30-025-41364
BC OPERATING
BATTLE #1H
A-34-21S-33E

BC OPERATING, INC.

BC Operating, Inc.

Lea County, NM (NAD27)
Battle
#1H

Wellbore #2 Job #1410731

Survey: Phoenix MWD Surveys

Standard Survey Report

22 August, 2014

PHOENIX
TECHNOLOGY SERVICES

Company:	BC Operating, Inc.	**Local Co-ordinate Reference:**	Well #1H
Project:	Lea County, NM (NAD27)	**TVD Reference:**	KB: 25' @ 3727.00usft (Latshaw 35)
Site:	Battle	**MD Reference:**	KB: 25' @ 3727.00usft (Latshaw 35)
Well:	#1H	**North Reference:**	Grid
Wellbore:	Wellbore #2 Job #1410731	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys (Latshaw 35)	**Database:**	GCR DB

Project	Lea County, NM (NAD27)		
Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Battle				
Site Position:		**Northing:**	525,391.70 usft	**Latitude:**	32° 26' 31.17732 N
From:	Map	**Easting:**	740,904.10 usft	**Longitude:**	103° 33' 8.82456 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.42 °

Well	#1H					
Well Position	**+N/-S**	0.00 usft	**Northing:**	525,391.70 usft	**Latitude:**	32° 26' 31.17732 N
	+E/-W	0.00 usft	**Easting:**	740,904.10 usft	**Longitude:**	103° 33' 8.82456 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,702.00 usft

Wellbore	Wellbore #2 Job #1410731				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010_14	07/18/14	7.21	60.31	48,438

Design	Surveys (Latshaw 35)					
Audit Notes:						
Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**		10,500.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**		
	0.00	0.00	0.00	179.43		

Survey Program **Date** 08/22/14

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	10,500.00	Gyrodata Survey (Wellbore #1 Job #141073	NS-GYRO-MS	North sensing gyrocompassing m/s
10,500.00	15,561.00	Phoenix MWD Surveys (Wellbore #2 Job #1	PHX+MWD+IGRF	PHX+MWD+IGRF v3:standard declination

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,500.00	1.69	152.36	10,498.01	-97.10	-17.03	96.92	0.00	0.00	0.00
Tie In WB#1									
10,571.00	9.90	150.50	10,568.59	-103.35	-13.53	103.21	11.56	11.56	-2.62
First Phoenix MWD Survey									
10,603.00	13.60	154.40	10,599.91	-109.14	-10.55	109.03	11.82	11.56	12.19
10,634.00	17.10	154.60	10,629.80	-116.55	-7.02	116.47	11.29	11.29	0.65
10,666.00	20.00	155.40	10,660.14	-125.77	-2.72	125.74	9.10	9.06	2.50
10,698.00	23.00	156.90	10,689.91	-136.50	2.01	136.52	9.53	9.38	4.69
10,729.00	26.20	161.40	10,718.09	-148.56	6.57	148.62	11.95	10.32	14.52

