

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM 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.*Lease Serial No.
NMNM120913

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.
STOVE PIPE FEDERAL COM 601H9. API Well No.
30-025-46556-00-X110. Field and Pool or Exploratory Area
RATTLESNAKE11. County or Parish, State
LEA COUNTY, NM

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other2. Name of Operator
COG OPERATING LLCContact: MAYTE X REYES
E-Mail: mreyes1@concho.com3a. Address
ONE CONCHO CENTER 600 W ILLINOIS AVENUE
MIDLAND, TX 79701-42873b. Phone No. (include area code)
Ph: 575-723-0446

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 31 T24S R35E SESW 270FSL 2160FWL
32.167461 N Lat, 103.408112 W Lon

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

TYPE OF SUBMISSION

TYPE OF ACTION

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

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 recompletable 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 recompletable 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 respectfully requests approval for the following changes to the originally approved APD.

BHL Change
C102 attached.
Drilling changes attached.
Directional plan attached.
AC report attached.

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #496867 verified by the BLM Well Information System
For COG OPERATING LLC, sent to the Hobbs
Committed to AFMSS for processing by PRISCILLA PEREZ on 01/08/2020 (20PP0783SE)

Name (Printed/Typed) MAYTE X REYES

Title SENIOR REGULATORY ANALYST

Signature (Electronic Submission)

Date 12/23/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By DYLAN ROSSMANGO

Title PETROLEUM ENGINEER

Date 01/09/2020

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 Hobbs

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 **

Stove Pipe Federal Com 601H

The Operator respectfully requests the following changes to the originally approved APD. A new directional plan and plat is included for the revised BHL.

Wellhead

The operator request to use multi-bowl wellhead assembly.

Surface

Drill 14.75" hole to 1,200'

Set 10.75" 45.5# L80 BTC casing @ 1,200'

Cement in one stage to surface:

Lead: 500 sx of Class C + 6% gel (13.5 ppg / 1.75 cuft/ sx)

Tail: 350 sx of Class C + 1% CaCl₂ (14.8 ppg/ 1.35 cuft/sx)

The Operator respectfully requests to preset the surface casing on the subject well.

Description of operations

1. Spudder rig will move in to drill the surface hole and pre-set surface casing on the well.
 - a. After drilling the surface hole section, the spudder rig will run casing and cement following all of the applicable rules and regulations (OnShore Order 2, all COAs and NMOCD regulations)
 - b. The spudder rig will utilize fresh water-based mud to drill the surface hole to TD. Solids control will be handled entirely on a closed loop basis. No earth pits will be used.
2. The wellhead will be installed and tested as soon as the surface casing is cut off and the WOC time has been reached.
3. A blind flange at the same pressure rating as the wellhead will be installed to seal the wellbore. Pressure will be monitored with needle valves installed on the wing valve.
4. Spudder rig operations are expected to take 2-3 days per well on the pad.
5. The BLM will be contacted and notified 24 hours prior to commencing spudder rig operations.
6. Drilling operations will begin with a larger rig and a BOP stack equal to or greater than the pressure rating that was permitted will be nipped up and tested on the wellhead before drilling operations resume on each well.
 - a. The larger rig will move back onto the location with 90 days from the point at which the wells are secured and spudder rig is moved off location.
 - b. The BLM will be contacted / notified 24 hours before the larger rig moves back on the pre-set locations
7. Operator will have supervision on the rig to ensure compliance with all BLM and NMOCD regulations and to oversee operations.
8. Once the rig is removed, Operator will secure the wellhead area by placing a 1 inch steel plate over the cellar and wellhead.

Intermediate

5M BOP System

Drill 9.875" hole to 11,750'

Set 7.625" 29.7# HCL-80 BTC @ 11,750'

Cement in two stages to surface with DV tool and ECP @ 5,450'

First Stage:

Lead: 550 sx of Halliburton NeoCem (11.0 ppg / 2.81 cuft/ sx)

Tail: 300 sx of Class H (16.4 ppg/ 1.10 cuft/sx)

Second Stage:

Lead: 800 sx of Halliburton NeoCem (11.0 ppg / 2.81 cuft/ sx)

Tail: 250 sx of Class C + 2% CaCl₂ (14.8 ppg/ 1.35 cuft/sx)

Production

10M BOP System (5M Annular variance approved with original APD)

Drill 6.75" hole to 23,194'

Set 5.5" 23# P110 BTC from 0' to 11,250' (500' inside intermediate casing)

Set 5.5" 23# P110 HC TecLock FJ (spec sheet attached) from 11,250' to 23,194'

Cement in one stage to surface

Lead: 550 sx of 35:36:6 Class C (12.7 ppg / 1.98 cuft/ sx)

Tail: 1000 sx of 50:50:2 Class H Blend (14.4 ppg / 1.25 cuft/sx)



U. S. Steel Tubular Products

10.750" 45.50lbs/ft (0.400" Wall) L80

4/23/2019 4:50:53 PM

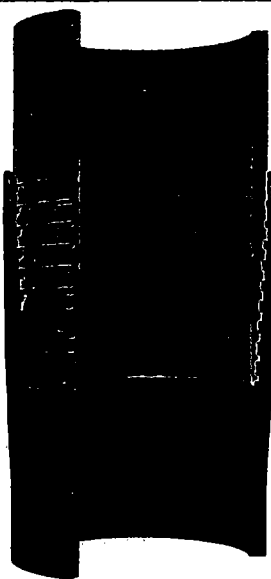
MECHANICAL PROPERTIES	Pipe	BTC	LTC	STC	
Minimum Yield Strength	80,000	--	--	--	psi
Maximum Yield Strength	95,000	--	--	--	psi
Minimum Tensile Strength	95,000	--	--	--	psi
DIMENSIONS	Pipe	BTC	LTC	STC	
Outside Diameter	10.750	11.750	--	11.750	in.
Wall Thickness	0.400	--	--	--	in.
Inside Diameter	9.950	9.950	--	9.950	in.
Standard Drift	9.794	9.794	--	9.794	in.
Alternate Drift	9.875	9.875	--	9.875	in.
Nominal Linear Weight, T&C	45.50	--	--	--	lbs/ft
Plain End Weight	44.26	--	--	--	lbs/ft
PERFORMANCE	Pipe	BTC	LTC	STC	
Minimum Collapse Pressure	2,470	2,470	--	2,470	psi
Minimum Internal Yield Pressure	5,210	5,210	--	5,210	psi
Minimum Pipe Body Yield Strength	1,040	--	--	--	1,000 lbs
Joint Strength	--	1,063	--	692	1,000 lbs
Reference Length	--	15,572	--	10,142	ft
MAKE-UP DATA	Pipe	BTC	LTC	STC	
Make-Up Loss	--	4.81	--	3.50	in.
Minimum Make-Up Torque	--	--	--	5,190	ft-lbs
Maximum Make-Up Torque	--	--	--	8,650	ft-lbs

Legal Notice

All material contained in this publication is for general information only. This material should not therefore be used or relied upon for any specific application without independent competent professional examination and verification of accuracy, suitability and applicability. Anyone making use of this material does so at their own risk and assumes any and all liability resulting from such use. U. S. Steel disclaims any and all expressed or implied warranties of fitness for any general or particular application.

