



PHOENIX
TECHNOLOGY SERVICES

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COG Operating LLC

**Lea County, NM (NAD27 NME)
Bonaid Federal Com
15H**

ST02 / 65010

Design: Surveys (Pioneer 84)

Standard Survey Report

07 October, 2019





Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

Project	Lea County, NM (NAD27 NME)		
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	Bonaid Federal Com		
Site Position:		Northing:	446,509.70 usft
From:	Map	Easting:	790,481.60 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 13' 26.694029 N
		Longitude:	103° 23' 38.423491 W
		Grid Convergence:	0.50 °

Well	15H		
Well Position	+N/-S	0.00 usft	Northing: 446,509.40 usft
	+E/-W	0.00 usft	Easting: 790,451.60 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 13' 26.693656 N
		Longitude:	103° 23' 38.772719 W
		Ground Level:	3,376.50 usft

Wellbore	ST02 / 65010				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	8/7/2019	6.61	59.86	47,833.50000000

Design	Surveys (Pioneer 84)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	10,942.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	180.00	

Survey Program	Date 10/7/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	9,550.00	Scientific - Gyro Surveys (OH / 65010)	Scientific Keeper	Scientific Drilling Intl. Standard Wireline Keeper
9,550.00	10,942.00	Phoenix MWD Surveys (ST01 / 65010)	MWD+HRGM	OWSG MWD + HRGM
10,978.00	21,799.00	Phoenix MWD Surveys (ST02 / 65010)	MWD+HRGM	OWSG MWD + HRGM

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.78	27.35	100.00	0.60	0.31	-0.60	0.78	0.78	0.00
125.00	0.90	26.78	124.99	0.93	0.48	-0.93	0.48	0.48	-2.28
150.00	1.07	26.63	149.99	1.31	0.67	-1.31	0.68	0.68	-0.60
175.00	1.11	24.11	174.99	1.74	0.88	-1.74	0.25	0.16	-10.08
200.00	1.05	21.18	199.98	2.18	1.06	-2.18	0.33	-0.24	-11.72
225.00	0.99	21.31	224.98	2.59	1.22	-2.59	0.24	-0.24	0.52
250.00	1.03	20.46	249.97	3.01	1.38	-3.01	0.17	0.16	-3.40
275.00	0.90	29.72	274.97	3.39	1.55	-3.39	0.81	-0.52	37.04

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
300.00	1.20	28.39	299.97	3.79	1.77	-3.79	1.20	1.20	-5.32
325.00	1.10	23.20	324.96	4.24	1.99	-4.24	0.58	-0.40	-20.76
350.00	0.96	22.72	349.96	4.65	2.17	-4.65	0.56	-0.56	-1.92
375.00	0.87	20.76	374.95	5.02	2.32	-5.02	0.38	-0.36	-7.84
400.00	0.97	33.89	399.95	5.38	2.50	-5.38	0.93	0.40	52.52
425.00	0.71	22.21	424.95	5.70	2.68	-5.70	1.24	-1.04	-46.72
450.00	0.58	14.06	449.95	5.96	2.77	-5.96	0.64	-0.52	-32.60
475.00	0.57	12.61	474.94	6.21	2.83	-6.21	0.07	-0.04	-5.80
500.00	0.52	5.10	499.94	6.44	2.86	-6.44	0.35	-0.20	-30.04
525.00	0.41	13.47	524.94	6.64	2.89	-6.64	0.52	-0.44	33.48
550.00	0.57	41.96	549.94	6.82	3.00	-6.82	1.15	0.64	113.96
575.00	0.56	18.80	574.94	7.03	3.12	-7.03	0.91	-0.04	-92.64
600.00	0.67	15.24	599.94	7.28	3.20	-7.28	0.47	0.44	-14.24
625.00	0.60	12.66	624.94	7.55	3.26	-7.55	0.30	-0.28	-10.32
650.00	0.61	8.56	649.94	7.81	3.31	-7.81	0.18	0.04	-16.40
675.00	0.55	7.23	674.94	8.06	3.35	-8.06	0.25	-0.24	-5.32
700.00	0.53	9.31	699.93	8.30	3.38	-8.30	0.11	-0.08	8.32
725.00	0.55	358.27	724.93	8.53	3.40	-8.53	0.42	0.08	-44.16
750.00	0.52	14.00	749.93	8.76	3.42	-8.76	0.60	-0.12	62.92
775.00	0.57	19.72	774.93	8.99	3.49	-8.99	0.30	0.20	22.88
800.00	0.61	16.64	799.93	9.23	3.57	-9.23	0.20	0.16	-12.32
825.00	0.54	11.16	824.93	9.47	3.63	-9.47	0.36	-0.28	-21.92
850.00	0.70	13.67	849.93	9.74	3.69	-9.74	0.65	0.64	10.04
875.00	0.62	351.35	874.93	10.02	3.71	-10.02	1.07	-0.32	-89.28
900.00	0.55	9.56	899.92	10.27	3.71	-10.27	0.79	-0.28	72.84
925.00	0.53	349.16	924.92	10.50	3.70	-10.50	0.77	-0.08	-81.60
950.00	0.40	341.77	949.92	10.70	3.65	-10.70	0.57	-0.52	-29.56
975.00	0.50	324.55	974.92	10.87	3.56	-10.87	0.67	0.40	-68.88
1,000.00	0.43	333.89	999.92	11.05	3.46	-11.05	0.41	-0.28	37.36
1,025.00	0.48	334.16	1,024.92	11.22	3.37	-11.22	0.20	0.20	1.08
1,050.00	0.54	336.63	1,049.92	11.43	3.28	-11.43	0.26	0.24	9.88
1,075.00	0.56	331.09	1,074.92	11.64	3.17	-11.64	0.23	0.08	-22.16
1,100.00	0.60	327.64	1,099.92	11.86	3.05	-11.86	0.21	0.16	-13.80
1,125.00	0.67	324.22	1,124.91	12.09	2.89	-12.09	0.32	0.28	-13.68
1,150.00	0.51	327.81	1,149.91	12.30	2.75	-12.30	0.66	-0.64	14.36
1,175.00	0.54	326.08	1,174.91	12.49	2.62	-12.49	0.14	0.12	-6.92
1,200.00	0.59	317.08	1,199.91	12.69	2.47	-12.69	0.41	0.20	-36.00
1,225.00	0.44	306.99	1,224.91	12.84	2.30	-12.84	0.70	-0.60	-40.36
1,250.00	0.41	324.21	1,249.91	12.97	2.17	-12.97	0.52	-0.12	68.88
1,275.00	0.46	324.35	1,274.91	13.12	2.06	-13.12	0.20	0.20	0.56
1,300.00	0.52	323.10	1,299.91	13.29	1.94	-13.29	0.24	0.24	-5.00
1,325.00	0.59	319.84	1,324.91	13.48	1.78	-13.48	0.31	0.28	-13.04
1,350.00	0.63	316.04	1,349.91	13.68	1.61	-13.68	0.23	0.16	-15.20

