

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

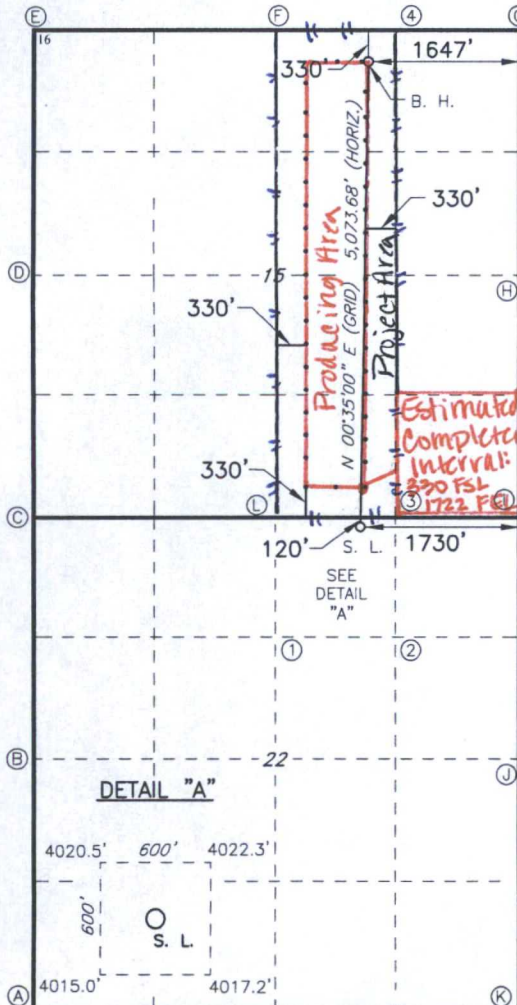
Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-025- 43277		² Pool Code 44500		³ Pool Name Maljamar; Yeso West	
⁴ Property Code 314671		⁵ Property Name RAGNAR FEDERAL COM			⁶ Well Number 26H
⁷ OGRID NO. 229137		⁸ Operator Name COG OPERATING, LLC			⁹ Elevation 4017'
¹⁰ Surface Location					
UL or lot no. B	Section 22	Township 17S	Range 32E	Lot Idn 120	Feet from the 1730
		North/South line NORTH		East/West line EAST	
				County LEA	
¹¹ Bottom Hole Location If Different From Surface					
UL or lot no. B	Section 15	Township 17S	Range 32E	Lot Idn 330	Feet from the 1647
		North/South line NORTH		East/West line EAST	
				County LEA	
¹² 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.



GEODETIC DATA
NAD 27 GRID - NM EAST
SURFACE LOCATION
N: 665029.1 - E: 678942.0
LAT: 32.82689611° N
LONG: 103.75080690° W
BOTTOM HOLE
N: 670101.2 - E: 678993.7
CORNER DATA
NAD 27 GRID - NM EAST
A: FOUND 1/2" REBAR
N: 659858.7 - E: 675431.5
B: FOUND 2" PIPE
N: 662496.7 - E: 675414.3
C: FOUND 1" NAIL
N: 665135.4 - E: 675398.3
D: FOUND 2" PIPE
N: 667777.2 - E: 675381.9
E: FOUND BRASS CAP "1913"
N: 670415.5 - E: 675366.5
F: FOUND BRASS CAP "1913"
N: 670430.0 - E: 678005.6
G: FOUND BRASS CAP "1913"
N: 670433.3 - E: 680638.7
H: FOUND BRASS CAP "1913"
N: 667794.8 - E: 680655.1
I: FOUND BRASS CAP "1913"
N: 665155.6 - E: 680671.4
J: FOUND 1/2" REBAR
N: 662516.2 - E: 680687.3
K: FOUND BRASS CAP "1913"
N: 659876.2 - E: 680701.5
L: FOUND BRASS CAP "1913"
N: 665145.7 - E: 678029.0

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 or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature: Date: **8-18-15**

Printed Name: **Kelly J. Holly**

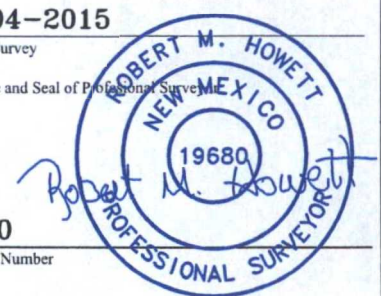
E-mail Address: **kholly@concho.com**

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.

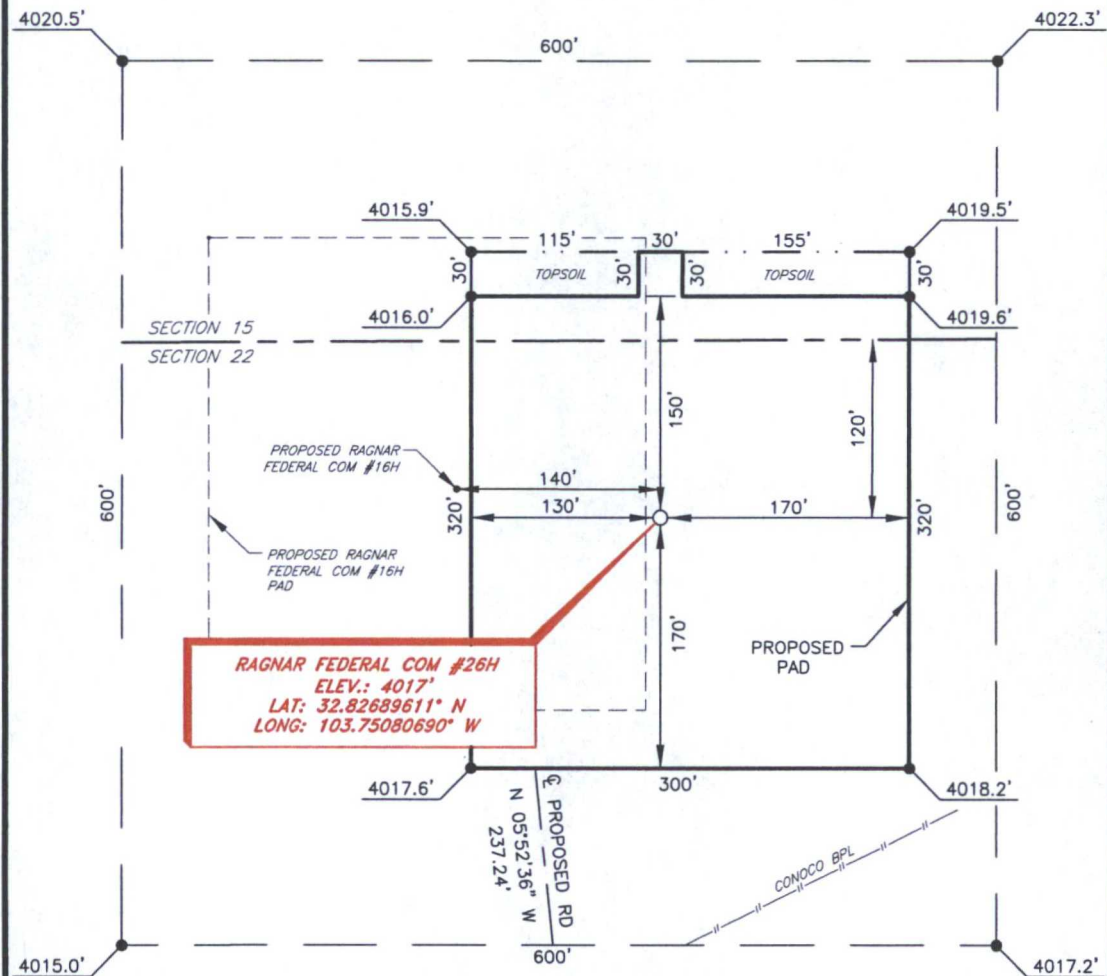
Date of Survey: **8-04-2015**

Signature and Seal of Professional Surveyor

19680
Certificate Number



COG OPERATING, LLC
 RAGNAR FEDERAL COM #26H
 (120' FNL & 1730' FEL)
 SECTION 22, T17S, R32E
 N. M. P. M., LEA CO., NEW MEXICO



DIRECTIONS TO LOCATION

From the intersection of CR-126 (Conoco Rd.) and CR-126A (Maljamar Rd.);
 Go North on CR-126A approx. 0.6 miles to a lease road on the right;
 Turn right and go Southeast approx. 0.7 miles to a lease road on the left;
 Turn left and go Northeast approx. 415 feet to the JC Federal #10;
 Location is approx. 500 feet Northwest of the JC Federal #10

SCALE: 1" = 100'
 0 50 100

BEARINGS ARE
 NAD 27 GRID - NM EAST
 DISTANCES ARE
 GROUND.

Firm No.: TX 10193838 NM 4655451

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NO.	REVISION	DATE
JOB NO.:	LS1508433	
DWG. NO.:	1508433PAD	

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 100'