U. S. Steel Tubular Products
460 Wildwood Forest Drive, Suite 300S
Spring, Texas 77380

1-877-893-9461
connections@uss.com
www.usstubular.com



TEC-LOCK WEDGE

5.500" 23.00 LB/FT (.415" Wall) with 5.875" Special Clearance OD
BORUSAN P110 CY

Pipe Body Data

Nominal OD:	5.500	in
Nominal Wall:	.415	in
Nominal Weight:	23.00	lb/ft
Plain End Weight:	22.56	lb/ft
Material Grade:	P110 CY	
Mill/Specification:	BORUSAN	
Yield Strength:	110,000	psi
Tensile Strength:	125,000	psi
Nominal ID:	4.670	in
API Drift Diameter:	4.545	in
Special Drift Diameter:	None	in
RBW:	87.5 %	
Body Yield:	729,000	lbf
Burst:	14,540	psi
Collapse:	14,540	psi

Connection Data

Standard OD:	5.875	in
Pin Bored ID:	4.670	in
Critical Section Area:	6.457	in ²
Tensile Efficiency:	97.4 %	
Compressive Efficiency:	100 %	
Longitudinal Yield Strength:	710,000	lbf
Compressive Limit:	729,000	lbf
Internal Pressure Rating:	14,540	psi
External Pressure Rating:	14,540	psi
Maximum Bend:	89.4	°/100ft

Operational Data

Minimum Makeup Torque:	14,900	ft*lbf
Optimum Makeup Torque:	18,600	ft*lbf
Maximum Makeup Torque:	40,800	ft*lbf
Minimum Yield:	45,300	ft*lbf
Makeup Loss:	5.97	in

Notes Operational Torque is equivalent to the Maximum Make-Up Torque



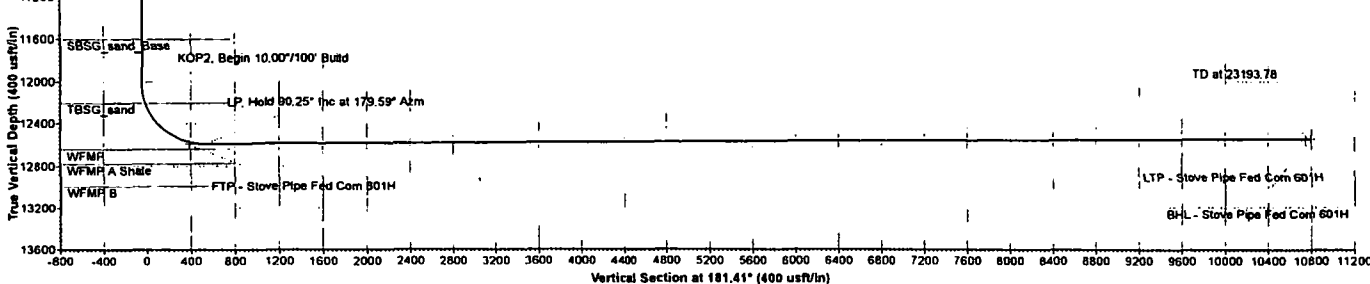
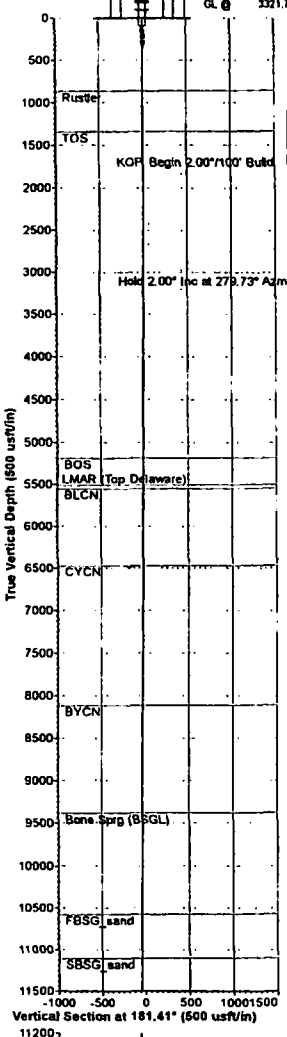


Project: Lea County, NM (NAD27 NME)
Site: Stove Pipe Federal Com
Well: 601H
Wellbore: OH
Design: Plan 2 12-19-19
Rig: Scandril Quest

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Azimuths to Grid North
True North: -0.49°
Magnetic North: 6.05°
Magnetic Field
Strength: 47726.8nT
Dip Angle: 59.77°
Date: 1/23/2020
Model: MVHD



WELL DETAILS									
		Ground Elevation:		3321.70	Latitude		Longitude		
-N-S	-E-W	North	East	3321.70	32° 10' 2.409795 N	103° 24' 27.522425 W			
0.00	0.00	425829.70	786441.50						