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Site:	Bonaud Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
1,375.00	0.48	329.34	1,374.90	13.87	1.46	-13.87	0.79	-0.60	53.20
1,400.00	0.53	312.57	1,399.90	14.04	1.32	-14.04	0.62	0.20	-67.08
1,425.00	0.47	323.90	1,424.90	14.20	1.17	-14.20	0.46	-0.24	45.32
1,450.00	0.50	311.63	1,449.90	14.35	1.03	-14.35	0.43	0.12	-49.08
1,475.00	0.60	352.56	1,474.90	14.56	0.93	-14.56	1.58	0.40	163.72
1,500.00	0.58	332.59	1,499.90	14.80	0.86	-14.80	0.82	-0.08	-79.88
1,525.00	0.53	331.57	1,524.90	15.01	0.74	-15.01	0.20	-0.20	-4.08
1,550.00	0.55	326.29	1,549.90	15.21	0.62	-15.21	0.21	0.08	-21.12
1,575.00	0.54	319.05	1,574.90	15.40	0.48	-15.40	0.28	-0.04	-28.96
1,600.00	0.57	305.58	1,599.89	15.56	0.30	-15.56	0.53	0.12	-53.88
1,625.00	0.49	322.03	1,624.89	15.72	0.13	-15.72	0.68	-0.32	65.80
1,650.00	0.49	335.19	1,649.89	15.90	0.02	-15.90	0.45	0.00	52.64
1,675.00	0.58	318.22	1,674.89	16.09	-0.11	-16.09	0.72	0.36	-67.88
1,700.00	0.60	312.65	1,699.89	16.28	-0.29	-16.28	0.24	0.08	-22.28
1,725.00	0.48	316.62	1,724.89	16.44	-0.45	-16.44	0.50	-0.48	15.88
1,750.00	0.45	312.99	1,749.89	16.58	-0.60	-16.58	0.17	-0.12	-14.52
1,775.00	0.47	306.47	1,774.89	16.71	-0.75	-16.71	0.22	0.08	-26.08
1,800.00	0.52	326.56	1,799.89	16.87	-0.90	-16.87	0.72	0.20	80.36
1,825.00	0.59	324.42	1,824.89	17.07	-1.04	-17.07	0.29	0.28	-8.56
1,850.00	0.56	330.01	1,849.88	17.28	-1.17	-17.28	0.25	-0.12	22.36
1,875.00	0.54	323.07	1,874.88	17.48	-1.30	-17.48	0.28	-0.08	-27.76
1,900.00	0.53	318.84	1,899.88	17.66	-1.45	-17.66	0.16	-0.04	-16.92
1,925.00	0.54	326.44	1,924.88	17.84	-1.59	-17.84	0.29	0.04	30.40
1,950.00	0.54	332.20	1,949.88	18.05	-1.71	-18.05	0.22	0.00	23.04
1,975.00	0.51	323.77	1,974.88	18.24	-1.83	-18.24	0.33	-0.12	-33.72
2,000.00	0.46	322.47	1,999.88	18.41	-1.96	-18.41	0.20	-0.20	-5.20
2,025.00	0.61	329.22	2,024.88	18.60	-2.09	-18.60	0.65	0.60	27.00
2,050.00	0.62	348.19	2,049.87	18.85	-2.18	-18.85	0.81	0.04	75.88
2,075.00	0.60	332.65	2,074.87	19.10	-2.27	-19.10	0.66	-0.08	-62.16
2,100.00	0.54	327.85	2,099.87	19.32	-2.39	-19.32	0.31	-0.24	-19.20
2,125.00	0.63	336.67	2,124.87	19.54	-2.51	-19.54	0.51	0.36	35.28
2,150.00	0.53	347.43	2,149.87	19.78	-2.59	-19.78	0.59	-0.40	43.04
2,175.00	0.62	332.05	2,174.87	20.01	-2.68	-20.01	0.71	0.36	-61.52
2,200.00	0.53	333.57	2,199.87	20.24	-2.79	-20.24	0.37	-0.36	6.08
2,225.00	0.59	350.93	2,224.87	20.47	-2.87	-20.47	0.72	0.24	69.44
2,250.00	0.78	348.63	2,249.86	20.76	-2.92	-20.76	0.77	0.76	-9.20
2,275.00	0.89	351.00	2,274.86	21.12	-2.98	-21.12	0.46	0.44	9.48
2,300.00	0.64	355.46	2,299.86	21.45	-3.03	-21.45	1.03	-1.00	17.84
2,325.00	0.64	349.05	2,324.86	21.73	-3.06	-21.73	0.29	0.00	-25.64
2,350.00	0.60	349.61	2,349.86	21.99	-3.11	-21.99	0.16	-0.16	2.24
2,375.00	0.63	4.54	2,374.85	22.26	-3.13	-22.26	0.65	0.12	59.72
2,400.00	0.63	1.13	2,399.85	22.53	-3.11	-22.53	0.15	0.00	-13.64
2,425.00	0.63	8.95	2,424.85	22.80	-3.09	-22.80	0.34	0.00	31.28

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Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
2,450.00	0.74	22.52	2,449.85	23.09	-3.01	-23.09	0.78	0.44	54.28
2,475.00	0.86	19.60	2,474.85	23.42	-2.88	-23.42	0.51	0.48	-11.68
2,500.00	1.02	23.03	2,499.84	23.80	-2.73	-23.80	0.68	0.64	13.72
2,525.00	1.00	19.74	2,524.84	24.21	-2.57	-24.21	0.25	-0.08	-13.16
2,550.00	1.03	29.65	2,549.84	24.61	-2.38	-24.61	0.71	0.12	39.64
2,575.00	1.18	29.17	2,574.83	25.03	-2.15	-25.03	0.60	0.60	-1.92
2,600.00	1.24	29.99	2,599.83	25.49	-1.89	-25.49	0.25	0.24	3.28
2,625.00	1.29	32.81	2,624.82	25.96	-1.60	-25.96	0.32	0.20	11.28
2,650.00	1.25	33.51	2,649.81	26.42	-1.30	-26.42	0.17	-0.16	2.80
2,675.00	1.24	37.63	2,674.81	26.86	-0.98	-26.86	0.36	-0.04	16.48
2,700.00	1.38	36.28	2,699.80	27.32	-0.64	-27.32	0.57	0.56	-5.40
2,725.00	1.32	40.50	2,724.79	27.78	-0.27	-27.78	0.46	-0.24	16.88
2,750.00	1.45	35.90	2,749.79	28.26	0.10	-28.26	0.68	0.52	-18.40
2,775.00	1.33	41.90	2,774.78	28.73	0.48	-28.73	0.75	-0.48	24.00
2,800.00	1.12	44.57	2,799.77	29.12	0.84	-29.12	0.87	-0.84	10.68
2,825.00	0.95	52.11	2,824.77	29.42	1.18	-29.42	0.87	-0.68	30.16
2,850.00	0.81	59.94	2,849.77	29.64	1.50	-29.64	0.74	-0.56	31.32
2,875.00	0.71	73.73	2,874.77	29.77	1.80	-29.77	0.83	-0.40	55.16
2,900.00	0.84	60.43	2,899.76	29.90	2.11	-29.90	0.88	0.52	-53.20
2,925.00	0.70	69.87	2,924.76	30.05	2.41	-30.05	0.75	-0.56	37.76
2,950.00	0.78	68.03	2,949.76	30.16	2.71	-30.16	0.33	0.32	-7.36
2,975.00	0.87	61.56	2,974.76	30.32	3.03	-30.32	0.52	0.36	-25.88
3,000.00	0.78	62.99	2,999.75	30.48	3.35	-30.48	0.37	-0.36	5.72
3,025.00	0.69	69.96	3,024.75	30.61	3.65	-30.61	0.51	-0.36	27.88
3,050.00	0.71	67.19	3,049.75	30.72	3.93	-30.72	0.16	0.08	-11.08
3,075.00	0.78	59.43	3,074.75	30.87	4.22	-30.87	0.49	0.28	-31.04
3,100.00	0.56	55.25	3,099.75	31.03	4.47	-31.03	0.90	-0.88	-16.72
3,125.00	0.58	5.49	3,124.74	31.22	4.58	-31.22	1.92	0.08	-199.04
3,150.00	0.62	15.90	3,149.74	31.48	4.63	-31.48	0.46	0.16	41.64
3,175.00	0.64	5.96	3,174.74	31.75	4.68	-31.75	0.44	0.08	-39.76
3,200.00	0.68	13.59	3,199.74	32.03	4.73	-32.03	0.39	0.16	30.52
3,225.00	0.58	17.77	3,224.74	32.29	4.80	-32.29	0.44	-0.40	16.72
3,250.00	0.62	15.03	3,249.74	32.55	4.88	-32.55	0.20	0.16	-10.96
3,275.00	0.66	22.70	3,274.74	32.81	4.97	-32.81	0.38	0.16	30.68
3,300.00	0.72	12.72	3,299.73	33.10	5.06	-33.10	0.54	0.24	-39.92
3,325.00	0.82	26.91	3,324.73	33.41	5.17	-33.41	0.86	0.40	56.76
3,350.00	0.97	30.91	3,349.73	33.75	5.36	-33.75	0.65	0.60	16.00
3,375.00	0.88	31.29	3,374.73	34.09	5.57	-34.09	0.36	-0.36	1.52
3,400.00	0.94	38.08	3,399.72	34.42	5.80	-34.42	0.49	0.24	27.16
3,425.00	0.87	36.06	3,424.72	34.74	6.03	-34.74	0.31	-0.28	-8.08
3,450.00	1.02	36.19	3,449.72	35.07	6.28	-35.07	0.60	0.60	0.52
3,475.00	0.88	47.01	3,474.71	35.38	6.55	-35.38	0.91	-0.56	43.28
3,500.00	0.95	40.32	3,499.71	35.67	6.82	-35.67	0.51	0.28	-26.76
3,525.00	1.01	45.54	3,524.71	35.98	7.12	-35.98	0.43	0.24	20.88

