

Results of Directional Survey

DD

API number:	30-025-39474		
OGRID:		Operator:	COG OPERATING LLC
		Property:	GC FEDERAL # 56

surface	ULSTR:	O	19	T 17S	R 32E
				623 FSL	1913 FEL

BH Loc	ULSTR:	O	19	T 17S	R 32E
7112 MD		7083.4	TVD	979 FSL	2308 FEL

Top Perf/OH	ULSTR:	O	19	T 17S	R 32E
5300 MD		5281.7	TVD	856 FSL	2159 FEL

Bot Perf/OH	ULSTR:	O	19	T 17S	R 32E
6700 MD		6673.7	TVD	953 FSL	2272 FEL

	MD	N/S	E/W	VD
	5210	226.20	-238.90	5192.3
TOP PERFS/OH	5300	233.09	-245.70	5281.73
	5304	233.40	-246.00	5285.70
	6612	324.20	-351.60	6586.30
BOT PERFS/OH	6700	330.29	-359.00	6673.74
	6706	330.70	-359.50	6679.70

NEXT TO LAST	7064	353.20	-390.60	7035.70
LAST READING	7112	356.00	-394.90	7083.40
TD	7112	356.00	-394.90	7083.40

Surface Location	623 FS	1913 FE
Projected BHL	979 FS	2308 FE
Location of		
Top Perfs/OH	856 FS	2159 FE
Bottom Perfs/OH	953 FS	2272 FE

SUMMARY of Subsurface Locations

Surface Location	O-19-17S-32E	623 FS	1913 FE	Vert. Depth
Top Perfs/OH	O-19-17S-32E	856 FS	2159 FE	5281.73
Bottom Perfs/OH	O-19-17S-32E	953 FS	2272 FE	6673.74
Projected TD	O-19-17S-32E	979 FS	2308 FE	7083.40

MAR 2 2 2012



COG OPERATING LLC

Lea County, NM (NAD27 NME)

GC Federal #56

GC Federal #56

OH - Job #32D1011971

HOBBS OCD

DEC 08 2011

RECEIVED

Survey: MWD Survey

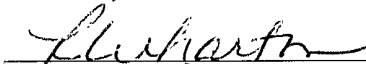
SUR: O-19-17S-32E, 623/S & 1913/E

BHL: O-19-17S-32E, 979/S & 2308/E

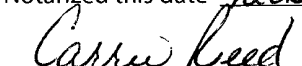
API # 30-025-39474

SDI Standard Survey Report

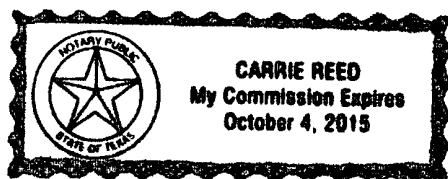
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 16th of November, 2011.



Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well GC Federal #56
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Site:	GC Federal #56	MD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Well:	GC Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D1011971	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	GC Federal #56		
Site Position:		Northing:	660,434 70 usft
From:	Map	Easting:	662,957 70 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 48' 52 198 N
		Longitude:	103° 48' 10 495 W
		Grid Convergence:	0 29 °

Well	GC Federal #56		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 48' 52 198 N
		Longitude:	103° 48' 10 495 W
		Ground Level:	3,924 0 usft

Wellbore	OH - Job #32D1011971				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	10/11/2011	7 70	60 69	48,911

Design	Actual			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth:
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0 0	0 0	0 0	312 42

Survey Program	Date 10/17/2011				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100 0	1,980 0	Gyro Survey (OH - Job #32D1011971)	Keeper	Standard Wireline Keeper ver 1 0 2	
2,154 0	7,112 0	MWD Survey (OH - Job #32D1011971)	MWD	MWD - Standard	