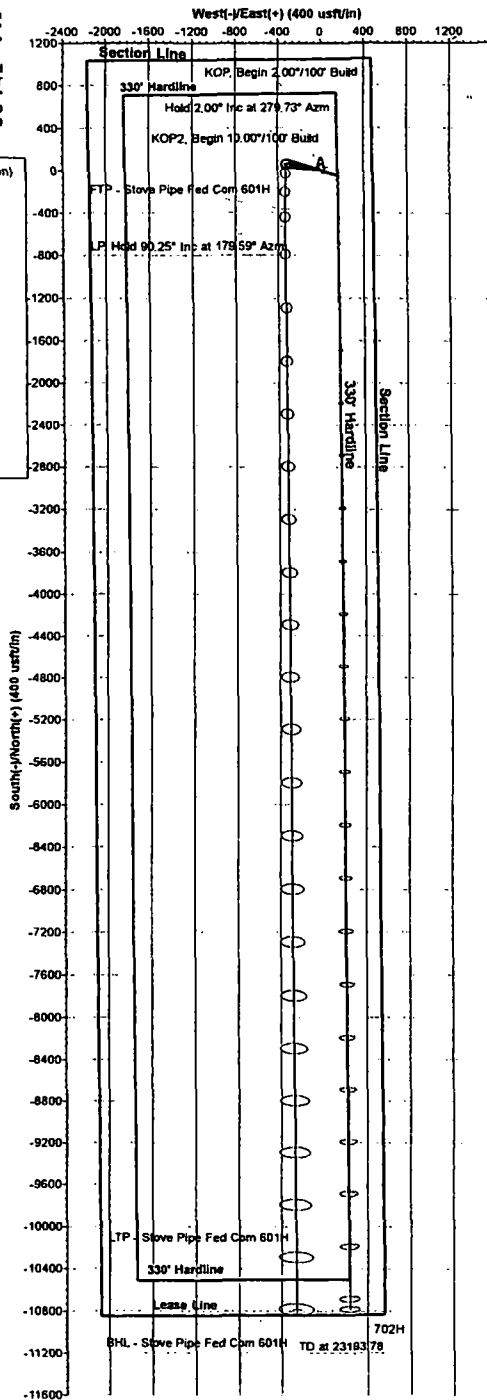
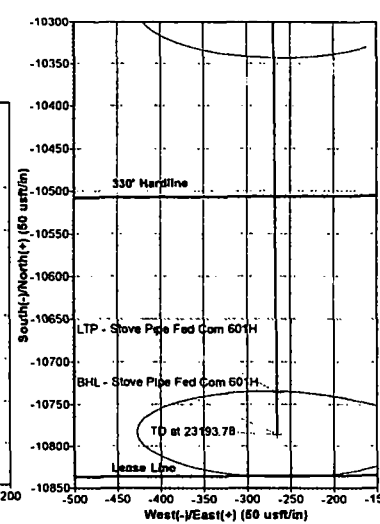
SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	-N-S	-E-W	Qleg	TFace	VFace
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2520.00	0.00	0.00	2520.00	0.00	0.00	0.00	0.00	0.00
3	2619.84	2.00	279.73	2619.82	0.29	-1.71	2.00	279.73	-0.25
4	12021.61	2.00	279.73	12015.88	55.68	-324.59	0.00	0.00	-47.84
5	12027.54	90.25	179.59	12592.01	-519.93	-340.29	10.00	-106.13	528.16
6	23193.78	90.25	179.59	12547.00	-10765.70	-268.19	0.00	0.00	0.00

DESIGN TARGET DETAILS									
Name	TVD	-N-S	-E-W	North	East	Latitude	Longitude		
BHL - Stove Pipe Fed Com 601H	12547.00	-10765.70	-268.19	415044.00	786175.40	32° 8' 15.705741 N	103° 24' 31.695413 W		
LTP - Stove Pipe Fed Com 601H	12547.22	-10735.70	-268.44	415094.00	786175.06	32° 8' 18.200331 N	103° 24' 31.694383 W		
FTP - Stove Pipe Fed Com 601H	12592.00	-372.50	-340.70	425457.20	786100.80	32° 9' 58.752824 N	103° 24' 31.522803 W		

FORMATION TOP DETAILS					
TVDPath	MDPath	Formation	DipAngle	DipDir	
861.70	861.70	Rudler	-2.25	181.41	
1341.70	1341.70	TOS	-2.25	181.41	
5181.78	5183.33	BOS	-2.25	181.41	
5503.78	5505.54	LMAR (Top Detritus)	-2.25	181.41	
5544.77	5548.56	BLCN	-2.25	181.41	
6485.79	6488.14	CYCN	-2.25	181.41	
8108.82	8113.18	BYCN	-2.25	181.41	
9379.65	9383.88	Bone Sprg (BSGL)	-2.25	181.41	
10571.88	10578.73	FBSSG sand	-2.25	181.41	
11102.89	11108.08	SBSG sand	-2.25	181.41	
11596.90	11602.37	SBSG sand Base	-2.25	181.41	
12201.78	12210.85	TBSG sand	-2.25	181.41	

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 601H, Grid North
Latitude: 32° 10' 2.409795 N
Longitude: 103° 24' 27.522425 W
Grid East: 786441.50
Grid North: 425829.70
Scale Factor: 1.000
Geomagnetic Model: MVHD
Sample Date: 23-Jan-20
Magnetic Declination: 6.55°
Dip Angle from Horizontal: 59.77°
Magnetic Field Strength: 47726.77526817nT
To convert a Magnetic Direction to a Grid Direction, Add 6.05°
To convert a Magnetic Direction to a True Direction, Add 6.55° East
To convert a True Direction to a Grid Direction, Subtract 0.49°

LEGEND
702H, OH / 65850, Surveys (Scandril Quest) V0
702H, OH / 65850, Plan 2 12-19-19 V0
Plan 2 12-19-19





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TECHNOLOGY SERVICES

COG Operating LLC

**Lea County, NM (NAD27 NME)
Stove Pipe Federal Com
601H**

OH

Plan: Plan 2 12-19-19

Standard Planning Report

19 December, 2019



Database: USA Compass
 Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Site: Stove Pipe Federal Com
 Well: 601H
 Wellbore: OH
 Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandril Quest)
 MD Reference: RKB @ 3351.70usft (Scandril Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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

Site Stove Pipe Federal Com

Site Position: Northing: 425,164.50 usft Latitude: 32° 9' 55.604318 N
 From: Map Easting: 789,052.00 usft Longitude: 103° 23' 57.222328 W
 Position Uncertainty: 0.00 usft Slot Radius: 13-3/16 " Grid Convergence: 0.50 °

Well 601H
 Well Position +N/-S 665.20 usft Northing: 425,829.70 usft Latitude: 32° 10' 2.409795 N
 +E/-W -2,610.50 usft Easting: 786,441.50 usft Longitude: 103° 24' 27.522425 W
 Position Uncertainty 1.00 usft Wellhead Elevation: Ground Level: 3,321.70 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	1/23/2020	6.55	59.77	47,726.77526817

