

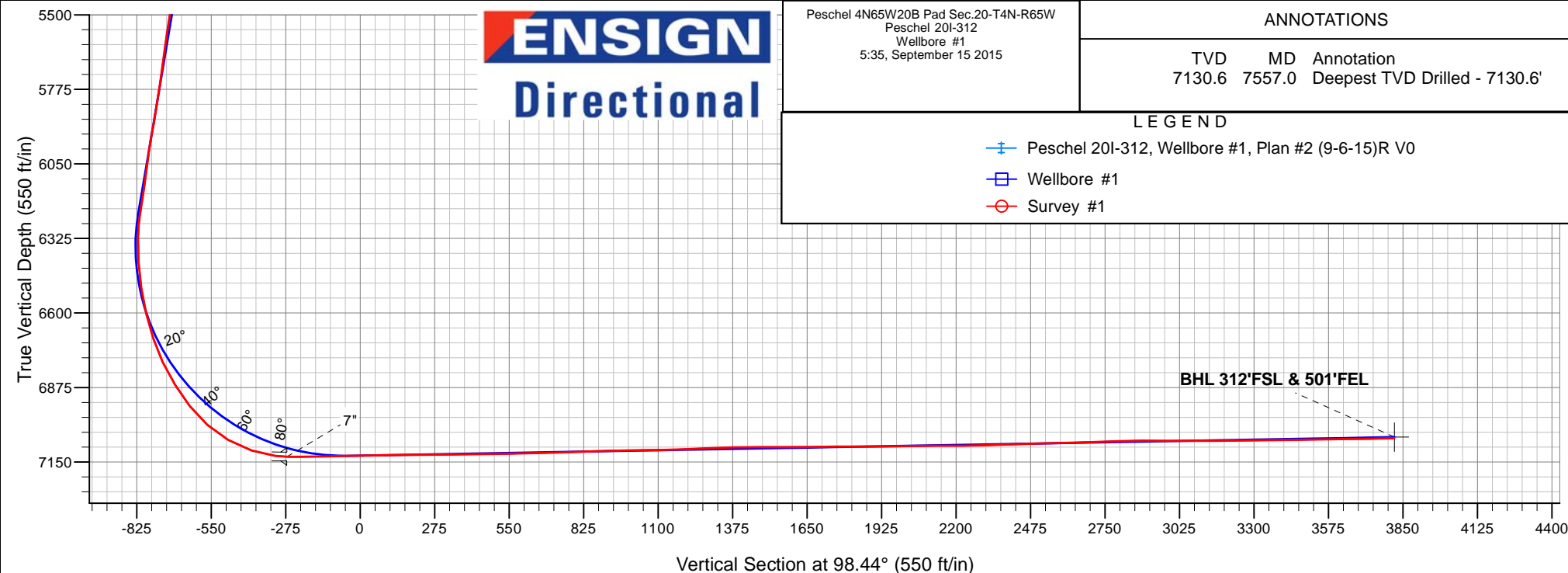
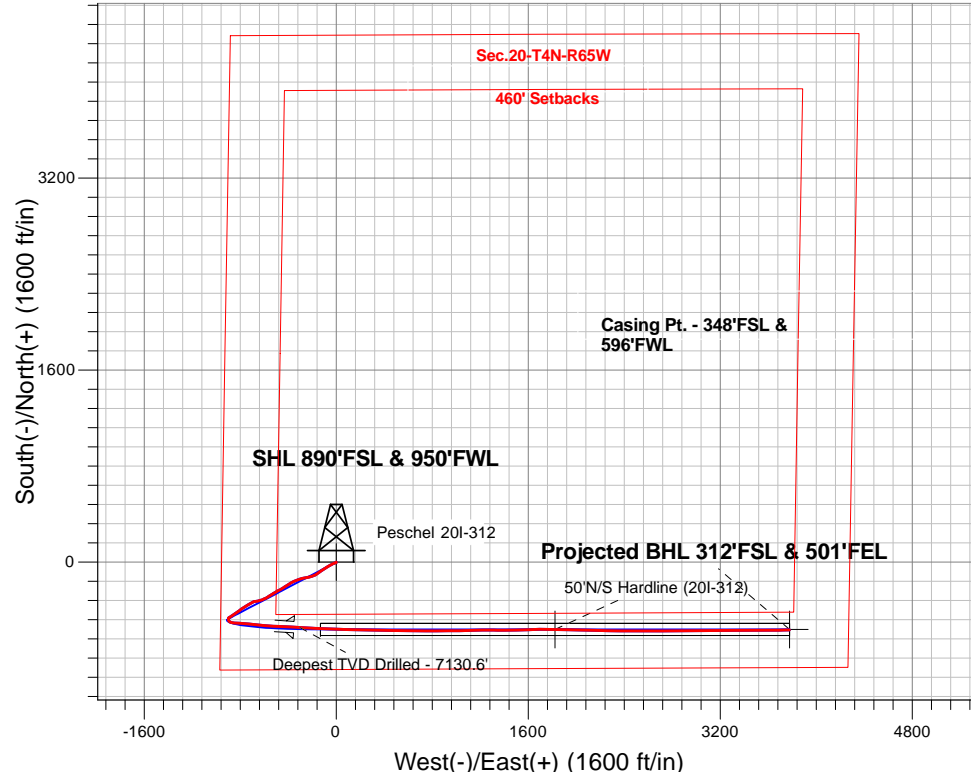
PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Peschel 20I-312**

