

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Dillard 20R-443**

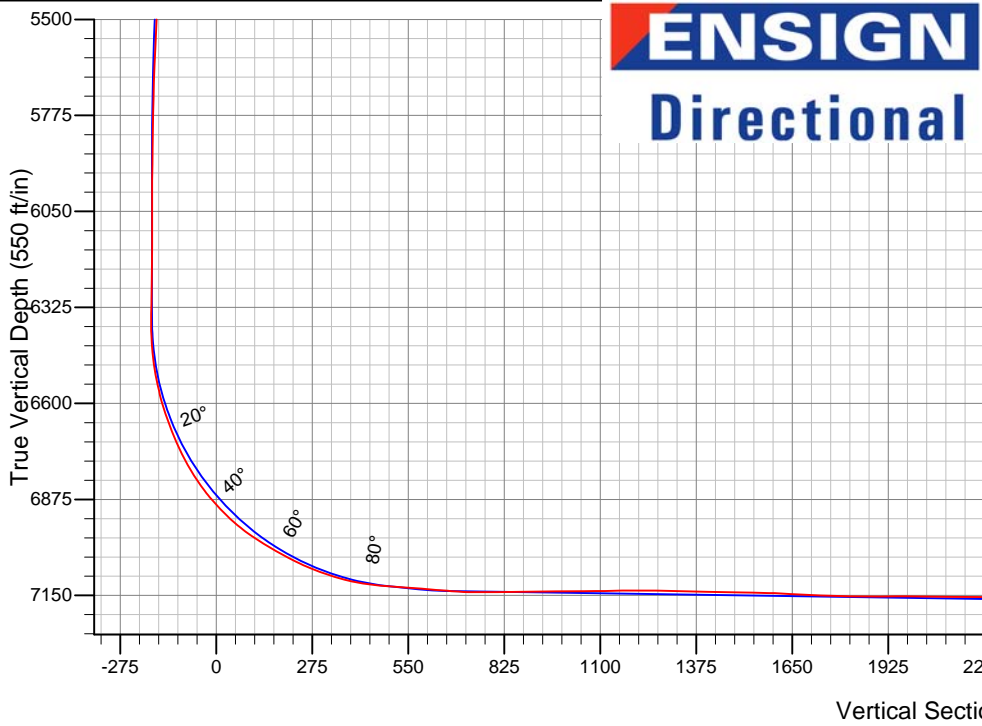
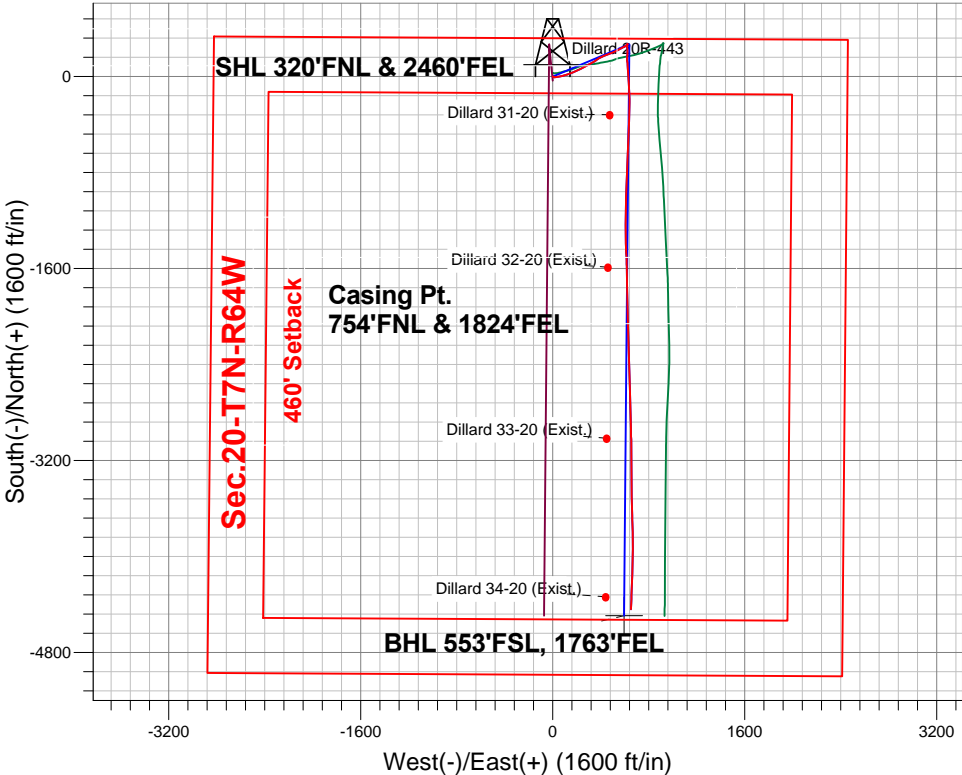
Surface Location: Dillard 20M-HZ Pad Sec.20-T7N-R64W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4899.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1449944.46	3257602.35	40.564800	-104.572800	
RKB - 15' WELL @ 4914.0ft (RKB - 15')						

