

API 47-103-03017

**PHOENIX**  
TECHNOLOGY SERVICES



## **EQT Production- Middlesex**

**Wetzel County, WV**

**Wetzel County 515645**

**Well #515645**

**Main Wellbore**

**Design: 515645 As Drilled Surveys**

## **Standard Survey Report**

**22 June, 2015**

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WV Department of  
Environmental Protection

10/28/2016



# PHX Survey Report

<b>Database:</b> PHX 5000 1 Sample User CS <b>Company:</b> OT Production Services <b>Project:</b> OWSG Quarry #4 <b>Site:</b> OWSG Quarry #4 T1941 <b>Well:</b> Main Wellbore <b>Wellbore Design:</b> Main Wellbore T1941 No. OWSG Quarry	<b>Local Co-ordinate Reference:</b> US State Plane 1927 <b>TVD Reference:</b> NAD 1927 <b>MD Reference:</b> NAD 1927 <b>North Reference:</b> NAD 1927 <b>Survey Calculation Method:</b> Minimum Curvature	<b>Map System:</b> US State Plane 1927 (Exact solution) <b>Geo Datum:</b> NAD 1927 (NADCON CONUS) <b>Map Zone:</b> West Virginia North 4701
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<b>Project:</b> OWSG Quarry #4		
<b>Map System:</b> US State Plane 1927 (Exact solution)	<b>System Datum:</b> Mean Sea Level	
<b>Geo Datum:</b> NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b> West Virginia North 4701		Using geodetic scale factor

<b>Site:</b> OWSG Quarry #4					
<b>Site Position:</b>		<b>Northing:</b> 386,660.55 usft	<b>Latitude:</b> 39.56		
<b>From:</b> Map		<b>Easting:</b> 1,695,497.88 usft	<b>Longitude:</b> -80.58		
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b> 13-3/16 "	<b>Grid Convergence:</b> -0.69 °		

<b>Well:</b> OWSG Quarry #4					
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b> 386,660.55 usft	<b>Latitude:</b> 39° 33' 23.702 N	
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b> 1,695,497.88 usft	<b>Longitude:</b> 80° 34' 47.940 W	
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b> usft	<b>Ground Level:</b> 1,443.0 usft	

<b>Wellbore:</b> OWSG Quarry #4					
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (")</b>	<b>Dip Angle (")</b>	<b>Field Strength (nT)</b>
	HDGM	5/18/2015	-8.33	67.06	52,537

<b>Design:</b> OWSG Quarry #4					
<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (")</b>
		0.0	0.0	0.0	144.29

<b>Survey Program</b>		<b>Date:</b> 6/22/2015
<b>From (')</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>
0.00	4,398.0	515645 Gyrodata Gyros (Main Wellbore)
0.00	13,823.0	515645 PHX MWD (Main Wellbore)
		<b>Tool Name</b>
		GYD_DP_MS
		PHX+MWD+HDGM
		<b>Description</b>
		Gyrodata gyro-compassing and drop
		PHX+OWSG MWD + HDGM

<b>Survey:</b> OWSG Quarry #4											
Measured Depth (usft)	Inclination (")	Azimuth (")	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate ("/100usft)	Build Rate ("/100usft)	Turn Rate ("/100usft)	
0.0	0.00	0.00	0.0	-1,459.0	0.0	0.0	0.0	0.00	0.00	0.00	
103.0	0.12	251.97	103.0	-1,356.0	0.0	-0.1	0.0	0.12	0.12	0.00	
203.0	0.14	248.40	203.0	-1,256.0	-0.1	-0.3	-0.1	0.02	0.02	0.00	
303.0	0.11	263.73	303.0	-1,156.0	-0.2	-0.5	-0.2	0.04	-0.05	15.33	
403.0	0.10	231.70	403.0	-1,056.0	-0.2	-0.7	-0.2	0.03	0.03	13.20	
503.0	0.09	265.53	503.0	-956.0	-0.3	-0.8	-0.3	0.06	-0.01	63.83	
603.0	0.08	236.09	603.0	-856.0	-0.3	-1.0	-0.3	0.04	-0.01	29.74	
703.0	0.12	284.98	703.0	-756.0	-0.3	-1.1	-0.4	0.09	0.04	48.89	

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**PHX**  
Survey Report

Database:	ADM 3008 1 (Deep) User LK	Local Co-ordinate Reference:	See Wellbore Survey 310002
Company:	GT Production Services	TVD Reference:	True Vertical Depth
Project:	WV 3008 1 (Deep) User LK	MD Reference:	Measured Depth
Site:	WV 3008 1 (Deep) User LK	North Reference:	North
Well:	WV 3008 1 (Deep) User LK	Survey Calculation Method:	Minimum Curvature
Wellbore:	See Wellbore		
Design:	WV 3008 1 (Deep) User LK		