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
3,550.00	0.97	48.08	3,549.70	36.28	7.43	-36.28	0.24	-0.16	10.16
3,575.00	0.77	36.34	3,574.70	36.55	7.69	-36.55	1.07	-0.80	-46.96
3,600.00	0.31	147.32	3,599.70	36.63	7.82	-36.63	3.71	-1.84	443.92
3,625.00	0.59	180.04	3,624.70	36.45	7.86	-36.45	1.48	1.12	130.88
3,650.00	0.80	195.37	3,649.70	36.15	7.81	-36.15	1.11	0.84	61.32
3,675.00	0.89	189.54	3,674.69	35.79	7.74	-35.79	0.50	0.36	-23.32
3,700.00	0.92	190.46	3,699.69	35.40	7.67	-35.40	0.13	0.12	3.68
3,725.00	0.92	195.42	3,724.69	35.01	7.58	-35.01	0.32	0.00	19.84
3,750.00	0.88	194.45	3,749.68	34.63	7.48	-34.63	0.17	-0.16	-3.88
3,775.00	0.98	196.36	3,774.68	34.24	7.37	-34.24	0.42	0.40	7.64
3,800.00	1.34	193.58	3,799.67	33.75	7.24	-33.75	1.46	1.44	-11.12
3,825.00	1.06	196.37	3,824.67	33.24	7.10	-33.24	1.14	-1.12	11.16
3,850.00	0.99	194.88	3,849.67	32.81	6.98	-32.81	0.30	-0.28	-5.96
3,875.00	1.01	195.85	3,874.66	32.39	6.87	-32.39	0.10	0.08	3.88
3,900.00	1.10	194.21	3,899.66	31.95	6.75	-31.95	0.38	0.36	-6.56
3,925.00	1.00	195.32	3,924.65	31.50	6.63	-31.50	0.41	-0.40	4.44
3,950.00	1.02	192.59	3,949.65	31.08	6.53	-31.08	0.21	0.08	-10.92
3,975.00	1.14	190.92	3,974.64	30.62	6.43	-30.62	0.50	0.48	-6.68
4,000.00	1.26	187.01	3,999.64	30.10	6.35	-30.10	0.58	0.48	-15.64
4,025.00	1.23	178.47	4,024.63	29.56	6.32	-29.56	0.75	-0.12	-34.16
4,050.00	1.49	171.72	4,049.63	28.97	6.38	-28.97	1.22	1.04	-27.00
4,075.00	1.62	165.79	4,074.62	28.30	6.51	-28.30	0.83	0.52	-23.72
4,100.00	1.57	162.98	4,099.61	27.63	6.70	-27.63	0.37	-0.20	-11.24
4,125.00	1.61	161.48	4,124.60	26.97	6.91	-26.97	0.23	0.16	-6.00
4,150.00	1.76	152.62	4,149.59	26.30	7.20	-26.30	1.20	0.60	-35.44
4,175.00	1.55	156.50	4,174.58	25.65	7.51	-25.65	0.95	-0.84	15.52
4,200.00	1.45	152.68	4,199.57	25.06	7.79	-25.06	0.57	-0.40	-15.28
4,225.00	1.49	153.65	4,224.56	24.48	8.08	-24.48	0.19	0.16	3.88
4,250.00	1.46	147.92	4,249.55	23.92	8.39	-23.92	0.60	-0.12	-22.92
4,275.00	1.24	145.92	4,274.54	23.43	8.71	-23.43	0.90	-0.88	-8.00
4,300.00	1.21	141.13	4,299.54	23.00	9.03	-23.00	0.43	-0.12	-19.16
4,325.00	1.13	144.15	4,324.53	22.59	9.34	-22.59	0.40	-0.32	12.08
4,350.00	1.13	139.35	4,349.53	22.21	9.65	-22.21	0.38	0.00	-19.20
4,375.00	1.43	129.22	4,374.52	21.82	10.05	-21.82	1.50	1.20	-40.52
4,400.00	1.84	119.27	4,399.51	21.43	10.64	-21.43	1.99	1.64	-39.80
4,425.00	2.24	112.34	4,424.50	21.05	11.44	-21.05	1.88	1.60	-27.72
4,450.00	2.48	108.24	4,449.48	20.69	12.41	-20.69	1.17	0.96	-16.40
4,475.00	2.65	105.37	4,474.45	20.37	13.48	-20.37	0.85	0.68	-11.48
4,500.00	2.90	101.78	4,499.42	20.09	14.65	-20.09	1.22	1.00	-14.36
4,525.00	2.75	106.57	4,524.39	19.79	15.85	-19.79	1.12	-0.60	19.16
4,550.00	2.24	89.93	4,549.37	19.62	16.91	-19.62	3.52	-2.04	-66.56
4,575.00	1.89	85.07	4,574.35	19.65	17.81	-19.65	1.56	-1.40	-19.44
4,600.00	1.80	82.48	4,599.34	19.74	18.61	-19.74	0.49	-0.36	-10.36

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
4,625.00	1.54	76.07	4,624.33	19.87	19.33	-19.87	1.28	-1.04	-25.64
4,650.00	0.65	346.79	4,649.32	20.09	19.62	-20.09	6.66	-3.56	-357.12
4,675.00	0.69	338.86	4,674.32	20.37	19.53	-20.37	0.40	0.16	-31.72
4,700.00	0.80	324.83	4,699.32	20.65	19.38	-20.65	0.85	0.44	-56.12
4,725.00	0.94	313.89	4,724.32	20.94	19.13	-20.94	0.87	0.56	-43.76
4,750.00	0.96	314.04	4,749.31	21.23	18.83	-21.23	0.08	0.08	0.60
4,775.00	0.96	309.03	4,774.31	21.50	18.52	-21.50	0.34	0.00	-20.04
4,800.00	1.10	298.36	4,799.31	21.75	18.14	-21.75	0.95	0.56	-42.68
4,825.00	1.47	287.02	4,824.30	21.96	17.63	-21.96	1.79	1.48	-45.36
4,850.00	1.72	282.69	4,849.29	22.13	16.95	-22.13	1.11	1.00	-17.32
4,875.00	1.84	279.14	4,874.28	22.28	16.19	-22.28	0.65	0.48	-14.20
4,900.00	1.78	280.97	4,899.27	22.42	15.41	-22.42	0.33	-0.24	7.32
4,925.00	1.81	281.05	4,924.25	22.57	14.65	-22.57	0.12	0.12	0.32
4,950.00	1.74	278.58	4,949.24	22.70	13.88	-22.70	0.41	-0.28	-9.88
4,975.00	1.99	278.25	4,974.23	22.82	13.08	-22.82	1.00	1.00	-1.32
5,000.00	1.55	287.28	4,999.22	22.98	12.33	-22.98	2.08	-1.76	36.12
5,025.00	1.79	279.42	5,024.21	23.14	11.62	-23.14	1.32	0.96	-31.44
5,050.00	1.83	280.74	5,049.19	23.28	10.84	-23.28	0.23	0.16	5.28
5,075.00	1.92	277.68	5,074.18	23.41	10.03	-23.41	0.54	0.36	-12.24
5,100.00	1.65	281.83	5,099.17	23.54	9.27	-23.54	1.20	-1.08	16.60
5,125.00	0.94	233.45	5,124.16	23.49	8.75	-23.49	4.97	-2.84	-193.52
5,150.00	0.86	206.05	5,149.16	23.20	8.50	-23.20	1.73	-0.32	-109.60
5,175.00	0.91	197.15	5,174.16	22.85	8.36	-22.85	0.58	0.20	-35.60
5,200.00	0.78	193.63	5,199.15	22.49	8.26	-22.49	0.56	-0.52	-14.08
5,225.00	0.91	195.32	5,224.15	22.13	8.17	-22.13	0.53	0.52	6.76
5,250.00	0.79	191.12	5,249.15	21.77	8.08	-21.77	0.54	-0.48	-16.80
5,275.00	0.74	194.03	5,274.15	21.45	8.01	-21.45	0.25	-0.20	11.64
5,300.00	0.81	205.52	5,299.14	21.13	7.90	-21.13	0.68	0.28	45.96
5,325.00	0.78	206.85	5,324.14	20.82	7.74	-20.82	0.14	-0.12	5.32
5,350.00	0.86	211.64	5,349.14	20.51	7.57	-20.51	0.42	0.32	19.16
5,375.00	0.79	216.56	5,374.14	20.21	7.37	-20.21	0.40	-0.28	19.68
5,400.00	0.86	238.54	5,399.13	19.97	7.10	-19.97	1.29	0.28	87.92
5,425.00	1.21	254.52	5,424.13	19.81	6.69	-19.81	1.80	1.40	63.92
5,450.00	1.33	268.01	5,449.12	19.73	6.15	-19.73	1.28	0.48	53.96
5,475.00	1.70	278.75	5,474.11	19.77	5.49	-19.77	1.86	1.48	42.96
5,500.00	2.08	289.13	5,499.10	19.98	4.69	-19.98	2.04	1.52	41.52
5,525.00	2.40	294.14	5,524.08	20.34	3.79	-20.34	1.50	1.28	20.04
5,550.00	2.64	298.05	5,549.06	20.82	2.80	-20.82	1.18	0.96	15.64
5,575.00	2.98	302.82	5,574.03	21.45	1.75	-21.45	1.65	1.36	19.08
5,600.00	3.74	312.19	5,598.98	22.35	0.60	-22.35	3.74	3.04	37.48
5,625.00	4.05	315.13	5,623.93	23.52	-0.63	-23.52	1.47	1.24	11.76
5,650.00	4.34	316.79	5,648.86	24.84	-1.90	-24.84	1.26	1.16	6.64
5,675.00	4.62	317.64	5,673.78	26.27	-3.23	-26.27	1.15	1.12	3.40

