

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

Form C-102

Revised August 1, 2011

Submit one copy to appropriate
District Office

RECEIVED

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015- 43400	Pool Code 3250	Pool Name Atoka; Glorieta Yeso
Property Code 38909	Property Name SHERMAN 4 FEE	Well Number 7H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3343'

Surface Location

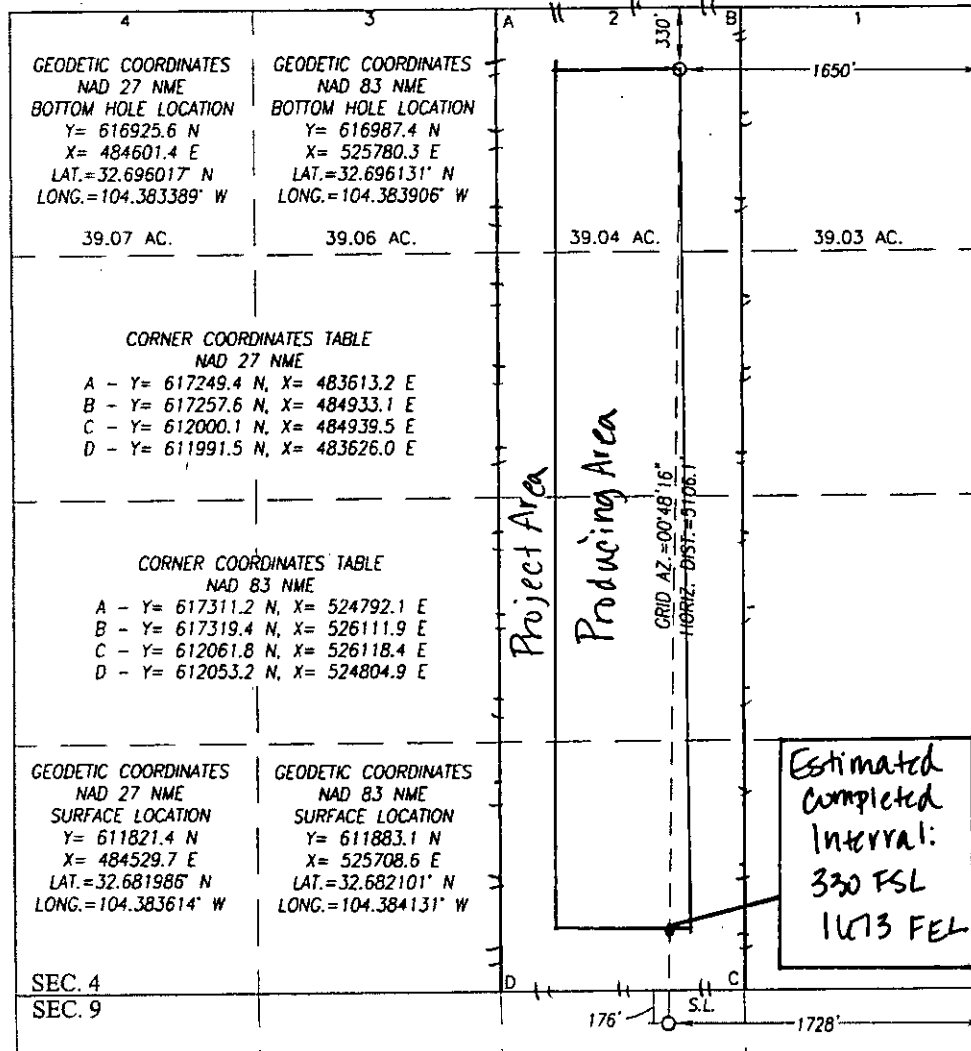
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	9	19-S	26-E		176	NORTH	1728	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
2	4	19-S	26-E		330	NORTH	1650	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
159.04			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



OPERATOR CERTIFICATION

I hereby certify that the information 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 mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

[Signature] **9-29-15**
Signature Date

Kelly J. Holly
Printed Name

kholly@concho.com
E-mail

SURVEYOR CERTIFICATION

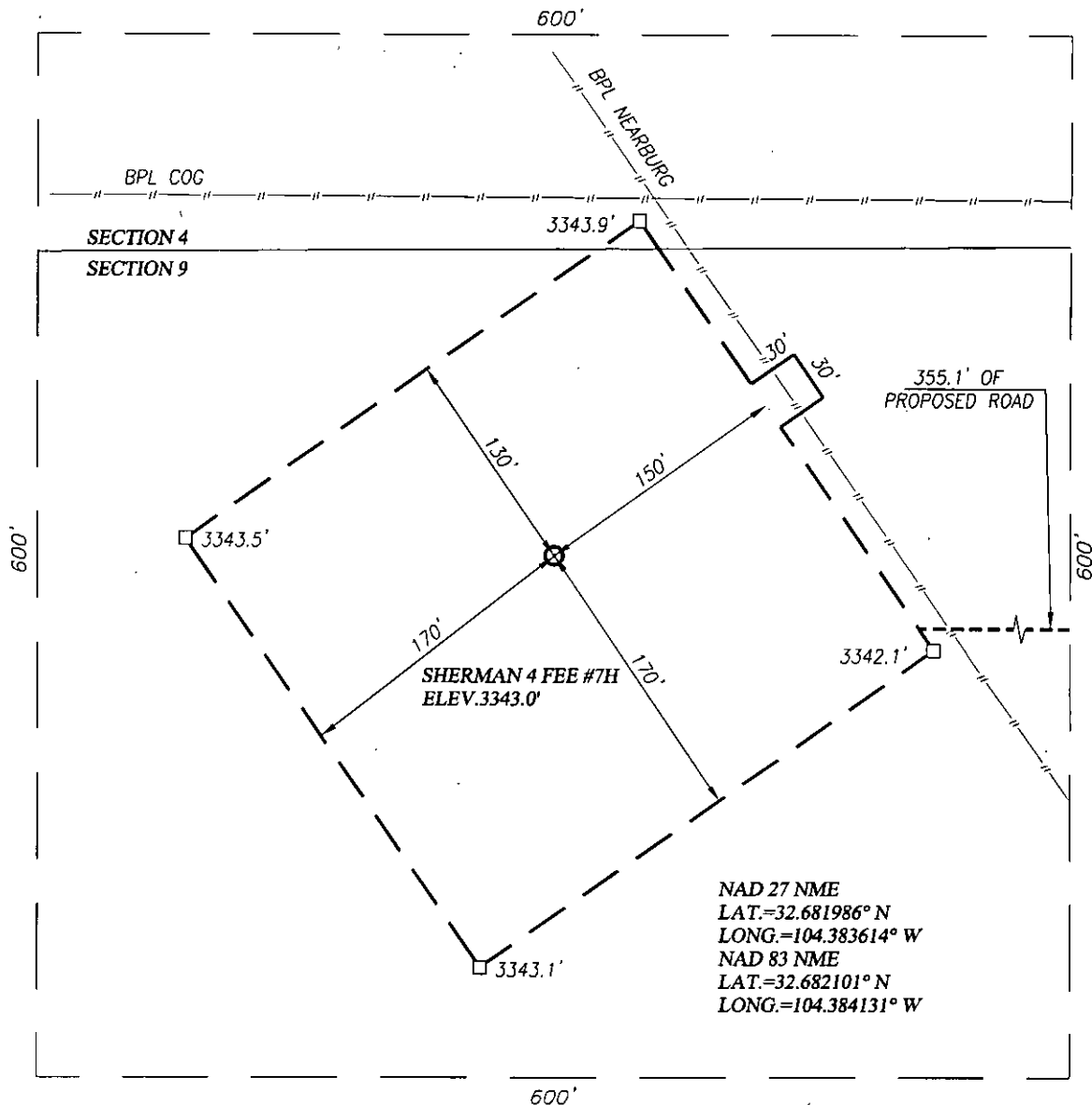
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

JUNE 22, 2015
Date of Survey

[Signature]
Signature & Seal of Professional Surveyor
NEW MEXICO
3239
REGISTERED SURVEYOR
Ronald J. Eidson
Certificate Number **12641**
Ronald J. Eidson **3239**

LSL JWSC W.O.: 15.11.0652

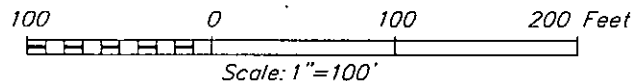
WELL SITE PLAN



NOTE:
1) SEE "TOPOGRAPHICAL AND ACCESS ROAD MAP" FOR PROPOSED ROAD LOCATION.

