

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sorin Natural Resources 2M-303**

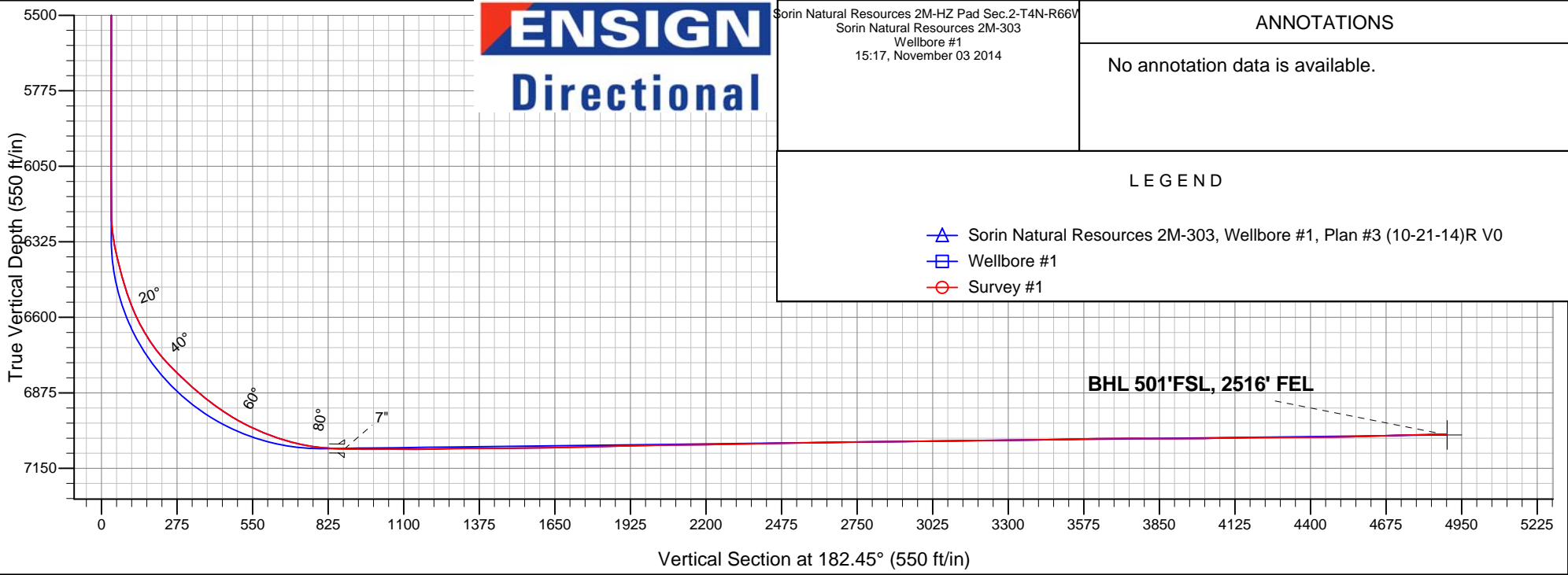
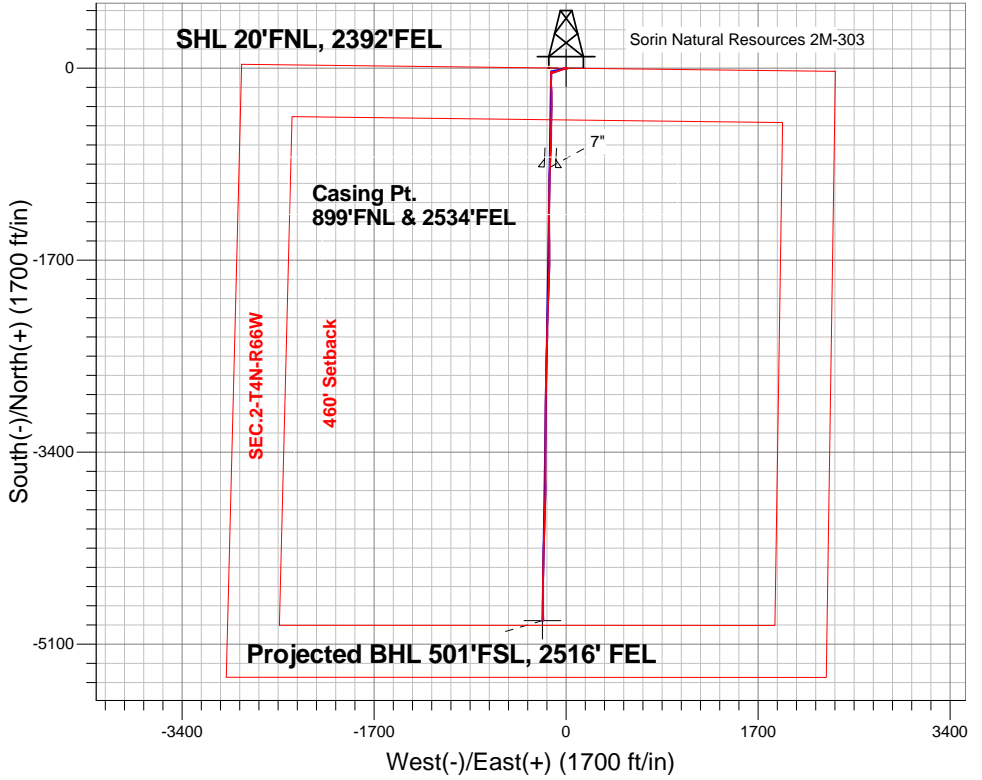
Surface Location: Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4673.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1370695.38	3210900.78	40.348490	-104.743320	
Ensign Rig #136 - RKB - 12.5' WELL @ 4685.5ft (Ensign Rig #136 - RKB - 12.5')						

