

WELL DETAILS: HIGHWAY 160 16C-2HZ

GL 5102' & KB 17' @ 5119.00ft (ASSUMED)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1274944.41	3212559.26	40.0856139	-104.7403130

SECTION DETAILS

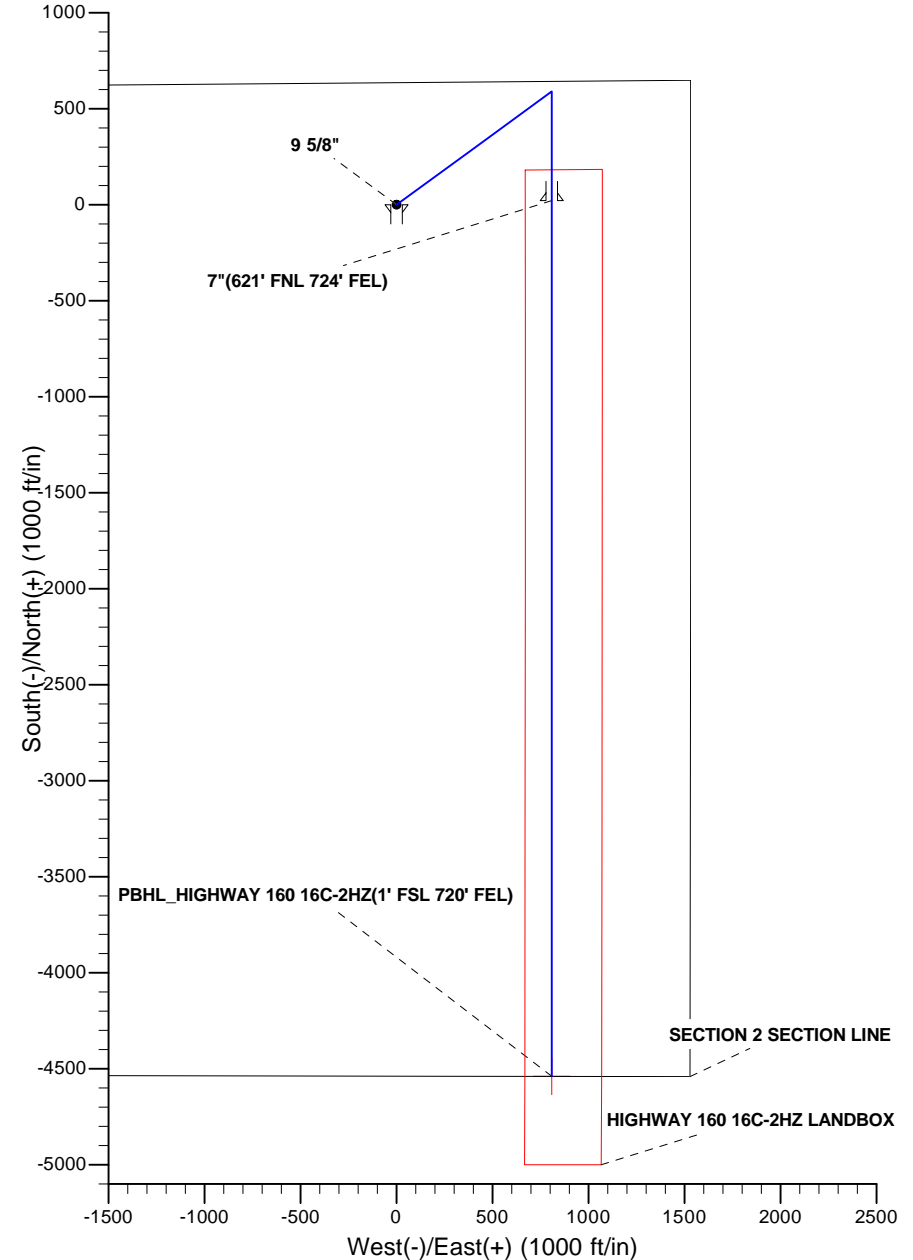
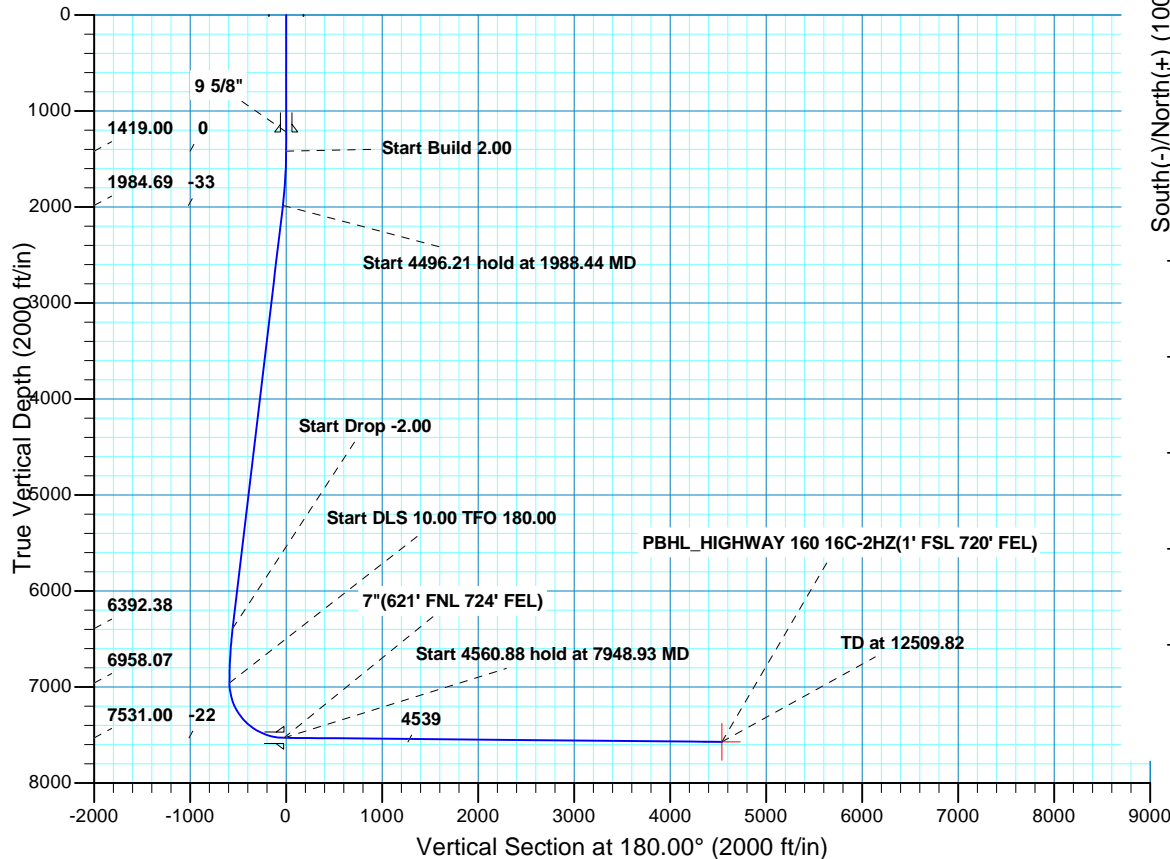
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1419.00	0.00	0.00	1419.00	0.00	0.00	0.00	0.00	0.00	
1988.44	11.39	53.87	1984.69	33.26	45.56	2.00	53.87	-33.26	
6484.65	11.39	53.87	6392.38	556.74	762.66	0.00	0.00	-556.74	
7054.08	0.00	0.00	6958.07	590.00	808.22	2.00	180.00	-590.00	
7948.93	89.48	180.00	7531.00	22.19	808.22	10.00	180.00	-22.19	
12509.82	89.48	180.00	7572.00	-4538.51	808.22	0.00	0.004538.51		PBHL_HIGHWAY 160 16C-2HZ(1' FSL 720' FEL)

