

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTOCD Artesia
NM OIL CONSERVATION
ARTESIA DISTRICTFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018**SUNDRY NOTICES AND REPORTS ON WELLS**
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

AUG 29 2017

SUBMIT IN TRIPLICATE - Other instructions on page 2

RECEIVED

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		5. Lease Serial No. NMNM01510
2. Name of Operator COG OPERATING LLC Contact: ROBYN RUSSELL E-Mail: rrussell@concho.com		6. If Indian, Allottee or Tribe Name
3a. Address 600 W ILLINOIS AVENUE MIDLAND, TX 79701	3b. Phone No. (include area code) Ph: 432-685-4385	7. If Unit or CA/Agreement, Name and/or No.
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 23 T17S R28E NENW 125FNL 1443FWL 32.827225 N Lat, 104.150482 W Lon		8. Well Name and No. MALCO 23 FEDERAL COM 13H
		9. API Well No. 30-015-44297-00-X1
		10. Field and Pool or Exploratory Area EMPIRE-GLORIETA-YESO
		11. County or Parish, State EDDY COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original APD
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplate horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

COG Operating LLC respectfully requests to change the surface and bottom hole locations of this well.

From: SHL: 125 FNL 1443 FWL, BHL: 220 FSL 1650 FWL, Sec 23, T17S, R28E
To: SHL: 125 FNL 1543 FWL, BHL: 10 FSL 1650 FWL, Sec 23, T17S, R28E

This change is to maximize the returns and reduce waste of the reservoir. Attached is a revised plat and directional plan.

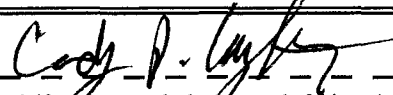
8/14/2017: Engineering review completed by mHague.

8/19/2017 OK per Bob Bell and original CA's Apply. DI- BLM - NM form 2017-0335-EA

UNORTHODOX
LOCATION

14. I hereby certify that the foregoing is true and correct. Electronic Submission #381268 verified by the BLM Well Information System For COG OPERATING LLC, sent to the Carlsbad Committed to AFMSS for processing by PRISCILLA PEREZ on 07/19/2017 (17PP0716SE)	
Name (Printed/Typed) ROBYN RUSSELL	Title REGULATORY ANALYST
Signature (Electronic Submission)	Date 07/13/2017

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By 	Title  FIELD MANAGER	Date 08/22/17
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.		Office CARLSBAD FIELD OFFICE

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED **

District I
1625 N. French Dr. Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St. Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr. Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number 30-015-44297		2 Pool Code 96210		3 Pool Name Empire; Glorieta-Yeso					
4 Property Code 318325		5 Property Name MALCO 23 FEDERAL COM						6 Well Number 13H	
7 OGRID NO. 229137		8 Operator Name COG OPERATING, LLC						9 Elevation 3637'	
10 Surface Location									
UL or lot no. C	Section 23	Township 17S	Range 28E	Lot Idn	Feet from the 125	North/South line NORTH	Feet from the 1543	East West line WEST	County EDDY
Bottom Hole Location If Different From Surface									
UL or lot no. N	Section 23	Township 17S	Range 28E	Lot Idn	Feet from the 10	North/South line SOUTH	Feet from the 1650	East West line WEST	County EDDY
Dedicated Acres 160		13 Joint or Infill		14 Consolidation Code		15 Order No.			

No allowable will be assigned to this completion until all interest have been consolidated or a non-standard unit has been approved by the division.

	17 OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location. It has the right to drill this well at the location pursuant to a contract with an owner, such as a mineral working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Signature: <u>Robyn M. Russell</u> Date: <u>7/13/17</u> Printed Name: <u>Robyn M. Russell</u> E-mail Address: <u>Russell@concho.com</u>
	18 SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. 10-26-2016 Date of Survey Signature and Seal of Professional Surveyor 19680 Certificate Number 6-26-17 BH

RRC - Job No.: LS1609302D4



NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 29 2017

RECEIVED

COG OPERATING, LLC

Eddy /Lea County, NM (NAD27) NMEZ
Malco 23 Federal COM 13H
#13H - Slot 125'FNL, 1543'FWL , Sec 23
PP, 676'FNL, 1677'FWL, Sec 23

Lateral

Planned BHL - 10'FSL,.1650'FWL, Sec 23



DIRECTIONAL SERVICES, LLC.



