

Results of Directional Survey

DD

API number:	30-025-39876		
OGRID:		Operator:	COG OPERATING LLC
		Property:	MC FEDERAL # 59

surface	ULSTR:	J	21	T 17S	R 32E
				2538 FSL	1809 FEL

BH Loc	ULSTR:	J	21	T 17S	R 32E
7227 MD			7199.6 TVD	2277 FSL	1644 FEL

Top Perf/OH	ULSTR:	J	21	T 17S	R 32E
5456 MD			5434.3 TVD	2301 FSL	1663 FEL

Bot Perf/OH	ULSTR:	J	21	T 17S	R 32E
6710 MD			6688.3 TVD	2284 FSL	1649 FEL

	MD	N/S	E/W	VD
	5436	-236.50	145.60	5414.3
TOP PERFS/OH	5456	-236.94	145.82	5434.30
	5499	-237.90	146.30	5477.30
	5499	-237.90	146.30	5477.30
BOT PERFS/OH	6710	-254.05	159.76	6688.30
	5544	-238.50	146.80	5522.30

NEXT TO LAST	5499	-237.90	146.30	5477.30
LAST READING	5544	-238.50	146.80	5522.30
TD	7227	-260.94	165.50	7205.30

Surface Location	2538 FS	1809 FE
Projected BHL	2277 FS	1644 FE
Location of		
Top Perfs/OH	2301 FS	1663 FE
Bottom Perfs/OH	2284 FS	1649 FE

SUMMARY of Subsurface Locations

Surface Location	J-21-17S-32E	2538 FS	1809 FE	Vert. Depth
Top Perfs/OH	J-21-17S-32E	2301 FS	1663 FE	5434.30
Bottom Perfs/OH	J-21-17S-32E	2284 FS	1649 FE	6688.30
Projected TD	J-21-17S-32E	2277 FS	1644 FE	7205.30

AUG 30 2011

SUR: J-21-17s-32e, 2538/S & 1809/E
BHL: J-21-17s-32e, 2277/S & 1644/E
API # 30-025-39876

HOBBS OCD

AUG 09 2011

WELL NAME AND NUMBER MC Federal No. 59

RECEIVED

LOCATION Section 21, T17S, R32E, 2538 FSL, 1809 FEL, Lea County

OPERATOR COG Operating LLC

DRILLING CONTRACTOR United Drilling, Inc.

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

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
3/4° @ 204'		
1 3/4° @ 357'		
2.75° @ 538'		
4° @ 695'		
5° @ 830'		
3 1/4° @ 1073'		
1° @ 1552'		
1 1/4° @ 5935'		
1° @ 6472'		
3/4° @ 6948'		
1/2° @ 7185'		

Drilling Contractor- UNITED DRILLING, INC.

By: Luisa Noriega
(Luisa Noriega)

Title: Assistant Office Manager

Subscribed and sworn to before me this 1st day of June, 2011.

My Commission Expires: 10/8/12

Charles M. Miller
Notary Public
Charles New Mexico
County State



HOBBS OCD

AUG 09 2011

COG OPERATING LLC

Lea County, NM (NAD27 NME)

MC Federal #59

MC Federal #59

OH - Job #32D0511493

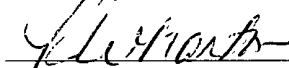
RECEIVED

SUR: J-21-17s-32e, 2538/S & 1809/E
BHL: J-21-17s-32e, 2277/S & 1644/E
API # 30-025-39876

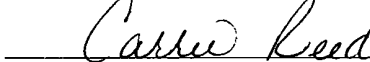
Survey: MWD Survey

SDI Standard Survey Report

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



Notarized this date 30th of June, 2011.