FINAL SURVEY

Projected Bottom Hole Location
11575'MD 7025'TVD 4891'S & 202'W of SHL
91.5 degree Incl @ 179.0 degree AZM



Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W Sorin Natural Resources 2M-303 Wellbore #1 15:17, November 03 2014	ANNOTATIONS
	No annotation data is available.
LEGEND	
Sorin Natural Resources 2M-303, Wellbore #1, Plan #3 (10-21-14)R V0	
Wellbore #1	
Survey #1	



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.2-T4N-R66W

Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W

Sorin Natural Resources 2M-303

Wellbore #1

Survey: Survey #1

Standard Survey Report

03 November, 2014

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4685.5ft (Ensign Rig #136 - RKB - 12.5')
Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4685.5ft (Ensign Rig #136 - RKB - 12.5')
Well:	Sorin Natural Resources 2M-303	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.2-T4N-R66W, Weld County, 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		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W			
Site Position:		Northing:	1,370,695.40ft	Latitude:	40.348490
From:	Lat/Long	Easting:	3,210,900.78ft	Longitude:	-104.743320
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.49 °

Well	Sorin Natural Resources 2M-303					
Well Position	+N-S	0.0 ft	Northing:	1,370,695.38 ft	Latitude:	40.348490
	+E-W	0.0 ft	Easting:	3,210,900.78 ft	Longitude:	-104.743320
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,673.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/21/2014	8.40	66.90	52,755

