



McVAY DRILLING COMPANY
P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

RECEIVED

AUG 21 15

COG
ARTESIA WEST

Well Name and Num: Black Pearl Federal #2 H
Location: Sec 1, T20S, R34E
Operator: COG
Drilling Contractor: McVay Drilling Company

The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.10	238	5.20	6365	89.60	1190		
0.20	637	5.10	6553	90.20	12183		
0.20	1014	5.20	6931	89.60	12467		
0.60	1203	5.70	7309	89.50	12750		
0.60	1580	5.00	7780	88.40	13233		
0.50	1769	5.50	8440	90.60	13695		
1.50	2197	4.20	8629	89.50	13883		
0.10	2575	5.50	9101	88.90	14261		
0.40	2952	6.00	9474	90.90	15206		
0.40	3405	6.10	9762	89.00	15580		
1.00	3623	4.40	10234				
2.00	4000	3.10	10486				
5.40	4378	24.40	10734				
5.50	4759	55.80	10986				
5.40	5042	74.50	11148				
5.50	5512	87.00	11491				
5.20	5987	89.00	11711				

By: *M. A. Brown*

Subscribed and sworn to be o

AW u

, 2015

Notary Public, Lea County, New Mexico





July 29, 2015

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

Attn: Kanicia Castillo

RE: **Black Pearl 1 Federal No 002H**

Please find enclosed a copy of the survey from 0' to 10,400' ran on the above referenced well.

Sincerely, 
Keith Havelka
Operations

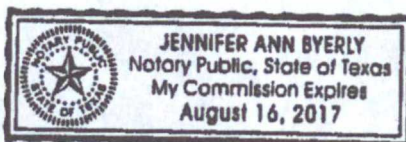
STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before
A.D., 2015, by Keith Havelka.

Jul -

be

VES Survey International
P.O. Box 261021 Corpus Christi, TX 78426
T (361) 767-0602 F (361) 767-0612
www.vessurvey.com





INTERNATIONAL

Depth Reference : RKB= 18

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyrosurvey3-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/29/2015 / 14:32

VES Survey International

Fort Worth, Texas

Office 817-741-3810

Surveyor: Gregg Wilson

Black Pearl 1 Federal No 002H / API 30-025-42293

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	0.31	24.83	100.00	0.24	0.11	-0.26	0.27	24.83	0.31
200.00	0.34	20.69	200.00	0.76	0.33	-0.81	0.83	23.37	0.04
300.00	0.14	41.44	300.00	1.13	0.52	-1.20	1.24	24.54	0.21
400.00	0.30	49.68	400.00	1.39	0.80	-1.51	1.81	29.86	0.16
500.00	0.33	75.10	499.99	1.64	1.28	-1.84	2.08	38.01	0.14
600.00	0.39	85.73	599.99	1.74	1.90	-2.04	2.58	47.55	0.09
700.00	0.47	78.64	699.99	1.85	2.64	-2.28	3.22	55.06	0.09
800.00	0.50	87.23	799.99	1.95	3.47	-2.52	3.98	60.72	0.08
900.00	0.17	125.73	899.98	1.88	4.02	-2.55	4.44	64.91	0.38
1000.00	0.29	135.46	999.98	1.61	4.32	-2.34	4.61	69.51	0.13
1100.00	0.40	140.19	1099.98	1.16	4.73	-1.97	4.87	76.20	0.11
1200.00	0.43	140.76	1199.98	0.60	5.19	-1.49	5.22	83.43	0.03
1300.00	0.37	143.89	1299.98	0.04	5.62	-1.02	5.62	89.54	0.07
1400.00	0.42	158.27	1399.97	-0.56	5.94	-0.49	5.97	95.36	0.11
1500.00	0.44	163.15	1499.97	-1.26	6.19	0.16	6.32	101.53	0.04
1600.00	0.57	172.08	1599.97	-2.12	6.37	0.98	6.71	108.39	0.15
1700.00	0.75	188.73	1699.96	-3.26	6.34	2.10	7.13	117.19	0.26
1800.00	0.92	199.65	1799.95	-4.66	5.97	3.55	7.57	127.98	0.23