Survey											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
803.0	0.15	317.05	803.0	-656.0	-0.2	-1.3	-0.6	0.08	0.03	32.07	
903.0	0.31	310.17	903.0	-556.0	0.0	-1.6	-1.0	0.16	0.16	-6.88	
1,003.0	0.37	301.45	1,003.0	-456.0	0.4	-2.1	-1.5	0.08	0.06	-8.72	
1,103.0	0.40	302.00	1,103.0	-356.0	0.7	-2.7	-2.2	0.03	0.03	0.55	
1,203.0	0.46	300.80	1,203.0	-256.0	1.1	-3.3	-2.9	0.06	0.06	-1.20	
1,303.0	0.51	304.32	1,303.0	-156.0	1.6	-4.0	-3.6	0.06	0.05	3.52	
1,403.0	0.55	297.49	1,403.0	-56.0	2.1	-4.8	-4.5	0.07	0.04	-6.83	
1,503.0	0.55	304.08	1,503.0	44.0	2.6	-5.6	-5.4	0.06	0.00	6.59	
1,603.0	0.51	313.52	1,603.0	144.0	3.1	-6.4	-6.3	0.10	-0.04	9.44	
1,703.0	0.51	318.79	1,703.0	244.0	3.8	-7.0	-7.1	0.05	0.00	5.27	
1,803.0	0.47	322.89	1,803.0	344.0	4.4	-7.5	-8.0	0.05	-0.04	4.10	
1,903.0	0.47	335.39	1,903.0	444.0	5.1	-7.9	-8.8	0.10	0.00	12.50	
2,003.0	0.52	355.57	2,003.0	544.0	6.0	-8.1	-9.6	0.18	0.05	20.18	
2,103.0	0.56	354.77	2,103.0	644.0	6.9	-8.2	-10.4	0.04	0.04	-0.80	
2,203.0	0.79	342.60	2,202.9	743.9	8.0	-8.5	-11.5	0.27	0.23	-12.17	
2,303.0	0.95	340.85	2,302.9	843.9	9.5	-8.9	-12.9	0.16	0.16	-1.75	
2,403.0	1.22	334.69	2,402.9	943.9	11.2	-9.7	-14.8	0.29	0.27	-6.16	
2,503.0	1.58	329.71	2,502.9	1,043.9	13.4	-10.8	-17.2	0.38	0.36	-4.98	
2,603.0	1.89	326.55	2,602.8	1,143.8	15.9	-12.4	-20.2	0.32	0.31	-3.16	
2,703.0	2.57	326.57	2,702.8	1,243.8	19.2	-14.6	-24.1	0.68	0.68	0.02	
2,803.0	3.06	323.80	2,802.6	1,343.6	23.2	-17.4	-29.0	0.51	0.49	-2.77	
2,903.0	3.29	322.47	2,902.5	1,443.5	27.6	-20.7	-34.5	0.24	0.23	-1.33	
3,003.0	2.82	317.53	3,002.3	1,543.3	31.7	-24.1	-39.8	0.54	-0.47	-4.94	
3,103.0	1.94	318.17	3,102.3	1,643.3	34.8	-26.9	-44.0	0.88	-0.88	0.64	
3,203.0	1.35	311.86	3,202.2	1,743.2	36.9	-28.9	-46.8	0.82	-0.59	-6.31	
3,303.0	0.94	306.71	3,302.2	1,843.2	38.1	-30.5	-48.7	0.42	-0.41	-5.15	
3,403.0	0.76	319.39	3,402.2	1,943.2	39.1	-31.5	-50.2	0.26	-0.18	12.68	
3,503.0	0.73	319.64	3,502.2	2,043.2	40.1	-32.4	-51.5	0.03	-0.03	0.25	
3,603.0	0.77	328.50	3,602.2	2,143.2	41.2	-33.1	-52.8	0.12	0.04	8.86	
3,703.0	0.77	334.53	3,702.2	2,243.2	42.4	-33.8	-54.1	0.08	0.00	6.03	
3,803.0	0.68	338.64	3,802.2	2,343.2	43.5	-34.3	-55.4	0.10	-0.09	4.11	
3,903.0	0.79	337.10	3,902.1	2,443.1	44.7	-34.8	-56.6	0.11	0.11	-1.54	
4,003.0	0.81	333.99	4,002.1	2,543.1	46.0	-35.4	-58.0	0.05	0.02	-3.11	
4,103.0	0.85	331.00	4,102.1	2,643.1	47.3	-36.0	-59.4	0.06	0.04	-2.99	
4,203.0	0.89	331.40	4,202.1	2,743.1	48.6	-36.8	-60.9	0.04	0.04	0.40	
4,303.0	0.88	326.52	4,302.1	2,843.1	49.9	-37.6	-62.4	0.08	-0.01	-4.88	
4,398.0	0.91	330.30	4,397.1	2,938.1	51.2	-38.3	-63.9	0.07	0.03	3.98	
4,422.0	0.80	285.80	4,421.1	2,962.1	51.4	-38.6	-64.2	2.75	0.46	165.42	
4,454.0	1.90	243.90	4,453.1	2,994.1	51.2	-39.3	-64.5	4.41	3.44	-130.84	
4,485.0	3.10	234.20	4,484.1	3,025.1	50.5	-40.4	-64.6	4.09	3.87	31.29	
4,517.0	4.50	223.40	4,516.0	3,057.0	49.1	-42.0	-64.4	4.89	4.38	33.75	