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Well:	#1H	**North Reference:**	Grid
Wellbore:	Wellbore #2 Job #1410731	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys (Latshaw 35)	**Database:**	GCR DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,761.00	29.50	167.20	10,746.39	-162.95	10.57	163.05	13.33	10.31	18.13
10,792.00	34.50	173.20	10,772.67	-179.12	13.30	179.25	19.10	16.13	19.35
10,824.00	39.40	175.70	10,798.24	-198.26	15.14	198.40	16.01	15.31	7.81
10,856.00	43.30	176.50	10,822.26	-219.35	16.57	219.50	12.30	12.19	2.50
10,887.00	47.40	176.70	10,844.04	-241.36	17.88	241.53	13.23	13.23	0.65
10,918.00	52.40	178.10	10,864.00	-265.04	18.94	265.22	16.49	16.13	4.52
10,950.00	55.90	179.90	10,882.74	-290.97	19.38	291.15	11.85	10.94	5.63
10,981.00	59.80	180.70	10,899.23	-317.21	19.24	317.39	12.77	12.58	2.58
11,013.00	63.80	181.40	10,914.35	-345.40	18.72	345.57	12.65	12.50	2.19
11,045.00	67.00	182.00	10,927.67	-374.48	17.86	374.64	10.14	10.00	1.88
11,076.00	69.20	182.70	10,939.23	-403.21	16.68	403.36	7.40	7.10	2.26
11,108.00	70.70	183.10	10,950.20	-433.24	15.16	433.37	4.83	4.69	1.25
11,139.00	73.50	182.90	10,959.73	-462.69	13.61	462.80	9.05	9.03	-0.65
11,171.00	77.90	182.00	10,967.63	-493.66	12.29	493.76	14.02	13.75	-2.81
11,203.00	81.80	181.30	10,973.27	-525.14	11.38	525.23	12.38	12.19	-2.19
11,234.00	84.90	180.90	10,976.86	-555.93	10.79	556.01	10.08	10.00	-1.29
11,266.00	86.60	180.40	10,979.23	-587.83	10.43	587.91	5.54	5.31	-1.56
11,329.00	89.30	179.80	10,981.49	-650.79	10.32	650.86	4.39	4.29	-0.95
11,424.00	90.70	178.90	10,981.49	-745.78	11.40	745.86	1.75	1.47	-0.95
11,519.00	89.40	178.40	10,981.40	-840.75	13.64	840.84	1.47	-1.37	-0.53
11,614.00	89.70	177.50	10,982.15	-935.69	17.04	935.81	1.00	0.32	-0.95
11,709.00	90.70	178.90	10,981.82	-1,030.63	20.02	1,030.78	1.81	1.05	1.47
11,803.00	89.40	180.30	10,981.74	-1,124.63	20.68	1,124.78	2.03	-1.38	1.49
11,898.00	89.40	179.20	10,982.73	-1,219.62	21.09	1,219.77	1.16	0.00	-1.16
11,993.00	88.50	180.60	10,984.47	-1,314.60	21.26	1,314.75	1.75	-0.95	1.47
12,088.00	89.50	180.50	10,986.13	-1,409.58	20.34	1,409.71	1.06	1.05	-0.11
12,183.00	90.70	180.50	10,985.96	-1,504.57	19.52	1,504.69	1.26	1.26	0.00
12,277.00	88.70	180.70	10,986.46	-1,598.56	18.53	1,598.67	2.14	-2.13	0.21
12,372.00	85.40	180.50	10,991.34	-1,693.42	17.54	1,693.51	3.48	-3.47	-0.21
12,476.00	86.50	179.30	10,998.69	-1,797.16	17.72	1,797.24	1.56	1.06	-1.15
12,571.00	89.10	178.70	11,002.34	-1,892.06	19.38	1,892.16	2.81	2.74	-0.63
12,666.00	89.80	177.50	11,003.25	-1,987.00	22.53	1,987.13	1.46	0.74	-1.26
12,761.00	90.60	177.00	11,002.92	-2,081.89	27.08	2,082.06	0.99	0.84	-0.53
12,856.00	90.40	178.40	11,002.09	-2,176.81	30.90	2,177.01	1.49	-0.21	1.47
12,950.00	89.90	179.80	11,001.84	-2,270.80	32.37	2,271.01	1.58	-0.53	1.49
13,045.00	89.70	179.10	11,002.17	-2,365.79	33.28	2,366.00	0.77	-0.21	-0.74
13,139.00	90.50	180.90	11,002.01	-2,459.79	33.28	2,460.00	2.10	0.85	1.91
13,234.00	90.10	180.70	11,001.51	-2,554.77	31.96	2,554.97	0.47	-0.42	-0.21
13,328.00	89.80	179.70	11,001.59	-2,648.77	31.63	2,648.96	1.11	-0.32	-1.06
13,423.00	90.00	179.90	11,001.76	-2,743.77	31.96	2,743.95	0.30	0.21	0.21
13,518.00	89.10	180.30	11,002.51	-2,838.77	31.80	2,838.94	1.04	-0.95	0.42
13,613.00	89.00	180.30	11,004.08	-2,933.75	31.30	2,933.92	0.11	-0.11	0.00
13,707.00	88.30	177.80	11,006.30	-3,027.71	32.86	3,027.88	2.76	-0.74	-2.66