Design Plan 2 12-19-19

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	181.41

Plan Survey Tool Program Date 12/19/2019

Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1 0.00	23,193.78	Plan 2 12-19-19 (OH)	MWD+HRGM OWSG MWD + HRGM	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Buidl 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	
2,520.00	0.00	0.00	2,520.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,619.84	2.00	279.73	2,619.82	0.29	-1.71	2.00	2.00	-80.40	279.73	
12,021.61	2.00	279.73	12,015.88	55.66	-324.59	0.00	0.00	0.00	0.00	
12,927.64	90.25	179.59	12,592.01	-519.93	-340.29	10.00	9.74	-11.05	-100.13	
23,193.78	90.25	179.59	12,547.00	-10,785.70	-266.10	0.00	0.00	0.00	0.00	0.00 BHL - Stove Pipe F

Database: USA Compass
 Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Site: Stove Pipe Federal Com
 Well: 601H
 Wellbore: OH
 Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandriil Quest)
 MD Reference: RKB @ 3351.70usft (Scandriil Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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
2,520.00	0.00	0.00	2,520.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100' Build									
2,600.00	1.60	279.73	2,599.99	0.19	-1.10	-0.16	2.00	2.00	0.00
2,619.84	2.00	279.73	2,619.82	0.29	-1.71	-0.25	2.00	2.00	0.00
Hold 2.00° Inc at 279.73° Azm									
2,700.00	2.00	279.73	2,699.93	0.77	-4.47	-0.66	0.00	0.00	0.00
2,800.00	2.00	279.73	2,799.87	1.35	-7.90	-1.16	0.00	0.00	0.00
2,900.00	2.00	279.73	2,899.81	1.94	-11.34	-1.66	0.00	0.00	0.00
3,000.00	2.00	279.73	2,999.75	2.53	-14.77	-2.17	0.00	0.00	0.00
3,100.00	2.00	279.73	3,099.69	3.12	-18.20	-2.67	0.00	0.00	0.00
3,200.00	2.00	279.73	3,199.63	3.71	-21.64	-3.18	0.00	0.00	0.00
3,300.00	2.00	279.73	3,299.57	4.30	-25.07	-3.68	0.00	0.00	0.00
3,400.00	2.00	279.73	3,399.51	4.89	-28.51	-4.18	0.00	0.00	0.00
3,500.00	2.00	279.73	3,499.45	5.48	-31.94	-4.69	0.00	0.00	0.00
3,600.00	2.00	279.73	3,599.38	6.07	-35.38	-5.19	0.00	0.00	0.00
3,700.00	2.00	279.73	3,699.32	6.65	-38.81	-5.70	0.00	0.00	0.00
3,800.00	2.00	279.73	3,799.26	7.24	-42.24	-6.20	0.00	0.00	0.00
3,900.00	2.00	279.73	3,899.20	7.83	-45.68	-6.70	0.00	0.00	0.00
4,000.00	2.00	279.73	3,999.14	8.42	-49.11	-7.21	0.00	0.00	0.00
4,100.00	2.00	279.73	4,099.08	9.01	-52.55	-7.71	0.00	0.00	0.00
4,200.00	2.00	279.73	4,199.02	9.60	-55.98	-8.22	0.00	0.00	0.00
4,300.00	2.00	279.73	4,298.96	10.19	-59.41	-8.72	0.00	0.00	0.00
4,400.00	2.00	279.73	4,398.90	10.78	-62.85	-9.22	0.00	0.00	0.00
4,500.00	2.00	279.73	4,498.84	11.37	-66.28	-9.73	0.00	0.00	0.00
4,600.00	2.00	279.73	4,598.78	11.95	-69.72	-10.23	0.00	0.00	0.00
4,700.00	2.00	279.73	4,698.72	12.54	-73.15	-10.74	0.00	0.00	0.00
4,800.00	2.00	279.73	4,798.66	13.13	-76.59	-11.24	0.00	0.00	0.00
4,900.00	2.00	279.73	4,898.60	13.72	-80.02	-11.74	0.00	0.00	0.00
5,000.00	2.00	279.73	4,998.53	14.31	-83.45	-12.25	0.00	0.00	0.00
5,100.00	2.00	279.73	5,098.47	14.90	-86.89	-12.75	0.00	0.00	0.00
5,200.00	2.00	279.73	5,198.41	15.49	-90.32	-13.26	0.00	0.00	0.00
5,300.00	2.00	279.73	5,298.35	16.08	-93.76	-13.76	0.00	0.00	0.00
5,400.00	2.00	279.73	5,398.29	16.67	-97.19	-14.26	0.00	0.00	0.00
5,500.00	2.00	279.73	5,498.23	17.25	-100.62	-14.77	0.00	0.00	0.00
5,600.00	2.00	279.73	5,598.17	17.84	-104.06	-15.27	0.00	0.00	0.00
5,700.00	2.00	279.73	5,698.11	18.43	-107.49	-15.78	0.00	0.00	0.00
5,800.00	2.00	279.73	5,798.05	19.02	-110.93	-16.28	0.00	0.00	0.00
5,900.00	2.00	279.73	5,897.99	19.61	-114.36	-16.78	0.00	0.00	0.00
6,000.00	2.00	279.73	5,997.93	20.20	-117.80	-17.29	0.00	0.00	0.00
6,100.00	2.00	279.73	6,097.87	20.79	-121.23	-17.79	0.00	0.00	0.00
6,200.00	2.00	279.73	6,197.81	21.38	-124.66	-18.30	0.00	0.00	0.00
6,300.00	2.00	279.73	6,297.75	21.97	-128.10	-18.80	0.00	0.00	0.00
6,400.00	2.00	279.73	6,397.68	22.55	-131.53	-19.30	0.00	0.00	0.00
6,500.00	2.00	279.73	6,497.62	23.14	-134.97	-19.81	0.00	0.00	0.00
6,600.00	2.00	279.73	6,597.56	23.73	-138.40	-20.31	0.00	0.00	0.00
6,700.00	2.00	279.73	6,697.50	24.32	-141.84	-20.82	0.00	0.00	0.00
6,800.00	2.00	279.73	6,797.44	24.91	-145.27	-21.32	0.00	0.00	0.00
6,900.00	2.00	279.73	6,897.38	25.50	-148.70	-21.82	0.00	0.00	0.00
7,000.00	2.00	279.73	6,997.32	26.09	-152.14	-22.33	0.00	0.00	0.00
7,100.00	2.00	279.73	7,097.26	26.68	-155.57	-22.83	0.00	0.00	0.00
7,200.00	2.00	279.73	7,197.20	27.27	-159.01	-23.34	0.00	0.00	0.00
7,300.00	2.00	279.73	7,297.14	27.85	-162.44	-23.84	0.00	0.00	0.00