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# PHX Survey Report

Database: Company: Project: Site: Well: Wellbore: Design:	Local Co-ordinate Reference: TVD Reference: MD Reference: North Reference: Survey Calculation Method:	TVD Reference: MD Reference: North Reference: Survey Calculation Method:
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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,548.0	5.70	225.60	4,546.9	3,087.9	47.1	-43.9	-63.9	3.92	3.87	7.10
4,580.0	4.80	246.90	4,578.7	3,119.7	45.5	-46.3	-63.9	6.66	-2.81	66.56
4,611.0	5.40	264.10	4,609.6	3,150.6	44.8	-48.9	-65.0	5.27	1.94	55.48
4,643.0	5.30	282.00	4,641.5	3,182.5	45.0	-51.9	-66.8	5.20	-0.31	55.94
4,674.0	6.70	297.20	4,672.3	3,213.3	46.1	-54.9	-69.5	6.78	4.52	49.03
4,706.0	8.30	304.00	4,704.0	3,245.0	48.2	-58.5	-73.3	5.71	5.00	21.25
4,738.0	9.30	314.00	4,735.6	3,276.6	51.3	-62.2	-78.0	5.70	3.13	31.25
4,769.0	10.50	323.40	4,766.2	3,307.2	55.3	-65.7	-83.3	6.48	3.87	30.32
4,801.0	11.70	331.80	4,797.6	3,338.6	60.5	-69.0	-89.4	6.28	3.75	26.25
4,832.0	12.60	342.00	4,827.9	3,368.9	66.5	-71.5	-95.8	7.50	2.90	32.90
4,864.0	12.90	352.20	4,859.1	3,400.1	73.4	-73.1	-102.2	7.09	0.94	31.88
4,895.0	13.00	3.30	4,889.3	3,430.3	80.3	-73.4	-108.0	8.02	0.32	35.81
4,927.0	13.40	14.20	4,920.5	3,461.5	87.5	-72.2	-113.2	7.87	1.25	34.06
4,958.0	13.60	25.10	4,950.6	3,491.6	94.3	-69.8	-117.3	8.22	0.65	35.16
4,990.0	13.40	37.10	4,981.8	3,522.8	100.6	-66.0	-120.2	8.78	-0.63	37.50
5,021.0	14.20	46.20	5,011.9	3,552.9	106.1	-61.1	-121.8	7.45	2.58	29.35
5,053.0	15.30	53.80	5,042.8	3,583.8	111.3	-54.8	-122.4	6.95	3.44	23.75
5,084.0	16.40	59.20	5,072.6	3,613.6	116.0	-47.8	-122.1	5.93	3.55	17.42
5,116.0	18.50	62.10	5,103.2	3,644.2	120.7	-39.4	-121.0	7.10	6.56	9.06
5,147.0	19.70	62.90	5,132.5	3,673.5	125.4	-30.4	-119.5	3.96	3.87	2.58
5,179.0	22.00	64.30	5,162.4	3,703.4	130.4	-20.2	-117.7	7.35	7.19	4.38
5,210.0	23.30	65.70	5,191.0	3,732.0	135.5	-9.4	-115.5	4.54	4.19	4.52
5,242.0	24.60	68.60	5,220.2	3,761.2	140.5	2.6	-112.6	5.48	4.06	9.06
5,273.0	25.80	71.40	5,248.3	3,789.3	145.0	15.0	-109.0	5.46	3.87	9.03
5,305.0	27.40	73.70	5,276.9	3,817.9	149.3	28.7	-104.5	5.95	5.00	7.19
5,336.0	28.80	74.90	5,304.2	3,845.2	153.2	42.7	-99.5	4.87	4.52	3.87
5,368.0	30.70	75.70	5,332.0	3,873.0	157.3	58.1	-93.8	6.07	5.94	2.50
5,399.0	32.30	76.70	5,358.4	3,899.4	161.1	73.8	-87.8	5.43	5.16	3.23
5,429.0	34.00	77.60	5,383.6	3,924.6	164.8	89.8	-81.4	5.90	5.67	3.00
5,460.0	35.80	78.70	5,409.0	3,950.0	168.4	107.2	-74.2	6.15	5.81	3.55
5,492.0	38.50	81.70	5,434.5	3,975.5	171.7	126.2	-65.8	10.16	8.44	9.38
5,523.0	41.50	84.40	5,458.2	3,999.2	174.1	146.0	-56.2	11.18	9.68	8.71
5,586.0	46.30	86.80	5,503.6	4,044.6	177.4	189.5	-33.4	8.06	7.62	3.81
5,650.0	46.00	86.10	5,548.0	4,089.0	180.3	235.6	-8.9	0.92	-0.47	-1.09
5,713.0	46.60	86.80	5,591.5	4,132.5	183.1	281.0	15.4	1.25	0.95	1.11
5,776.0	46.60	85.60	5,634.8	4,175.8	186.1	326.7	39.6	1.38	0.00	-1.90
5,839.0	45.70	87.50	5,678.4	4,219.4	188.8	372.1	63.8	2.60	0.00	8.92
5,902.0	45.50	87.50	5,722.5	4,263.5	190.8	417.0	88.4	0.32	-0.32	0.00
5,965.0	45.30	86.60	5,766.7	4,307.7	193.1	461.8	112.7	0.00	0.00	0.00
6,029.0	45.10	88.10	5,811.8	4,352.8	195.2	507.2	137.5	1.69	-0.31	2.34
6,092.0	44.80	88.80	5,856.4	4,397.4	196.4	551.7	162.5	0.92	0.00	0.00
6,155.0	42.60	87.20	5,902.0	4,443.0	197.9	595.2	186.6	3.91	-3.49	-2.54