Survey								
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance	
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)	
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0	
100 0	0 47	265 58	100 0	0 0	-0 4	265 58	0 4	
200 0	0 35	292 81	200 0	0 1	-1 1	272 87	1 1	
300 0	0 38	266 79	300 0	0 2	-1 7	275 17	1 7	
400 0	0 16	311 09	400 0	0 2	-2 1	276 06	2 2	
500 0	0 17	305 58	500 0	0 4	-2 4	279 71	2 4	
600 0	0 23	327 02	600 0	0 7	-2 6	284 24	2 7	
700 0	0 35	339 21	700 0	1 1	-2 8	291 56	3 0	
800 0	0 81	328 21	800 0	2 0	-3 3	301 21	3 9	
900 0	0 83	326 49	900 0	3 2	-4 1	308 19	5 2	
1,000 0	0 85	338 35	1,000 0	4 5	-4 7	313 46	6 5	



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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Site:	GC Federal #56	MD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Well:	GC Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D1011971	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,100 0	0 94	339 26	1,100 0	6 0	-5 3	318 27	8 0
1,200 0	1 08	339 19	1,199 9	7 6	-5 9	322 01	9 6
1,300 0	0 93	344 06	1,299 9	9 3	-6 5	324 97	11 3
1,400 0	0 86	330 93	1,399 9	10 7	-7 1	326 50	12 8
1,500 0	0 85	351 77	1,499 9	12 1	-7 6	328 01	14 3
1,600 0	0 98	8 32	1,599 9	13 7	-7 5	331 14	15 6
1,700 0	1 19	21 10	1,699 9	15 5	-7 0	335 56	17 0
1,800 0	1 12	29 94	1,799 8	17 3	-6 2	340 35	18 4
1,900 0	1 07	33 28	1,899 8	18 9	-5 2	344 70	19 6
1,980 0	0 94	40 98	1,979 8	20 0	-4 3	347 79	20 5



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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Site:	GC Federal #56	MD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Well:	GC Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D1011971	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	GC Federal #56		
Site Position:		Northing:	660,434 70 usft
From:	Map	Easting:	662,957 70 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 48' 52 198 N
		Longitude:	103° 48' 10 495 W
		Grid Convergence:	0 29 °

Well	GC Federal #56		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 48' 52 198 N
		Longitude:	103° 48' 10 495 W
		Ground Level:	3,924 0 usft

Wellbore	OH - Job #32D1011971		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	10/11/2011	7 70
			Dip Angle
			60 69
			Field Strength
			48,911

Design	Actual		
Audit Notes:			
Version:	1 0	Phase:	ACTUAL
		Tie On Depth:	0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0 0	0 0	0 0
			Direction
			312 42

Survey Program	Date: 11/15/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100 0	1,980 0	Gyro Survey (OH - Job #32D1011971)	Keeper
2,154 0	7,112 0	MWD Survey (OH - Job #32D1011971)	MWD
			Description
			Standard Wireline Keeper ver 1 0 2
			MWD - Standard

Survey			
Measured Depth	Inclination	Azimuth	True Vertical
(usft)	(°)	(°)	Depth
1,980 0	0 94	40 98	1,979 8
2,154 0	1 14	47 36	2,153 8
2,217 0	1 90	22 94	2,216 8
2,279 0	2 54	13 47	2,278 7
2,341 0	3 15	356 85	2,340 6
2,404 0	3 54	342 14	2,403 5
2,497 0	4 55	321 73	2,496 3
2,591 0	5 03	310 17	2,590 0
2,685 0	5 37	311 78	2,683 6
2,778 0	5 81	313 18	2,776 2
2,872 0	5 61	307 97	2,869 7
			North/South
			(usft)
			20 0
			22 3
			23 7
			26 0
			29 0
			32 6
			38 2
			43 8
			49 4
			55 5
			61 6
			East/West
			(usft)
			-4 3
			-2 1
			-1 3
			-0 5
			-0 3
			-1 0
			-4 2
			-9 6
			-16 1
			-22 7
			-29 8
			Closure Azimuth
			(°)
			347 79
			354 55
			356 96
			358 81
			359 38
			358 24
			353 77
			347 60
			341 99
			337 73
			334 16
			Closure Distance
			(usft)
			20 5
			22 4
			23 7
			26 0
			29 0
			32 6
			38 4
			44 8
			51 9
			60 0
			68 4