Database: USA Compass
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Local Co-ordinate Reference: Well601H
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 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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)
7,400.00	2.00	279.73	7,397.08	28.44	-165.87	-24.34	0.00	0.00	0.00
7,500.00	2.00	279.73	7,497.02	29.03	-169.31	-24.85	0.00	0.00	0.00
7,600.00	2.00	279.73	7,596.96	29.62	-172.74	-25.35	0.00	0.00	0.00
7,700.00	2.00	279.73	7,696.90	30.21	-176.18	-25.86	0.00	0.00	0.00
7,800.00	2.00	279.73	7,796.83	30.80	-179.61	-26.36	0.00	0.00	0.00
7,900.00	2.00	279.73	7,896.77	31.39	-183.05	-26.86	0.00	0.00	0.00
8,000.00	2.00	279.73	7,996.71	31.98	-186.48	-27.37	0.00	0.00	0.00
8,100.00	2.00	279.73	8,096.65	32.57	-189.91	-27.87	0.00	0.00	0.00
8,200.00	2.00	279.73	8,196.59	33.15	-193.35	-28.38	0.00	0.00	0.00
8,300.00	2.00	279.73	8,296.53	33.74	-196.78	-28.88	0.00	0.00	0.00
8,400.00	2.00	279.73	8,396.47	34.33	-200.22	-29.38	0.00	0.00	0.00
8,500.00	2.00	279.73	8,496.41	34.92	-203.65	-29.89	0.00	0.00	0.00
8,600.00	2.00	279.73	8,596.35	35.51	-207.09	-30.39	0.00	0.00	0.00
8,700.00	2.00	279.73	8,696.29	36.10	-210.52	-30.90	0.00	0.00	0.00
8,800.00	2.00	279.73	8,796.23	36.69	-213.95	-31.40	0.00	0.00	0.00
8,900.00	2.00	279.73	8,896.17	37.28	-217.39	-31.90	0.00	0.00	0.00
9,000.00	2.00	279.73	8,996.11	37.87	-220.82	-32.41	0.00	0.00	0.00
9,100.00	2.00	279.73	9,096.05	38.45	-224.26	-32.91	0.00	0.00	0.00
9,200.00	2.00	279.73	9,195.98	39.04	-227.69	-33.42	0.00	0.00	0.00
9,300.00	2.00	279.73	9,295.92	39.63	-231.12	-33.92	0.00	0.00	0.00
9,400.00	2.00	279.73	9,395.86	40.22	-234.56	-34.42	0.00	0.00	0.00
9,500.00	2.00	279.73	9,495.80	40.81	-237.99	-34.93	0.00	0.00	0.00
9,600.00	2.00	279.73	9,595.74	41.40	-241.43	-35.43	0.00	0.00	0.00
9,700.00	2.00	279.73	9,695.68	41.99	-244.86	-35.94	0.00	0.00	0.00
9,800.00	2.00	279.73	9,795.62	42.58	-248.30	-36.44	0.00	0.00	0.00
9,900.00	2.00	279.73	9,895.56	43.17	-251.73	-36.94	0.00	0.00	0.00
10,000.00	2.00	279.73	9,995.50	43.75	-255.16	-37.45	0.00	0.00	0.00
10,100.00	2.00	279.73	10,095.44	44.34	-258.60	-37.95	0.00	0.00	0.00
10,200.00	2.00	279.73	10,195.38	44.93	-262.03	-38.46	0.00	0.00	0.00
10,300.00	2.00	279.73	10,295.32	45.52	-265.47	-38.96	0.00	0.00	0.00
10,400.00	2.00	279.73	10,395.26	46.11	-268.90	-39.46	0.00	0.00	0.00
10,500.00	2.00	279.73	10,495.20	46.70	-272.33	-39.97	0.00	0.00	0.00
10,600.00	2.00	279.73	10,595.13	47.29	-275.77	-40.47	0.00	0.00	0.00
10,700.00	2.00	279.73	10,695.07	47.88	-279.20	-40.98	0.00	0.00	0.00
10,800.00	2.00	279.73	10,795.01	48.47	-282.64	-41.48	0.00	0.00	0.00
10,900.00	2.00	279.73	10,894.95	49.05	-286.07	-41.98	0.00	0.00	0.00
11,000.00	2.00	279.73	10,994.89	49.64	-289.51	-42.49	0.00	0.00	0.00
11,100.00	2.00	279.73	11,094.83	50.23	-292.94	-42.99	0.00	0.00	0.00
11,200.00	2.00	279.73	11,194.77	50.82	-296.37	-43.50	0.00	0.00	0.00
11,300.00	2.00	279.73	11,294.71	51.41	-299.81	-44.00	0.00	0.00	0.00
11,400.00	2.00	279.73	11,394.65	52.00	-303.24	-44.50	0.00	0.00	0.00
11,500.00	2.00	279.73	11,494.59	52.59	-306.68	-45.01	0.00	0.00	0.00
11,600.00	2.00	279.73	11,594.53	53.18	-310.11	-45.51	0.00	0.00	0.00
11,700.00	2.00	279.73	11,694.47	53.77	-313.55	-46.02	0.00	0.00	0.00
11,800.00	2.00	279.73	11,794.41	54.35	-316.98	-46.52	0.00	0.00	0.00
11,900.00	2.00	279.73	11,894.35	54.94	-320.41	-47.02	0.00	0.00	0.00
12,000.00	2.00	279.73	11,994.28	55.53	-323.85	-47.53	0.00	0.00	0.00
12,021.61	2.00	279.73	12,015.88	55.66	-324.59	-47.64	0.00	0.00	0.00
KOP2, Begin 10.00°/100' Build									
12,100.00	7.74	194.22	12,094.01	50.77	-327.24	-42.68	10.00	7.33	-109.08
12,200.00	17.59	185.81	12,191.47	29.15	-330.43	-20.99	10.00	9.85	-8.41
12,300.00	27.55	183.37	12,283.69	-9.07	-333.32	17.29	10.00	9.96	-2.44
12,400.00	37.53	182.16	12,367.88	-62.74	-335.83	71.00	10.00	9.98	-1.21
12,500.00	47.52	181.40	12,441.49	-130.21	-337.88	138.50	10.00	9.99	-0.76