Surface Location: Peschel 4N65W20B Pad Sec.20-T4N-R65W
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
 Ground Elevation: 4802.0
 +N/-S+E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1350634.133225067.38 40.293080 -104.693150
 Ensign Rig #134 - 13' WELL @ 4815.0ft (Ensign Rig #134 - 13')

FINAL SURVEY

Projected Bottom Hole Location
11639'MD 7062'TVD 565'S & 3776'E of SHL
91.2 degree Incl @ 88.6 degree AZM



Peschel 4N65W20B Pad Sec.20-T4N-R65W
 Peschel 20I-312
 Wellbore #1
 5:35, September 15 2015

ANNOTATIONS

TVD	MD	Annotation
7130.6	7557.0	Deepest TVD Drilled - 7130.6'

LEGEND

- + Peschel 20I-312, Wellbore #1, Plan #2 (9-6-15)R V0
- Wellbore #1
- o Survey #1



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.20-T4N-R65W

Peschel 4N65W20B Pad Sec.20-T4N-R65W

Peschel 20I-312

Wellbore #1

Survey: Survey #1

Standard Survey Report

15 September, 2015

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Peschel 20I-312
Project:	SEC.20-T4N-R65W	TVD Reference:	WELL @ 4815.0ft (Ensign Rig #134 - 13')
Site:	Peschel 4N65W20B Pad Sec.20-T4N-R65W	MD Reference:	WELL @ 4815.0ft (Ensign Rig #134 - 13')
Well:	Peschel 20I-312	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Project	SEC.20-T4N-R65W, Weld, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Peschel 4N65W20B Pad Sec.20-T4N-R65W				
Site Position:		Northing:	1,350,841.81 usft	Latitude:	40.293650
From:	Lat/Long	Easting:	3,225,068.28 usft	Longitude:	-104.693140
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.52 °

Well	Peschel 20I-312					
Well Position	+N/-S	0.0 ft	Northing:	1,350,634.13 usft	Latitude:	40.293080
	+E/-W	0.0 ft	Easting:	3,225,067.38 usft	Longitude:	-104.693150
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,802.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/6/2015	8.25	66.83	52,638

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	98.44	

Survey Program	Date	9/15/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
166.0	11,639.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.00	165.20	1.0	0.0	0.0	0.0	0.30	0.30	0.00	
SHL 890'FSL & 950'FWL										
5.4	0.02	165.20	5.4	0.0	0.0	0.0	0.30	0.30	0.00	
50'N/S Hardline (20I-312)										
166.0	0.50	165.20	166.0	-0.7	0.2	0.3	0.30	0.30	0.00	
259.0	0.50	179.80	259.0	-1.5	0.3	0.5	0.14	0.00	15.70	
351.0	0.40	219.90	351.0	-2.1	0.1	0.4	0.35	-0.11	43.59	
443.0	0.40	233.40	443.0	-2.6	-0.4	0.0	0.10	0.00	14.67	
536.0	0.50	229.80	536.0	-3.0	-0.9	-0.5	0.11	0.11	-3.87	

