

EIDER FEDERAL #2H

30-025-41813

Sec 26-T24S-R32E

HOBBS OCD**MAY 19 2016****RECEIVED**

<u>Perfs</u>	<u>7 1/2%(Gal)</u>	<u>Sand(#)</u>	<u>Fluid(Gal)</u>
1	4032	312353	379176
2	3024	309675	345450
3	3024	308993	338058
4	3066	311861	345786
5	3024	310880	340158
6	3024	309119	335580
7	3024	313757	336000
8	3024	309289	340830
9	3024	358047	367206
10	3024	308978	330876
11	3024	310491	331002
12	3024	311846	339318
13	3066	311268	338352
14	3024	310312	331968
15	3024	309982	322644
16	3024	309961	324996
17	3024	310381	319326
18	3012	311441	325866
19	3012	310396	321624
20	3012	311033	323820
21	3024	310967	318738
22	3024	311941	319074
23	3024	311351	321510
24	2982	310479	320418
25	3012	311079	328218
26	3024	310193	320124
27	3024	310820	313782
28	3024	311162	316554
29	3024	311176	320376
30	2982	311061	321552
31	3012	310786	321204
32	3024	310787	315126
33	3024	310454	314370
34	3024	311296	319452
35	2982	310716	315168
36	3024	310725	314916
37	2982	311700	316050
38	3024	310780	312648
39	3024	310087	314790
40	3024	311337	311220
41	3066	311125	312438
42	2982	310829	312270
43	3024	309829	313320
44	3024	310429	312102
45	4494	309954	327684
46	3024	310176	312270
47	2478	310253	308826
48	3024	311331	314538
49	3276	326128	318990
Totals	150215	15289014	15925763

August 25, 2015

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

HOBBS OCD

MAY 19 2016

RECEIVED

Attn: Kanicia Castillo

RE: Eider Federal No 002H

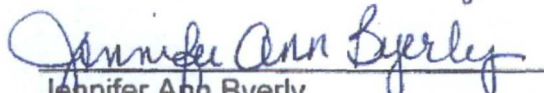
Please find enclosed a copy of the survey from 0' to 10,200' ran on the above referenced well.

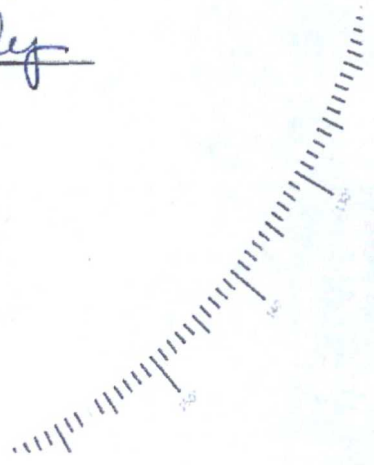
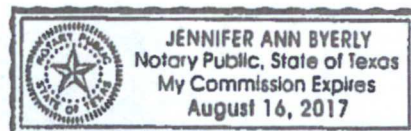
Sincerely, 

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 25 day of August,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho
Lease/Well: Elder Federal No/002H

Rig Name: Ensign 772
State/County: New Mexico/Lea
VS-Azi: 0.00 Degrees
Latitude: 32.16723, Longitude: -103.64225
Grid North = True North -0.37 degs (NAD 27)
Grid Correction Applied = -0.37 degs

HOBBS OCD

MAY 19 2016

RECEIVED

Depth Reference : RKB = 31 Foot

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: elder federal 2h_gyro survey.ut

Minimum Curvature Method

Report Date/Time: 8/25/2015 / 10:33

VES Survey International

Midland, TX

(432) 563-5444

Surveyor: Gene Heiss

Elder Federal No 002H / API 30-025-41813

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.34	161.66	100.00	-0.28	0.09	-0.28	0.30	161.66	0.34
200.00	0.37	156.69	200.00	-0.86	0.32	-0.86	0.92	159.92	0.04
300.00	0.41	159.47	300.00	-1.51	0.51	-1.51	1.60	161.42	0.10
400.00	0.87	160.01	399.99	-2.58	0.83	-2.58	2.71	162.10	0.46
500.00	0.48	152.53	499.98	-3.66	1.28	-3.66	3.88	160.67	0.40
600.00	0.78	163.99	599.98	-4.68	1.66	-4.68	4.97	160.44	0.32
700.00	1.04	176.88	699.96	-6.24	1.90	-6.24	6.52	163.06	0.33
800.00	1.08	182.48	799.95	-8.08	1.91	-8.08	8.31	166.72	0.11
900.00	1.56	194.84	899.92	-10.34	1.52	-10.34	10.45	171.65	0.56
1000.00	1.73	201.68	999.88	-13.06	0.61	-13.06	13.07	177.31	0.26
1100.00	1.77	196.02	1099.83	-15.94	-0.37	-15.94	15.95	181.33	0.18
1200.00	1.98	214.34	1199.78	-18.86	-1.77	-18.86	18.94	185.37	0.63
1300.00	1.60	192.39	1299.73	-21.64	-3.05	-21.64	21.86	188.01	0.78
1400.00	1.44	175.84	1399.70	-24.26	-3.25	-24.26	24.48	187.64	0.46
1500.00	1.67	181.39	1499.66	-26.97	-3.20	-26.97	27.15	186.76	0.27
1600.00	1.56	173.09	1599.62	-29.77	-3.07	-29.77	29.93	185.89	0.26