Planning Report



Database: VON_EDM
Company: COG OPERATING, LLC
Project: Eddy /Lea County, NM (NAD27) NMEZ
Site: Malco 23 Federal COM 13H
Well: #13H
Wellbore: Lateral
Design: Plan #1

Local Co-ordinate Reference: Well #13H - Slot Malco 13H
TVD Reference: 3639+18 @ 3657.00ft (Planning Est)
MD Reference: 3639+18 @ 3657.00ft (Planning Est)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Eddy /Lea County, NM (NAD27) NMEZ		
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	Malco 23 Federal COM 13H			
Site Position:		Northing:	664,672.10 ft	Latitude: 32° 49' 37.675 N
From: Map		Easting:	556,425.90 ft	Longitude: 104° 8' 58.729 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.20 in	Grid Convergence: 0.10 °

Well	#13H - Slot Malco 13H, SHL 125'FNL, 1443'FWL Sec23			
Well Position	+N/-S	0.00 ft	Northing:	664,672.10 ft
	+E/-W	0.00 ft	Easting:	556,425.90 ft
Position Uncertainty	0.00 ft		Wellhead Elevation:	Ground Level: 3,639.00 ft

Wellbore	Lateral				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	05/26/17	7.27	60.52	48,238

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	181.10

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,454.59	5.32	91.26	1,454.08	-0.36	16.44	1.50	1.50	0.00	91.26	
2,781.42	5.32	91.26	2,775.20	-3.06	139.41	0.00	0.00	0.00	0.00	
3,136.01	0.00	0.00	3,129.28	-3.42	155.85	1.50	-1.50	0.00	180.00	
3,286.01	0.00	0.00	3,279.28	-3.42	155.85	0.00	0.00	0.00	0.00	
4,116.68	91.37	181.10	3,800.00	-536.68	145.63	11.00	11.00	-21.54	181.10	
8,705.46	91.37	181.10	3,690.00	-5,123.30	57.70	0.00	0.00	0.00	0.00	Malco 13H PBHL



Planning Report



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 Project: Eddy /Lea County, NM (NAD27) NMEZ
 Site: Malco 23 Federal COM 13H
 Well: #13H
 Wellbore: Lateral
 Design: Plan #1

