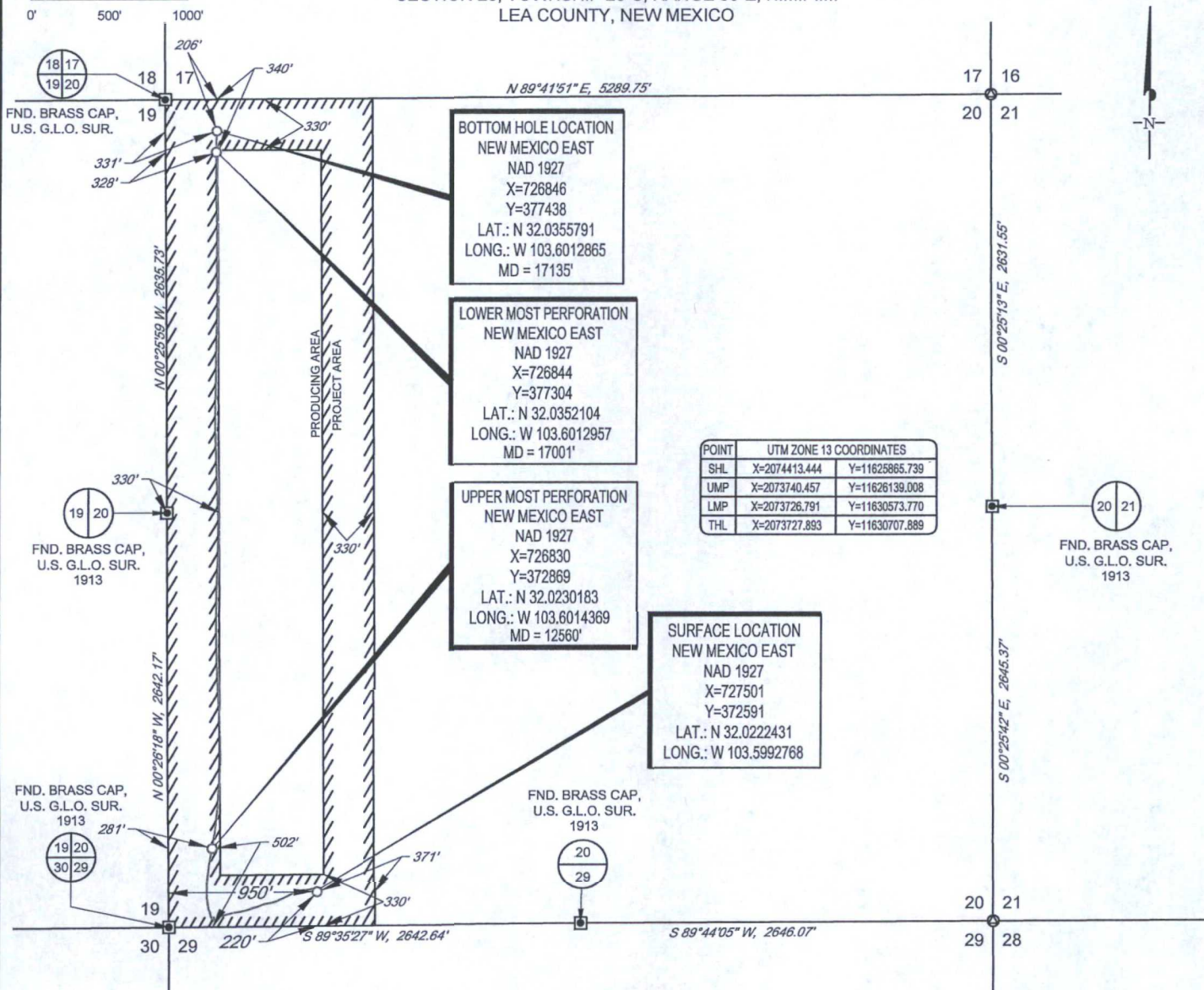


SCALE: 1" = 1000'