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	182.45	

Survey Program	Date	11/3/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
39.0	11,575.0	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 (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.01	120.50	1.0	0.0	0.0	0.0	0.77	0.77	0.00	
SHL 20'FNL, 2392'FEL										
39.0	0.30	120.50	39.0	-0.1	0.1	0.0	0.77	0.77	0.00	
127.0	0.30	144.60	127.0	-0.4	0.4	0.3	0.14	0.00	27.39	
220.0	0.40	90.70	220.0	-0.6	0.9	0.5	0.35	0.11	-57.96	
314.0	0.50	175.70	314.0	-1.0	1.2	0.9	0.65	0.11	90.43	
407.0	0.20	269.40	407.0	-1.4	1.1	1.3	0.59	-0.32	100.75	
501.0	0.40	357.70	501.0	-1.1	0.9	1.0	0.47	0.21	93.94	
595.0	0.50	328.50	595.0	-0.4	0.7	0.3	0.26	0.11	-31.06	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
688.0	0.30	321.30	688.0	0.2	0.3	-0.2	0.22	-0.22	-7.74
782.0	0.40	297.90	782.0	0.5	-0.1	-0.5	0.18	0.11	-24.89
858.0	0.40	341.20	858.0	0.9	-0.4	-0.9	0.39	0.00	56.97
938.0	0.40	121.40	938.0	1.0	-0.3	-1.0	0.94	0.00	175.25
1,033.0	0.90	177.70	1,033.0	0.1	0.0	-0.1	0.80	0.53	59.26
1,128.0	0.60	191.70	1,128.0	-1.1	0.0	1.1	0.37	-0.32	14.74
1,223.0	0.70	183.50	1,223.0	-2.2	-0.2	2.2	0.14	0.11	-8.63
1,316.0	0.60	198.10	1,316.0	-3.2	-0.4	3.3	0.21	-0.11	15.70
1,413.0	0.10	7.50	1,413.0	-3.6	-0.5	3.7	0.72	-0.52	174.64
1,507.0	0.30	234.80	1,507.0	-3.7	-0.7	3.7	0.40	0.21	-141.17
1,601.0	0.50	332.00	1,601.0	-3.5	-1.1	3.5	0.65	0.21	103.40
1,694.0	0.30	200.20	1,694.0	-3.4	-1.4	3.4	0.79	-0.22	-141.72
1,788.0	0.60	215.60	1,788.0	-4.0	-1.7	4.1	0.34	0.32	16.38
1,882.0	0.40	172.60	1,881.9	-4.7	-2.0	4.8	0.44	-0.21	-45.74
1,975.0	0.40	339.90	1,974.9	-4.7	-2.0	4.8	0.85	0.00	179.89
2,069.0	0.40	125.50	2,068.9	-4.6	-1.9	4.7	0.81	0.00	154.89
2,162.0	1.00	104.00	2,161.9	-5.0	-0.8	5.0	0.69	0.65	-23.12
2,256.0	1.20	81.30	2,255.9	-5.0	0.9	5.0	0.51	0.21	-24.15
2,350.0	1.40	95.80	2,349.9	-5.0	3.0	4.9	0.41	0.21	15.43
2,443.0	1.30	87.70	2,442.9	-5.1	5.2	4.9	0.23	-0.11	-8.71