DIRECTIONS TO THIS LOCATION:

FROM THE INTERSECTION OF US HWY 285 AND CO. RD. 140, GO SOUTH ON US. HWY 285 APPROX. 0.2 MILES TO CALICHE LSE. ROAD. TURN LEFT AND GO EAST APPROX. 0.67 MILES ROAD BENDS RIGHT CONTINUE SOUTHEAST APPROX. 0.2 MILES TO A ROAD TEE. TURN LEFT AND GO EAST THEN SOUTH 358' TO THE NW PAD CORNER OF THE STONEWALL 9 FEE #4H, TURN RIGHT AND GO SOUTH APPROX. 177' TO PROPOSED ROAD SURVEY, TURN RIGHT AND FOLLOW STAKES WEST 355' TO THIS LOCATION.



COG OPERATING, LLC

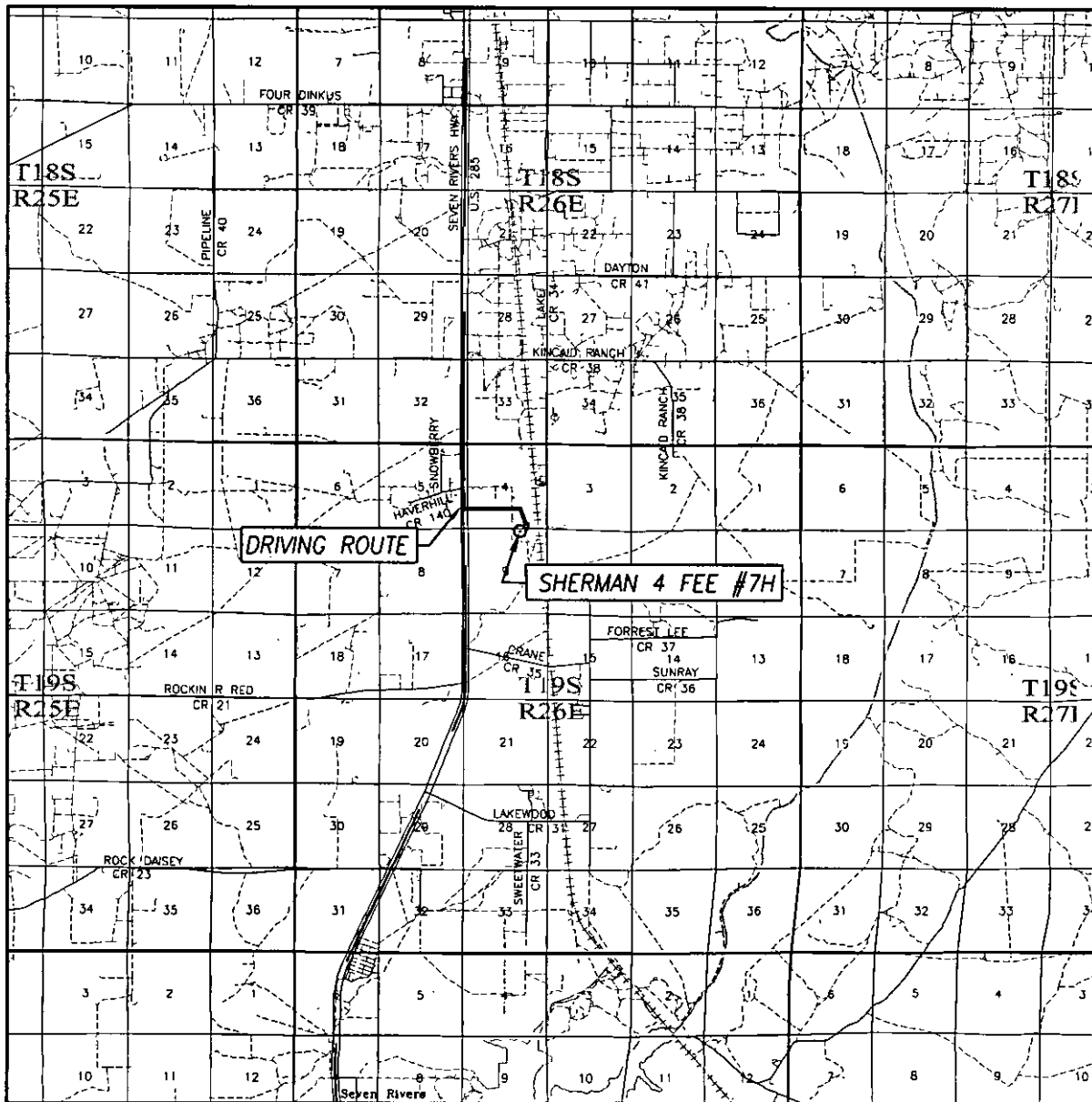
SHERMAN 4 FEE #7H WELL
LOCATED 176 FEET FROM THE NORTH LINE
AND 1728 FEET FROM THE EAST LINE OF SECTION 9,
TOWNSHIP 19 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO



PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO HOBBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10021000

Survey Date: 6/22/15	CAD Date: 6/30/15	Drawn By: LSL
W.O. No.: 15110652	Rev: .	Rel. W.O.: ' Sheet 1 of 1

VICINITY MAP



SCALE: 1" = 2 MILES

DRIVING ROUTE: SEE TOPOGRAPHICAL AND ACCESS ROAD MAP

SEC. 9 TWP. 19-S RGE. 26-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 176' FNL & 1728' FWL

ELEVATION 3343'