SECTION 20, TOWNSHIP 26-S, RANGE 33-E, N.M.P.M.
LEA COUNTY, NEW MEXICO

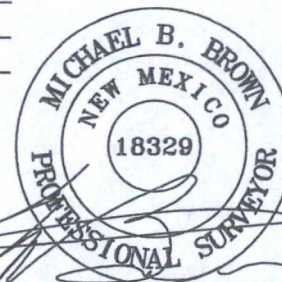


LEASE NAME & WELL NO.: ORRTANNA 20 FED #701H
SECTION 20 TWP 26-S RGE 33-E SURVEY N.M.P.M.
COUNTY LEA STATE NM ELEVATION 3218'
DESCRIPTION 950' FWL & 220' FSL



TOPOGRAPHIC
LOYALTY INNOVATION LEGACY

1400 EVERMAN PARKWAY, Ste. 197 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7548
2903 NORTH BIG SPRING • MIDLAND, TEXAS 79705
TELEPHONE: (432) 682-1653 OR (800) 767-1653 • FAX (432) 682-1743
WWW.TOPOGRAPHIC.COM



Michael Blake Brown, P.S. No. 18329
JULY 14, 2016



ORRTANNA 20 FED #701H AS-COMPLETED		REVISION:	NOTES:
DATE: 07/14/2016			1. ORIGINAL DOCUMENT SIZE: 8.5" X 11"
FILE: AD_ORRTANNA20FED_701H			2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE, U.S. SURVEY FEET, NORTH AMERICAN DATUM 19 27.
DRAWN BY: A.C.C.			3. THIS WELL LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY EOG RESOURCES, INC. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.
SHEET: 1 OF 1			

HOBBS OCD**CRESCENT**
DIRECTIONAL DRILLING

SEP 06 2016

Minimum Curvature Calculation

Client: EOG Resources

Job #: PB-161118

Well: ORRTANNA FED 2011-11-11

M.W.D. Operators: Keith Clark / Josh Posey

County: LEA

Directional Drillers: Cory Baker / Jesse Ramirez

Rig: Precision 612

Tool Azimuth to Grid North: 6.58

Lat / Long: 32Deg 1' 20.073 N / -103Deg 35' 57.401 W

Geomagnetic Model: HDGM

API#: 30-025-42936

Single or Multi-well Pad (# /total): Multi #1 Of 2

RKB / GL: 3243' / 3218'

DSI Corrected Runs:

Vertical Section Angle: 352.25

Survey #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	DLS
Tie In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GYRO	128.16	0.61	338.01	128.16	0.66	0.63	-0.26	0.48
GYRO	221.39	0.69	326.87	221.38	1.65	1.56	-0.75	0.16
GYRO	314.62	1.37	339.45	314.60	3.24	3.08	-1.45	0.76
GYRO	407.85	1.37	334.64	407.80	5.39	5.13	-2.31	0.12
GYRO	501.08	1.46	330.33	501.00	7.56	7.17	-3.38	0.15
GYRO	594.31	1.49	327.54	594.20	9.76	9.22	-4.62	0.08
GYRO	687.54	1.56	327.05	687.40	12.01	11.31	-5.96	0.08
GYRO	780.77	1.58	323.92	780.59	14.29	13.41	-7.41	0.09
GYRO	874.00	1.61	321.02	873.79	16.54	15.47	-8.99	0.09
1	1066.00	1.23	317.80	1065.73	20.55	19.09	-12.07	0.20
2	1252.00	3.69	267.62	1251.56	22.75	20.32	-19.39	1.64
3	1439.00	5.89	267.18	1437.89	24.14	19.60	-34.99	1.18
4	1625.00	6.86	257.51	1622.74	24.04	16.73	-55.37	0.78
5	1812.00	6.86	259.79	1808.41	22.64	12.33	-77.26	0.15
6	1997.00	6.33	260.14	1992.18	21.79	8.63	-98.18	0.29
7	2183.00	6.24	255.75	2177.06	20.27	4.39	-118.08	0.26
8	2369.00	6.60	250.83	2361.90	17.01	-1.61	-137.98	0.35
9	2556.00	7.83	243.71	2547.42	10.83	-10.78	-159.55	0.81
10	2742.00	7.03	245.12	2731.86	3.45	-21.18	-181.24	0.44
11	2928.00	6.77	243.88	2916.51	-3.36	-30.80	-201.40	0.16
12	3114.00	6.07	244.24	3101.34	-9.85	-39.90	-220.11	0.38
13	3300.00	6.86	245.73	3286.16	-16.05	-48.74	-239.09	0.43
14	3487.00	4.66	242.57	3472.20	-21.79	-56.83	-256.01	1.19
15	3673.00	5.80	256.10	3657.43	-25.34	-62.57	-271.84	0.90
16	3860.00	6.07	258.83	3843.43	-26.94	-66.76	-290.72	0.21
17	4047.00	6.60	261.81	4029.29	-27.61	-70.20	-311.05	0.33
18	4233.00	6.07	251.71	4214.16	-29.50	-74.81	-330.97	0.66
19	4419.00	6.24	249.51	4399.08	-33.52	-81.44	-349.78	0.16
20	4607.00	6.16	247.93	4585.99	-38.27	-88.80	-368.70	0.10
21	4794.00	6.42	254.70	4771.86	-42.13	-95.33	-388.08	0.42
22	4980.00	5.98	253.20	4956.77	-45.02	-100.87	-407.38	0.25
23	5166.00	6.77	251.71	5141.62	-48.55	-107.12	-427.07	0.43
24	5353.00	6.51	250.65	5327.37	-52.69	-114.09	-447.54	0.15
25	5539.00	6.51	252.23	5512.17	-56.65	-120.80	-467.53	0.10
26	5725.00	6.60	261.99	5696.96	-58.53	-125.51	-488.15	0.60
27	5911.00	6.24	260.06	5881.79	-58.97	-128.74	-508.69	0.23
28	6097.00	5.72	258.39	6066.78	-59.98	-132.35	-527.73	0.29
29	6283.00	5.28	256.01	6251.92	-61.53	-136.29	-545.11	0.27
30	6470.00	5.80	257.24	6438.05	-63.29	-140.45	-562.68	0.29
31	6656.00	5.54	255.05	6623.14	-65.24	-144.84	-580.52	0.18
32	6842.00	5.19	253.55	6808.32	-67.64	-149.54	-597.26	0.20
33	7028.00	4.31	257.33	6993.68	-69.51	-153.46	-612.15	0.50
34	7214.00	1.41	246.87	7179.43	-70.71	-155.89	-621.08	1.58
35	7401.00	1.32	239.58	7366.38	-72.15	-157.89	-625.05	0.10
36	7588.00	0.79	235.45	7553.35	-73.57	-159.71	-627.97	0.29
37	7774.00	0.44	229.38	7739.34	-74.53	-160.90	-629.57	0.19
38	7960.00	0.53	231.84	7925.33	-75.36	-161.90	-630.78	0.05
39	8145.00	0.53	209.26	8110.32	-76.47	-163.17	-631.88	0.11
40	8331.00	1.32	192.21	8296.30	-79.17	-166.02	-632.75	0.45
41	8513.00	1.85	198.71	8478.23	-83.77	-170.85	-634.13	0.31
42	8700.00	0.53	81.90	8665.20	-86.47	-173.58	-634.25	1.15