Notary Signature
County of Midland
State of Texas



Scientific Drilling
Directional Drilling Operations



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well MC Federal #59
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 4071 0usft (UDI #42)
Site:	MC Federal #59	MD Reference:	KB Elev (20') @ 4071 0usft (UDI #42)
Well:	MC Federal #59	North Reference:	Grid
Wellbore:	OH - Job #32D0511493	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	MC Federal #59		
Site Position:		Northing:	662,391 30 usft
From:	Map	Easting:	673,606 40 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 49' 11 012 N
		Longitude:	103° 46' 5 598 W
		Grid Convergence:	0 31 °

Well	MC Federal #59		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 11 012 N
		Longitude:	103° 46' 5 598 W
		Ground Level:	4,051 0 usft

Wellbore	OH - Job #32D0511493				
Magnetics:	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	5/26/2011	7 73	60 71	48,955

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	147 66

Survey Program	Date 7/6/2011			
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100 0	2,076 0	Gyro Survey (OH - Job #32D0511493)	Keeper	Standard Wireline Keeper ver 1 0 2
2,201 0	5,544 0	MWD Survey (OH - Job #32D0511493)	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 14	8 81	100 0	0 1	0 0	8 81	0 1
200 0	0 43	345 84	200 0	0 6	-0 1	354 87	0 6
300 0	1 47	344 41	300 0	2 2	-0 5	347 45	2 3
400 0	2 29	328 95	399 9	5 2	-1 9	340 09	5 5
500 0	2 72	319 13	499 8	8 7	-4 4	332 80	9 7
600 0	3 30	298 88	599 7	11 8	-8 5	324 26	14 6
700 0	4 11	272 50	699 5	13 4	-14 6	312 48	19 8
800 0	4 98	258 58	799 2	12 7	-22 5	299 46	25 8
900 0	4 22	257 04	898 9	11 0	-30 3	289 96	32 2
1,000 0	3 56	260 96	998 6	9 7	-37 0	284 69	38 2



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SDI Standard Survey Report



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Site:	MC Federal #59	MD Reference:	KB Elev (20') @ 4071 0usft (UDI #42)
Well:	MC Federal #59	North Reference:	Grid
Wellbore:	OH - Job #32D0511493	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	3 32	261 41	1,098 4	8 8	-42 9	281 56	43 8	
1,200 0	2 95	263 38	1,198 3	8 0	-48 3	279 45	49 0	
1,300 0	2 58	265 50	1,298 2	7 6	-53 1	278 11	53 6	
1,400 0	2 22	263 43	1,398 1	7 2	-57 3	277 13	57 7	
1,500 0	1 70	264 00	1,498 0	6 8	-60 7	276 39	61 0	
1,600 0	1 03	295 77	1,598 0	7 0	-63 0	276 37	63 3	
1,700 0	0 98	328 51	1,698 0	8 1	-64 2	277 23	64 7	
1,800 0	1 35	349 67	1,798 0	10 0	-64 9	278 79	65 6	
1,900 0	1 92	4 78	1,897 9	12 9	-64 9	281 20	66 2	
2,000 0	1 78	9 65	1,997 9	16 1	-64 5	283 98	66 5	
2,076 0	1 77	23 86	2,073 8	18 3	-63 9	285 99	66 4	



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SDI Standard Survey Report



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Site:	MC Federal #59	MD Reference:	KB Elev (20') @ 4071 0usft (UDI #42)
Well:	MC Federal #59	North Reference:	Grid
Wellbore:	OH - Job #32D0511493	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	MC Federal #59		
Site Position:		Northing:	662,391 30 usft
From:	Map	Easting:	673,606 40 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 49' 11 012 N
		Longitude:	103° 46' 5 598 W
		Grid Convergence:	0 31 °

Well	MC Federal #59		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 11 012 N
		Longitude:	103° 46' 5 598 W
		Ground Level:	4,051 0usft

Wellbore	OH - Job #32D0511493				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	5/26/2011	7 73	60 71	48,955

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	147 66

Survey Program	Date 7/6/2011				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100 0	2,076 0	Gyro Survey (OH - Job #32D0511493)	Keeper	Standard Wireline Keeper ver 1 0 2	
2,201 0	5,544 0	MWD Survey (OH - Job #32D0511493)	MWD	MWD - Standard	