Local Co-ordinate Reference: Well #13H - Slot Malco 13H
 TVD Reference: 3639+18 @ 3657.00ft (Planning Est)
 MD Reference: 3639+18 @ 3657.00ft (Planning Est)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00
Salt Top									
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
492.00	0.00	0.00	492.00	0.00	0.00	0.00	0.00	0.00	0.00
Tansill									
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
597.00	0.00	0.00	597.00	0.00	0.00	0.00	0.00	0.00	0.00
Yates									
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
856.00	0.00	0.00	856.00	0.00	0.00	0.00	0.00	0.00	0.00
Seven Rivers									
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	1.50	91.26	1,199.99	-0.03	1.31	0.00	1.50	1.50	0.00
1,300.00	3.00	91.26	1,299.91	-0.11	5.23	0.01	1.50	1.50	0.00
1,400.00	4.50	91.26	1,399.69	-0.26	11.77	0.03	1.50	1.50	0.00
1,407.33	4.61	91.26	1,407.00	-0.27	12.35	0.03	1.50	1.50	0.00
Queen									
1,454.59	5.32	91.26	1,454.08	-0.36	16.44	0.05	1.50	1.50	0.00
1,500.00	5.32	91.26	1,499.30	-0.45	20.65	0.06	0.00	0.00	0.00
1,600.00	5.32	91.26	1,598.86	-0.66	29.92	0.08	0.00	0.00	0.00
1,700.00	5.32	91.26	1,698.43	-0.86	39.19	0.11	0.00	0.00	0.00
1,800.00	5.32	91.26	1,798.00	-1.06	48.45	0.13	0.00	0.00	0.00
1,835.15	5.32	91.26	1,833.00	-1.13	51.71	0.14	0.00	0.00	0.00
Grayburg									
1,900.00	5.32	91.26	1,897.57	-1.27	57.72	0.16	0.00	0.00	0.00
2,000.00	5.32	91.26	1,997.14	-1.47	66.99	0.18	0.00	0.00	0.00
2,100.00	5.32	91.26	2,096.71	-1.67	76.26	0.21	0.00	0.00	0.00
2,161.55	5.32	91.26	2,158.00	-1.80	81.96	0.22	0.00	0.00	0.00
San Andres									
2,200.00	5.32	91.26	2,196.28	-1.88	85.52	0.23	0.00	0.00	0.00
2,300.00	5.32	91.26	2,295.85	-2.08	94.79	0.26	0.00	0.00	0.00
2,400.00	5.32	91.26	2,395.42	-2.28	104.06	0.29	0.00	0.00	0.00
2,500.00	5.32	91.26	2,494.99	-2.49	113.33	0.31	0.00	0.00	0.00
2,600.00	5.32	91.26	2,594.56	-2.69	122.59	0.34	0.00	0.00	0.00
2,700.00	5.32	91.26	2,694.13	-2.89	131.86	0.36	0.00	0.00	0.00
2,781.42	5.32	91.26	2,775.20	-3.06	139.41	0.38	0.00	0.00	0.00
2,800.00	5.04	91.26	2,793.70	-3.10	141.08	0.39	1.50	-1.50	0.00
2,900.00	3.54	91.26	2,893.42	-3.26	148.56	0.41	1.50	-1.50	0.00
3,000.00	2.04	91.26	2,993.30	-3.37	153.43	0.42	1.50	-1.50	0.00
3,100.00	0.54	91.26	3,093.27	-3.42	155.68	0.43	1.50	-1.50	0.00
3,136.01	0.00	0.00	3,129.28	-3.42	155.85	0.43	1.50	-1.50	0.00
3,200.00	0.00	0.00	3,193.27	-3.42	155.85	0.43	0.00	0.00	0.00
3,286.01	0.00	0.00	3,279.28	-3.42	155.85	0.43	0.00	0.00	0.00
3,300.00	1.54	181.10	3,293.27	-3.61	155.85	0.62	11.00	11.00	0.00
3,400.00	12.54	181.10	3,392.36	-15.84	155.61	12.85	11.00	11.00	0.00



Planning Report



Database: VON_EDM
 Company: COG OPERATING, LLC
 Project: Eddy /Lea County, NM (NAD27) NMEZ
 Site: Malco 23 Federal COM 13H
 Well: #13H
 Wellbore: Lateral
 Design: Plan #1

