

**PHOENIX**  
TECHNOLOGY SERVICES



**XTO**

Harrison County, WV  
Bogges A PAD  
South Unit 1H

Main Wellbore

Design: 1H As Drilled Surveys

## **Standard Survey Report**

01 June, 2015

**XTO**  
ENERGY



PHX  
Survey Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well South Unit 1H
<b>Company:</b>	XTO	<b>TVD Reference:</b>	KB@ @ 1205.0usft
<b>Project:</b>	Harrison County, WV	<b>MD Reference:</b>	KB@ @ 1205.0usft
<b>Site:</b>	Bogges A PAD	<b>North Reference:</b>	True
<b>Well:</b>	South Unit 1H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Main Wellbore		
<b>Design:</b>	1H As Drilled Surveys		

<b>Project</b>	Harrison County, WV		
<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		

<b>Site</b>	Bogges A PAD		
<b>Site Position:</b>		<b>Northing:</b>	320,323.00 usft
<b>From:</b>	Map	<b>Easting:</b>	1,749,542.00 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.38
		<b>Longitude:</b>	-80.39
		<b>Grid Convergence:</b>	-0.57 "

<b>Well</b>	South Unit 1H		
<b>Well Position</b>	<b>+N/-S</b>	0.0 usft	<b>Northing:</b> 320,314.00 usft
	<b>+E/-W</b>	0.0 usft	<b>Easting:</b> 1,749,545.00 usft
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	0.0 usft
		<b>Ground Level:</b>	1,183.0 usft

<b>Wellbore</b>	Main Wellbore				
<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	-8.98	66.80	52,509

<b>Design</b>	1H As Drilled Surveys		
<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	138.97	

<b>Survey Program</b>	<b>Date</b>	6/1/2015			
<b>From (')</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
0.00	5,309.0	Bogges A South Unit 1H Gyro (Main Wellb)	Javins Gyros	Surface Read Out Inertial Gyroscope	
0.00	11,738.0	Bogges A South Unit 1H MWD (Main Wel	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM	

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	-1,205.0	0.0	0.0	0.0	0.00	0.00	0.00
59.0	0.48	9.30	59.0	-1,146.0	0.2	0.0	-0.2	0.81	0.81	0.00
109.0	0.60	27.10	109.0	-1,096.0	0.7	0.2	-0.4	0.41	0.24	35.60
159.0	0.61	46.40	159.0	-1,046.0	1.1	0.5	-0.5	0.41	0.02	38.60
209.0	0.91	61.10	209.0	-996.0	1.5	1.0	-0.4	0.71	0.60	29.40
259.0	0.59	89.60	259.0	-946.0	1.7	1.7	-0.2	0.96	-0.64	57.00
309.0	0.63	89.70	309.0	-896.0	1.7	2.2	0.2	0.08	0.08	0.20
359.0	0.55	86.20	359.0	-846.0	1.7	2.7	0.5	0.18	-0.16	-7.00





PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well South Unit 1H
Company:	XTO	TVD Reference:	KB@ @ 1205.0usft
Project:	Harrison County, WV	MD Reference:	KB@ @ 1205.0usft
Site:	Bogges A/PAD	North Reference:	True
Well:	South Unit 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	1H As Drilled Surveys		