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Local Co-ordinate Reference: Well 601H
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 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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)
12,600.00	57.51	180.85	12,502.27	-209.45	-339.41	217.75	10.00	9.99	-0.55
12,700.00	67.50	180.41	12,548.38	-298.03	-340.36	306.34	10.00	9.99	-0.44
12,800.00	77.50	180.03	12,578.41	-393.28	-340.72	401.57	10.00	9.99	-0.38
12,900.00	87.49	179.68	12,591.46	-492.30	-340.47	500.55	10.00	9.99	-0.35
12,927.64	90.25	179.59	12,592.01	-519.93	-340.29	528.16	10.00	9.99	-0.34
LP, Hold 90.25° Inc at 179.59° Azm									
13,000.00	90.25	179.59	12,591.69	-592.29	-339.77	600.49	0.00	0.00	0.00
13,100.00	90.25	179.59	12,591.25	-692.28	-339.04	700.44	0.00	0.00	0.00
13,200.00	90.25	179.59	12,590.81	-792.28	-338.32	800.38	0.00	0.00	0.00
13,300.00	90.25	179.59	12,590.37	-892.28	-337.60	900.33	0.00	0.00	0.00
13,400.00	90.25	179.59	12,589.94	-992.27	-336.88	1,000.28	0.00	0.00	0.00
13,500.00	90.25	179.59	12,589.50	-1,092.27	-336.15	1,100.23	0.00	0.00	0.00
13,600.00	90.25	179.59	12,589.06	-1,192.27	-335.43	1,200.18	0.00	0.00	0.00
13,700.00	90.25	179.59	12,588.62	-1,292.26	-334.71	1,300.12	0.00	0.00	0.00
13,800.00	90.25	179.59	12,588.18	-1,392.26	-333.99	1,400.07	0.00	0.00	0.00
13,900.00	90.25	179.59	12,587.74	-1,492.26	-333.26	1,500.02	0.00	0.00	0.00
14,000.00	90.25	179.59	12,587.31	-1,592.25	-332.54	1,599.97	0.00	0.00	0.00
14,100.00	90.25	179.59	12,586.87	-1,692.25	-331.82	1,699.92	0.00	0.00	0.00
14,200.00	90.25	179.59	12,586.43	-1,792.24	-331.10	1,799.87	0.00	0.00	0.00
14,300.00	90.25	179.59	12,585.99	-1,892.24	-330.37	1,899.81	0.00	0.00	0.00
14,400.00	90.25	179.59	12,585.55	-1,992.24	-329.65	1,999.76	0.00	0.00	0.00
14,500.00	90.25	179.59	12,585.11	-2,092.23	-328.93	2,099.71	0.00	0.00	0.00
14,600.00	90.25	179.59	12,584.68	-2,192.23	-328.20	2,199.66	0.00	0.00	0.00
14,700.00	90.25	179.59	12,584.24	-2,292.23	-327.48	2,299.61	0.00	0.00	0.00
14,800.00	90.25	179.59	12,583.80	-2,392.22	-326.76	2,399.55	0.00	0.00	0.00
14,900.00	90.25	179.59	12,583.36	-2,492.22	-326.04	2,499.50	0.00	0.00	0.00
15,000.00	90.25	179.59	12,582.92	-2,592.22	-325.31	2,599.45	0.00	0.00	0.00
15,100.00	90.25	179.59	12,582.48	-2,692.21	-324.59	2,699.40	0.00	0.00	0.00
15,200.00	90.25	179.59	12,582.04	-2,792.21	-323.87	2,799.35	0.00	0.00	0.00
15,300.00	90.25	179.59	12,581.61	-2,892.21	-323.15	2,899.30	0.00	0.00	0.00
15,400.00	90.25	179.59	12,581.17	-2,992.20	-322.42	2,999.24	0.00	0.00	0.00
15,500.00	90.25	179.59	12,580.73	-3,092.20	-321.70	3,099.19	0.00	0.00	0.00
15,600.00	90.25	179.59	12,580.29	-3,192.19	-320.98	3,199.14	0.00	0.00	0.00
15,700.00	90.25	179.59	12,579.85	-3,292.19	-320.26	3,299.09	0.00	0.00	0.00
15,800.00	90.25	179.59	12,579.41	-3,392.19	-319.53	3,399.04	0.00	0.00	0.00
15,900.00	90.25	179.59	12,578.98	-3,492.18	-318.81	3,498.98	0.00	0.00	0.00
16,000.00	90.25	179.59	12,578.54	-3,592.18	-318.09	3,598.93	0.00	0.00	0.00
16,100.00	90.25	179.59	12,578.10	-3,692.18	-317.36	3,698.88	0.00	0.00	0.00
16,200.00	90.25	179.59	12,577.66	-3,792.17	-316.64	3,798.83	0.00	0.00	0.00
16,300.00	90.25	179.59	12,577.22	-3,892.17	-315.92	3,898.78	0.00	0.00	0.00
16,400.00	90.25	179.59	12,576.78	-3,992.17	-315.20	3,998.73	0.00	0.00	0.00
16,500.00	90.25	179.59	12,576.35	-4,092.16	-314.47	4,098.67	0.00	0.00	0.00
16,600.00	90.25	179.59	12,575.91	-4,192.16	-313.75	4,198.62	0.00	0.00	0.00
16,700.00	90.25	179.59	12,575.47	-4,292.16	-313.03	4,298.57	0.00	0.00	0.00
16,800.00	90.25	179.59	12,575.03	-4,392.15	-312.31	4,398.52	0.00	0.00	0.00
16,900.00	90.25	179.59	12,574.59	-4,492.15	-311.58	4,498.47	0.00	0.00	0.00
17,000.00	90.25	179.59	12,574.15	-4,592.14	-310.86	4,598.41	0.00	0.00	0.00
17,100.00	90.25	179.59	12,573.72	-4,692.14	-310.14	4,698.36	0.00	0.00	0.00
17,200.00	90.25	179.59	12,573.28	-4,792.14	-309.42	4,798.31	0.00	0.00	0.00
17,300.00	90.25	179.59	12,572.84	-4,892.13	-308.69	4,898.26	0.00	0.00	0.00
17,400.00	90.25	179.59	12,572.40	-4,992.13	-307.97	4,998.21	0.00	0.00	0.00
17,500.00	90.25	179.59	12,571.96	-5,092.13	-307.25	5,098.16	0.00	0.00	0.00
17,600.00	90.25	179.59	12,571.52	-5,192.12	-306.52	5,198.10	0.00	0.00	0.00