DATE: 8-4-2015

SURVEYED BY: GB

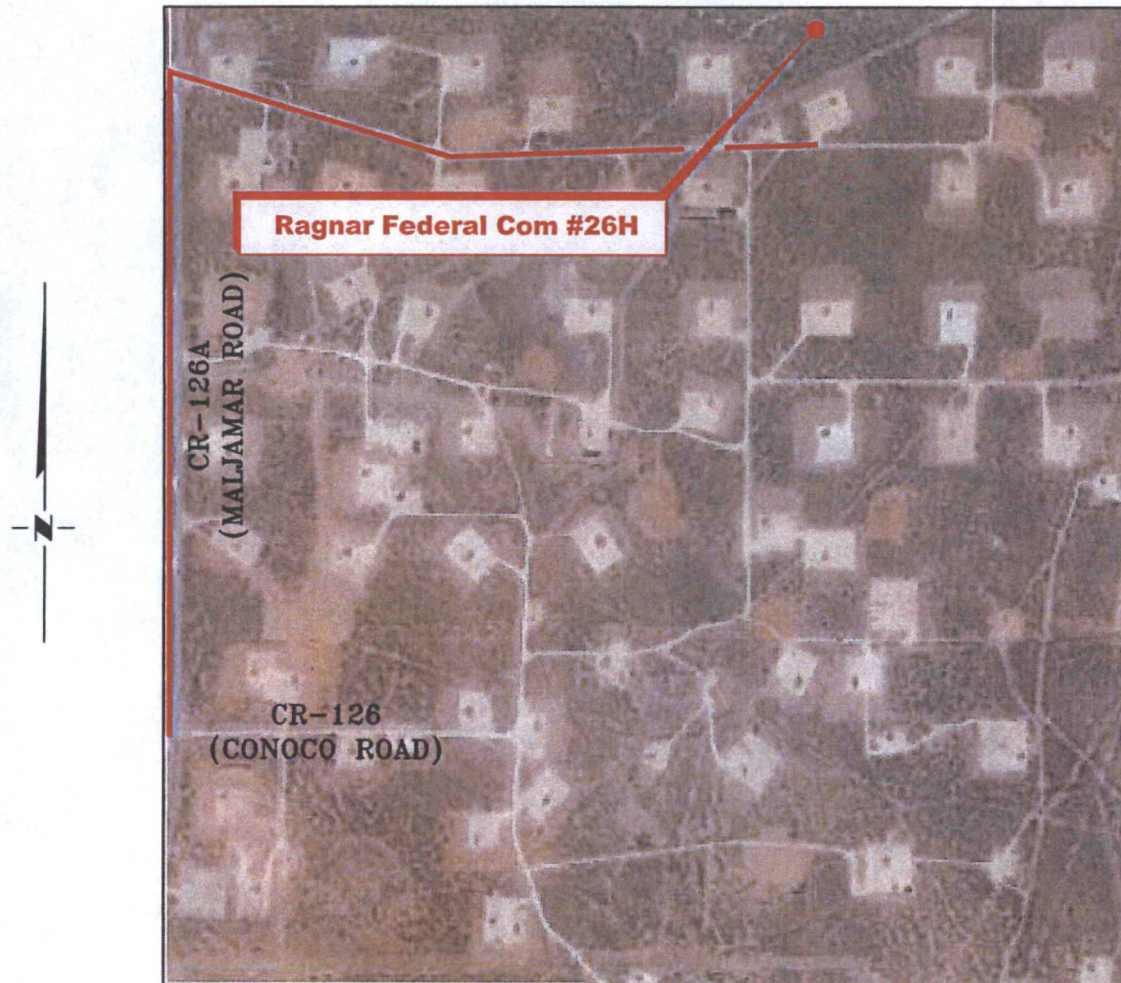
DRAWN BY: RMH

APPROVED BY: RMH

SHEET : 1 OF 1

VICINITY MAP

NOT TO SCALE



*SECTION 22, TWP. 17 SOUTH, RGE. 32 EAST,
N. M. P. M., LEA CO., NEW MEXICO*

OPERATOR: COG Operating, LLC
LEASE: Ragnar Federal Com
WELL NO.: 26H

LOCATION: 120' FNL & 1730' FEL
ELEVATION: 4017'

Firm No.: TX 10193838 NM 4655451

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NO.	REVISION	DATE
JOB NO.: LS1508433		
DWG. NO.: 1508433VM		

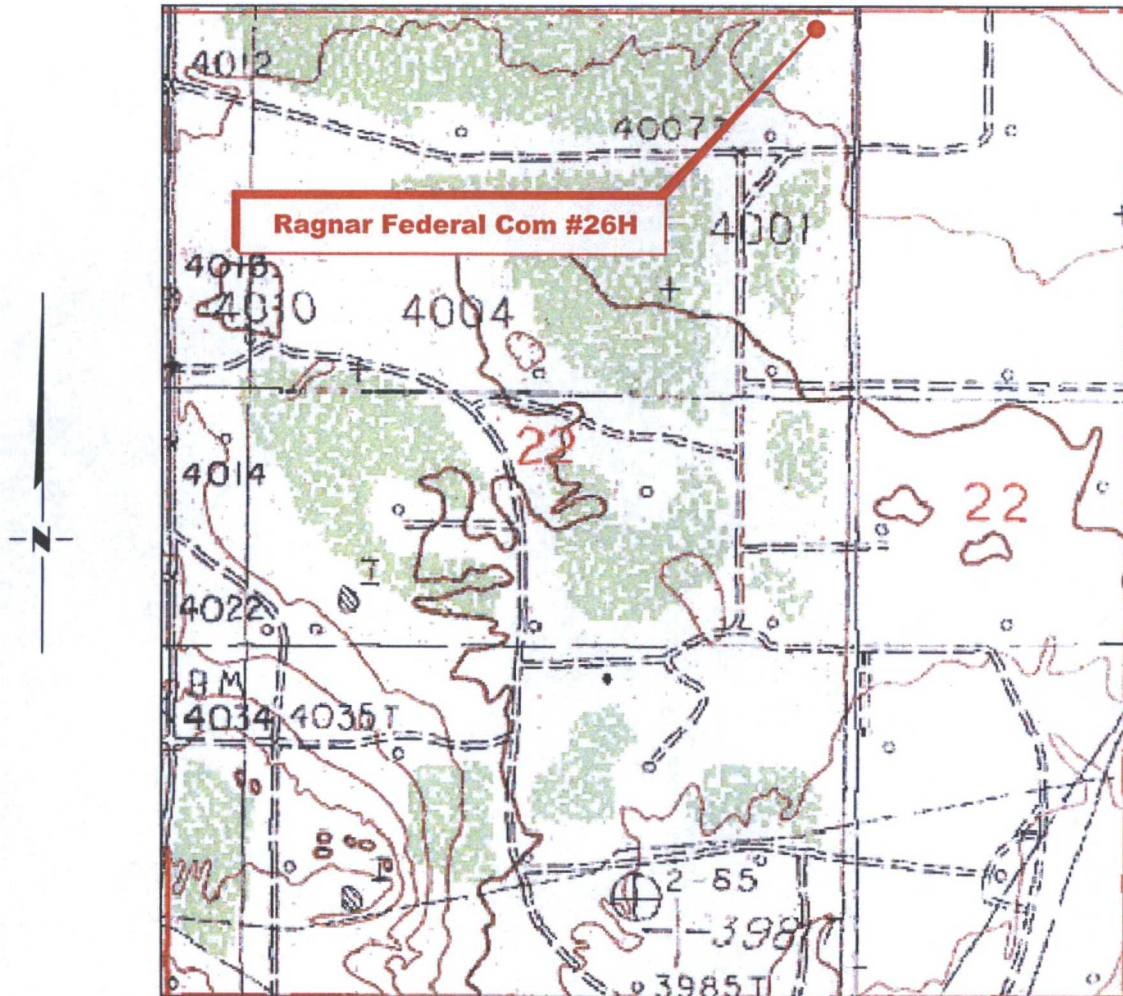
RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: NTS
DATE: 8-4-2015
SURVEYED BY: GB
DRAWN BY: CMJ
APPROVED BY: RMH
SHEET : 1 OF 1

VICINITY MAP

NOT TO SCALE



*SECTION 22, TWP. 17 SOUTH, RGE. 32 EAST,
N. M. P. M., LEA CO., NEW MEXICO*

OPERATOR: COG Operating, LLC
LEASE: Ragnar Federal Com
WELL NO.: 26H
ELEVATION: 4017'

LOCATION: 120' FNL & 1730' FEL
CONTOUR INTERVAL:
USGS TOPO. SOURCE MAP:
Maljamar (P. E. 1985)

Firm No.: TX 10193838 NM 4655451

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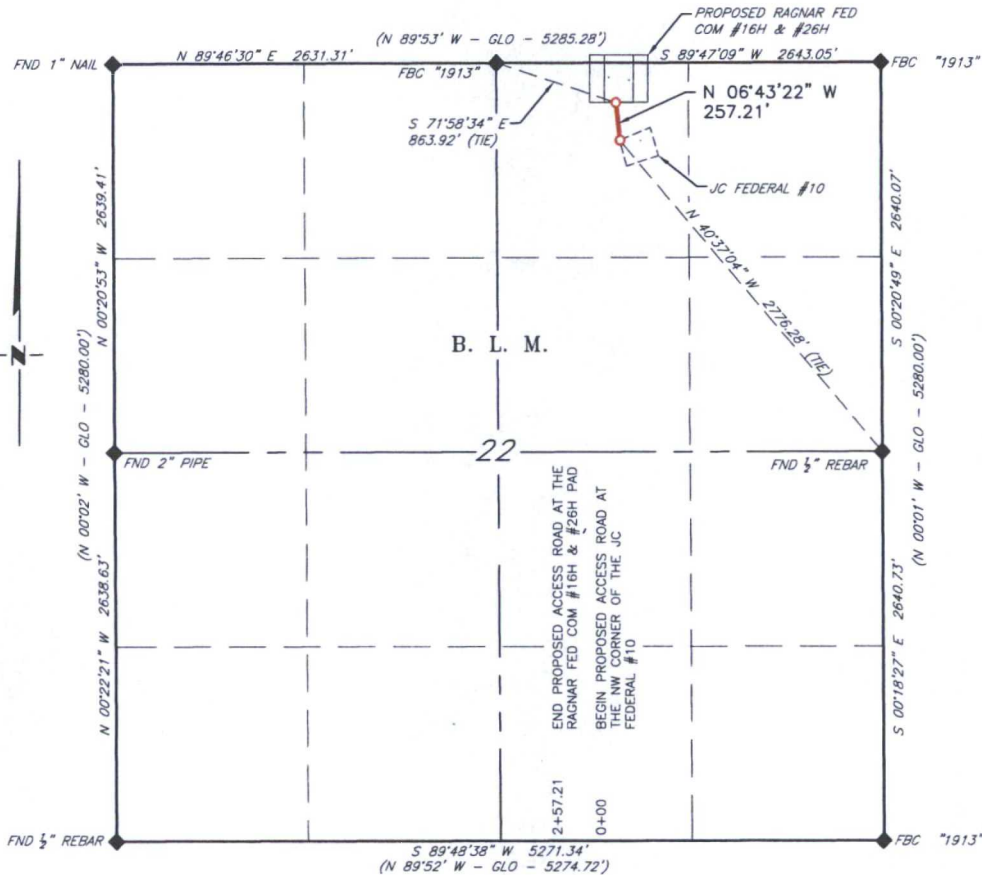
NO.	REVISION	DATE
JOB NO.: LS1508433		
DWG. NO.: 1508433VM		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: NTS
DATE: 8-4-2015
SURVEYED BY: GB
DRAWN BY: CMJ
APPROVED BY: RMH
SHEET : 1 OF 1

COG OPERATING, LLC
PROPOSED ACCESS ROAD FOR THE RAGNAR
FED COM #16H & #26H WELL LOCATIONS
SECTION 22, T17S, R32E,
N. M. P. M., LEA CO., NEW MEXICO



DESCRIPTION

A strip of land 30 feet wide, being 257.21 feet or 15.588 rods in length lying in Section 22, Township 17 South, Range 32 East, N. M. P. M., Eddy County, New Mexico, being 15 feet left and 15 feet right of the following described survey of a centerline across B. L. M. land;

BEGINNING at Engr. Sta. 0+00, a point in the Northeast quarter of Section 22, which bears N 40°37'04\" W, 2,776.28 feet from a 1/2\" rebar, found for the East quarter corner of Section 22;

Thence N 06°43'22\" E, 257.21 feet to Engr. Sta. 2+57.21, the End of Survey, a point which bears S 71°58'34\" W, 863.92 feet from a brass cap, stamped \"1913\" found for the North quarter corner of Section 22.

