

CONOCOPHILLIPS

Embar

Andrews County, Texas

University Andrews #224

VH - Job #32K11121447

Survey: Gyro

SDI Standard Survey Report

16 December, 2012



Company:	CONOCOPHILLIPS	Local Co-ordinate Reference:	Well University Andrews #224
Project:	Embar	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Andrews County, Texas	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	University Andrews #224	North Reference:	Grid
Wellbore:	VH - Job #32K11121447	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11121447	Database:	EDM-Regulatory

Project	Embar		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Texas North Central 4202		

Site	Andrews County, Texas				
Site Position:		Northing:	189,405.00 usft	Latitude:	32° 4' 41.780 N
From:	Lat/Long	Easting:	393,917.64 usft	Longitude:	102° 41' 13.070 W
Position Uncertainty:	0.00 usft	Slot Radius:	0"	Grid Convergence:	-2.83 °

Well	University Andrews #224, Vertical					
Well Position	+N/-S	0.00 usft	Northing:	208,721.09 usft	Latitude:	32° 7' 49.000 N
	+E/-W	0.00 usft	Easting:	386,381.77 usft	Longitude:	102° 42' 51.680 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	0.00 usft

Wellbore	VH - Job #32K11121447				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/30/12	7.00	60.21	48,530

Design	VH - Job #32K11121447				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	300.91	

Survey Program	Date	12/16/12			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	8,135.00	Gyro (VH - Job #32K11121447)	Keeper	Keeper Gyro	

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.25	227.16	100.00	-0.15	-0.16	227.16	0.22	
200.00	0.07	187.14	200.00	-0.36	-0.33	222.51	0.48	
300.00	0.31	220.77	300.00	-0.62	-0.51	219.41	0.81	
400.00	0.29	269.61	400.00	-0.83	-0.94	228.62	1.25	
500.00	0.35	295.38	500.00	-0.70	-1.47	244.54	1.63	
600.00	0.29	268.71	599.99	-0.57	-2.00	253.96	2.08	
700.00	0.13	320.20	699.99	-0.49	-2.33	258.02	2.38	
800.00	0.17	275.99	799.99	-0.39	-2.55	261.27	2.58	
900.00	0.34	185.59	899.99	-0.67	-2.72	256.16	2.80	
1,000.00	0.64	167.32	999.99	-1.51	-2.63	240.11	3.03	
1,100.00	0.58	168.68	1,099.98	-2.55	-2.41	223.31	3.51	