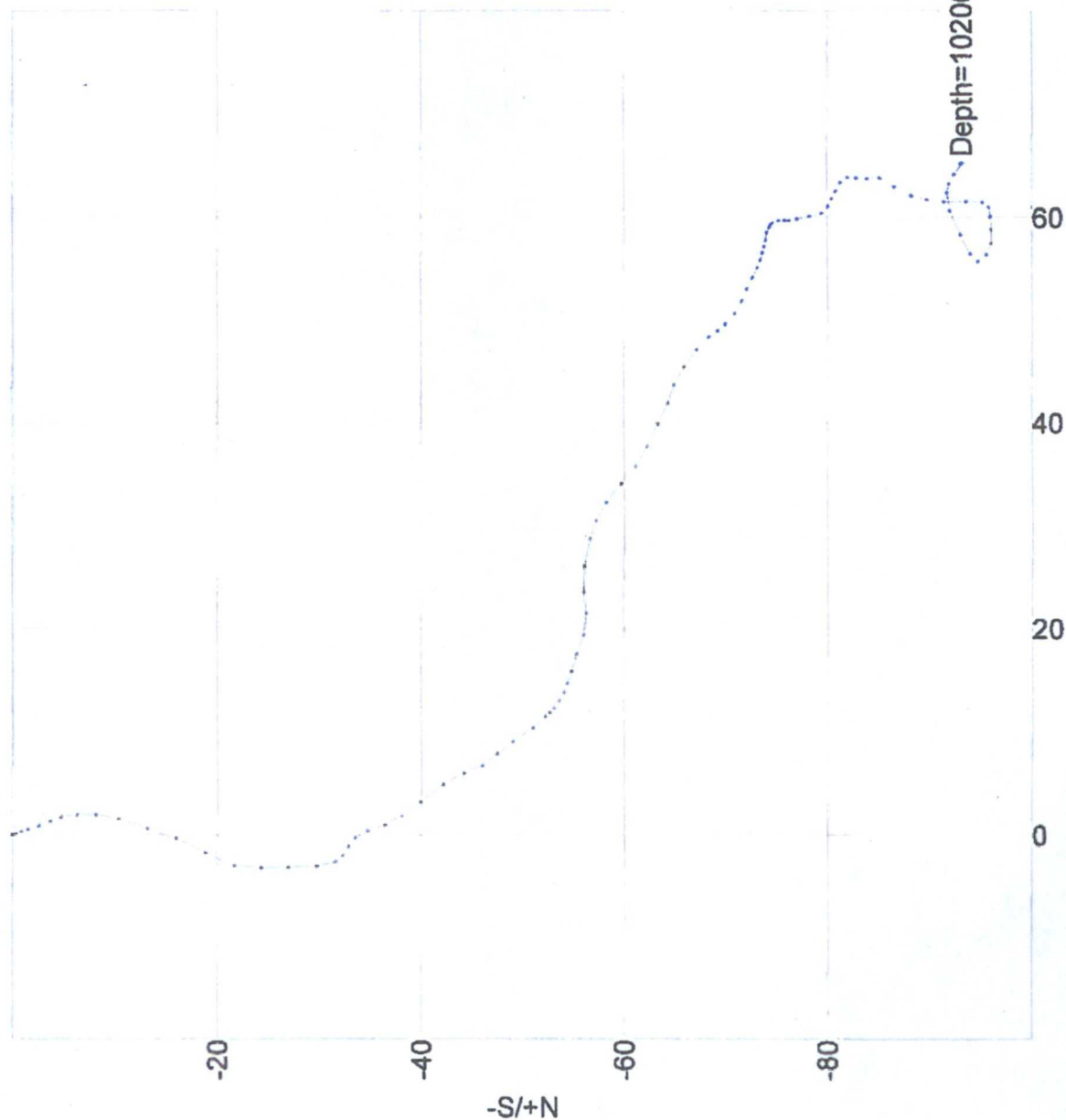
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.00	0.59	150.09	1699.60	-31.57	-2.65	-31.57	31.68	184.80	1.04
1800.00	0.52	126.18	1799.60	-32.28	-2.03	-32.28	32.35	183.59	0.24
1900.00	0.65	116.45	1899.59	-32.80	-1.15	-32.80	32.82	182.01	0.17
2000.00	0.67	142.03	1999.59	-33.52	-0.28	-33.52	33.52	180.48	0.29
2100.00	0.93	161.41	2099.58	-34.75	0.34	-34.75	34.75	179.44	0.37
2200.00	1.13	158.51	2199.56	-36.44	0.96	-36.44	36.45	178.49	0.21
2300.00	1.04	147.53	2299.54	-38.13	1.81	-38.13	38.17	177.28	0.23
2400.00	1.57	141.80	2399.52	-39.97	3.15	-39.97	40.10	175.50	0.54
2500.00	1.61	143.52	2499.48	-42.18	4.83	-42.18	42.48	173.47	0.06
2600.00	1.11	162.67	2599.45	-44.23	5.95	-44.23	44.63	172.34	0.67
2700.00	1.14	153.90	2699.43	-46.04	6.68	-46.04	46.52	171.75	0.17
2800.00	1.06	128.37	2799.41	-47.51	7.84	-47.51	48.15	170.63	0.49
2900.00	1.27	156.60	2899.39	-49.10	9.01	-49.10	49.92	169.61	0.60
3000.00	1.47	135.40	2999.36	-51.03	10.35	-51.03	52.07	168.54	0.54
3100.00	0.39	142.40	3099.35	-52.21	11.45	-52.21	53.46	167.63	1.08
3200.00	0.30	139.57	3199.35	-52.69	11.84	-52.69	54.00	167.34	0.09
3300.00	0.37	132.13	3299.35	-53.11	12.25	-53.11	54.50	167.01	0.08
3400.00	0.62	121.59	3399.34	-53.61	12.95	-53.61	55.15	166.42	0.26
3500.00	0.47	114.38	3499.34	-54.06	13.78	-54.06	55.79	165.70	0.16
3600.00	0.59	114.77	3599.33	-54.44	14.62	-54.44	56.37	164.97	0.12
3700.00	0.91	103.74	3699.32	-54.85	15.86	-54.85	57.09	163.88	0.35
3800.00	1.09	110.84	3799.31	-55.37	17.51	-55.37	58.08	162.45	0.22
3900.00	1.17	109.95	3899.29	-56.06	19.36	-56.06	59.31	160.94	0.08
4000.00	1.29	84.79	3999.27	-56.30	21.44	-56.30	60.25	159.15	0.55
4100.00	1.17	81.23	4099.24	-56.05	23.57	-56.05	60.80	157.19	0.14
4200.00	1.74	98.86	4199.21	-56.12	26.08	-56.12	61.89	155.08	0.71
4300.00	1.33	106.38	4299.18	-56.68	28.69	-56.68	63.53	153.16	0.46
4400.00	0.86	111.85	4399.16	-57.29	30.49	-57.29	64.90	151.97	0.48
4500.00	1.49	123.58	4499.14	-58.29	32.27	-58.29	66.63	151.03	0.67
4600.00	1.21	134.61	4599.11	-59.75	34.11	-59.75	68.80	150.28	0.37
4700.00	1.27	125.49	4699.09	-61.13	35.76	-61.13	70.83	149.67	0.20
4800.00	1.36	112.80	4799.06	-62.24	37.76	-62.24	72.79	148.76	0.30
4900.00	1.41	120.20	4899.03	-63.31	39.91	-63.31	74.84	147.77	0.18
5000.00	1.17	107.95	4999.01	-64.25	41.94	-64.25	76.73	146.86	0.36
5100.00	1.01	108.69	5098.99	-64.84	43.75	-64.84	78.22	145.99	0.16
5200.00	1.27	129.77	5198.97	-65.83	45.43	-65.83	79.99	145.39	0.49
5300.00	1.15	124.70	5298.95	-67.12	47.11	-67.12	82.00	144.93	0.16
5400.00	0.82	147.02	5398.93	-68.29	48.33	-68.29	83.66	144.71	0.50
5500.00	0.38	139.15	5498.93	-69.15	48.94	-69.15	84.71	144.71	0.45