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# PHX Survey Report

Database: <b>00000000000000000000</b> Company: <b>PHX Technology Services</b> Project: <b>00000000000000000000</b> Site: <b>00000000000000000000</b> Well: <b>00000000000000000000</b> Wellbore: <b>00000000000000000000</b> Design: <b>00000000000000000000</b>	Local Co-ordinate Reference: TVD Reference: MD Reference: North Reference: Survey Calculation Method:	00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000 00000000000000000000
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Survey											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
6,218.0	41.30	85.90	5,948.8	4,489.8	200.5	637.2	209.1	2.48	-2.06	-2.06	
6,281.0	42.80	85.00	5,995.6	4,536.6	203.8	679.3	230.9	2.57	2.38	-1.43	
6,344.0	44.10	83.90	6,041.3	4,582.3	208.0	722.4	252.7	2.39	2.06	-1.75	
6,407.0	43.30	83.00	6,086.9	4,627.9	213.0	765.6	273.9	1.61	-1.27	-1.43	
6,470.0	44.20	84.40	6,132.4	4,673.4	217.7	808.9	295.3	2.10	1.43	2.22	
6,533.0	44.50	85.90	6,177.4	4,718.4	221.5	852.8	317.9	1.73	0.48	2.38	
6,596.0	44.00	85.30	6,222.6	4,763.6	224.8	896.6	340.7	1.04	-0.79	-0.95	
6,659.0	43.90	83.90	6,267.9	4,808.9	228.9	940.2	362.8	1.55	-0.16	-2.22	
6,722.0	43.20	82.90	6,313.6	4,854.6	233.9	983.3	383.9	1.56	-1.11	-1.59	
6,785.0	43.90	84.80	6,359.2	4,900.2	238.6	1,026.4	405.3	2.36	1.11	3.02	
6,848.0	43.90	84.70	6,404.6	4,945.6	242.6	1,069.9	427.5	0.11	0.00	-0.16	
6,911.0	43.10	83.60	6,450.3	4,991.3	247.0	1,113.1	449.0	1.75	-1.27	-1.75	
6,974.0	44.40	84.70	6,495.8	5,036.8	251.4	1,156.4	470.7	2.39	2.06	1.75	
7,038.0	45.10	84.90	6,541.3	5,082.3	255.5	1,201.3	493.6	1.12	1.09	0.31	
7,101.0	44.80	83.50	6,585.9	5,126.9	260.0	1,245.6	515.8	1.64	-0.48	-2.22	
7,164.0	44.30	83.70	6,630.8	5,171.8	264.9	1,289.5	537.4	0.82	-0.79	0.32	
7,227.0	44.80	86.80	6,675.7	5,216.7	268.6	1,333.5	560.2	3.54	0.79	4.92	
7,290.0	45.20	87.60	6,720.2	5,261.2	270.8	1,378.0	584.4	1.10	0.63	1.27	
7,353.0	44.60	86.50	6,764.9	5,305.9	273.0	1,422.4	608.4	1.56	-0.95	-1.75	
7,416.0	44.70	86.00	6,809.7	5,350.7	275.9	1,466.6	631.9	0.58	0.16	-0.79	
7,479.0	44.70	89.00	6,854.5	5,395.5	277.9	1,510.9	656.1	3.35	0.00	4.76	
7,511.0	44.30	88.40	6,877.3	5,418.3	278.4	1,533.3	668.8	1.81	-1.25	-1.88	
7,542.0	44.50	92.00	6,899.4	5,440.4	278.3	1,555.0	681.5	8.15	0.65	11.61	
7,574.0	45.40	94.80	6,922.1	5,463.1	277.0	1,577.5	695.8	6.79	2.81	8.75	
7,605.0	46.30	97.60	6,943.7	5,484.7	274.6	1,599.6	710.6	7.10	2.90	9.03	
7,637.0	47.60	100.10	6,965.5	5,506.5	271.0	1,622.7	727.0	7.01	4.06	7.81	
7,668.0	49.50	102.30	6,986.0	5,527.0	266.4	1,645.5	744.0	8.11	6.13	7.10	
7,700.0	50.00	103.90	7,006.7	5,547.7	260.9	1,669.3	762.4	4.12	1.56	5.00	
7,732.0	51.30	103.50	7,027.0	5,568.0	255.0	1,693.4	781.2	4.18	4.06	-1.25	
7,763.0	52.30	105.50	7,046.2	5,587.2	248.9	1,716.9	799.9	6.01	3.23	6.45	
7,795.0	52.90	107.40	7,065.6	5,606.6	241.7	1,741.3	820.0	5.08	1.88	5.94	
7,827.0	53.60	109.50	7,084.8	5,625.8	233.6	1,765.6	840.7	5.69	2.19	6.56	
7,858.0	54.30	111.70	7,103.0	5,644.0	224.8	1,789.1	861.6	6.17	2.26	7.10	
7,890.0	55.60	113.60	7,121.4	5,662.4	214.7	1,813.3	883.9	6.33	4.06	5.94	
7,921.0	57.40	115.10	7,138.5	5,679.5	204.1	1,836.8	906.3	7.07	5.81	4.84	
7,953.0	58.60	117.30	7,155.5	5,696.5	192.1	1,861.2	930.2	6.93	3.75	6.88	
7,984.0	60.50	119.30	7,171.2	5,712.2	179.4	1,884.7	954.3	8.28	6.13	6.45	
8,016.0	62.80	121.30	7,186.4	5,727.4	165.2	1,909.0	980.0	9.05	7.19	6.25	
8,047.0	64.40	123.30	7,200.2	5,741.2	150.3	1,932.5	1,005.7	6.55	6.45	6.45	
8,079.0	65.50	125.90	7,213.7	5,754.7	133.9	1,956.3	1,033.0	7.07	5.81	4.84	
8,111.0	66.00	128.30	7,226.8	5,767.8	116.3	1,979.6	1,060.9	7.01	1.56	7.50	
8,142.0	66.60	130.50	7,239.3	5,780.3	98.3	2,001.5	1,088.3	7.10	7.10	7.10	
8,173.0	67.80	132.90	7,251.3	5,792.3	79.3	2,022.9	1,116.2	8.12	3.97	7.74	