2,537.0	1.10	72.70	2,536.9	-4.8	7.2	4.5	0.39	-0.21	-15.96
2,659.0	0.80	75.50	2,658.8	-4.2	9.1	3.8	0.25	-0.25	2.30
2,749.0	1.60	292.30	2,748.8	-3.6	8.5	3.2	2.55	0.89	-159.11
2,840.0	1.80	303.70	2,839.8	-2.3	6.2	2.0	0.43	0.22	12.53
2,930.0	2.10	323.40	2,929.7	-0.2	4.0	0.0	0.81	0.33	21.89
3,020.0	2.00	287.40	3,019.7	1.6	1.5	-1.7	1.41	-0.11	-40.00
3,111.0	4.80	258.70	3,110.5	1.3	-3.7	-1.2	3.51	3.08	-31.54
3,201.0	5.20	240.60	3,200.2	-1.4	-11.0	1.9	1.80	0.44	-20.11
3,291.0	6.20	236.40	3,289.7	-6.1	-18.6	6.9	1.20	1.11	-4.67
3,382.0	4.70	250.30	3,380.3	-10.1	-26.2	11.2	2.18	-1.65	15.27
3,472.0	6.40	251.50	3,469.9	-12.9	-34.4	14.4	1.89	1.89	1.33
3,562.0	6.90	253.40	3,559.3	-16.1	-44.3	17.9	0.61	0.56	2.11
3,652.0	6.00	256.10	3,648.7	-18.7	-54.1	21.0	1.05	-1.00	3.00
3,743.0	8.30	248.30	3,739.0	-22.3	-64.8	25.0	2.74	2.53	-8.57
3,833.0	8.40	249.00	3,828.1	-27.1	-77.0	30.3	0.16	0.11	0.78
3,923.0	8.10	249.90	3,917.1	-31.6	-89.1	35.4	0.36	-0.33	1.00
4,014.0	6.90	251.30	4,007.3	-35.5	-100.3	39.8	1.33	-1.32	1.54
4,104.0	5.90	256.80	4,096.8	-38.3	-109.9	43.0	1.30	-1.11	6.11
4,195.0	4.30	267.20	4,187.4	-39.6	-117.8	44.6	2.02	-1.76	11.43
4,285.0	3.30	273.10	4,277.2	-39.6	-123.8	44.8	1.19	-1.11	6.56
4,376.0	1.60	302.80	4,368.1	-38.8	-127.5	44.2	2.27	-1.87	32.64
4,466.0	1.60	320.10	4,458.1	-37.1	-129.3	42.6	0.53	0.00	19.22
4,557.0	0.60	302.80	4,549.1	-35.9	-130.6	41.4	1.15	-1.10	-19.01
4,647.0	1.10	334.30	4,639.1	-34.9	-131.3	40.4	0.74	0.56	35.00
4,737.0	0.70	359.10	4,729.1	-33.5	-131.7	39.1	0.61	-0.44	27.56
4,827.0	0.80	11.60	4,819.1	-32.4	-131.6	38.0	0.21	0.11	13.89
4,918.0	0.40	42.20	4,910.1	-31.5	-131.3	37.1	0.55	-0.44	33.63
5,008.0	0.30	68.90	5,000.1	-31.2	-130.8	36.7	0.21	-0.11	29.67
5,099.0	0.40	73.30	5,091.1	-31.0	-130.3	36.5	0.11	0.11	4.84
5,189.0	0.30	87.20	5,181.0	-30.9	-129.8	36.4	0.14	-0.11	15.44
5,279.0	0.50	78.00	5,271.0	-30.8	-129.1	36.3	0.23	0.22	-10.22