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5600.00	0.72	136.67	5698.92	-69.86	49.56	-69.86	85.66	144.65	0.34
5700.00	0.90	126.16	5698.91	-70.80	50.61	-70.80	87.03	144.44	0.26
5800.00	0.73	112.84	5798.90	-71.51	51.84	-71.51	88.32	144.06	0.26
5900.00	0.72	116.17	5898.89	-72.03	52.99	-72.03	89.42	143.66	0.04
6000.00	0.68	117.45	5998.89	-72.59	54.08	-72.59	90.52	143.31	0.05
6100.00	0.58	114.72	6098.88	-73.07	55.07	-73.07	91.50	143.00	0.10
6200.00	0.33	108.38	6198.88	-73.38	55.81	-73.38	92.19	142.74	0.26
6300.00	0.52	102.68	6298.87	-73.67	56.53	-73.67	92.78	142.46	0.20
6400.00	0.20	123.53	6398.87	-73.76	57.12	-73.76	93.29	142.25	0.35
6500.00	0.57	95.48	6498.87	-73.90	57.76	-73.90	93.80	141.99	0.41
6600.00	0.30	105.52	6598.87	-74.02	58.51	-74.02	94.35	141.68	0.29
6700.00	0.28	118.65	6698.86	-74.21	58.97	-74.21	94.79	141.53	0.07
6800.00	0.05	121.81	6798.86	-74.35	59.23	-74.35	95.06	141.46	0.23
6900.00	0.29	140.49	6898.86	-74.57	59.43	-74.57	95.35	141.45	0.24
7000.00	0.49	172.52	6998.86	-75.19	59.64	-75.19	95.97	141.58	0.29
7100.00	0.20	187.15	7098.86	-75.79	59.68	-75.79	96.46	141.78	0.30
7200.00	0.32	180.67	7198.86	-76.24	59.65	-76.24	96.81	141.96	0.12
7300.00	0.57	162.64	7298.85	-77.00	59.80	-77.00	97.49	142.17	0.29
7400.00	0.86	171.01	7398.85	-78.22	60.07	-78.22	98.62	142.48	0.31
7500.00	0.57	158.72	7498.84	-79.43	60.37	-79.43	99.77	142.77	0.33
7600.00	0.56	106.72	7598.83	-80.04	61.01	-80.04	100.64	142.68	0.49
7700.00	0.43	130.35	7698.83	-80.42	61.76	-80.42	101.40	142.48	0.24
7800.00	0.52	108.73	7798.83	-80.81	62.48	-80.81	102.15	142.29	0.20
7900.00	0.57	127.29	7898.82	-81.26	63.31	-81.26	103.01	142.08	0.18
8000.00	0.46	165.67	7998.82	-81.95	63.81	-81.95	103.86	142.09	0.35
8100.00	0.60	198.01	8098.82	-82.83	63.74	-82.83	104.52	142.42	0.33
8200.00	0.70	167.73	8198.81	-83.93	63.71	-83.93	105.37	142.80	0.35
8300.00	0.74	189.11	8298.80	-85.16	63.74	-85.16	106.37	143.19	0.27
8400.00	1.24	222.64	8398.79	-86.59	62.90	-86.59	107.03	144.00	0.75
8500.00	1.00	188.84	8498.77	-88.25	62.04	-88.25	107.87	144.89	0.69
8600.00	0.81	198.81	8598.76	-89.78	61.67	-89.78	108.92	145.51	0.25
8700.00	1.16	180.39	8698.74	-91.46	61.44	-91.46	110.18	146.11	0.47
8800.00	1.21	177.41	8798.72	-93.53	61.48	-93.53	111.92	146.68	0.08
8900.00	0.59	190.42	8898.71	-95.09	61.44	-95.09	113.21	147.13	0.65
9000.00	0.48	248.63	8998.70	-95.75	60.95	-95.75	113.50	147.52	0.53
9100.00	0.59	269.82	9098.70	-95.90	60.05	-95.90	113.15	147.95	0.22
9200.00	0.87	266.46	9198.69	-95.95	58.78	-95.95	112.52	148.51	0.29
9300.00	0.64	275.38	9298.68	-95.94	57.47	-95.94	111.84	149.08	0.26
9400.00	0.83	307.69	9398.68	-95.45	56.34	-95.45	110.84	149.45	0.45

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
9500.00	0.47	350.95	9498.57	-94.60	55.71	-94.60	109.78	149.51	0.58
9600.00	0.93	67.89	9598.66	-93.89	56.39	-93.89	109.52	149.01	0.94
9700.00	1.46	60.95	9698.64	-92.97	58.26	-92.97	109.71	147.93	0.55
9800.00	1.48	73.95	9798.61	-91.99	60.61	-91.99	110.16	146.62	0.33
9900.00	0.55	98.96	9898.59	-91.71	62.33	-91.71	110.88	145.80	1.01
10000.00	0.51	105.69	9998.59	-91.90	63.23	-91.90	111.55	145.47	0.07
10100.00	0.67	128.39	10098.58	-92.39	64.11	-92.39	112.45	145.24	0.28
10200.00	0.79	121.97	10198.57	-93.11	65.15	-93.11	113.64	145.02	0.15



VES Survey International
Midland, TX
(432) 563-5444
Surveyor: Gene Heiss
Eider Federal No 002H / API 30-025-41813



VES Survey Date: 8/19/2015



HOBBS OCD
MAY 19 2016
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I Gene Heiss certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 08/19/15 through 08/19/15 conduct or supervise the taking of a Rate Gyro survey from a depth of 0 feet to a depth of 10200 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Eider Federal No Well # 002H API # 30-025-41813 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Vaughn Energy Services

A handwritten signature in blue ink, appearing to be "Gene Heiss", written over a horizontal line.

Gene Heiss
Service Technician
Vaughn Energy Services

COG Operating, LLC

Lea County, NM
Sec 35, T24S, R32E
Eider Federal #2H

HOBBS OCD

MAY 19 2016

RECE

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

10 September, 2015



HP

Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Elder Federal #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3608.0usft (Ensign #772)
Site:	Sec 35, T24S, R32E	MD Reference:	Well @ 3608.0usft (Ensign #772)
Well:	Elder Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Project	Lea County, NM		
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		Sec 35, T24S, R32E			
Site Position:		Northing:	425,247.30 usft	Latitude:	32° 10' 2.043 N
From:	Map	Easting:	713,845.80 usft	Longitude:	103° 38' 32.087 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0 37 °

Well	Elder Federal #2H					
Well Position	+N/-S	0.0 usft	Northing:	425,247.30 usft	Latitude:	32° 10' 2.043 N
	+E/-W	0.0 usft	Easting:	713,845.80 usft	Longitude:	103° 38' 32.087 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,577.0 usft	

Wellbore	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/10/2015	7.19	60.02	48,095

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	359.71	

Survey Program		Date 9/10/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,200.0	GYRO (Wellbore #1)	MWD default	MWD - Standard
10,302.0	20,769.0	MWD (Wellbore #1)	MWD default	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	425,247.30	713,845.80	32° 10' 2.043 N	103° 38' 32.087 W
100.0	0.34	161.66	100.0	-0.3	0.1	425,247.02	713,845.89	32° 10' 2.040 N	103° 38' 32.086 W
200.0	0.37	156.69	200.0	-0.9	0.3	425,246.44	713,846.11	32° 10' 2.035 N	103° 38' 32.083 W
300.0	0.41	169.47	300.0	-1.5	0.5	425,245.79	713,846.30	32° 10' 2.028 N	103° 38' 32.081 W
400.0	0.87	160.01	400.0	-2.6	0.8	425,244.73	713,846.63	32° 10' 2.018 N	103° 38' 32.078 W
500.0	0.48	152.53	500.0	-3.7	1.3	425,243.64	713,847.08	32° 10' 2.007 N	103° 38' 32.072 W
600.0	0.78	163.99	600.0	-4.7	1.7	425,242.62	713,847.46	32° 10' 1.997 N	103° 38' 32.068 W
700.0	1.04	176.88	700.0	-6.2	1.9	425,241.05	713,847.70	32° 10' 1.981 N	103° 38' 32.065 W
800.0	1.08	182.48	799.9	-8.1	1.9	425,239.21	713,847.71	32° 10' 1.963 N	103° 38' 32.065 W
900.0	1.56	194.84	899.9	-10.3	1.5	425,236.95	713,847.32	32° 10' 1.941 N	103° 38' 32.070 W
1,000.0	1.73	201.68	999.9	-13.1	0.6	425,234.23	713,846.41	32° 10' 1.914 N	103° 38' 32.081 W