OPERATOR COG OPERATING, LLC

LEASE SHERMAN 4 FEE

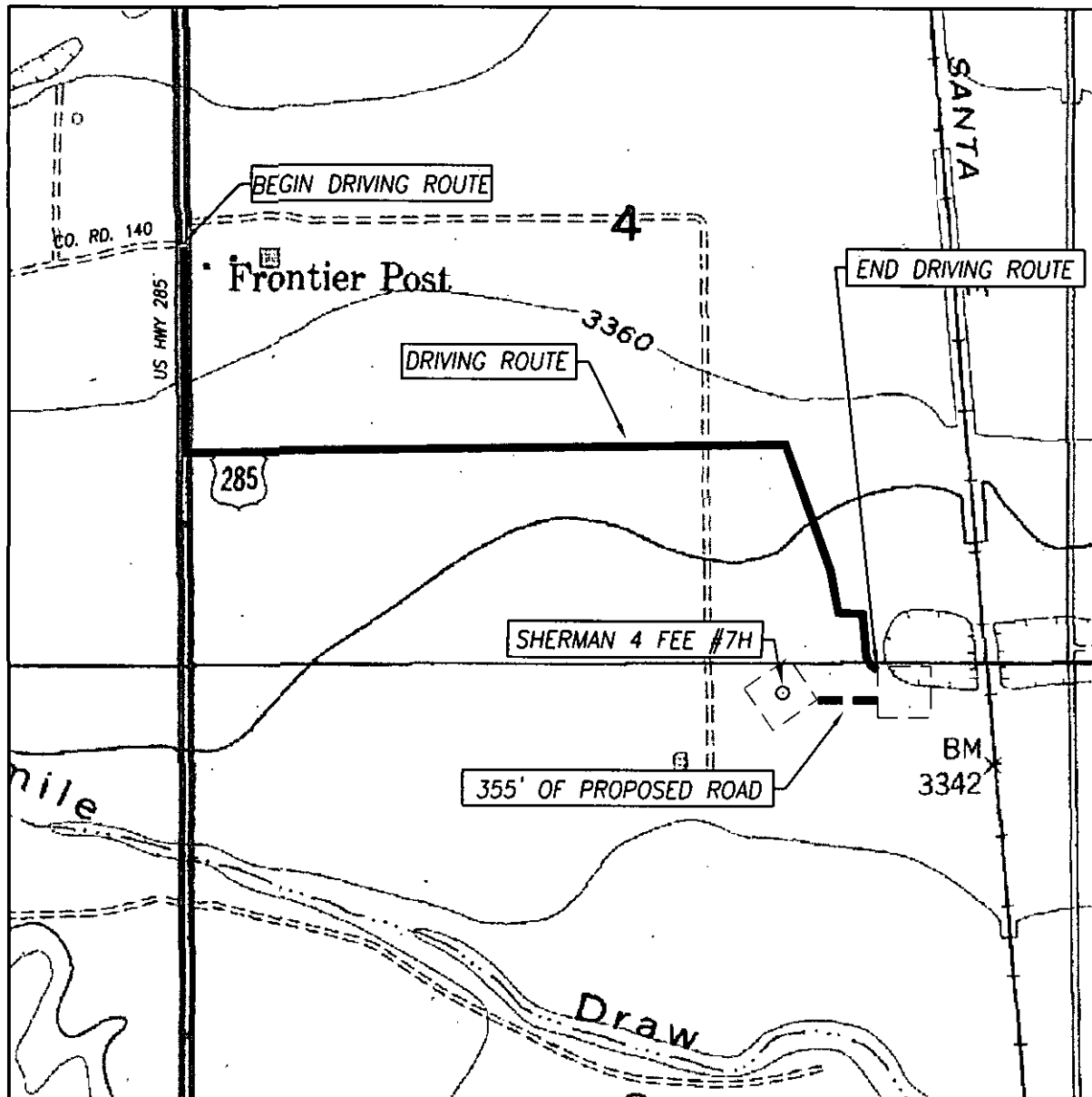


PROVIDING SURVEYING SERVICES
SINCE 1946

JOHN WEST SURVEYING COMPANY

412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10021000

TOPOGRAPHICAL AND ACCESS ROAD MAP



SCALE: 1" = 1000'

CONTOUR INTERVAL:
DAYTON, N.M. - 10'

DIRECTIONS TO THIS LOCATION:

FROM THE INTERSECTION OF US HWY 285 AND CO. RD. 140, GO SOUTH ON US. HWY 285 APPROX. 0.2 MILES TO CALICHE LSE. ROAD. TURN LEFT AND GO EAST APPROX. 0.67 MILES ROAD BENDS RIGHT CONTINUE SOUTHEAST APPROX. 0.2 MILES TO A ROAD TEE. TURN LEFT AND GO EAST THEN SOUTH 358' TO THE NW PAD CORNER OF THE STONEWALL 9 FEE #4H, TURN RIGHT AND GO SOUTH APPROX. 177' TO PROPOSED ROAD SURVEY, TURN RIGHT AND FOLLOW STAKES WEST 355' TO THIS LOCATION.

SEC. 9 TWP. 19-S RGE. 26-E
SURVEY N.M.P.M.
COUNTY EDDY STATE NEW MEXICO
DESCRIPTION 176' FNL & 1728' FEL
ELEVATION 3343'

OPERATOR COG OPERATING, LLC
LEASE SHERMAN 4 FEE
U.S.G.S. TOPOGRAPHIC MAP
DAYTON, N.M.

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10021000



COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#7H

OH

Plan: Plan #1 09-03-15

Surface: 176' FNL, 1728' FEL, Sec 9, T19S, R26E, Unit B

PP: 330' FSL, 1673' FEL, Sec 4, T19S, R26E, Unit O

BHL: 330' FNL, 1650' FEL, Sec 4, T19S, R26E, Lot #2

Standard Planning Report

03 September, 2015





Phoenix Technology Services LP
Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #7H
Company:	COG Operating LLC	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 09-03-15		

Project	Eddy 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	Sherman 4 Fee		
Site Position:	Map	Northing:	612,151.80 usft
From:		Easting:	485,212.40 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 40' 58.42381 N
		Longitude:	104° 22' 53.02452 W
		Grid Convergence:	-0.03 °

Well	#7H		
Well Position	+N/-S	-330.40 usft	Northing:
	+E/-W	-682.70 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	Ground Level:
			3,343.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	HDGM	9/3/2015	7.58
			Dip Angle
			60.55
			Field Strength
			48,413

Design	Plan #1 09-03-15		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			0.80

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,559.58	0.00	0.00	2,559.58	0.00	0.00	0.00	0.00	0.00	0.00	
3,382.31	90.50	5.50	3,080.43	523.00	50.36	11.00	11.00	0.00	5.50	
3,560.19	90.50	0.16	3,078.88	700.59	59.14	3.00	0.00	-3.00	-89.98	
7,963.98	90.50	0.16	3,040.46	5,104.20	71.70	0.00	0.00	0.00	0.00	BHL (Sherman 4 Fee)



Phoenix Technology Services LP
Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #7H
Company:	COG Operating LLC	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 09-03-15		