Local Co-ordinate Reference: Well #13H - Slot Malco 13H
 TVD Reference: 3639+18 @ 3657.00ft (Planning Est)
 MD Reference: 3639+18 @ 3657.00ft (Planning Est)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,500.00	23.54	181.10	3,487.30	-46.75	155.02	43.77	11.00	11.00	0.00
3,562.54	30.42	181.10	3,543.00	-75.10	154.48	72.12	11.00	11.00	0.00
Glorieta									
3,600.00	34.54	181.10	3,574.59	-95.21	154.09	92.23	11.00	11.00	0.00
3,660.06	41.15	181.10	3,622.00	-132.03	153.38	129.06	11.00	11.00	0.00
Paddock									
3,700.00	45.54	181.10	3,651.04	-159.43	152.86	156.47	11.00	11.00	0.00
3,800.00	56.54	181.10	3,713.82	-237.05	151.37	234.10	11.00	11.00	0.00
3,900.00	67.54	181.10	3,760.64	-325.23	149.68	322.30	11.00	11.00	0.00
4,000.00	78.54	181.10	3,789.76	-420.71	147.85	417.80	11.00	11.00	0.00
4,100.00	89.54	181.10	3,800.13	-520.00	145.95	517.11	11.00	11.00	0.00
4,116.68	91.37	181.10	3,800.00	-536.68	145.63	533.78	11.00	11.00	0.00
4,200.00	91.37	181.10	3,798.00	-619.96	144.03	617.08	0.00	0.00	0.00
4,300.00	91.37	181.10	3,795.61	-719.91	142.11	717.05	0.00	0.00	0.00
4,400.00	91.37	181.10	3,793.21	-819.87	140.20	817.02	0.00	0.00	0.00
4,500.00	91.37	181.10	3,790.81	-919.82	138.28	916.99	0.00	0.00	0.00
4,600.00	91.37	181.10	3,788.42	-1,019.77	136.37	1,016.97	0.00	0.00	0.00
4,700.00	91.37	181.10	3,786.02	-1,119.72	134.45	1,116.94	0.00	0.00	0.00
4,800.00	91.37	181.10	3,783.62	-1,219.68	132.53	1,216.91	0.00	0.00	0.00
4,900.00	91.37	181.10	3,781.22	-1,319.63	130.62	1,316.88	0.00	0.00	0.00
5,000.00	91.37	181.10	3,778.83	-1,419.58	128.70	1,416.85	0.00	0.00	0.00
5,100.00	91.37	181.10	3,776.43	-1,519.54	126.79	1,516.82	0.00	0.00	0.00
5,200.00	91.37	181.10	3,774.03	-1,619.49	124.87	1,616.79	0.00	0.00	0.00
5,300.00	91.37	181.10	3,771.63	-1,719.44	122.95	1,716.76	0.00	0.00	0.00
5,400.00	91.37	181.10	3,769.24	-1,819.39	121.04	1,816.74	0.00	0.00	0.00
5,500.00	91.37	181.10	3,766.84	-1,919.35	119.12	1,916.71	0.00	0.00	0.00
5,600.00	91.37	181.10	3,764.44	-2,019.30	117.20	2,016.68	0.00	0.00	0.00
5,700.00	91.37	181.10	3,762.05	-2,119.25	115.29	2,116.65	0.00	0.00	0.00
5,800.00	91.37	181.10	3,759.65	-2,219.21	113.37	2,216.62	0.00	0.00	0.00
5,900.00	91.37	181.10	3,757.25	-2,319.16	111.46	2,316.59	0.00	0.00	0.00
6,000.00	91.37	181.10	3,754.85	-2,419.11	109.54	2,416.56	0.00	0.00	0.00
6,100.00	91.37	181.10	3,752.46	-2,519.06	107.62	2,516.53	0.00	0.00	0.00
6,200.00	91.37	181.10	3,750.06	-2,619.02	105.71	2,616.51	0.00	0.00	0.00
6,300.00	91.37	181.10	3,747.66	-2,718.97	103.79	2,716.48	0.00	0.00	0.00
6,400.00	91.37	181.10	3,745.27	-2,818.92	101.88	2,816.45	0.00	0.00	0.00
6,500.00	91.37	181.10	3,742.87	-2,918.88	99.96	2,916.42	0.00	0.00	0.00
6,600.00	91.37	181.10	3,740.47	-3,018.83	98.04	3,016.39	0.00	0.00	0.00
6,700.00	91.37	181.10	3,738.07	-3,118.78	96.13	3,116.36	0.00	0.00	0.00
6,800.00	91.37	181.10	3,735.68	-3,218.73	94.21	3,216.33	0.00	0.00	0.00
6,900.00	91.37	181.10	3,733.28	-3,318.69	92.30	3,316.30	0.00	0.00	0.00
7,000.00	91.37	181.10	3,730.88	-3,418.64	90.38	3,416.28	0.00	0.00	0.00
7,100.00	91.37	181.10	3,728.49	-3,518.59	88.46	3,516.25	0.00	0.00	0.00
7,200.00	91.37	181.10	3,726.09	-3,618.55	86.55	3,616.22	0.00	0.00	0.00
7,300.00	91.37	181.10	3,723.69	-3,718.50	84.63	3,716.19	0.00	0.00	0.00
7,400.00	91.37	181.10	3,721.29	-3,818.45	82.71	3,816.16	0.00	0.00	0.00
7,500.00	91.37	181.10	3,718.90	-3,918.41	80.80	3,916.13	0.00	0.00	0.00
7,600.00	91.37	181.10	3,716.50	-4,018.36	78.88	4,016.10	0.00	0.00	0.00
7,700.00	91.37	181.10	3,714.10	-4,118.31	76.97	4,116.07	0.00	0.00	0.00
7,800.00	91.37	181.10	3,711.71	-4,218.26	75.05	4,216.05	0.00	0.00	0.00
7,900.00	91.37	181.10	3,709.31	-4,318.22	73.13	4,316.02	0.00	0.00	0.00
8,000.00	91.37	181.10	3,706.91	-4,418.17	71.22	4,415.99	0.00	0.00	0.00
8,100.00	91.37	181.10	3,704.51	-4,518.12	69.30	4,515.96	0.00	0.00	0.00
8,200.00	91.37	181.10	3,702.12	-4,618.08	67.39	4,615.93	0.00	0.00	0.00
8,300.00	91.37	181.10	3,699.72	-4,718.03	65.47	4,715.90	0.00	0.00	0.00