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
5,700.00	5.01	322.90	5,698.69	27.88	-4.56	-27.88	2.35	1.56	21.04
5,725.00	5.15	323.71	5,723.60	29.66	-5.89	-29.66	0.63	0.56	3.24
5,750.00	5.25	324.12	5,748.49	31.49	-7.22	-31.49	0.43	0.40	1.64
5,775.00	5.38	324.31	5,773.39	33.37	-8.57	-33.37	0.52	0.52	0.76
5,800.00	5.53	324.18	5,798.27	35.30	-9.96	-35.30	0.60	0.60	-0.52
5,825.00	5.37	324.53	5,823.16	37.23	-11.35	-37.23	0.65	-0.64	1.40
5,850.00	5.38	324.78	5,848.05	39.14	-12.70	-39.14	0.10	0.04	1.00
5,875.00	5.47	324.84	5,872.94	41.07	-14.06	-41.07	0.36	0.36	0.24
5,900.00	5.56	324.91	5,897.82	43.03	-15.45	-43.03	0.36	0.36	0.28
5,925.00	5.51	324.31	5,922.71	45.00	-16.84	-45.00	0.31	-0.20	-2.40
5,950.00	5.58	324.66	5,947.59	46.97	-18.25	-46.97	0.31	0.28	1.40
5,975.00	5.53	324.83	5,972.47	48.94	-19.64	-48.94	0.21	-0.20	0.68
6,000.00	5.53	325.14	5,997.36	50.91	-21.03	-50.91	0.12	0.00	1.24
6,025.00	5.58	324.48	6,022.24	52.89	-22.42	-52.89	0.32	0.20	-2.64
6,050.00	5.56	324.82	6,047.12	54.87	-23.82	-54.87	0.15	-0.08	1.36
6,075.00	5.53	324.63	6,072.00	56.84	-25.22	-56.84	0.14	-0.12	-0.76
6,100.00	5.59	325.18	6,096.88	58.83	-26.61	-58.83	0.32	0.24	2.20
6,125.00	5.61	324.68	6,121.77	60.82	-28.01	-60.82	0.21	0.08	-2.00
6,150.00	5.71	323.60	6,146.64	62.82	-29.46	-62.82	0.58	0.40	-4.32
6,175.00	5.55	324.55	6,171.52	64.81	-30.90	-64.81	0.74	-0.64	3.80
6,200.00	5.47	324.29	6,196.41	66.76	-32.29	-66.76	0.34	-0.32	-1.04
6,225.00	5.48	324.06	6,221.29	68.69	-33.69	-68.69	0.10	0.04	-0.92
6,250.00	5.51	324.51	6,246.18	70.64	-35.09	-70.64	0.21	0.12	1.80
6,275.00	5.52	324.18	6,271.06	72.59	-36.49	-72.59	0.13	0.04	-1.32
6,300.00	5.57	324.07	6,295.95	74.55	-37.90	-74.55	0.20	0.20	-0.44
6,325.00	5.61	323.96	6,320.83	76.52	-39.33	-76.52	0.17	0.16	-0.44
6,350.00	5.61	324.12	6,345.71	78.49	-40.77	-78.49	0.06	0.00	0.64
6,375.00	5.65	323.72	6,370.59	80.48	-42.21	-80.48	0.22	0.16	-1.60
6,400.00	5.65	323.83	6,395.47	82.46	-43.67	-82.46	0.04	0.00	0.44
6,425.00	5.56	326.66	6,420.35	84.47	-45.06	-84.47	1.16	-0.36	11.32
6,450.00	5.63	329.33	6,445.23	86.53	-46.35	-86.53	1.08	0.28	10.68
6,475.00	5.66	330.01	6,470.11	88.66	-47.59	-88.66	0.29	0.12	2.72
6,500.00	5.71	331.07	6,494.98	90.81	-48.81	-90.81	0.47	0.20	4.24
6,525.00	5.67	331.86	6,519.86	92.99	-49.99	-92.99	0.35	-0.16	3.16
6,550.00	5.68	332.11	6,544.74	95.17	-51.16	-95.17	0.11	0.04	1.00
6,575.00	5.73	331.99	6,569.61	97.37	-52.32	-97.37	0.21	0.20	-0.48
6,600.00	5.69	332.53	6,594.49	99.57	-53.48	-99.57	0.27	-0.16	2.16
6,625.00	5.37	330.21	6,619.37	101.68	-54.63	-101.68	1.56	-1.28	-9.28
6,650.00	5.30	330.38	6,644.26	103.70	-55.78	-103.70	0.29	-0.28	0.68
6,675.00	5.19	329.70	6,669.16	105.68	-56.92	-105.68	0.51	-0.44	-2.72
6,700.00	5.16	328.62	6,694.06	107.62	-58.08	-107.62	0.41	-0.12	-4.32
6,725.00	5.22	328.72	6,718.96	109.55	-59.26	-109.55	0.24	0.24	0.40
6,750.00	5.18	328.68	6,743.85	111.49	-60.43	-111.49	0.16	-0.16	-0.16
6,775.00	5.15	328.78	6,768.75	113.41	-61.60	-113.41	0.13	-0.12	0.40