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Wellbore:	Wellbore #2 Job #1410731	**Survey Calculation Method:**	Minimum Curvature
Design:	Surveys (Latshaw 35)	**Database:**	GCR DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,802.00	90.20	178.40	11,007.54	-3,122.64	36.01	3,122.85	2.10	2.00	0.63
13,897.00	89.40	180.00	11,007.87	-3,217.63	37.33	3,217.84	1.88	-0.84	1.68
13,992.00	90.20	179.50	11,008.20	-3,312.62	37.75	3,312.84	0.99	0.84	-0.53
14,086.00	90.40	180.30	11,007.71	-3,406.62	37.91	3,406.83	0.88	0.21	0.85
14,181.00	90.00	179.40	11,007.38	-3,501.62	38.16	3,501.83	1.04	-0.42	-0.95
14,275.00	89.90	180.20	11,007.46	-3,595.62	38.49	3,595.82	0.86	-0.11	0.85
14,370.00	90.10	180.50	11,007.46	-3,690.62	37.91	3,690.81	0.38	0.21	0.32
14,464.00	90.60	179.60	11,006.89	-3,784.61	37.83	3,784.80	1.10	0.53	-0.96
14,559.00	89.60	179.30	11,006.72	-3,879.61	38.74	3,879.80	1.10	-1.05	-0.32
14,654.00	89.90	181.30	11,007.14	-3,974.60	38.24	3,974.78	2.13	0.32	2.11
14,749.00	88.90	181.00	11,008.13	-4,069.58	36.33	4,069.74	1.10	-1.05	-0.32
14,843.00	88.60	180.20	11,010.18	-4,163.55	35.35	4,163.69	0.91	-0.32	-0.85
14,938.00	88.70	179.50	11,012.42	-4,258.52	35.60	4,258.66	0.74	0.11	-0.74
15,033.00	88.30	178.80	11,014.91	-4,353.48	37.01	4,353.63	0.85	-0.42	-0.74
15,127.00	89.70	179.50	11,016.55	-4,447.45	38.40	4,447.61	1.67	1.49	0.74
15,222.00	90.30	178.80	11,016.55	-4,542.44	39.81	4,542.61	0.97	0.63	-0.74
15,317.00	90.70	178.40	11,015.72	-4,637.40	42.13	4,637.59	0.60	0.42	-0.42
15,412.00	91.10	177.50	11,014.22	-4,732.33	45.53	4,732.55	1.04	0.42	-0.95
Last Phoenix MWD Survey									
15,468.00	91.10	177.50	11,013.15	-4,788.27	47.97	4,788.51	0.00	0.00	0.00
Projection to Bit									
15,561.00	91.10	177.50	11,011.36	-4,881.16	52.03	4,881.44	0.00	0.00	0.00
Projection to TD									

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
10,500.00	10,498.01	-97.10	-17.03	Tie In WB#1
10,571.00	10,568.59	-103.35	-13.53	First Phoenix MWD Survey
15,412.00	11,014.22	-4,732.33	45.53	Last Phoenix MWD Survey
15,468.00	11,013.15	-4,788.27	47.97	Projection to Bit
15,561.00	11,011.36	-4,881.16	52.03	Projection to TD

Checked By: _____ Approved By: _____ Date: _____

Phoenix Technology Services

BC Operating, Inc.

Battle #1H
Lea County, NM (NAD27)
Wellbore #2 Job #1410731
Phoenix MWD Surveys

Surface Loc.:
Northing: (Y) 525391.70
Easting: (X) 740904.10
KB: 25' Elev: 3727.00'
GL Elev: 3702.00'

Survey Type Information:
H 100.00 - 10500.00 GYRODATA SURVEY : NS-GYRO-MS
H 10500.00 - 15561.00 PHOENIX MWD SURVEYS : PHX+MWD+IGRF