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)
409.0	0.41	99.90	409.0	-796.0	1.7	3.1	0.8	0.36	-0.28	27.40
459.0	0.59	96.70	459.0	-746.0	1.6	3.5	1.1	0.36	0.36	-6.40
509.0	0.56	111.30	509.0	-696.0	1.5	4.0	1.5	0.30	-0.06	29.20
559.0	0.74	121.40	559.0	-646.0	1.2	4.5	2.0	0.43	0.36	20.20
609.0	0.68	115.60	609.0	-596.0	0.9	5.1	2.6	0.19	-0.12	-11.60
659.0	0.55	105.40	659.0	-546.0	0.8	5.6	3.1	0.34	-0.26	-20.40
709.0	0.67	111.00	709.0	-496.0	0.6	6.1	3.6	0.27	0.24	11.20
759.0	0.79	114.70	759.0	-446.0	0.3	6.7	4.1	0.26	0.24	7.40
809.0	1.11	132.20	809.0	-396.0	-0.1	7.3	4.9	0.86	0.64	35.00
859.0	0.83	121.00	858.9	-346.1	-0.6	8.0	5.7	0.67	-0.56	-22.40
909.0	0.88	122.20	908.9	-296.1	-1.0	8.6	6.5	0.11	0.10	2.40
959.0	0.48	129.10	958.9	-246.1	-1.4	9.1	7.0	0.82	-0.80	13.80
1,009.0	0.51	189.50	1,008.9	-196.1	-1.7	9.3	7.4	1.00	0.06	120.80
1,059.0	0.89	187.40	1,058.9	-146.1	-2.3	9.3	7.9	0.92	0.76	-44.20
1,109.0	0.62	172.00	1,108.9	-96.1	-3.0	9.4	8.4	0.55	-0.54	9.20
1,159.0	0.80	175.70	1,158.9	-46.1	-3.6	9.5	8.9	0.37	0.36	7.40
1,209.0	0.43	187.80	1,208.9	3.9	-4.1	9.5	9.3	0.78	-0.74	24.20
1,259.0	0.51	156.30	1,258.9	53.9	-4.5	9.6	9.7	0.53	0.16	-63.00
1,309.0	0.38	148.60	1,308.9	103.9	-4.9	9.7	10.1	0.29	-0.26	-15.40
1,359.0	0.28	165.00	1,358.9	153.9	-5.1	9.8	10.3	0.27	-0.20	32.80
1,409.0	0.20	196.50	1,408.9	203.9	-5.3	9.9	10.5	0.30	-0.16	63.00
1,459.0	0.13	165.70	1,458.9	253.9	-5.5	9.8	10.6	0.22	-0.14	-61.60
1,509.0	0.39	253.70	1,508.9	303.9	-5.6	9.7	10.6	0.81	0.52	176.00
1,559.0	0.28	231.90	1,558.9	353.9	-5.7	9.4	10.5	0.33	-0.22	-43.60
1,609.0	0.27	229.20	1,608.9	403.9	-5.8	9.2	10.5	0.03	-0.02	-5.40
1,659.0	0.33	242.10	1,658.9	453.9	-6.0	9.0	10.4	0.18	0.12	25.80
1,709.0	0.19	197.50	1,708.9	503.9	-6.1	8.9	10.5	0.47	-0.28	-89.20
1,759.0	0.30	230.20	1,758.9	553.9	-6.3	8.8	10.5	0.35	0.22	65.40
1,809.0	0.18	201.50	1,808.9	603.9	-6.4	8.6	10.5	0.33	-0.24	-57.40
1,859.0	0.60	341.70	1,858.9	653.9	-6.3	8.5	10.3	1.49	0.84	280.40
1,909.0	0.54	346.30	1,908.9	703.9	-5.8	8.4	9.9	0.15	-0.12	9.20
1,959.0	0.73	324.60	1,958.9	753.9	-5.3	8.1	9.3	0.61	0.38	-43.40
2,009.0	0.57	324.50	2,008.9	803.9	-4.8	7.8	8.8	0.32	-0.32	-0.20
2,059.0	0.52	331.80	2,058.9	853.9	-4.4	7.6	8.3	0.17	-0.10	14.60
2,109.0	0.56	315.50	2,108.9	903.9	-4.1	7.3	7.8	0.32	0.08	-32.60
2,159.0	0.51	317.50	2,158.9	953.9	-3.7	7.0	7.4	0.11	-0.10	4.00
2,209.0	0.62	293.10	2,208.9	1,003.9	-3.5	6.6	6.9	0.52	0.22	-48.80
2,259.0	0.52	308.70	2,258.9	1,053.9	-3.2	6.1	6.4	0.37	-0.20	31.20
2,309.0	0.55	309.80	2,308.9	1,103.9	-2.9	5.8	6.0	0.06	0.06	2.20
2,359.0	0.50	317.60	2,358.9	1,153.9	-2.6	5.4	5.5	0.17	-0.10	15.60
2,409.0	0.47	326.90	2,408.9	1,203.9	-2.3	5.2	5.1	0.17	-0.06	18.60
2,459.0	0.45	311.10	2,458.9	1,253.9	-2.0	4.9	4.7	0.26	-0.04	-31.60