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Site:	Peschel 4N65W20B Pad Sec.20-T4N-R65W	MD Reference:	WELL @ 4815.0ft (Ensign Rig #134 - 13')
Well:	Peschel 20I-312	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
628.0	0.60	237.00	628.0	-3.6	-1.7	-1.1	0.13	0.11	7.83
720.0	0.90	236.10	720.0	-4.2	-2.7	-2.0	0.33	0.33	-0.98
813.0	1.10	237.00	813.0	-5.1	-4.0	-3.2	0.22	0.22	0.97
905.0	1.30	237.80	904.9	-6.2	-5.6	-4.7	0.22	0.22	0.87
1,016.0	1.20	257.30	1,015.9	-7.1	-7.8	-6.7	0.39	-0.09	17.57
1,108.0	3.30	257.50	1,107.8	-7.9	-11.4	-10.1	2.28	2.28	0.22
1,200.0	4.40	257.70	1,199.6	-9.2	-17.4	-15.9	1.20	1.20	0.22
1,293.0	6.00	240.30	1,292.2	-12.4	-25.1	-23.0	2.40	1.72	-18.71
1,385.0	7.20	241.70	1,383.6	-17.5	-34.4	-31.4	1.32	1.30	1.52
1,477.0	9.10	242.90	1,474.7	-23.5	-45.9	-42.0	2.07	2.07	1.30
1,570.0	9.20	240.50	1,566.5	-30.5	-58.9	-53.8	0.42	0.11	-2.58
1,662.0	9.00	235.40	1,657.4	-38.2	-71.3	-64.9	0.90	-0.22	-5.54
1,755.0	10.90	237.50	1,749.0	-47.1	-84.7	-76.8	2.08	2.04	2.26
1,847.0	11.60	239.80	1,839.2	-56.4	-100.0	-90.6	0.90	0.76	2.50
1,943.0	12.50	239.60	1,933.1	-66.5	-117.3	-106.3	0.94	0.94	-0.21
2,038.0	10.80	231.80	2,026.1	-77.2	-133.2	-120.4	2.44	-1.79	-8.21
2,133.0	11.10	231.70	2,119.4	-88.4	-147.3	-132.8	0.32	0.32	-0.11
2,228.0	10.60	236.40	2,212.7	-98.9	-161.8	-145.5	1.07	-0.53	4.95
2,324.0	9.30	243.40	2,307.3	-107.3	-176.1	-158.4	1.85	-1.35	7.29
2,419.0	10.30	247.70	2,400.9	-113.9	-190.8	-172.0	1.30	1.05	4.53
2,514.0	11.50	254.50	2,494.2	-119.7	-207.8	-188.0	1.85	1.26	7.16
2,610.0	13.90	260.00	2,587.8	-124.3	-228.4	-207.6	2.80	2.50	5.73
2,705.0	14.20	257.70	2,680.0	-128.7	-251.0	-229.4	0.67	0.32	-2.42
2,800.0	13.60	256.50	2,772.2	-133.8	-273.2	-250.6	0.70	-0.63	-1.26
2,896.0	15.70	255.60	2,865.1	-139.7	-296.8	-273.1	2.20	2.19	-0.94
2,991.0	12.90	248.50	2,957.1	-146.8	-319.1	-294.1	3.47	-2.95	-7.47
3,086.0	14.50	248.20	3,049.4	-155.1	-340.0	-313.6	1.69	1.68	-0.32
3,181.0	11.30	244.10	3,142.0	-163.6	-359.4	-331.5	3.50	-3.37	-4.32
3,276.0	10.50	237.60	3,235.3	-172.3	-375.1	-345.8	1.54	-0.84	-6.84
3,372.0	10.60	237.80	3,329.7	-181.6	-390.0	-359.1	0.11	0.10	0.21
3,467.0	11.50	237.60	3,422.9	-191.4	-405.4	-372.9	0.95	0.95	-0.21
3,562.0	12.10	239.40	3,515.9	-201.5	-421.9	-387.8	0.74	0.63	1.89
3,657.0	9.80	234.30	3,609.2	-211.3	-437.1	-401.3	2.62	-2.42	-5.37
3,753.0	11.20	242.20	3,703.6	-220.4	-452.0	-414.7	2.09	1.46	8.23
3,848.0	12.50	242.00	3,796.5	-229.6	-469.2	-430.4	1.37	1.37	-0.21
3,943.0	13.40	240.30	3,889.1	-239.8	-487.8	-447.3	1.03	0.95	-1.79
4,038.0	13.20	238.30	3,981.6	-251.0	-506.6	-464.3	0.53	-0.21	-2.11
4,133.0	13.70	239.60	4,074.0	-262.4	-525.6	-481.3	0.62	0.53	1.37
4,228.0	9.80	234.70	4,166.9	-272.8	-541.9	-495.9	4.23	-4.11	-5.16
4,323.0	10.90	241.30	4,260.4	-281.7	-556.4	-509.0	1.70	1.16	6.95
4,419.0	11.00	235.90	4,354.7	-291.2	-571.9	-522.9	1.07	0.10	-5.63
4,514.0	10.40	243.60	4,448.0	-300.1	-587.1	-536.6	1.63	-0.63	8.11

