

# PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Brown 13-2H**

Surface Location: Brown 13-2H Pad Sec.2-T6N-R63W

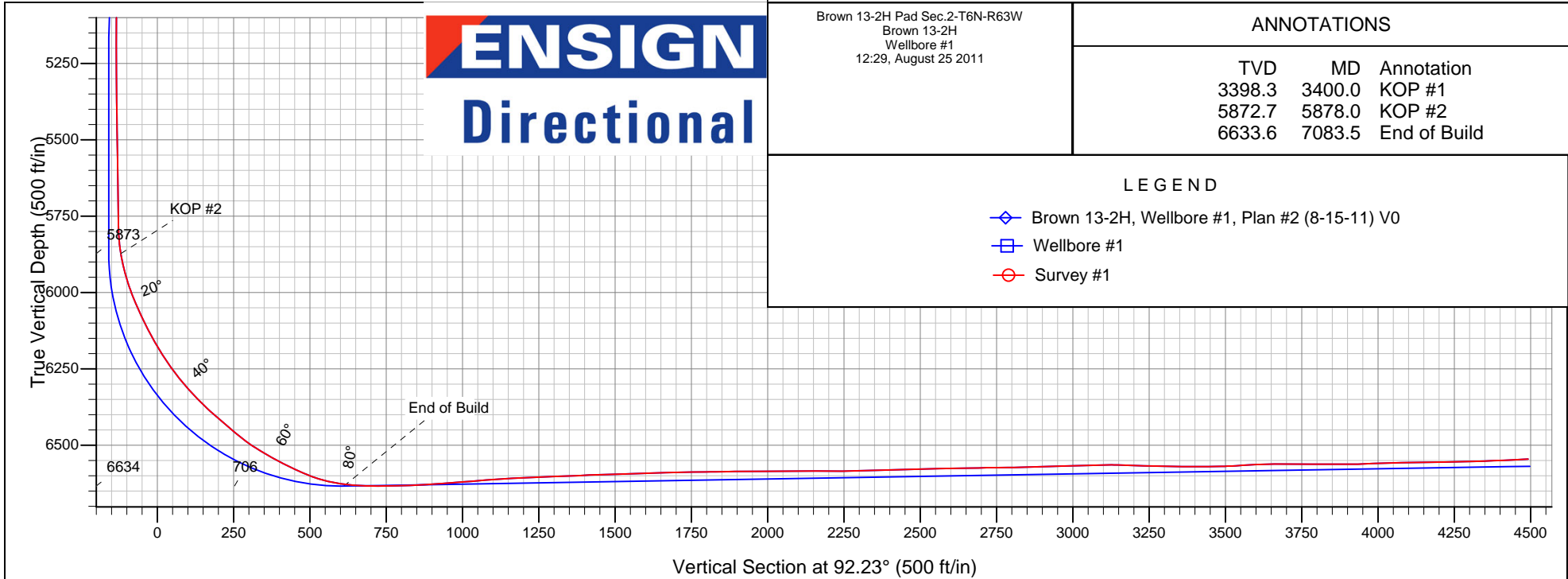
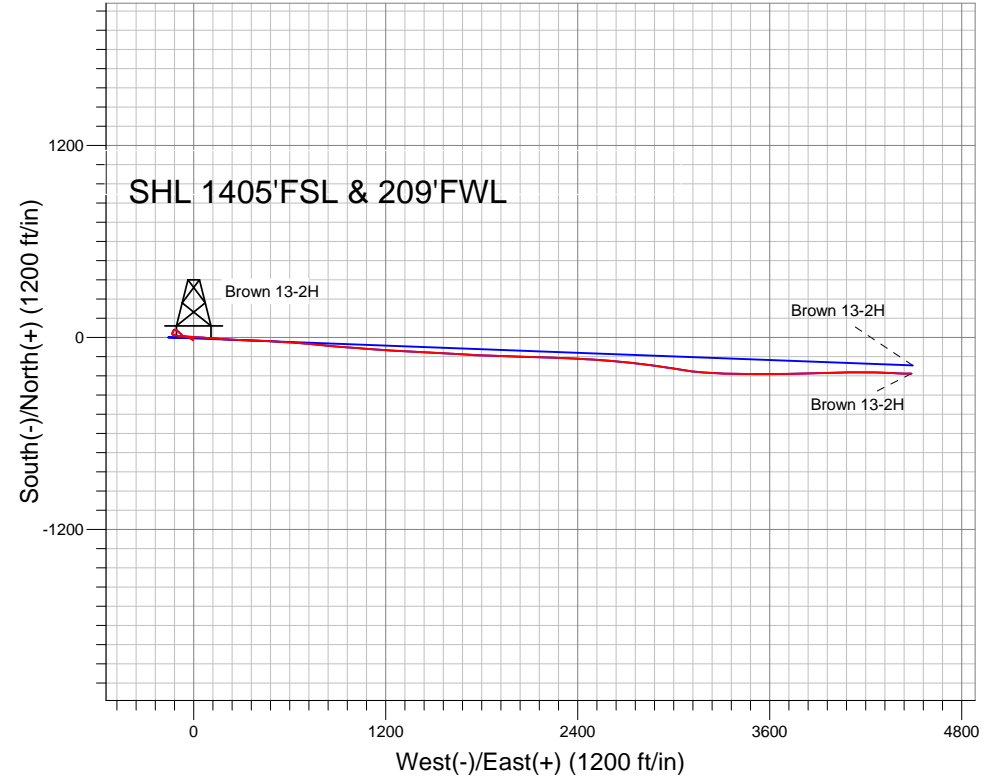
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4740.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1431435.08	3302386.04	40.512600	-104.412440	
RKB Ensign 32 - 15' WELL @ 4755.0ft (RKB Ensign 32 - 15')						