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5,370.0	0.70	69.40	5,362.0	-30.5	-128.2	36.0	0.24	0.22	-9.45	
5,461.0	0.40	321.30	5,453.0	-30.1	-127.9	35.5	1.00	-0.33	-118.79	
5,551.0	0.80	271.20	5,543.0	-29.8	-128.7	35.3	0.69	0.44	-55.67	
5,642.0	0.70	270.80	5,634.0	-29.8	-129.9	35.3	0.11	-0.11	-0.44	
5,732.0	0.30	316.70	5,724.0	-29.6	-130.6	35.2	0.60	-0.44	51.00	
5,822.0	0.20	22.80	5,814.0	-29.3	-130.7	34.9	0.32	-0.11	73.44	
5,913.0	0.10	174.30	5,905.0	-29.3	-130.7	34.8	0.32	-0.11	166.48	
6,003.0	0.10	106.00	5,995.0	-29.4	-130.6	34.9	0.12	0.00	-75.89	
6,094.0	0.40	150.60	6,086.0	-29.6	-130.4	35.2	0.37	0.33	49.01	
6,184.0	0.10	246.90	6,176.0	-30.0	-130.3	35.5	0.47	-0.33	107.00	
6,229.0	0.60	197.90	6,221.0	-30.2	-130.4	35.7	1.20	1.11	-108.89	
6,274.0	4.50	177.00	6,266.0	-32.2	-130.4	37.7	8.77	8.67	-46.44	
6,320.0	8.70	175.00	6,311.7	-37.5	-130.0	43.0	9.14	9.13	-4.35	
6,365.0	12.00	179.40	6,355.9	-45.5	-129.6	51.0	7.54	7.33	9.78	
6,410.0	13.80	183.10	6,399.8	-55.6	-129.9	61.1	4.40	4.00	8.22	
6,455.0	15.10	183.70	6,443.4	-66.8	-130.5	72.3	2.91	2.89	1.33	
6,500.0	17.10	180.00	6,486.6	-79.2	-130.9	84.8	4.99	4.44	-8.22	
6,546.0	19.30	181.20	6,530.3	-93.6	-131.1	99.1	4.85	4.78	2.61	
6,591.0	22.80	183.80	6,572.3	-109.7	-131.8	115.3	8.05	7.78	5.78	
6,636.0	26.50	181.70	6,613.2	-128.5	-132.7	134.0	8.45	8.22	-4.67	
6,681.0	30.20	178.00	6,652.8	-149.8	-132.6	155.4	9.10	8.22	-8.22	
6,727.0	34.20	176.60	6,691.7	-174.3	-131.4	179.8	8.85	8.70	-3.04	
6,772.0	38.60	175.70	6,727.9	-201.0	-129.6	206.3	9.85	9.78	-2.00	
6,817.0	42.90	177.20	6,762.0	-230.3	-127.8	235.5	9.80	9.56	3.33	
6,862.0	45.20	179.80	6,794.3	-261.5	-127.0	266.7	6.50	5.11	5.78	
6,907.0	46.80	180.10	6,825.6	-293.9	-127.0	299.1	3.59	3.56	0.67	
6,953.0	49.20	181.90	6,856.4	-328.1	-127.6	333.2	5.97	5.22	3.91	
6,998.0	50.30	181.50	6,885.4	-362.4	-128.6	367.6	2.54	2.44	-0.89	
7,043.0	52.40	180.70	6,913.5	-397.5	-129.3	402.7	4.87	4.67	-1.78	
7,088.0	56.00	180.80	6,939.9	-434.0	-129.7	439.2	8.00	8.00	0.22	
7,134.0	59.30	180.80	6,964.5	-472.9	-130.3	478.0	7.17	7.17	0.00	
7,179.0	62.50	180.30	6,986.4	-512.2	-130.7	517.3	7.18	7.11	-1.11	
7,224.0	65.20	180.50	7,006.2	-552.6	-130.9	557.7	6.01	6.00	0.44	
7,269.0	68.20	180.80	7,024.0	-593.9	-131.4	599.0	6.69	6.67	0.67	
7,315.0	71.90	181.50	7,039.7	-637.1	-132.3	642.2	8.17	8.04	1.52	
7,360.0	74.70	182.60	7,052.6	-680.2	-133.8	685.3	6.65	6.22	2.44	
7,405.0	78.00	182.20	7,063.2	-723.9	-135.7	729.0	7.38	7.33	-0.89	
7,450.0	82.30	181.90	7,070.9	-768.2	-137.2	773.3	9.58	9.56	-0.67	
7,495.0	85.60	182.10	7,075.7	-812.9	-138.8	818.1	7.35	7.33	0.44	
7,524.0	87.00	182.40	7,077.5	-841.8	-139.9	847.0	4.94	4.83	1.03	
7,561.0	88.48	182.40	7,079.0	-878.7	-141.5	884.0	4.00	4.00	0.00	
7"										
7,584.0	89.40	182.40	7,079.4	-901.7	-142.5	907.0	4.00	4.00	0.00	
7,677.0	89.70	181.90	7,080.1	-994.7	-145.9	1,000.0	0.63	0.32	-0.54	
7,771.0	89.90	180.70	7,080.5	-1,088.6	-148.1	1,094.0	1.29	0.21	-1.28	
7,864.0	91.10	180.10	7,079.7	-1,181.6	-148.7	1,186.9	1.44	1.29	-0.65	
7,958.0	91.00	179.80	7,077.9	-1,275.6	-148.6	1,280.8	0.34	-0.11	-0.32	
8,065.0	89.90	180.00	7,077.1	-1,382.6	-148.5	1,387.7	1.04	-1.03	0.19	
8,156.0	90.70	180.00	7,076.6	-1,473.6	-148.5	1,478.6	0.88	0.88	0.00	
8,246.0	90.90	179.10	7,075.4	-1,563.6	-147.8	1,568.5	1.02	0.22	-1.00	
8,337.0	90.70	179.10	7,074.1	-1,654.6	-146.3	1,659.3	0.22	-0.22	0.00	