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Design:	VH - Job #32K11121447	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.00	0.53	180.95	1,199.98	-3.51	-2.31	213.39	4.20
1,300.00	0.43	182.54	1,299.98	-4.35	-2.34	208.27	4.94
1,400.00	0.27	212.78	1,399.97	-4.92	-2.48	206.77	5.51
1,500.00	0.19	245.01	1,499.97	-5.19	-2.76	208.01	5.88
1,600.00	0.31	260.12	1,599.97	-5.31	-3.18	210.92	6.18
1,700.00	0.22	256.15	1,699.97	-5.40	-3.63	213.92	6.51
1,800.00	0.16	341.80	1,799.97	-5.31	-3.86	216.01	6.57
1,900.00	0.10	358.54	1,899.97	-5.09	-3.91	217.50	6.42
2,000.00	0.44	29.60	1,999.97	-4.67	-3.72	218.53	5.97
2,100.00	0.52	27.79	2,099.97	-3.94	-3.32	220.13	5.15
2,200.00	0.74	20.59	2,199.96	-2.93	-2.88	224.51	4.11
2,300.00	0.67	17.67	2,299.95	-1.77	-2.47	234.46	3.04
2,400.00	0.70	17.76	2,399.94	-0.63	-2.11	253.41	2.20
2,500.00	0.70	21.02	2,499.94	0.52	-1.71	287.06	1.78
2,600.00	0.56	33.92	2,599.93	1.50	-1.21	321.01	1.93
2,700.00	0.47	54.58	2,699.93	2.14	-0.61	344.19	2.23
2,800.00	0.50	70.60	2,799.92	2.52	0.14	3.16	2.53
2,900.00	0.47	75.80	2,899.92	2.77	0.95	18.90	2.93
3,000.00	0.40	69.04	2,999.92	3.00	1.67	29.17	3.43
3,100.00	0.44	68.91	3,099.91	3.26	2.36	35.87	4.02
3,200.00	0.44	66.04	3,199.91	3.55	3.07	40.79	4.69
3,300.00	0.37	65.52	3,299.91	3.84	3.71	43.99	5.34
3,400.00	0.27	52.09	3,399.91	4.12	4.19	45.47	5.88
3,500.00	0.18	41.73	3,499.91	4.38	4.48	45.63	6.27
3,600.00	0.09	52.79	3,599.91	4.55	4.65	45.62	6.50
3,700.00	0.01	74.14	3,699.91	4.60	4.72	45.74	6.59
3,800.00	0.09	216.78	3,799.91	4.54	4.68	45.89	6.52
3,900.00	0.14	204.17	3,899.91	4.36	4.58	46.41	6.33
4,000.00	0.18	144.88	3,999.91	4.12	4.62	48.27	6.19
4,100.00	0.35	113.17	4,099.90	3.87	4.99	52.20	6.32
4,200.00	0.29	119.95	4,199.90	3.63	5.49	56.56	6.58
4,300.00	0.51	21.41	4,299.90	3.92	5.88	56.32	7.06
4,400.00	0.76	21.12	4,399.90	4.95	6.28	51.75	7.99
4,500.00	1.00	15.35	4,499.88	6.41	6.75	46.47	9.31
4,600.00	1.08	8.95	4,599.87	8.18	7.13	41.05	10.85
4,700.00	1.07	22.53	4,699.85	9.97	7.63	37.41	12.56
4,800.00	0.88	23.65	4,799.83	11.54	8.30	35.71	14.21
4,900.00	0.88	28.39	4,899.82	12.92	8.97	34.77	15.73
5,000.00	0.63	22.77	4,999.81	14.10	9.55	34.10	17.03
5,100.00	0.79	23.33	5,099.81	15.24	10.03	33.35	18.25
5,200.00	0.95	35.91	5,199.80	16.55	10.79	33.11	19.75
5,300.00	1.80	45.82	5,299.77	18.31	12.40	34.11	22.12
5,400.00	1.44	52.94	5,399.73	20.16	14.53	35.78	24.86
5,500.00	1.19	48.94	5,499.70	21.60	16.32	37.07	27.07