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# PHX Survey Report

<b>Database:</b> 20150011 <b>Company:</b> Phoenix Technology Services <b>Project:</b> [REDACTED] <b>Site:</b> [REDACTED] <b>Well:</b> [REDACTED] <b>Wellbore:</b> [REDACTED] <b>Design:</b> [REDACTED]	<b>Local Co-ordinate Reference:</b> [REDACTED] <b>TVD Reference:</b> [REDACTED] <b>MD Reference:</b> [REDACTED] <b>North Reference:</b> [REDACTED] <b>Survey Calculation Method:</b> [REDACTED]	<b>Log Wellbore:</b> [REDACTED] <b>Log Date:</b> [REDACTED] <b>Log Time:</b> [REDACTED] <b>Log User:</b> [REDACTED]
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Survey											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Oogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,205.0	69.20	134.70	7,263.1	5,804.1	58.7	2,044.3	1,145.5	6.82	4.38	5.63	
8,236.0	70.50	136.80	7,273.7	5,814.7	37.8	2,084.6	1,174.3	7.62	4.19	6.77	
8,268.0	72.00	138.60	7,284.0	5,825.0	15.4	2,085.0	1,204.4	7.10	4.69	5.63	
8,299.0	72.50	140.70	7,293.5	5,834.5	-7.1	2,104.1	1,233.8	6.65	1.61	6.77	
8,331.0	73.30	142.50	7,302.9	5,843.9	-31.1	2,123.1	1,264.3	5.93	2.50	5.63	
8,362.0	74.90	144.80	7,311.4	5,852.4	-55.1	2,140.8	1,294.1	8.81	5.16	7.42	
8,394.0	77.10	146.60	7,319.1	5,860.1	-80.7	2,158.3	1,325.2	8.78	6.88	5.63	
8,425.0	79.50	147.90	7,325.4	5,866.4	-106.3	2,174.7	1,355.5	8.76	7.74	4.19	
8,457.0	81.90	149.80	7,330.6	5,871.6	-133.3	2,191.1	1,387.0	9.52	7.50	5.94	
8,488.0	84.00	151.70	7,334.4	5,875.4	-160.1	2,206.1	1,417.5	9.10	6.77	6.13	
8,520.0	85.70	153.90	7,337.3	5,878.3	-188.5	2,220.6	1,449.0	8.67	5.31	6.88	
8,551.0	87.50	155.90	7,339.1	5,880.1	-216.5	2,233.8	1,479.5	8.67	5.81	6.45	
8,555.9	87.68	156.27	7,339.3	5,880.3	-220.9	2,235.7	1,484.2	8.38	3.75	7.50	
8,583.0	88.70	158.30	7,340.2	5,881.2	-245.9	2,246.2	1,510.6	8.38	3.75	7.50	
8,615.0	89.20	160.40	7,340.7	5,881.7	-275.9	2,257.5	1,541.5	6.74	1.56	6.56	
8,646.0	89.50	162.60	7,341.1	5,882.1	-305.3	2,267.3	1,571.1	7.16	0.97	7.10	
8,678.0	89.70	163.00	7,341.3	5,882.3	-335.8	2,276.8	1,601.5	1.40	0.63	1.25	
8,741.0	90.40	164.80	7,341.3	5,882.3	-396.4	2,294.3	1,660.8	3.07	1.11	2.86	
8,804.0	90.50	164.80	7,340.8	5,881.8	-457.2	2,310.8	1,719.8	0.16	0.16	0.00	
8,867.0	90.60	164.40	7,340.2	5,881.2	-517.9	2,327.5	1,778.9	0.65	0.16	-0.63	
8,930.0	90.70	164.40	7,339.4	5,880.4	-578.6	2,344.5	1,838.1	0.16	0.16	0.00	
8,977.0	90.85	164.33	7,338.8	5,879.8	-623.9	2,357.1	1,882.3	0.35	0.32	-0.16	
8,993.0	90.90	164.30	7,338.6	5,879.6	-639.2	2,361.4	1,897.3	0.35	0.32	-0.16	
9,056.0	89.60	165.30	7,338.3	5,879.3	-700.0	2,378.0	1,956.3	2.60	-2.06	1.59	
9,120.0	89.60	166.00	7,338.7	5,879.7	-762.0	2,393.8	2,015.9	1.09	0.00	1.09	
9,183.0	89.60	166.10	7,339.2	5,880.2	-823.2	2,409.0	2,074.4	0.16	0.00	0.16	
9,246.0	89.40	166.60	7,339.7	5,880.7	-884.4	2,423.9	2,132.8	0.85	-0.32	0.79	
9,309.0	89.90	166.90	7,340.1	5,881.1	-945.7	2,438.3	2,191.0	0.93	0.79	0.48	
9,372.0	88.80	166.40	7,340.8	5,881.8	-1,007.0	2,452.9	2,249.2	1.92	-1.75	-0.79	
9,435.0	89.00	166.00	7,342.0	5,883.0	-1,068.2	2,467.9	2,307.7	0.71	0.32	-0.63	
9,498.0	89.30	165.60	7,343.0	5,884.0	-1,129.2	2,483.3	2,366.3	0.79	0.48	-0.63	
9,561.0	89.50	166.00	7,343.6	5,884.6	-1,190.3	2,498.8	2,424.9	0.71	0.32	0.63	
9,624.0	90.10	165.70	7,343.8	5,884.8	-1,251.4	2,514.2	2,483.5	1.06	0.95	-0.48	
9,687.0	90.30	165.50	7,343.6	5,884.6	-1,312.4	2,529.9	2,542.2	0.45	0.32	-0.32	
9,750.0	90.40	165.40	7,343.2	5,884.2	-1,373.4	2,545.7	2,600.9	0.22	0.16	0.16	
9,813.0	89.30	165.30	7,343.4	5,884.4	-1,434.4	2,561.6	2,659.7	0.75	0.75	0.16	
9,876.0	89.40	165.30	7,344.1	5,885.1	-1,495.3	2,577.6	2,718.6	0.16	0.16	0.00	
9,940.0	88.40	165.50	7,345.4	5,886.4	-1,557.2	2,593.7	2,778.2	1.59	1.59	0.31	
10,003.0	88.70	165.20	7,346.9	5,887.9	-1,618.1	2,609.7	2,837.0	0.67	0.48	-0.48	
10,066.0	88.10	164.20	7,348.7	5,889.7	-1,678.9	2,626.3	2,896.0	0.89	0.95	-1.59	