## FINAL SURVEY

Projected Bottom Hole Location  
10875' MD 6546' TVD 226' S & 4486' E of  
SHL  
93.0 degree Incl @ 91.4 degree AZM





## **Directional**

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.2-T6N-R63W**

**Brown 13-2H Pad Sec.2-T6N-R63W**

**Brown 13-2H**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**25 August, 2011**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Brown 13-2H
<b>Project:</b>	SEC.2-T6N-R63W	<b>TVD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Site:</b>	Brown 13-2H Pad Sec.2-T6N-R63W	<b>MD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Well:</b>	Brown 13-2H	<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.2-T6N-R63W, Weld County, Colorado		
<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	Brown 13-2H Pad Sec.2-T6N-R63W				
Site Position:		Northing:	1,431,435.10ft	Latitude:	40.512600
From:	Lat/Long	Easting:	3,302,386.04ft	Longitude:	-104.412440
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.70 °

Well	Brown 13-2H					
Well Position	+N-S	0.0 ft	Northing:	1,431,435.08 ft	Latitude:	40.512600
	+E-W	0.0 ft	Easting:	3,302,386.04 ft	Longitude:	-104.412440
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,740.0 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>
	IGRF200510	1/25/2011	8.69	67.22	53,290

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	92.23	

<b>Survey Program</b>	<b>Date</b>	8/25/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
912.0	10,875.0	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	
<b>500' Circle Kohlhoff 34-2 - 500' Circle Kohlhoff 33-2 - HARDLINE BHL 460'FEL - 500' Circle Kohlhoff 43-2 - 500' Circle Kc</b>										
0.2	0.00	251.20	0.2	0.0	0.0	0.0	0.00	0.00	0.00	
<b>HARDLINE SHL 460'FWL</b>										
912.0	0.80	251.20	912.0	-2.1	-6.0	-5.9	0.09	0.09	0.00	
1,004.0	1.10	157.60	1,004.0	-3.1	-6.3	-6.2	1.52	0.33	-101.74	
1,096.0	1.20	181.30	1,095.9	-4.9	-6.0	-5.8	0.52	0.11	25.76	
1,189.0	1.00	153.90	1,188.9	-6.6	-5.6	-5.4	0.60	-0.22	-29.46	
1,282.0	1.20	167.20	1,281.9	-8.2	-5.1	-4.8	0.35	0.22	14.30	
1,374.0	1.00	180.40	1,373.9	-10.0	-4.9	-4.5	0.35	-0.22	14.35	
1,467.0	0.60	178.70	1,466.9	-11.3	-4.9	-4.4	0.43	-0.43	-1.83	
1,559.0	1.00	165.10	1,558.9	-12.5	-4.6	-4.2	0.48	0.43	-14.78	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Brown 13-2H
<b>Project:</b>	SEC.2-T6N-R63W	<b>TVD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Site:</b>	Brown 13-2H Pad Sec.2-T6N-R63W	<b>MD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Well:</b>	Brown 13-2H	<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)
1,653.0	0.50	177.30	1,652.9	-13.7	-4.4	-3.9	0.56	-0.53	12.98
1,746.0	0.80	153.90	1,745.9	-14.7	-4.1	-3.5	0.42	0.32	-25.16
1,838.0	1.10	200.60	1,837.8	-16.1	-4.1	-3.5	0.87	0.33	50.76
1,932.0	0.70	310.00	1,931.8	-16.6	-4.9	-4.2	1.58	-0.43	116.38
2,025.0	1.40	353.30	2,024.8	-15.1	-5.5	-4.9	1.09	0.75	46.56