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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Site:	GC Federal #56	MD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Well:	GC Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D1011971	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
2,965 0	6 36	308 97	2,962 2	67 6	-37 4	331 05	77 3
3,059 0	7 27	312 55	3,055 5	74 9	-45 8	328 54	87 8
3,152 0	6 71	313 12	3,147 8	82 6	-54 1	326 76	98 8
3,245 0	7 02	305 82	3,240 2	89 7	-62 7	325 03	109 4
3,337 0	6 42	306 82	3,331 5	96 0	-71 4	323 37	119 7
3,432 0	6 17	304 93	3,426 0	102 1	-79 8	321 99	129 6
3,525 0	7 71	309 58	3,518 3	109 0	-88 7	320 84	140 5
3,618 0	7 73	306 93	3,610 4	116 7	-98 5	319 82	152 7
3,712 0	7 36	306 55	3,703 6	124 1	-108 4	318 85	164 8
3,805 0	7 26	305 96	3,795 9	131 1	-118 0	318 01	176 4
3,898 0	6 92	305 09	3,888 1	137 8	-127 3	317 26	187 6
3,991 0	7 23	305 82	3,980 4	144 4	-136 6	316 58	198 8
4,084 0	7 05	305 93	4,072 7	151 2	-146 0	316 00	210 2
4,179 0	6 81	305 90	4,167 0	157 9	-155 3	315 48	221 5
4,273 0	6 59	302 94	4,260 4	164 1	-164 3	314 96	232 2
4,366 0	6 64	301 59	4,352 8	169 8	-173 4	314 40	242 7
4,459 0	5 60	307 70	4,445 2	175 4	-181 6	314 01	252 5
4,552 0	5 74	306 83	4,537 8	181 0	-188 9	313 78	261 6
4,646 0	5 55	303 84	4,631 3	186 3	-196 4	313 49	270 7
4,740 0	5 87	312 94	4,724 9	192 1	-203 7	313 32	280 0
4,835 0	5 54	311 74	4,819 4	198 5	-210 7	313 29	289 5
4,928 0	5 28	312 52	4,912 0	204 4	-217 2	313 26	298 2
5,022 0	6 50	315 84	5,005 5	211 1	-224 1	313 29	307 9
5,116 0	6 50	314 96	5,098 9	218 7	-231 6	313 36	318 5
5,210 0	6 32	316 86	5,192 3	226 2	-238 9	313 44	329 0
5,304 0	6 06	313 70	5,285 7	233 4	-246 0	313 50	339 1
5,397 0	6 16	311 18	5,378 2	240 1	-253 3	313 47	349 0
5,491 0	6 00	311 95	5,471 7	246 7	-260 7	313 42	359 0
5,586 0	5 79	311 44	5,566 2	253 2	-268 0	313 37	368 7
5,680 0	5 93	310 44	5,659 7	259 5	-275 3	313 31	378 3
5,773 0	5 83	309 78	5,752 2	265 6	-282 6	313 23	387 8
5,867 0	5 75	309 11	5,845 7	271 7	-289 9	313 14	397 3
5,960 0	6 01	309 12	5,938 2	277 7	-297 3	313 05	406 8
6,053 0	5 76	307 82	6,030 7	283 6	-304 7	312 94	416 3
6,146 0	6 07	310 62	6,123 2	289 7	-312 2	312 86	425 9
6,241 0	6 70	311 50	6,217 7	296 6	-320 1	312 82	436 4
6,333 0	6 72	311 39	6,309 0	303 7	-328 2	312 78	447 2
6,426 0	6 45	312 89	6,401 4	310 9	-336 1	312 77	457 8
6,520 0	6 27	310 28	6,494 8	317 8	-343 9	312 74	468 2
6,612 0	6 26	309 27	6,586 3	324 2	-351 6	312 68	478 3
6,706 0	6 30	309 34	6,679 7	330 7	-359 5	312 61	488 5
6,799 0	5 92	308 07	6,772 2	336 9	-367 3	312 53	498 4
6,892 0	6 48	305 25	6,864 6	342 9	-375 3	312 41	508 4
6,985 0	6 01	304 07	6,957 1	348 7	-383 7	312 26	518 4