Planning Report



Database: VON_EDM
 Company: COG OPERATING, LLC
 Project: Eddy /Lea County, NM (NAD27) NMEZ
 Site: Malco 23 Federal COM 13H
 Well: #13H
 Wellbore: Lateral
 Design: Plan #1

Local Co-ordinate Reference: Well #13H - Slot Malco 13H
 TVD Reference: 3639+18 @ 3657.00ft (Planning Est)
 MD Reference: 3639+18 @ 3657.00ft (Planning Est)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,400.00	91.37	181.10	3,697.32	-4,817.98	63.55	4,815.87	0.00	0.00	0.00
8,500.00	91.37	181.10	3,694.93	-4,917.93	61.64	4,915.84	0.00	0.00	0.00
8,600.00	91.37	181.10	3,692.53	-5,017.89	59.72	5,015.82	0.00	0.00	0.00
8,700.00	91.37	181.10	3,690.13	-5,117.84	57.80	5,115.79	0.00	0.00	0.00
8,705.46	91.37	181.10	3,690.00	-5,123.30	57.70	5,121.25	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Malco 13H SL	0.00	0.00	0.00	0.00	0.00	664,672.10	556,425.90	32° 49' 37.675 N	104° 8' 58.729 W
- plan hits target center									
- Point									
Malco 13H Tgt	0.00	0.00	3,037.87	-3.42	155.85	664,668.68	556,581.75	32° 49' 37.639 N	104° 8' 56.902 W
- plan misses target center by 1.09ft at 3044.62ft MD (3037.89 TVD, -3.40 N, 154.76 E)									
- Point									
Malco 13H PBHL	0.00	0.00	3,690.00	-5,123.30	57.70	659,548.80	556,483.60	32° 48' 46.977 N	104° 8' 58.157 W
- plan hits target center									
- Point									
Malco 13H LP	0.00	0.00	3,800.00	-536.68	145.63	664,135.42	556,571.53	32° 49' 32.362 N	104° 8' 57.033 W
- plan hits target center									
- Point									

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
250.00	250.00	Salt Top			
492.00	492.00	Tansill			
597.00	597.00	Yates			
856.00	856.00	Seven Rivers			
1,407.33	1,407.00	Queen			
1,835.15	1,833.00	Grayburg			
2,161.55	2,158.00	San Andres			
3,562.54	3,543.00	Glorieta			
3,660.06	3,622.00	Paddock			

COG OPERATING, LLC

Project: Eddy /Lea County, NM (NAD27) NMEZ 3639+18 @ 3657.00ft (Planning Est)
 Site: Malco 23 Federal COM 13H NAD 1927 (NADCON CONUS)
 Well: #13H
 Wellbore: Lateral
 Design: Plan #1