2,119.0	1.40	291.80	2,118.8	-13.5	-6.7	-6.1	1.52	0.00	-65.43
2,212.0	2.30	302.80	2,211.8	-12.1	-9.3	-8.8	1.04	0.97	11.83
2,305.0	1.60	288.80	2,304.7	-10.7	-12.1	-11.7	0.91	-0.75	-15.05
2,398.0	2.50	294.20	2,397.6	-9.4	-15.2	-14.8	0.99	0.97	5.81
2,491.0	2.90	306.80	2,490.5	-7.2	-18.9	-18.6	0.77	0.43	13.55
2,585.0	2.50	294.20	2,584.4	-4.9	-22.7	-22.5	0.76	-0.43	-13.40
2,678.0	2.40	300.20	2,677.3	-3.1	-26.2	-26.1	0.30	-0.11	6.45
2,770.0	3.50	287.80	2,769.2	-1.3	-30.5	-30.5	1.38	1.20	-13.48
2,863.0	3.20	284.60	2,862.1	0.2	-35.8	-35.7	0.38	-0.32	-3.44
2,957.0	3.60	288.90	2,955.9	1.9	-41.1	-41.1	0.50	0.43	4.57
3,050.0	3.40	280.70	3,048.7	3.3	-46.6	-46.7	0.58	-0.22	-8.82
3,143.0	3.40	277.60	3,141.6	4.2	-52.0	-52.1	0.20	0.00	-3.33
3,237.0	2.50	270.10	3,235.4	4.6	-56.8	-57.0	1.04	-0.96	-7.98
3,330.0	2.00	283.70	3,328.4	4.9	-60.4	-60.6	0.78	-0.54	14.62
3,400.0	2.07	288.96	3,398.3	5.6	-62.8	-63.0	0.29	0.10	7.51
KOP #1									
3,423.0	2.10	290.60	3,421.3	5.9	-63.6	-63.8	0.29	0.12	7.14
3,516.0	3.50	311.90	3,514.2	8.4	-67.3	-67.6	1.85	1.51	22.90
3,610.0	4.10	314.10	3,608.0	12.7	-71.9	-72.3	0.66	0.64	2.34
3,703.0	4.20	314.50	3,700.7	17.4	-76.7	-77.3	0.11	0.11	0.43
3,795.0	4.20	315.30	3,792.5	22.1	-81.4	-82.2	0.06	0.00	0.87
3,888.0	4.70	316.50	3,885.2	27.3	-86.5	-87.5	0.55	0.54	1.29
3,981.0	4.10	311.90	3,977.9	32.3	-91.6	-92.7	0.75	-0.65	-4.95
4,074.0	4.60	309.50	4,070.7	36.9	-96.9	-98.3	0.57	0.54	-2.58
4,168.0	3.40	311.20	4,164.4	41.1	-101.9	-103.4	1.28	-1.28	1.81
4,261.0	2.50	314.10	4,257.3	44.4	-105.4	-107.1	0.98	-0.97	3.12
4,354.0	3.00	287.00	4,350.2	46.5	-109.2	-111.0	1.48	0.54	-29.14
4,447.0	3.10	282.70	4,443.1	47.7	-114.0	-115.8	0.27	0.11	-4.62
4,540.0	3.00	256.20	4,536.0	47.7	-118.8	-120.6	1.51	-0.11	-28.49
4,634.0	2.30	237.70	4,629.9	46.1	-122.8	-124.5	1.17	-0.74	-19.68
4,727.0	2.50	224.80	4,722.8	43.7	-125.8	-127.4	0.62	0.22	-13.87
4,820.0	1.90	200.40	4,815.7	40.8	-127.8	-129.3	1.18	-0.65	-26.24
4,913.0	2.70	202.90	4,908.6	37.3	-129.2	-130.5	0.87	0.86	2.69
5,006.0	2.50	209.90	5,001.5	33.6	-131.0	-132.2	0.40	-0.22	7.53
5,099.0	2.70	191.70	5,094.4	29.7	-132.5	-133.5	0.91	0.22	-19.57
5,192.0	1.80	188.10	5,187.4	26.1	-133.1	-134.1	0.98	-0.97	-3.87
5,286.0	2.60	176.10	5,281.3	22.5	-133.2	-134.0	0.98	0.85	-12.77
5,379.0	2.00	154.60	5,374.2	18.9	-132.4	-133.0	1.12	-0.65	-23.12
5,472.0	0.90	93.50	5,467.2	17.4	-130.9	-131.5	1.88	-1.18	-65.70
5,565.0	1.20	146.20	5,560.2	16.5	-129.7	-130.2	1.04	0.32	56.67
5,658.0	0.90	108.70	5,653.2	15.5	-128.4	-128.9	0.79	-0.32	-40.32
5,722.0	0.90	149.10	5,717.2	14.9	-127.7	-128.2	0.97	0.00	63.13
5,754.0	0.60	117.40	5,749.2	14.6	-127.4	-127.9	1.57	-0.94	-99.06
5,785.0	1.50	115.20	5,780.2	14.4	-126.9	-127.4	2.91	2.90	-7.10
5,816.0	3.30	99.20	5,811.1	14.1	-125.7	-126.1	6.14	5.81	-51.61
5,847.0	6.30	94.00	5,842.0	13.8	-123.1	-123.5	9.77	9.68	-16.77
5,878.0	9.30	98.30	5,872.7	13.3	-118.9	-119.3	9.85	9.68	13.87
KOP #2									