Said strip of land contains 0.247 acres, more or less, and is allocated by forties as follows:

NW 1/4 NE 1/4 15.588 Rods 0.177 Acres

SCALE: 1\" = 1000'
0 500' 1000'

BEARINGS ARE GRID NAD 27
NM EAST
DISTANCES ARE HORIZ. GROUND.

LEGEND

- () RECORD DATA - GLO
- ◆ FOUND MONUMENT AS NOTED
- FOUND MON. AS NOTED
- PROPOSED ACCESS ROAD

I, R. M. Howett, a N. M. Professional Surveyor, hereby certify that I prepared this plat from an actual survey made on the ground under my direct supervision, said survey and plat meet the Min. Stds. for Land Surveying in the State of N. M. and are true and correct to the best of my knowledge and belief.

Robert M. Howett
Robert M. Howett NM PS 19680



Firm No.: TX 10193838 NM 4655451

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NO.	REVISION	DATE
JOB NO.:	LS140551	
DWG. NO.:	140551RD	

RRC

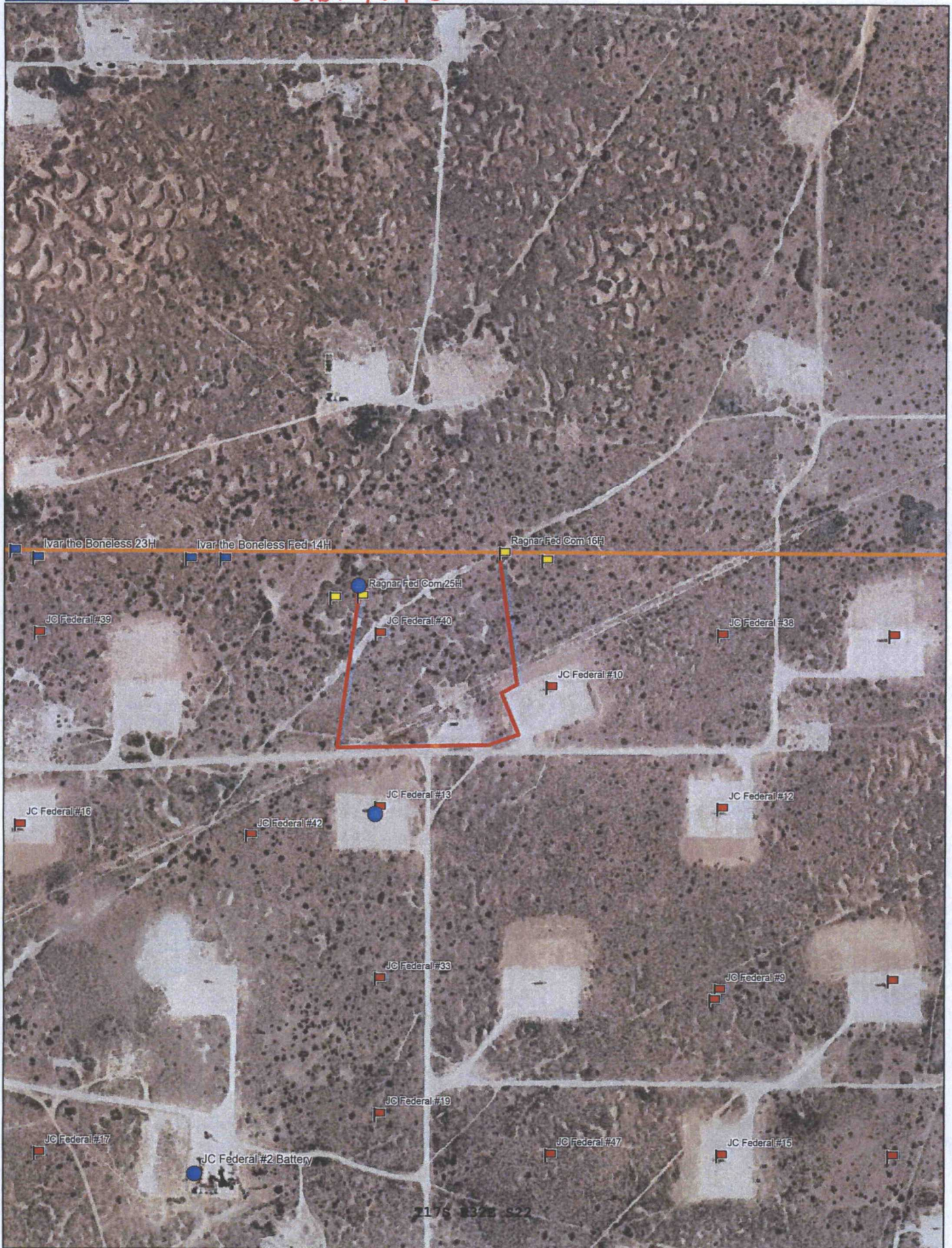
308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1\" = 1000'
DATE: 12-5-2015
SURVEYED BY: IE/DH
DRAWN BY: RMH
APPROVED BY: RMH
SHEET : 1 OF 1



SENM Shelf Area
Ragnar Federal Com #26H

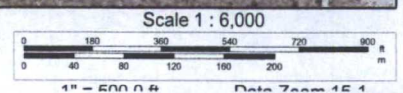
SEC. 22, T17S - R32E SHL 120 FNL 1730 FEL, UNIT B
SEC. 15, T17S - R32E BHL 330 FNL 1647 FEL, UNIT B



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www.delorme.com



Water Well Map

Legend

RA11684

RA11684 pod2

32.848961, -103.735745

RA11684 pod3

079
17S32E

Google earth

© 2015 Google

700 ft



COG Operating LLC

Lea County, NM (NAD-27 2015)

Ragnar Federal Com #26H

SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B

PP: 330' FSL, 1723' FEL, Sec 15, T17S, R32E, Unit O

BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B

Plan: Design #1

Standard Planning Report

16 May, 2016



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Company:	COG Operating LLC	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site:	Ragnar Federal Com #26H	North Reference:	Grid
Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B		
Design:	Design #1		

Project	Lea County, NM (NAD-27 2015)		
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		Ragnar Federal Com #26H			
Site Position:		Northing:	665,029.10 usft	Latitude:	32° 49' 36.826 N
From:	Map	Easting:	678,942.00 usft	Longitude:	103° 45' 2.905 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.32 °

Well	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B					
Well Position	+N/-S	0.00 usft	Northing:	665,029.10 usft	Latitude:	32° 49' 36.826 N
	+E/-W	0.00 usft	Easting:	678,942.00 usft	Longitude:	103° 45' 2.905 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,017.00 usft	

Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/16/2016	7.20	60.60	48,385

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	0.58

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,879.21	0.00	0.00	5,879.21	0.00	0.00	0.00	0.00	0.00	0.00	
6,706.48	91.00	0.58	6,400.00	529.93	5.40	11.00	11.00	0.07	0.58	
11,249.58	91.00	0.58	6,320.71	5,072.10	51.70	0.00	0.00	0.00	0.00	PBHL (RFC #26H/L1)