FINAL SURVEY

Projected Bottom Hole Location  
11578'MD 7198'TVD 4440'S & 653 'E of SHL  
92.0 degree Incl @ 181.6 degree AZM



Dillard 20M-HZ Pad Sec.20-T7N-R64W Dillard 20R-443 Wellbore #1 7:32, September 30 2013	ANNOTATIONS
	No annotation data is available.
LEGEND	
<ul style="list-style-type: none"><li>Dillard 20R-303, Wellbore #1, Wellbore #1 V0</li><li>Dillard 20R-443, Wellbore #1, Plan #1 (9-18-13)R V0</li><li>Dillard 20M-203, Wellbore #1, Plan #1 (11-28-12) V0</li><li>Dillard 31-20 (Exist.), Wellbore #1, Design #1 V0</li><li>Dillard 32-20 (Exist.), Wellbore #1, Design #1 V0</li><li>Dillard 33-20 (Exist.), Wellbore #1, Design #1 V0</li><li>Dillard 34-20 (Exist.), Wellbore #1, Design #1 V0</li><li>Wellbore #1</li><li>Survey #1</li></ul>	

BHL 553'FSL, 1763'FEL



# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.20-T7N-R64W**

**Dillard 20M-HZ Pad Sec.20-T7N-R64W**

**Dillard 20R-443**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**30 September, 2013**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Dillard 20R-443
<b>Project:</b>	SEC.20-T7N-R64W	<b>TVD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Site:</b>	Dillard 20M-HZ Pad Sec.20-T7N-R64W	<b>MD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Well:</b>	Dillard 20R-443	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	SEC.20-T7N-R64W, Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site	Dillard 20M-HZ Pad Sec.20-T7N-R64W				
Site Position:		Northing:	1,449,911.68ft	Latitude:	40.564710
From:	Lat/Long	Easting:	3,257,602.69ft	Longitude:	-104.572800
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.60 °

Well	Dillard 20R-443					
Well Position	+N-S	0.0 ft	Northing:	1,449,944.46 ft	Latitude:	40.564800
	+E-W	0.0 ft	Easting:	3,257,602.35 ft	Longitude:	-104.572800
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,899.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	9/18/2013	8.47	67.14	52,999

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 (°)	
	7,195.0	0.0	0.0	172.46	

<b>Survey Program</b>	<b>Date</b>	9/30/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
146.0	11,578.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
146.0	1.20	93.40	146.0	-0.1	1.5	0.3	0.82	0.82	0.00	
237.0	1.50	83.10	237.0	0.0	3.7	0.5	0.42	0.33	-11.32	
329.0	0.50	94.20	328.9	0.1	5.3	0.6	1.10	-1.09	12.07	
421.0	0.90	113.30	420.9	-0.2	6.3	1.0	0.50	0.43	20.76	
513.0	1.00	126.50	512.9	-1.0	7.6	2.0	0.26	0.11	14.35	
605.0	0.90	112.20	604.9	-1.7	8.9	2.9	0.28	-0.11	-15.54	
697.0	1.40	108.20	696.9	-2.3	10.7	3.7	0.55	0.54	-4.35	
788.0	1.00	151.00	787.9	-3.4	12.1	4.9	1.05	-0.44	47.03	
901.0	0.60	274.00	900.9	-4.2	12.0	5.7	1.26	-0.35	108.85	
976.0	0.90	249.10	975.9	-4.4	11.1	5.8	0.58	0.40	-33.20	
1,068.0	0.40	202.40	1,067.9	-4.9	10.3	6.2	0.75	-0.54	-50.76	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Dillard 20R-443
<b>Project:</b>	SEC.20-T7N-R64W	<b>TVD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Site:</b>	Dillard 20M-HZ Pad Sec.20-T7N-R64W	<b>MD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Well:</b>	Dillard 20R-443	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