HP

Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Elder Federal #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3608.0usft (Ensign #772)
Site:	Sec 35, T24S, R32E	MD Reference:	Well @ 3608.0usft (Ensign #772)
Well:	Elder Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
1,100.0	1.77	196.02	1,099.8	-16.0	-0.4	425,231.34	713,845.43	32° 10' 1.885 N	103° 38' 32.092 W	
1,200.0	1.98	214.34	1,199.8	-18.9	-1.8	425,228.43	713,844.03	32° 10' 1.857 N	103° 38' 32.109 W	
1,300.0	1.60	192.39	1,299.7	-21.7	-3.0	425,225.64	713,842.75	32° 10' 1.829 N	103° 38' 32.124 W	
1,400.0	1.44	175.84	1,399.7	-24.3	-3.3	425,223.03	713,842.55	32° 10' 1.803 N	103° 38' 32.127 W	
1,500.0	1.67	181.39	1,499.7	-27.0	-3.2	425,220.32	713,842.60	32° 10' 1.776 N	103° 38' 32.126 W	
1,600.0	1.56	173.09	1,599.6	-29.8	-3.1	425,217.51	713,842.73	32° 10' 1.748 N	103° 38' 32.125 W	
1,700.0	0.59	150.09	1,699.6	-31.6	-2.6	425,215.71	713,843.15	32° 10' 1.731 N	103° 38' 32.120 W	
1,800.0	0.52	126.18	1,799.6	-32.3	-2.0	425,215.00	713,843.77	32° 10' 1.724 N	103° 38' 32.113 W	
1,900.0	0.65	116.45	1,899.6	-32.8	-1.1	425,214.48	713,844.65	32° 10' 1.718 N	103° 38' 32.103 W	
2,000.0	0.67	142.03	1,999.6	-33.5	-0.3	425,213.76	713,845.51	32° 10' 1.711 N	103° 38' 32.093 W	
2,100.0	0.93	161.41	2,099.6	-34.8	0.3	425,212.53	713,846.13	32° 10' 1.699 N	103° 38' 32.086 W	
2,200.0	1.13	158.51	2,199.6	-36.5	1.0	425,210.85	713,846.75	32° 10' 1.682 N	103° 38' 32.079 W	
2,300.0	1.04	147.53	2,299.5	-38.1	1.8	425,209.16	713,847.60	32° 10' 1.666 N	103° 38' 32.069 W	
2,400.0	1.57	141.80	2,399.5	-40.0	3.1	425,207.32	713,848.94	32° 10' 1.647 N	103° 38' 32.053 W	
2,500.0	1.61	143.52	2,499.5	-42.2	4.8	425,205.11	713,850.62	32° 10' 1.625 N	103° 38' 32.034 W	
2,600.0	1.11	162.67	2,599.4	-44.2	5.9	425,203.06	713,851.74	32° 10' 1.605 N	103° 38' 32.021 W	
2,700.0	1.14	153.90	2,699.4	-46.1	6.7	425,201.24	713,852.47	32° 10' 1.587 N	103° 38' 32.013 W	
2,800.0	1.06	128.37	2,799.4	-47.5	7.8	425,199.77	713,853.63	32° 10' 1.572 N	103° 38' 31.999 W	
2,900.0	1.27	156.60	2,899.4	-49.1	9.0	425,198.18	713,854.80	32° 10' 1.556 N	103° 38' 31.986 W	
3,000.0	1.47	135.40	2,999.4	-51.0	10.3	425,196.25	713,856.14	32° 10' 1.537 N	103° 38' 31.971 W	
3,100.0	0.39	142.40	3,099.3	-52.2	11.4	425,195.07	713,857.25	32° 10' 1.526 N	103° 38' 31.958 W	
3,200.0	0.30	139.57	3,199.3	-52.7	11.8	425,194.60	713,857.62	32° 10' 1.521 N	103° 38' 31.953 W	
3,300.0	0.37	132.13	3,299.3	-53.1	12.2	425,194.19	713,858.03	32° 10' 1.517 N	103° 38' 31.949 W	
3,400.0	0.62	121.59	3,399.3	-53.6	12.9	425,193.69	713,858.73	32° 10' 1.512 N	103° 38' 31.941 W	
3,500.0	0.47	114.38	3,499.3	-54.1	13.8	425,193.23	713,859.57	32° 10' 1.507 N	103° 38' 31.931 W	
3,600.0	0.59	114.77	3,599.3	-54.5	14.6	425,192.85	713,860.41	32° 10' 1.503 N	103° 38' 31.921 W	
3,700.0	0.91	103.74	3,699.3	-54.9	15.9	425,192.44	713,861.65	32° 10' 1.499 N	103° 38' 31.907 W	
3,800.0	1.09	110.84	3,799.3	-55.4	17.5	425,191.92	713,863.31	32° 10' 1.494 N	103° 38' 31.887 W	
3,900.0	1.17	109.95	3,899.3	-56.1	19.4	425,191.23	713,865.16	32° 10' 1.487 N	103° 38' 31.866 W	
4,000.0	1.29	84.79	3,999.3	-56.3	21.4	425,190.98	713,867.24	32° 10' 1.484 N	103° 38' 31.842 W	
4,100.0	1.17	81.23	4,099.2	-56.1	23.6	425,191.24	713,869.37	32° 10' 1.487 N	103° 38' 31.817 W	
4,200.0	1.74	98.86	4,199.2	-56.1	26.1	425,191.16	713,871.88	32° 10' 1.486 N	103° 38' 31.788 W	
4,300.0	1.33	106.38	4,299.2	-56.7	28.7	425,190.60	713,874.49	32° 10' 1.480 N	103° 38' 31.757 W	
4,400.0	0.86	111.85	4,399.2	-57.3	30.5	425,190.00	713,876.30	32° 10' 1.474 N	103° 38' 31.736 W	
4,500.0	1.49	123.58	4,499.1	-58.3	32.3	425,189.00	713,878.08	32° 10' 1.464 N	103° 38' 31.716 W	
4,600.0	1.21	134.61	4,599.1	-59.8	34.1	425,187.54	713,879.91	32° 10' 1.450 N	103° 38' 31.695 W	
4,700.0	1.27	125.49	4,699.1	-61.1	35.8	425,186.15	713,881.57	32° 10' 1.436 N	103° 38' 31.675 W	
4,800.0	1.36	112.80	4,799.1	-62.3	37.8	425,185.05	713,883.56	32° 10' 1.425 N	103° 38' 31.652 W	
4,900.0	1.41	120.20	4,899.0	-63.3	39.9	425,183.97	713,885.72	32° 10' 1.414 N	103° 38' 31.627 W	
5,000.0	1.17	107.95	4,999.0	-64.3	42.0	425,183.04	713,887.76	32° 10' 1.405 N	103° 38' 31.604 W	
5,100.0	1.01	108.69	5,099.0	-64.9	43.8	425,182.44	713,889.56	32° 10' 1.398 N	103° 38' 31.583 W	
5,200.0	1.27	129.77	5,199.0	-65.9	45.5	425,181.45	713,891.25	32° 10' 1.389 N	103° 38' 31.563 W	
5,300.0	1.15	124.70	5,298.9	-67.1	47.1	425,180.17	713,892.93	32° 10' 1.376 N	103° 38' 31.544 W	
5,400.0	0.82	147.02	5,398.9	-68.3	48.3	425,179.00	713,894.14	32° 10' 1.364 N	103° 38' 31.530 W	
5,500.0	0.38	139.15	5,498.9	-69.2	49.0	425,178.14	713,894.75	32° 10' 1.356 N	103° 38' 31.523 W	
5,600.0	0.72	138.67	5,598.9	-69.9	49.6	425,177.42	713,895.38	32° 10' 1.348 N	103° 38' 31.515 W	
5,700.0	0.90	126.16	5,698.9	-70.8	50.6	425,176.49	713,896.43	32° 10' 1.339 N	103° 38' 31.503 W	
5,800.0	0.73	112.84	5,798.9	-71.5	51.9	425,175.78	713,897.65	32° 10' 1.332 N	103° 38' 31.489 W	
5,900.0	0.72	116.17	5,898.9	-72.0	53.0	425,175.25	713,898.80	32° 10' 1.327 N	103° 38' 31.476 W	
6,000.0	0.68	117.45	5,998.9	-72.6	54.1	425,174.70	713,899.89	32° 10' 1.321 N	103° 38' 31.463 W	
6,100.0	0.58	114.72	6,098.9	-73.1	55.1	425,174.22	713,900.88	32° 10' 1.316 N	103° 38' 31.452 W	
6,200.0	0.33	108.38	6,198.9	-73.4	55.8	425,173.91	713,901.61	32° 10' 1.313 N	103° 38' 31.443 W	
6,300.0	0.52	102.68	6,298.9	-73.6	56.5	425,173.72	713,902.33	32° 10' 1.311 N	103° 38' 31.435 W	
6,400.0	0.20	123.53	6,398.9	-73.8	57.1	425,173.53	713,902.91	32° 10' 1.309 N	103° 38' 31.428 W	
6,500.0	0.57	95.48	6,498.9	-73.9	57.8	425,173.38	713,903.55	32° 10' 1.308 N	103° 38' 31.421 W	