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Company:	COG Operating LLC	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site:	Ragnar Federal Com #26H	North Reference:	Grid
Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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
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
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
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
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	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Company:	COG Operating LLC	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site:	Ragnar Federal Com #26H	North Reference:	Grid
Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,879.21	0.00	0.00	5,879.21	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 11.00 TFO 0.58									
5,900.00	2.29	0.58	5,899.99	0.41	0.00	0.41	11.00	11.00	0.00
5,950.00	7.79	0.58	5,949.78	4.80	0.05	4.80	11.00	11.00	0.00
6,000.00	13.29	0.58	5,998.92	13.94	0.14	13.94	11.00	11.00	0.00
6,050.00	18.79	0.58	6,046.96	27.75	0.28	27.75	11.00	11.00	0.00
6,100.00	24.29	0.58	6,093.45	46.10	0.47	46.10	11.00	11.00	0.00
6,150.00	29.79	0.58	6,137.97	68.81	0.70	68.82	11.00	11.00	0.00
6,200.00	35.29	0.58	6,180.10	95.69	0.98	95.70	11.00	11.00	0.00
6,250.00	40.79	0.58	6,219.47	126.49	1.29	126.50	11.00	11.00	0.00
6,300.00	46.29	0.58	6,255.70	160.92	1.64	160.92	11.00	11.00	0.00
6,350.00	51.79	0.58	6,288.47	198.66	2.02	198.67	11.00	11.00	0.00
6,400.00	57.29	0.58	6,317.46	239.36	2.44	239.38	11.00	11.00	0.00
6,450.00	62.79	0.58	6,342.43	282.66	2.88	282.68	11.00	11.00	0.00
6,500.00	68.29	0.58	6,363.12	328.15	3.34	328.17	11.00	11.00	0.00
6,550.00	73.79	0.58	6,379.37	375.42	3.83	375.44	11.00	11.00	0.00
6,600.00	79.29	0.58	6,391.00	424.02	4.32	424.05	11.00	11.00	0.00
6,650.00	84.79	0.58	6,397.93	473.52	4.83	473.54	11.00	11.00	0.00
6,700.00	90.29	0.58	6,400.07	523.45	5.34	523.48	11.00	11.00	0.00
6,706.48	91.00	0.58	6,400.00	529.93	5.40	529.96	11.00	11.00	0.00
Start 4543.09 hold at 6706.48 MD									
6,800.00	91.00	0.58	6,398.37	623.43	6.35	623.46	0.00	0.00	0.00
6,900.00	91.00	0.58	6,396.62	723.41	7.37	723.45	0.00	0.00	0.00
7,000.00	91.00	0.58	6,394.88	823.39	8.39	823.43	0.00	0.00	0.00
7,100.00	91.00	0.58	6,393.13	923.37	9.41	923.42	0.00	0.00	0.00
7,200.00	91.00	0.58	6,391.39	1,023.35	10.43	1,023.40	0.00	0.00	0.00
7,300.00	91.00	0.58	6,389.64	1,123.33	11.45	1,123.39	0.00	0.00	0.00
7,400.00	91.00	0.58	6,387.90	1,223.31	12.47	1,223.37	0.00	0.00	0.00
7,500.00	91.00	0.58	6,386.15	1,323.29	13.49	1,323.36	0.00	0.00	0.00
7,600.00	91.00	0.58	6,384.41	1,423.27	14.51	1,423.34	0.00	0.00	0.00
7,700.00	91.00	0.58	6,382.66	1,523.25	15.53	1,523.33	0.00	0.00	0.00
7,800.00	91.00	0.58	6,380.92	1,623.23	16.55	1,623.31	0.00	0.00	0.00
7,900.00	91.00	0.58	6,379.17	1,723.21	17.56	1,723.30	0.00	0.00	0.00
8,000.00	91.00	0.58	6,377.43	1,823.19	18.58	1,823.28	0.00	0.00	0.00
8,100.00	91.00	0.58	6,375.68	1,923.17	19.60	1,923.27	0.00	0.00	0.00
8,200.00	91.00	0.58	6,373.94	2,023.15	20.62	2,023.25	0.00	0.00	0.00
8,300.00	91.00	0.58	6,372.19	2,123.13	21.64	2,123.24	0.00	0.00	0.00
8,400.00	91.00	0.58	6,370.45	2,223.11	22.66	2,223.22	0.00	0.00	0.00
8,500.00	91.00	0.58	6,368.70	2,323.08	23.68	2,323.21	0.00	0.00	0.00
8,600.00	91.00	0.58	6,366.95	2,423.06	24.70	2,423.19	0.00	0.00	0.00
8,700.00	91.00	0.58	6,365.21	2,523.04	25.72	2,523.17	0.00	0.00	0.00
8,800.00	91.00	0.58	6,363.46	2,623.02	26.74	2,623.16	0.00	0.00	0.00
8,900.00	91.00	0.58	6,361.72	2,723.00	27.76	2,723.14	0.00	0.00	0.00
9,000.00	91.00	0.58	6,359.97	2,822.98	28.77	2,823.13	0.00	0.00	0.00
9,100.00	91.00	0.58	6,358.23	2,922.96	29.79	2,923.11	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Company:	COG Operating LLC	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site:	Ragnar Federal Com #26H	North Reference:	Grid
Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B		
Design:	Design #1		

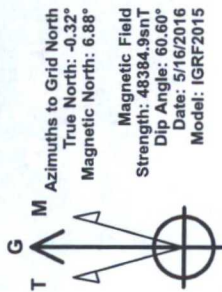
Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,200.00	91.00	0.58	6,356.48	3,022.94	30.81	3,023.10	0.00	0.00	0.00	
9,300.00	91.00	0.58	6,354.74	3,122.92	31.83	3,123.08	0.00	0.00	0.00	
9,400.00	91.00	0.58	6,352.99	3,222.90	32.85	3,223.07	0.00	0.00	0.00	
9,500.00	91.00	0.58	6,351.25	3,322.88	33.87	3,323.05	0.00	0.00	0.00	
9,600.00	91.00	0.58	6,349.50	3,422.86	34.89	3,423.04	0.00	0.00	0.00	
9,700.00	91.00	0.58	6,347.76	3,522.84	35.91	3,523.02	0.00	0.00	0.00	
9,800.00	91.00	0.58	6,346.01	3,622.82	36.93	3,623.01	0.00	0.00	0.00	
9,900.00	91.00	0.58	6,344.27	3,722.80	37.95	3,722.99	0.00	0.00	0.00	
10,000.00	91.00	0.58	6,342.52	3,822.78	38.97	3,822.98	0.00	0.00	0.00	
10,100.00	91.00	0.58	6,340.78	3,922.76	39.98	3,922.96	0.00	0.00	0.00	
10,200.00	91.00	0.58	6,339.03	4,022.74	41.00	4,022.95	0.00	0.00	0.00	
10,300.00	91.00	0.58	6,337.29	4,122.72	42.02	4,122.93	0.00	0.00	0.00	
10,400.00	91.00	0.58	6,335.54	4,222.70	43.04	4,222.92	0.00	0.00	0.00	
10,500.00	91.00	0.58	6,333.79	4,322.68	44.06	4,322.90	0.00	0.00	0.00	
10,600.00	91.00	0.58	6,332.05	4,422.66	45.08	4,422.89	0.00	0.00	0.00	
10,700.00	91.00	0.58	6,330.30	4,522.64	46.10	4,522.87	0.00	0.00	0.00	
10,800.00	91.00	0.58	6,328.56	4,622.61	47.12	4,622.86	0.00	0.00	0.00	
10,900.00	91.00	0.58	6,326.81	4,722.59	48.14	4,722.84	0.00	0.00	0.00	
11,000.00	91.00	0.58	6,325.07	4,822.57	49.16	4,822.82	0.00	0.00	0.00	
11,100.00	91.00	0.58	6,323.32	4,922.55	50.18	4,922.81	0.00	0.00	0.00	
11,200.00	91.00	0.58	6,321.58	5,022.53	51.19	5,022.79	0.00	0.00	0.00	
11,249.58	91.00	0.58	6,320.71	5,072.10	51.70	5,072.36	0.00	0.00	0.00	
TD at 11249.58										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
71.69' Radius @ 6345.4	0.00	0.00	0.00	3,650.55	617.55	668,679.65	679,559.55	32° 50' 12.915 N	103° 44' 55.432 W	
- hit/miss target										
- Shape										
- plan misses target center by 3702.42usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)										
- Circle (radius 71.69)										
KOP (RFC #26H/L1 Des	0.00	0.00	5,879.21	0.00	0.00	665,029.10	678,942.00	32° 49' 36.826 N	103° 45' 2.905 W	
- plan hits target center										
- Point										
PBHL (RFC #26H/L1)	0.00	0.00	6,320.71	5,072.10	51.70	670,101.20	678,993.70	32° 50' 27.012 N	103° 45' 1.972 W	
- plan hits target center										
- Point										
PP (RFC #26H/L1 Desig	0.00	0.00	6,395.24	450.03	4.59	665,479.13	678,946.58	32° 49' 41.279 N	103° 45' 2.823 W	
- plan hits target center										
- Point										
EOC (RFC #26H/L1 Des	0.00	0.00	6,400.00	529.93	5.40	665,559.04	678,947.40	32° 49' 42.070 N	103° 45' 2.808 W	
- plan hits target center										
- Point										

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Company:	COG Operating LLC	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site:	Ragnar Federal Com #26H	North Reference:	Grid
Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B		
Design:	Design #1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,879.21	5,879.21	0.00	0.00	Start DLS 11.00 TFO 0.58
6,706.48	6,400.00	529.93	5.40	Start 4543.09 hold at 6706.48 MD
11,249.58	6,320.71	5,072.10	51.70	TD at 11249.58



Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5879.21	0.00	0.00	5879.21	0.00	0.00	0.00	0.00	0.00	0.00
3	6706.48	91.00	0.58	6400.00	529.93	5.40	11.00	0.58	529.96	PBHL (RFC #26H/L1)
4	11249.58	91.00	0.58	6320.71	5072.10	51.70	0.00	0.00	5072.36	PBHL (RFC #26H/L1)

Ground Elevation: 4017.00
RKB Elevation: KB @ 4035.00usft (Silver Oak 3)

COG Operating LLC

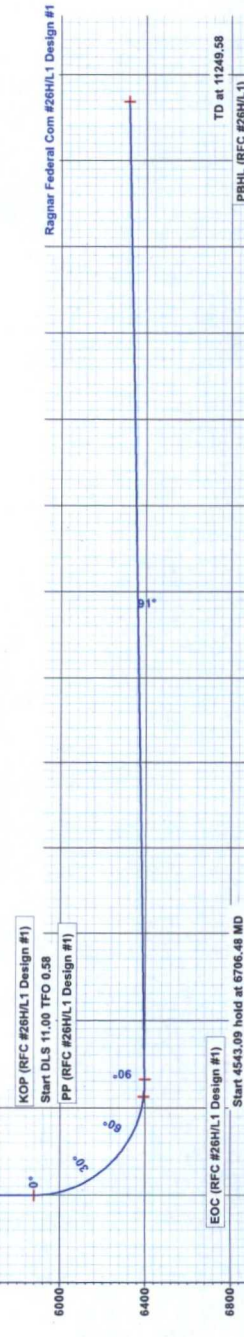
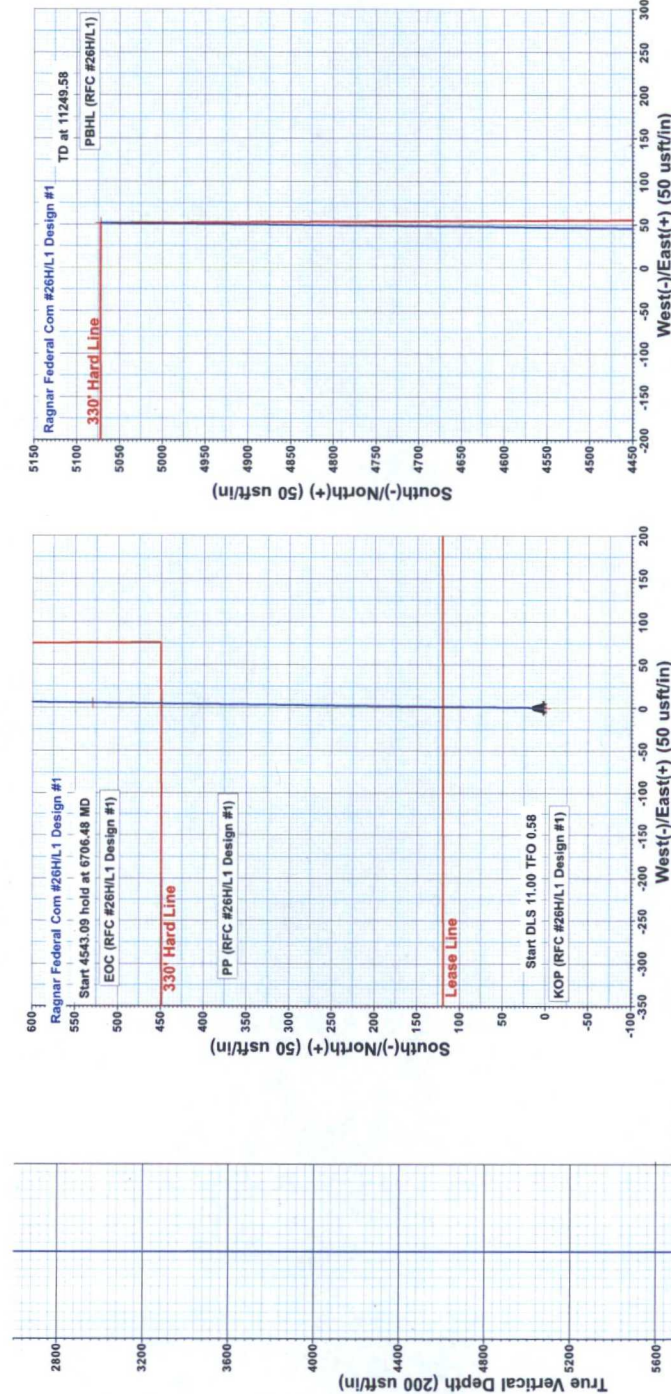
Project: Lea County, NM (NAD-27 2015)