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)
1,160.0	1.90	87.70	1,159.8	-5.2	11.7	6.7	2.28	1.63	-124.67
1,255.0	4.40	83.30	1,254.7	-4.7	16.9	6.9	2.64	2.63	-4.63
1,350.0	6.70	82.70	1,349.2	-3.6	26.0	6.9	2.42	2.42	-0.63
1,445.0	8.70	82.20	1,443.4	-1.9	38.6	6.9	2.11	2.11	-0.53
1,540.0	9.30	84.00	1,537.2	-0.1	53.4	7.1	0.70	0.63	1.89
1,635.0	9.90	76.10	1,630.9	2.7	68.9	6.4	1.52	0.63	-8.32
1,730.0	10.40	76.30	1,724.4	6.7	85.2	4.6	0.53	0.53	0.21
1,825.0	10.00	76.50	1,817.9	10.6	101.5	2.8	0.42	-0.42	0.21
1,921.0	10.00	68.60	1,912.4	15.6	117.4	-0.1	1.43	0.00	-8.23
2,016.0	9.20	67.20	2,006.1	21.6	132.1	-4.0	0.88	-0.84	-1.47
2,111.0	8.40	66.20	2,100.0	27.3	145.4	-8.0	0.86	-0.84	-1.05
2,206.0	9.00	70.30	2,193.9	32.6	158.8	-11.5	0.91	0.63	4.32
2,301.0	9.50	67.70	2,287.7	38.1	173.0	-15.0	0.69	0.53	-2.74
2,397.0	9.10	68.00	2,382.4	43.9	187.4	-19.0	0.42	-0.42	0.31
2,492.0	9.70	66.70	2,476.1	49.9	201.7	-23.0	0.67	0.63	-1.37
2,587.0	9.20	67.60	2,569.8	56.0	216.1	-27.1	0.55	-0.53	0.95
2,682.0	8.70	61.30	2,663.7	62.3	229.4	-31.7	1.16	-0.53	-6.63
2,777.0	10.00	63.00	2,757.4	69.5	243.0	-37.0	1.40	1.37	1.79
2,873.0	9.80	62.90	2,852.0	77.0	257.7	-42.5	0.21	-0.21	-0.10
2,968.0	9.40	61.90	2,945.7	84.4	271.8	-48.0	0.46	-0.42	-1.05
3,063.0	9.80	58.80	3,039.3	92.2	285.5	-53.9	0.69	0.42	-3.26
3,158.0	9.50	59.60	3,133.0	100.3	299.2	-60.2	0.35	-0.32	0.84
3,253.0	10.10	62.50	3,226.6	108.2	313.4	-66.1	0.82	0.63	3.05
3,348.0	9.90	62.40	3,320.2	115.8	328.0	-71.7	0.21	-0.21	-0.11
3,443.0	9.40	63.00	3,413.8	123.1	342.2	-77.1	0.54	-0.53	0.63
3,538.0	8.00	56.90	3,507.7	130.2	354.6	-82.6	1.76	-1.47	-6.42
3,633.0	7.70	52.50	3,601.8	137.7	365.2	-88.6	0.71	-0.32	-4.63
3,730.0	7.70	52.50	3,698.0	145.6	375.5	-95.1	0.00	0.00	0.00
3,826.0	7.40	59.50	3,793.1	152.7	385.9	-100.7	1.01	-0.31	7.29
3,922.0	8.80	64.50	3,888.2	159.0	397.9	-105.4	1.63	1.46	5.21
4,017.0	9.80	67.00	3,981.9	165.3	411.9	-109.8	1.14	1.05	2.63
4,112.0	10.30	66.10	4,075.5	171.9	427.1	-114.3	0.55	0.53	-0.95
4,208.0	10.90	66.90	4,169.8	178.9	443.3	-119.2	0.64	0.63	0.83
4,302.0	11.00	68.50	4,262.1	185.7	459.8	-123.7	0.34	0.11	1.70
4,397.0	10.60	69.30	4,355.4	192.1	476.4	-127.9	0.45	-0.42	0.84
4,492.0	9.80	68.50	4,448.9	198.1	492.1	-131.8	0.86	-0.84	-0.84
4,587.0	8.90	69.00	4,542.7	203.7	506.5	-135.5	0.95	-0.95	0.53
4,682.0	8.10	67.40	4,636.6	208.9	519.5	-139.0	0.88	-0.84	-1.68
4,777.0	9.10	61.10	4,730.5	215.1	532.3	-143.4	1.44	1.05	-6.63
4,873.0	7.90	62.20	4,825.5	221.9	544.8	-148.5	1.26	-1.25	1.15
4,969.0	7.00	61.50	4,920.7	227.8	555.8	-152.9	0.94	-0.94	-0.73
5,064.0	5.90	60.80	5,015.1	232.9	565.1	-156.7	1.16	-1.16	-0.74
5,159.0	4.90	63.00	5,109.7	237.1	573.0	-159.9	1.07	-1.05	2.32
5,254.0	5.40	63.10	5,204.3	241.0	580.6	-162.7	0.53	0.53	0.11
5,350.0	5.80	66.60	5,299.8	245.0	589.1	-165.5	0.55	0.42	3.65
5,445.0	4.60	62.20	5,394.4	248.6	596.8	-168.2	1.33	-1.26	-4.63
5,540.0	4.70	55.70	5,489.1	252.6	603.4	-171.2	0.56	0.11	-6.84
5,635.0	4.70	52.70	5,583.8	257.2	609.7	-174.9	0.26	0.00	-3.16
5,729.0	3.70	49.70	5,677.5	261.5	615.1	-178.5	1.09	-1.06	-3.19
5,825.0	2.20	54.90	5,773.4	264.5	619.0	-181.0	1.59	-1.56	5.42
5,920.0	1.80	52.60	5,868.3	266.5	621.7	-182.6	0.43	-0.42	-2.42
6,014.0	0.70	74.70	5,962.3	267.5	623.4	-183.4	1.26	-1.17	23.51
6,109.0	0.30	71.60	6,057.3	267.8	624.2	-183.5	0.42	-0.42	-3.26

