CNX GAS Company

Marshall County, WV
MAJ-10 PAD
B-HSU

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

04 February, 2019

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10/21/2022

Company:	CNX GAS Company	**Local Co-ordinate Reference:**	Well B-HSU
Project:	Marshall County, WV	**TVD Reference:**	RKB @ 1329.0usft (Decker #11)
Site:	MAJ-10 PAD	**MD Reference:**	RKB @ 1329.0usft (Decker #11)
Well:	B-HSU	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

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Project	Marshall County, WV		
Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		Using geodetic scale factor

Site	MAJ-10 PAD				
Site Position:		**Northing:**	518,312.90 usft	**Latitude:**	39° 55' 6.378 N
From:	Map	**Easting:**	1,709,041.44 usft	**Longitude:**	80° 32' 14.438 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-0.66 °

Well	B-HSU					
Well Position	**+N/-S**	0.0 usft	**Northing:**	518,305.49 usft	**Latitude:**	39° 55' 6.307 N
	+E/-W	0.0 usft	**Easting:**	1,709,060.01 usft	**Longitude:**	80° 32' 14.198 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	1,317.0 usft

Wellbore	Wellbore #1				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	1/27/2019	-8.88	66.90	52,034.59915445

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.0	0.0	0.0	290.79	

Survey Program **Date** 2/4/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
50.0	742.0	VES GYRO (Wellbore #1)	GYRO-NS	OWSG Gyrocompass Gyro
887.0	3,250.0	QES MWD (Wellbore #1)	MWD	OWSG MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	518,305.49	1,709,060.01	39° 55' 6.307 N	80° 32' 14.198 W
50.0	0.32	292.60	50.0	0.1	-0.1	518,305.54	1,709,059.88	39° 55' 6.308 N	80° 32' 14.200 W
100.0	0.27	284.67	100.0	0.1	-0.4	518,305.62	1,709,059.64	39° 55' 6.308 N	80° 32' 14.203 W
150.0	0.27	316.87	150.0	0.3	-0.6	518,305.74	1,709,059.45	39° 55' 6.310 N	80° 32' 14.206 W
200.0	0.34	309.37	200.0	0.4	-0.8	518,305.92	1,709,059.25	39° 55' 6.311 N	80° 32' 14.208 W
250.0	0.47	297.52	250.0	0.6	-1.1	518,306.11	1,709,058.95	39° 55' 6.313 N	80° 32' 14.212 W
300.0	0.31	273.90	300.0	0.7	-1.4	518,306.21	1,709,058.64	39° 55' 6.314 N	80° 32' 14.216 W
350.0	0.42	271.21	350.0	0.7	-1.7	518,306.23	1,709,058.32	39° 55' 6.314 N	80° 32' 14.220 W
400.0	0.16	281.49	400.0	0.8	-1.9	518,306.24	1,709,058.07	39° 55' 6.314 N	80° 32' 14.223 W
450.0	0.23	286.11	450.0	0.8	-2.1	518,306.29	1,709,057.90	39° 55' 6.315 N	80° 32' 14.226 W
500.0	0.12	318.30	500.0	0.9	-2.2	518,306.35	1,709,057.77	39° 55' 6.315 N	80° 32' 14.227 W