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
2,559.58	0.00	0.00	2,559.58	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 11°/100' Build									
2,600.00	4.45	5.50	2,599.96	1.56	0.15	1.56	11.00	11.00	0.00
2,700.00	15.45	5.50	2,698.31	18.73	1.80	18.75	11.00	11.00	0.00
2,800.00	26.45	5.50	2,791.55	54.26	5.22	54.32	11.00	11.00	0.00
2,900.00	37.45	5.50	2,876.28	106.84	10.29	106.98	11.00	11.00	0.00
3,000.00	48.45	5.50	2,949.36	174.56	16.81	174.78	11.00	11.00	0.00
3,100.00	59.45	5.50	3,008.13	254.91	24.54	255.23	11.00	11.00	0.00
3,200.00	70.45	5.50	3,050.41	344.94	33.21	345.38	11.00	11.00	0.00
3,300.00	81.45	5.50	3,074.66	441.36	42.50	441.91	11.00	11.00	0.00
3,365.25	88.62	5.50	3,080.30	506.02	48.72	506.65	11.00	11.00	0.00
PP (Sherman 4 Fee #7H)									
3,381.43	90.40	5.50	3,080.44	522.13	50.28	522.78	11.00	11.00	0.00
TL, 3085' TVD @ 0 VZ, 90.5° Inc									
3,382.31	90.50	5.50	3,080.43	523.00	50.36	523.66	10.97	10.97	0.00
LP, Begin 3°/100' Turn									
3,400.00	90.50	4.97	3,080.28	540.62	51.97	541.29	3.00	0.00	-3.00
3,500.00	90.50	1.97	3,079.40	640.42	58.02	641.17	3.00	0.00	-3.00
3,560.19	90.50	0.16	3,078.88	700.59	59.14	701.35	3.00	0.00	-3.00
Hold 90.5° Inc, 0.16° Azm									
3,600.00	90.50	0.16	3,078.53	740.40	59.26	741.16	0.00	0.00	0.00
3,700.00	90.50	0.16	3,077.66	840.40	59.54	841.15	0.00	0.00	0.00
3,800.00	90.50	0.16	3,076.79	940.39	59.83	941.14	0.00	0.00	0.00
3,900.00	90.50	0.16	3,075.91	1,040.39	60.11	1,041.13	0.00	0.00	0.00
4,000.00	90.50	0.16	3,075.04	1,140.38	60.40	1,141.12	0.00	0.00	0.00
4,100.00	90.50	0.16	3,074.17	1,240.38	60.68	1,241.11	0.00	0.00	0.00
4,200.00	90.50	0.16	3,073.30	1,340.37	60.97	1,341.10	0.00	0.00	0.00
4,300.00	90.50	0.16	3,072.42	1,440.37	61.25	1,441.09	0.00	0.00	0.00
4,400.00	90.50	0.16	3,071.55	1,540.37	61.54	1,541.08	0.00	0.00	0.00
4,500.00	90.50	0.16	3,070.68	1,640.36	61.82	1,641.07	0.00	0.00	0.00
4,600.00	90.50	0.16	3,069.81	1,740.36	62.11	1,741.06	0.00	0.00	0.00
4,700.00	90.50	0.16	3,068.93	1,840.35	62.39	1,841.05	0.00	0.00	0.00
4,800.00	90.50	0.16	3,068.06	1,940.35	62.68	1,941.04	0.00	0.00	0.00
4,900.00	90.50	0.16	3,067.19	2,040.35	62.96	2,041.03	0.00	0.00	0.00
5,000.00	90.50	0.16	3,066.32	2,140.34	63.25	2,141.02	0.00	0.00	0.00
5,100.00	90.50	0.16	3,065.44	2,240.34	63.53	2,241.01	0.00	0.00	0.00
5,200.00	90.50	0.16	3,064.57	2,340.33	63.82	2,341.00	0.00	0.00	0.00
5,300.00	90.50	0.16	3,063.70	2,440.33	64.10	2,440.99	0.00	0.00	0.00
5,400.00	90.50	0.16	3,062.83	2,540.32	64.39	2,540.98	0.00	0.00	0.00
5,500.00	90.50	0.16	3,061.96	2,640.32	64.67	2,640.97	0.00	0.00	0.00
5,600.00	90.50	0.16	3,061.08	2,740.32	64.96	2,740.96	0.00	0.00	0.00
5,700.00	90.50	0.16	3,060.21	2,840.31	65.24	2,840.95	0.00	0.00	0.00
5,800.00	90.50	0.16	3,059.34	2,940.31	65.53	2,940.94	0.00	0.00	0.00
5,900.00	90.50	0.16	3,058.47	3,040.30	65.81	3,040.93	0.00	0.00	0.00
6,000.00	90.50	0.16	3,057.59	3,140.30	66.10	3,140.92	0.00	0.00	0.00
6,100.00	90.50	0.16	3,056.72	3,240.29	66.39	3,240.91	0.00	0.00	0.00
6,200.00	90.50	0.16	3,055.85	3,340.29	66.67	3,340.90	0.00	0.00	0.00
6,300.00	90.50	0.16	3,054.98	3,440.29	66.96	3,440.89	0.00	0.00	0.00
6,400.00	90.50	0.16	3,054.10	3,540.28	67.24	3,540.88	0.00	0.00	0.00
6,500.00	90.50	0.16	3,053.23	3,640.28	67.53	3,640.87	0.00	0.00	0.00
6,600.00	90.50	0.16	3,052.36	3,740.27	67.81	3,740.86	0.00	0.00	0.00
6,700.00	90.50	0.16	3,051.49	3,840.27	68.10	3,840.85	0.00	0.00	0.00
6,800.00	90.50	0.16	3,050.61	3,940.27	68.38	3,940.84	0.00	0.00	0.00



Phoenix Technology Services LP
Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #7H
Company:	COG Operating LLC	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 09-03-15		

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)
6,900.00	90.50	0.16	3,049.74	4,040.26	68.67	4,040.83	0.00	0.00	0.00
7,000.00	90.50	0.16	3,048.87	4,140.26	68.95	4,140.82	0.00	0.00	0.00
7,100.00	90.50	0.16	3,048.00	4,240.25	69.24	4,240.81	0.00	0.00	0.00
7,200.00	90.50	0.16	3,047.12	4,340.25	69.52	4,340.80	0.00	0.00	0.00
7,300.00	90.50	0.16	3,046.25	4,440.24	69.81	4,440.79	0.00	0.00	0.00
7,400.00	90.50	0.16	3,045.38	4,540.24	70.09	4,540.78	0.00	0.00	0.00
7,500.00	90.50	0.16	3,044.51	4,640.24	70.38	4,640.77	0.00	0.00	0.00
7,600.00	90.50	0.16	3,043.64	4,740.23	70.66	4,740.76	0.00	0.00	0.00
7,700.00	90.50	0.16	3,042.76	4,840.23	70.95	4,840.75	0.00	0.00	0.00
7,800.00	90.50	0.16	3,041.89	4,940.22	71.23	4,940.74	0.00	0.00	0.00
7,900.00	90.50	0.16	3,041.02	5,040.22	71.52	5,040.73	0.00	0.00	0.00
7,963.98	90.50	0.16	3,040.46	5,104.20	71.70	5,104.70	0.00	0.00	0.00
TD at 7963.98' MD - BHL (Sherman 4 Fee #7H)									

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
BHL (Sherman 4 Fee #7 - plan hits target center - Point	0.00	360.00	3,040.46	5,104.20	71.70	616,925.60	484,601.40	32° 41' 45.66081 N	104° 23' 0.19997 W
PP (Sherman 4 Fee #7H - plan misses target center by 0.01usft at 3365.23usft MD (3080.30 TVD, 506.00 N, 48.72 E) - Point	0.00	0.00	3,080.29	506.00	48.72	612,327.40	484,578.42	32° 41' 0.15858 N	104° 23' 0.44344 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,381.43	3,080.44	TL, 3085' TVD @ 0 VZ, 90.5° Inc		-0.50	0.80

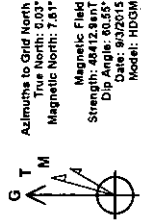
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
2,559.58	2,559.58	0.00	0.00	KOP, Begin 11°/100' Build
3,382.31	3,080.43	523.00	50.36	LP, Begin 3°/100' Turn
3,560.19	3,078.88	700.59	59.14	Hold 90.5° Inc, 0.16° Azm
7,963.98	3,040.46	5,104.20	71.70	TD at 7963.98' MD



Project: Eddy County, NM (NAD27 NME)
Site: Sherman 4 Fee
Well: #7H
Wellbore: OH
Design: Plan #1 09-03-15
Rig: Silver Oak 3