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Wellbore:	VH - Job #32K11121447	Survey Calculation Method:	Minimum Curvature
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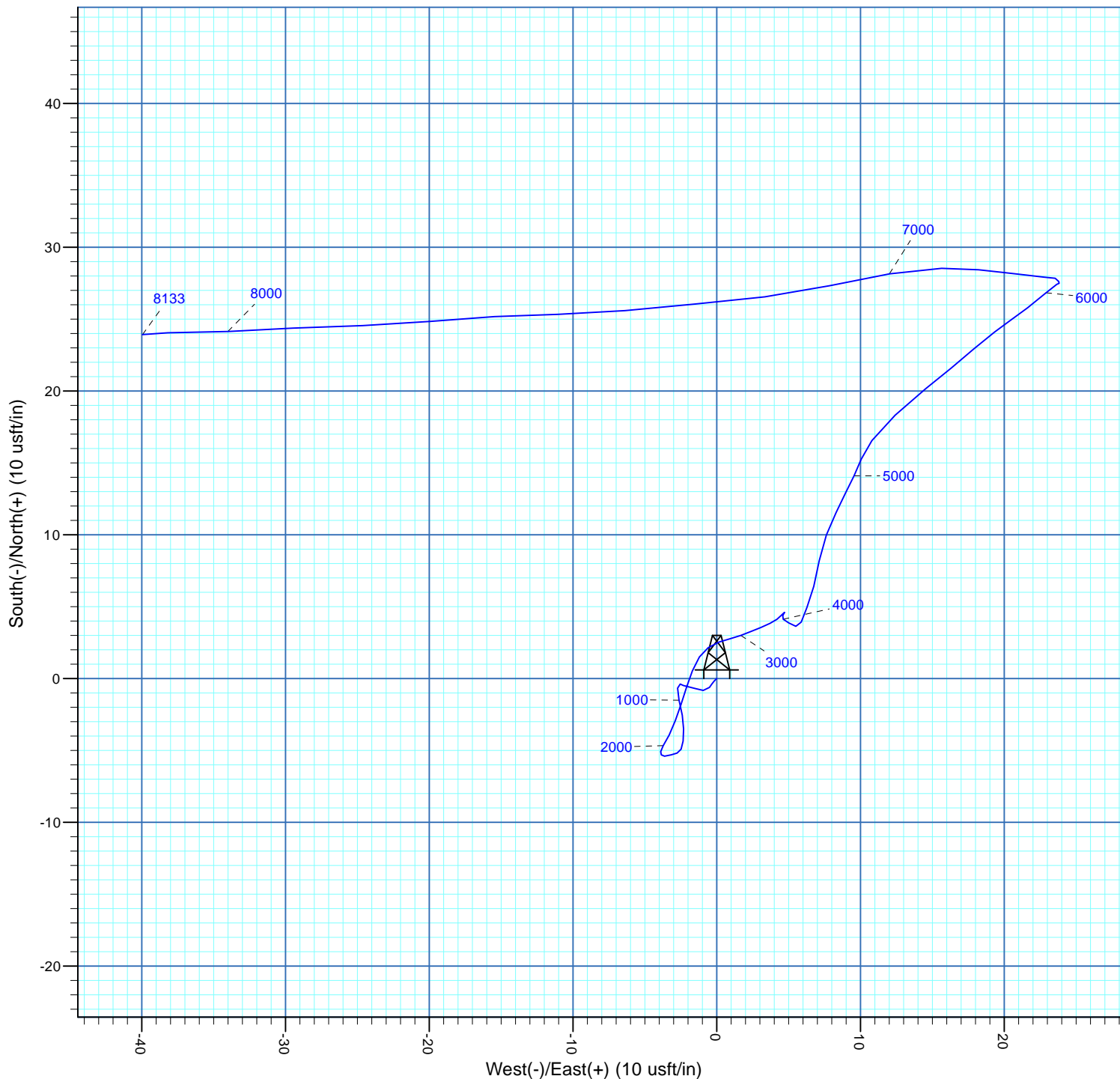
Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600.00	1.20	50.53	5,599.68	22.95	17.91	37.97	29.11
5,700.00	0.89	51.26	5,699.66	24.10	19.32	38.72	30.89
5,800.00	0.65	56.80	5,799.65	24.90	20.40	39.33	32.19
5,900.00	1.07	52.05	5,899.64	25.78	21.62	39.97	33.65
6,000.00	0.82	49.71	5,999.63	26.82	22.90	40.49	35.27
6,100.00	0.28	58.03	6,099.62	27.41	23.65	40.79	36.21
6,200.00	0.07	217.56	6,199.62	27.49	23.82	40.91	36.38
6,300.00	0.19	0.06	6,299.62	27.61	23.78	40.74	36.44
6,400.00	0.29	283.98	6,399.62	27.84	23.54	40.22	36.46
6,500.00	0.58	271.10	6,499.62	27.91	22.79	39.23	36.03
6,600.00	0.90	280.24	6,599.61	28.06	21.51	37.47	35.35
6,700.00	0.88	272.85	6,699.60	28.24	19.97	35.27	34.58
6,800.00	1.15	278.95	6,799.58	28.43	18.21	32.64	33.76
6,900.00	1.81	267.83	6,899.55	28.53	15.64	28.73	32.53
7,000.00	2.36	261.10	6,999.48	28.15	12.03	23.14	30.61
7,100.00	2.52	256.58	7,099.39	27.32	7.86	16.04	28.43
7,200.00	2.74	263.76	7,199.29	26.55	3.34	7.17	26.76
7,300.00	2.85	264.47	7,299.17	26.05	-1.51	356.68	26.09
7,400.00	2.76	264.71	7,399.05	25.59	-6.38	346.00	26.37
7,500.00	2.58	269.08	7,498.94	25.33	-11.03	336.47	27.63
7,600.00	2.52	266.74	7,598.84	25.17	-15.47	328.42	29.55
7,700.00	2.61	264.89	7,698.74	24.84	-19.94	321.25	31.85
7,800.00	2.77	267.76	7,798.63	24.54	-24.62	314.91	34.76
7,900.00	2.81	268.00	7,898.51	24.36	-29.48	309.57	38.25
8,000.00	2.32	266.11	7,998.41	24.14	-33.95	305.41	41.66
8,100.00	2.55	271.08	8,098.32	24.05	-38.20	302.19	45.14
8,135.00	3.25	261.95	8,133.27	23.92	-39.96	300.91	46.57