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Site:	Peschel 4N65W20B Pad Sec.20-T4N-R65W	MD Reference:	WELL @ 4815.0ft (Ensign Rig #134 - 13')
Well:	Peschel 20I-312	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,609.0	11.90	247.50	4,541.2	-307.7	-603.8	-552.1	1.77	1.58	4.11
4,704.0	10.70	248.90	4,634.4	-314.6	-621.1	-568.2	1.30	-1.26	1.47
4,800.0	10.70	253.30	4,728.7	-320.4	-637.9	-584.0	0.85	0.00	4.58
4,895.0	12.50	258.70	4,821.8	-324.9	-656.5	-601.6	2.21	1.89	5.68
4,990.0	7.90	262.40	4,915.2	-327.8	-673.0	-617.6	4.89	-4.84	3.89
5,086.0	8.10	257.50	5,010.3	-330.1	-686.2	-630.3	0.74	0.21	-5.10
5,181.0	9.90	244.70	5,104.1	-335.1	-700.1	-643.3	2.82	1.89	-13.47
5,276.0	10.50	236.20	5,197.6	-343.4	-714.7	-656.5	1.70	0.63	-8.95
5,371.0	11.00	236.60	5,291.0	-353.2	-729.4	-669.7	0.53	0.53	0.42
5,467.0	11.60	242.00	5,385.1	-362.8	-745.6	-684.3	1.27	0.63	5.63
5,562.0	12.00	238.20	5,478.1	-372.5	-762.4	-699.5	0.92	0.42	-4.00
5,657.0	10.60	238.00	5,571.3	-382.3	-778.2	-713.7	1.47	-1.47	-0.21
5,752.0	11.20	231.50	5,664.6	-392.7	-792.9	-726.6	1.44	0.63	-6.84
5,848.0	11.60	232.50	5,758.7	-404.3	-807.8	-739.7	0.46	0.42	1.04
5,943.0	12.80	234.80	5,851.5	-416.2	-824.0	-753.9	1.36	1.26	2.42
6,038.0	13.90	237.10	5,944.0	-428.5	-842.2	-770.1	1.29	1.16	2.42
6,134.0	9.80	230.60	6,037.9	-439.9	-858.2	-784.3	4.48	-4.27	-6.77
6,229.0	10.60	240.10	6,131.4	-449.4	-872.0	-796.6	1.96	0.84	10.00
6,324.0	11.80	239.10	6,224.6	-458.8	-887.9	-810.9	1.28	1.26	-1.05
6,420.0	7.40	200.70	6,319.3	-469.6	-898.5	-819.8	7.85	-4.58	-40.00
6,515.0	9.90	167.70	6,413.3	-483.3	-899.0	-818.2	5.74	2.63	-34.74
6,610.0	10.20	129.00	6,506.9	-496.6	-890.7	-808.1	6.98	0.32	-40.74
6,706.0	12.80	97.70	6,601.1	-503.4	-873.5	-790.1	6.93	2.71	-32.60
6,801.0	18.70	96.50	6,692.5	-506.5	-847.9	-764.4	6.22	6.21	-1.26
6,896.0	25.10	92.40	6,780.6	-509.1	-812.6	-729.1	6.92	6.74	-4.32
6,992.0	31.70	95.40	6,865.0	-512.3	-767.1	-683.6	7.03	6.88	3.13
7,087.0	38.10	95.30	6,942.8	-517.4	-713.0	-629.3	6.74	6.74	-0.11
7,182.0	48.30	95.80	7,012.0	-523.7	-648.4	-564.5	10.74	10.74	0.53
7,278.0	59.40	94.00	7,068.6	-530.2	-571.3	-487.2	11.66	11.56	-1.88
7,373.0	71.90	92.40	7,107.6	-535.0	-485.0	-401.2	13.25	13.16	-1.68
7,464.0	83.00	93.50	7,127.4	-539.6	-396.5	-312.9	12.25	12.20	1.21
7,507.0	89.14	93.50	7,130.3	-542.2	-353.7	-270.2	14.29	14.29	0.00
7"									
7,513.0	90.00	93.50	7,130.4	-542.6	-347.7	-264.2	14.29	14.29	0.00
7,557.0	89.50	93.90	7,130.6	-545.4	-303.8	-220.4	1.46	-1.14	0.91
Deepest TVD Drilled - 7130.6'									
7,652.0	91.80	92.60	7,129.5	-550.8	-208.9	-125.8	2.78	2.42	-1.37
7,747.0	91.30	92.30	7,126.9	-554.8	-114.1	-31.4	0.61	-0.53	-0.32
7,842.0	90.80	91.90	7,125.2	-558.3	-19.1	63.1	0.67	-0.53	-0.42
7,937.0	90.90	91.60	7,123.8	-561.2	75.8	157.4	0.33	0.11	-0.32
8,033.0	90.00	91.20	7,123.0	-563.6	171.8	252.7	1.03	-0.94	-0.42
8,128.0	91.20	91.60	7,122.0	-565.9	266.7	346.9	1.33	1.26	0.42
8,222.0	90.20	90.50	7,120.9	-567.6	360.7	440.1	1.58	-1.06	-1.17