PHOENIX
TECHNOLOGY SERVICES



Alignments to Grid North
True North: 0.03°
Magnetic North: 7.51°
Magnetic Field
Strength: 48412.8nT
Dip Angle: 60.55°
Grid: 832015
Model: HDGM

WELL DETAILS

Ground Level 3343.00
Easting 484325.70
Northing 611821.40
Latitude 32° 40' 55.15115" N
Longitude 104° 23' 1.01072" W

SECTION DETAILS

Sec	MD	Inc	Atz	TVD	-NUS	-EJW	Org	ITers	VSet	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 11'100' Build
2	2558.58	0.00	0.00	2558.58	0.00	0.00	0.00	0.00	0.00	0.00	LP Begin 3'1000' Turn
3	3382.31	90.50	5.50	3080.43	52.00	50.35	11.00	5.50	523.65		Hold 90.5° Inc 0.15° Azm
4	3568.19	90.50	0.16	3078.88	708.59	59.14	3.00	48.98	701.35		TD at 7983.08' MD
5	7983.38	90.50	0.16	3040.48	5104.20	71.70	0.00	0.00	5104.78		BH (Sherman 4 Fee #7H) TD at 7983.08' MD

DESIGN TARGET DETAILS

Name	MD	Inc	Atz	TVD	-NUS	-EJW	Org	ITers	VSet	Target	Annotation
BH (Sherman 4 Fee #7H)	3340.46	0.00	0.00	3340.46	5104.20	71.70	0.00	0.00	0.00	0.00	104° 23' 0.08571" W Point
PP (Sherman 4 Fee #7H)	3082.25	506.00	48.72	61237.40	44578.42	32° 41' 6.15458" N	104° 23' 0.43444" W				Point

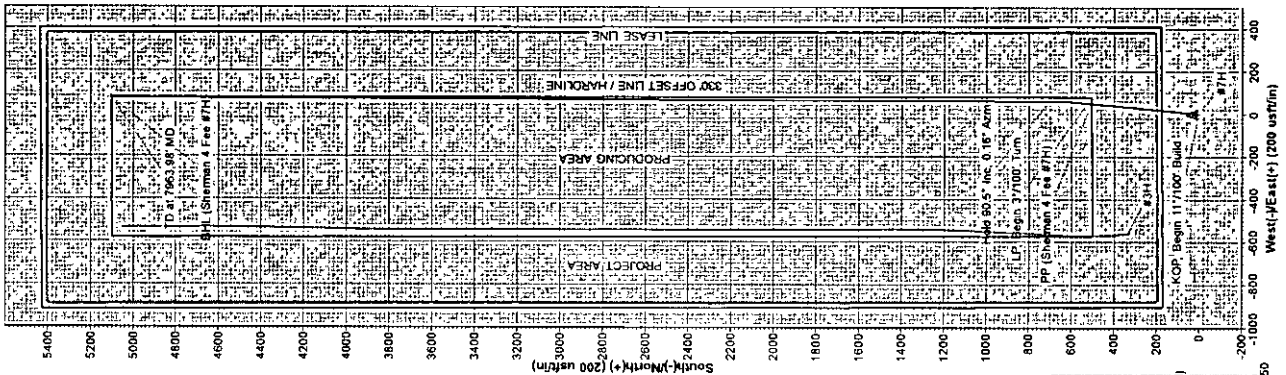
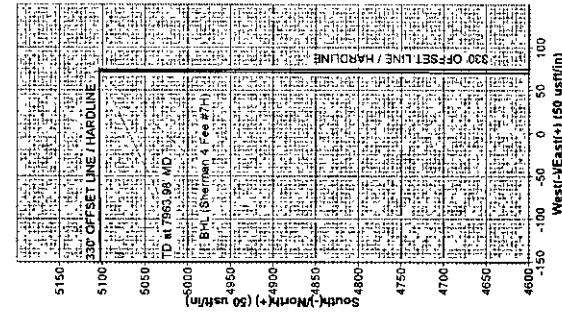
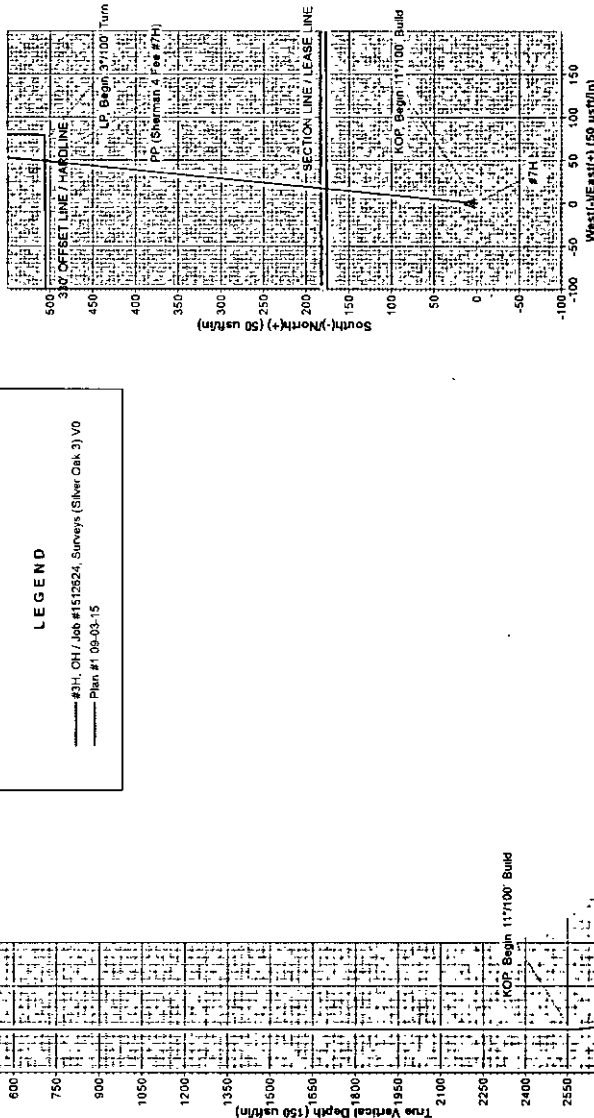
LEGEND

--- #7H, OH / Job #1513824, Surveys (Silver Oak 3) VO
--- Plan #1 09-03-15

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well #7H, Grid North
Latitude: 32° 40' 55.15115" N
Longitude: 104° 23' 1.01072" W
Grid East: 484325.70
Grid North: 611821.40
Scale Factor: 1.000
Geometric Model: HDGM
Sample Date: 7-25-Sep-15
Magnetic Declination: 7.51°
Dip Angle from Horizontal: 60.55°
Magnetic Field Strength: 48413
To convert a Magnetic Direction to a Grid Direction, Add 7.51°
To convert a Magnetic Direction to a True Direction, Add 7.53° East
To convert a True Direction to a Grid Direction, Add 0.03°

FORMATION TOP DETAILS

TVD=611 MD=611 Formation
3880.44 3381.43 TL 3085 TVD @ 91° 42' 46.5" Inc -0.50
Dip=0.50



Vertical Section at 0.80° (150 usft/in)

Created By: Jabo Pae Date: 8/30/2015



COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#7H

OH

Plan #1 09-03-15

Anticollision Report

03 September, 2015





Phoenix Technology Services LP

Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 09-03-15	Offset TVD Reference:	Offset Datum