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Brown 13-2H
<b>Project:</b>	SEC.2-T6N-R63W	<b>TVD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Site:</b>	Brown 13-2H Pad Sec.2-T6N-R63W	<b>MD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Well:</b>	Brown 13-2H	<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)
5,909.0	12.30	99.40	5,903.2	12.4	-113.2	-113.6	9.70	9.68	3.55
5,940.0	15.00	99.00	5,933.3	11.2	-106.0	-106.3	8.71	8.71	-1.29
5,971.0	17.50	98.90	5,963.1	9.9	-97.4	-97.7	8.07	8.06	-0.32
6,002.0	19.40	96.80	5,992.5	8.6	-87.7	-87.9	6.49	6.13	-6.77
6,033.0	21.80	96.30	6,021.5	7.3	-76.8	-77.1	7.76	7.74	-1.61
6,064.0	23.90	94.30	6,050.0	6.2	-64.8	-65.0	7.22	6.77	-6.45
6,095.0	25.90	93.50	6,078.2	5.3	-51.8	-52.0	6.54	6.45	-2.58
6,126.0	26.90	91.60	6,105.9	4.7	-38.1	-38.2	4.22	3.23	-6.13
6,157.0	28.60	92.40	6,133.4	4.2	-23.6	-23.8	5.61	5.48	2.58
6,189.0	29.80	93.80	6,161.3	3.4	-8.0	-8.2	4.31	3.75	4.38
6,220.0	31.00	94.20	6,188.0	2.3	7.6	7.5	3.93	3.87	1.29
6,251.0	32.70	94.00	6,214.4	1.1	23.9	23.9	5.49	5.48	-0.65
6,282.0	34.70	94.50	6,240.2	-0.2	41.1	41.0	6.51	6.45	1.61
6,313.0	37.20	93.70	6,265.3	-1.5	59.2	59.2	8.21	8.06	-2.58
6,344.0	39.90	93.00	6,289.5	-2.6	78.5	78.5	8.82	8.71	-2.26
6,375.0	41.60	93.20	6,313.0	-3.7	98.7	98.8	5.50	5.48	0.65
6,406.0	43.50	93.90	6,335.8	-5.0	119.6	119.7	6.32	6.13	2.26
6,437.0	45.10	94.80	6,358.0	-6.6	141.2	141.4	5.55	5.16	2.90
6,468.0	46.70	94.00	6,379.6	-8.3	163.4	163.6	5.48	5.16	-2.58
6,499.0	48.40	93.20	6,400.5	-9.8	186.2	186.5	5.80	5.48	-2.58
6,531.0	49.70	93.90	6,421.5	-11.3	210.4	210.6	4.39	4.06	2.19
6,562.0	49.90	95.10	6,441.5	-13.1	234.0	234.3	3.03	0.65	3.87
6,593.0	49.90	94.60	6,461.4	-15.1	257.6	258.0	1.23	0.00	-1.61
6,624.0	52.40	93.30	6,480.9	-16.8	281.7	282.1	8.70	8.06	-4.19
6,655.0	55.80	91.40	6,499.1	-17.8	306.8	307.2	12.04	10.97	-6.13
6,687.0	58.80	90.80	6,516.4	-18.3	333.7	334.1	9.51	9.38	-1.88
6,718.0	60.00	91.10	6,532.1	-18.8	360.4	360.8	3.96	3.87	0.97
6,749.0	61.40	91.20	6,547.3	-19.3	387.4	387.8	4.52	4.52	0.32
6,780.0	63.10	92.50	6,561.7	-20.2	414.8	415.3	6.62	5.48	4.19
6,811.0	64.70	93.50	6,575.4	-21.7	442.6	443.1	5.92	5.16	3.23
6,842.0	66.40	94.10	6,588.2	-23.5	470.8	471.3	5.76	5.48	1.94
6,873.0	68.70	93.50	6,600.0	-25.4	499.4	500.0	7.63	7.42	-1.94
6,904.0	72.50	93.20	6,610.3	-27.1	528.5	529.2	12.29	12.26	-0.97
6,935.0	76.90	93.70	6,618.5	-28.9	558.4	559.1	14.28	14.19	1.61
6,967.0	80.40	92.40	6,624.8	-30.6	589.7	590.4	11.64	10.94	-4.06
6,997.0	83.60	93.20	6,629.0	-32.0	619.4	620.1	10.99	10.67	2.67
7,029.0	86.20	94.70	6,631.8	-34.2	651.2	652.0	9.37	8.13	4.69
7,060.0	88.70	95.50	6,633.2	-37.0	682.0	682.9	8.47	8.06	2.58
7,083.5	89.20	95.22	6,633.6	-39.2	705.4	706.4	2.44	2.12	-1.21
End of Build									
7,126.0	90.10	94.70	6,633.9	-42.9	747.7	748.8	2.44	2.12	-1.21
7,157.0	91.80	96.10	6,633.4	-45.8	778.6	779.8	7.10	5.48	4.52
7,189.0	91.70	95.40	6,632.4	-49.0	810.4	811.7	2.21	-0.31	-2.19
7,222.0	92.90	95.60	6,631.1	-52.1	843.2	844.6	3.69	3.64	0.61
7,254.0	93.20	95.30	6,629.4	-55.2	875.1	876.5	1.32	0.94	-0.94
7,286.0	93.70	95.00	6,627.5	-58.0	906.9	908.4	1.82	1.56	-0.94
7,317.0	94.20	95.00	6,625.3	-60.7	937.7	939.3	1.61	1.61	0.00
7,349.0	94.50	94.00	6,622.9	-63.2	969.5	971.2	3.25	0.94	-3.13
7,380.0	94.40	93.90	6,620.5	-65.4	1,000.3	1,002.1	0.46	-0.32	-0.32
7,412.0	94.40	93.70	6,618.0	-67.5	1,032.2	1,034.0	0.62	0.00	-0.63
7,443.0	94.50	93.90	6,615.6	-69.5	1,063.0	1,064.9	0.72	0.32	0.65
7,474.0	94.50	94.40	6,613.2	-71.8	1,093.8	1,095.8	1.61	0.00	1.61
7,506.0	93.80	94.40	6,610.9	-74.2	1,125.6	1,127.7	2.19	-2.19	0.00