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8,427.0	91.50	181.20	7,072.4	-1,744.5	-146.6	1,749.2	2.50	0.89	2.33	
8,517.0	91.60	182.60	7,069.9	-1,834.5	-149.5	1,839.2	1.56	0.11	1.56	
8,608.0	91.60	182.40	7,067.4	-1,925.3	-153.5	1,930.1	0.22	0.00	-0.22	
8,698.0	90.70	181.90	7,065.6	-2,015.3	-156.9	2,020.1	1.14	-1.00	-0.56	
8,789.0	90.40	181.70	7,064.7	-2,106.2	-159.7	2,111.1	0.40	-0.33	-0.22	
8,879.0	91.20	181.20	7,063.5	-2,196.2	-162.0	2,201.1	1.05	0.89	-0.56	
8,969.0	91.10	181.00	7,061.6	-2,286.1	-163.7	2,291.0	0.25	-0.11	-0.22	
9,060.0	90.70	181.90	7,060.2	-2,377.1	-166.0	2,382.0	1.08	-0.44	0.99	
9,150.0	91.40	181.90	7,058.6	-2,467.0	-169.0	2,472.0	0.78	0.78	0.00	
9,240.0	90.90	181.50	7,056.8	-2,557.0	-171.7	2,562.0	0.71	-0.56	-0.44	
9,330.0	91.00	181.50	7,055.3	-2,646.9	-174.1	2,651.9	0.11	0.11	0.00	
9,421.0	90.40	181.40	7,054.2	-2,737.9	-176.4	2,742.9	0.67	-0.66	-0.11	
9,511.0	90.90	180.70	7,053.1	-2,827.9	-178.0	2,832.9	0.96	0.56	-0.78	
9,602.0	90.80	180.50	7,051.8	-2,918.8	-179.0	2,923.8	0.25	-0.11	-0.22	
9,692.0	90.50	180.50	7,050.8	-3,008.8	-179.7	3,013.8	0.33	-0.33	0.00	
9,783.0	90.80	179.80	7,049.7	-3,099.8	-180.0	3,104.7	0.84	0.33	-0.77	
9,873.0	90.70	180.10	7,048.6	-3,189.8	-179.9	3,194.6	0.35	-0.11	0.33	
9,963.0	90.70	180.80	7,047.5	-3,279.8	-180.6	3,284.5	0.78	0.00	0.78	
10,054.0	90.60	180.50	7,046.4	-3,370.8	-181.6	3,375.5	0.35	-0.11	-0.33	
10,144.0	91.40	180.30	7,044.9	-3,460.8	-182.3	3,465.4	0.92	0.89	-0.22	
10,234.0	90.90	180.50	7,043.0	-3,550.8	-182.9	3,555.3	0.60	-0.56	0.22	
10,325.0	90.90	178.90	7,041.6	-3,641.8	-182.4	3,646.2	1.76	0.00	-1.76	
10,415.0	90.00	180.30	7,040.9	-3,731.7	-181.8	3,736.1	1.85	-1.00	1.56	
10,506.0	89.40	181.40	7,041.4	-3,822.7	-183.1	3,827.1	1.38	-0.66	1.21	
10,596.0	90.30	181.90	7,041.6	-3,912.7	-185.7	3,917.1	1.14	1.00	0.56	
10,686.0	90.70	182.10	7,040.8	-4,002.6	-188.9	4,007.0	0.50	0.44	0.22	
10,777.0	91.10	182.20	7,039.4	-4,093.6	-192.3	4,098.0	0.45	0.44	0.11	
10,867.0	90.70	181.70	7,038.0	-4,183.5	-195.4	4,188.0	0.71	-0.44	-0.56	
10,958.0	90.50	181.70	7,037.0	-4,274.4	-198.1	4,279.0	0.22	-0.22	0.00	
11,049.0	90.00	181.20	7,036.6	-4,365.4	-200.4	4,370.0	0.78	-0.55	-0.55	
11,139.0	90.40	181.20	7,036.3	-4,455.4	-202.2	4,460.0	0.44	0.44	0.00	
11,229.0	91.80	180.30	7,034.6	-4,545.4	-203.4	4,549.9	1.85	1.56	-1.00	
11,320.0	91.70	180.30	7,031.8	-4,636.3	-203.9	4,640.8	0.11	-0.11	0.00	
11,410.0	91.40	179.80	7,029.4	-4,726.3	-204.0	4,730.7	0.65	-0.33	-0.56	
11,500.0	91.50	179.30	7,027.1	-4,816.3	-203.3	4,820.5	0.57	0.11	-0.56	
11,518.0	91.50	178.90	7,026.6	-4,834.3	-203.0	4,838.5	2.22	0.00	-2.22	
11,575.0	91.50	179.00	7,025.2	-4,891.2	-201.9	4,895.4	0.18	0.00	0.18	
BHL 500'FSL, 2523' FEL										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,561.0	7,079.0	7"	7	7-1/2	

Checked By: _____	Approved By: _____	Date: _____
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