Survey #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	DLS
43	8887.00	0.35	157.14	8852.19	-87.02	-173.99	-633.17	0.30
44	9072.00	0.70	75.57	9037.19	-87.43	-174.23	-631.85	0.40
45	9259.00	0.44	285.02	9224.18	-87.02	-173.76	-631.44	0.59
46	9447.00	1.58	277.28	9412.15	-86.07	-173.24	-634.71	0.61
47	9632.00	0.70	243.09	9597.11	-85.78	-173.43	-638.25	0.58
48	9818.00	1.85	302.07	9783.07	-84.23	-172.35	-641.81	0.86
49	10004.00	0.62	218.22	9969.03	-83.00	-171.55	-644.97	1.01
50	10190.00	0.79	232.63	10155.02	-84.34	-173.12	-646.61	0.13
51	10378.00	0.70	239.84	10343.00	-85.42	-174.48	-648.64	0.07
52	10564.00	0.97	218.31	10528.98	-86.94	-176.28	-650.60	0.22
53	10751.00	1.06	219.71	10715.95	-89.21	-178.86	-652.68	0.05
54	10939.00	1.14	210.75	10903.92	-91.85	-181.80	-654.75	0.10
55	11002.00	1.49	223.41	10966.90	-92.85	-182.94	-655.63	0.72
56	11137.00	2.55	238.61	11101.82	-95.16	-185.78	-659.40	0.87
57	11324.00	1.67	349.27	11288.74	-94.10	-185.26	-663.46	1.88
58	11510.00	1.85	320.09	11474.66	-88.86	-180.30	-665.89	0.49
59	11699.00	2.29	344.26	11663.54	-82.53	-174.32	-668.87	0.51
60	11792.00	1.85	325.18	11756.48	-79.36	-171.30	-670.24	0.87
61	11885.00	2.81	337.05	11849.40	-75.82	-167.97	-671.98	1.15
62	11916.00	4.48	336.79	11880.34	-73.92	-166.16	-672.76	5.39
63	11947.00	6.15	337.75	11911.20	-71.15	-163.51	-673.86	5.39
64	11978.00	9.23	344.61	11941.92	-67.07	-159.57	-675.15	10.35
65	12024.00	18.11	342.85	11986.57	-56.34	-149.17	-678.24	19.32
66	12071.00	28.04	342.32	12029.76	-38.21	-131.62	-683.77	21.13
67	12117.00	38.73	346.01	12068.12	-13.18	-107.28	-690.55	23.65
68	12164.00	48.75	351.29	12102.04	19.20	-75.46	-696.80	22.67
69	12210.00	52.75	355.15	12131.15	54.79	-40.10	-700.97	10.85
70	12259.00	56.62	358.58	12159.47	94.63	-0.19	-703.12	9.75
71	12305.00	60.79	2.36	12183.37	133.51	39.10	-702.77	11.46
72	12352.00	65.45	5.88	12204.62	174.51	80.89	-699.74	11.95
73	12398.00	68.79	6.84	12222.50	215.60	123.00	-695.04	7.51
74	12445.00	71.91	7.90	12238.30	258.33	166.89	-689.36	6.97
75	12491.00	75.69	9.30	12251.14	300.70	210.56	-682.75	8.72
76	12539.00	77.89	9.83	12262.10	345.31	256.63	-674.98	4.71
77	12570.00	80.22	9.74	12267.99	374.33	286.63	-669.81	7.52
78	12601.00	84.13	9.13	12272.21	403.67	316.92	-664.78	12.76
79	12633.00	85.85	8.60	12275.00	434.21	348.41	-659.86	5.62
80	12664.00	87.56	8.16	12276.79	463.94	379.03	-655.35	5.70
81	12695.00	88.22	7.02	12277.93	493.82	409.73	-651.26	4.25
82	12727.00	88.97	6.58	12278.71	524.78	441.50	-647.47	2.72
83	12820.00	89.67	5.79	12279.82	615.04	533.95	-637.46	1.13
84	12912.00	88.97	2.80	12280.91	704.99	625.67	-630.57	3.34
85	13005.00	90.73	3.94	12281.15	796.24	718.51	-625.10	2.25
86	13098.00	86.59	0.43	12283.33	887.79	811.38	-621.55	5.84
87	13193.00	89.49	359.81	12286.58	981.83	906.31	-621.36	3.12
88	13286.00	89.71	358.32	12287.22	1074.16	999.30	-622.87	1.62
89	13381.00	90.77	357.70	12286.83	1168.68	1094.24	-626.17	1.29
90	13475.00	89.67	356.74	12286.47	1262.33	1188.12	-630.73	1.55
91	13569.00	89.85	356.74	12286.86	1356.04	1281.97	-636.08	0.19
92	13663.00	90.20	357.44	12286.82	1449.70	1375.85	-640.85	0.83
93	13757.00	88.48	357.26	12287.90	1543.32	1469.74	-645.19	1.84
94	13850.00	91.69	359.64	12287.76	1635.76	1562.69	-647.71	4.30
95	13944.00	87.38	357.88	12288.53	1729.12	1656.63	-649.74	4.95
96	14038.00	86.95	359.99	12293.18	1822.36	1750.50	-651.49	2.29
97	14132.00	89.10	0.52	12296.42	1915.38	1844.43	-651.07	2.36
98	14226.00	91.21	1.92	12296.16	2008.23	1938.41	-649.07	2.69
99	14319.00	91.52	1.75	12293.95	2099.90	2031.33	-646.09	0.38
100	14412.00	89.63	1.39	12293.01	2191.67	2124.29	-643.54	2.07
101	14505.00	90.15	1.31	12293.19	2283.50	2217.26	-641.35	0.57
102	14599.00	90.20	0.08	12292.90	2376.47	2311.25	-640.21	1.31
103	14692.00	89.85	358.41	12292.86	2468.78	2404.24	-641.44	1.83
104	14786.00	90.42	357.53	12292.64	2562.31	2498.18	-644.77	1.12
105	14879.00	90.51	357.97	12291.89	2654.88	2591.10	-648.42	0.48
106	14973.00	90.37	358.41	12291.17	2748.37	2685.05	-651.39	0.49
107	15066.00	90.77	357.88	12290.24	2840.87	2778.00	-654.40	0.71