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<b>Site:</b>	Dillard 20M-HZ Pad Sec.20-T7N-R64W	<b>MD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Well:</b>	Dillard 20R-443	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

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)
6,205.0	0.40	329.60	6,153.3	268.1	624.2	-183.9	0.57	0.10	-106.25
6,300.0	0.90	321.60	6,248.3	269.0	623.6	-184.8	0.53	0.53	-8.42
6,364.0	1.10	326.10	6,312.3	269.9	623.0	-185.8	0.34	0.31	7.03
6,396.0	1.10	313.50	6,344.3	270.4	622.6	-186.3	0.75	0.00	-39.38
6,428.0	1.00	233.30	6,376.3	270.4	622.1	-186.4	4.23	-0.31	-250.63
6,459.0	2.50	192.40	6,407.3	269.6	621.8	-185.7	6.01	4.84	-131.94
6,491.0	4.60	189.40	6,439.2	267.6	621.4	-183.8	6.59	6.56	-9.38
6,523.0	6.80	184.30	6,471.1	264.5	621.0	-180.7	7.05	6.88	-15.94
6,555.0	9.10	181.50	6,502.7	260.1	620.8	-176.3	7.29	7.19	-8.75
6,586.0	11.40	179.40	6,533.2	254.6	620.8	-170.9	7.52	7.42	-6.77
6,618.0	13.60	177.60	6,564.5	247.6	621.0	-164.0	6.98	6.88	-5.63
6,650.0	15.80	176.70	6,595.4	239.5	621.4	-155.9	6.91	6.88	-2.81
6,681.0	18.00	176.50	6,625.1	230.5	621.9	-146.9	7.10	7.10	-0.65
6,713.0	20.00	178.70	6,655.4	220.1	622.4	-136.5	6.64	6.25	6.88
6,744.0	22.10	180.60	6,684.3	209.0	622.4	-125.5	7.12	6.77	6.13
6,776.0	24.40	181.00	6,713.7	196.4	622.2	-113.0	7.20	7.19	1.25
6,808.0	26.80	181.60	6,742.5	182.5	621.9	-99.3	7.54	7.50	1.88
6,840.0	28.90	182.30	6,770.8	167.6	621.4	-84.6	6.64	6.56	2.19
6,871.0	31.60	180.50	6,797.6	152.0	621.0	-69.2	9.19	8.71	-5.81
6,903.0	34.50	178.60	6,824.4	134.5	621.2	-51.9	9.62	9.06	-5.94
6,935.0	37.50	176.00	6,850.3	115.8	622.1	-33.1	10.52	9.38	-8.13
6,966.0	40.50	175.50	6,874.4	96.3	623.5	-13.6	9.73	9.68	-1.61
6,998.0	43.20	175.60	6,898.2	75.0	625.2	7.7	8.44	8.44	0.31
7,029.0	45.80	176.10	6,920.3	53.4	626.8	29.4	8.46	8.39	1.61
7,061.0	49.00	176.00	6,942.0	29.9	628.4	52.9	10.00	10.00	-0.31
7,093.0	52.60	175.80	6,962.2	5.1	630.2	77.6	11.26	11.25	-0.63
7,124.0	56.00	176.40	6,980.3	-20.0	631.9	102.7	11.08	10.97	1.94
7,156.0	58.20	176.90	6,997.7	-46.8	633.4	129.5	7.00	6.88	1.56
7,188.0	59.60	177.20	7,014.2	-74.2	634.9	156.8	4.45	4.38	0.94
7,219.0	61.10	177.00	7,029.6	-101.1	636.2	183.7	4.87	4.84	-0.65
7,251.0	62.70	177.50	7,044.6	-129.3	637.6	211.8	5.19	5.00	1.56
7,283.0	64.70	177.50	7,058.8	-157.9	638.8	240.4	6.25	6.25	0.00
7,315.0	67.40	178.30	7,071.8	-187.1	639.9	269.5	8.74	8.44	2.50
7,346.0	70.10	179.40	7,083.0	-216.0	640.5	298.2	9.32	8.71	3.55
7,378.0	72.40	180.30	7,093.3	-246.3	640.5	328.3	7.66	7.19	2.81
7,410.0	74.90	181.40	7,102.3	-277.0	640.1	358.6	8.48	7.81	3.44
7,441.0	77.90	181.20	7,109.6	-307.2	639.4	388.4	9.70	9.68	-0.65
7,473.0	81.10	181.20	7,115.4	-338.6	638.7	419.5	10.00	10.00	0.00
7,502.0	83.80	181.90	7,119.3	-367.3	638.0	447.9	9.61	9.31	2.41
7,569.0	85.70	182.10	7,125.4	-434.0	635.6	513.7	2.85	2.84	0.30
7,600.0	86.90	183.90	7,127.4	-464.9	634.0	544.1	6.97	3.87	5.81
7,630.0	86.10	182.90	7,129.2	-494.8	632.2	573.5	4.26	-2.67	-3.33
7,660.0	85.10	182.30	7,131.5	-524.7	630.9	602.9	3.88	-3.33	-2.00
7,691.0	85.10	182.90	7,134.2	-555.5	629.5	633.3	1.93	0.00	1.94
7,721.0	84.90	182.80	7,136.8	-585.4	628.0	662.7	0.74	-0.67	-0.33
7,752.0	87.00	183.10	7,139.0	-616.3	626.4	693.1	6.84	6.77	0.97
7,782.0	88.40	183.10	7,140.2	-646.2	624.8	722.6	4.67	4.67	0.00
7,813.0	89.70	182.50	7,140.7	-677.1	623.3	753.1	4.62	4.19	-1.94
7,844.0	90.50	182.40	7,140.6	-708.1	622.0	783.6	2.60	2.58	-0.32
7,874.0	91.00	181.50	7,140.2	-738.1	620.9	813.2	3.43	1.67	-3.00
7,905.0	91.30	181.60	7,139.6	-769.1	620.1	843.8	1.02	0.97	0.32
7,935.0	90.50	181.70	7,139.1	-799.1	619.2	873.4	2.69	-2.67	0.33
7,966.0	90.30	182.60	7,138.9	-830.0	618.1	904.0	2.97	-0.65	2.90
7,996.0	90.40	182.30	7,138.7	-860.0	616.8	933.5	1.05	0.33	-1.00

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<b>Site:</b>	Dillard 20M-HZ Pad Sec.20-T7N-R64W	<b>MD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Well:</b>	Dillard 20R-443	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