Measured Depth (ft)	Incl.	Azim.	Sub-Sea Depth (ft)	Vertical Depth (ft)	Local Coo (+N/-S) (ft)	(+E/-W) (ft)	UTM Coorc Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Annotation
10500	1.69	152.36	6771.01	10498.01	-97.1	-17.03	525294.6	740887.1	96.92	0	Tie In WB#1
10571	9.9	150.5	6841.59	10568.59	-103.35	-13.53	525288.4	740890.6	103.21	11.56	First Phoenix MWD Survey - PHX+MWD+IGRF
10603	13.6	154.4	6872.91	10599.91	-109.14	-10.55	525282.6	740893.6	109.03	11.82	
10634	17.1	154.6	6902.8	10629.8	-116.55	-7.02	525275.2	740897.1	116.47	11.29	
10666	20	155.4	6933.14	10660.14	-125.77	-2.72	525265.9	740901.4	125.74	9.1	
10698	23	156.9	6962.91	10689.91	-136.5	2.01	525255.2	740906.1	136.52	9.53	
10729	26.2	161.4	6991.09	10718.09	-148.56	6.57	525243.1	740910.7	148.62	11.95	
10761	29.5	167.2	7019.39	10746.39	-162.95	10.57	525228.8	740914.7	163.05	13.33	
10792	34.5	173.2	7045.67	10772.67	-179.12	13.3	525212.6	740917.4	179.25	19.1	
10824	39.4	175.7	7071.24	10798.24	-198.26	15.14	525193.4	740919.2	198.4	16.01	
10856	43.3	176.5	7095.26	10822.26	-219.35	16.57	525172.4	740920.7	219.5	12.3	
10887	47.4	176.7	7117.04	10844.04	-241.36	17.88	525150.3	740922	241.53	13.23	
10918	52.4	178.1	7137	10864	-265.04	18.94	525126.7	740923	265.22	16.49	
10950	55.9	179.9	7155.74	10882.74	-290.97	19.38	525100.7	740923.5	291.15	11.85	
10981	59.8	180.7	7172.23	10899.23	-317.21	19.24	525074.5	740923.3	317.39	12.77	
11013	63.8	181.4	7187.35	10914.35	-345.4	18.72	525046.3	740922.8	345.57	12.65	
11045	67	182	7200.67	10927.67	-374.48	17.86	525017.2	740922	374.64	10.14	
11076	69.2	182.7	7212.23	10939.23	-403.21	16.68	524988.5	740920.8	403.36	7.4	
11108	70.7	183.1	7223.2	10950.2	-433.24	15.16	524958.5	740919.3	433.37	4.83	
11139	73.5	182.9	7232.73	10959.73	-462.69	13.61	524929	740917.7	462.8	9.05	
11171	77.9	182	7240.63	10967.63	-493.66	12.29	524898	740916.4	493.76	14.02	
11203	81.8	181.3	7246.27	10973.27	-525.14	11.38	524866.6	740915.5	525.23	12.38	
11234	84.9	180.9	7249.86	10976.86	-555.93	10.79	524835.8	740914.9	556.01	10.08	
11266	86.6	180.4	7252.23	10979.23	-587.83	10.43	524803.9	740914.5	587.91	5.54	
11329	89.3	179.8	7254.49	10981.49	-650.79	10.32	524740.9	740914.4	650.86	4.39	
11424	90.7	178.9	7254.49	10981.49	-745.78	11.4	524645.9	740915.5	745.86	1.75	
11519	89.4	178.4	7254.4	10981.4	-840.75	13.64	524551	740917.7	840.84	1.47	
11614	89.7	177.5	7255.15	10982.15	-935.69	17.04	524456	740921.1	935.81	1	
11709	90.7	178.9	7254.82	10981.82	-1030.63	20.02	524361.1	740924.1	1030.78	1.81	
11803	89.4	180.3	7254.74	10981.74	-1124.63	20.68	524267.1	740924.8	1124.78	2.03	
11898	89.4	179.2	7255.73	10982.73	-1219.62	21.09	524172.1	740925.2	1219.77	1.16	
11993	88.5	180.6	7257.47	10984.47	-1314.6	21.26	524077.1	740925.4	1314.75	1.75	
12088	89.5	180.5	7259.13	10986.13	-1409.58	20.34	523982.1	740924.4	1409.71	1.06	
12183	90.7	180.5	7258.96	10985.96	-1504.57	19.52	523887.1	740923.6	1504.69	1.26	
12277	88.7	180.7	7259.46	10986.46	-1598.56	18.53	523793.1	740922.6	1598.67	2.14	
12372	85.4	180.5	7264.34	10991.34	-1693.42	17.54	523698.3	740921.6	1693.51	3.48	
12476	86.5	179.3	7271.69	10998.69	-1797.16	17.72	523594.5	740921.8	1797.24	1.56	
12571	89.1	178.7	7275.34	11002.34	-1892.06	19.38	523499.6	740923.5	1892.16	2.81	
12666	89.8	177.5	7276.25	11003.25	-1987	22.53	523404.7	740926.6	1987.13	1.46	
12761	90.6	177	7275.92	11002.92	-2081.89	27.08	523309.8	740931.2	2082.06	0.99	
12856	90.4	178.4	7275.09	11002.09	-2176.81	30.9	523214.9	740935	2177.01	1.49	
12950	89.9	179.8	7274.84	11001.84	-2270.8	32.37	523120.9	740936.5	2271.01	1.58	
13045	89.7	179.1	7275.17	11002.17	-2365.79	33.28	523025.9	740937.4	2366	0.77	
13139	90.5	180.9	7275.01	11002.01	-2459.79	33.28	522931.9	740937.4	2460	2.1	
13234	90.1	180.7	7274.51	11001.51	-2554.77	31.96	522836.9	740936.1	2554.97	0.47	
13328	89.8	179.7	7274.59	11001.59	-2648.77	31.63	522742.9	740935.7	2648.96	1.11	
13423	90	179.9	7274.76	11001.76	-2743.77	31.96	522647.9	740936.1	2743.95	0.3	
13518	89.1	180.3	7275.51	11002.51	-2838.77	31.8	522552.9	740935.9	2838.94	1.04	