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<b>Site:</b>	Brown 13-2H Pad Sec.2-T6N-R63W	<b>MD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Well:</b>	Brown 13-2H	<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)
7,538.0	93.40	93.90	6,608.9	-76.5	1,157.5	1,159.6	2.00	-1.25	-1.56
7,570.0	93.10	93.50	6,607.1	-78.6	1,189.4	1,191.5	1.56	-0.94	-1.25
7,602.0	92.50	93.90	6,605.5	-80.7	1,221.3	1,223.5	2.25	-1.88	1.25
7,634.0	91.20	93.20	6,604.5	-82.6	1,253.2	1,255.5	4.61	-4.06	-2.19
7,665.0	92.10	93.20	6,603.6	-84.4	1,284.1	1,286.4	2.90	2.90	0.00
7,698.0	92.50	93.20	6,602.2	-86.2	1,317.0	1,319.4	1.21	1.21	0.00
7,730.0	92.10	93.80	6,601.0	-88.2	1,349.0	1,351.4	2.25	-1.25	1.88
7,762.0	93.00	93.50	6,599.5	-90.2	1,380.9	1,383.3	2.96	2.81	-0.94
7,794.0	92.60	92.80	6,598.0	-92.0	1,412.8	1,415.3	2.52	-1.25	-2.19
7,826.0	92.00	92.80	6,596.7	-93.5	1,444.7	1,447.3	1.88	-1.88	0.00
7,858.0	92.00	92.50	6,595.6	-95.0	1,476.7	1,479.2	0.94	0.00	-0.94
7,889.0	91.60	92.40	6,594.6	-96.3	1,507.6	1,510.2	1.33	-1.29	-0.32
7,921.0	91.60	93.10	6,593.7	-97.9	1,539.6	1,542.2	2.19	0.00	2.19
7,953.0	90.90	93.00	6,593.0	-99.6	1,571.5	1,574.2	2.21	-2.19	-0.31
7,984.0	91.30	93.00	6,592.4	-101.2	1,602.5	1,605.2	1.29	1.29	0.00
8,016.0	92.20	93.60	6,591.4	-103.0	1,634.4	1,637.2	3.38	2.81	1.88
8,048.0	92.40	93.20	6,590.2	-104.9	1,666.3	1,669.1	1.40	0.63	-1.25
8,080.0	91.70	93.60	6,589.0	-106.8	1,698.2	1,701.1	2.52	-2.19	1.25
8,112.0	91.60	94.20	6,588.1	-109.0	1,730.1	1,733.1	1.90	-0.31	1.88
8,144.0	90.10	92.20	6,587.6	-110.8	1,762.1	1,765.1	7.81	-4.69	-6.25
8,176.0	90.20	92.40	6,587.5	-112.1	1,794.1	1,797.1	0.70	0.31	0.63
8,208.0	91.30	91.80	6,587.1	-113.2	1,826.0	1,829.1	3.92	3.44	-1.88
8,240.0	90.40	91.50	6,586.6	-114.2	1,858.0	1,861.1	2.96	-2.81	-0.94
8,271.0	90.50	92.00	6,586.4	-115.1	1,889.0	1,892.1	1.64	0.32	1.61
8,303.0	90.60	92.60	6,586.1	-116.4	1,921.0	1,924.1	1.90	0.31	1.88