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	Inc
1169.00	1169.00	Fox Hills Base	0.00
4407.00	4459.40	Parkman	11.39
5445.00	5518.24	Sussex	11.39
7156.00	7256.18	Sharon Springs	20.21
7192.00	7295.06	Niobrara A	24.10
7272.00	7386.32	Niobrara B	33.22
7355.00	7492.59	Niobrara C	43.85
7502.00	7770.92	Fort Hays	71.68
7526.00	7878.13	Codell	82.40

CASING DETAILS

TVD	MD	Name	Size
1219.00	1219.00	9 5/8"	9.625
7531.00	7948.93	7"	7.000





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

HIGHWAY 160 2-2HZ PAD

HIGHWAY 160 16C-2HZ

OH

Plan: PLAN #1 PRELIMINARY

Standard Planning Report

17 June, 2013

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HIGHWAY 160 16C-2HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Site:	HIGHWAY 160 2-2HZ PAD	North Reference:	True
Well:	HIGHWAY 160 16C-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

Project	COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	HIGHWAY 160 2-2HZ PAD, SECTION 2 T1N R66W			
Site Position:		Northing:	1,274,974.30 usft	Latitude: 40.0856960
From:	Lat/Long	Easting:	3,212,558.72 usft	Longitude: -104.7403140
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence: 0.49 °

Well	HIGHWAY 160 16C-2HZ, 636' FNL 1532' FEL			
Well Position	+N/-S	-29.89 ft	Northing:	1,274,944.41 usft
	+E/-W	0.28 ft	Easting:	3,212,559.26 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Ground Level: 5,102.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	2013/06/17	8.58	66.72	52,687

Design	PLAN #1 PRELIMINARY			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	180.00

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,419.00	0.00	0.00	1,419.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,988.44	11.39	53.87	1,984.69	33.26	45.56	2.00	2.00	0.00	53.87	
6,484.65	11.39	53.87	6,392.38	556.74	762.66	0.00	0.00	0.00	0.00	
7,054.09	0.00	0.00	6,958.07	590.00	808.22	2.00	-2.00	0.00	180.00	
7,948.93	89.48	180.00	7,531.00	22.19	808.22	10.00	10.00	20.12	180.00	
12,509.82	89.48	180.00	7,572.00	-4,538.51	808.22	0.00	0.00	0.00	0.00	PBHL_HIGHWAY 160

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HIGHWAY 160 16C-2HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Site:	HIGHWAY 160 2-2HZ PAD	North Reference:	True
Well:	HIGHWAY 160 16C-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