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)
8,027.0	90.30	182.10	7,138.6	-891.0	615.6	964.1	0.72	-0.32	-0.65
8,057.0	90.50	181.80	7,138.4	-921.0	614.6	993.7	1.20	0.67	-1.00
8,088.0	90.70	181.90	7,138.0	-952.0	613.6	1,024.2	0.72	0.65	0.32
8,118.0	90.70	181.50	7,137.7	-981.9	612.7	1,053.9	1.33	0.00	-1.33
8,149.0	90.70	181.90	7,137.3	-1,012.9	611.8	1,084.5	1.29	0.00	1.29
8,179.0	90.90	181.20	7,136.9	-1,042.9	610.9	1,114.1	2.43	0.67	-2.33
8,210.0	91.10	182.00	7,136.3	-1,073.9	610.1	1,144.7	2.66	0.65	2.58
8,240.0	90.40	181.50	7,135.9	-1,103.9	609.2	1,174.3	2.87	-2.33	-1.67
8,270.0	90.20	180.80	7,135.8	-1,133.9	608.6	1,203.9	2.43	-0.67	-2.33
8,301.0	89.30	179.90	7,135.9	-1,164.9	608.4	1,234.6	4.11	-2.90	-2.90
8,331.0	89.20	179.80	7,136.3	-1,194.9	608.5	1,264.4	0.47	-0.33	-0.33
8,362.0	89.30	179.40	7,136.7	-1,225.9	608.7	1,295.1	1.33	0.32	-1.29
8,392.0	88.70	179.40	7,137.2	-1,255.9	609.0	1,324.9	2.00	-2.00	0.00
8,422.0	88.30	178.90	7,138.0	-1,285.8	609.4	1,354.7	2.13	-1.33	-1.67
8,453.0	88.30	178.70	7,138.9	-1,316.8	610.1	1,385.5	0.64	0.00	-0.65
8,483.0	88.50	179.10	7,139.8	-1,346.8	610.7	1,415.3	1.49	0.67	1.33
8,514.0	88.90	178.60	7,140.5	-1,377.8	611.3	1,446.1	2.07	1.29	-1.61
8,544.0	89.00	179.20	7,141.0	-1,407.8	611.9	1,475.9	2.03	0.33	2.00
8,574.0	88.90	178.20	7,141.6	-1,437.8	612.5	1,505.7	3.35	-0.33	-3.33
8,605.0	89.20	178.30	7,142.1	-1,468.7	613.5	1,536.6	1.02	0.97	0.32
8,636.0	89.10	178.30	7,142.5	-1,499.7	614.4	1,567.4	0.32	-0.32	0.00
8,668.0	87.90	177.90	7,143.4	-1,531.7	615.5	1,599.2	3.95	-3.75	-1.25
8,700.0	86.80	178.30	7,144.9	-1,563.6	616.5	1,631.0	3.66	-3.44	1.25
8,733.0	86.60	177.30	7,146.8	-1,596.6	617.8	1,663.8	3.09	-0.61	-3.03
8,764.0	87.10	178.20	7,148.5	-1,627.5	619.0	1,694.7	3.32	1.61	2.90
8,796.0	87.80	178.80	7,149.9	-1,659.5	619.8	1,726.4	2.88	2.19	1.88