Reference	Plan #1 09-03-15		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 99,999,999.00 us	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	9/3/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	7,963.97	Plan #1 09-03-15 (OH)	PHX+MWD+HDGM	PHX+MWD+HDGM	

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						
Sherman 4 Fee						
#3H - OH / Job #1512624 - Surveys (Silver Oak 3)	4,269.90	3,943.61	604.19	555.04	12.292	CC
#3H - OH / Job #1512624 - Surveys (Silver Oak 3)	7,900.00	7,569.18	608.06	422.48	3.277	ES
#3H - OH / Job #1512624 - Surveys (Silver Oak 3)	7,963.98	7,587.00	610.31	423.28	3.263	SF

Offset Design										Offset Site Error:		0.00 usft	
Survey Program: 100-NS-GYRO-MS, 2541-PHX+MWD+IGRF										Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Distance						Warning	
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
0.00	0.00	3.75	3.75	0.00	0.00	-59.01	322.50	-536.90	626.31				
100.00	100.00	100.00	100.00	0.15	0.11	-59.03	322.56	-537.49	626.86	626.60	0.26	2,442.052	
200.00	200.00	197.48	197.47	0.51	0.37	-59.07	322.72	-538.59	627.91	627.04	0.87	719.175	
300.00	300.00	298.91	298.89	0.86	0.63	-59.08	323.09	-539.46	628.84	627.35	1.49	421.500	
400.00	400.00	394.73	394.71	1.22	0.87	-59.05	323.92	-540.24	629.98	627.89	2.09	301.347	
500.00	500.00	491.88	491.84	1.58	1.12	-59.03	324.95	-541.55	631.68	628.98	2.70	233.962	
600.00	600.00	591.16	591.11	1.94	1.38	-59.04	325.88	-543.30	633.68	630.35	3.32	190.783	
700.00	700.00	692.75	692.68	2.30	1.65	-59.05	326.81	-545.03	635.60	631.65	3.95	160.934	
800.00	800.00	797.47	797.39	2.66	1.93	-59.09	327.26	-546.49	637.02	632.44	4.58	139.040	
900.00	900.00	898.30	898.21	3.01	2.19	-59.13	327.37	-547.57	637.99	632.79	5.20	122.690	
1,000.00	1,000.00	896.83	896.73	3.37	2.44	-59.16	327.56	-548.62	639.01	633.19	5.82	109.873	
1,100.00	1,100.00	1,096.27	1,096.17	3.73	2.71	-59.19	327.86	-549.81	640.19	633.75	6.44	99.453	
1,200.00	1,200.00	1,194.62	1,194.50	4.09	2.96	-59.24	328.12	-551.20	641.54	634.49	7.05	90.937	
1,300.00	1,300.00	1,295.47	1,295.35	4.45	3.23	-59.29	328.36	-552.73	642.96	635.29	7.68	83.735	
1,400.00	1,400.00	1,397.49	1,397.36	4.81	3.50	-59.33	328.56	-554.02	644.16	635.85	8.31	77.556	
1,500.00	1,500.00	1,495.96	1,495.82	5.17	3.76	-59.36	328.81	-555.18	645.30	636.37	8.92	72.305	
1,600.00	1,600.00	1,597.97	1,597.82	5.52	4.03	-59.40	329.05	-556.37	646.42	636.87	9.55	67.671	
1,700.00	1,700.00	1,694.49	1,694.33	5.88	4.28	-59.43	329.33	-557.57	647.64	637.47	10.17	63.708	
1,800.00	1,800.00	1,796.97	1,796.80	6.24	4.56	-59.46	329.76	-558.89	648.97	638.17	10.80	60.111	
1,900.00	1,900.00	1,897.22	1,897.04	6.60	4.82	-59.48	330.12	-559.95	650.05	638.63	11.42	56.919	
2,000.00	2,000.00	1,899.16	1,898.99	6.96	5.09	-59.49	330.53	-560.80	650.97	638.93	12.05	54.035	
2,100.00	2,100.00	2,100.16	2,099.98	7.32	5.36	-59.49	330.84	-561.43	651.67	639.00	12.67	51.428	
2,200.00	2,200.00	2,201.02	2,200.84	7.67	5.62	-59.50	331.01	-561.97	652.22	638.92	13.30	49.048	
2,300.00	2,300.00	2,300.90	2,300.71	8.03	5.89	-59.51	331.19	-562.44	652.71	638.79	13.92	46.891	

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 09-03-15	Offset TVD Reference:	Offset Datum