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)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,169.00	0.00	0.00	1,169.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base									
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,219.00	0.00	0.00	1,219.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"									
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,419.00	0.00	0.00	1,419.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,500.00	1.62	53.87	1,499.99	0.68	0.92	-0.68	2.00	2.00	0.00
1,600.00	3.62	53.87	1,599.88	3.37	4.62	-3.37	2.00	2.00	0.00
1,700.00	5.62	53.87	1,699.55	8.12	11.12	-8.12	2.00	2.00	0.00
1,800.00	7.62	53.87	1,798.88	14.92	20.43	-14.92	2.00	2.00	0.00
1,900.00	9.62	53.87	1,897.74	23.75	32.54	-23.75	2.00	2.00	0.00
1,988.44	11.39	53.87	1,984.69	33.26	45.56	-33.26	2.00	2.00	0.00
Start 4496.21 hold at 1988.44 MD									
2,000.00	11.39	53.87	1,996.03	34.60	47.40	-34.60	0.00	0.00	0.00
2,100.00	11.39	53.87	2,094.06	46.25	63.35	-46.25	0.00	0.00	0.00
2,200.00	11.39	53.87	2,192.09	57.89	79.30	-57.89	0.00	0.00	0.00
2,300.00	11.39	53.87	2,290.12	69.53	95.25	-69.53	0.00	0.00	0.00
2,400.00	11.39	53.87	2,388.15	81.18	111.20	-81.18	0.00	0.00	0.00
2,500.00	11.39	53.87	2,486.19	92.82	127.15	-92.82	0.00	0.00	0.00
2,600.00	11.39	53.87	2,584.22	104.46	143.10	-104.46	0.00	0.00	0.00
2,700.00	11.39	53.87	2,682.25	116.10	159.05	-116.10	0.00	0.00	0.00
2,800.00	11.39	53.87	2,780.28	127.75	175.00	-127.75	0.00	0.00	0.00
2,900.00	11.39	53.87	2,878.31	139.39	190.94	-139.39	0.00	0.00	0.00
3,000.00	11.39	53.87	2,976.34	151.03	206.89	-151.03	0.00	0.00	0.00
3,100.00	11.39	53.87	3,074.37	162.68	222.84	-162.68	0.00	0.00	0.00
3,200.00	11.39	53.87	3,172.40	174.32	238.79	-174.32	0.00	0.00	0.00
3,300.00	11.39	53.87	3,270.43	185.96	254.74	-185.96	0.00	0.00	0.00
3,400.00	11.39	53.87	3,368.46	197.60	270.69	-197.60	0.00	0.00	0.00
3,500.00	11.39	53.87	3,466.50	209.25	286.64	-209.25	0.00	0.00	0.00
3,600.00	11.39	53.87	3,564.53	220.89	302.59	-220.89	0.00	0.00	0.00
3,700.00	11.39	53.87	3,662.56	232.53	318.54	-232.53	0.00	0.00	0.00
3,800.00	11.39	53.87	3,760.59	244.17	334.48	-244.17	0.00	0.00	0.00
3,900.00	11.39	53.87	3,858.62	255.82	350.43	-255.82	0.00	0.00	0.00
4,000.00	11.39	53.87	3,956.65	267.46	366.38	-267.46	0.00	0.00	0.00
4,100.00	11.39	53.87	4,054.68	279.10	382.33	-279.10	0.00	0.00	0.00
4,200.00	11.39	53.87	4,152.71	290.75	398.28	-290.75	0.00	0.00	0.00
4,300.00	11.39	53.87	4,250.74	302.39	414.23	-302.39	0.00	0.00	0.00
4,400.00	11.39	53.87	4,348.77	314.03	430.18	-314.03	0.00	0.00	0.00
4,459.40	11.39	53.87	4,407.00	320.95	439.65	-320.95	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HIGHWAY 160 16C-2HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Site:	HIGHWAY 160 2-2HZ PAD	North Reference:	True
Well:	HIGHWAY 160 16C-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