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
1900.00	0.91	198.90	1899.94	-8.17	5.44	5.13	8.22	138.59	0.01
2000.00	0.77	199.12	1999.93	-7.55	4.96	6.58	9.04	146.73	0.14
2100.00	0.34	190.82	2099.92	-8.49	4.68	7.55	9.70	151.12	0.44
2200.00	0.50	193.20	2199.92	-9.21	4.53	8.28	10.26	153.82	0.16
2300.00	0.43	197.96	2299.92	-9.99	4.31	9.09	10.88	156.85	0.08
2400.00	0.17	208.66	2399.91	-10.48	4.13	9.60	11.28	158.50	0.26
2500.00	0.16	205.88	2499.91	-10.73	4.00	9.87	11.45	159.58	0.02
2600.00	0.03	193.31	2599.91	-10.88	3.93	10.03	11.57	160.14	0.12
2700.00	0.11	193.30	2699.91	-11.00	3.90	10.15	11.67	160.47	0.08
2800.00	0.03	31.05	2799.91	-11.07	3.89	10.22	11.73	160.61	0.14
2900.00	0.12	168.90	2899.91	-11.15	3.93	10.29	11.82	160.57	0.15
3000.00	0.26	119.44	2999.91	-11.36	4.15	10.47	12.10	159.94	0.20
3100.00	0.36	110.33	3099.91	-11.58	4.64	10.60	12.48	158.16	0.12
3200.00	0.37	99.78	3199.91	-11.75	5.26	10.65	12.87	155.89	0.07
3300.00	0.31	93.85	3299.91	-11.82	5.85	10.62	13.19	153.67	0.07
3400.00	0.34	95.83	3399.91	-11.87	6.42	10.57	13.50	151.58	0.03
3500.00	0.29	65.60	3499.91	-11.80	6.95	10.41	13.69	149.49	0.17
3600.00	0.29	57.53	3599.90	-11.56	7.39	10.10	13.72	147.41	0.04
3700.00	1.51	303.01	3699.89	-10.71	6.50	9.41	12.52	148.76	1.65
3800.00	2.11	289.43	3799.84	-9.38	3.65	8.60	10.06	158.71	0.73
3900.00	2.02	293.60	3899.78	-8.05	0.30	7.88	8.06	177.85	0.18
4000.00	2.06	294.32	3999.71	-8.60	-2.95	7.01	7.23	204.07	0.04
4100.00	2.55	292.00	4099.63	-5.03	-6.65	6.11	8.33	232.90	0.50
4200.00	3.93	285.06	4199.47	-3.30	-12.02	5.35	12.47	254.64	1.43
4300.00	4.65	286.12	4299.19	-1.28	-19.23	4.61	19.28	266.18	0.72
4400.00	5.13	282.91	4398.83	0.84	-27.48	3.96	27.50	271.75	0.55
4500.00	4.89	279.10	4498.44	2.51	-36.05	3.80	36.14	273.99	0.41
4600.00	4.64	279.02	4598.10	3.82	-44.26	3.94	44.42	274.94	0.24
4700.00	5.60	283.70	4697.70	5.61	-53.00	3.70	53.29	276.05	1.04
4800.00	5.48	281.18	4797.23	7.69	-62.42	3.30	62.89	277.03	0.27
4900.00	5.54	269.75	4896.77	8.60	-71.93	4.06	72.44	276.82	1.10
5000.00	5.35	271.95	4996.32	8.74	-81.42	5.58	81.88	276.12	0.28
5100.00	5.17	267.40	5095.90	8.69	-90.57	7.22	90.99	275.48	0.45
5200.00	5.19	264.51	5195.49	8.05	-99.57	9.41	99.90	274.62	0.26
5300.00	5.42	277.41	5295.07	8.23	-108.76	10.84	109.07	274.33	1.21
5400.00	5.11	269.32	5394.65	8.78	-117.90	11.88	118.22	274.26	0.80
5500.00	5.21	269.41	5494.24	8.68	-126.89	13.55	127.18	273.92	0.10
5600.00	5.36	268.72	5593.82	8.53	-136.09	15.30	136.36	273.59	0.17
5700.00	5.22	278.00	5693.39	9.06	-145.27	16.38	145.55	273.57	0.87

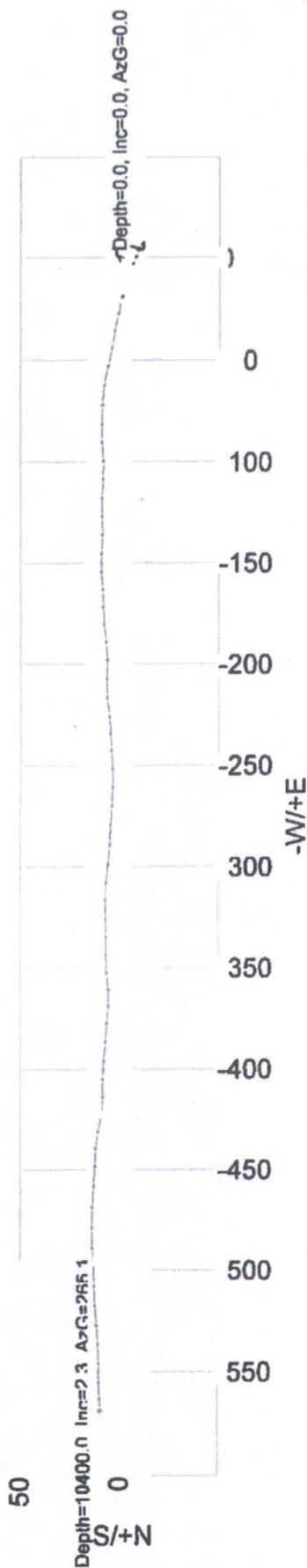
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	5.24	262.81	5792.98	9.12	-154.30	17.89	154.57	273.38	1.38
5900.00	4.91	268.74	5892.59	8.46	-163.11	20.08	163.33	272.97	0.62
6000.00	5.08	268.16	5992.21	8.22	-171.81	21.83	172.01	272.74	0.19
6100.00	4.88	264.37	6091.83	7.66	-180.47	23.89	180.64	272.43	0.39
6200.00	4.95	262.88	6191.47	6.71	-188.98	26.30	189.10	272.03	0.14
6300.00	5.40	267.92	6291.06	6.01	-197.96	28.56	198.05	271.74	0.64
6400.00	5.28	274.41	6390.83	6.19	-207.25	30.00	207.34	271.71	0.62
6500.00	5.57	263.90	6490.18	6.03	-216.65	31.80	216.74	271.59	1.03
6600.00	5.07	263.17	6589.75	4.99	-225.86	34.43	225.92	271.26	0.50
6700.00	4.55	269.72	6689.40	4.44	-234.22	36.42	234.26	271.09	0.75
6800.00	5.16	265.38	6789.04	4.06	-242.67	38.27	242.71	270.96	0.71
6900.00	5.15	267.31	6888.64	3.49	-251.63	40.39	251.66	270.79	0.17
7000.00	5.24	272.04	6988.22	3.44	-260.68	42.01	260.70	270.76	0.44
7100.00	5.45	272.76	7087.79	3.83	-269.99	43.25	270.01	270.81	0.21
7200.00	5.38	273.40	7187.34	4.34	-279.41	44.39	279.44	270.89	0.09
7300.00	5.77	271.86	7286.87	4.78	-289.11	45.65	289.15	270.95	0.41
7400.00	5.44	278.34	7386.39	5.63	-298.83	46.50	298.88	271.08	0.71
7500.00	4.97	276.01	7485.98	6.77	-307.83	46.95	307.90	271.26	0.52
7600.00	5.21	269.06	7585.59	7.15	-316.67	48.11	316.75	271.29	0.66
7700.00	5.26	267.78	7685.17	6.90	-325.79	49.95	325.87	271.21	0.13
7800.00	5.00	270.33	7784.77	6.74	-334.73	51.66	334.79	271.15	0.35
7900.00	5.14	270.08	7884.38	6.78	-343.56	53.16	343.62	271.13	0.14
8000.00	4.97	264.66	7983.99	6.38	-352.35	55.09	352.41	271.04	0.50
8100.00	4.81	264.49	8083.64	5.59	-360.66	57.31	360.71	270.89	0.37
8200.00	4.89	273.70	8183.30	5.48	-368.91	58.86	368.95	270.85	0.81
8300.00	4.80	275.28	8282.94	6.14	-377.33	59.67	377.38	270.93	0.16
8400.00	5.55	274.36	8382.53	6.89	-386.32	60.50	386.38	271.02	0.75
8500.00	5.45	275.25	8482.07	7.69	-395.87	61.37	395.94	271.11	0.13
8600.00	5.11	270.59	8581.65	8.18	-405.05	62.49	405.13	271.16	0.54
8700.00	4.76	269.82	8681.28	8.21	-413.65	63.96	413.73	271.14	0.35
8800.00	5.23	277.36	8780.90	8.78	-422.32	64.91	422.41	271.19	0.81
8900.00	4.65	286.91	8880.53	10.54	-430.72	64.63	430.85	271.40	1.01
9000.00	5.06	270.72	8980.18	11.78	-439.00	64.86	439.16	271.54	1.42
9100.00	5.74	272.01	9079.73	12.01	-448.41	66.27	448.57	271.53	0.69
9200.00	5.92	275.87	9179.22	12.71	-458.54	67.35	458.72	271.59	0.43
9300.00	5.72	271.33	9278.70	13.35	-468.65	68.47	468.84	271.63	0.50
9400.00	5.79	271.29	9378.20	13.58	-478.67	69.99	478.87	271.63	0.07
9500.00	5.90	265.38	9477.68	13.28	-488.84	72.06	489.02	271.56	0.61
9600.00	5.30	267.33	9577.20	12.65	-498.58	74.38	498.74	271.45	0.63