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
6,800.00	5.15	328.93	6,793.65	115.33	-62.76	-115.33	0.05	0.00	0.60
6,825.00	5.35	328.79	6,818.55	117.29	-63.95	-117.29	0.80	0.80	-0.56
6,850.00	5.19	329.01	6,843.44	119.26	-65.13	-119.26	0.65	-0.64	0.88
6,875.00	5.23	328.67	6,868.34	121.20	-66.31	-121.20	0.20	0.16	-1.36
6,900.00	5.18	328.81	6,893.23	123.14	-67.48	-123.14	0.21	-0.20	0.56
6,925.00	5.29	329.48	6,918.13	125.09	-68.65	-125.09	0.50	0.44	2.68
6,950.00	5.21	328.80	6,943.02	127.06	-69.83	-127.06	0.41	-0.32	-2.72
6,975.00	5.31	329.19	6,967.92	129.02	-71.01	-129.02	0.42	0.40	1.56
7,000.00	5.32	328.81	6,992.81	131.01	-72.20	-131.01	0.15	0.04	-1.52
7,025.00	5.32	328.96	7,017.70	132.99	-73.40	-132.99	0.06	0.00	0.60
7,050.00	5.36	329.12	7,042.59	134.99	-74.59	-134.99	0.17	0.16	0.64
7,075.00	5.37	328.85	7,067.49	136.99	-75.80	-136.99	0.11	0.04	-1.08
7,100.00	5.32	329.00	7,092.38	138.99	-77.00	-138.99	0.21	-0.20	0.60
7,125.00	5.20	329.03	7,117.27	140.95	-78.18	-140.95	0.48	-0.48	0.12
7,150.00	5.26	328.91	7,142.17	142.90	-79.35	-142.90	0.24	0.24	-0.48
7,175.00	5.08	329.01	7,167.07	144.83	-80.52	-144.83	0.72	-0.72	0.40
7,200.00	4.86	327.80	7,191.97	146.68	-81.65	-146.68	0.97	-0.88	-4.84
7,225.00	4.21	326.20	7,216.89	148.34	-82.73	-148.34	2.65	-2.60	-6.40
7,250.00	3.92	324.45	7,241.83	149.79	-83.73	-149.79	1.26	-1.16	-7.00
7,275.00	3.77	322.91	7,266.77	151.15	-84.73	-151.15	0.73	-0.60	-6.16
7,300.00	3.70	321.31	7,291.72	152.43	-85.73	-152.43	0.50	-0.28	-6.40
7,325.00	3.53	319.22	7,316.67	153.64	-86.73	-153.64	0.86	-0.68	-8.36
7,350.00	3.35	316.35	7,341.63	154.75	-87.74	-154.75	1.00	-0.72	-11.48
7,375.00	3.28	314.58	7,366.58	155.79	-88.75	-155.79	0.50	-0.28	-7.08
7,400.00	3.20	313.24	7,391.54	156.77	-89.77	-156.77	0.44	-0.32	-5.36
7,425.00	3.17	312.17	7,416.51	157.71	-90.79	-157.71	0.27	-0.12	-4.28
7,450.00	3.18	313.88	7,441.47	158.65	-91.80	-158.65	0.38	0.04	6.84
7,475.00	2.51	312.38	7,466.44	159.50	-92.71	-159.50	2.70	-2.68	-6.00
7,500.00	2.20	318.30	7,491.42	160.23	-93.43	-160.23	1.57	-1.24	23.68
7,525.00	1.83	327.59	7,516.40	160.92	-93.96	-160.92	1.97	-1.48	37.16
7,550.00	1.76	329.51	7,541.39	161.59	-94.37	-161.59	0.37	-0.28	7.68
7,575.00	1.61	343.84	7,566.38	162.26	-94.67	-162.26	1.78	-0.60	57.32
7,600.00	1.60	352.27	7,591.37	162.94	-94.81	-162.94	0.94	-0.04	33.72
7,625.00	1.54	0.50	7,616.36	163.63	-94.85	-163.63	0.93	-0.24	32.92
7,650.00	1.67	1.11	7,641.35	164.33	-94.84	-164.33	0.52	0.52	2.44
7,675.00	1.71	0.63	7,666.34	165.06	-94.83	-165.06	0.17	0.16	-1.92
7,700.00	1.65	0.96	7,691.33	165.80	-94.82	-165.80	0.24	-0.24	1.32
7,725.00	1.62	1.93	7,716.32	166.51	-94.80	-166.51	0.16	-0.12	3.88
7,750.00	1.64	3.28	7,741.31	167.22	-94.77	-167.22	0.17	0.08	5.40
7,775.00	1.70	9.04	7,766.30	167.94	-94.69	-167.94	0.71	0.24	23.04
7,800.00	1.83	17.27	7,791.28	168.69	-94.52	-168.69	1.14	0.52	32.92
7,825.00	1.70	23.26	7,816.27	169.41	-94.25	-169.41	0.90	-0.52	23.96
7,850.00	1.58	28.56	7,841.26	170.05	-93.94	-170.05	0.77	-0.48	21.20

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
7,875.00	1.58	28.97	7,866.25	170.66	-93.61	-170.66	0.05	0.00	1.64
7,900.00	1.70	24.24	7,891.24	171.30	-93.29	-171.30	0.72	0.48	-18.92
7,925.00	1.49	31.03	7,916.23	171.92	-92.97	-171.92	1.13	-0.84	27.16
7,950.00	1.39	32.72	7,941.22	172.45	-92.64	-172.45	0.43	-0.40	6.76
7,975.00	1.22	43.12	7,966.22	172.90	-92.29	-172.90	1.16	-0.68	41.60
8,000.00	1.06	51.52	7,991.21	173.24	-91.93	-173.24	0.92	-0.64	33.60
8,025.00	1.09	48.51	8,016.21	173.54	-91.57	-173.54	0.26	0.12	-12.04
8,050.00	1.04	51.46	8,041.20	173.84	-91.22	-173.84	0.30	-0.20	11.80
8,075.00	0.98	55.44	8,066.20	174.10	-90.86	-174.10	0.37	-0.24	15.92
8,100.00	1.08	56.64	8,091.20	174.35	-90.49	-174.35	0.41	0.40	4.80
8,125.00	1.02	53.71	8,116.19	174.61	-90.11	-174.61	0.32	-0.24	-11.72
8,150.00	1.11	51.45	8,141.19	174.89	-89.74	-174.89	0.40	0.36	-9.04
8,175.00	1.15	53.63	8,166.18	175.19	-89.35	-175.19	0.23	0.16	8.72
8,200.00	1.11	61.18	8,191.18	175.46	-88.94	-175.46	0.62	-0.16	30.20
8,225.00	1.08	54.21	8,216.17	175.71	-88.54	-175.71	0.55	-0.12	-27.88
8,250.00	1.16	55.14	8,241.17	176.00	-88.14	-176.00	0.33	0.32	3.72
8,275.00	1.08	55.94	8,266.16	176.27	-87.73	-176.27	0.33	-0.32	3.20
8,300.00	1.09	54.79	8,291.16	176.54	-87.34	-176.54	0.10	0.04	-4.60
8,325.00	1.11	54.31	8,316.15	176.82	-86.95	-176.82	0.09	0.08	-1.92
8,350.00	1.26	51.51	8,341.15	177.13	-86.54	-177.13	0.64	0.60	-11.20
8,375.00	1.21	41.39	8,366.14	177.50	-86.15	-177.50	0.89	-0.20	-40.48
8,400.00	1.42	39.32	8,391.14	177.94	-85.78	-177.94	0.86	0.84	-8.28
8,425.00	1.42	39.57	8,416.13	178.42	-85.39	-178.42	0.02	0.00	1.00
8,450.00	1.46	37.00	8,441.12	178.91	-85.00	-178.91	0.30	0.16	-10.28
8,475.00	1.69	34.14	8,466.11	179.47	-84.60	-179.47	0.97	0.92	-11.44
8,500.00	1.63	35.93	8,491.10	180.06	-84.18	-180.06	0.32	-0.24	7.16
8,525.00	1.56	34.68	8,516.09	180.63	-83.78	-180.63	0.31	-0.28	-5.00
8,550.00	1.49	36.04	8,541.08	181.17	-83.40	-181.17	0.32	-0.28	5.44
8,575.00	1.54	33.82	8,566.07	181.72	-83.02	-181.72	0.31	0.20	-8.88
8,600.00	1.71	37.59	8,591.06	182.29	-82.60	-182.29	0.80	0.68	15.08
8,625.00	1.53	35.31	8,616.05	182.86	-82.18	-182.86	0.76	-0.72	-9.12
8,650.00	1.52	36.45	8,641.05	183.40	-81.79	-183.40	0.13	-0.04	4.56
8,675.00	1.51	36.58	8,666.04	183.93	-81.40	-183.93	0.04	-0.04	0.52
8,700.00	1.51	36.41	8,691.03	184.46	-81.01	-184.46	0.02	0.00	-0.68
8,725.00	1.52	34.78	8,716.02	185.00	-80.62	-185.00	0.18	0.04	-6.52
8,750.00	1.45	36.91	8,741.01	185.52	-80.25	-185.52	0.36	-0.28	8.52
8,775.00	1.36	37.09	8,766.00	186.01	-79.88	-186.01	0.36	-0.36	0.72
8,800.00	1.45	35.88	8,791.00	186.50	-79.51	-186.50	0.38	0.36	-4.84
8,825.00	1.60	34.46	8,815.99	187.05	-79.13	-187.05	0.62	0.60	-5.68
8,850.00	1.56	34.70	8,840.98	187.62	-78.74	-187.62	0.16	-0.16	0.96
8,875.00	1.47	37.22	8,865.97	188.15	-78.35	-188.15	0.45	-0.36	10.08
8,900.00	1.41	38.83	8,890.96	188.65	-77.96	-188.65	0.29	-0.24	6.44
8,925.00	1.45	37.94	8,915.95	189.13	-77.58	-189.13	0.18	0.16	-3.56