Survey							
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
2,076 0	1 77	23 86	2,073 8	18 3	-63 9	285 99	66 4
Gyro Tie-in							
2,201 0	1 56	27 91	2,198 8	21 6	-62 3	289 10	65 9
2,265 0	1 50	39 65	2,262 8	23 0	-61 3	290 54	65 5
2,328 0	1 52	72 92	2,325 7	23 9	-60 0	291 68	64 6
2,391 0	1 38	100 46	2,388 7	24 0	-58 5	292 29	63 2
2,455 0	1 96	120 45	2,452 7	23 3	-56 8	292 29	61 4
2,518 0	2 75	124 86	2,515 6	21 9	-54 6	291 83	58 8
2,581 0	3 39	134 57	2,578 6	19 7	-52 0	290 73	55 6
2,645 0	3 77	145 20	2,642 4	16 6	-49 5	288 59	52 2
2,708 0	4 38	150 60	2,705 3	12 8	-47 1	285 25	48 8



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SDI Standard Survey Report



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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 4071 0usft (UDI #42)
Site:	MC Federal #59	MD Reference:	KB Elev (20') @ 4071 0usft (UDI #42)
Well:	MC Federal #59	North Reference:	Grid
Wellbore:	OH - Job #32D0511493	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)
2,771 0	4 90	149 42	2,768 1	8 4	-44 6	280 71	45 4
2,834 0	6 17	144 69	2,830 8	3 4	-41 2	274 65	41 4
2,898 0	6 40	146 87	2,894 4	-2 4	-37 3	266 26	37 4
2,961 0	7 08	149 44	2,957 0	-8 7	-33 4	255 37	34 5
3,024 0	7 49	146 81	3,019 4	-15 5	-29 2	242 03	33 1
3,087 0	7 89	144 37	3,081 9	-22 5	-24 4	227 41	33 2
3,182 0	7 66	143 83	3,176 0	-32 9	-16 9	207 21	37 0
3,277 0	6 84	142 33	3,270 2	-42 5	-9 7	192 87	43 5
3,372 0	6 35	139 62	3,364 6	-50 9	-2 8	183 19	51 0
3,467 0	6 90	139 01	3,459 0	-59 2	4 3	175 84	59 4
3,562 0	6 78	138 78	3,553 3	-67 8	11 7	170 17	68 8
3,664 0	7 40	141 07	3,654 5	-77 4	19 8	165 62	79 9
3,759 0	7 27	141 40	3,748 7	-86 9	27 4	162 47	91 1
3,854 0	7 47	141 15	3,843 0	-96 4	35 1	160 01	102 6
3,949 0	7 60	138 98	3,937 1	-105 9	43 1	157 88	114 3
4,044 0	7 53	138 33	4,031 3	-115 3	51 3	156 01	126 2
4,139 0	6 87	137 73	4,125 6	-124 2	59 3	154 48	137 6
4,233 0	7 06	137 45	4,218 9	-132 6	67 0	153 20	148 5
4,328 0	7 41	136 87	4,313 1	-141 4	75 1	152 02	160 1
4,423 0	7 95	136 44	4,407 3	-150 6	83 8	150 90	172 3
4,518 0	7 96	139 46	4,501 3	-160 3	92 6	149 99	185 2
4,613 0	7 28	142 02	4,595 5	-170 1	100 6	149 40	197 6
4,708 0	6 81	145 15	4,689 8	-179 5	107 5	149 07	209 2
4,803 0	6 88	145 05	4,784 1	-188 7	114 0	148 87	220 5
4,898 0	7 00	143 03	4,878 4	-198 0	120 7	148 63	231 9
4,993 0	6 43	146 18	4,972 8	-207 1	127 2	148 44	243 0
5,056 0	5 81	145 32	5,035 4	-212 6	131 0	148 37	249 7
5,119 0	5 58	142 48	5,098 1	-217 7	134 6	148 26	256 0
5,183 0	5 33	144 07	5,161 8	-222 6	138 3	148 15	262 0
5,246 0	4 40	152 28	5,224 6	-227 1	141 1	148 14	267 3
5,309 0	3 60	155 58	5,287 4	-231 0	143 1	148 23	271 7
5,372 0	2 55	155 91	5,350 3	-234 1	144 5	148 32	275 1
5,436 0	2 14	154 22	5,414 3	-236 5	145 6	148 39	277 7
5,499 0	0 91	145 46	5,477 3	-237 9	146 3	148 40	279 3
Last MWD Survey							
5,544 0	0 91	145 46	5,522 3	-238 5	146 8	148 40	280 0
Projection to Bit							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,076 0	2,073 8	18 3	-63 9	Gyro Tie-in
5,499 0	5,477 3	-237 9	146 3	Last MWD Survey
5,544 0	5,522 3	-238 5	146 8	Projection to Bit