Offset Design: Sherman 4 Fee - #3H - OH / Job #1512624 - Surveys (Silver Oak 3)														Offset Site Error:	0.00 usft
Survey Program: 100-NS-GYRO-MS, 2541-PHX+MWD+IGRF														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
2,400.00	2,400.00	2,402.31	2,402.12	8.39	6.15	-59.52	331.31	-562.83	653.11	638.56	14.54	44.907			
2,500.00	2,500.00	2,505.35	2,505.17	8.75	6.34	-59.52	331.37	-562.91	653.21	638.12	15.09	43.295			
2,518.67	2,518.67	2,524.78	2,524.58	8.82	6.36	-65.02	331.41	-562.84	653.10	637.92	15.18	43.025			
2,600.00	2,599.96	2,592.66	2,592.42	9.11	6.39	-64.91	333.21	-562.34	653.34	637.84	15.50	42.148			
2,700.00	2,698.31	2,635.00	2,634.36	9.47	6.41	-65.19	339.61	-562.42	652.64	636.75	15.89	41.082			
2,800.00	2,791.55	2,697.00	2,694.83	9.63	6.45	-66.21	353.08	-563.85	650.61	634.33	16.28	39.964			
2,900.00	2,876.28	2,752.22	2,747.07	10.22	6.51	-67.71	370.72	-566.21	647.86	631.14	16.72	38.743			
3,000.00	2,949.36	2,818.63	2,807.17	10.70	6.63	-70.00	398.71	-569.14	644.17	626.84	17.33	37.179			
3,100.00	3,008.13	2,896.00	2,884.14	11.30	6.86	-72.76	434.57	-570.94	639.36	621.20	18.16	35.204			
3,200.00	3,050.41	2,958.57	2,920.02	12.05	7.26	-76.09	480.75	-572.23	634.88	615.57	19.31	32.882			
3,300.00	3,074.66	3,032.60	2,970.20	12.93	7.85	-79.74	535.09	-571.92	630.91	610.14	20.78	30.366			
3,385.03	3,081.63	3,090.70	3,004.26	13.76	8.45	-82.57	582.13	-571.52	629.64	607.43	22.21	28.355			
3,400.00	3,080.28	3,100.46	3,009.54	13.90	8.56	-83.18	590.35	-571.48	629.89	607.42	22.46	28.042			
3,500.00	3,079.40	3,212.72	3,060.78	14.90	10.04	-87.96	689.99	-568.13	628.52	603.59	24.93	25.207			
3,600.00	3,078.53	3,299.36	3,089.30	16.02	11.38	-90.65	771.60	-563.08	623.15	595.76	27.40	22.744			
3,700.00	3,077.66	3,390.56	3,109.96	17.28	12.93	-92.63	860.30	-559.13	619.64	589.42	30.22	20.505			
3,800.00	3,076.79	3,501.01	3,120.52	18.62	14.95	-93.73	970.00	-554.03	615.85	582.28	33.57	18.345			
3,900.00	3,075.91	3,601.00	3,119.95	20.00	16.85	-93.78	1,069.86	-548.98	611.11	574.26	36.86	16.581			
4,000.00	3,075.04	3,695.00	3,118.80	21.44	18.68	-93.78	1,163.76	-544.96	607.11	566.93	40.12	15.132			
4,100.00	3,074.17	3,778.05	3,118.00	22.90	20.34	-93.78	1,246.79	-543.16	605.19	561.95	43.24	13.996			
4,200.00	3,073.30	3,879.24	3,117.04	24.40	22.37	-93.77	1,347.97	-542.22	604.54	557.77	46.78	12.924			
4,269.90	3,072.69	3,943.61	3,116.27	25.47	23.68	-93.76	1,412.34	-541.72	604.19	555.04	49.15	12.292 CC			
4,300.00	3,072.42	3,971.04	3,115.87	25.93	24.24	-93.74	1,439.76	-541.71	604.25	554.08	50.17	12.045			
4,400.00	3,071.55	4,062.37	3,114.94	27.47	26.12	-93.72	1,531.09	-542.52	605.41	551.82	53.59	11.297			
4,500.00	3,070.68	4,160.97	3,114.96	29.04	28.16	-93.79	1,629.66	-544.23	607.48	550.29	57.19	10.622			
4,600.00	3,069.81	4,272.18	3,114.96	30.61	30.47	-93.88	1,740.87	-545.21	608.71	547.63	61.08	9.966			
4,700.00	3,068.93	4,375.68	3,113.84	32.20	32.62	-93.86	1,844.37	-544.77	608.55	543.73	64.82	9.388			
4,741.09	3,068.58	4,414.85	3,113.38	32.86	33.44	-93.85	1,883.53	-544.61	608.49	542.19	66.30	9.178			
4,800.00	3,068.06	4,471.46	3,113.01	33.81	34.62	-93.86	1,940.14	-544.56	608.62	540.19	68.42	8.895			
4,900.00	3,067.19	4,569.47	3,112.61	35.42	36.67	-93.90	2,038.14	-544.80	609.17	537.09	72.09	8.451			
5,000.00	3,066.32	4,667.61	3,112.12	37.04	38.73	-93.93	2,136.29	-545.29	609.98	534.22	75.77	8.051			
5,100.00	3,065.44	4,766.75	3,111.19	38.66	40.82	-93.91	2,235.41	-546.27	611.25	531.77	79.48	7.691			
5,200.00	3,064.57	4,871.84	3,109.60	40.29	43.03	-93.84	2,340.49	-546.67	611.87	528.54	83.32	7.343			
5,300.00	3,063.70	4,973.97	3,107.54	41.93	45.18	-93.73	2,442.60	-546.63	612.04	524.93	87.11	7.026			
5,400.00	3,062.83	5,075.93	3,106.33	43.57	47.33	-93.70	2,544.55	-546.13	611.81	520.91	90.90	6.730			
5,500.00	3,061.96	5,175.88	3,105.15	45.22	49.44	-93.68	2,644.49	-545.48	611.43	516.77	94.66	6.459			
5,559.42	3,061.44	5,233.21	3,104.20	46.20	50.65	-93.64	2,701.81	-545.20	611.28	514.43	96.85	6.312			
5,600.00	3,061.08	5,270.76	3,103.60	46.87	51.44	-93.61	2,739.36	-545.21	611.38	513.07	98.31	6.219			
5,700.00	3,060.21	5,370.66	3,102.42	48.52	53.56	-93.58	2,839.25	-545.67	612.11	510.03	102.08	5.996			
5,800.00	3,059.34	5,472.57	3,102.12	50.18	55.72	-93.63	2,941.16	-545.65	612.41	506.51	105.90	5.783			
5,900.00	3,058.47	5,572.90	3,102.00	51.84	57.84	-93.70	3,041.48	-545.48	612.57	502.89	109.68	5.585			
6,000.00	3,057.59	5,673.04	3,101.52	53.50	59.96	-93.74	3,141.63	-545.31	612.71	499.25	113.46	5.400			
6,100.00	3,056.72	5,771.04	3,100.91	55.17	62.04	-93.76	3,239.62	-545.27	612.98	495.77	117.21	5.230			
6,200.00	3,055.85	5,871.06	3,100.15	56.84	64.16	-93.76	3,339.64	-545.45	613.44	492.45	121.00	5.070			
6,300.00	3,054.98	5,969.95	3,099.11	58.51	66.26	-93.75	3,438.53	-545.71	613.98	489.21	124.77	4.921			
6,400.00	3,054.10	6,068.51	3,097.89	60.18	68.35	-93.71	3,537.07	-546.23	614.77	486.24	128.53	4.783			
6,500.00	3,053.23	6,174.91	3,096.30	61.85	70.61	-93.64	3,643.46	-546.19	614.97	482.50	132.46	4.643			
6,528.79	3,052.98	6,202.70	3,095.92	62.33	71.20	-93.63	3,671.25	-546.09	614.94	481.40	133.54	4.605			
6,600.00	3,052.36	6,272.79	3,095.13	63.52	72.69	-93.61	3,741.34	-546.01	615.05	478.83	136.21	4.515			
6,700.00	3,051.49	6,377.60	3,094.41	65.20	74.91	-93.63	3,846.15	-545.56	614.91	474.80	140.11	4.389			
6,800.00	3,050.61	6,483.32	3,093.52	66.88	77.15	-93.64	3,951.85	-543.96	613.69	469.66	144.03	4.261			
6,900.00	3,049.74	6,587.53	3,092.09	68.56	79.35	-93.61	4,056.03	-541.85	611.92	464.01	147.91	4.137			

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 09-03-15	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4 Fee - #3H - OH / Job #1512624 - Surveys (Silver Oak 3)													Offset Site Error:	0.00 usft
Survey Program: 100-NS-GYRO-MS; 2541-PHX+MWD+IGRF													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning				
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		
7,000.00	3,048.87	6,685.81	3,090.72	70.24	81.43	-93.57	4,154.26	-539.23	609.52	457.86	151.66	4.019		
7,100.00	3,048.00	6,778.70	3,090.77	71.92	83.39	-93.66	4,247.14	-537.66	608.17	452.87	155.31	3.916		
7,200.00	3,047.12	6,880.67	3,091.24	73.60	85.55	-93.79	4,349.10	-536.61	607.53	448.38	159.15	3.817		
7,300.00	3,046.25	6,980.32	3,091.59	75.28	87.66	-93.92	4,448.73	-534.94	606.21	443.27	162.94	3.720		
7,373.67	3,045.61	7,047.59	3,091.74	76.52	89.09	-93.99	4,516.01	-534.26	605.75	440.14	165.61	3.658		
7,400.00	3,045.38	7,070.89	3,091.69	76.96	89.58	-94.00	4,539.30	-534.24	605.81	439.27	166.55	3.638		
7,500.00	3,044.51	7,169.33	3,090.89	78.65	91.68	-94.00	4,637.73	-534.87	606.73	436.40	170.33	3.562		
7,600.00	3,043.64	7,268.80	3,089.43	80.33	93.80	-93.94	4,737.19	-535.33	607.44	433.31	174.13	3.488		
7,700.00	3,042.76	7,378.44	3,087.24	82.02	96.13	-93.82	4,846.81	-535.38	607.71	429.56	178.15	3.411		
7,774.62	3,042.11	7,448.56	3,085.72	83.27	97.62	-93.74	4,916.91	-534.91	607.37	426.47	180.90	3.358		
7,800.00	3,041.89	7,472.01	3,085.31	83.70	98.12	-93.72	4,940.36	-534.89	607.41	425.58	181.82	3.341		
7,900.00	3,041.02	7,569.18	3,084.01	85.39	100.19	-93.67	5,037.52	-535.29	608.06	422.48	185.58	3.277 ES		
7,963.98	3,040.46	7,587.00	3,083.79	86.47	100.57	-93.67	5,055.34	-535.38	610.31	423.28	187.04	3.263 SF		