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SDI Standard Survey Report



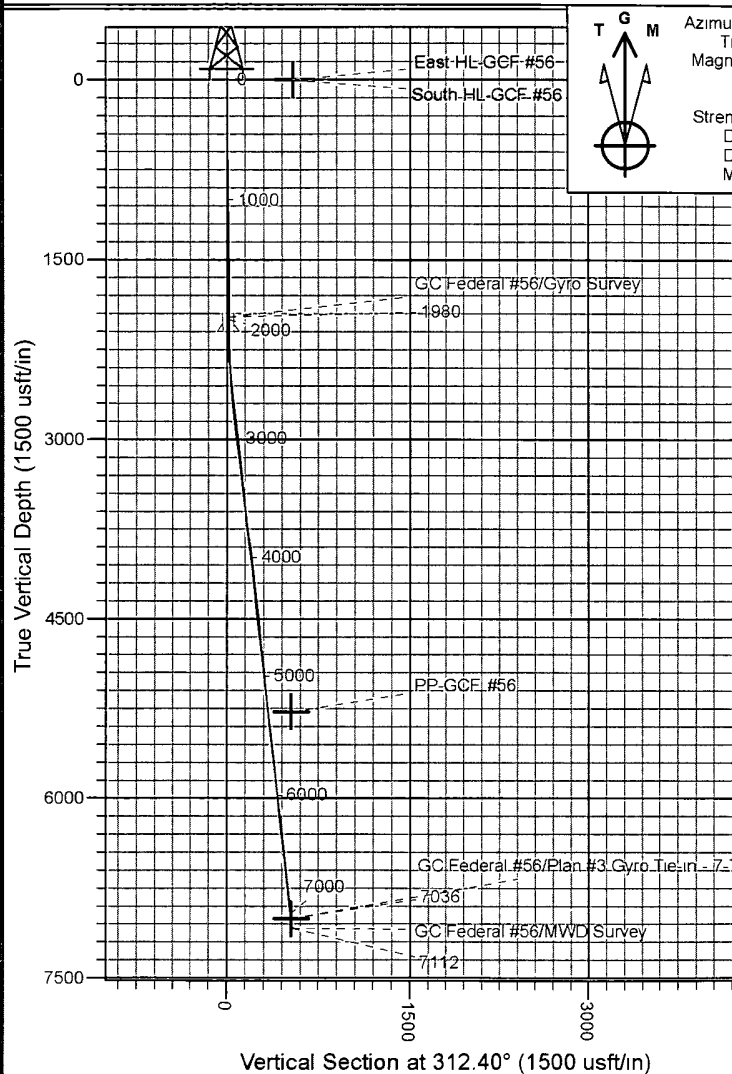
Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well GC Federal #56
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Site:	GC Federal #56	MD Reference:	KB Elev (13') @ 3937 0usft (JW #4)
Well:	GC Federal #56	North Reference:	Grid
Wellbore:	OH - Job #32D1011971	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
7,064 0	6 09	302 92	7,035 7	353 2	-390 6	312 13	526 6
Last MWD Survey							
7,112 0	6 09	302 92	7,083 4	356 0	-394 9	312 04	531 7
Projection to Bit							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,064 0	7,035 7	353 2	-390 6	Last MWD Survey
7,112 0	7,083 4	356 0	-394 9	Projection to Bit



Project: Lea County, NM (NAD27 NME)
 Site: GC Federal #56
 Well: GC Federal #56
 Wellbore: OH - Job #32D1011971
 Design: Plan #3 Gyro Tie-in - 7-7/8" Hole



Azimuths to Grid North
 True North -0 29°
 Magnetic North 7 41°
 Magnetic Field
 Strength 48910 7snT
 Dip Angle 60 69°
 Date 10/11/2011
 Model IGRF2010