8,335.0	89.80	92.40	6,586.0	-117.8	1,953.0	1,956.1	2.58	-2.50	-0.63
8,367.0	90.60	91.90	6,585.9	-119.0	1,984.9	1,988.1	2.95	2.50	-1.56
8,398.0	90.10	90.80	6,585.7	-119.7	2,015.9	2,019.0	3.90	-1.61	-3.55
8,431.0	90.50	91.60	6,585.5	-120.4	2,048.9	2,052.0	2.71	1.21	2.42
8,463.0	90.40	91.30	6,585.2	-121.2	2,080.9	2,084.0	0.99	-0.31	-0.94
8,495.0	90.70	91.80	6,584.9	-122.1	2,112.9	2,116.0	1.82	0.94	1.56
8,527.0	90.10	92.00	6,584.7	-123.1	2,144.9	2,148.0	1.98	-1.88	0.63
8,559.0	90.20	91.80	6,584.6	-124.2	2,176.8	2,180.0	0.70	0.31	-0.63
8,591.0	89.10	91.80	6,584.8	-125.2	2,208.8	2,212.0	3.44	-3.44	0.00
8,624.0	90.20	91.90	6,585.0	-126.3	2,241.8	2,245.0	3.35	3.33	0.30
8,656.0	91.70	92.70	6,584.5	-127.6	2,273.8	2,277.0	5.31	4.69	2.50
8,687.0	91.80	92.50	6,583.5	-129.0	2,304.7	2,308.0	0.72	0.32	-0.65
8,719.0	91.60	92.60	6,582.6	-130.4	2,336.7	2,340.0	0.70	-0.63	0.31
8,751.0	90.80	92.90	6,581.9	-131.9	2,368.6	2,372.0	2.67	-2.50	0.94
8,783.0	91.60	92.60	6,581.3	-133.4	2,400.6	2,404.0	2.67	2.50	-0.94
8,815.0	92.50	93.90	6,580.1	-135.3	2,432.5	2,435.9	4.94	2.81	4.06
8,847.0	91.00	92.90	6,579.1	-137.2	2,464.5	2,467.9	5.63	-4.69	-3.13
8,877.0	91.50	93.20	6,578.5	-138.8	2,494.4	2,497.9	1.94	1.67	1.00
8,910.0	91.50	94.10	6,577.6	-140.9	2,527.3	2,530.9	2.73	0.00	2.73
8,943.0	90.90	94.80	6,576.9	-143.4	2,560.2	2,563.9	2.79	-1.82	2.12
8,975.0	90.90	95.20	6,576.4	-146.2	2,592.1	2,595.8	1.25	0.00	1.25
9,007.0	91.00	95.10	6,575.9	-149.1	2,624.0	2,627.8	0.44	0.31	-0.31
9,038.0	91.30	94.90	6,575.3	-151.8	2,654.8	2,658.7	1.16	0.97	-0.65
9,071.0	91.30	94.40	6,574.5	-154.5	2,687.7	2,691.7	1.51	0.00	-1.52
9,102.0	90.90	96.00	6,573.9	-157.3	2,718.6	2,722.6	5.32	-1.29	5.16
9,134.0	90.30	95.40	6,573.6	-160.4	2,750.4	2,754.6	2.65	-1.88	-1.88
9,166.0	90.20	96.00	6,573.5	-163.6	2,782.3	2,786.5	1.90	-0.31	1.88
9,198.0	91.70	97.60	6,572.9	-167.4	2,814.0	2,818.4	6.85	4.69	5.00