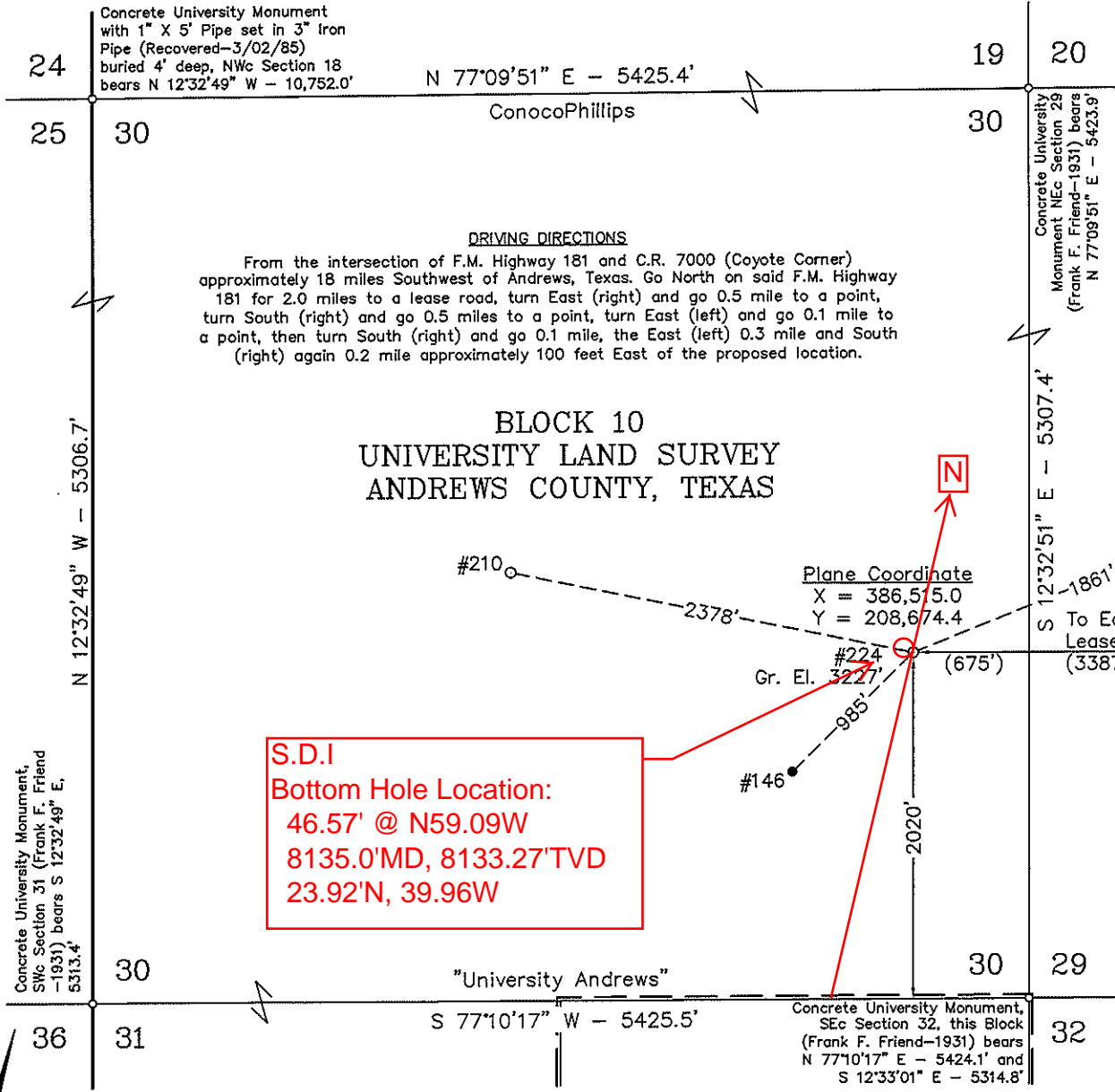
Project: Embar
Andrews County, Texas
Well: University Andrews #224
Wellbore: VH - Job #32K11121447
Design: VH - Job #32K11121447

WELL DETAILS: University Andrews #224
WELL @ 0.00usft (Original Well Elev)
Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	208721.09	386381.77	32° 7' 49.000 N	102° 42' 51.680 W	