Survey Report



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Bonaid Federal Com
Well: 15H
Wellbore: ST02 / 65010
Design: Surveys (Pioneer 84)

Local Co-ordinate Reference: Well 15H
TVD Reference: RKB @ 3401.50usft (Pioneer 84)
MD Reference: RKB @ 3401.50usft (Pioneer 84)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: USA Compass

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)
8,950.00	1.51	28.84	8,940.94	189.67	-77.22	-189.67	0.97	0.24	-36.40
8,975.00	1.52	25.98	8,965.94	190.26	-76.92	-190.26	0.31	0.04	-11.44
9,000.00	1.56	25.10	8,990.93	190.87	-76.63	-190.87	0.19	0.16	-3.52
9,025.00	1.60	24.75	9,015.92	191.49	-76.34	-191.49	0.16	0.16	-1.40
9,050.00	1.59	21.81	9,040.91	192.13	-76.06	-192.13	0.33	-0.04	-11.76
9,075.00	1.75	18.31	9,065.90	192.81	-75.81	-192.81	0.76	0.64	-14.00
9,100.00	1.79	16.87	9,090.89	193.55	-75.58	-193.55	0.24	0.16	-5.76
9,125.00	1.72	18.93	9,115.87	194.28	-75.35	-194.28	0.38	-0.28	8.24
9,150.00	1.71	19.99	9,140.86	194.98	-75.10	-194.98	0.13	-0.04	4.24
9,175.00	1.78	17.58	9,165.85	195.70	-74.85	-195.70	0.41	0.28	-9.64
9,200.00	1.80	15.97	9,190.84	196.45	-74.63	-196.45	0.22	0.08	-6.44
9,225.00	1.11	6.99	9,215.83	197.07	-74.49	-197.07	2.90	-2.76	-35.92
9,250.00	0.78	357.94	9,240.83	197.48	-74.47	-197.48	1.44	-1.32	-36.20
9,275.00	0.47	301.86	9,265.83	197.70	-74.56	-197.70	2.59	-1.24	-224.32
9,300.00	0.84	231.14	9,290.82	197.64	-74.79	-197.64	3.26	1.48	-282.88
9,325.00	1.25	218.70	9,315.82	197.32	-75.10	-197.32	1.87	1.64	-49.76
9,350.00	1.62	214.41	9,340.81	196.81	-75.47	-196.81	1.54	1.48	-17.16
9,375.00	1.81	218.13	9,365.80	196.21	-75.92	-196.21	0.88	0.76	14.88
9,400.00	1.95	218.19	9,390.79	195.56	-76.42	-195.56	0.56	0.56	0.24
9,425.00	1.98	215.99	9,415.77	194.88	-76.94	-194.88	0.32	0.12	-8.80
9,450.00	1.56	247.10	9,440.76	194.40	-77.51	-194.40	4.13	-1.68	124.44
9,475.00	1.44	270.13	9,465.75	194.27	-78.13	-194.27	2.44	-0.48	92.12
9,500.00	1.45	276.84	9,490.75	194.31	-78.76	-194.31	0.68	0.04	26.84
9,525.00	1.63	290.33	9,515.74	194.47	-79.41	-194.47	1.61	0.72	53.96
9,550.00	1.81	301.09	9,540.72	194.79	-80.08	-194.79	1.48	0.72	43.04
9,574.00	2.11	246.74	9,564.71	194.82	-80.81	-194.82	7.54	1.25	-226.46
9,606.00	3.61	214.13	9,596.67	193.75	-81.92	-193.75	6.74	4.69	-101.91
9,638.00	5.98	201.56	9,628.56	191.36	-83.10	-191.36	8.06	7.41	-39.28
9,669.00	7.48	195.23	9,659.35	187.91	-84.22	-187.91	5.39	4.84	-20.42
9,701.00	7.74	195.58	9,691.06	183.83	-85.35	-183.83	0.83	0.81	1.09
9,732.00	7.92	193.56	9,721.78	179.74	-86.41	-179.74	1.06	0.58	-6.52
9,827.00	8.80	184.77	9,815.77	166.14	-88.55	-166.14	1.63	0.93	-9.25
9,922.00	6.25	182.58	9,909.94	153.73	-89.38	-153.73	2.70	-2.68	-2.31
9,999.00	4.62	180.92	9,986.59	146.44	-89.62	-146.44	2.13	-2.12	-2.16
10,094.00	4.13	186.91	10,081.32	139.22	-90.10	-139.22	0.70	-0.52	6.31
10,188.00	4.00	194.56	10,175.08	132.68	-91.33	-132.68	0.59	-0.14	8.14
10,278.00	4.14	207.50	10,264.86	126.76	-93.62	-126.76	1.03	0.16	14.38
10,373.00	5.53	208.73	10,359.52	119.71	-97.40	-119.71	1.47	1.46	1.29
10,467.00	6.59	212.81	10,452.99	111.20	-102.50	-111.20	1.22	1.13	4.34
10,562.00	7.05	215.84	10,547.32	101.90	-108.87	-101.90	0.61	0.48	3.19
10,657.00	6.51	219.09	10,641.65	92.99	-115.68	-92.99	0.70	-0.57	3.42
10,751.00	6.06	204.35	10,735.10	84.33	-121.08	-84.33	1.78	-0.48	-15.68
10,846.00	4.58	192.27	10,829.69	76.06	-123.96	-76.06	1.95	-1.56	-12.72
10,942.00	4.67	178.40	10,925.38	68.40	-124.66	-68.40	1.17	0.09	-14.45