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
9700.00	5.28	268.53	9676.77	12.32	-507.80	76.31	507.96	271.39	0.11
9800.00	5.89	266.92	9776.30	11.92	-517.53	78.39	517.68	271.32	0.63
9900.00	5.51	264.76	9876.80	11.21	-527.43	80.82	527.55	271.22	0.43
10000.00	5.02	265.06	9976.38	10.39	-536.58	83.22	536.68	271.11	0.49
10100.00	5.55	269.15	10074.95	9.95	-545.78	85.26	545.87	271.04	0.65
10200.00	5.10	268.53	10174.52	9.76	-555.06	87.06	555.15	271.01	0.45
10300.00	4.19	266.61	10274.19	9.43	-563.16	88.80	563.24	270.96	0.92
10400.00	2.35	265.15	10374.03	9.04	-568.85	90.17	568.92	270.91	1.85

VES Survey International
Fort Worth, Texas
Office 817-741-3610
Surveyor: Gregg Wilson
Black Pearl 1 Federal No 002H / API 30-025-42293



VES SURVEY
INTERNATIONAL





I Gregg Wilson certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 07/23/15 through 07/23/15 conduct or supervise the taking of a HA Gyro survey from a depth of 0 feet to a depth of 10400 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 Black Pearl 1 Federal No Well # 002H API # 30-025-42293 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

Gregg Wilson
Service Tech I
Vaughn Energy Services



I Gregg Wilson certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 07/23/15 through 07/23/15 conduct or supervise the taking of a HA Gyro survey from a depth of 0 feet to a depth of 10400 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 Black Pearl 1 Federal No. Well # 002H API # 30-025-42293 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

Gregg Wilson
Service Technician
Vaughn Energy Services

A handwritten signature in blue ink, appearing to read "Gregg Wilson", is written over a horizontal line. The signature is stylized with a long, sweeping underline that extends to the right.



COG Operating LLC

Lea County, NM

Black Pearl 1 Federal

#2H

OH

Design: OH

Survey Report - Geographic

29 July, 2015





TDS
Survey Report - Geographic



Well #2H
KB @ 3712 3usft
KB @ 3712 3usft
Grid
Minimum Curvature
EDM 5000 1 Single User Db

US State Plane 1927 (Easting)
D 927 (DCO CO US)
Wellhead Elevation 3001

System Datum:

Mean Sea Level

Well #2H
Northing: 586 220 00 usft
Easting: 754 185 00 usft
Wellhead Elevation: 13-3/16"
Latitude: 32 36 32.078 N
Longitude: 103 30' 28 361 W
Grid Convergence: 0.44

Well #2H
Well Position: +N-S 0.0 usft, +E-W 0.0 usft
Position Uncertainty: 0.0 usft
Northing: 586 219.00 usft
Easting: 754 084 80 usft
Wellhead Elevation: 0.0 usft
Latitude: 32 36 32.076 N
Longitude: 103 30' 29 533 W
Ground Level: 3 694 3 usft

Wellbore OH
Magnetics: Model Name I R 2 1, Sample Date 6/24/2015, Declination 60.45, Dip Angle 60.45, Field Strength 8,449 nT

Design
Audit Notes:
Version: Phase Tie On Depth 0.0
Vertical Section: Depth From (TVD) 0.0, +N-S 0.0, +E-W 0.0, Direction 190.03

Survey Program		Date	7/29/2015	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	10,400 0	Gyro #1 (OH)	NS-GYRO-SS	NS Gyro single shots
10,423 0	15 632 0	MWD #3 (OH)	MWD	MWD - Standard