13613	89	180.3	7277.08	11004.08	-2933.75	31.3	522458	740935.4	2933.92	0.11	
13707	88.3	177.8	7279.3	11006.3	-3027.71	32.86	522364	740937	3027.88	2.76	
13802	90.2	178.4	7280.54	11007.54	-3122.64	36.01	522269.1	740940.1	3122.84	2.1	
13897	89.4	180	7280.87	11007.87	-3217.63	37.33	522174.1	740941.4	3217.84	1.88	
13992	90.2	179.5	7281.2	11008.2	-3312.62	37.75	522079.1	740941.9	3312.84	0.99	
14086	90.4	180.3	7280.71	11007.71	-3406.62	37.91	521985.1	740942	3406.83	0.88	
14181	90	179.4	7280.38	11007.38	-3501.62	38.16	521890.1	740942.3	3501.83	1.04	
14275	89.9	180.2	7280.46	11007.46	-3595.62	38.49	521796.1	740942.6	3595.82	0.86	
14370	90.1	180.5	7280.46	11007.46	-3690.62	37.91	521701.1	740942	3690.81	0.38	
14464	90.6	179.6	7279.89	11006.89	-3784.61	37.83	521607.1	740941.9	3784.8	1.1	
14559	89.6	179.3	7279.72	11006.72	-3879.61	38.74	521512.1	740942.8	3879.8	1.1	
14654	89.9	181.3	7280.13	11007.13	-3974.6	38.24	521417.1	740942.3	3974.78	2.13	
14749	88.9	181	7281.13	11008.13	-4069.58	36.33	521322.1	740940.4	4069.74	1.1	
14843	88.6	180.2	7283.18	11010.18	-4163.55	35.35	521228.2	740939.5	4163.69	0.91	
14938	88.7	179.5	7285.42	11012.42	-4258.52	35.6	521133.2	740939.7	4258.66	0.74	
15033	88.3	178.8	7287.91	11014.91	-4353.48	37.01	521038.2	740941.1	4353.63	0.85	
15127	89.7	179.5	7289.55	11016.55	-4447.45	38.4	520944.3	740942.5	4447.61	1.67	
15222	90.3	178.8	7289.55	11016.55	-4542.44	39.81	520849.3	740943.9	4542.61	0.97	
15317	90.7	178.4	7288.72	11015.72	-4637.4	42.13	520754.3	740946.2	4637.59	0.6	
15412	91.1	177.5	7287.22	11014.22	-4732.33	45.53	520659.4	740949.6	4732.55	1.04	Last Phoenix MWD Survey
15468	91.1	177.5	7286.15	11013.15	-4788.27	47.97	520603.4	740952.1	4788.51	0	Projection to Bit
15561	91.1	177.5	7284.36	11011.36	-4881.16	52.03	520510.5	740956.1	4881.44	0	Projection to TD

All data are in feet unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to KB: 25'. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100 feet.
Vertical Section is from Slot and calculated along an Azimuth of 179.426° (Grid).

Coordinate System is NAD 1927 (NADCON CONUS) US State Plane 1927 (Exact solution), New Mexico East 3001.
Grid Convergence at Surface is 0.419°.

Based upon Minimum Curvature type calculations, at a Measured Depth of 15561.00ft.,
the Bottom Hole Displacement is 4881.44ft., in the Direction of 179.426° (Grid).