PHX  
Survey Report



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Project:	Harrison County, WV	MD Reference:	KB@ @ 1205.0usft
Site:	Bogges A PAD	North Reference:	True
Well:	South Unit 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	1H As Drilled Surveys		

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)
2,509.0	0.39	243.80	2,508.9	1,303.9	-1.9	4.8	4.5	0.94	-0.12	-134.60
2,559.0	0.42	255.30	2,558.9	1,353.9	-2.0	4.3	4.3	0.17	0.06	23.00
2,609.0	0.25	221.20	2,608.9	1,403.9	-2.2	4.0	4.3	0.51	-0.34	-68.20
2,659.0	0.25	72.60	2,658.9	1,453.9	-2.2	4.1	4.3	0.96	0.00	-297.20
2,709.0	0.49	21.90	2,708.9	1,503.9	-2.0	4.3	4.3	0.77	0.48	-101.40
2,759.0	0.38	252.40	2,758.9	1,553.9	-1.8	4.2	4.1	1.58	-0.22	-259.00
2,809.0	0.36	65.50	2,808.9	1,603.9	-1.8	4.2	4.1	1.48	-0.04	346.20
2,859.0	0.41	44.80	2,858.9	1,653.9	-1.6	4.4	4.1	0.29	0.10	-41.40
2,909.0	0.49	334.20	2,908.9	1,703.9	-1.3	4.5	3.9	1.05	0.16	-141.20
2,959.0	0.26	244.50	2,958.9	1,753.9	-1.2	4.3	3.7	1.11	-0.46	-179.40
3,009.0	0.45	61.20	3,008.9	1,803.9	-1.1	4.3	3.7	1.42	0.38	353.40
3,059.0	0.41	310.50	3,058.9	1,853.9	-0.9	4.4	3.6	1.42	-0.08	-221.40
3,109.0	0.35	238.00	3,108.9	1,903.9	-0.9	4.1	3.4	0.90	-0.12	-145.00
3,159.0	0.12	194.00	3,158.9	1,953.9	-1.0	4.0	3.4	0.55	-0.46	-88.00
3,209.0	0.27	178.00	3,208.9	2,003.9	-1.2	4.0	3.5	0.32	0.30	-32.00
3,259.0	0.51	12.70	3,258.9	2,053.9	-1.1	4.0	3.4	1.55	0.48	-330.60
3,309.0	0.51	8.60	3,308.9	2,103.9	-0.6	4.1	3.2	0.07	0.00	-8.20
3,359.0	0.66	342.10	3,358.9	2,153.9	-0.1	4.0	2.8	0.81	0.30	-53.00
3,409.0	0.56	342.40	3,408.9	2,203.9	0.4	3.9	2.3	0.20	-0.20	0.60
3,459.0	0.51	258.30	3,458.9	2,253.9	0.6	3.6	1.9	1.44	-0.10	-168.20
3,509.0	0.33	230.80	3,508.9	2,303.9	0.4	3.3	1.8	0.53	-0.36	-55.00
3,559.0	0.37	5.70	3,558.9	2,353.9	0.5	3.2	1.7	1.29	0.08	269.80
3,609.0	0.59	350.20	3,608.9	2,403.9	0.9	3.1	1.4	0.51	0.44	-31.00
3,659.0	0.57	281.00	3,658.9	2,453.9	1.2	2.8	1.0	1.32	-0.04	-138.40
3,709.0	0.66	271.30	3,708.9	2,503.9	1.3	2.3	0.6	0.27	0.18	-19.40
3,759.0	0.73	343.20	3,758.8	2,553.8	1.6	1.9	0.1	1.64	0.14	143.80
3,809.0	0.82	286.60	3,808.8	2,603.8	2.0	1.5	-0.5	1.43	0.18	-109.20
3,859.0	0.67	272.00	3,858.8	2,653.8	2.1	0.9	-1.0	0.52	-0.30	-33.20
3,909.0	0.42	256.90	3,908.8	2,703.8	2.1	0.4	-1.3	0.57	-0.50	-30.20
3,959.0	0.70	270.60	3,958.8	2,753.8	2.0	-0.1	-1.6	0.62	0.56	27.40
4,009.0	0.65	262.90	4,008.8	2,803.8	2.0	-0.7	-2.0	0.21	-0.10	-15.40
4,059.0	1.14	298.00	4,058.8	2,853.8	2.2	-1.4	-2.6	1.43	0.98	70.20
4,109.0	0.93	316.70	4,108.8	2,903.8	2.7	-2.1	-3.5	0.79	-0.42	37.40
4,159.0	1.09	311.90	4,158.8	2,953.8	3.4	-2.7	-4.3	0.36	0.32	-9.60
4,209.0	0.99	293.70	4,208.8	3,003.8	3.8	-3.5	-5.2	0.69	-0.20	-36.40
4,259.0	0.58	256.80	4,258.8	3,053.8	4.0	-4.1	-5.7	1.26	-0.82	-73.80
4,309.0	0.47	313.30	4,308.8	3,103.8	4.0	-4.5	-6.0	1.01	-0.22	113.00
4,359.0	0.72	323.80	4,358.8	3,153.8	4.4	-4.9	-6.5	0.54	0.50	21.00
4,409.0	1.13	315.10	4,408.8	3,203.8	5.0	-5.4	-7.3	0.86	0.82	-17.40
4,459.0	1.14	319.70	4,458.8	3,253.8	5.8	-6.1	-8.3	0.18	0.02	9.20
4,509.0	1.36	291.50	4,508.8	3,303.8	6.4	-6.9	-9.4	1.29	0.44	-56.40
4,559.0	0.94	315.30	4,558.8	3,353.8	6.9	-7.8	-10.3	1.26	-0.84	47.60
4,609.0	0.51	307.70	4,608.8	3,403.8	7.3	-8.2	-10.9	0.88	-0.86	-15.20