Site: Ragnar Federal Com #26H

Well: SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B

Wellbore: BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B

Plan: Design #1 (SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B/BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B)



Terra Directional Services LLC
322 Spring Hill Drive, Suite A300, Spring, Tx 77386
Phone: 432-425-7532

PROJECT DETAILS: Lea County, NM (NAD-27 2015)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid



COG Operating LLC

Lea County, NM (NAD-27 2015)

Ragnar Federal Com #26H

SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B

PP: 330' FSL, 1723' FEL, Sec 15, T17S, R32E, Unit O

**BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B
Design #1**

Anticollision Report

16 May, 2016



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Reference Site:	Ragnar Federal Com #26H	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Reference	Design #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	5/16/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	11,249.58	Design #1 (BHL: 330' FNL, 1647' FEL, Sec	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Hudson #1						
Hudson #1 - OH - OH	9,833.42	6,339.93	508.79	314.52	2.619	CC, ES
Hudson #1 - OH - OH	10,100.00	6,335.30	574.37	345.98	2.515	SF

Offset Design		Hudson #1 - Hudson #1 - OH - OH										Offset Site Error:		0.00 usft	
Survey Program:		232-INC										Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis			Distance								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.00	0.00	0.00	0.00	0.00	0.00	9.60	3,650.55	617.55	3,702.46						
100.00	100.00	81.89	81.89	0.09	1.23	9.60	3,650.55	617.49	3,702.41	3,701.09	1.32	2,814.602			
200.00	200.00	183.00	183.00	0.32	2.74	9.60	3,650.55	617.24	3,702.37	3,699.32	3.05	1,213.829			
300.00	300.00	283.53	283.53	0.54	4.86	9.59	3,650.56	616.82	3,702.30	3,696.92	5.39	687.411			
400.00	400.00	383.53	383.53	0.77	7.54	9.58	3,650.56	616.38	3,702.23	3,693.95	8.29	446.759			
500.00	500.00	483.53	483.53	0.99	10.23	9.58	3,650.57	615.95	3,702.17	3,690.98	11.19	330.908			
600.00	600.00	585.91	585.90	1.22	13.32	9.57	3,650.57	615.35	3,702.07	3,687.59	14.49	255.524			
700.00	700.00	688.95	688.93	1.44	16.86	9.55	3,650.58	614.18	3,701.90	3,683.68	18.21	203.235			
800.00	800.00	790.97	790.95	1.67	21.62	9.53	3,650.60	612.60	3,701.66	3,678.51	23.15	159.915			
900.00	900.00	890.58	890.54	1.89	26.57	9.50	3,650.62	610.90	3,701.39	3,673.13	28.27	130.948			
1,000.00	1,000.00	990.07	990.02	2.12	31.53	9.48	3,650.63	609.29	3,701.14	3,667.74	33.40	110.824			
1,100.00	1,100.00	1,089.56	1,089.50	2.34	36.49	9.45	3,650.65	607.77	3,700.90	3,662.38	38.53	96.055			
1,200.00	1,200.00	1,189.06	1,188.98	2.56	41.45	9.43	3,650.66	606.33	3,700.68	3,657.02	43.66	84.757			
1,300.00	1,300.00	1,288.56	1,288.47	2.79	46.40	9.41	3,650.68	604.98	3,700.47	3,651.68	48.80	75.834			
1,400.00	1,400.00	1,389.05	1,388.96	3.01	51.55	9.39	3,650.69	603.62	3,700.27	3,646.15	54.12	68.373			
1,500.00	1,500.00	1,489.63	1,489.52	3.24	56.72	9.37	3,650.71	602.15	3,700.04	3,640.58	59.46	62.230			
1,600.00	1,600.00	1,590.20	1,590.08	3.46	61.88	9.34	3,650.72	600.58	3,699.80	3,635.01	64.80	57.099			
1,700.00	1,700.00	1,690.77	1,690.64	3.69	67.04	9.32	3,650.74	598.91	3,699.55	3,629.42	70.14	52.748			
1,800.00	1,800.00	1,790.47	1,790.32	3.91	72.19	9.29	3,650.76	597.20	3,699.29	3,623.84	75.46	49.026			
1,900.00	1,900.00	1,889.81	1,889.66	4.14	77.32	9.27	3,650.77	595.61	3,699.05	3,618.28	80.77	45.800			
2,000.00	2,000.00	1,989.16	1,988.99	4.36	82.45	9.24	3,650.79	594.13	3,698.82	3,612.75	86.08	42.972			
2,100.00	2,100.00	2,088.51	2,088.34	4.59	87.58	9.22	3,650.80	592.76	3,698.62	3,607.23	91.39	40.472			
2,200.00	2,200.00	2,187.72	2,187.54	4.81	91.16	9.20	3,650.81	591.52	3,698.43	3,603.26	95.17	38.863			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Reference Site:	Ragnar Federal Com #26H	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 232-INC													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)						
2,300.00	2,300.00	2,286.92	2,286.73	5.04	94.57	9.19	3,650.82	590.42	3,698.26	3,599.48	98.78	37.438		
2,400.00	2,400.00	2,386.12	2,385.92	5.26	97.99	9.17	3,650.83	589.46	3,698.12	3,595.72	102.40	36.114		
2,500.00	2,500.00	2,485.32	2,485.12	5.49	101.40	9.16	3,650.84	588.65	3,698.00	3,591.98	106.02	34.881		
2,600.00	2,600.00	2,584.52	2,584.32	5.71	104.82	9.15	3,650.85	587.98	3,697.90	3,588.26	109.63	33.730		
2,700.00	2,700.00	2,683.73	2,683.52	5.94	108.23	9.14	3,650.85	587.46	3,697.82	3,584.57	113.25	32.652		
2,800.00	2,800.00	2,783.91	2,783.71	6.16	111.11	9.13	3,650.86	586.99	3,697.75	3,581.41	116.34	31.785		
2,900.00	2,900.00	2,884.28	2,884.07	6.39	113.89	9.13	3,650.86	586.47	3,697.67	3,578.34	119.33	30.988		
3,000.00	3,000.00	2,984.64	2,984.43	6.61	116.67	9.12	3,650.87	585.87	3,697.58	3,575.27	122.32	30.229		
3,100.00	3,100.00	3,085.00	3,084.79	6.84	119.45	9.11	3,650.88	585.21	3,697.48	3,572.18	125.31	29.507		
3,200.00	3,200.00	3,185.36	3,185.15	7.06	122.23	9.10	3,650.88	584.48	3,697.38	3,569.08	128.30	28.818		
3,300.00	3,300.00	3,285.72	3,285.51	7.28	125.01	9.08	3,650.89	583.69	3,697.26	3,565.97	131.29	28.161		
3,400.00	3,400.00	3,386.11	3,385.89	7.51	128.12	9.07	3,650.90	582.83	3,697.13	3,562.52	134.61	27.465		
3,500.00	3,500.00	3,486.58	3,486.35	7.73	132.15	9.06	3,650.91	581.89	3,696.99	3,558.16	138.84	26.628		
3,600.00	3,600.00	3,587.04	3,586.82	7.96	136.18	9.04	3,650.92	580.86	3,696.84	3,553.78	143.06	25.841		
3,700.00	3,700.00	3,687.51	3,687.27	8.18	140.21	9.02	3,650.93	579.74	3,696.68	3,549.39	147.29	25.098		
3,800.00	3,800.00	3,787.97	3,787.73	8.41	144.24	9.00	3,650.95	578.53	3,696.50	3,544.99	151.51	24.397		
3,900.00	3,900.00	3,888.32	3,888.07	8.63	148.39	8.98	3,650.96	577.24	3,696.32	3,540.45	155.87	23.714		
4,000.00	4,000.00	3,988.31	3,988.06	8.86	152.98	8.96	3,650.97	575.94	3,696.13	3,535.48	160.64	23.008		
4,100.00	4,100.00	4,088.30	4,088.04	9.08	157.56	8.94	3,650.98	574.63	3,695.93	3,530.51	165.42	22.343		
4,200.00	4,200.00	4,188.30	4,188.02	9.31	162.15	8.92	3,651.00	573.32	3,695.74	3,525.55	170.20	21.715		
4,300.00	4,300.00	4,288.29	4,288.00	9.53	166.73	8.90	3,651.01	572.01	3,695.55	3,520.58	174.97	21.121		
4,400.00	4,400.00	4,387.88	4,387.58	9.76	170.99	8.88	3,651.02	570.72	3,695.37	3,515.94	179.43	20.595		
4,500.00	4,500.00	4,487.05	4,486.76	9.98	174.91	8.87	3,651.04	569.58	3,695.20	3,511.65	183.55	20.132		
4,600.00	4,600.00	4,586.24	4,585.93	10.21	178.83	8.85	3,651.05	568.58	3,695.06	3,507.39	187.67	19.689		
4,700.00	4,700.00	4,686.38	4,686.07	10.43	182.79	8.84	3,651.06	567.67	3,694.93	3,503.10	191.83	19.262		
4,800.00	4,800.00	4,787.05	4,786.74	10.66	186.78	8.82	3,651.07	566.64	3,694.78	3,498.77	196.01	18.850		
4,900.00	4,900.00	4,887.73	4,887.41	10.88	190.76	8.80	3,651.08	565.49	3,694.62	3,494.42	200.19	18.455		
5,000.00	5,000.00	4,988.17	4,987.84	11.11	194.74	8.78	3,651.09	564.21	3,694.43	3,490.06	204.37	18.077		
5,100.00	5,100.00	5,087.91	5,087.58	11.33	198.69	8.77	3,651.10	562.94	3,694.25	3,485.73	208.52	17.716		
5,200.00	5,200.00	5,187.66	5,187.32	11.56	202.64	8.75	3,651.12	561.72	3,694.08	3,481.40	212.67	17.370		
5,300.00	5,300.00	5,287.41	5,287.06	11.78	206.59	8.73	3,651.13	560.54	3,693.91	3,477.09	216.82	17.036		
5,400.00	5,400.00	5,387.16	5,386.80	12.00	210.54	8.71	3,651.14	559.41	3,693.75	3,472.77	220.98	16.716		
5,500.00	5,500.00	5,486.91	5,486.55	12.23	214.49	8.69	3,651.15	558.32	3,693.60	3,468.47	225.13	16.407		