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	586 219 00	754 084 80	32 36 32 076 N	103° 30' 29 533 W
100.0	0.31	24 83	100 0	0.2	0.1	586 219 25	754 084 91	32 36 32 079 N	103° 30' 29 531 W
200.0	0.34	20 69	200 0	0.8	0.3	586 219 77	754 085 13	32 36 32 084 N	103° 30' 29 529 W
300.0	0.14	41 44	300 0	1.1	0.5	586 220 14	754 085 31	32 36 32 087 N	103° 30' 29 527 W
400.0	0.30	49 68	400 0	1.4	0.8	586 220 40	754 085 60	32 36 32 090 N	103° 30' 29 523 W
500.0	0.33	75 10	500 0	1.6	1.3	586 220 65	754 086 07	32 36 32 092 N	103° 30' 29 518 W
600.0	0.39	85 73	600 0	1.7	1.9	586 220 74	754 086 69	32 36 32 093 N	103° 30' 29 510 W
700.0	0.47	78 64	700 0	1.8	2.6	586 220 85	754 087 43	32 36 32 094 N	103° 30' 29 502 W
800.0	0.50	87 23	800 0	1.9	3.5	586 220 95	754 088 27	32 36 32 095 N	103° 30' 29 492 W
900.0	0.17	125 73	900 0	1.9	4.0	586 220 89	754 088 83	32 36 32 095 N	103° 30' 29 485 W
1 000 0	0.29	135 46	1 000 0	1.6	4.3	586 220 62	754 089 12	32 36 32 092 N	103° 30' 29 482 W



TDS
Survey Report - Geographic

Company: COG Operating LLC
Project: Lea County NM
Site: Black Pearl 1 Federal
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference
TVD Reference
MD Reference
North Reference
Survey Calculation Method
Database:

Well #2H
KB @ 3712 3usft
KB @ 3712 3usft
Grid
Minimum Curvature
EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1 100 0	0.40	140.19	1,100.0	1.2	4 7	586 220 17	754 089 53	32 36 32 087 N	103 30 29 477 W
1 200 0	0.43	140.76	1,200.0	0.6	5 2	586 219 61	754 089 99	32 36 32 082 N	103 30 29 472 W
1 300 0	0.37	143.89	1,300.0	0.1	5 6	586 219 06	754 090 41	32 36 32 07 N	103 30 29 467 W
1 400 0	0.42	158.27	1,400.0	-0.5	5 9	586 218.46	754 090 74	32 36 32 070 N	103 30 9 463 W
1 500 0	0.44	63.15	1,500.0	-1.3	6 2	586,217 75	754 090 99	32 36 32 063 N	1 3 30 29 46 W
1 600 0	0.57	172.08	1,600.0	-2.1	6 4	586,216 89	754 091 17	32 36 32 055 N	103 30 29 458 W
1 700 0	0.75	188.73	1,700.0	-3.3	6 3	586,215 75	754 091 14	32 36 32 044 N	103 30 29 459 W
1 800 0	0.92	199.65	1,800.0	-4.7	6 0	586,214 35	754 090 77	32 36 32 030 N	103 30 29 463 W
1 900 0	0.91	198.90	1,899.9	-5.2	5.4	586,212 84	754 090 24	32 36 32 015 N	103 30 29 47 W
2 000 0	0.77	199.12	1,999.9	-7.5	5.0	586 211 46	754 089 76	32 36 32 0 1 N	103 30 29 475 W
2 100 0	0.34	19	2,099.9	-8.5	4.7	586,210 53	754 089 49	32 36 31 992 N	103 30 29 479 W
2 200 0	0.50	19	2,199.9	-9.2	4.5	586,209 81	754 089 33	32 36 31 985 N	103 30' 29 481 W
2 300 0	0.43	197 96	2,299.9	-10.0	4.3	586,209.03	754 089 12	32 36 31 9 N	103 30 29 483 W
2 400 0	0.17	20	2,399.9	-10.5	4.1	586,208.54	754 088 93	32 36 31 972 N	03 30 29 485 W
2 500 0	0.16	205.88	2,499.9	-10.7	4.0	586,208.29	754 088 8	32 36 31 9 0 N	103 30 29 48 W
2 600 0	0.03	193.31	2,599.9	-10.9	3.9	586 208 14	754 088 73	32 36 31 968 N	03 30 29 488 W
2 700 0	0.11	193 30	2,699.9	-11.0	3.9	586 208 02	754 088 70	32 3 31 967 N	1 3 30 29 488 W
2 800 0	0.03	31	2,799.9	-11.1	3.9	586 207 95	754 088 69	32 36 31 96 N	103 30 29 488 W
2 900 0	0 12	168. 0	2,899.9	-11.1	3.9	586 207 87	754 088 73	32 36 31 966 N	103 30 29 488 W
3 000 0	0.26	119.44	2,999.9	-11.4	4.1	586 207 65	754 088 94	32 36 31 964 N	103 30 29 485 W