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Brown 13-2H
<b>Project:</b>	SEC.2-T6N-R63W	<b>TVD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Site:</b>	Brown 13-2H Pad Sec.2-T6N-R63W	<b>MD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Well:</b>	Brown 13-2H	<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)
9,230.0	92.00	98.90	6,571.9	-172.0	2,845.7	2,850.2	4.17	0.94	4.06
9,262.0	91.50	98.30	6,570.9	-176.8	2,877.3	2,882.0	2.44	-1.56	-1.88
9,293.0	91.60	98.30	6,570.1	-181.2	2,908.0	2,912.8	0.32	0.32	0.00
9,325.0	91.60	99.00	6,569.2	-186.1	2,939.6	2,944.6	2.19	0.00	2.19
9,357.0	91.50	99.00	6,568.3	-191.1	2,971.2	2,976.4	0.31	-0.31	0.00
9,389.0	91.60	98.80	6,567.5	-196.0	3,002.8	3,008.2	0.70	0.31	-0.63
9,422.0	91.60	99.00	6,566.5	-201.1	3,035.4	3,040.9	0.61	0.00	0.61
9,453.0	91.60	98.50	6,565.7	-205.8	3,066.0	3,071.7	1.61	0.00	-1.61
9,486.0	91.40	97.60	6,564.8	-210.5	3,098.7	3,104.5	2.79	-0.61	-2.73
9,517.0	89.70	94.90	6,564.5	-213.8	3,129.5	3,135.4	10.29	-5.48	-8.71
9,549.0	87.80	94.10	6,565.2	-216.3	3,161.4	3,167.4	6.44	-5.94	-2.50
9,582.0	87.80	94.00	6,566.5	-218.7	3,194.3	3,200.4	0.30	0.00	-0.30
9,614.0	88.20	94.20	6,567.6	-221.0	3,226.2	3,232.3	1.40	1.25	0.63
9,646.0	88.50	92.80	6,568.5	-222.9	3,258.1	3,264.3	4.47	0.94	-4.38
9,678.0	88.60	93.00	6,569.3	-224.5	3,290.0	3,296.3	0.70	0.31	0.63
9,710.0	88.80	93.20	6,570.0	-226.3	3,322.0	3,328.3	0.88	0.63	0.63
9,742.0	90.10	92.80	6,570.3	-227.9	3,353.9	3,360.3	4.25	4.06	-1.25
9,774.0	90.90	91.40	6,570.1	-229.1	3,385.9	3,392.3	5.04	2.50	-4.38
9,806.0	90.40	90.50	6,569.7	-229.6	3,417.9	3,424.3	3.22	-1.56	-2.81
9,837.0	90.10	89.20	6,569.6	-229.5	3,448.9	3,455.2	4.30	-0.97	-4.19
9,869.0	90.60	88.90	6,569.4	-229.0	3,480.9	3,487.2	1.82	1.56	-0.94
9,900.0	92.50	89.60	6,568.5	-228.6	3,511.9	3,518.1	6.53	6.13	2.26
9,932.0	94.00	90.50	6,566.7	-228.6	3,543.8	3,550.1	5.46	4.69	2.81
9,964.0	93.70	89.80	6,564.6	-228.7	3,575.8	3,582.0	2.38	-0.94	-2.19
9,996.0	92.20	90.60	6,562.9	-228.8	3,607.7	3,613.9	5.31	-4.69	2.50
10,029.0	91.10	89.60	6,562.0	-228.9	3,640.7	3,646.9	4.50	-3.33	-3.03
10,061.0	90.50	89.50	6,561.5	-228.6	3,672.7	3,678.8	1.90	-1.88	-0.31
10,093.0	89.60	89.10	6,561.5	-228.2	3,704.7	3,710.8	3.08	-2.81	-1.25