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Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
550.0	0.22	329.72	550.0	1.0	-2.3	518,306.47	1,709,057.69	39° 55' 6.317 N	80° 32' 14.228 W
600.0	0.19	286.22	600.0	1.1	-2.5	518,306.58	1,709,057.56	39° 55' 6.318 N	80° 32' 14.230 W
650.0	0.34	285.79	650.0	1.2	-2.7	518,306.64	1,709,057.34	39° 55' 6.318 N	80° 32' 14.233 W
700.0	0.18	251.15	700.0	1.2	-2.9	518,306.66	1,709,057.12	39° 55' 6.318 N	80° 32' 14.236 W
742.0	0.08	221.40	742.0	1.1	-3.0	518,306.62	1,709,057.04	39° 55' 6.318 N	80° 32' 14.237 W
Gyro Tie-in @ 742.0' MD / 742.0' TVD									
887.0	0.57	310.87	887.0	1.5	-3.6	518,307.01	1,709,056.43	39° 55' 6.322 N	80° 32' 14.245 W
975.0	0.51	314.86	975.0	2.1	-4.2	518,307.57	1,709,055.82	39° 55' 6.327 N	80° 32' 14.253 W
1,061.0	0.69	314.72	1,061.0	2.7	-4.8	518,308.21	1,709,055.18	39° 55' 6.334 N	80° 32' 14.261 W
1,146.0	0.66	310.69	1,146.0	3.4	-5.6	518,308.89	1,709,054.44	39° 55' 6.340 N	80° 32' 14.270 W
1,232.0	0.56	308.68	1,232.0	4.0	-6.3	518,309.47	1,709,053.74	39° 55' 6.346 N	80° 32' 14.279 W
1,319.0	0.48	308.55	1,319.0	4.5	-6.9	518,309.97	1,709,053.12	39° 55' 6.351 N	80° 32' 14.287 W
1,408.0	0.67	296.67	1,408.0	4.9	-7.6	518,310.43	1,709,052.37	39° 55' 6.355 N	80° 32' 14.297 W
1,495.0	0.43	301.41	1,495.0	5.3	-8.4	518,310.83	1,709,051.63	39° 55' 6.359 N	80° 32' 14.307 W
1,583.0	0.25	296.96	1,583.0	5.6	-8.8	518,311.09	1,709,051.18	39° 55' 6.362 N	80° 32' 14.313 W
1,670.0	0.10	337.93	1,670.0	5.8	-9.0	518,311.25	1,709,050.98	39° 55' 6.363 N	80° 32' 14.315 W
1,757.0	0.24	336.06	1,757.0	6.0	-9.1	518,311.48	1,709,050.88	39° 55' 6.365 N	80° 32' 14.316 W
1,844.0	0.29	313.83	1,844.0	6.3	-9.4	518,311.80	1,709,050.65	39° 55' 6.368 N	80° 32' 14.319 W
1,931.0	0.40	335.47	1,931.0	6.7	-9.6	518,312.23	1,709,050.36	39° 55' 6.373 N	80° 32' 14.323 W
2,019.0	0.36	335.56	2,019.0	7.3	-9.9	518,312.76	1,709,050.12	39° 55' 6.378 N	80° 32' 14.326 W
2,106.0	0.26	323.95	2,105.9	7.7	-10.1	518,313.17	1,709,049.89	39° 55' 6.382 N	80° 32' 14.329 W
2,193.0	0.22	313.95	2,192.9	8.0	-10.4	518,313.45	1,709,049.66	39° 55' 6.385 N	80° 32' 14.332 W
2,281.0	0.27	312.83	2,280.9	8.2	-10.6	518,313.70	1,709,049.38	39° 55' 6.387 N	80° 32' 14.336 W
2,368.0	0.32	315.85	2,367.9	8.5	-11.0	518,314.02	1,709,049.06	39° 55' 6.390 N	80° 32' 14.340 W
2,452.0	0.26	325.27	2,451.9	8.9	-11.2	518,314.34	1,709,048.79	39° 55' 6.393 N	80° 32' 14.344 W
2,539.0	0.30	327.41	2,538.9	9.2	-11.5	518,314.70	1,709,048.56	39° 55' 6.397 N	80° 32' 14.347 W
2,626.0	0.35	309.78	2,625.9	9.6	-11.8	518,315.06	1,709,048.23	39° 55' 6.400 N	80° 32' 14.351 W
2,711.0	0.61	304.27	2,710.9	10.0	-12.4	518,315.48	1,709,047.66	39° 55' 6.404 N	80° 32' 14.358 W
2,798.0	0.72	310.51	2,797.9	10.6	-13.2	518,316.10	1,709,046.86	39° 55' 6.410 N	80° 32' 14.369 W
2,885.0	1.07	311.51	2,884.9	11.5	-14.2	518,316.99	1,709,045.83	39° 55' 6.419 N	80° 32' 14.382 W
2,971.0	1.23	337.68	2,970.9	12.9	-15.1	518,318.38	1,709,044.88	39° 55' 6.433 N	80° 32' 14.394 W
3,015.0	1.13	356.01	3,014.9	13.8	-15.3	518,319.24	1,709,044.67	39° 55' 6.441 N	80° 32' 14.397 W
3,102.0	1.40	17.91	3,101.9	15.6	-15.1	518,321.11	1,709,044.94	39° 55' 6.460 N	80° 32' 14.394 W
3,181.0	1.58	18.85	3,180.9	17.6	-14.4	518,323.06	1,709,045.59	39° 55' 6.479 N	80° 32' 14.386 W
3,250.0	1.58	18.85	3,249.8	19.4	-13.8	518,324.86	1,709,046.20	39° 55' 6.497 N	80° 32' 14.378 W
Last QES MWD Survey									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
742.0	742.0	1.1	-3.0	Gyro Tie-in @ 742.0' MD / 742.0' TVD
3,250.0	3,249.8	19.4	-13.8	Last QES MWD Survey

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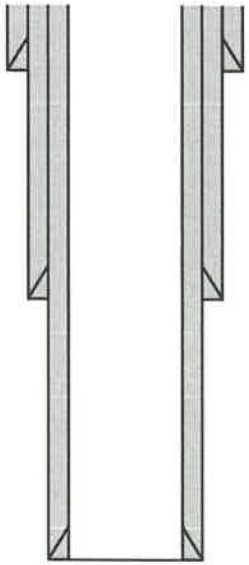
CURRENT WELLBORE DIAGRAM

MAJ-10B-HSU

47-051-02070

Marshall County, WV

Ground Elevation	1317 GL Elevation			MAJ-10B-HSU SHL				N 518305.49, E 1709060.01 (NAD27)
WELLBORE DIAGRAM	HOLE	CASING	GEOLOGY	MD-GL	TVD-GL	MUD	CEMENT	COMMENTS
	36"	30" L/S	**Conductor**	**100**	**100**	AIR	Grout to Surface	Drill with auger Stabilize surface fill/soil
	24"	18-5/8" 87.5# J-55 BTC	Washington Coal		352	AIR / FW Mist	BJ 15.6 ppg Class A + 2% CaCl2 + 1/4 pps Flake 50% OH Excess Yield = 1.19 TOC @ surface	Set through fresh water zones Set through coal zones Cemented to surface with 1428 sxs (256 bbls), 55 bbls cement returned to surface
			Deepest Fresh Water		482			
			Waynesburg 2 Coal		489			
			Waynesburg 1 Coal		490			
			Sewickley Coal		690			
			Pittsburgh Coal		779			
			FW / Coal Casing	**832**	**832**			
	17-1/2"	13-3/8" 68.0# L-80HC BTC	Gas Sand		1403	AIR / Soap	BJ 16.0 ppg Class H Gas block blend with additives 35% OH Excess Yield = 1.16 TOC @ surface	Set through gas storage interval Casing to be set below the Fifth Sand Cemented to surface with 2473 sxs (507 bbls), 50 bbls cement returned to surface, did not bump plug during displacement
			Salt Sands		1470			
			Big Lime		1860			
			Big Injun Sand		1966			
			Gantz Sand		2172			
			Gordon Sand		2776			
			Fifth Sand		2827			
			Intermediate Casing	**3188**	**3188**			

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