5,600.00	5,600.00	5,586.66	5,586.30	12.45	218.44	8.68	3,651.16	557.29	3,693.45	3,464.17	229.28	16.109		
5,700.00	5,700.00	5,686.42	5,686.04	12.68	222.39	8.66	3,651.17	556.29	3,693.31	3,459.88	233.43	15.822		
5,800.00	5,800.00	5,786.17	5,785.79	12.90	226.34	8.65	3,651.18	555.35	3,693.18	3,455.59	237.58	15.545		
5,879.21	5,879.21	5,865.19	5,864.80	13.08	229.47	8.64	3,651.19	554.63	3,693.08	3,452.20	240.87	15.332		
5,900.00	5,899.99	5,885.92	5,885.54	13.13	230.29	8.06	3,651.19	554.45	3,692.64	3,450.90	241.73	15.276		
5,950.00	5,949.78	5,936.69	5,936.31	13.24	233.00	8.13	3,651.19	553.97	3,688.23	3,443.69	244.54	15.082		
6,000.00	5,998.92	5,987.12	5,986.73	13.36	235.90	8.29	3,651.20	553.37	3,679.10	3,431.58	247.52	14.864		
6,050.00	6,046.96	6,036.40	6,036.01	13.47	238.73	8.54	3,651.21	552.66	3,665.33	3,414.90	250.43	14.636		
6,100.00	6,093.45	6,084.10	6,083.70	13.59	241.47	8.90	3,651.22	551.85	3,647.05	3,393.81	253.24	14.401		
6,150.00	6,137.97	6,129.78	6,129.37	13.69	244.09	9.38	3,651.22	550.98	3,624.44	3,368.51	255.93	14.162		
6,200.00	6,180.10	6,173.00	6,172.58	13.82	246.57	10.03	3,651.23	550.06	3,597.70	3,339.23	258.48	13.919		
6,250.00	6,219.47	6,213.38	6,212.95	13.97	248.89	10.87	3,651.24	549.12	3,567.09	3,306.25	260.84	13.675		
6,300.00	6,255.70	6,250.00	6,249.56	14.15	250.99	11.99	3,651.25	548.19	3,532.89	3,269.91	262.99	13.434		
6,350.00	6,288.47	6,283.18	6,282.72	14.36	253.50	13.48	3,651.26	547.33	3,495.43	3,229.90	265.52	13.164		
6,400.00	6,317.46	6,312.07	6,311.61	14.60	255.69	15.51	3,651.27	546.58	3,455.05	3,187.32	267.72	12.905		
6,450.00	6,342.43	6,336.95	6,336.48	14.89	257.58	18.38	3,651.28	545.94	3,412.13	3,142.52	269.61	12.656		
6,500.00	6,363.12	6,357.57	6,357.10	15.22	259.14	22.62	3,651.28	545.41	3,367.07	3,095.92	271.16	12.417		
6,550.00	6,379.37	6,373.76	6,373.28	15.59	260.37	29.33	3,651.28	545.00	3,320.29	3,047.93	272.36	12.191		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Reference Site:	Ragnar Federal Com #26H	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design Hudson #1 - Hudson #1 - OH - OH													Offset Site Error: 0.00 usft
Survey Program: 232-INC													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
6,600.00	6,391.00	6,385.35	6,384.87	16.00	261.25	40.78	3,651.29	544.71	3,272.22	2,999.02	273.20	11.978	
6,650.00	6,397.93	6,392.25	6,391.77	16.44	261.77	61.41	3,651.29	544.53	3,223.30	2,949.63	273.67	11.778	
6,700.00	6,400.07	6,394.39	6,393.91	16.92	261.93	93.22	3,651.29	544.48	3,173.99	2,900.21	273.78	11.593	
6,706.48	6,400.00	6,394.32	6,393.83	16.99	261.93	97.57	3,651.29	544.48	3,167.59	2,893.83	273.76	11.571	
6,800.00	6,398.37	6,392.70	6,392.21	17.98	261.81	97.39	3,651.29	544.52	3,075.34	2,801.82	273.52	11.243	
6,900.00	6,396.62	6,390.96	6,390.47	19.15	261.67	97.19	3,651.29	544.56	2,976.78	2,703.52	273.26	10.894	
7,000.00	6,394.88	6,389.22	6,388.73	20.42	261.54	97.00	3,651.29	544.61	2,878.31	2,605.32	272.99	10.544	
7,100.00	6,393.13	6,387.48	6,386.99	21.77	261.41	96.81	3,651.29	544.65	2,779.96	2,507.24	272.72	10.193	
7,200.00	6,391.39	6,385.74	6,385.25	23.18	261.28	96.61	3,651.29	544.70	2,681.73	2,409.28	272.45	9.843	
7,300.00	6,389.64	6,384.00	6,383.51	24.65	261.15	96.42	3,651.29	544.74	2,583.63	2,311.47	272.16	9.493	
7,400.00	6,387.90	6,382.26	6,381.78	26.17	261.01	96.22	3,651.29	544.78	2,485.68	2,213.81	271.87	9.143	
7,500.00	6,386.15	6,380.52	6,380.04	27.72	260.88	96.03	3,651.29	544.83	2,387.90	2,116.32	271.58	8.793	
7,600.00	6,384.41	6,378.78	6,378.30	29.31	260.75	95.83	3,651.29	544.87	2,290.31	2,019.04	271.27	8.443	
7,700.00	6,382.66	6,377.04	6,376.56	30.92	260.62	95.64	3,651.29	544.92	2,192.93	1,921.98	270.96	8.093	
7,800.00	6,380.92	6,375.30	6,374.82	32.56	260.49	95.44	3,651.28	544.96	2,095.81	1,825.18	270.63	7.744	
7,900.00	6,379.17	6,373.56	6,373.08	34.21	260.36	95.25	3,651.28	545.00	1,998.96	1,728.67	270.29	7.396	
8,000.00	6,377.43	6,371.82	6,371.34	35.88	260.22	95.05	3,651.28	545.05	1,902.44	1,632.51	269.93	7.048	
8,100.00	6,375.68	6,370.08	6,369.60	37.57	260.09	94.86	3,651.28	545.09	1,806.29	1,536.75	269.54	6.701	
8,200.00	6,373.94	6,368.34	6,367.86	39.27	259.96	94.66	3,651.28	545.14	1,710.59	1,441.47	269.12	6.356	
8,300.00	6,372.19	6,366.60	6,366.13	40.98	259.83	94.47	3,651.28	545.18	1,615.40	1,346.74	268.66	6.013	
8,400.00	6,370.45	6,364.87	6,364.39	42.70	259.70	94.27	3,651.28	545.23	1,520.83	1,252.70	268.13	5.672	
8,500.00	6,368.70	6,363.13	6,362.65	44.43	259.56	94.08	3,651.28	545.27	1,427.00	1,159.48	267.52	5.334	
8,600.00	6,366.95	6,361.39	6,360.91	46.16	259.43	93.88	3,651.28	545.31	1,334.06	1,067.29	266.77	5.001	
8,700.00	6,365.21	6,359.65	6,359.17	47.91	259.30	93.69	3,651.28	545.36	1,242.22	976.37	265.85	4.673	
8,800.00	6,363.46	6,357.91	6,357.43	49.66	259.17	93.49	3,651.28	545.40	1,151.74	887.07	264.66	4.352	
8,900.00	6,361.72	6,356.17	6,355.69	51.41	259.04	93.30	3,651.28	545.45	1,062.95	799.85	263.10	4.040	
9,000.00	6,359.97	6,354.43	6,353.95	53.17	258.91	93.10	3,651.28	545.49	976.34	715.36	260.98	3.741	
9,100.00	6,358.23	6,352.69	6,352.22	54.94	258.77	92.90	3,651.28	545.54	892.53	634.48	258.05	3.459	
9,200.00	6,356.48	6,350.95	6,350.48	56.71	258.64	92.71	3,651.28	545.58	812.38	558.44	253.94	3.199	
9,300.00	6,354.74	6,349.21	6,348.74	58.48	258.51	92.51	3,651.28	545.63	737.10	488.94	248.16	2.970	
9,400.00	6,352.99	6,347.47	6,347.00	60.26	258.38	92.32	3,651.28	545.67	668.33	428.25	240.08	2.784	
9,500.00	6,351.25	6,345.73	6,345.26	62.04	258.25	92.12	3,651.28	545.71	608.27	379.08	229.19	2.654	
9,600.00	6,349.50	6,343.99	6,343.52	63.82	258.11	91.93	3,651.28	545.76	559.76	344.01	215.75	2.595	
9,700.00	6,347.76	6,342.25	6,341.78	65.60	257.98	91.73	3,651.28	545.80	525.98	323.78	202.20	2.601	
9,800.00	6,346.01	6,340.51	6,340.04	67.39	257.85	91.53	3,651.28	545.85	509.88	315.47	194.41	2.623	
9,833.42	6,345.43	6,339.93	6,339.46	67.99	257.81	91.47	3,651.28	545.86	508.79	314.52	194.27	2.619 CC, ES	
9,900.00	6,344.27	6,338.78	6,338.30	69.18	257.72	91.34	3,651.28	545.89	513.12	314.94	198.19	2.589	
10,000.00	6,342.52	6,337.04	6,336.57	70.97	257.59	91.14	3,651.28	545.94	535.35	323.51	211.84	2.527	
10,100.00	6,340.78	6,335.30	6,334.83	72.76	257.45	90.95	3,651.27	545.98	574.37	345.98	228.40	2.515 SF	
10,200.00	6,339.03	6,333.56	6,333.09	74.56	257.32	90.75	3,651.27	546.03	627.06	384.04	243.02	2.580	
10,300.00	6,337.29	6,331.82	6,331.35	76.36	257.19	90.55	3,651.27	546.07	690.29	436.03	254.25	2.715	
10,400.00	6,335.54	6,330.08	6,329.61	78.16	257.06	90.36	3,651.27	546.12	761.43	499.09	262.34	2.902	
10,500.00	6,333.79	6,328.34	6,327.87	79.95	256.93	90.16	3,651.27	546.16	838.49	570.48	268.00	3.129	
10,600.00	6,332.05	6,326.60	6,326.13	81.76	256.80	89.97	3,651.27	546.21	919.96	648.06	271.90	3.383	
10,700.00	6,330.30	6,324.86	6,324.39	83.56	256.66	89.77	3,651.27	546.25	1,004.79	730.22	274.56	3.660	
10,800.00	6,328.56	6,323.12	6,322.66	85.36	256.53	89.58	3,651.27	546.29	1,092.18	815.81	276.37	3.952	
10,900.00	6,326.81	6,321.38	6,320.92	87.17	256.40	89.38	3,651.27	546.34	1,181.57	903.99	277.58	4.257	
11,000.00	6,325.07	6,319.64	6,319.18	88.97	256.27	89.18	3,651.27	546.38	1,272.54	994.16	278.38	4.571	
11,100.00	6,323.32	6,317.90	6,317.44	90.78	256.14	88.99	3,651.27	546.43	1,364.77	1,085.89	278.88	4.894	
11,200.00	6,321.58	6,316.16	6,315.70	92.59	256.00	88.79	3,651.27	546.47	1,458.03	1,178.85	279.18	5.223	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