10,125.0	89.20	88.60	6,561.8	-227.6	3,736.7	3,742.7	2.00	-1.25	-1.56
10,157.0	89.50	88.60	6,562.2	-226.8	3,768.7	3,774.7	0.94	0.94	0.00
10,189.0	90.10	88.60	6,562.3	-226.0	3,800.7	3,806.6	1.88	1.88	0.00
10,221.0	90.50	88.50	6,562.1	-225.2	3,832.7	3,838.5	1.29	1.25	-0.31
10,253.0	89.80	88.80	6,562.1	-224.5	3,864.7	3,870.5	2.38	-2.19	0.94
10,284.0	89.70	88.40	6,562.2	-223.7	3,895.6	3,901.4	1.33	-0.32	-1.29
10,317.0	90.60	88.40	6,562.1	-222.8	3,928.6	3,934.3	2.73	2.73	0.00
10,348.0	92.40	88.70	6,561.3	-222.0	3,959.6	3,965.2	5.89	5.81	0.97
10,380.0	92.50	87.50	6,559.9	-221.0	3,991.6	3,997.1	3.76	0.31	-3.75
10,412.0	91.90	88.10	6,558.7	-219.7	4,023.5	4,029.0	2.65	-1.88	1.88
10,444.0	91.30	88.40	6,557.8	-218.8	4,055.5	4,060.9	2.10	-1.88	0.94
10,476.0	91.30	88.80	6,557.1	-218.0	4,087.5	4,092.9	1.25	0.00	1.25
10,508.0	91.00	89.70	6,556.4	-217.6	4,119.5	4,124.8	2.96	-0.94	2.81
10,539.0	90.30	90.90	6,556.1	-217.7	4,150.5	4,155.8	4.48	-2.26	3.87
10,571.0	90.60	91.40	6,555.8	-218.4	4,182.4	4,187.8	1.82	0.94	1.56
10,603.0	91.30	91.40	6,555.3	-219.1	4,214.4	4,219.8	2.19	2.19	0.00
10,635.0	91.00	91.60	6,554.7	-220.0	4,246.4	4,251.8	1.13	-0.94	0.63
10,667.0	91.10	91.40	6,554.1	-220.8	4,278.4	4,283.8	0.70	0.31	-0.63
10,699.0	91.80	91.70	6,553.3	-221.7	4,310.4	4,315.7	2.38	2.19	0.94
10,731.0	92.10	91.40	6,552.2	-222.5	4,342.3	4,347.7	1.33	0.94	-0.94
10,763.0	92.40	91.60	6,550.9	-223.4	4,374.3	4,379.7	1.13	0.94	0.63
10,795.0	92.30	91.80	6,549.6	-224.3	4,406.3	4,411.7	0.70	-0.31	0.63
10,829.0	93.00	91.40	6,548.0	-225.3	4,440.2	4,445.6	2.37	2.06	-1.18
10,875.0	93.00	91.40	6,545.6	-226.4	4,486.1	4,491.6	0.00	0.00	0.00
BHL 1313°FSL, 501°FEL									

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Brown 13-2H
<b>Project:</b>	SEC.2-T6N-R63W	<b>TVD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Site:</b>	Brown 13-2H Pad Sec.2-T6N-R63W	<b>MD Reference:</b>	WELL @ 4755.0ft (RKB Ensign 32 - 15')
<b>Well:</b>	Brown 13-2H	<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 Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
3,400.0	3,398.3	5.6	-62.8	KOP #1	
5,878.0	5,872.7	13.3	-118.9	KOP #2	
7,083.5	6,633.6	-39.2	705.4	End of Build	

Checked By: _____	Approved By: _____	Date: _____
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