**PHX**  
Survey Report



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Project:	Harrison County, WV	MD Reference:	KB@ @ 1205.0usft
Site:	Boggs A PAD	North Reference:	True
Well:	South Unit 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	1H As Drilled Surveys		

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)
4,659.0	1.03	328.10	4,658.7	3,453.7	7.8	-8.7	-11.6	1.16	1.04	40.80
4,709.0	0.62	347.10	4,708.7	3,503.7	8.5	-9.0	-12.3	0.98	-0.82	38.00
4,759.0	0.76	343.50	4,758.7	3,553.7	9.0	-9.1	-12.8	0.29	0.28	-7.20
4,809.0	0.64	300.50	4,808.7	3,603.7	9.5	-9.4	-13.4	1.05	-0.24	-86.00
4,859.0	0.84	325.90	4,858.7	3,653.7	9.9	-9.9	-14.0	0.76	0.40	50.80
4,909.0	0.76	319.50	4,908.7	3,703.7	10.5	-10.3	-14.7	0.24	-0.16	-12.80
4,959.0	0.56	323.50	4,958.7	3,753.7	11.0	-10.7	-15.3	0.41	-0.40	8.00
5,009.0	1.27	302.40	5,008.7	3,803.7	11.4	-11.3	-16.0	1.55	1.42	-42.20
5,059.0	0.83	256.10	5,058.7	3,853.7	11.7	-12.1	-16.7	1.84	-0.88	-92.60
5,109.0	1.87	298.90	5,108.7	3,903.7	12.0	-13.2	-17.7	2.76	2.08	85.60
5,159.0	1.81	304.00	5,158.7	3,953.7	12.8	-14.5	-19.2	0.35	-0.12	10.20
5,209.0	1.66	301.70	5,208.6	4,003.6	13.6	-15.8	-20.7	0.33	-0.30	-4.60
5,259.0	2.00	305.10	5,258.6	4,053.6	14.5	-17.1	-22.2	0.71	0.68	6.80
5,309.0	1.76	307.40	5,308.6	4,103.6	15.5	-18.5	-23.8	0.50	-0.48	4.60
5,421.0	2.59	284.43	5,420.5	4,215.5	17.1	-22.3	-27.6	1.06	0.74	-20.51
5,484.0	5.41	259.73	5,483.4	4,278.4	17.0	-26.6	-30.3	5.15	4.48	-39.21
5,547.0	4.79	255.03	5,546.1	4,341.1	15.8	-32.1	-32.9	1.19	-0.98	-7.46
5,610.0	4.20	251.91	5,608.9	4,403.9	14.4	-36.8	-35.0	1.01	-0.94	-4.95
5,673.0	4.79	237.80	5,671.7	4,466.7	12.2	-41.2	-36.3	1.98	0.94	-22.40
5,736.0	5.30	232.62	5,734.5	4,529.5	9.1	-45.7	-36.9	1.08	0.81	-8.22
5,798.0	7.80	274.63	5,796.1	4,591.1	7.7	-52.2	-40.1	8.45	4.03	67.76
5,861.0	8.79	298.63	5,858.5	4,653.5	10.3	-60.7	-47.6	5.67	1.57	38.10
5,924.0	8.90	298.50	5,920.7	4,715.7	15.0	-69.2	-56.7	0.18	0.17	-0.21
5,987.0	11.60	322.41	5,982.7	4,777.7	22.3	-77.4	-67.6	7.91	4.29	37.95
6,050.0	13.40	326.80	6,044.2	4,839.2	33.4	-85.2	-81.2	3.23	2.86	6.97
6,113.0	19.10	336.43	6,104.7	4,899.7	49.0	-93.4	-98.3	9.98	9.05	15.29
6,176.0	25.01	345.70	6,163.1	4,958.1	71.4	-100.8	-120.0	10.86	9.38	14.71
6,239.0	26.11	356.43	6,219.9	5,014.9	98.2	-104.9	-142.9	7.54	1.75	17.03
6,302.0	21.29	5.61	6,277.6	5,072.6	123.4	-104.7	-161.8	9.61	-7.65	14.57
6,364.0	16.70	15.24	6,336.3	5,131.3	143.2	-101.2	-174.5	8.94	-7.40	15.53
6,427.0	13.60	35.10	6,397.1	5,192.1	158.0	-94.6	-181.3	9.53	-4.92	31.52
6,490.0	12.31	34.31	6,458.5	5,253.5	169.6	-86.5	-184.8	2.07	-2.05	-1.25
6,553.0	11.69	47.10	6,520.1	5,315.1	179.5	-78.1	-186.7	4.32	-0.98	20.30
6,615.0	15.91	71.41	6,580.4	5,375.4	186.5	-65.4	-183.6	11.43	6.81	39.21
6,677.0	20.90	88.02	6,639.2	5,434.2	189.6	-46.3	-173.4	11.60	8.05	26.79
6,741.0	21.91	96.94	6,698.8	5,493.8	188.6	-23.0	-157.3	5.32	1.58	13.94
6,826.0	28.39	116.24	6,775.9	5,570.9	177.7	11.0	-126.8	12.21	7.62	22.71
6,889.0	33.29	124.41	6,830.0	5,625.0	161.3	38.7	-96.2	10.22	7.78	12.97
6,952.0	36.19	126.61	6,881.7	5,676.7	140.4	67.9	-61.3	5.01	4.60	3.49
6,984.0	37.91	127.14	6,907.3	5,702.3	128.8	83.3	-42.5	5.47	5.38	1.66
7,015.0	41.01	130.52	6,931.2	5,726.2	116.5	98.6	-23.1	12.16	10.00	10.90



**PHX**  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well South Unit 1H
Company:	XTO	TVD Reference:	KB@ @ 1205.0usft
Project:	Harrison County, WV	MD Reference:	KB@ @ 1205.0usft
Site:	Bogges A PAD	North Reference:	True
Well:	South Unit 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	1H As Drilled Surveys		