<i>Survey #</i>	<i>Meas. Depth</i>	<i>Inc.</i>	<i>Azm.</i>	<i>T.V.D.</i>	<i>Ver. Sect.</i>	<i>+N / -S</i>	<i>+E / -W</i>	<i>DLS</i>
108	15159.00	90.33	357.88	12289.35	2933.42	2870.93	-657.84	0.47
109	15253.00	87.25	358.67	12291.33	3026.87	2964.86	-660.67	3.38
110	15347.00	89.89	0.60	12293.68	3120.05	3058.81	-661.26	3.48
111	15441.00	91.47	1.48	12292.56	3212.93	3152.79	-659.56	1.92
112	15535.00	88.26	0.43	12292.78	3305.83	3246.76	-657.99	3.59
113	15629.00	87.96	0.08	12295.88	3398.87	3340.71	-657.57	0.49
114	15723.00	89.85	1.48	12297.68	3491.80	3434.68	-656.29	2.50
115	15816.00	90.55	1.13	12297.36	3583.64	3527.65	-654.18	0.84
116	15909.00	90.77	0.60	12296.28	3675.59	3620.63	-652.77	0.62
117	16002.00	92.00	0.95	12294.04	3767.53	3713.60	-651.52	1.38
118	16095.00	91.65	359.72	12291.07	3859.56	3806.54	-650.97	1.37
119	16188.00	89.27	357.26	12290.33	3951.99	3899.50	-653.42	3.68
120	16282.00	92.84	0.34	12288.60	4045.34	3993.43	-655.39	5.02
121	16374.00	92.66	0.16	12284.18	4136.34	4085.33	-654.99	0.28
122	16467.00	93.05	0.25	12279.55	4228.33	4178.21	-654.66	0.43
123	16560.00	87.12	358.93	12279.41	4320.52	4271.16	-655.32	6.53
124	16653.00	88.84	359.46	12282.69	4412.78	4364.09	-656.63	1.94
125	16747.00	90.55	359.64	12283.19	4506.01	4458.08	-657.37	1.83
126	16840.00	90.46	359.90	12282.37	4598.21	4551.08	-657.74	0.30
127	16933.00	90.86	359.99	12281.30	4690.36	4644.07	-657.83	0.44
128	17026.00	90.81	0.25	12279.95	4782.48	4737.06	-657.63	0.28
129	17080.00	91.08	1.22	12279.05	4835.88	4791.05	-656.94	1.86
PTBTD	17136.00	91.08	1.22	12278.00	4891.18	4847.03	-655.75	0.00