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# PHX Survey Report

<b>Database:</b> PHX Survey Data <b>Company:</b> [Redacted] <b>Project:</b> [Redacted] <b>Site:</b> [Redacted] <b>Well:</b> [Redacted] <b>Wellbore:</b> [Redacted] <b>Design:</b> [Redacted]	<b>Local Co-ordinate Reference:</b> [Redacted] <b>TVD Reference:</b> [Redacted] <b>MD Reference:</b> [Redacted] <b>North Reference:</b> [Redacted] <b>Survey Calculation Method:</b> [Redacted]	<b>Wellhead Design:</b> [Redacted] <b>Wellhead:</b> [Redacted] <b>Wellhead:</b> [Redacted]
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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,129.0	88.00	163.70	7,350.8	5,891.8	-1,739.4	2,643.7	2,955.3	0.81	-0.16	-0.79
10,192.0	88.20	163.50	7,352.9	5,893.9	-1,799.8	2,661.5	3,014.8	0.45	0.32	-0.32
10,255.0	88.10	163.70	7,355.0	5,896.0	-1,860.2	2,679.2	3,074.2	0.35	-0.16	0.32
10,318.0	88.90	165.10	7,356.6	5,897.6	-1,920.9	2,696.2	3,133.3	2.56	1.27	2.22
10,382.0	88.80	164.40	7,357.9	5,898.9	-1,982.6	2,713.0	3,193.3	1.10	-0.16	-1.09
10,444.0	89.20	164.90	7,359.0	5,900.0	-2,042.4	2,729.4	3,251.4	1.03	0.65	0.81
10,508.0	89.40	164.70	7,359.8	5,900.8	-2,104.1	2,746.2	3,311.3	0.44	0.31	-0.31
10,571.0	88.70	163.90	7,360.8	5,901.8	-2,164.8	2,763.2	3,370.5	1.69	-1.11	-1.27
10,634.0	88.60	163.80	7,362.3	5,903.3	-2,225.3	2,780.8	3,429.9	0.22	-0.16	-0.16
10,697.0	89.40	163.90	7,363.4	5,904.4	-2,285.8	2,798.3	3,489.2	1.28	1.27	0.16
10,760.0	89.70	163.20	7,363.9	5,904.9	-2,346.2	2,816.1	3,548.7	1.21	0.48	-1.11
10,823.0	88.60	162.30	7,364.8	5,905.8	-2,406.3	2,834.8	3,608.5	2.26	-1.75	-1.43
10,886.0	89.10	161.50	7,366.1	5,907.1	-2,466.2	2,854.4	3,668.5	1.50	0.79	-1.27
10,949.0	89.60	161.40	7,366.8	5,907.8	-2,525.9	2,874.4	3,728.7	0.81	0.79	-0.16
11,012.0	90.10	161.40	7,367.0	5,908.0	-2,585.6	2,894.5	3,788.9	0.79	0.79	0.00
11,075.0	90.60	161.10	7,366.6	5,907.6	-2,645.3	2,914.8	3,849.2	0.93	0.79	-0.48
11,139.0	90.70	160.90	7,365.9	5,906.9	-2,705.8	2,935.6	3,910.5	0.35	0.16	-0.31
11,202.0	89.20	161.30	7,365.9	5,906.9	-2,765.4	2,956.0	3,970.8	2.46	-2.38	0.63
11,265.0	88.90	160.50	7,367.0	5,908.0	-2,824.9	2,976.6	4,031.1	1.36	-0.48	-1.27
11,328.0	89.30	160.70	7,367.9	5,908.9	-2,884.4	2,997.5	4,091.6	0.71	0.63	0.32
11,391.0	89.50	160.30	7,368.6	5,909.6	-2,943.7	3,018.6	4,152.1	0.71	0.32	-0.63
11,455.0	89.50	159.40	7,369.2	5,910.2	-3,003.8	3,040.6	4,213.7	1.41	0.00	-1.41
11,518.0	89.60	159.40	7,369.7	5,910.7	-3,062.8	3,062.8	4,274.6	0.16	0.16	0.00
11,581.0	89.60	160.50	7,370.1	5,911.1	-3,122.0	3,084.4	4,335.2	1.75	0.00	1.75
11,643.0	89.40	163.00	7,370.6	5,911.6	-3,180.8	3,103.8	4,394.4	4.04	-0.32	4.03
11,706.0	90.20	164.40	7,370.9	5,911.9	-3,241.3	3,121.5	4,453.8	2.56	1.27	2.22
11,769.0	88.50	163.00	7,371.6	5,912.6	-3,301.8	3,139.2	4,513.2	3.50	-2.70	-2.22
11,832.0	87.10	162.40	7,374.0	5,915.0	-3,361.9	3,157.9	4,572.9	2.42	-2.22	-0.95
11,896.0	87.80	162.40	7,376.8	5,917.8	-3,422.8	3,177.2	4,633.7	1.09	1.09	0.00
11,959.0	87.80	162.30	7,379.3	5,920.3	-3,482.8	3,196.3	4,693.5	0.16	0.00	-0.16
12,022.0	88.70	161.80	7,381.2	5,922.2	-3,542.7	3,215.7	4,753.5	1.63	1.43	-0.79
12,085.0	89.20	160.40	7,382.3	5,923.3	-3,602.3	3,236.1	4,813.8	2.36	0.79	-2.22
12,148.0	89.40	159.50	7,383.1	5,924.1	-3,661.5	3,257.7	4,874.5	1.46	0.32	-1.43
12,211.0	89.80	159.00	7,383.5	5,924.5	-3,720.4	3,280.0	4,935.3	1.02	0.63	-0.79
12,274.0	89.40	159.60	7,384.0	5,925.0	-3,779.3	3,302.3	4,996.2	1.14	-0.63	0.95
12,337.0	88.80	159.80	7,385.0	5,926.0	-3,838.4	3,324.1	5,056.9	1.00	-0.95	0.32
12,400.0	89.50	160.60	7,385.9	5,926.9	-3,897.7	3,345.5	5,117.5	1.06	-0.95	0.48
12,463.0	90.80	161.50	7,385.7	5,926.7	-3,957.2	3,365.9	5,177.8	0.95	0.00	0.95
12,526.0	90.20	161.80	7,385.2	5,926.2	-4,017.0	3,385.8	5,237.9	0.48	0.00	0.48
12,589.0	90.20	162.40	7,385.0	5,926.0	-4,077.0	3,405.1	5,297.9	0.06	0.00	0.06
12,652.0	90.20	162.70	7,384.8	5,925.8	-4,137.1	3,424.0	5,357.8	0.06	0.00	0.06
12,715.0	89.90	162.10	7,384.7	5,925.7	-4,197.1	3,443.1	5,417.6	0.06	0.48	-0.85