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)
<b>Top of Marcellus @ 9853' TVD</b>										
7,044.6	43.95	129.79	6,953.0	5,748.0	103.6	113.9	-3.4	10.08	9.94	-2.48
7,047.0	44.19	129.73	6,954.8	5,749.8	102.5	115.2	-1.7	10.08	9.95	-2.34
7,078.0	48.30	131.62	6,976.2	5,771.2	87.9	132.2	20.5	13.97	13.26	6.10
7,110.0	53.09	132.54	6,996.5	5,791.5	71.3	150.5	45.0	15.13	14.97	2.88
7,141.0	57.29	134.21	7,014.1	5,809.1	53.8	169.0	70.4	14.25	13.55	5.39
<b>Unit 1H Plat LP</b>										
7,193.9	65.19	136.53	7,039.6	5,834.6	20.8	201.6	116.6	15.42	14.93	4.39
7,204.0	66.70	136.94	7,043.7	5,838.7	14.1	207.9	125.8	15.42	14.97	4.03
7,267.0	74.30	139.62	7,064.7	5,859.7	-30.2	247.3	185.2	12.71	12.06	4.25
7,329.0	83.40	140.54	7,076.7	5,871.7	-76.8	286.3	245.9	14.75	14.68	1.48
<b>LP=7392' MD/ 7080' TVD</b>										
7,392.0	91.20	141.90	7,079.7	5,874.7	-125.8	325.7	308.7	12.57	12.38	2.16
7,455.0	91.79	140.72	7,078.0	5,873.0	-175.0	365.1	371.7	2.09	0.94	-1.87
7,518.0	91.70	140.10	7,076.1	5,871.1	-223.5	405.2	434.6	0.99	-0.14	-0.98
<b>Unit 1H LP=440' VS</b>										
7,523.2	91.56	139.97	7,075.9	5,870.9	-227.5	408.5	439.8	3.67	-2.68	-2.51
7,581.0	90.01	138.52	7,075.2	5,870.2	-271.3	446.3	497.6	3.67	-2.68	-2.51
7,644.0	89.40	137.64	7,075.5	5,870.5	-318.1	488.4	560.8	1.70	-0.97	-1.40
7,707.0	89.59	138.21	7,076.0	5,871.0	-364.9	530.6	623.6	0.95	0.30	0.90
7,770.0	89.40	139.00	7,076.6	5,871.6	-412.2	572.2	686.6	1.29	-0.30	1.25
7,833.0	89.00	139.53	7,077.5	5,872.5	-459.9	613.3	749.6	1.05	-0.63	0.84
7,896.0	88.69	139.71	7,078.7	5,873.7	-507.9	654.1	812.5	0.57	-0.49	0.29
7,959.0	88.30	139.92	7,080.4	5,875.4	-556.0	694.8	875.5	0.70	-0.62	0.33
8,022.0	88.21	139.84	7,082.3	5,877.3	-604.1	735.4	938.5	0.19	-0.14	-0.13
8,085.0	89.11	142.03	7,083.8	5,878.8	-653.0	775.0	1,001.4	3.76	1.43	3.48
8,148.0	88.49	140.80	7,085.1	5,880.1	-702.3	814.3	1,064.3	2.19	-0.98	-1.95
8,211.0	88.21	141.51	7,086.9	5,881.9	-751.3	853.8	1,127.3	1.21	-0.44	1.13
8,273.0	88.69	142.43	7,088.6	5,883.6	-800.1	892.0	1,189.2	1.67	0.77	1.48
8,337.0	88.41	142.52	7,090.2	5,885.2	-850.9	931.0	1,253.0	0.46	-0.44	0.14
8,399.0	88.10	142.12	7,092.1	5,887.1	-899.9	968.9	1,314.9	0.82	-0.50	-0.64
<b>Top of Cherokee @ 9853' TVD</b>										
8,424.6	87.89	142.32	7,093.0	5,888.0	-920.1	984.5	1,340.4	1.12	-0.81	0.78
8,462.0	87.59	142.61	7,094.5	5,889.5	-949.8	1,007.3	1,377.7	1.12	-0.81	0.78
8,524.0	88.49	143.00	7,096.6	5,891.6	-999.1	1,044.8	1,439.6	1.58	1.45	0.63
8,587.0	87.70	141.81	7,098.7	5,893.7	-1,049.0	1,083.2	1,502.4	2.27	-1.25	-1.89
8,650.0	88.80	141.42	7,100.6	5,895.6	-1,098.4	1,122.3	1,565.3	1.85	1.75	-0.62
8,713.0	89.11	141.73	7,101.8	5,896.8	-1,147.7	1,161.4	1,628.2	0.70	0.49	0.49
8,776.0	90.01	140.54	7,102.2	5,897.2	-1,196.8	1,200.9	1,691.2	2.37	1.43	-1.89
8,839.0	90.80	140.80	7,101.8	5,896.8	-1,245.5	1,240.9	1,754.2	1.32	1.25	0.41
8,902.0	91.11	140.72	7,100.8	5,895.8	-1,294.3	1,280.7	1,817.1	0.51	0.49	-0.13
8,965.0	90.49	141.73	7,099.9	5,894.9	-1,343.4	1,320.2	1,880.1	1.88	-0.98	1.60
9,028.0	90.49	141.51	7,099.3	5,894.3	-1,392.8	1,359.3	1,943.0	0.35	0.00	-0.35