Planning Report



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TVD Reference: RKB @ 3351.70usft (Scandril Quest)
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North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
17,700.00	90.25	179.59	12,571.08	-5,292.12	-305.80	5,298.05	0.00	0.00	0.00
17,800.00	90.25	179.59	12,570.65	-5,392.12	-305.08	5,398.00	0.00	0.00	0.00
17,900.00	90.25	179.59	12,570.21	-5,492.11	-304.36	5,497.95	0.00	0.00	0.00
18,000.00	90.25	179.59	12,569.77	-5,592.11	-303.63	5,597.90	0.00	0.00	0.00
18,100.00	90.25	179.59	12,569.33	-5,692.11	-302.91	5,697.85	0.00	0.00	0.00
18,200.00	90.25	179.59	12,568.89	-5,792.10	-302.19	5,797.79	0.00	0.00	0.00
18,300.00	90.25	179.59	12,568.45	-5,892.10	-301.47	5,897.74	0.00	0.00	0.00
18,400.00	90.25	179.59	12,568.02	-5,992.09	-300.74	5,997.69	0.00	0.00	0.00
18,500.00	90.25	179.59	12,567.58	-6,092.09	-300.02	6,097.64	0.00	0.00	0.00
18,600.00	90.25	179.59	12,567.14	-6,192.09	-299.30	6,197.59	0.00	0.00	0.00
18,700.00	90.25	179.59	12,566.70	-6,292.08	-298.58	6,297.53	0.00	0.00	0.00
18,800.00	90.25	179.59	12,566.26	-6,392.08	-297.85	6,397.48	0.00	0.00	0.00
18,900.00	90.25	179.59	12,565.82	-6,492.08	-297.13	6,497.43	0.00	0.00	0.00
19,000.00	90.25	179.59	12,565.39	-6,592.07	-296.41	6,597.38	0.00	0.00	0.00
19,100.00	90.25	179.59	12,564.95	-6,692.07	-295.68	6,697.33	0.00	0.00	0.00
19,200.00	90.25	179.59	12,564.51	-6,792.07	-294.96	6,797.28	0.00	0.00	0.00
19,300.00	90.25	179.59	12,564.07	-6,892.06	-294.24	6,897.22	0.00	0.00	0.00
19,400.00	90.25	179.59	12,563.63	-6,992.06	-293.52	6,997.17	0.00	0.00	0.00
19,500.00	90.25	179.59	12,563.19	-7,092.06	-292.79	7,097.12	0.00	0.00	0.00
19,600.00	90.25	179.59	12,562.76	-7,192.05	-292.07	7,197.07	0.00	0.00	0.00
19,700.00	90.25	179.59	12,562.32	-7,292.05	-291.35	7,297.02	0.00	0.00	0.00
19,800.00	90.25	179.59	12,561.88	-7,392.04	-290.63	7,396.96	0.00	0.00	0.00
19,900.00	90.25	179.59	12,561.44	-7,492.04	-289.90	7,496.91	0.00	0.00	0.00
20,000.00	90.25	179.59	12,561.00	-7,592.04	-289.18	7,596.86	0.00	0.00	0.00
20,100.00	90.25	179.59	12,560.56	-7,692.03	-288.46	7,696.81	0.00	0.00	0.00
20,200.00	90.25	179.59	12,560.12	-7,792.03	-287.74	7,796.76	0.00	0.00	0.00
20,300.00	90.25	179.59	12,559.69	-7,892.03	-287.01	7,896.71	0.00	0.00	0.00
20,400.00	90.25	179.59	12,559.25	-7,992.02	-286.29	7,996.65	0.00	0.00	0.00
20,500.00	90.25	179.59	12,558.81	-8,092.02	-285.57	8,096.60	0.00	0.00	0.00
20,600.00	90.25	179.59	12,558.37	-8,192.02	-284.84	8,196.55	0.00	0.00	0.00
20,700.00	90.25	179.59	12,557.93	-8,292.01	-284.12	8,296.50	0.00	0.00	0.00
20,800.00	90.25	179.59	12,557.49	-8,392.01	-283.40	8,396.45	0.00	0.00	0.00
20,900.00	90.25	179.59	12,557.06	-8,492.01	-282.68	8,496.39	0.00	0.00	0.00
21,000.00	90.25	179.59	12,556.62	-8,592.00	-281.95	8,596.34	0.00	0.00	0.00
21,100.00	90.25	179.59	12,556.18	-8,692.00	-281.23	8,696.29	0.00	0.00	0.00
21,200.00	90.25	179.59	12,555.74	-8,791.99	-280.51	8,796.24	0.00	0.00	0.00
21,300.00	90.25	179.59	12,555.30	-8,891.99	-279.79	8,896.19	0.00	0.00	0.00
21,400.00	90.25	179.59	12,554.86	-8,991.99	-279.06	8,996.14	0.00	0.00	0.00
21,500.00	90.25	179.59	12,554.43	-9,091.98	-278.34	9,096.08	0.00	0.00	0.00
21,600.00	90.25	179.59	12,553.99	-9,191.98	-277.62	9,196.03	0.00	0.00	0.00
21,700.00	90.25	179.59	12,553.55	-9,291.98	-276.90	9,295.98	0.00	0.00	0.00
21,800.00	90.25	179.59	12,553.11	-9,391.97	-276.17	9,395.93	0.00	0.00	0.00
21,900.00	90.25	179.59	12,552.67	-9,491.97	-275.45	9,495.88	0.00	0.00	0.00
22,000.00	90.25	179.59	12,552.23	-9,591.97	-274.73	9,595.82	0.00	0.00	0.00
22,100.00	90.25	179.59	12,551.80	-9,691.96	-274.00	9,695.77	0.00	0.00	0.00
22,200.00	90.25	179.59	12,551.36	-9,791.96	-273.28	9,795.72	0.00	0.00	0.00
22,300.00	90.25	179.59	12,550.92	-9,891.96	-272.56	9,895.67	0.00	0.00	0.00
22,400.00	90.25	179.59	12,550.48	-9,991.95	-271.84	9,995.62	0.00	0.00	0.00
22,500.00	90.25	179.59	12,550.04	-10,091.95	-271.11	10,095.57	0.00	0.00	0.00
22,600.00	90.25	179.59	12,549.60	-10,191.94	-270.39	10,195.51	0.00	0.00	0.00
22,700.00	90.25	179.59	12,549.16	-10,291.94	-269.67	10,295.46	0.00	0.00	0.00
22,800.00	90.25	179.59	12,548.73	-10,391.94	-268.95	10,395.41	0.00	0.00	0.00
22,900.00	90.25	179.59	12,548.29	-10,491.93	-268.22	10,495.36	0.00	0.00	0.00
23,000.00	90.25	179.59	12,547.85	-10,591.93	-267.50	10,595.31	0.00	0.00	0.00