To convert a Magnetic Direction to a Grid Direction, Add 7.16°

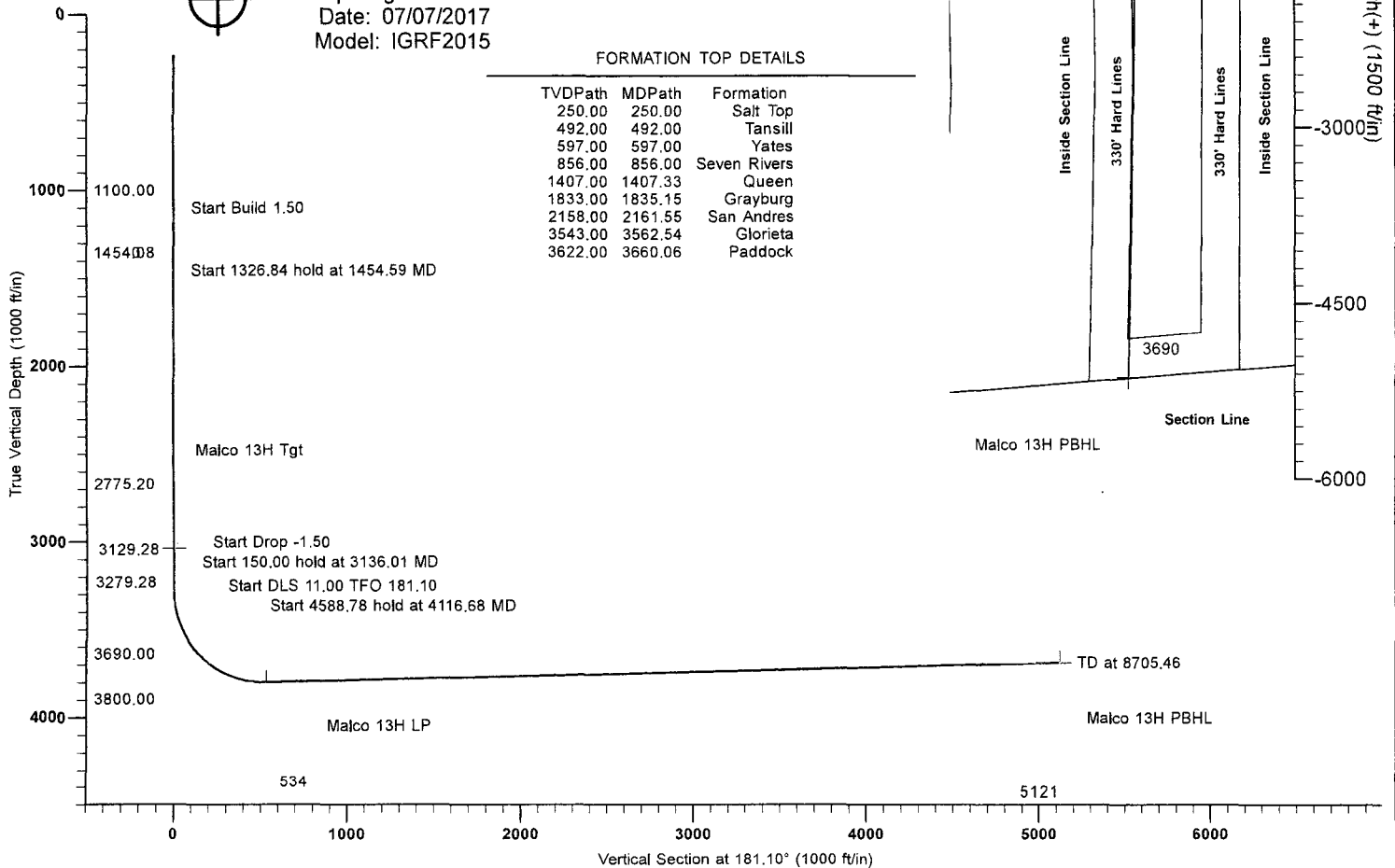


Azimuths to Grid North
 True North: -0.10°
 Magnetic North: 7.16°

Magnetic Field
 Strength: 48226.2snT
 Dip Angle: 60.52°
 Date: 07/07/2017
 Model: IGRF2015