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Well:	Peschel 20I-312	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,318.0	91.50	90.70	7,119.5	-568.6	456.7	535.2	1.37	1.35	0.21
8,413.0	91.20	91.40	7,117.2	-570.4	551.6	629.4	0.80	-0.32	0.74
8,508.0	91.70	90.00	7,114.8	-571.5	646.6	723.5	1.56	0.53	-1.47
8,603.0	91.70	90.50	7,112.0	-571.9	741.6	817.5	0.53	0.00	0.53
8,698.0	91.70	89.60	7,109.2	-572.0	836.5	911.5	0.95	0.00	-0.95
8,793.0	91.20	89.60	7,106.8	-571.4	931.5	1,005.3	0.53	-0.53	0.00
8,889.0	90.30	90.00	7,105.5	-571.0	1,027.5	1,100.2	1.03	-0.94	0.42
8,984.0	92.70	88.10	7,103.0	-569.4	1,122.4	1,193.9	3.22	2.53	-2.00
9,079.0	92.10	88.80	7,099.1	-566.9	1,217.3	1,287.3	0.97	-0.63	0.74
9,174.0	91.50	91.20	7,096.1	-566.9	1,312.3	1,381.3	2.60	-0.63	2.53
9,269.0	89.80	89.60	7,095.0	-567.5	1,407.2	1,475.3	2.46	-1.79	-1.68
9,364.0	90.40	88.90	7,094.8	-566.3	1,502.2	1,569.1	0.97	0.63	-0.74
9,460.0	90.60	87.50	7,094.0	-563.3	1,598.2	1,663.6	1.47	0.21	-1.46
9,555.0	90.70	88.90	7,092.9	-560.3	1,693.1	1,757.0	1.48	0.11	1.47
9,650.0	89.40	90.90	7,092.8	-560.1	1,788.1	1,851.0	2.51	-1.37	2.11
9,745.0	91.00	91.60	7,092.5	-562.2	1,883.1	1,945.2	1.84	1.68	0.74
9,840.0	90.80	91.20	7,091.0	-564.5	1,978.0	2,039.5	0.47	-0.21	-0.42
9,935.0	90.40	91.20	7,090.0	-566.5	2,073.0	2,133.7	0.42	-0.42	0.00
10,031.0	90.00	91.40	7,089.7	-568.7	2,169.0	2,229.0	0.47	-0.42	0.21
10,126.0	92.20	90.90	7,087.8	-570.6	2,263.9	2,323.2	2.37	2.32	-0.53
10,221.0	91.90	91.20	7,084.4	-572.3	2,358.9	2,417.3	0.45	-0.32	0.32
10,316.0	91.40	90.00	7,081.7	-573.3	2,453.8	2,511.4	1.37	-0.53	-1.26
10,411.0	91.30	90.50	7,079.5	-573.7	2,548.8	2,605.4	0.54	-0.11	0.53
10,506.0	92.00	88.90	7,076.7	-573.3	2,643.8	2,699.3	1.84	0.74	-1.68
10,601.0	92.20	89.30	7,073.3	-571.8	2,738.7	2,792.9	0.47	0.21	0.42
10,697.0	90.30	89.50	7,071.2	-570.8	2,834.6	2,887.7	1.99	-1.98	0.21
10,792.0	89.60	91.20	7,071.2	-571.3	2,929.6	2,981.8	1.94	-0.74	1.79
10,887.0	90.00	90.50	7,071.6	-572.7	3,024.6	3,075.9	0.85	0.42	-0.74
10,982.0	89.60	87.90	7,071.9	-571.4	3,119.6	3,169.7	2.77	-0.42	-2.74
11,077.0	91.10	89.50	7,071.3	-569.3	3,214.6	3,263.3	2.31	1.58	1.68
11,172.0	90.90	89.80	7,069.7	-568.7	3,309.6	3,357.2	0.38	-0.21	0.32
11,267.0	91.20	89.80	7,067.9	-568.4	3,404.5	3,451.1	0.32	0.32	0.00
11,363.0	90.90	90.00	7,066.2	-568.2	3,500.5	3,546.0	0.38	-0.31	0.21
11,458.0	90.20	90.00	7,065.3	-568.2	3,595.5	3,640.0	0.74	-0.74	0.00
11,553.0	91.10	88.60	7,064.2	-567.0	3,690.5	3,733.8	1.75	0.95	-1.47
11,582.0	91.20	88.60	7,063.6	-566.3	3,719.5	3,762.3	0.34	0.34	0.00
11,639.0	91.20	88.60	7,062.4	-564.9	3,776.5	3,818.5	0.00	0.00	0.00
BHL 316'FSL & 500'FEL									