3 100 0	0.36	1 .33	3,099.9	-11.6	4.6	586 207 43	754 089 44	32 36 31 961 N	103 30 29 479 W
3 200 0	0.37	99.78	3 199 9	-11.7	5 3	586 207 27	754 090 05	3' 36 31 960 N	103 30 29 472 W
3 300 0	0.31	93 85	3 299 9	-11.8	5 8	586 207 20	754 090 64	3' 36 31 959 N	103 30 29 465 W
3 400 0	0.34	95.83	3 399 9	-11.9	6 4	586 207 15	754 091 20	3' 36 31 958 N	103 30 29 459 W
3 500 0	0.29	65 60	3 499 9	11.8	6 9	586 207 22	754 091 73	3' 36 31 959 N	103 30 29 453 W
3 600 0	0.29	57.53	3 599 9	-11.5	7 4	586 207 46	754 092 17	3' 36 31 961 N	103 30 29 448 W
3 700 0	1.51	303 01	3 699 9	-10 7	6 5	586 208 32	754 091 28	3' 36 31 970 N	103 30 29 458 W
3 800 0	2.11	289.43	3 799 8	-9.4	3 6	586 209 65	754 088 44	3' 36 31 983 N	103 30 29 491 W
3 900 0	2.02	293 80	3 899 8	-8.0	0 3	586 210 97	754 085 09	3' 36 31 997 N	103 30 29 530 W
4 000 0	2.06	294 32	3 999 7	-6.6	-3 0	586 212 42	754 081 84	3' 36 32 011 N	103 30 29 588 W
4 100 0	2.55	292.00	4 099 6	-5.0	-6 7	586 213 99	754 078 14	3' 36 32 027 N	03 30' 29 611 W
4 200 0	3.93	285.06	4 199 5	-3.3	-12 0	586 215 72	754 072 77	3' 36 32 045 N	103 30 29 674 W
4 300 0	4.65	286.12	4 299 2	-1.3	-19 2	586 217 73	754 065 56	3' 36 32 065 N	103 30 29 758 W
4 400 0	5.13	282.91	4 398 8	0.9	-27 5	586 219 86	754 057 31	3' 36 32 087 N	103 30 29 854 W
4 500 0	4.89	279.10	4 498 4	2.5	-36 1	586,221 53	754 048 75	3' 36 32 104 N	103 30 29 954 W
4 600 0	4.64	279.02	4 598 1	3 8	-44 3	586,222.84	754 040 54	3' 36 32 118 N	103 30' 30 050 W
4 700 0	5.60	283.70	4 697 7	5.6	-53.0	586,224 63	754 031 81	3' 36 32 136 N	103 30' 30 152 W
4 800 0	5.48	281.18	4 797 2	7.7	-62.4	586,226 71	754 022 38	3' 36 32 15 N	103 30' 30 262 W
4 900 0	5.54	269.75	4 896 8	8.6	-71 9	586 227 62	754 012 87	3' 36 32 167 N	103 30 30 373 W
5 000 0	5.35	271.95	4 996 3	8.7	-81 4	586 227 75	754 003 39	3' 36 32 169 N	103 30' 30 484 W
5 100 0	5.17	267.40	5 095 9	8.7	-90 6	586 227 71	753 994 23	3' 36 32 169 N	103 30 30 591 W
5 200 0	5.19	264.51	5 195 5	8.1	-99 6	586 227 07	753 985 22	3' 36 32 164 N	103 30 30 696 W
5 300 0	5 42	277.41	5 295 1	8.2	-108 8	586 227 25	753 976 04	32 36 32 166 N	103 30 30 803 W
5 400 0	5.11	269.32	5 394 6	8.8	-117 9	586 227 80	753 966 90	32 36 32 172 N	103 30 30 910 W
5 500 0	5.21	269.41	5 494 2	8 7	-126 9	586 227 70	753 957 91	32 36 32 172 N	103 30 31 015 W
5 600 0	5.36	268.72	5 593 8	8 5	-136 1	586 227 55	753 948 70	32 36 32 17 N	103 30 31 123 W
5 700 0	5.22	278.00	5 693 4	9 1	-145 3	586 228 08	753 939 52	32 36 32 17 N	103 30 31 230 W
5 800 0	5.24	262.81	5 793 0	9 1	-154 3	586 228 14	753 930 49	32 36 32 79 N	103 30 31 336 W
5 900 0	4 91	268.74	5 892 6	8.5	-163 1	586 227 48	753 921 68	32 36 32 1 3 N	103 30 31 439 W
6 000 0	5 08	268.16	5 992 2	8 2	-171 8	586 227 24	753 912 97	32 36 32 171 N	103 30 31 541 W
6 100 0	4.88	264.37	6 091 8	7 7	-180 5	586 226 68	753 904 32	32 36 32 166 N	103 30 31 642 W
6 200 0	4 95	262.88	6 191 5	6 7	-189 0	586 225 73	753 895 80	32 36 32 157 N	103 30 31 741 W
6 300 0	5 40	267.92	6 291 1	6 0	-198 0	586 225 02	753 886 82	32 36 32 151 N	103 30 31 846 W
6 400 0	5 28	274 41	6 390 6	6 2	-207 3	586 225 21	753 877 53	32 36 32 154 N	103 30 31 955 W
6 500 0	5.57	263.90	6 490 2	6 0	-216 7	586 225 04	753 868 12	32 36 32 153 N	103 30 32 065 W