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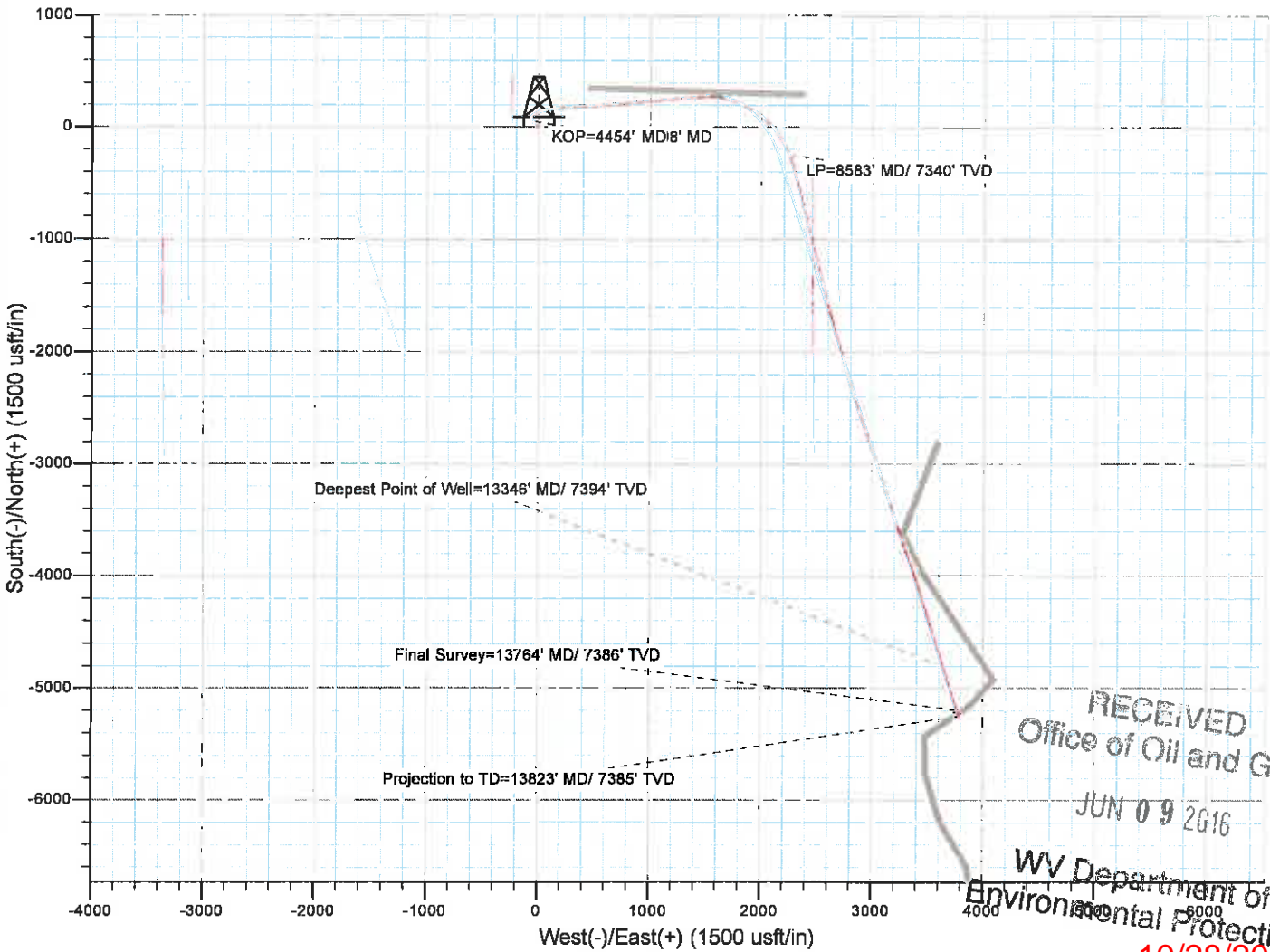
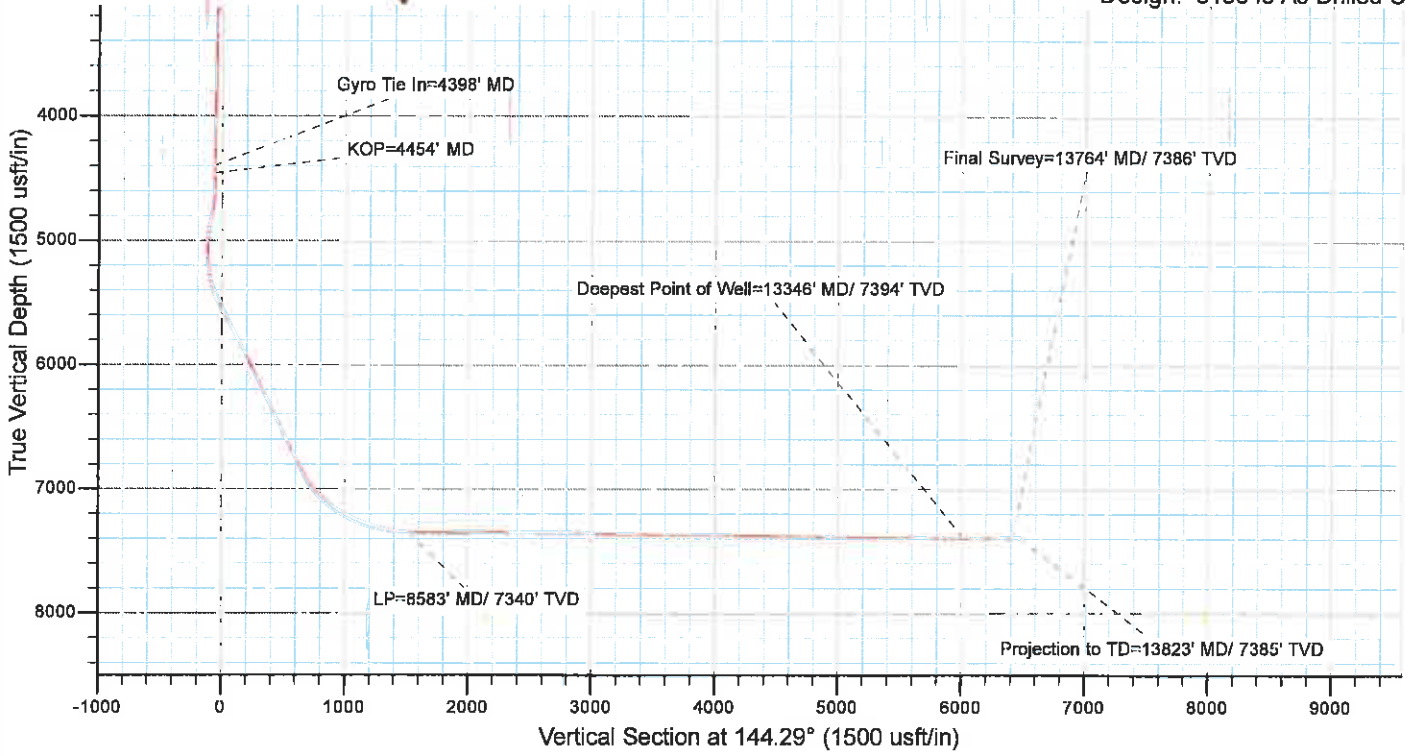
Database:	WV State Survey	Local Co-ordinate Reference:	WV State Survey
Company:	WV State Survey	TVD Reference:	WV State Survey
Project:	WV State Survey	MD Reference:	WV State Survey
Site:	WV State Survey	North Reference:	WV State Survey
Well:	WV State Survey	Survey Calculation Method:	WV State Survey
Wellbore:	WV State Survey		
Design:	WV State Survey		