8,828.0	88.20	179.20	7,151.0	-1,691.4	620.4	1,758.2	1.77	1.25	1.25
8,860.0	88.70	179.50	7,151.9	-1,723.4	620.8	1,790.0	1.82	1.56	0.94
8,892.0	89.20	179.40	7,152.5	-1,755.4	621.1	1,821.7	1.59	1.56	-0.31
8,923.0	89.60	179.50	7,152.8	-1,786.4	621.4	1,852.5	1.33	1.29	0.32
8,955.0	90.00	179.30	7,152.9	-1,818.4	621.7	1,884.3	1.40	1.25	-0.63
8,987.0	90.40	179.20	7,152.8	-1,850.4	622.1	1,916.0	1.29	1.25	-0.31
9,018.0	90.00	179.10	7,152.7	-1,881.4	622.6	1,946.8	1.33	-1.29	-0.32
9,050.0	89.90	178.60	7,152.7	-1,913.4	623.2	1,978.6	1.59	-0.31	-1.56
9,082.0	89.50	178.70	7,152.9	-1,945.4	624.0	2,010.4	1.29	-1.25	0.31
9,113.0	89.60	178.60	7,153.1	-1,976.4	624.7	2,041.3	0.46	0.32	-0.32
9,145.0	89.50	178.90	7,153.4	-2,008.4	625.4	2,073.1	0.99	-0.31	0.94
9,177.0	89.10	178.10	7,153.8	-2,040.3	626.2	2,104.9	2.79	-1.25	-2.50
9,210.0	89.50	178.40	7,154.2	-2,073.3	627.2	2,137.7	1.52	1.21	0.91
9,241.0	89.60	177.80	7,154.4	-2,104.3	628.3	2,168.6	1.96	0.32	-1.94
9,273.0	89.70	178.40	7,154.6	-2,136.3	629.3	2,200.4	1.90	0.31	1.88
9,305.0	89.70	177.70	7,154.8	-2,168.3	630.4	2,232.3	2.19	0.00	-2.19
9,337.0	89.80	178.20	7,154.9	-2,200.3	631.6	2,264.1	1.59	0.31	1.56
9,369.0	90.10	178.00	7,154.9	-2,232.2	632.6	2,296.0	1.13	0.94	-0.63
9,400.0	89.80	178.80	7,155.0	-2,263.2	633.5	2,326.8	2.76	-0.97	2.58
9,432.0	89.90	178.40	7,155.0	-2,295.2	634.3	2,358.6	1.29	0.31	-1.25
9,464.0	89.90	178.70	7,155.1	-2,327.2	635.1	2,390.4	0.94	0.00	0.94
9,495.0	90.20	178.30	7,155.1	-2,358.2	635.9	2,421.3	1.61	0.97	-1.29
9,527.0	89.30	178.60	7,155.2	-2,390.2	636.8	2,453.1	2.96	-2.81	0.94
9,559.0	88.60	178.60	7,155.8	-2,422.2	637.5	2,484.9	2.19	-2.19	0.00
9,591.0	88.80	178.70	7,156.5	-2,454.1	638.3	2,516.7	0.70	0.63	0.31
9,623.0	88.10	177.80	7,157.4	-2,486.1	639.3	2,548.5	3.56	-2.19	-2.81
9,654.0	88.60	177.60	7,158.3	-2,517.1	640.5	2,579.4	1.74	1.61	-0.65