TDS
Survey Report - Geographic



Company: COG Operating LLC
Project: Lea County NM
Site: Black Pearl 1 Federal
Well: #2H
Wellbore: OH
Design: OH

Local Coordinate Reference
TVD Reference
MD Reference
North Reference
Survey Calculation Method:
Database

Well #2H
KB @ 3712.3usft
KB @ 3712.3usft
Grid
Minimum Curvature
EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map North ng (usft)	Map Easting (usft)	Latitude	Longitude
6 600.0	5.07	263.17	6 589.7	5.0	-225.9	586 224.00	753 858.90	31° 32' 143.1 N	103° 30' 32.173 W
6 700.0	4.55	269.72	6 689.4	4.5	-234.2	586 223.46	753 850.55	31° 32' 138.1 N	103° 30' 32.271 W
6 800.0	5.16	265.38	6 789.0	4.1	-242.7	586 223.08	753 842.10	31° 32' 135.1 N	103° 30' 32.369 W
6 900.0	5.5	267.31	6 888.6	3.5	-251.7	586 222.50	753 833.13	31° 32' 130.1 N	103° 30' 32.474 W
7 000.0	5.24	272.04	6 988.2	3.5	-260.7	586 222.46	53 824.09	31° 32' 130.1 N	103° 30' 32.58 W
7 100.0	5.45	272.76	7 087.8	3.8	-270.0	586 222.05	753 814.78	31° 32' 135.1 N	103° 30' 32.689 W
7 200.0	5.38	273.40	7 187.3	4.4	-279.4	586 223.35	753 805.36	31° 32' 141.1 N	103° 30' 32.799 W
7 300.0	5.77	271.86	7 286.9	4.8	-289.1	586 223.80	753 795.65	31° 32' 146.1 N	103° 30' 32.912 W
7 400.0	5.44	278.34	7 386.4	5.6	-298.9	586 224.65	753 785.94	31° 32' 155.1 N	103° 30' 33.026 W
7 500.0	4.97	276.01	7 486.0	6.8	-307.9	586 225.79	753 776.94	31° 32' 167.1 N	103° 30' 33.131 W
7 600.0	5.21	269.06	7 585.6	7.2	-316.7	586 226.17	753 768.09	31° 32' 171.1 N	103° 30' 33.234 W
7 700.0	5.26	267.78	7 685.2	6.9	-325.8	586 225.91	753 758.97	31° 32' 170.1 N	103° 30' 33.341 W
7 800.0	5.00	270.33	7 784.8	6.8	-334.8	586 225.76	753 750.04	31° 32' 169.1 N	103° 30' 33.445 W
7 900.0	5.14	270.08	7 884.4	6.8	-343.6	586 225.79	753 741.20	31° 32' 170.1 N	103° 30' 33.549 W
8 000.0	4.97	264.66	7 984.0	6.4	-352.4	586 225.40	753 732.41	31° 32' 167.1 N	103° 30' 33.651 W
8 100.0	4.61	264.49	8 083.6	5.6	-360	586 224.61	753 724.09	31° 32' 159.1 N	103° 30' 33.749 W
8 200.0	4.89	273.70	8 183.3	5.5	-369	586 224.50	753 715.84	31° 32' 159.1 N	103° 30' 33.845 W
8 300.0	4.80	275.28	8 282.9	6.2	-377.4	586 225.1	753 707.42	31° 32' 166.1 N	103° 30' 33.944 W
8 400.0	5.55	274.36	8 382.5	6.9	-386.4	586 225.91	753 698.43	31° 32' 174.1 N	103° 30' 34.049 W
8 500.0	5.45	275.25	8 482.1	7.7	-395.9	586 226.71	753 688.88	31° 32' 183.1 N	103° 30' 34.160 W
8 600.0	5.11	270.59	8 581.6	8.2	-405.1	586 227.19	753 679.70	31° 32' 188.1 N	103° 30' 34.267 W
8 700.0	4.76	269.82	8 681.3	8.2	-413.7	586 227.22	753 671.10	31° 32' 189.1 N	103° 30' 34.368 W
8 800.0	5.23	277.36	8 780.9	8.8	-422.4	586 227.80	753 662.43	31° 32' 196.1 N	103° 30' 34.469 W
8 900.0	4.65	286.91	8 880.5	10.6	-430.8	586 229.56	753 654.03	31° 32' 214.1 N	103° 30' 34.567 W
9 000.0	5.06	270.72	8 980.2	11.8	-439.1	586 230.79	753 645.74	31° 32' 227.1 N	103° 30' 34.664 W
9 100.0	5.74	272.01	9 079.7	12.0	-448.5	586 231.02	753 636.33	31° 32' 230.1 N	103° 30' 34.774 W
9 200.0	5.92	275.87	9 179.2	12.7	-458.6	586 231.73	753 626.21	31° 32' 237.1 N	103° 30' 34.892 W
9 300.0	5.72	271.33	9 278.7	13.4	-468.7	586 232.37	753 616.09	31° 32' 244.1 N	103° 30' 35.011 W
9 400.0	5.79	271.29	9 378.2	13.6	-478.7	586 232.60	753 606.07	31° 32' 248.1 N	103° 30' 35.128 W
9 500.0	5.90	265.38	9 477.7	13.3	-488.9	586 232.30	753 595.90	31° 32' 245.1 N	103° 30' 35.247 W
9 600.0	5.30	267.33	9 577.2	12.7	-498.6	586 231.67	753 586.17	31° 32' 240.1 N	103° 30' 35.360 W
9 700.0	5.28	268.53	9 676.8	12.3	-507.8	586 231.34	753 576.95	31° 32' 237.1 N	103° 30' 35.468 W
9 800.0	5.89	266.92	9 776.3	11.9	-517.6	586 230.94	753 567.23	31° 32' 234.1 N	103° 30' 35.582 W
9 900.0	5.51	264.76	9 875.8	11.2	-527.5	586 230.23	753 557.33	31° 32' 228.1 N	103° 30' 35.698 W
10,000.0	5.02	265.06	9 975.4	10.4	-536.6	586 229.41	753 548.19	31° 32' 220.1 N	103° 30' 35.805 W
10,100.0	5.55	269.15	10,075.0	10.0	-545.8	586 228.96	753 538.99	31° 32' 217.1 N	103° 30' 35.912 W
10,200.0	5.10	268.53	10 174.5	9.8	-555.1	586 228.78	753 529.71	31° 32' 216.1 N	103° 30' 36.021 W
10,300.0	4.19	266.61	10 274.2	9.4	-563.2	586 228.45	753 521.62	31° 32' 213.1 N	103° 30' 36.115 W
10,400.0	2.35	265.15	10 374.0	9.1	-568.9	586 228.06	753 515.93	31° 32' 210.1 N	103° 30' 36.182 W
TIE-IN to VES Gyro									
10 423.0	2.30	216.30	10 397.0	8.6	-569.6	586 227.65	753 515.19	32° 36' 32.205 N	103° 30' 36.191 W
10 486.0	3.10	201.40	10 459.9	6.0	-571.0	586 225.04	753 513.82	32° 36' 32.180 N	103° 30' 36.207 W
10 514.0	3.30	197.40	10 487.9	4.6	-571.5	586 223.57	753 513.30	32° 36' 32.165 N	103° 30' 36.23 W
10 546.0	4.60	204.00	10 519.8	2.5	-572.3	586 221.52	753 512.50	32° 36' 32.145 N	103° 30' 36.222 W
10 577.0	7.10	203.70	10 550.7	-0.4	-573.6	586 218.63	753 511.23	32° 36' 32.117 N	103° 30' 36.238 W
10 609.0	10.50	198.40	10 582.3	-5.0	-575.3	586 214.05	753 509.51	32° 36' 32.071 N	103° 30' 36.258 W
10 637.0	13.30	194.50	10 609.7	-10.5	-576.9	586 208.51	753 507.90	32° 36' 32.017 N	103° 30' 36.277 W
10 671.0	17.10	190.70	10 642.5	-19.2	-578.8	586 199.81	753 505.99	32° 36' 31.931 N	103° 30' 36.301 W
10 703.0	20.80	187.90	10 672.7	-29.5	-580.5	586 189.55	753 504.34	32° 36' 31.829 N	103° 30' 36.321 W
10 734.0	24.40	187.20	10 701.4	-41.3	-582.0	586 177.74	753 502.78	32° 36' 31.713 N	103° 30' 36.340 W
10 766.0	28.00	185.80	10 730.1	-55.3	-583.6	586 163.71	753 501.19	32° 36' 31.574 N	103° 30' 36.360 W
10 797.0	31.50	185.10	10 757.0	-70.6	-585.1	586 148.40	753 499.73	32° 36' 31.423 N	103° 30' 36.378 W
10 829.0	34.90	184.80	10 783.7	-88.1	-586.6	586 130.94	753 498.23	32° 36' 31.250 N	103° 30' 36.398 W
10 860.0	38.90	184.90	10 808.5	-106.6	-588.1	586 112.40	753 496.65	32° 36' 31.067 N	103° 30' 36.418 W
10 892.0	43.30	185.40	10 832.6	-127.5	-590.0	586 091.45	753 494.76	32° 36' 30.859 N	103° 30' 36.442 W