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Site:	Sec 35, T24S, R32E	MD Reference:	Well @ 3608.0usft (Ensign #772)
Well:	Elder Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.0	0.30	105.52	6,598.9	-74.0	58.5	425,173.27	713,904.30	32° 10' 1.307 N	103° 38' 31.412 W
6,700.0	0.28	118.65	6,698.9	-74.2	59.0	425,173.08	713,904.77	32° 10' 1.305 N	103° 38' 31.406 W
6,800.0	0.05	121.81	6,798.9	-74.4	59.2	425,172.94	713,905.02	32° 10' 1.303 N	103° 38' 31.404 W
6,900.0	0.29	140.49	6,898.9	-74.6	59.4	425,172.72	713,905.22	32° 10' 1.301 N	103° 38' 31.401 W
7,000.0	0.49	172.52	6,998.9	-75.2	59.6	425,172.10	713,905.43	32° 10' 1.295 N	103° 38' 31.399 W
7,100.0	0.20	187.15	7,098.9	-75.8	59.7	425,171.50	713,905.47	32° 10' 1.289 N	103° 38' 31.398 W
7,200.0	0.32	180.67	7,198.9	-76.2	59.6	425,171.05	713,905.44	32° 10' 1.285 N	103° 38' 31.399 W
7,300.0	0.57	162.64	7,298.9	-77.0	59.8	425,170.30	713,905.59	32° 10' 1.277 N	103° 38' 31.397 W
7,400.0	0.86	171.01	7,398.8	-78.2	60.1	425,169.08	713,905.85	32° 10' 1.265 N	103° 38' 31.394 W
7,500.0	0.57	158.72	7,498.8	-79.4	60.4	425,167.88	713,906.15	32° 10' 1.253 N	103° 38' 31.391 W
7,600.0	0.56	106.72	7,598.8	-80.0	61.0	425,167.27	713,906.80	32° 10' 1.247 N	103° 38' 31.383 W
7,700.0	0.43	130.35	7,698.8	-80.4	61.8	425,166.89	713,907.55	32° 10' 1.243 N	103° 38' 31.375 W
7,800.0	0.52	108.73	7,798.8	-80.8	62.5	425,166.50	713,908.27	32° 10' 1.240 N	103° 38' 31.366 W
7,900.0	0.57	127.29	7,898.8	-81.2	63.3	425,166.05	713,909.10	32° 10' 1.235 N	103° 38' 31.357 W
8,000.0	0.46	165.67	7,998.8	-81.9	63.8	425,165.36	713,909.59	32° 10' 1.228 N	103° 38' 31.351 W
8,100.0	0.60	198.01	8,098.8	-82.8	63.7	425,164.48	713,909.53	32° 10' 1.219 N	103° 38' 31.352 W
8,200.0	0.70	167.73	8,198.8	-83.9	63.7	425,163.38	713,909.50	32° 10' 1.209 N	103° 38' 31.352 W
8,300.0	0.74	189.11	8,298.8	-85.2	63.7	425,162.15	713,909.52	32° 10' 1.196 N	103° 38' 31.352 W
8,400.0	1.24	222.64	8,398.8	-86.6	62.9	425,160.71	713,908.69	32° 10' 1.182 N	103° 38' 31.362 W
8,500.0	1.00	188.84	8,498.8	-88.2	62.0	425,159.05	713,907.82	32° 10' 1.166 N	103° 38' 31.372 W
8,600.0	0.81	198.81	8,598.8	-89.8	61.7	425,157.52	713,907.46	32° 10' 1.151 N	103° 38' 31.376 W
8,700.0	1.16	180.39	8,698.7	-91.5	61.4	425,155.84	713,907.22	32° 10' 1.134 N	103° 38' 31.379 W
8,800.0	1.21	177.41	8,798.7	-93.5	61.5	425,153.78	713,907.27	32° 10' 1.114 N	103° 38' 31.379 W
8,900.0	0.59	190.42	8,898.7	-95.1	61.4	425,152.21	713,907.22	32° 10' 1.098 N	103° 38' 31.380 W
9,000.0	0.48	248.63	8,998.7	-95.7	60.9	425,151.56	713,906.74	32° 10' 1.092 N	103° 38' 31.385 W
9,100.0	0.59	269.82	9,098.7	-95.9	60.0	425,151.40	713,905.83	32° 10' 1.090 N	103° 38' 31.396 W
9,200.0	0.87	266.46	9,198.7	-95.9	58.8	425,151.35	713,904.56	32° 10' 1.090 N	103° 38' 31.411 W
9,300.0	0.64	275.38	9,298.7	-95.9	57.4	425,151.36	713,903.25	32° 10' 1.090 N	103° 38' 31.426 W
9,400.0	0.83	307.69	9,398.7	-95.4	56.3	425,151.85	713,902.12	32° 10' 1.095 N	103° 38' 31.439 W
9,500.0	0.47	350.95	9,498.7	-94.6	55.7	425,152.70	713,901.48	32° 10' 1.103 N	103° 38' 31.446 W
9,600.0	0.93	67.89	9,598.7	-93.9	56.4	425,153.41	713,902.17	32° 10' 1.110 N	103° 38' 31.438 W
9,700.0	1.46	60.95	9,698.6	-93.0	58.2	425,154.34	713,904.03	32° 10' 1.119 N	103° 38' 31.416 W
9,800.0	1.48	73.95	9,798.6	-92.0	60.6	425,155.31	713,906.39	32° 10' 1.129 N	103° 38' 31.389 W
9,900.0	0.55	98.96	9,898.6	-91.7	62.3	425,155.59	713,908.10	32° 10' 1.132 N	103° 38' 31.369 W
10,000.0	0.51	105.69	9,998.6	-91.9	63.2	425,155.40	713,909.00	32° 10' 1.130 N	103° 38' 31.359 W
10,100.0	0.67	128.39	10,098.6	-92.4	64.1	425,154.91	713,909.89	32° 10' 1.125 N	103° 38' 31.348 W
10,200.0	0.79	121.97	10,198.6	-93.1	65.1	425,154.19	713,910.93	32° 10' 1.118 N	103° 38' 31.336 W
Gyro Tie-in @ 10200' MD / 10199' TVD									
10,302.0	1.40	5.60	10,300.6	-92.2	65.9	425,155.05	713,911.65	32° 10' 1.126 N	103° 38' 31.328 W
10,334.0	4.00	355.80	10,332.5	-90.7	65.8	425,156.56	713,911.61	32° 10' 1.141 N	103° 38' 31.328 W
10,365.0	6.80	2.30	10,363.4	-87.8	65.8	425,159.47	713,911.60	32° 10' 1.170 N	103° 38' 31.328 W
10,396.0	9.60	5.80	10,394.1	-83.4	66.1	425,163.88	713,911.94	32° 10' 1.213 N	103° 38' 31.324 W
10,428.0	12.10	6.30	10,425.5	-77.4	66.8	425,169.87	713,912.58	32° 10' 1.273 N	103° 38' 31.316 W
10,459.0	15.00	4.00	10,455.6	-70.2	67.4	425,177.10	713,913.21	32° 10' 1.344 N	103° 38' 31.308 W
10,490.0	18.80	3.30	10,485.3	-61.2	68.0	425,186.09	713,913.78	32° 10' 1.433 N	103° 38' 31.301 W
10,522.0	22.20	3.70	10,515.2	-50.0	68.7	425,197.27	713,914.47	32° 10' 1.544 N	103° 38' 31.292 W
10,554.0	24.60	4.20	10,544.6	-37.3	69.5	425,209.95	713,915.35	32° 10' 1.669 N	103° 38' 31.281 W
10,585.0	27.60	1.90	10,572.5	-23.7	70.3	425,223.57	713,916.06	32° 10' 1.804 N	103° 38' 31.271 W
10,617.0	30.30	358.60	10,600.5	-8.2	70.3	425,239.05	713,916.10	32° 10' 1.957 N	103° 38' 31.270 W
10,648.0	32.80	357.50	10,626.9	8.0	69.8	425,255.26	713,915.55	32° 10' 2.117 N	103° 38' 31.275 W
10,680.0	35.70	357.00	10,653.3	25.9	68.9	425,273.25	713,914.68	32° 10' 2.295 N	103° 38' 31.284 W
10,711.0	39.00	358.20	10,678.0	44.7	68.1	425,292.03	713,913.90	32° 10' 2.481 N	103° 38' 31.291 W
10,742.0	41.70	359.10	10,701.6	64.8	67.6	425,312.10	713,913.43	32° 10' 2.680 N	103° 38' 31.295 W
10,774.0	44.70	358.60	10,724.9	86.7	67.2	425,333.99	713,912.99	32° 10' 2.897 N	103° 38' 31.299 W
10,805.0	47.70	1.00	10,746.4	109.1	67.1	425,356.36	713,912.92	32° 10' 3.118 N	103° 38' 31.298 W