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Dillard 20R-443
<b>Project:</b>	SEC.20-T7N-R64W	<b>TVD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Site:</b>	Dillard 20M-HZ Pad Sec.20-T7N-R64W	<b>MD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Well:</b>	Dillard 20R-443	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

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)
9,686.0	88.30	178.20	7,159.2	-2,549.1	641.7	2,611.2	2.10	-0.94	1.88
9,718.0	88.40	178.00	7,160.1	-2,581.0	642.8	2,643.1	0.70	0.31	-0.63
9,750.0	88.40	178.40	7,161.0	-2,613.0	643.8	2,674.9	1.25	0.00	1.25
9,782.0	88.70	177.70	7,161.8	-2,645.0	644.8	2,706.7	2.38	0.94	-2.19
9,813.0	88.50	177.90	7,162.5	-2,675.9	646.0	2,737.6	0.91	-0.65	0.65
9,845.0	87.50	179.30	7,163.6	-2,707.9	646.8	2,769.4	5.37	-3.13	4.38
9,876.0	86.50	178.70	7,165.3	-2,738.9	647.4	2,800.1	3.76	-3.23	-1.94
9,908.0	86.00	178.00	7,167.4	-2,770.8	648.3	2,831.9	2.68	-1.56	-2.19
9,940.0	86.90	178.00	7,169.3	-2,802.7	649.4	2,863.7	2.81	2.81	0.00
9,971.0	87.40	178.10	7,170.9	-2,833.6	650.4	2,894.5	1.64	1.61	0.32
10,003.0	87.90	178.70	7,172.2	-2,865.6	651.3	2,926.3	2.44	1.56	1.88
10,034.0	88.30	178.70	7,173.2	-2,896.6	652.0	2,957.1	1.29	1.29	0.00
10,066.0	88.70	179.20	7,174.1	-2,928.6	652.6	2,988.9	2.00	1.25	1.56
10,098.0	88.80	179.40	7,174.8	-2,960.5	653.0	3,020.6	0.70	0.31	0.63
10,129.0	89.30	179.20	7,175.3	-2,991.5	653.4	3,051.4	1.74	1.61	-0.65
10,161.0	89.50	179.70	7,175.6	-3,023.5	653.7	3,083.2	1.68	0.63	1.56
10,193.0	89.50	179.60	7,175.9	-3,055.5	653.9	3,114.9	0.31	0.00	-0.31
10,224.0	89.00	178.90	7,176.3	-3,086.5	654.3	3,145.7	2.77	-1.61	-2.26
10,256.0	88.70	179.30	7,176.9	-3,118.5	654.8	3,177.5	1.56	-0.94	1.25
10,288.0	88.60	179.60	7,177.7	-3,150.5	655.1	3,209.2	0.99	-0.31	0.94
10,320.0	88.40	179.80	7,178.5	-3,182.5	655.3	3,241.0	0.88	-0.63	0.63
10,351.0	88.00	179.00	7,179.5	-3,213.5	655.6	3,271.7	2.88	-1.29	-2.58
10,383.0	87.30	179.10	7,180.8	-3,245.4	656.1	3,303.5	2.21	-2.19	0.31
10,415.0	87.10	179.60	7,182.4	-3,277.4	656.5	3,335.2	1.68	-0.63	1.56
10,446.0	87.40	179.40	7,183.9	-3,308.4	656.8	3,365.9	1.16	0.97	-0.65
10,478.0	88.40	179.90	7,185.0	-3,340.3	657.0	3,397.7	3.49	3.13	1.56
10,510.0	88.60	179.70	7,185.9	-3,372.3	657.1	3,429.4	0.88	0.63	-0.63
10,541.0	88.30	179.30	7,186.7	-3,403.3	657.3	3,460.2	1.61	-0.97	-1.29
10,574.0	88.40	179.40	7,187.7	-3,436.3	657.7	3,492.9	0.43	0.30	0.30
10,605.0	87.40	179.50	7,188.8	-3,467.3	658.0	3,523.6	3.24	-3.23	0.32
10,638.0	87.40	178.90	7,190.3	-3,500.2	658.5	3,556.4	1.82	0.00	-1.82