TDS
Survey Report - Geographic

Company: COG Operating LLC
Project: Lea County NM
Site: Black Pearl 1 Federal
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference
TVD Reference:
MD Reference:
North Reference
Survey Calculation Method
Database

Well #2H
KB @ 3712.3usft
KB @ 3712.3usft
Grid
Minimum Curvature
EDM 5000 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,923.0	47 10	184.90	10 854 5	-149 5	-592 0	586,069 55	753 492 79	32° 36' 30.643 N	* 30' 36.467 W
10,955.0	51 30	184.70	10 875 4	-173 6	-594 0	586 045 42	753 490 76	32° 36' 30.404 N	* 30' 36.493 W
10,986.0	55 80	184.10	10 893 8	-198 4	-595 9	586 020 56	753 488 85	32° 36' 30.158 N	* 30' 36.517 W
11,018.0	60 00	182.90	10 910 8	-225 5	-597 6	585 993 51	753 487 21	32° 36' 29.8 1 N	* 30' 36.539 W
11,049.0	63 60	182.20	10 925 4	-252 8	-598 8	585 966 22	753 485 99	32° 36' 29.621 N	* 30' 36.555 W
11,080.0	67 50	182.50	10 938 3	-281 0	-600 0	585 938 03	753 484 84	32° 36' 29.342 N	* 30' 36.572 W
11,112.0	71 00	183. 0	10 949 6	-310 9	-601 4	585 908 15	753 483.40	32° 36' 29.047 N	* 30' 36.591 W
11 148.0	74 50	184.10	10 960 3	-345.2	-603 5	585 873 84	753 481 27	32° 36' 28.707 N	* 30' 36.619 W
11,176.0	76 0	185.40	10 967 2	-372 2	-605 8	585 846 80	753 479 02	32° 36' 28.440 N	* 30' 36.648 W
11,207.0	00	185.90	10 973 1	-402 5	-608 8	585 816 53	753 476 02	32° 36' 28.141 N	* 30' 36.686 W
11,239.0	70	185.80	10 977 1	-434 1	-612 0	585 784 95	753 472 9	32° 36' 27.828 N	* 30' 36.726 W
11,270.0	00	185.10	10 978 8	-464 9	-614 9	585 754 14	753 469 85	32° 36' 27.524 N	* 30' 36.763 W
11,333.0	3. 0	184 50	10 977 6	-527 6	-620 2	585 691 39	753 464 58	32° 36' 26.903 N	* 30' 36.831 W
11,364.0	9 0	184.30	10 976.2	-558 5	-622 6	585 6 0 52	753 462 20	32° 36' 26.598 N	* 30' 36.861 W
11,396.0	9 0	184.00	10 975.2	-590 4	-624 9	585 628 61	753 459 89	32° 36' 26.282 N	* 30' 36.891 W
11,428.0	0	184 00	10 975 1	-622 3	-627 1	585 596 69	753 457 66	32° 36' 25.967 N	* 30' 36.92 W
11 459.0	87 30	183.70	10 976 1	-653 2	-629 2	585 565 78	753 455 58	32° 36' 25.661 N	* 30' 36.947 W
11 491.0	87 00	183.60	10 977 7	-685 1	-631 3	585 533 89	753 453 54	32° 36' 25.346 N	* 30' 36.974 W
11 522.0	87 30	183.30	10 979 3	-716 0	-633 1	585 502 98	753 451 68	32° 36' 25.040 N	* 30' 36.999 W
11 585.0	88 00	183.30	10 981 9	-778 9	-636 7	585 440 14	753 448 06	32° 36' 24.418 N	* 30' 37.047 W
11 648.0	8 40	183.7	10 983 8	-841 7	-640 6	585 377 29	753 444 21	32° 36' 23.797 N	* 30' 37.097 W
11,711.0	89.00	182.90	10,985.3	-904 6	-644 2	585 314.41	753 440 59	32° 36' 23.175 N	* 30' 37.145 W
11,805.0	90 60	182.40	10,985.6	-998.5	-648.6	585,220 51	753 436.24	32° 36' 22.246 N	* 30' 37.205 W
11,900.0	89 60	182.40	10,985.4	-1,093 4	-652.5	585 125.60	753 432.26	32° 36' 21.307 N	* 30' 37.260 W
11,994.0	90 20	182.20	10,985 6	-1,187.3	-656 3	585,031.67	753 428 49	32° 36' 20.378 N	* 30' 37.312 W
12,089.0	89 40	182.60	10,985 9	-1,282.2	-660.3	584 936.76	753 424.51	32° 36' 19.439 N	* 30' 37.367 W
12,183.0	90 20	182.60	10 986 3	-1,376.1	-664.5	584,842.86	753 42 2	32° 36' 18.511 N	1 * 30' 37.426 W
12,278.0	88.70	182.40	10,987.2	-1,471.0	-668 7	584 747.96	753 41	32° 36' 17.572 N	* 30' 37.483 W
12,372.0	90.00	182.50	10,988 2	-1,565.0	-672.7	584,654.05	753 41 0	32° 36' 16.643 N	* 30' 37.538 W
12,467.0	89 60	182.90	10,988.6	-1,659.8	-677.2	584,559.16	753 40 6	32° 36' 15.704 N	* 30' 37.599 W
12,561.0	90 80	183.00	10,988.2	-1,753.7	-682.0	584,465.28	753 40 77	32° 36' 14.776 N	* 30' 37.664 W
12,656.0	90 60	183.50	10,987.1	-1,848.6	-687.4	584,370.44	753 39 39	32° 36' 13.838 N	* 30' 37.736 W
12,750.0	89.50	183.40	10,987.0	-1,942.4	-693.1	584,276.61	753 391.73	32° 36' 12.910 N	* 30' 37.810 W
12,845.0	88.90	182.70	10,988.3	-2,037.2	-698.1	584,181.76	753 38 68	32° 36' 11.972 N	* 30' 37.878 W
12,939.0	89.80	182.90	10,989.4	-2 131.1	-702.7	584,087.88	753 38 09	32° 36' 11.043 N	103 * 30' 37.940 W
13,034.0	88.20	182.30	10,991.0	-2,226 0	-707.0	583,992.99	753 37 78	32° 36' 10.105 N	103 30' 37.999 W
13,128.0	88.40	181.80	10,993.8	-2 319 9	-710.4	583 899.10	753 37 42	32° 36' 9.176 N	103 30' 38.047 W
13,223.0	88.40	181.50	10,996.5	-2,414.8	-713.1	583 804.17	753 37 68	32° 36' 8.237 N	103 30' 38.087 W
13,317.0	89.50	182.50	10,998.2	-2,508 8	-716.4	583 710 25	753 36 0	32° 36' 7.308 N	1 3 30' 38.134 W
13,411.0	90.00	182.20	10,998.6	-2,602.7	-720.3	583 616.33	753 36 5	32° 36' 6.379 N	103 30' 38.188 W
13,506.0	89.90	182.60	10,998.7	-2,697.6	-724.2	583 521.41	753 360 57	32° 36' 5.440 N	103 30' 38.243 W
13,600.0	91.30	184.20	10,997.7	-2,791.4	-729.8	583 427.59	753 354 99	32° 36' 4.512 N	103 30' 38.316 W
13,695.0	90.60	184.10	10,996.1	-2,886.2	-736.7	583 332.85	753 348 12	32° 36' 3.575 N	103 30' 38.405 W
13,789.0	90.80	183 80	10,995.0	-2,979.9	-743.2	583,239.08	753 341 65	32° 36' 2.648 N	103 30' 38.489 W
13,883.0	89.50	183 80	10,994.7	-3,073.7	-749.4	583 145 29	753 335.42	32° 36' 1.720 N	' 38 571 W
13,978.0	89.90	183.40	10,995 2	-3 168.5	-755 3	583 050.48	753 329.45	32° 36' 0.782 N	1 * ' 38 64 W
14,072.0	89.50	184.40	10,995.7	-3 262.3	-761.7	582,956.70	753 323 0	32° 36' 0.855 N	' 38 732 W
14,167.0	90.00	183 90	10,996 2	-3 357.1	-768 6	582 861.95	753 316	32° 36' 0.818 N	1 * 0' 38 821 W
14,261.0	88.90	184.20	10,997.1	-3 450.8	-775 3	582 768.19	753 309.5	32° 36' 0.799 N	0 * ' 38 907 W
14,355.0	89.10	184.40	10,998.7	-3 544.5	-782.3	582,674.47	753 302 5	32° 36' 0.706 N	* 38 998 W
14,450.0	89.00	184.30	11,000 3	-3 639.2	-789.5	582,579.76	753 295 9	32° 36' 0.612 N	0 39 091 W
14,545.0	90.10	183.90	11,001.0	-3 734.0	-796.3	582,485.00	753 288 50	32° 36' 0.519 N	' 39 179 W
14,639.0	89.80	183.20	11,001.1	-3 827.8	-802.1	582,391 19	753 282.6	32° 36' 0.426 N	39 255 W
14,734.0	90.00	182.60	11,001.3	-3 922.7	-808.9	582,296 31	753 277 87	32° 36' 0.324 N	103 30' 39.320 W
14,828.0	90.10	182.00	11,001.2	-4 016.6	-810.7	582,202 38	753 274 10	32° 36' 0.239 N	103 30' 39.373 W