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Project:	Lea County, NM	TVD Reference:	Well @ 3608.0usft (Ensign #772)
Site:	Sec 35, T24S, R32E	MD Reference:	Well @ 3608.0usft (Ensign #772)
Well:	Elder Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,837.0	50.00	1.90	10,767.4	133.1	67.7	425,380.45	713,913.54	32° 10' 3.356 N	103° 38' 31.289 W
10,846.2	50.62	2.32	10,773.3	140.2	68.0	425,387.52	713,913.80	32° 10' 3.426 N	103° 38' 31.285 W
Crossed Hard Line @ 10846' MD / 10773' TVD									
10,868.0	52.10	3.30	10,786.9	157.2	68.8	425,404.53	713,914.63	32° 10' 3.595 N	103° 38' 31.274 W
10,900.0	55.30	1.40	10,805.8	183.0	69.9	425,430.29	713,915.68	32° 10' 3.850 N	103° 38' 31.260 W
10,931.0	58.70	358.90	10,822.7	209.0	69.9	425,456.29	713,915.74	32° 10' 4.107 N	103° 38' 31.258 W
10,963.0	62.70	357.50	10,838.4	236.9	69.1	425,484.17	713,914.86	32° 10' 4.383 N	103° 38' 31.266 W
10,995.0	66.70	357.30	10,852.1	265.8	67.7	425,513.07	713,913.54	32° 10' 4.669 N	103° 38' 31.279 W
11,026.0	69.60	357.50	10,863.6	294.5	66.4	425,541.81	713,912.24	32° 10' 4.953 N	103° 38' 31.292 W
11,058.0	72.50	358.00	10,874.0	324.7	65.3	425,572.04	713,911.05	32° 10' 5.253 N	103° 38' 31.304 W
11,090.0	74.60	358.90	10,883.0	355.4	64.4	425,602.72	713,910.22	32° 10' 5.556 N	103° 38' 31.311 W
11,121.0	76.20	359.40	10,890.9	385.4	64.0	425,632.72	713,909.78	32° 10' 5.853 N	103° 38' 31.314 W
11,153.0	80.50	359.60	10,897.3	416.7	63.7	425,664.05	713,909.51	32° 10' 6.163 N	103° 38' 31.315 W
11,197.0	84.90	359.40	10,902.9	460.4	63.3	425,707.68	713,909.12	32° 10' 6.595 N	103° 38' 31.316 W
11,229.0	86.10	359.40	10,905.4	492.3	63.0	425,739.58	713,908.79	32° 10' 6.911 N	103° 38' 31.317 W
11,260.0	88.10	359.40	10,907.0	523.2	62.7	425,770.54	713,908.47	32° 10' 7.217 N	103° 38' 31.319 W
11,292.0	90.50	359.30	10,907.4	555.2	62.3	425,802.53	713,908.10	32° 10' 7.534 N	103° 38' 31.321 W
11,355.0	92.20	359.30	10,905.9	618.2	61.5	425,865.50	713,907.33	32° 10' 8.157 N	103° 38' 31.325 W
11,447.0	92.10	359.10	10,902.4	710.1	60.3	425,957.43	713,906.05	32° 10' 9.067 N	103° 38' 31.333 W
11,541.0	90.90	358.70	10,900.0	804.1	58.5	426,051.38	713,904.25	32° 10' 9.996 N	103° 38' 31.347 W
11,635.0	89.70	358.00	10,899.5	898.0	55.7	426,145.34	713,901.54	32° 10' 10.926 N	103° 38' 31.371 W
11,730.0	88.40	357.50	10,901.1	992.9	52.0	426,240.25	713,897.81	32° 10' 11.866 N	103° 38' 31.408 W
11,825.0	89.70	357.00	10,902.6	1,087.8	47.5	426,335.12	713,893.25	32° 10' 12.805 N	103° 38' 31.454 W
11,919.0	91.00	356.80	10,902.1	1,181.7	42.4	426,428.98	713,888.17	32° 10' 13.734 N	103° 38' 31.506 W
12,014.0	90.90	358.40	10,900.5	1,276.6	38.4	426,523.88	713,884.19	32° 10' 14.673 N	103° 38' 31.545 W
12,109.0	89.70	358.70	10,900.0	1,371.5	36.0	426,618.85	713,881.79	32° 10' 15.613 N	103° 38' 31.566 W
12,203.0	90.90	358.70	10,899.5	1,465.5	33.9	426,712.82	713,879.66	32° 10' 16.543 N	103° 38' 31.564 W
12,298.0	90.00	358.60	10,898.8	1,560.5	31.6	426,807.79	713,877.42	32° 10' 17.483 N	103° 38' 31.603 W
12,392.0	91.30	358.40	10,897.7	1,654.5	29.2	426,901.75	713,874.96	32° 10' 18.413 N	103° 38' 31.624 W
12,487.0	90.10	358.60	10,896.5	1,749.4	26.7	426,996.71	713,872.47	32° 10' 19.353 N	103° 38' 31.646 W
12,581.0	89.00	358.60	10,897.3	1,843.4	24.4	427,090.68	713,870.17	32° 10' 20.283 N	103° 38' 31.666 W
12,675.0	90.50	358.70	10,897.7	1,937.3	22.2	427,184.65	713,867.96	32° 10' 21.213 N	103° 38' 31.684 W
12,770.0	89.60	0.10	10,897.6	2,032.3	21.2	427,279.64	713,866.97	32° 10' 22.153 N	103° 38' 31.689 W
12,865.0	91.00	0.30	10,897.1	2,127.3	21.5	427,374.63	713,867.30	32° 10' 23.093 N	103° 38' 31.678 W
12,959.0	90.00	0.00	10,896.3	2,221.3	21.7	427,468.63	713,867.54	32° 10' 24.023 N	103° 38' 31.668 W
13,054.0	88.80	359.40	10,897.3	2,316.3	21.3	427,563.62	713,867.05	32° 10' 24.963 N	103° 38' 31.667 W
13,149.0	89.30	359.30	10,898.8	2,411.3	20.2	427,658.60	713,865.97	32° 10' 25.903 N	103° 38' 31.672 W
13,244.0	90.40	359.60	10,899.1	2,506.3	19.3	427,753.59	713,865.06	32° 10' 26.844 N	103° 38' 31.676 W
13,338.0	91.30	359.60	10,897.7	2,600.3	18.6	427,847.58	713,864.40	32° 10' 27.774 N	103° 38' 31.676 W
13,432.0	89.80	359.60	10,896.8	2,694.3	17.9	427,941.57	713,863.74	32° 10' 28.704 N	103° 38' 31.677 W
13,527.0	88.70	0.00	10,898.0	2,789.3	17.6	428,036.56	713,863.41	32° 10' 29.644 N	103° 38' 31.674 W
13,621.0	89.20	359.80	10,899.8	2,883.2	17.5	428,130.55	713,863.25	32° 10' 30.574 N	103° 38' 31.669 W
13,715.0	90.20	359.40	10,900.3	2,977.2	16.8	428,224.54	713,862.59	32° 10' 31.504 N	103° 38' 31.669 W
13,809.0	88.70	359.80	10,901.2	3,071.2	16.1	428,318.53	713,861.94	32° 10' 32.434 N	103° 38' 31.670 W
13,903.0	90.20	359.40	10,902.1	3,165.2	15.5	428,412.52	713,861.28	32° 10' 33.364 N	103° 38' 31.670 W
13,997.0	90.40	359.80	10,901.6	3,259.2	14.8	428,506.52	713,860.62	32° 10' 34.295 N	103° 38' 31.671 W
14,092.0	89.80	0.00	10,901.4	3,354.2	14.7	428,601.52	713,860.46	32° 10' 35.235 N	103° 38' 31.666 W
14,187.0	89.10	359.80	10,902.3	3,449.2	14.5	428,696.51	713,860.29	32° 10' 36.175 N	103° 38' 31.661 W
14,281.0	90.00	359.30	10,903.1	3,543.2	13.8	428,790.50	713,859.55	32° 10' 37.105 N	103° 38' 31.662 W
14,376.0	91.40	358.60	10,901.9	3,638.2	12.0	428,885.48	713,857.81	32° 10' 38.045 N	103° 38' 31.675 W
14,470.0	90.30	358.70	10,900.5	3,732.1	9.8	428,979.44	713,855.60	32° 10' 38.975 N	103° 38' 31.694 W
14,564.0	89.80	358.70	10,900.4	3,826.1	7.7	429,073.42	713,853.47	32° 10' 39.905 N	103° 38' 31.712 W
14,658.0	88.70	358.20	10,901.6	3,920.1	5.1	429,167.37	713,850.92	32° 10' 40.835 N	103° 38' 31.734 W
14,752.0	89.30	357.50	10,903.3	4,014.0	1.6	429,261.29	713,847.40	32° 10' 41.764 N	103° 38' 31.768 W
14,846.0	91.00	357.00	10,903.0	4,107.9	-2.9	429,355.18	713,842.89	32° 10' 42.694 N	103° 38' 31.814 W

HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Eider Federal #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3608.0usft (Ensign #772)
Site:	Sec 35, T24S, R32E	MD Reference:	Well @ 3608.0usft (Ensign #772)
Well:	Eider Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
14,941.0	89.60	357.30	10,902.5	4,202.8	-7.6	429,450.06	713,838.16	32° 10' 43.633 N	103° 38' 31.862 W	
15,035.0	91.30	358.80	10,901.8	4,296.6	-12.5	429,543.93	713,833.33	32° 10' 44.562 N	103° 38' 31.911 W	
15,129.0	90.80	357.10	10,900.1	4,390.5	-17.5	429,637.78	713,828.33	32° 10' 45.491 N	103° 38' 31.962 W	
15,224.0	90.80	358.20	10,898.8	4,485.4	-21.4	429,732.69	713,824.43	32° 10' 46.431 N	103° 38' 32.000 W	
15,318.0	89.70	358.40	10,898.3	4,579.3	-24.2	429,826.64	713,821.64	32° 10' 47.361 N	103° 38' 32.026 W	
15,412.0	89.10	359.60	10,899.3	4,673.3	-25.8	429,920.62	713,820.00	32° 10' 48.291 N	103° 38' 32.038 W	
15,506.0	89.60	359.30	10,900.4	4,767.3	-26.7	430,014.61	713,819.10	32° 10' 49.221 N	103° 38' 32.041 W	
15,601.0	91.60	359.80	10,899.4	4,862.3	-27.4	430,109.60	713,818.35	32° 10' 50.161 N	103° 38' 32.043 W	
15,696.0	92.60	0.00	10,895.9	4,957.2	-27.6	430,204.53	713,818.19	32° 10' 51.100 N	103° 38' 32.038 W	
15,790.0	90.00	0.50	10,893.8	5,051.2	-27.2	430,298.50	713,818.60	32° 10' 52.030 N	103° 38' 32.026 W	
15,884.0	90.40	359.80	10,893.5	5,145.2	-27.0	430,392.50	713,818.85	32° 10' 52.960 N	103° 38' 32.016 W	
15,979.0	89.70	0.30	10,893.4	5,240.2	-26.9	430,487.50	713,818.93	32° 10' 53.900 N	103° 38' 32.008 W	
16,074.0	89.30	1.20	10,894.2	5,335.2	-25.6	430,582.48	713,820.17	32° 10' 54.840 N	103° 38' 31.986 W	
16,169.0	88.40	1.40	10,896.1	5,430.1	-23.5	430,677.44	713,822.33	32° 10' 55.780 N	103° 38' 31.954 W	
16,263.0	89.30	1.40	10,898.0	5,524.1	-21.2	430,771.39	713,824.62	32° 10' 56.709 N	103° 38' 31.921 W	
16,358.0	88.50	1.50	10,899.8	5,619.0	-18.8	430,866.34	713,827.03	32° 10' 57.649 N	103° 38' 31.885 W	
16,452.0	89.40	1.00	10,901.5	5,713.0	-16.7	430,960.30	713,829.08	32° 10' 58.579 N	103° 38' 31.855 W	
16,547.0	90.20	1.00	10,901.9	5,808.0	-15.1	431,055.29	713,830.73	32° 10' 59.518 N	103° 38' 31.828 W	
16,642.0	88.70	1.20	10,902.8	5,903.0	-13.2	431,150.26	713,832.56	32° 11' 0.458 N	103° 38' 31.800 W	
16,736.0	89.60	0.70	10,904.2	5,996.9	-11.7	431,244.24	713,834.12	32° 11' 1.388 N	103° 38' 31.775 W	
16,830.0	90.40	0.70	10,904.2	6,090.9	-10.5	431,338.23	713,835.26	32° 11' 2.318 N	103° 38' 31.754 W	
16,925.0	89.60	0.70	10,904.2	6,185.9	-9.4	431,433.22	713,836.42	32° 11' 3.258 N	103° 38' 31.734 W	
17,020.0	90.10	0.80	10,904.4	6,280.9	-8.1	431,528.21	713,837.67	32° 11' 4.198 N	103° 38' 31.712 W	
17,113.0	89.30	0.50	10,904.9	6,373.9	-7.1	431,621.20	713,838.72	32° 11' 5.118 N	103° 38' 31.693 W	
17,207.0	90.10	0.00	10,905.4	6,467.9	-6.7	431,715.20	713,839.13	32° 11' 6.048 N	103° 38' 31.681 W	
17,301.0	90.50	0.10	10,904.9	6,561.9	-6.6	431,809.20	713,839.22	32° 11' 6.978 N	103° 38' 31.673 W	
17,396.0	88.70	0.10	10,905.6	6,656.9	-6.4	431,904.19	713,839.38	32° 11' 7.918 N	103° 38' 31.664 W	
17,490.0	89.30	359.80	10,907.2	6,750.9	-6.5	431,998.18	713,839.30	32° 11' 8.848 N	103° 38' 31.658 W	
17,585.0	90.20	359.80	10,907.6	6,845.9	-6.8	432,093.18	713,838.97	32° 11' 9.789 N	103° 38' 31.655 W	
17,679.0	91.20	359.60	10,906.5	6,939.9	-7.3	432,187.17	713,838.48	32° 11' 10.719 N	103° 38' 31.653 W	
17,775.0	90.30	359.30	10,905.2	7,035.9	-8.2	432,283.15	713,837.55	32° 11' 11.669 N	103° 38' 31.657 W	
17,867.0	89.60	358.20	10,905.3	7,127.8	-10.2	432,375.13	713,835.55	32° 11' 12.579 N	103° 38' 31.673 W	
17,961.0	90.30	358.40	10,905.4	7,221.8	-13.0	432,469.09	713,832.76	32° 11' 13.509 N	103° 38' 31.699 W	
18,056.0	89.50	358.60	10,905.6	7,316.8	-15.5	432,564.05	713,830.27	32° 11' 14.449 N	103° 38' 31.721 W	
18,150.0	90.00	358.00	10,906.0	7,410.7	-18.3	432,658.01	713,827.48	32° 11' 15.379 N	103° 38' 31.746 W	
18,244.0	89.70	358.00	10,906.2	7,504.7	-21.6	432,751.95	713,824.20	32° 11' 16.309 N	103° 38' 31.777 W	
18,338.0	90.70	358.00	10,905.9	7,598.6	-24.9	432,845.89	713,820.92	32° 11' 17.238 N	103° 38' 31.808 W	
18,433.0	91.40	358.40	10,904.2	7,693.5	-27.9	432,940.83	713,817.94	32° 11' 18.178 N	103° 38' 31.836 W	
18,528.0	91.00	358.00	10,902.2	7,788.5	-30.8	433,035.76	713,814.96	32° 11' 19.118 N	103° 38' 31.864 W	
18,622.0	90.10	357.00	10,901.3	7,882.4	-34.9	433,129.67	713,810.86	32° 11' 20.047 N	103° 38' 31.904 W	
18,716.0	90.30	357.10	10,900.9	7,976.2	-39.8	433,223.54	713,806.02	32° 11' 20.976 N	103° 38' 31.954 W	
18,811.0	89.90	358.40	10,900.8	8,071.2	-43.5	433,318.46	713,802.29	32° 11' 21.916 N	103° 38' 31.990 W	
18,905.0	88.40	358.60	10,902.2	8,165.1	-46.0	433,412.42	713,799.83	32° 11' 22.846 N	103° 38' 32.012 W	
19,000.0	89.00	357.90	10,904.3	8,260.0	-48.9	433,507.35	713,796.93	32° 11' 23.785 N	103° 38' 32.038 W	
19,094.0	90.00	358.00	10,905.1	8,354.0	-52.2	433,601.28	713,793.57	32° 11' 24.715 N	103° 38' 32.070 W	
19,188.0	90.60	359.30	10,904.6	8,448.0	-54.4	433,695.25	713,791.35	32° 11' 25.645 N	103° 38' 32.089 W	
19,283.0	89.60	359.60	10,904.5	8,542.9	-55.4	433,790.25	713,790.44	32° 11' 26.585 N	103° 38' 32.093 W	
19,377.0	90.30	359.40	10,904.6	8,636.9	-56.2	433,884.24	713,789.62	32° 11' 27.516 N	103° 38' 32.095 W	
19,472.0	90.90	359.10	10,903.6	8,731.9	-57.4	433,979.23	713,788.37	32° 11' 28.456 N	103° 38' 32.102 W	
19,566.0	90.10	359.10	10,902.7	8,825.9	-58.9	434,073.21	713,786.90	32° 11' 29.386 N	103° 38' 32.113 W	
19,660.0	88.60	358.90	10,903.8	8,919.9	-60.5	434,167.19	713,785.26	32° 11' 30.316 N	103° 38' 32.125 W	
19,755.0	89.40	358.60	10,905.5	9,014.9	-62.6	434,262.15	713,783.19	32° 11' 31.256 N	103° 38' 32.142 W	
19,849.0	89.30	358.90	10,906.5	9,108.8	-64.7	434,356.13	713,781.14	32° 11' 32.186 N	103° 38' 32.158 W	
19,943.0	89.70	0.10	10,907.4	9,202.8	-65.5	434,450.12	713,780.32	32° 11' 33.116 N	103° 38' 32.161 W	
20,038.0	90.90	359.30	10,906.9	9,297.8	-66.0	434,545.11	713,779.82	32° 11' 34.056 N	103° 38' 32.160 W	

HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Elder Federal #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3608.0usft (Ensign #772)
Site:	Sec 35, T24S, R32E	MD Reference:	Well @ 3608.0usft (Ensign #772)
Well:	Elder Federal #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,131.0	90.20	357.70	10,906.0	9,390.8	-88.4	434,638.07	713,777.38	32° 11' 34.976 N	103° 38' 32.181 W
20,227.0	90.80	358.70	10,905.1	9,486.7	-71.4	434,734.02	713,774.37	32° 11' 35.926 N	103° 38' 32.209 W
20,321.0	90.00	358.00	10,904.5	9,580.7	-74.1	434,827.98	713,771.66	32° 11' 36.856 N	103° 38' 32.233 W
20,416.0	91.10	357.90	10,903.6	9,675.6	-77.5	434,922.91	713,768.26	32° 11' 37.795 N	103° 38' 32.266 W
20,509.0	90.20	359.30	10,902.5	9,768.6	-79.8	435,015.87	713,765.99	32° 11' 38.715 N	103° 38' 32.285 W
20,603.0	91.00	359.40	10,901.5	9,862.6	-80.9	435,109.86	713,764.93	32° 11' 39.645 N	103° 38' 32.291 W
20,697.0	92.20	359.60	10,898.9	9,956.5	-81.7	435,203.82	713,764.11	32° 11' 40.575 N	103° 38' 32.293 W
20,769.0	92.20	359.60	10,896.1	10,028.5	-82.2	435,275.76	713,763.60	32° 11' 41.287 N	103° 38' 32.294 W
TD @ 20769' MD / 10896' TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,200.0	10,198.6	-93.1	65.1	Gyro Tie-in @ 10200' MD / 10199' TVD
10,846.2	10,773.3	140.2	68.0	Crossed Hard Line @ 10846' MD / 10773' TVD
20,769.0	10,896.1	10,028.5	-82.2	TD @ 20769' MD / 10896' TVD

Checked By: _____	Approved By: _____	Date: _____
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