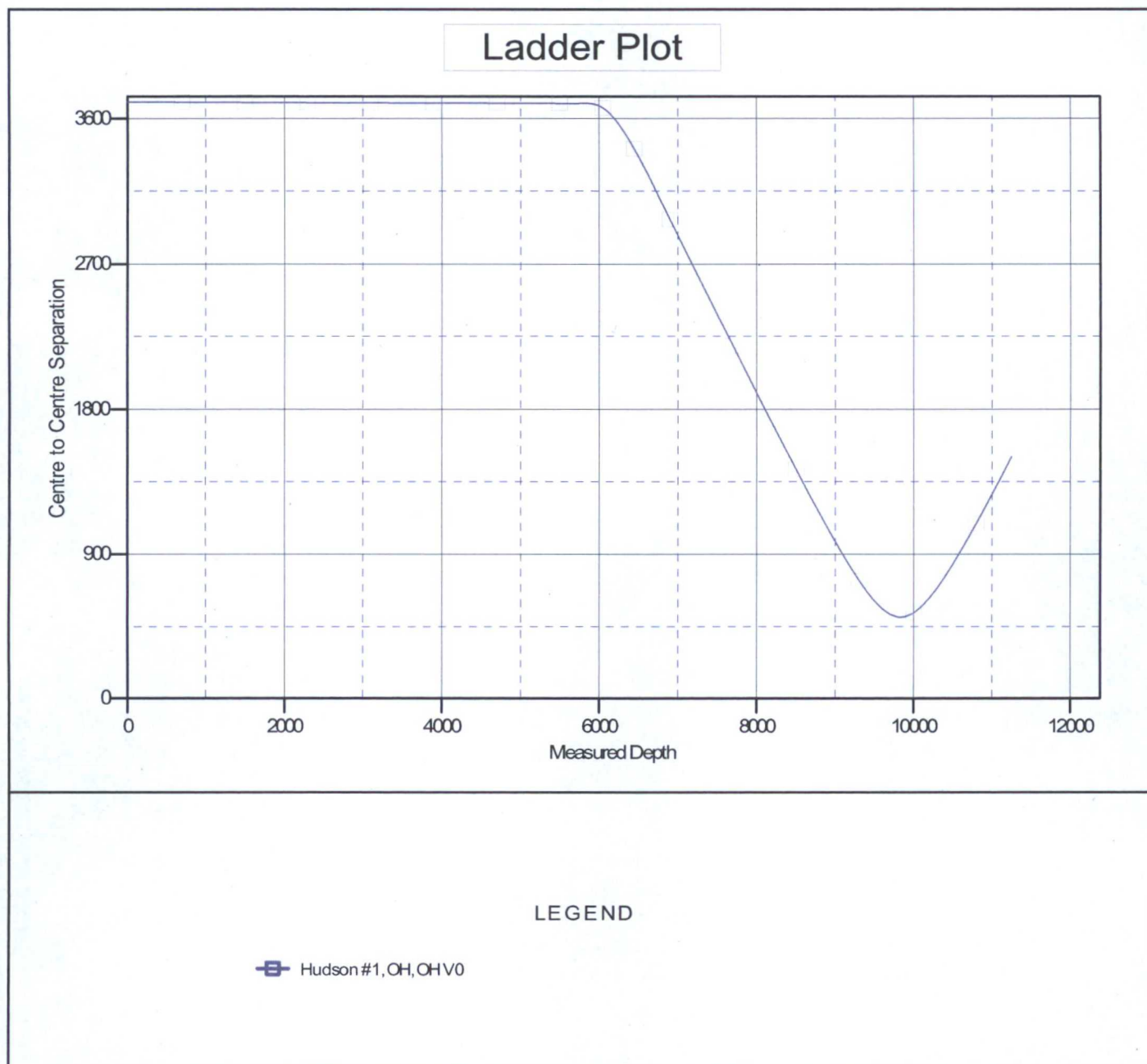
Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Reference Site:	Ragnar Federal Com #26H	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design Hudson #1 - Hudson #1 - OH - OH												Offset Site Error:	0.00 usft
Survey Program: 232-INC												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
11,249.58	6,320.71	6,315.30	6,314.84	93.48	255.94	88.70	3,651.27	546.50	1,504.58	1,225.31	279.26	5.388	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Reference Site:	Ragnar Federal Com #26H	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 4035.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Ragnar Federal Com #26H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.32"



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Ragnar Federal Com #26H
Project:	Lea County, NM (NAD-27 2015)	TVD Reference:	KB @ 4035.00usft (Silver Oak 3)
Reference Site:	Ragnar Federal Com #26H	MD Reference:	KB @ 4035.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	SHL: 120' FNL, 1730' FEL, Sec 22, T17S, R32E, Unit B	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	BHL: 330' FNL, 1647' FEL, Sec 15, T17S, R32E, Unit B	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 4035.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Ragnar Federal Com #26H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.32°