PHX  
Survey Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well South Unit 1H
Company:	XTO	TVD Reference:	KB@ @ 1205.0usft
Project:	Harrison County, WV	MD Reference:	KB@ @ 1205.0usft
Site:	Bogges A PAD	North Reference:	True
Well:	South Unit 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Main Wellbore		
Design:	1H As Drilled Surveys		

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)
9,091.0	91.51	141.02	7,098.2	5,893.2	-1,441.9	1,398.7	2,005.9	1.80	1.62	-0.78
9,154.0	91.20	140.10	7,096.7	5,891.7	-1,490.6	1,438.7	2,068.9	1.54	-0.49	-1.46
9,217.0	91.00	140.80	7,095.5	5,890.5	-1,539.1	1,478.8	2,131.9	1.16	-0.32	1.11
9,280.0	90.21	140.32	7,094.9	5,889.9	-1,587.8	1,518.8	2,194.8	1.47	-1.25	-0.76
9,342.0	89.70	139.71	7,094.9	5,889.9	-1,635.3	1,558.7	2,256.8	1.28	-0.82	-0.98
9,405.0	90.80	138.61	7,094.6	5,889.6	-1,683.0	1,599.9	2,319.8	2.47	1.75	-1.75
9,468.0	89.90	136.80	7,094.3	5,889.3	-1,729.5	1,642.3	2,382.8	3.21	-1.43	-2.87
9,530.0	89.70	136.41	7,094.5	5,889.5	-1,774.6	1,684.9	2,444.7	0.71	-0.32	-0.63
9,593.0	90.41	136.23	7,094.4	5,889.4	-1,820.2	1,728.4	2,507.7	1.16	1.13	-0.29
9,656.0	91.51	137.64	7,093.4	5,888.4	-1,866.2	1,771.4	2,570.6	2.84	1.75	2.24
9,719.0	93.11	139.84	7,090.8	5,885.8	-1,913.5	1,812.9	2,633.6	4.32	2.54	3.49
9,782.0	92.89	139.31	7,087.5	5,882.5	-1,961.4	1,853.7	2,696.5	0.91	-0.35	-0.84
9,845.0	92.21	140.94	7,084.7	5,879.7	-2,009.7	1,894.0	2,759.4	2.80	-1.08	2.59
9,908.0	91.40	140.72	7,082.7	5,877.7	-2,058.5	1,933.8	2,822.3	1.33	-1.29	-0.35
9,971.0	88.60	141.11	7,082.7	5,877.7	-2,107.4	1,973.5	2,885.3	4.49	-4.44	0.62
10,035.0	90.01	142.12	7,083.5	5,878.5	-2,157.6	2,013.3	2,949.2	2.71	2.20	1.58
10,098.0	89.79	143.22	7,083.6	5,878.6	-2,207.7	2,051.5	3,012.1	1.78	-0.35	1.75
10,160.0	89.40	143.13	7,084.1	5,879.1	-2,257.3	2,088.6	3,073.9	0.65	-0.63	-0.15
10,224.0	90.01	143.53	7,084.4	5,879.4	-2,308.6	2,126.8	3,137.7	1.14	0.95	0.63