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,778.0	90.00	163.10	7,384.8	5,925.8	-4,257.3	3,461.9	5,477.4	1.60	0.16	1.59
12,841.0	89.50	162.20	7,385.0	5,926.0	-4,317.4	3,480.7	5,537.2	1.63	-0.79	-1.43
12,904.0	89.00	161.80	7,385.9	5,926.9	-4,377.3	3,500.2	5,597.3	1.02	-0.79	-0.63
12,967.0	88.90	162.40	7,387.0	5,928.0	-4,437.2	3,519.5	5,657.2	0.97	-0.16	0.95
13,030.0	88.70	162.50	7,388.3	5,929.3	-4,497.3	3,538.5	5,717.1	0.35	-0.32	0.16
13,093.0	88.60	162.30	7,389.8	5,930.8	-4,557.3	3,557.6	5,776.9	0.35	-0.16	-0.32
13,156.0	88.00	161.60	7,391.7	5,932.7	-4,617.2	3,577.1	5,836.9	1.46	-0.95	-1.11
13,219.0	89.00	162.30	7,393.3	5,934.3	-4,677.1	3,596.6	5,897.0	1.94	1.59	1.11
13,282.0	90.00	162.60	7,393.9	5,934.9	-4,737.1	3,615.6	5,956.8	1.66	1.59	0.48
13,346.0	89.80	162.20	7,394.0	5,935.0	-4,798.1	3,634.9	6,017.6	0.70	-0.31	-0.63
13,409.0	90.90	161.90	7,393.6	5,934.6	-4,858.1	3,654.3	6,077.6	1.81	1.75	-0.48
13,472.0	92.10	162.30	7,392.0	5,933.0	-4,918.0	3,673.7	6,137.6	2.01	1.90	0.63
13,535.0	91.80	162.30	7,389.8	5,930.8	-4,978.0	3,692.8	6,197.5	0.48	-0.48	0.00
13,598.0	91.20	161.90	7,388.2	5,929.2	-5,037.9	3,712.2	6,257.4	1.14	-0.95	-0.63
13,661.0	91.00	161.50	7,387.0	5,928.0	-5,097.7	3,732.0	6,317.5	0.71	-0.32	-0.63
13,724.0	90.80	161.60	7,386.0	5,927.0	-5,157.5	3,751.9	6,377.7	0.35	-0.32	0.16
13,784.0	90.40	160.80	7,385.6	5,926.6	-5,195.3	3,764.8	6,416.0	2.24	-1.00	-2.00
13,823.0	90.40	160.80	7,385.1	5,926.1	-5,251.1	3,784.2	6,472.5	0.00	0.00	0.00

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,398.0	4,397.1	51.2	-38.3	Gyro Tie In=4398' MD
4,454.0	4,453.1	51.2	-39.3	KOP=4454' MD
8,583.0	7,340.2	-245.9	2,246.2	LP=8583' MD/ 7340' TVD
13,346.0	7,394.0	-4,798.1	3,634.9	Deepest Point of Well=13346' MD/ 7394' TVD
13,764.0	7,385.6	-5,195.3	3,764.8	Final Survey=13764' MD/ 7386' TVD 3,784.2
13,823.0	7,385.1	-5,251.1		Projection to TD=13823' MD/ 7385' TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_





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