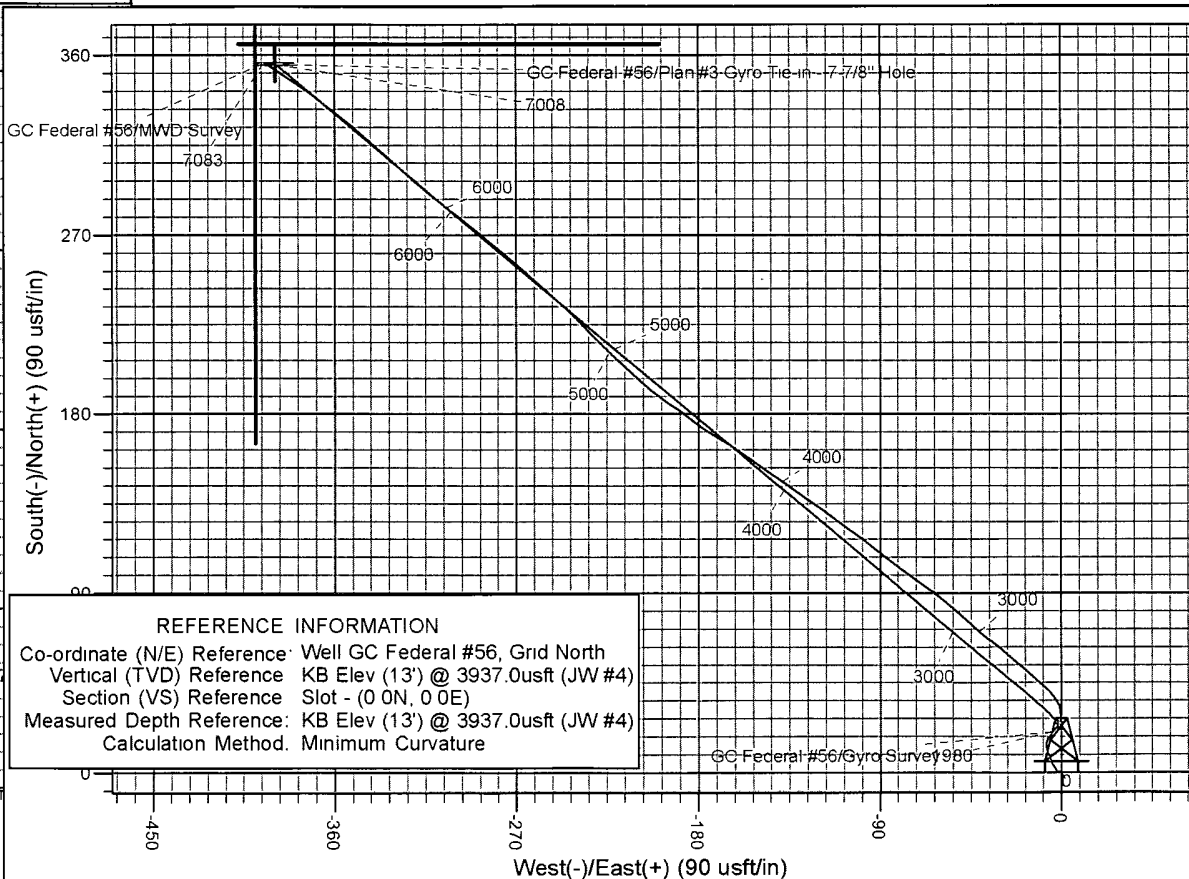
+N/-S
 0.0

+E/-W
 0.0

Northing
 660434.70

WELL DETAILS: GC Federal #56
 KB Elev (13') @ 3937.0usft (JW #4)
 Ground Level: 3924.0
 Easting 662957.70
 Latitude 32° 48' 52.198 N
 Longitude 103° 48' 10.495 W

Slot



REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GC Federal #56, Grid North
 Vertical (TVD) Reference: KB Elev (13') @ 3937.0usft (JW #4)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: KB Elev (13') @ 3937.0usft (JW #4)
 Calculation Method: Minimum Curvature

COMPANY DETAILS: COG OPERATING LLC
 223032

Calculation Method: Minimum Curvature
 Error System: ISCWSA
 Scan Method: Closest Approach 3D
 Error Surface: Elliptical Conic
 Warning Method: Error Ratio

PROJECT DETAILS: Lea County, NM (NAD27 NME)
 Geodetic System: State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

SITE DETAILS: GC Federal #56
 Site Centre Latitude: 32° 48' 52.198 N
 Longitude: 103° 48' 10.495 W
 Positional Uncertainty: 0.0
 Convergence: 0.29
 Local North: Grid