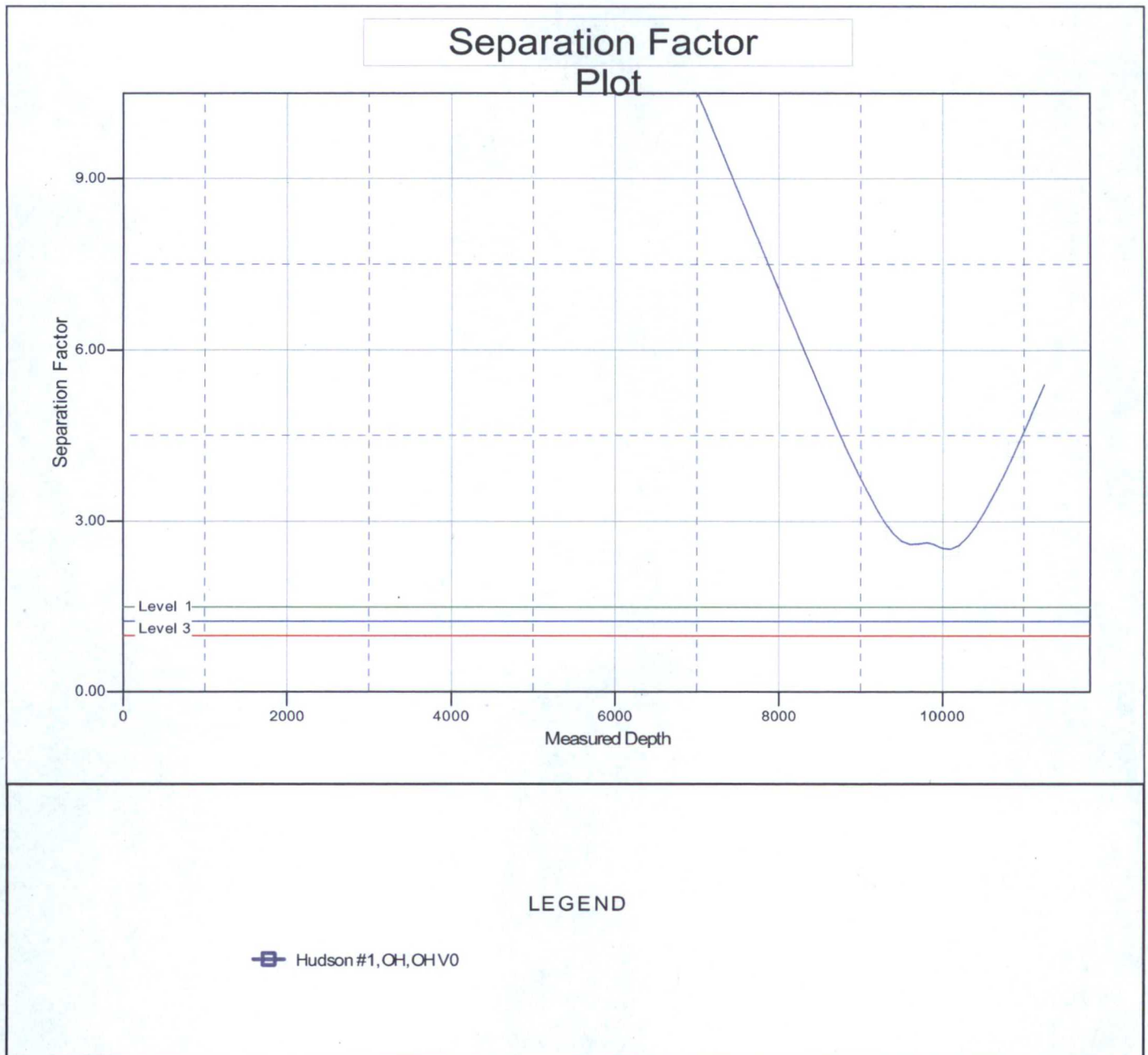
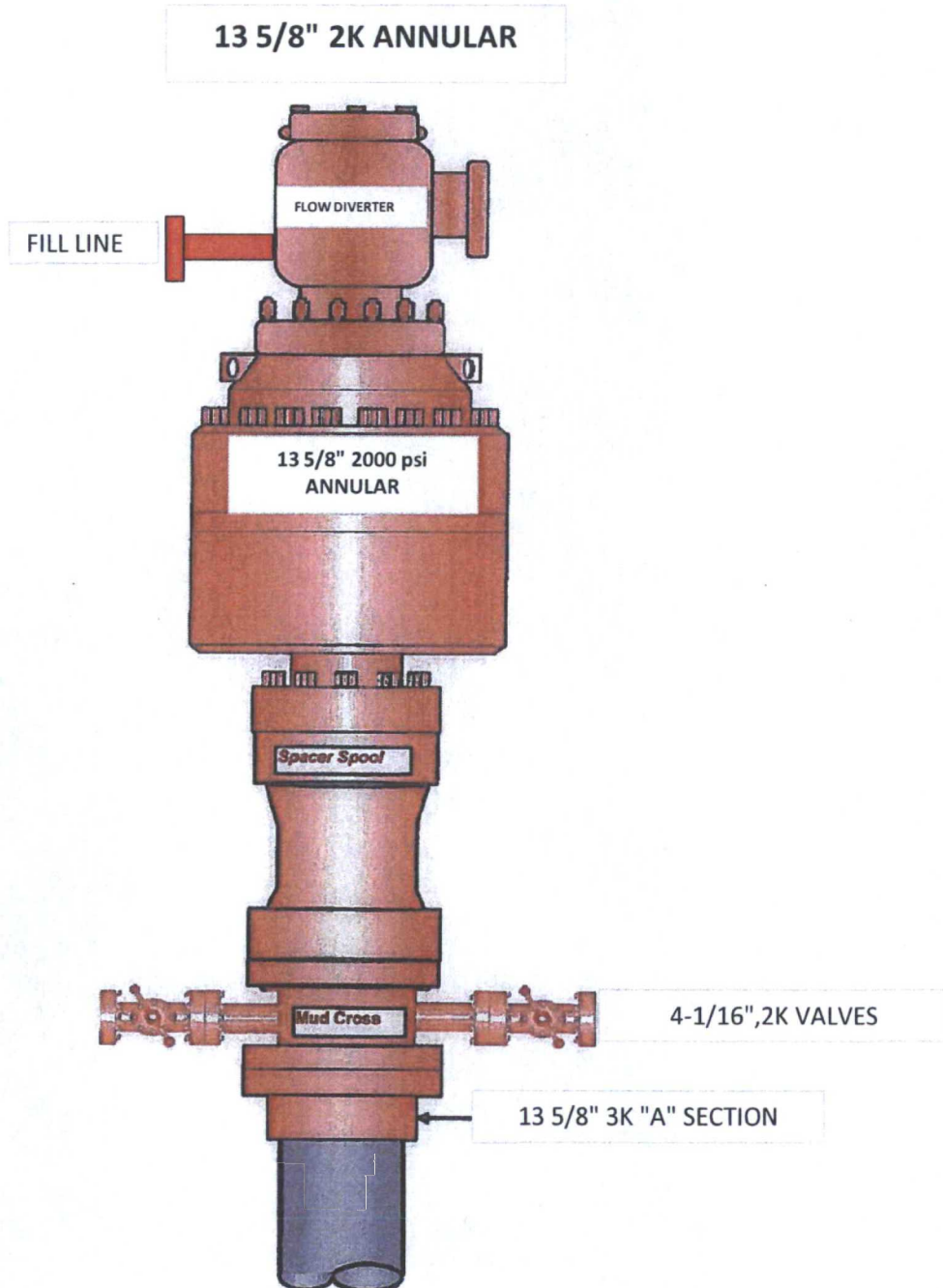


Exhibit #10

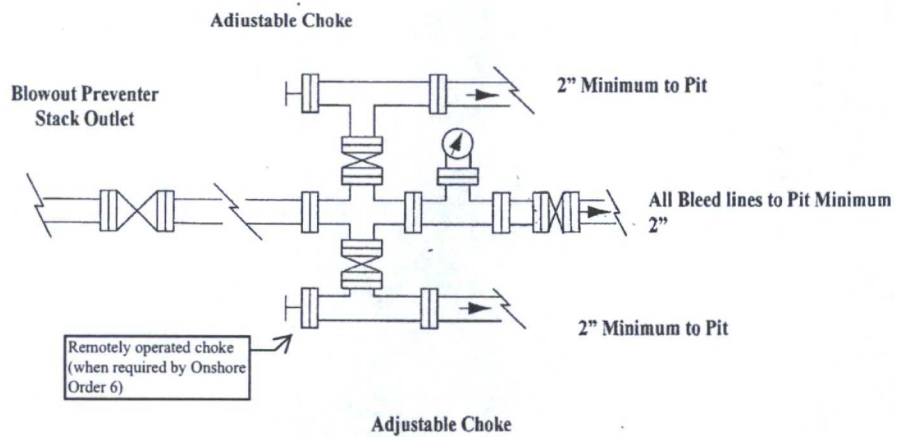
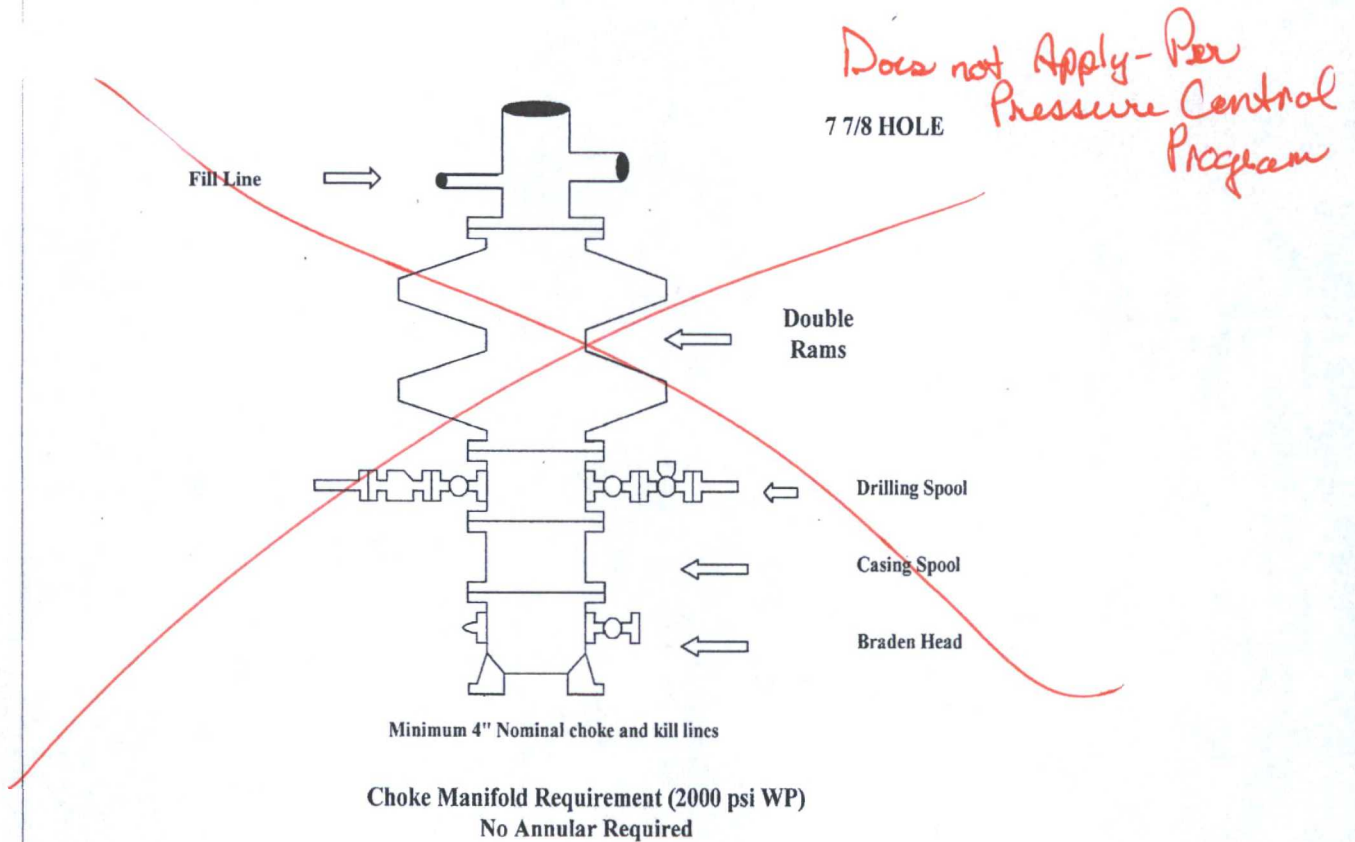
(Choke Manifold Schematic same as Exhibit #9)



COG Operating LLC

Exhibit #9

BOPE and Choke Schematic



NOTES REGARDING THE BLOWOUT PREVENTERS

**Master Drilling Plan
Eddy County, New Mexico**

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

Closed Loop Operation & Maintenance Procedure

All drilling fluid circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) are circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid is continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll off containers are lined and de-watered with fluids re-circulated into system.

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained 24 hrs./day by solids control personnel and or rig crews that stay on location.

Cuttings will be hauled to either:

CRI (permit number R9166)

or

GMI (permit number 711-019-001)

dependent upon which rig is available to drill this well.

COG Operating LLC

Closed Loop Equipment Diagram