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Peschel 20I-312
Project:	SEC.20-T4N-R65W	TVD Reference:	WELL @ 4815.0ft (Ensign Rig #134 - 13')
Site:	Peschel 4N65W20B Pad Sec.20-T4N-R65W	MD Reference:	WELL @ 4815.0ft (Ensign Rig #134 - 13')
Well:	Peschel 20I-312	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL 890'FSL & 950'FWL - hit/miss target - Shape - Point	0.00	0.00	1.0	0.0	0.0	1,350,634.15	3,225,067.38	40.293080	-104.693150
50'N/S Hardline (20I-312) - survey hits target center - Rectangle (sides W100.0 H3,910.1 D0.0)	0.00	0.00	1.0	-560.7	1,822.1	1,350,090.06	3,226,894.48	40.291541	-104.686619
BHL 316'FSL & 500'FEL - survey misses target center by 6.1ft at 11639.0ft MD (7062.4 TVD, -564.9 N, 3776.5 E) - Point	0.00	0.00	7,058.0	-560.7	3,777.2	1,350,107.82	3,228,849.39	40.291540	-104.679610

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,507.0	7,130.3	7"	7	7-1/2	

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
7,557.0	7,130.6	-545.4	-303.8	Deepest TVD Drilled - 7130.6'

Checked By: _____ Approved By: _____ Date: _____