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)	Turn Rate (°/100ft)
Parkman									
4,500.00	11.39	53.87	4,446.81	325.67	446.13	-325.67	0.00	0.00	0.00
4,600.00	11.39	53.87	4,544.84	337.32	462.08	-337.32	0.00	0.00	0.00
4,700.00	11.39	53.87	4,642.87	348.96	478.03	-348.96	0.00	0.00	0.00
4,800.00	11.39	53.87	4,740.90	360.60	493.97	-360.60	0.00	0.00	0.00
4,900.00	11.39	53.87	4,838.93	372.24	509.92	-372.24	0.00	0.00	0.00
5,000.00	11.39	53.87	4,936.96	383.89	525.87	-383.89	0.00	0.00	0.00
5,100.00	11.39	53.87	5,034.99	395.53	541.82	-395.53	0.00	0.00	0.00
5,200.00	11.39	53.87	5,133.02	407.17	557.77	-407.17	0.00	0.00	0.00
5,300.00	11.39	53.87	5,231.05	418.82	573.72	-418.82	0.00	0.00	0.00
5,400.00	11.39	53.87	5,329.08	430.46	589.67	-430.46	0.00	0.00	0.00
5,500.00	11.39	53.87	5,427.12	442.10	605.62	-442.10	0.00	0.00	0.00
5,518.24	11.39	53.87	5,445.00	444.23	608.53	-444.23	0.00	0.00	0.00
Sussex									
5,600.00	11.39	53.87	5,525.15	453.74	621.57	-453.74	0.00	0.00	0.00
5,700.00	11.39	53.87	5,623.18	465.39	637.51	-465.39	0.00	0.00	0.00
5,800.00	11.39	53.87	5,721.21	477.03	653.46	-477.03	0.00	0.00	0.00
5,900.00	11.39	53.87	5,819.24	488.67	669.41	-488.67	0.00	0.00	0.00
6,000.00	11.39	53.87	5,917.27	500.31	685.36	-500.31	0.00	0.00	0.00
6,100.00	11.39	53.87	6,015.30	511.96	701.31	-511.96	0.00	0.00	0.00
6,200.00	11.39	53.87	6,113.33	523.60	717.26	-523.60	0.00	0.00	0.00
6,300.00	11.39	53.87	6,211.36	535.24	733.21	-535.24	0.00	0.00	0.00
6,400.00	11.39	53.87	6,309.39	546.89	749.16	-546.89	0.00	0.00	0.00
6,484.65	11.39	53.87	6,392.38	556.74	762.66	-556.74	0.00	0.00	0.00
Start Drop -2.00									
6,500.00	11.08	53.87	6,407.43	558.50	765.07	-558.50	2.00	-2.00	0.00
6,600.00	9.08	53.87	6,505.88	568.83	779.21	-568.83	2.00	-2.00	0.00
6,700.00	7.08	53.87	6,604.89	577.11	790.57	-577.11	2.00	-2.00	0.00
6,800.00	5.08	53.87	6,704.32	583.36	799.12	-583.36	2.00	-2.00	0.00
6,900.00	3.08	53.87	6,804.06	587.56	804.87	-587.56	2.00	-2.00	0.00
7,000.00	1.08	53.87	6,903.99	589.70	807.80	-589.70	2.00	-2.00	0.00
7,054.09	0.00	0.00	6,958.07	590.00	808.22	-590.00	2.00	-2.00	0.00
Start DLS 10.00 TFO 180.00									
7,100.00	4.59	180.00	7,003.94	588.16	808.22	-588.16	10.00	10.00	0.00
7,200.00	14.59	180.00	7,102.41	571.52	808.22	-571.52	10.00	10.00	0.00
7,256.18	20.21	180.00	7,156.00	554.73	808.22	-554.73	10.00	10.00	0.00
Sharon Springs									
7,295.06	24.10	180.00	7,192.00	540.07	808.22	-540.07	10.00	10.00	0.00
Niobrara A									
7,300.00	24.59	180.00	7,196.50	538.03	808.22	-538.03	10.00	10.00	0.00
7,386.32	33.22	180.00	7,272.00	496.34	808.22	-496.34	10.00	10.00	0.00
Niobrara B									
7,400.00	34.59	180.00	7,283.35	488.71	808.22	-488.71	10.00	10.00	0.00
7,492.59	43.85	180.00	7,355.00	430.23	808.22	-430.23	10.00	10.00	0.00
Niobrara C									
7,500.00	44.59	180.00	7,360.31	425.06	808.22	-425.06	10.00	10.00	0.00
7,600.00	54.59	180.00	7,425.05	349.02	808.22	-349.02	10.00	10.00	0.00
7,700.00	64.59	180.00	7,475.61	262.88	808.22	-262.88	10.00	10.00	0.00
7,770.92	71.68	180.00	7,502.00	197.10	808.22	-197.10	10.00	10.00	0.00
Fort Hays									
7,800.00	74.59	180.00	7,510.43	169.28	808.22	-169.28	10.00	10.00	0.00
7,878.13	82.40	180.00	7,526.00	92.78	808.22	-92.78	10.00	10.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HIGHWAY 160 16C-2HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Site:	HIGHWAY 160 2-2HZ PAD	North Reference:	True
Well:	HIGHWAY 160 16C-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