FORMATION TOP DETAILS

TVDPATH	MDPATH	FORMATION
250.00	250.00	Salt Top
492.00	492.00	Tansill
597.00	597.00	Yates
856.00	856.00	Seven Rivers
1407.00	1407.33	Queen
1833.00	1835.15	Grayburg
2158.00	2161.55	San Andres
3543.00	3562.54	Glorieta
3622.00	3660.06	Paddock



TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
Malco 13H SL	0.00	0.00	0.00	664672.10	556425.90	Point
Malco 13H Tgt	3037.87	-3.42	155.85	664668.68	556581.75	Point
Malco 13H PBHL	3690.00	-5123.30	57.70	659548.80	556483.60	Point
Malco 13H LP	3800.00	-536.68	145.63	664135.42	556571.53	Point

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1100.00	0.00	0.00	1100.00	0.00	0.00	0.00	0.00	0.00	
1454.59	5.32	91.26	1454.08	-0.36	16.44	1.50	91.26	0.05	
2781.42	5.32	91.26	2775.20	-3.06	139.41	0.00	0.00	0.38	
3136.01	0.00	0.00	3129.28	-3.42	155.85	1.50	180.00	0.43	
3286.01	0.00	0.00	3279.28	-3.42	155.85	0.00	0.00	0.43	
4116.68	91.37	181.10	3800.00	-536.68	145.63	11.00	181.10	533.78	
8705.46	91.37	181.10	3690.00	-5123.30	57.70	0.00	0.00	5121.25	Malco 13H PBHL

Plan: Plan #1 (#13H/Lateral)
 Created By: Mekka Williams
 eSomina Well Design
 mekka@esominawelldesign.com
 14:54, July 07 2017

VON DIRECTIONAL
 12074 FM 3083 Conroe, Texas 77301
 936-756-2400



13 3/8 Segment	surface csg in a #/ft	17 1/2 Grade	inch hole. Coupling	Joint	Design Factors		SURFACE	
"A"			ST&C		Collapse	Burst	Length	Weight
"B"	48.00	H 40		29.81	7.49	2.61	225	10,800
							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,113				Tail Cmt	does	circ to sfc.	Totals:	225 10,800

Comparison of Proposed to Minimum Required Cement Volumes

Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg
17 1/2	0.6946	300	396	211	88	8.80	387	2M	1.56

9 5/8 Segment	casing inside the #/ft	13 3/8 Grade	Coupling	Joint	Design Factors		INTERMEDIATE	
"A"			LT&C		Collapse	Burst	Length	Weight
"B"	40.00	J 55		10.40	3.88	2.17	1,250	50,000
							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig:							Totals:	1,250 50,000
The cement volume(s) are intended to achieve a top of				n			225	overlap.
Hole	Annular	1 Stage	1 Stag				Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt C				BOPE	Hole-Cplg
12 1/4	0.3132	450	877				2M	0.81
D V Tool(s):							Σ CuFt	Σ%excess
t by stage % :							1122	164
Class 'C' tail cmt yld > 1.35								

only for "official file" copy.

- DON'T DISTRIBUTE
PLEASE

7 Segment	casing inside the #/ft	9 5/8 Grade						PRODUCTION	
"A"								Length	Weight
"B"	29.00	L 80						3,286	95,294
	17.00	L 80						5,419	92,123
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,500								3,705	187,417
B would be.									tical wellbore.
No Pilot Hole Planned				MTD				11	4117
				8705				1,250	overlap.
The cement volume(s) are intended to ach								Req'd	Min Dist
Hole	Annular	1 Stage	1 Stage	min	1 Stage	Drilling	Calc	BOPE	Hole-Cplg
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP		
8 3/4	0.1503	1900	2795	1325	111	9.20			0.55
Setting Depths for D V Tool(s):				4000			sum of sx	Σ CuFt	Σ%excess
% excess cmt by stage:				216	138		2350	3707	180
Class 'C' tail cmt yld > 1.35									