10,286.0	90.21	143.92	7,084.3	5,879.3	-2,358.6	2,163.5	3,199.5	0.71	0.32	0.63
10,349.0	90.30	146.21	7,084.0	5,879.0	-2,410.2	2,199.6	3,262.1	3.64	0.14	3.63
10,413.0	91.79	146.21	7,082.8	5,877.8	-2,463.4	2,235.2	3,325.6	2.33	2.33	0.00
10,476.0	87.90	143.70	7,083.0	5,878.0	-2,515.0	2,271.4	3,388.3	7.35	-8.17	-3.98
10,539.0	86.41	142.91	7,086.1	5,881.1	-2,565.4	2,308.9	3,451.0	2.68	-2.37	-1.25
10,602.0	86.21	142.61	7,090.2	5,885.2	-2,615.5	2,347.0	3,513.7	0.57	-0.32	-0.48
10,665.0	86.80	142.83	7,094.0	5,889.0	-2,665.5	2,385.1	3,576.5	1.00	0.94	0.35
10,728.0	88.21	141.42	7,096.8	5,891.8	-2,715.2	2,423.7	3,639.3	3.16	2.24	-2.24
10,791.0	88.69	141.51	7,098.5	5,893.5	-2,764.5	2,463.0	3,702.2	0.78	0.76	0.14
10,854.0	91.40	141.02	7,096.4	5,893.4	-2,813.6	2,502.4	3,765.2	4.37	4.30	-0.78
10,917.0	92.49	141.51	7,096.3	5,891.3	-2,862.7	2,541.8	3,828.1	1.90	1.73	0.78
10,980.0	92.89	141.33	7,093.3	5,888.3	-2,911.9	2,581.0	3,891.0	0.70	0.63	-0.29
11,043.0	90.89	141.20	7,091.2	5,886.2	-2,961.0	2,620.4	3,953.9	3.18	-3.17	-0.21
11,106.0	91.59	141.73	7,089.9	5,884.9	-3,010.3	2,659.7	4,016.8	1.39	1.11	0.84
11,170.0	89.59	141.11	7,089.2	5,884.2	-3,060.3	2,699.6	4,080.7	3.27	-3.13	-0.97
11,232.0	87.90	141.73	7,090.6	5,885.6	-3,108.8	2,738.2	4,142.7	2.90	-2.73	1.00
11,295.0	87.11	142.91	7,093.3	5,888.3	-3,158.6	2,776.7	4,205.5	2.25	-1.25	1.87
11,358.0	87.51	144.54	7,096.3	5,891.3	-3,209.3	2,813.9	4,268.2	2.66	0.63	2.59
11,421.0	86.80	144.32	7,099.4	5,894.4	-3,260.5	2,850.5	4,330.8	1.18	-1.13	-0.35
11,480.0	86.69	144.63	7,101.6	5,896.6	-3,292.2	2,873.1	4,369.6	0.84	-0.28	0.79
11,523.0	86.60	146.34	7,105.3	5,900.3	-3,344.0	2,908.8	4,432.1	2.71	-0.14	2.71
11,585.0	86.41	146.12	7,109.1	5,904.1	-3,395.5	2,943.2	4,493.5	0.47	-0.31	-0.35
11,648.0	84.41	145.90	7,114.1	5,909.1	-3,447.5	2,978.3	4,555.8	3.19	-3.17	-0.35