Project: Lea County, NM (NAD27 NME)
 Site: MC Federal #59
 Well: MC Federal #59
 Wellbore: OH - Job #32D0511493
 Design: Plan #3 - 7-7/8" Hole



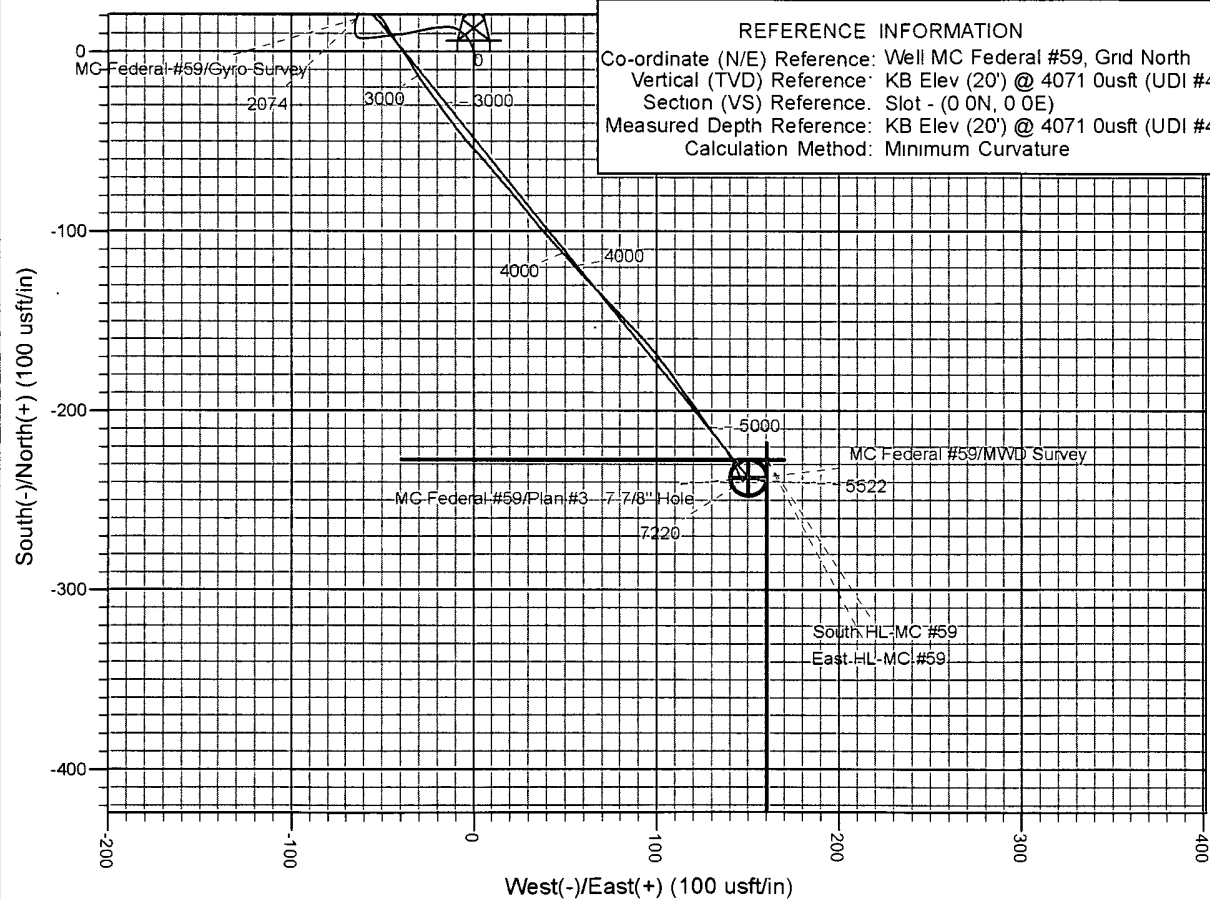
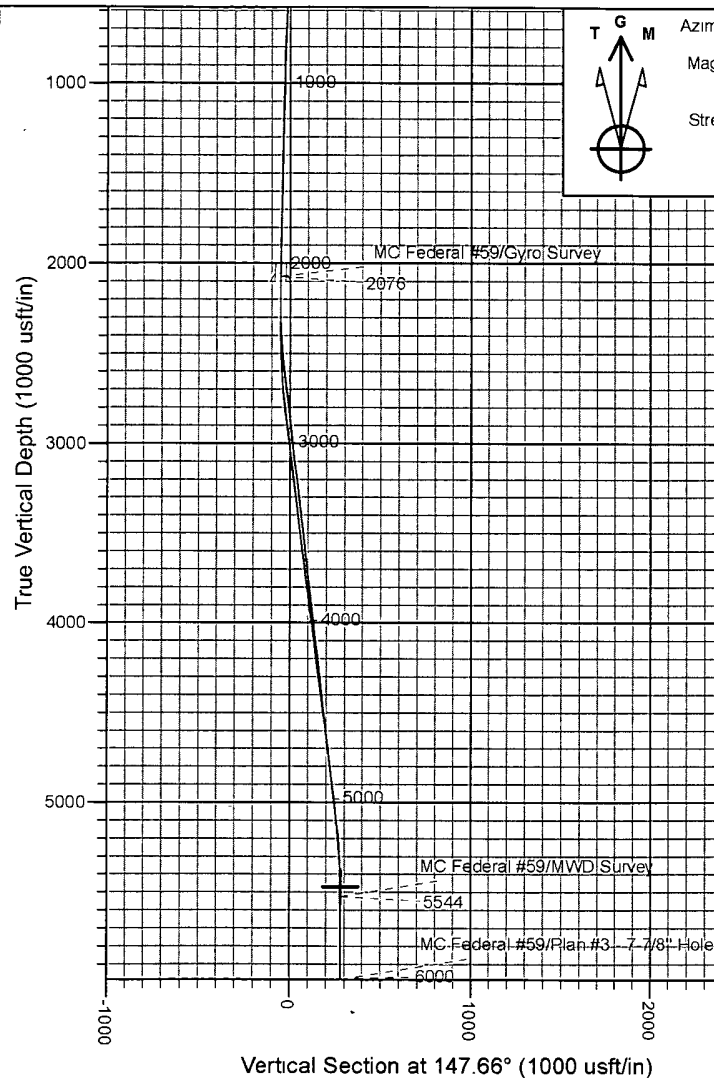
Azimuths to Grid North
 True North -0 31°
 Magnetic North 7 42°
 Magnetic Field
 Strength 48954 7snT
 Dip Angle 60 71°
 Date 5/26/2011

WELL DETAILS MC Federal #59
 KB Elev (20') @ 4071.0usft (UDI #42)
 Ground Level: 4051.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	662391.30	673606.40	32° 49' 11.012 N	103° 46' 5.598 W	

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well MC Federal #59, Grid North
 Vertical (TVD) Reference: KB Elev (20') @ 4071.0usft (UDI #42)
 Section (VS) Reference: Slot - (0 ON, 0 OE)
 Measured Depth Reference: KB Elev (20') @ 4071.0usft (UDI #42)
 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: NAD 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: MC Federal #59
 Site Centre Latitude: 32° 49' 11.012 N
 Longitude: 103° 46' 5.598 W
 Positional Uncertainty: 0.0
 Convergence: 0.31
 Local North: Grid