TDS
Survey Report - Geographic

Company: COG Operating LL
Project: Lea County, NM
Site: Black Pearl 1 Federal
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordin Reference
TVD Reference
MD Reference
North Reference
Survey Calculation Method
Database
Well #2H
KB @ 3712 3usft
KB @ 3712 3usft
rid
Min mum Curvature
M 50 0 1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14 923.0	9 6	2.80	11 000.6	-4 111.5	-81 7	582 107 47	753 70 12	: ° ' . 6 N	103° 30' 39.428 W
15 017.0	9 0	2.50	10 999.3	-4 205.4	-19 0	582 013 58	753 265 78	: ° ' 0. N	103° 30' 39.487 W
15 112.0	9 0	3.70	10 998.0	-4 300.3	-82 2	581 918 73	753 260 64	: ° 5' . 9 N	103° 30' 39.556 W
15,206.0	90 90	83.10	10 996.9	-4 394.1	-829 7	581 824 90	753 255 07	: ° ' . 6 N	103° 30' 39.629 W
15,300.0	8 0	.20	10 996.4	-4 487.9	-835 7	581 731 10	753 249 08	: ° 5' 7. N	103° 30' 39.708 W
15,395.0	9 20	18 .00	10 996.5	-4 582.7	-8 2 5	581 636 34	753 242 29	: ° ' 6. 7 N	103° 30' 39.796 W
15,489.0	8 0	83.50	10 997.2	-4 676.5	-8 8 7	581 542 55	753 236 14	: ° ' 5. 9 N	103° 30' 39.876 W
15,580.0	8 00	83.10	10 998.9	-4 767.3	853 9	581 451 71	753 230 91	: 2° ' .97 N	103° 30' 39.945 W
Final MWD Survey									
15,632.0	8 00	83.10	10 999.8	-4 819.2	-856 7	581 399 80	753 228 09	: ° ' . 57 N	103° 30' 39.983 W
Projection to Bit/TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10 400.	0 374 0	9 1	-568 9	IE-4 to VES Gyro
15 580.	0 998 9	-4 767 3	-853 9	Final MWD Survey
15 63 .	0 999 8	-4 819 2	-856 7	Projection to Bit/TD

Checked By _____ Approved By _____ Date _____