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
Tie In - ST02									
10,978.00	4.17	176.72	10,961.27	65.63	-124.55	-65.63	1.43	-1.39	-4.67
First Phoenix MWD Survey - ST02									
11,041.00	5.80	169.35	11,024.03	60.22	-123.83	-60.22	2.77	2.59	-11.70
11,073.00	10.02	169.36	11,055.72	55.89	-123.01	-55.89	13.19	13.19	0.03
11,136.00	11.49	170.91	11,117.61	44.31	-121.01	-44.31	2.38	2.33	2.46
11,231.00	10.16	165.93	11,210.92	26.84	-117.48	-26.84	1.71	-1.40	-5.24
11,262.00	12.89	164.75	11,241.29	20.85	-115.90	-20.85	8.84	8.81	-3.81
11,294.00	13.97	170.45	11,272.42	13.59	-114.32	-13.59	5.34	3.38	17.81
11,326.00	15.14	174.12	11,303.39	5.63	-113.26	-5.63	4.65	3.66	11.47
11,358.00	17.31	177.55	11,334.11	-3.29	-112.62	3.29	7.41	6.78	10.72
11,389.00	18.97	181.93	11,363.57	-12.93	-112.60	12.93	6.93	5.35	14.13
11,421.00	19.87	188.40	11,393.76	-23.51	-113.57	23.51	7.28	2.81	20.22
11,452.00	23.39	187.97	11,422.57	-34.82	-115.19	34.82	11.37	11.35	-1.39
11,484.00	24.45	186.53	11,451.82	-47.69	-116.82	47.69	3.78	3.31	-4.50
11,515.00	25.67	182.36	11,479.90	-60.78	-117.83	60.78	6.92	3.94	-13.45
11,547.00	27.71	180.85	11,508.49	-75.14	-118.22	75.14	6.72	6.38	-4.72
11,578.00	29.70	177.88	11,535.68	-90.02	-118.05	90.02	7.90	6.42	-9.58
11,610.00	31.64	174.91	11,563.21	-106.31	-117.01	106.31	7.69	6.06	-9.28
11,642.00	34.60	172.34	11,590.01	-123.68	-115.05	123.68	10.24	9.25	-8.03
11,673.00	37.69	171.13	11,615.04	-141.77	-112.42	141.77	10.23	9.97	-3.90
11,705.00	38.95	171.90	11,640.14	-161.39	-109.49	161.39	4.21	3.94	2.41
11,736.00	39.82	169.78	11,664.10	-180.81	-106.36	180.81	5.17	2.81	-6.84
11,768.00	43.97	170.18	11,687.92	-201.85	-102.64	201.85	13.00	12.97	1.25
11,799.00	48.21	170.06	11,709.41	-223.85	-98.81	223.85	13.68	13.68	-0.39
11,831.00	53.33	170.61	11,729.64	-248.27	-94.66	248.27	16.06	16.00	1.72
11,863.00	55.83	170.79	11,748.19	-274.01	-90.44	274.01	7.83	7.81	0.56
11,894.00	58.61	171.76	11,764.97	-299.77	-86.49	299.77	9.35	8.97	3.13
11,926.00	62.51	172.43	11,780.70	-327.36	-82.66	327.36	12.32	12.19	2.09
11,957.00	64.33	171.31	11,794.57	-354.81	-78.74	354.81	6.70	5.87	-3.61
11,989.00	66.49	169.55	11,807.88	-383.50	-73.90	383.50	8.40	6.75	-5.50
12,020.00	68.66	170.49	11,819.71	-411.72	-68.94	411.72	7.54	7.00	3.03
12,052.00	71.25	171.20	11,830.68	-441.39	-64.16	441.39	8.36	8.09	2.22
12,084.00	75.31	172.43	11,839.88	-471.72	-59.80	471.72	13.21	12.69	3.84
12,147.00	78.15	176.66	11,854.35	-532.74	-53.98	532.74	7.94	4.51	6.71
12,179.00	78.75	176.80	11,860.75	-564.04	-52.20	564.04	1.92	1.88	0.44
12,274.00	82.30	178.73	11,876.39	-657.65	-48.55	657.65	4.24	3.74	2.03
12,368.00	81.58	180.93	11,889.57	-750.72	-48.27	750.72	2.44	-0.77	2.34
12,463.00	82.05	180.83	11,903.10	-844.74	-49.72	844.74	0.51	0.49	-0.11
12,558.00	82.46	180.03	11,915.90	-938.87	-50.42	938.87	0.94	0.43	-0.84
12,653.00	81.85	178.49	11,928.87	-1,032.97	-49.21	1,032.97	1.73	-0.64	-1.62
12,690.00	81.97	178.09	11,934.08	-1,069.58	-48.11	1,069.58	1.12	0.32	-1.08
12,785.00	81.42	181.59	11,947.80	-1,163.57	-47.85	1,163.57	3.69	-0.58	3.68

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
12,880.00	80.97	181.90	11,962.34	-1,257.41	-50.71	1,257.41	0.57	-0.47	0.33
12,975.00	79.88	181.65	11,978.15	-1,351.04	-53.61	1,351.04	1.18	-1.15	-0.26
13,069.00	81.88	180.63	11,993.04	-1,443.83	-55.45	1,443.83	2.38	2.13	-1.09
13,164.00	82.79	180.43	12,005.72	-1,537.97	-56.33	1,537.97	0.98	0.96	-0.21
13,258.00	82.53	179.46	12,017.72	-1,631.20	-56.24	1,631.20	1.06	-0.28	-1.03
13,353.00	83.89	179.30	12,028.96	-1,725.53	-55.22	1,725.53	1.44	1.43	-0.17
13,448.00	84.42	178.80	12,038.63	-1,820.02	-53.65	1,820.02	0.77	0.56	-0.53
13,542.00	84.69	179.22	12,047.55	-1,913.58	-52.03	1,913.58	0.53	0.29	0.45
13,637.00	84.61	181.75	12,056.41	-2,008.16	-52.83	2,008.16	2.65	-0.08	2.66
13,732.00	85.17	182.34	12,064.87	-2,102.72	-56.21	2,102.72	0.85	0.59	0.62
13,827.00	84.12	181.24	12,073.74	-2,197.25	-59.16	2,197.25	1.60	-1.11	-1.16
13,922.00	83.38	181.06	12,084.08	-2,291.67	-61.06	2,291.67	0.80	-0.78	-0.19
14,017.00	82.44	180.14	12,095.81	-2,385.94	-62.05	2,385.94	1.38	-0.99	-0.97
14,112.00	81.26	179.54	12,109.27	-2,479.97	-61.79	2,479.97	1.39	-1.24	-0.63
14,207.00	80.97	179.76	12,123.95	-2,573.83	-61.21	2,573.83	0.38	-0.31	0.23
14,302.00	81.66	180.19	12,138.29	-2,667.74	-61.17	2,667.74	0.85	0.73	0.45
14,396.00	81.28	178.97	12,152.23	-2,760.70	-60.49	2,760.70	1.35	-0.40	-1.30
14,491.00	86.36	178.84	12,162.46	-2,855.10	-58.69	2,855.10	5.35	5.35	-0.14
14,586.00	86.48	178.54	12,168.39	-2,949.89	-56.52	2,949.89	0.34	0.13	-0.32
14,680.00	85.79	178.05	12,174.73	-3,043.63	-53.73	3,043.63	0.90	-0.73	-0.52
14,775.00	86.18	179.49	12,181.38	-3,138.37	-51.69	3,138.37	1.57	0.41	1.52
14,870.00	85.50	180.94	12,188.27	-3,233.12	-52.05	3,233.12	1.68	-0.72	1.53
14,965.00	84.94	179.59	12,196.19	-3,327.79	-52.49	3,327.79	1.53	-0.59	-1.42
15,060.00	83.87	179.41	12,205.45	-3,422.33	-51.66	3,422.33	1.14	-1.13	-0.19
15,155.00	83.76	179.64	12,215.68	-3,516.77	-50.88	3,516.77	0.27	-0.12	0.24
15,250.00	83.23	179.62	12,226.45	-3,611.16	-50.27	3,611.16	0.56	-0.56	-0.02
15,344.00	82.45	178.80	12,238.16	-3,704.41	-48.98	3,704.41	1.20	-0.83	-0.87
15,439.00	84.56	179.11	12,248.91	-3,798.78	-47.26	3,798.78	2.24	2.22	0.33
15,534.00	87.14	178.76	12,255.78	-3,893.51	-45.50	3,893.51	2.74	2.72	-0.37
15,629.00	89.91	178.61	12,258.23	-3,988.44	-43.32	3,988.44	2.92	2.92	-0.16
15,724.00	89.15	177.78	12,259.01	-4,083.39	-40.33	4,083.39	1.18	-0.80	-0.87
15,819.00	92.37	179.52	12,257.75	-4,178.34	-38.09	4,178.34	3.85	3.39	1.83
15,882.00	90.22	181.15	12,256.32	-4,241.32	-38.46	4,241.32	4.28	-3.41	2.59
15,977.00	89.77	180.79	12,256.33	-4,336.30	-40.07	4,336.30	0.61	-0.47	-0.38
16,071.00	89.86	180.67	12,256.64	-4,430.30	-41.27	4,430.30	0.16	0.10	-0.13
16,166.00	89.77	179.64	12,256.94	-4,525.29	-41.52	4,525.29	1.09	-0.09	-1.08
16,261.00	89.92	178.98	12,257.20	-4,620.29	-40.38	4,620.29	0.71	0.16	-0.69
16,356.00	92.56	179.38	12,255.14	-4,715.25	-39.02	4,715.25	2.81	2.78	0.42
16,451.00	93.36	179.21	12,250.24	-4,810.11	-37.85	4,810.11	0.86	0.84	-0.18
16,547.00	91.78	180.36	12,245.93	-4,906.01	-37.49	4,906.01	2.03	-1.65	1.20
16,642.00	92.23	180.67	12,242.61	-5,000.95	-38.35	5,000.95	0.58	0.47	0.33
16,736.00	89.64	181.77	12,241.08	-5,094.90	-40.35	5,094.90	2.99	-2.76	1.17
16,831.00	90.15	181.71	12,241.25	-5,189.86	-43.23	5,189.86	0.54	0.54	-0.06
16,926.00	90.13	181.66	12,241.02	-5,284.82	-46.03	5,284.82	0.06	-0.02	-0.05