10,669.0	87.80	178.80	7,191.6	-3,531.2	659.1	3,587.2	1.33	1.29	-0.32
10,701.0	87.60	178.30	7,192.9	-3,563.2	659.9	3,619.0	1.68	-0.63	-1.56
10,733.0	87.50	177.80	7,194.2	-3,595.1	661.0	3,650.8	1.59	-0.31	-1.56
10,764.0	88.10	178.50	7,195.4	-3,626.1	662.0	3,681.6	2.97	1.94	2.26
10,796.0	89.00	179.20	7,196.2	-3,658.1	662.6	3,713.4	3.56	2.81	2.19
10,828.0	89.30	178.60	7,196.7	-3,690.1	663.3	3,745.2	2.10	0.94	-1.88
10,859.0	89.70	178.90	7,197.0	-3,721.1	663.9	3,776.0	1.61	1.29	0.97
10,891.0	89.70	178.30	7,197.2	-3,753.0	664.7	3,807.8	1.87	0.00	-1.88
10,923.0	89.30	178.20	7,197.4	-3,785.0	665.7	3,839.7	1.29	-1.25	-0.31
10,955.0	88.40	178.40	7,198.1	-3,817.0	666.6	3,871.5	2.88	-2.81	0.63
10,986.0	88.20	178.50	7,199.0	-3,848.0	667.5	3,902.3	0.72	-0.65	0.32
11,018.0	87.30	178.70	7,200.3	-3,879.9	668.3	3,934.1	2.88	-2.81	0.63
11,050.0	87.20	179.30	7,201.8	-3,911.9	668.8	3,965.8	1.90	-0.31	1.88
11,081.0	88.10	180.50	7,203.1	-3,942.9	668.9	3,996.6	4.84	2.90	3.87
11,113.0	88.30	181.50	7,204.1	-3,974.9	668.3	4,028.2	3.19	0.63	3.13
11,145.0	89.00	181.80	7,204.8	-4,006.8	667.4	4,059.8	2.38	2.19	0.94
11,176.0	89.40	181.60	7,205.3	-4,037.8	666.5	4,090.4	1.44	1.29	-0.65
11,208.0	89.80	181.50	7,205.5	-4,069.8	665.6	4,122.0	1.29	1.25	-0.31
11,240.0	90.60	181.90	7,205.4	-4,101.8	664.7	4,153.5	2.80	2.50	1.25
11,272.0	91.30	181.90	7,204.8	-4,133.8	663.6	4,185.1	2.19	2.19	0.00
11,303.0	91.70	181.90	7,204.0	-4,164.7	662.6	4,215.7	1.29	1.29	0.00
11,335.0	91.50	183.00	7,203.1	-4,196.7	661.2	4,247.2	3.49	-0.63	3.44



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Dillard 20R-443
<b>Project:</b>	SEC.20-T7N-R64W	<b>TVD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Site:</b>	Dillard 20M-HZ Pad Sec.20-T7N-R64W	<b>MD Reference:</b>	WELL @ 4914.0ft (RKB - 15')
<b>Well:</b>	Dillard 20R-443	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

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)
11,367.0	90.60	182.50	7,202.5	-4,228.7	659.7	4,278.7	3.22	-2.81	-1.56
11,398.0	90.50	182.30	7,202.3	-4,259.6	658.4	4,309.2	0.72	-0.32	-0.65
11,430.0	90.20	181.20	7,202.1	-4,291.6	657.4	4,340.8	3.56	-0.94	-3.44
11,462.0	90.70	181.90	7,201.8	-4,323.6	656.5	4,372.4	2.69	1.56	2.19
11,493.0	91.40	181.60	7,201.2	-4,354.6	655.6	4,402.9	2.46	2.26	-0.97
11,524.0	92.00	181.60	7,200.3	-4,385.6	654.7	4,433.5	1.94	1.94	0.00
11,578.0	92.00	181.60	7,198.4	-4,439.5	653.2	4,486.8	0.00	0.00	0.00

Checked By: _____	Approved By: _____	Date: _____
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