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)	Turn Rate (°/100ft)
Codell									
7,900.00	84.59	180.00	7,528.48	71.05	808.22	-71.05	10.00	10.00	0.00
7,948.93	89.48	180.00	7,531.00	22.20	808.22	-22.20	10.00	10.00	0.00
Start 4560.88 hold at 7948.93 MD - 7"(621' FNL 724' FEL)									
8,000.00	89.48	180.00	7,531.46	-28.87	808.22	28.87	0.00	0.00	0.00
8,100.00	89.48	180.00	7,532.36	-128.87	808.22	128.87	0.00	0.00	0.00
8,200.00	89.48	180.00	7,533.26	-228.86	808.22	228.86	0.00	0.00	0.00
8,300.00	89.48	180.00	7,534.16	-328.86	808.22	328.86	0.00	0.00	0.00
8,400.00	89.48	180.00	7,535.06	-428.85	808.22	428.85	0.00	0.00	0.00
8,500.00	89.48	180.00	7,535.96	-528.85	808.22	528.85	0.00	0.00	0.00
8,600.00	89.48	180.00	7,536.86	-628.85	808.22	628.85	0.00	0.00	0.00
8,700.00	89.48	180.00	7,537.76	-728.84	808.22	728.84	0.00	0.00	0.00
8,800.00	89.48	180.00	7,538.65	-828.84	808.22	828.84	0.00	0.00	0.00
8,900.00	89.48	180.00	7,539.55	-928.83	808.22	928.83	0.00	0.00	0.00
9,000.00	89.48	180.00	7,540.45	-1,028.83	808.22	1,028.83	0.00	0.00	0.00
9,100.00	89.48	180.00	7,541.35	-1,128.83	808.22	1,128.83	0.00	0.00	0.00
9,200.00	89.48	180.00	7,542.25	-1,228.82	808.22	1,228.82	0.00	0.00	0.00
9,300.00	89.48	180.00	7,543.15	-1,328.82	808.22	1,328.82	0.00	0.00	0.00
9,400.00	89.48	180.00	7,544.05	-1,428.81	808.22	1,428.81	0.00	0.00	0.00
9,500.00	89.48	180.00	7,544.95	-1,528.81	808.22	1,528.81	0.00	0.00	0.00
9,600.00	89.48	180.00	7,545.85	-1,628.81	808.22	1,628.81	0.00	0.00	0.00
9,700.00	89.48	180.00	7,546.74	-1,728.80	808.22	1,728.80	0.00	0.00	0.00
9,800.00	89.48	180.00	7,547.64	-1,828.80	808.22	1,828.80	0.00	0.00	0.00
9,900.00	89.48	180.00	7,548.54	-1,928.79	808.22	1,928.79	0.00	0.00	0.00
10,000.00	89.48	180.00	7,549.44	-2,028.79	808.22	2,028.79	0.00	0.00	0.00
10,100.00	89.48	180.00	7,550.34	-2,128.79	808.22	2,128.79	0.00	0.00	0.00
10,200.00	89.48	180.00	7,551.24	-2,228.78	808.22	2,228.78	0.00	0.00	0.00
10,300.00	89.48	180.00	7,552.14	-2,328.78	808.22	2,328.78	0.00	0.00	0.00
10,400.00	89.48	180.00	7,553.04	-2,428.77	808.22	2,428.77	0.00	0.00	0.00
10,500.00	89.48	180.00	7,553.93	-2,528.77	808.22	2,528.77	0.00	0.00	0.00
10,600.00	89.48	180.00	7,554.83	-2,628.77	808.22	2,628.77	0.00	0.00	0.00
10,700.00	89.48	180.00	7,555.73	-2,728.76	808.22	2,728.76	0.00	0.00	0.00
10,800.00	89.48	180.00	7,556.63	-2,828.76	808.22	2,828.76	0.00	0.00	0.00
10,900.00	89.48	180.00	7,557.53	-2,928.75	808.22	2,928.75	0.00	0.00	0.00
11,000.00	89.48	180.00	7,558.43	-3,028.75	808.22	3,028.75	0.00	0.00	0.00
11,100.00	89.48	180.00	7,559.33	-3,128.75	808.22	3,128.75	0.00	0.00	0.00
11,200.00	89.48	180.00	7,560.23	-3,228.74	808.22	3,228.74	0.00	0.00	0.00
11,300.00	89.48	180.00	7,561.13	-3,328.74	808.22	3,328.74	0.00	0.00	0.00
11,400.00	89.48	180.00	7,562.02	-3,428.73	808.22	3,428.73	0.00	0.00	0.00
11,500.00	89.48	180.00	7,562.92	-3,528.73	808.22	3,528.73	0.00	0.00	0.00
11,600.00	89.48	180.00	7,563.82	-3,628.73	808.22	3,628.73	0.00	0.00	0.00
11,700.00	89.48	180.00	7,564.72	-3,728.72	808.22	3,728.72	0.00	0.00	0.00
11,800.00	89.48	180.00	7,565.62	-3,828.72	808.22	3,828.72	0.00	0.00	0.00
11,900.00	89.48	180.00	7,566.52	-3,928.71	808.22	3,928.71	0.00	0.00	0.00
12,000.00	89.48	180.00	7,567.42	-4,028.71	808.22	4,028.71	0.00	0.00	0.00
12,100.00	89.48	180.00	7,568.32	-4,128.71	808.22	4,128.71	0.00	0.00	0.00
12,200.00	89.48	180.00	7,569.22	-4,228.70	808.22	4,228.70	0.00	0.00	0.00
12,300.00	89.48	180.00	7,570.11	-4,328.70	808.22	4,328.70	0.00	0.00	0.00
12,400.00	89.48	180.00	7,571.01	-4,428.69	808.22	4,428.69	0.00	0.00	0.00
12,500.00	89.48	180.00	7,571.91	-4,528.69	808.22	4,528.69	0.00	0.00	0.00
12,509.82	89.48	180.00	7,572.00	-4,538.51	808.22	4,538.51	0.00	0.00	0.00
TD at 12509.82 - PBHL_HIGHWAY 160 16C-2HZ(1' FSL 720' FEL)									