**PHX**  
Survey Report



<b>Database:</b> EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b> Well South Unit 1H
<b>Company:</b> XTO	<b>TVD Reference:</b> KB @ @ 1205.0usft
<b>Project:</b> Harrison County, WV	<b>MD Reference:</b> KB @ @ 1205.0usft
<b>Site:</b> Boggess A PAD	<b>North Reference:</b> True
<b>Well:</b> South Unit 1H	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Wellbore:</b> Main Wellbore	
<b>Design:</b> 1H As Drilled Surveys	

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)
<b>Projection to TD/ Deepest Point of Well=11738' MD/ 7122' TVD - Unit 1H Plat TD</b>										
11,738.0	85.94	145.34	7,121.7	5,916.7	-3,521.5	3,028.9	4,644.9	1.81	1.70	-0.62

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
7,044.6	6,953.0	Top of Marcellus@6953' TVD		0.00	
8,424.6	7,093.0	Top of Onondaga7093' TVD		0.00	

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,309.0	5,308.6	15.5	-18.5	Gyro Tie In=5309' MD
5,309.0	5,308.6	15.5	-18.5	Gyro Tie In=5309' MD
5,421.0	5,420.5	17.1	-22.3	KOP=5421' MD
7,392.0	7,079.7	-125.8	325.7	LP=7392' MD/ 7080' TVD
11,648.0	7,114.1	-3,447.5	2,978.3	Final Survey=11648' MD/ 7114' TVD
11,738.0	7,121.7	-3,521.5	3,028.9	Projection to TD/ Deepest Point of Well=11738' MD/ 7122' TVD

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





# XTO

Project: Harrison County, WV  
 Site: Boggess A PAD  
 Well: South Unit 1H  
 Wellbore: Main Wellbore  
 Design: 1H As Drilled Surveys

KB Elevation=1205 FT  
 Ground Elevation= 1183 FT  
 All measurements were taken from KB Elevation

