	90.00	6,819.0	601.4	3,172.3	3,172.3	0.00	0.00	
10,500.0	90.00	90.00	6,819.0	601.4	3,272.3	3,272.3	0.00	0.00	
10,600.0	90.00	90.00	6,819.0	601.4	3,372.3	3,372.3	0.00	0.00	
10,700.0	90.00	90.00	6,819.0	601.4	3,472.3	3,472.3	0.00	0.00	
10,800.0	90.00	90.00	6,819.0	601.4	3,572.3	3,572.3	0.00	0.00	
10,900.0	90.00	90.00	6,819.0	601.4	3,672.3	3,672.3	0.00	0.00	
11,000.0	90.00	90.00	6,819.0	601.4	3,772.3	3,772.3	0.00	0.00	
11,100.0	90.00	90.00	6,819.0	601.4	3,872.3	3,872.3	0.00	0.00	
11,200.0	90.00	90.00	6,819.0	601.4	3,972.3	3,972.3	0.00	0.00	
11,300.0	90.00	90.00	6,819.0	601.4	4,072.3	4,072.3	0.00	0.00	
11,400.0	90.00	90.00	6,819.0	601.4	4,172.3	4,172.3	0.00	0.00	
11,406.0	90.00	90.00	6,819.0	601.4	4,178.3	4,178.3	0.00	0.00	TD at 11406.0

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Boyd 3C-19H-M368 PBH - plan hits target center - Point	0.00	0.00	6,819.0	601.4	4,178.3	1,319,028.33	3,129,035.90	40.208200	-105.038020

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
229.0	229.0	Fox Hills - BASE			
3,697.9	3,668.0	Sussex			
3,917.2	3,885.0	Sussex Marker			
4,158.8	4,124.0	Shannon			
5,852.6	5,800.0	Teepee Buttes (*if present)			
6,725.5	6,630.0	Sharon Springs			
6,917.0	6,748.0	Niobrara			
7,098.5	6,809.0	B Chalk			

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Boyd 3C-19H-M368
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Project:	DJ Wattenberg	**MD Reference:**	WELL @ 5029.0ft (Original Well Elev)
Site:	S19-T3N-R68W (Boyd)	**North Reference:**	True
Well:	Boyd 3C-19H-M368	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #1		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
300.0	300.0	0.0	0.0	KOP @ 300'
1,132.2	1,129.3	40.7	-44.6	EOB; Inc=8.32°
6,244.6	6,187.8	539.2	-591.4	Start build/turn @ 6244' MD
7,206.0	6,819.0	601.4	-21.7	LP @ 6819' TVD; 90°
11,406.0	6,819.0	601.4	4,178.3	TD at 11406.0