Phoenix Technology Services LP
Anticollision Report

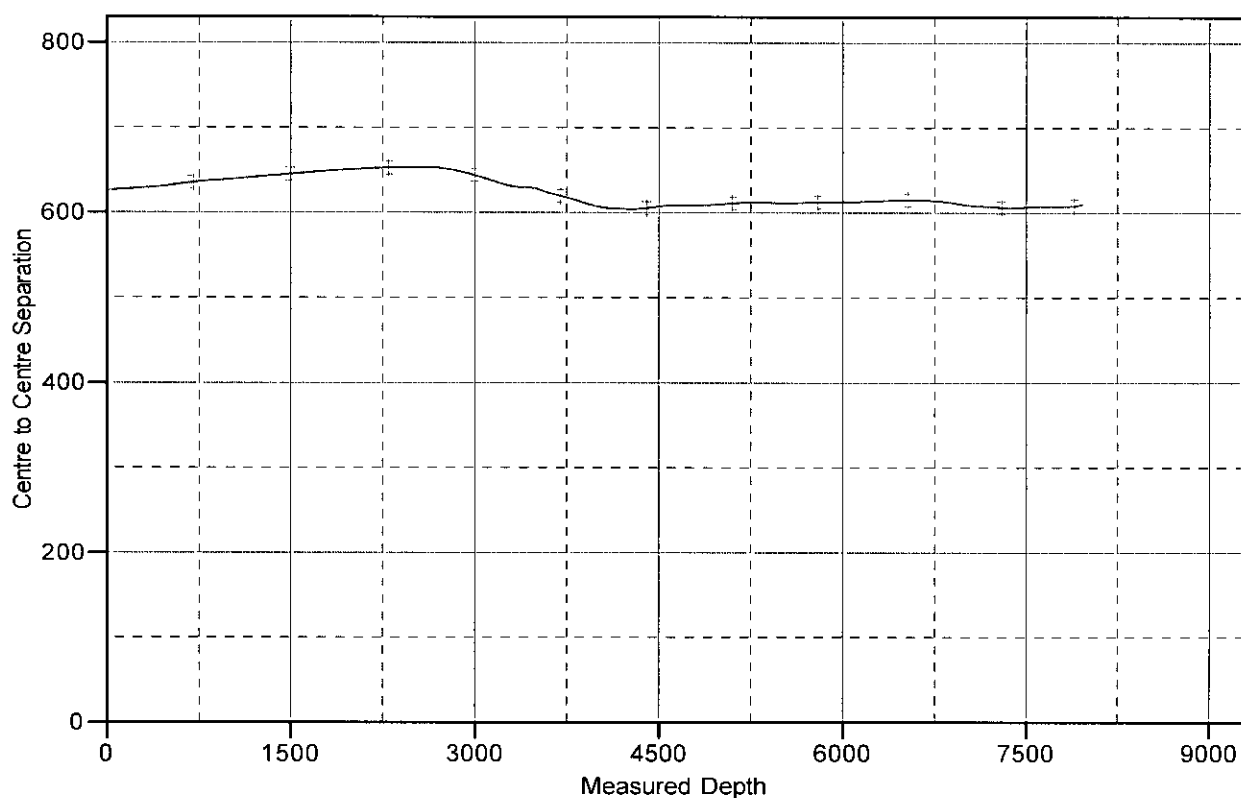


Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #7H
Project:	Eddy County, NM (NAD27, NME)	TVD Reference:	KB @ 3361.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3361.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 09-03-15	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3361.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #7H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: -0.03°

Ladder Plot



LEGEND

#3H, OH / Job #1512624, Surveys (Silver Oak 3) V0



Phoenix Technology Services LP
Anticollision Report

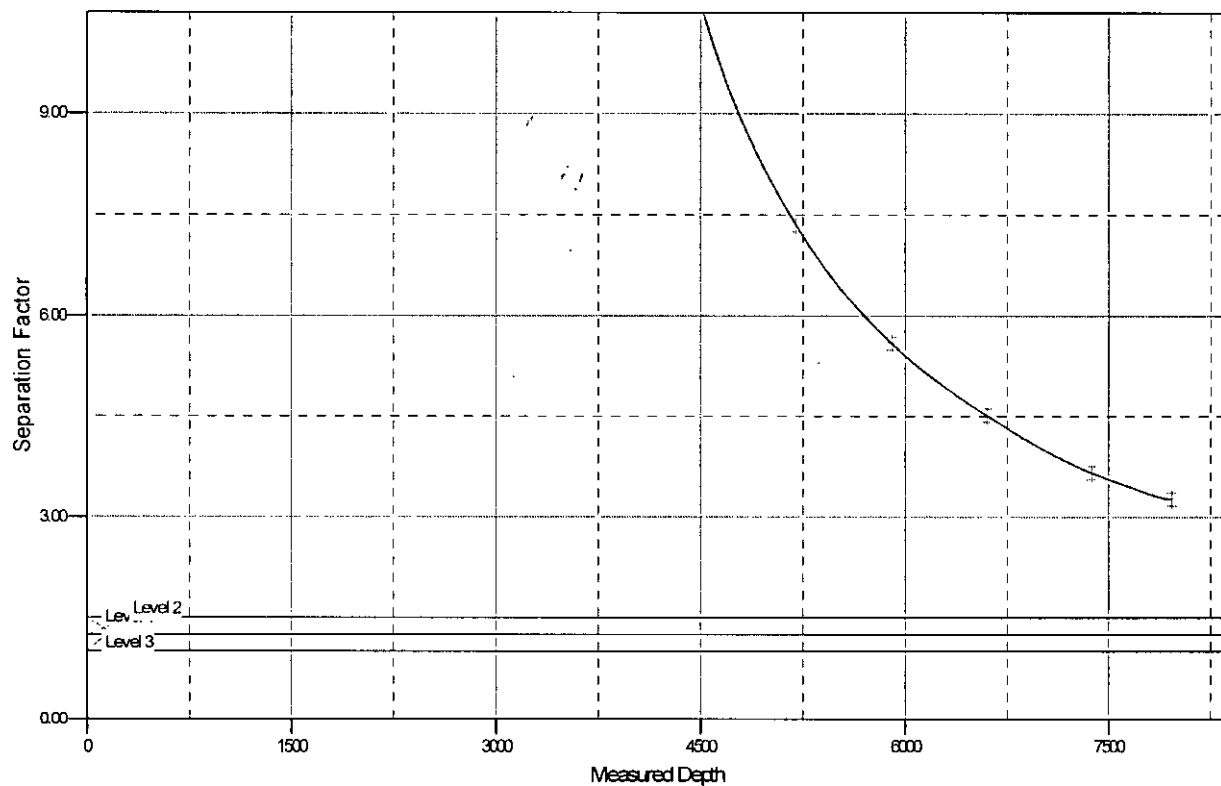


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Coordinates are relative to: #7H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: -0.03°

Separation Factor Plot



LEGEND

#3H, OH / Job #1512624, Surveys (Silver Oak 3) V0