PROJECT DETAILS: Embar	SITE DETAILS: Andrews County, Texas
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 4' 41.780 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 102° 41' 13.070 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: Texas North Central 4202	Convergence: -2.83
System Datum: Mean Sea Level	Local North: Grid



DRIVING DIRECTIONS
 From the intersection of F.M. Highway 181 and C.R. 7000 (Coyote Corner) approximately 18 miles Southwest of Andrews, Texas. Go North on said F.M. Highway 181 for 2.0 miles to a lease road, turn East (right) and go 0.5 mile to a point, turn South (right) and go 0.5 miles to a point, turn East (left) and go 0.1 mile to a point, then turn South (right) and go 0.1 mile, the East (left) 0.3 mile and South (right) again 0.2 mile approximately 100 feet East of the proposed location.

**BLOCK 10
 UNIVERSITY LAND SURVEY
 ANDREWS COUNTY, TEXAS**

S.D.I
Bottom Hole Location:
46.57' @ N59.09W
8135.0'MD, 8133.27'TVD
23.92'N, 39.96W

Plane Coordinate
 X = 386,515.0
 Y = 208,674.4

LEGEND

- - Denotes Proposed Well Location
- - Denotes Producing Well Location
- - Denotes Calculated Corner this Survey
- - Denotes Lease Line

Date Surveyed: May 21, 2012
 Weather: Hot & Clear

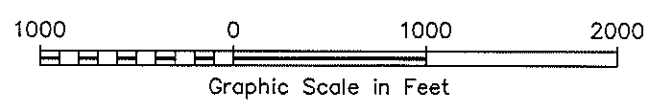
The University Andrews #224 is located approximately 17 miles Southwest of Andrews, Texas.

NOTE:

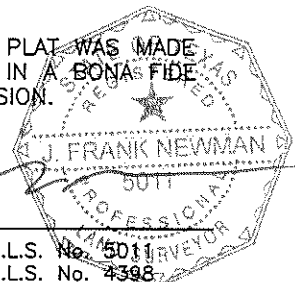
- 1) Plane Coordinates and Bearings shown hereon are Lambert Grid and Conform to the "Texas Coordinate System", Texas North Central Zone, North American Datum of 1927. Distances shown hereon are mean horizontal surface values.
- 2) Geodetic Coordinate unless otherwise shown hereon references the North American Datum of 1927, (Clarke Spheroid of 1866). Reference Station - "WALKER" (CU0800)
- 3) See information filed in the office of this Surveyor which describes the reconstruction of this Section.

Geodetic Coordinate (NAD 83)
 Latitude = 32°07'49.00" N
 Longitude = 102°42'51.68" W

Geodetic Coordinate
 Latitude = 32°07'48.60" N
 Longitude = 102°42'50.11" W



I HEREBY CERTIFY THAT THIS PLAT WAS MADE FROM NOTES TAKEN IN THE FIELD IN A BONA FIDE SURVEY MADE UNDER MY SUPERVISION.



J. FRANK NEWMAN TEXAS R.P.L.S. No. 5011
 MACON McDONALD TEXAS R.P.L.S. No. 4398
 R. CRAIG ALDERMAN TEXAS R.P.L.S. No. 5285

**WEST COMPANY
 of Midland, Inc.**

110 W. LOUISIANA, STE. 110
 MIDLAND TEXAS, 79701
 (432) 687-0865 - (432) 687-0868 FAX

ConocoPhillips

**Location of the
 UNIVERSITY ANDREWS #224**
 2020' FSL & 675' FEL
 Section 30, Block 10
 University Land Survey
 Andrews County, Texas

Drawn By: LVA	Date: May 29, 2012
Scale: 1" = 1000'	Field Book: 556 / 1-3
Revision Date:	Quadrangle: North Cowden NW
W.O. No: 2012-0983	Dwg. No.: L-2012-0983



State of Texas
County of Midland

I, Eliseo Garza, certify that; I am employed by Scientific Drilling International; that I did on the day(s) of 11/30/12 through 11/30/12 conduct or supervise the taking of a Keeper Gyro survey from a depth of 0 feet to a depth of 8135 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Scientific Drilling International; that I am authorized and qualified to make this report; that this survey was conducted at the request of Conoco Phillips Company for the University Andrews #224 Well, API# 42-003-44476 in Andrews County, Texas; and that I have reviewed this report and find that it conforms to the principals and procedures as set forth by Scientific Drilling International.



Field Technician