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
17,021.00	90.88	181.42	12,240.18	-5,379.78	-48.58	5,379.78	0.83	0.79	-0.25
17,115.00	89.00	182.15	12,240.28	-5,473.73	-51.51	5,473.73	2.15	-2.00	0.78
17,210.00	89.51	181.83	12,241.51	-5,568.66	-54.81	5,568.66	0.63	0.54	-0.34
17,305.00	89.86	181.73	12,242.04	-5,663.62	-57.76	5,663.62	0.38	0.37	-0.11
17,400.00	89.74	181.68	12,242.37	-5,758.57	-60.58	5,758.57	0.14	-0.13	-0.05
17,495.00	89.09	180.42	12,243.34	-5,853.55	-62.32	5,853.55	1.49	-0.68	-1.33
17,590.00	89.64	179.23	12,244.39	-5,948.54	-62.03	5,948.54	1.38	0.58	-1.25
17,684.00	90.59	179.13	12,244.20	-6,042.53	-60.69	6,042.53	1.02	1.01	-0.11
17,779.00	89.53	179.89	12,244.10	-6,137.52	-59.88	6,137.52	1.37	-1.12	0.80
17,874.00	90.48	180.02	12,244.09	-6,232.52	-59.80	6,232.52	1.01	1.00	0.14
17,969.00	91.18	179.81	12,242.72	-6,327.51	-59.66	6,327.51	0.77	0.74	-0.22
18,063.00	90.07	180.14	12,241.69	-6,421.51	-59.62	6,421.51	1.23	-1.18	0.35
18,158.00	87.28	179.05	12,243.89	-6,516.47	-58.95	6,516.47	3.15	-2.94	-1.15
18,253.00	86.52	178.97	12,249.03	-6,611.31	-57.31	6,611.31	0.80	-0.80	-0.08
18,348.00	86.57	177.62	12,254.75	-6,706.10	-54.49	6,706.10	1.42	0.05	-1.42
18,443.00	88.67	175.61	12,258.70	-6,800.84	-48.88	6,800.84	3.06	2.21	-2.12
18,538.00	88.14	175.66	12,261.34	-6,895.53	-41.66	6,895.53	0.56	-0.56	0.05
18,633.00	87.07	175.42	12,265.31	-6,990.15	-34.28	6,990.15	1.15	-1.13	-0.25
18,728.00	88.78	174.68	12,268.75	-7,084.73	-26.08	7,084.73	1.96	1.80	-0.78
18,823.00	90.63	175.06	12,269.24	-7,179.35	-17.59	7,179.35	1.99	1.95	0.40
18,911.00	91.44	176.23	12,267.65	-7,267.08	-10.91	7,267.08	1.62	0.92	1.33
19,006.00	91.59	178.05	12,265.14	-7,361.92	-6.17	7,361.92	1.92	0.16	1.92
19,101.00	92.42	178.92	12,261.81	-7,456.83	-3.66	7,456.83	1.27	0.87	0.92
19,196.00	93.50	178.61	12,256.91	-7,551.68	-1.62	7,551.68	1.18	1.14	-0.33
19,259.00	94.97	177.88	12,252.26	-7,614.47	0.31	7,614.47	2.60	2.33	-1.16
19,386.00	92.67	176.10	12,243.80	-7,741.00	6.96	7,741.00	2.29	-1.81	-1.40
19,481.00	92.51	176.82	12,239.50	-7,835.72	12.82	7,835.72	0.78	-0.17	0.76
19,576.00	89.84	177.19	12,237.56	-7,930.57	17.79	7,930.57	2.84	-2.81	0.39
19,671.00	90.44	179.29	12,237.32	-8,025.51	20.70	8,025.51	2.30	0.63	2.21
19,766.00	89.82	182.04	12,237.11	-8,120.50	19.60	8,120.50	2.97	-0.65	2.89
19,861.00	88.77	182.32	12,238.28	-8,215.42	15.99	8,215.42	1.14	-1.11	0.29
19,955.00	87.66	182.48	12,241.20	-8,309.29	12.05	8,309.29	1.19	-1.18	0.17
20,050.00	88.57	182.44	12,244.33	-8,404.15	7.98	8,404.15	0.96	0.96	-0.04
20,148.00	88.40	182.37	12,246.92	-8,502.03	3.87	8,502.03	0.19	-0.17	-0.07
20,244.00	87.50	183.69	12,250.35	-8,597.83	-1.20	8,597.83	1.66	-0.94	1.38
20,339.00	87.56	183.99	12,254.45	-8,692.53	-7.56	8,692.53	0.32	0.06	0.32
20,434.00	87.42	182.48	12,258.61	-8,787.29	-12.92	8,787.29	1.59	-0.15	-1.59
20,529.00	87.33	181.65	12,262.96	-8,882.12	-16.33	8,882.12	0.88	-0.09	-0.87
20,624.00	87.42	179.89	12,267.31	-8,977.01	-17.61	8,977.01	1.85	0.09	-1.85
20,719.00	87.45	179.05	12,271.56	-9,071.91	-16.73	9,071.91	0.88	0.03	-0.88
20,814.00	87.40	179.02	12,275.83	-9,166.80	-15.13	9,166.80	0.06	-0.05	-0.03
20,909.00	87.14	179.45	12,280.36	-9,261.69	-13.87	9,261.69	0.53	-0.27	0.45
21,004.00	87.48	179.63	12,284.81	-9,356.58	-13.11	9,356.58	0.40	0.36	0.19

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 15H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RKB @ 3401.50usft (Pioneer 84)
Site:	Bonaid Federal Com	MD Reference:	RKB @ 3401.50usft (Pioneer 84)
Well:	15H	North Reference:	Grid
Wellbore:	ST02 / 65010	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Pioneer 84)	Database:	USA Compass

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)
21,099.00	87.45	179.21	12,289.02	-9,451.48	-12.14	9,451.48	0.44	-0.03	-0.44
21,194.00	87.42	179.15	12,293.27	-9,546.37	-10.79	9,546.37	0.07	-0.03	-0.06
21,289.00	87.12	179.08	12,297.79	-9,641.26	-9.32	9,641.26	0.32	-0.32	-0.07
21,384.00	87.40	179.59	12,302.33	-9,736.14	-8.22	9,736.14	0.61	0.29	0.54
21,478.00	87.48	179.45	12,306.53	-9,830.04	-7.43	9,830.04	0.17	0.09	-0.15
21,573.00	87.51	179.10	12,310.68	-9,924.94	-6.23	9,924.94	0.37	0.03	-0.37
21,668.00	87.54	179.18	12,314.79	-10,019.85	-4.81	10,019.85	0.09	0.03	0.08
21,669.00	87.54	179.18	12,314.83	-10,020.84	-4.79	10,020.84	0.00	0.00	0.00
LTP: 21669' MD									
21,716.00	87.51	179.26	12,316.86	-10,067.80	-4.15	10,067.80	0.18	-0.06	0.17
Final Phoenix MWD Survey - ST02									
21,799.00	87.51	179.26	12,320.47	-10,150.71	-3.08	10,150.71	0.00	0.00	0.00
Projection to TD - ST02									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,942.00	10,925.38	68.40	-124.66	Tie In - ST02
10,978.00	10,961.27	65.63	-124.55	First Phoenix MWD Survey - ST02
21,669.00	12,314.83	-10,020.84	-4.79	LTP: 21669' MD
21,716.00	12,316.86	-10,067.80	-4.15	Final Phoenix MWD Survey - ST02
21,799.00	12,320.47	-10,150.71	-3.08	Projection to TD - ST02