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HIGHWAY 160 16C-2HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5102' & KB 17' @ 5119.00ft (ASSUMED)
Site:	HIGHWAY 160 2-2HZ PAD	North Reference:	True
Well:	HIGHWAY 160 16C-2HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)		
- Shape									
PBHL_HIGHWAY 160 1	0.00	0.00	7,572.00	-4,538.51	808.22	1,270,413.00	3,213,406.33	40.0731550	-104.7374250
- plan hits target center									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name		Casing Diameter	Hole Diameter
(ft)	(ft)			(in)	(in)
1,219.00	1,219.00	9 5/8"		9.625	12.250
7,948.93	7,531.00	7"(621' FNL 724' FEL)		7.000	7.500

Formations						
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction	
(ft)	(ft)			(°)	(°)	
1,169.00	1,169.00	Fox Hills Base				
4,459.40	4,407.00	Parkman				
5,518.24	5,445.00	Sussex				
7,256.18	7,156.00	Sharon Springs				
7,295.06	7,192.00	Niobrara A				
7,386.32	7,272.00	Niobrara B				
7,492.59	7,355.00	Niobrara C				
7,770.92	7,502.00	Fort Hays				
7,878.13	7,526.00	Codell				

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S	+E/-W	
(ft)	(ft)	(ft)	(ft)	
1,419.00	1,419.00	0.00	0.00	Start Build 2.00
1,988.44	1,984.69	33.26	45.56	Start 4496.21 hold at 1988.44 MD
6,484.65	6,392.38	556.74	762.66	Start Drop -2.00
7,054.09	6,958.07	590.00	808.22	Start DLS 10.00 TFO 180.00
7,948.93	7,531.00	22.19	808.22	Start 4560.88 hold at 7948.93 MD
12,509.82	7,572.00	-4,538.51	808.22	TD at 12509.82