Database: USA Compass
 Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Site: Stove Pipe Federal Com
 Well: 601H
 Wellbore: OH
 Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandril Quest)
 MD Reference: RKB @ 3351.70usft (Scandril Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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)
23,100.00	90.25	179.59	12,547.41	-10,691.93	-266.78	10,695.25	0.00	0.00	0.00
23,193.78	90.25	179.59	12,547.00	-10,785.70	-266.10	10,788.98	0.00	0.00	0.00
TD at 23193.78									

Design Targets
Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
BHL - Stove Pipe Fed	0.00	0.00	12,547.00	-10,785.70	-266.10	415,044.00	786,175.40	32° 8' 15.705741 N	3° 24' 31.695413 W
- plan hits target center									
- Point									
LTP - Stove Pipe Fed	0.00	0.00	12,547.22	-10,735.70	-266.44	415,094.00	786,175.06	32° 8' 16.200531 N	3° 24' 31.694383 W
- plan misses target center by 43.77usft at 23100.00usft MD (12547.41 TVD, -10691.93 N, -266.78 E)									
- Point									
FTP - Stove Pipe Fed	0.00	0.00	12,592.00	-372.50	-340.70	425,457.20	786,100.80	32° 9' 58.752824 N	3° 24' 31.522937 W
- plan misses target center by 18.05usft at 12784.25usft MD (12574.79 TVD, -377.95 N, -340.70 E)									
- Point									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
861.70	861.70	Rustler		-0.25	181.41
1,341.70	1,341.70	TOS		-0.25	181.41
5,183.33	5,181.76	BOS		-0.25	181.41
5,505.54	5,503.76	LMAR (Top Delaware)		-0.25	181.41
5,546.56	5,544.77	BLCN		-0.25	181.41
6,468.14	6,465.79	CYCN		-0.25	181.41
8,113.18	8,109.82	BYCN		-0.25	181.41
9,383.98	9,379.85	Bone Sprg (BSGL)		-0.25	181.41
10,576.73	10,571.88	FBSG_sand		-0.25	181.41
11,108.06	11,102.89	SBSG_sand		-0.25	181.41
11,602.37	11,596.90	SBSG_sand_Base		-0.25	181.41
12,210.85	12,201.78	TBSG_sand		-0.25	181.41

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,520.00	2,520.00	0.00	0.00	KOP, Begin 2.00°/100' Build
2,619.84	2,619.82	0.29	-1.71	Hold 2.00° Inc at 279.73° Azm
12,021.61	12,015.88	55.66	-324.59	KOP2, Begin 10.00°/100' Build
12,927.64	12,592.01	-519.93	-340.29	LP, Hold 90.25° Inc at 179.59° Azm
23,193.78	12,547.00	-10,785.70	-266.10	TD at 23193.78



PHOENIX
TECHNOLOGY SERVICES

COG Operating LLC

Lea County, NM (NAD27 NME)
Stove Pipe Federal Com
601H

OH
Plan 2 12-19-19

Anticollision Report

19 December, 2019



Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well601H
TVD Reference: RKB @ 3351.70usft (Scandrill Quest)
MD Reference: RKB @ 3351.70usft (Scandrill Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Reference	Plan 2 12-19-19		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCSWA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 50,000.00 u	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program **Date** 12/19/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	23,193.78	Plan 2 12-19-19 (OH)	MWD+HRGM	OWSG MWD + HRGM

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						
Stove Pipe Federal Com						
702H - OH / 65850 - Plan 2 12-16-19	658.33	658.06	21.32	15.79	3.850	CC
702H - OH / 65850 - Plan 2 12-16-19	2,500.00	2,500.04	25.77	12.05	1.879	ES, SF
702H - OH / 65850 - Surveys (Scandrill Quest)	658.33	658.06	21.32	15.79	3.850	CC
702H - OH / 65850 - Surveys (Scandrill Quest)	1,800.00	1,800.01	22.07	10.29	1.873	ES
702H - OH / 65850 - Surveys (Scandrill Quest)	2,000.00	1,999.93	23.42	10.59	1.826	SF

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Plan 2 12-16-19												
Survey Program: 50-MWD 1202-Scientific Keeper, 12250-MWD+IFR1+FDIR												
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	0.00	0.00	1.00	1.00	89.62	0.20	30.00	30.00			
100.00	100.00	99.83	99.82	1.03	1.10	91.25	-0.63	29.01	29.02	26.91	2.11	13.753
200.00	200.00	200.30	200.27	1.34	1.46	92.72	-1.33	27.90	27.94	25.41	2.54	11.023
300.00	300.00	300.05	299.99	1.73	1.90	90.43	-0.19	25.66	25.66	22.54	3.12	8.217
400.00	400.00	399.99	399.92	2.11	2.14	89.78	0.09	24.40	24.40	20.65	3.75	6.507
500.00	500.00	499.97	499.88	2.48	2.54	87.04	1.19	23.11	23.14	18.77	4.38	5.286
600.00	600.00	599.99	599.88	2.85	2.98	82.30	2.93	21.66	21.86	16.78	5.08	4.303
658.33	658.33	658.06	657.93	3.07	3.19	78.10	4.40	20.87	21.32	15.79	5.54	3.850 CC
700.00	700.00	699.47	699.33	3.22	3.34	75.47	5.42	20.92	21.61	15.74	5.87	3.683
800.00	800.00	799.46	799.29	3.58	3.83	75.37	5.97	22.86	23.63	16.94	6.69	3.530
900.00	900.00	899.94	899.72	3.95	4.32	82.64	3.03	23.47	23.67	16.19	7.48	3.163
1,000.00	1,000.00	999.89	999.63	4.31	4.59	89.31	0.28	23.33	23.33	15.35	7.98	2.922
1,032.98	1,032.98	1,032.85	1,032.58	4.43	4.68	91.43	-0.58	23.31	23.31	15.15	8.16	2.858
1,100.00	1,100.00	1,099.87	1,099.58	4.67	4.89	95.94	-2.41	23.22	23.34	14.82	8.52	2.740
1,200.00	1,200.00	1,199.84	1,199.50	5.03	5.20	103.02	-5.31	22.99	23.60	14.54	9.06	2.604
1,300.00	1,300.00	1,299.80	1,299.41	5.40	5.35	109.85	-8.22	22.76	24.20	14.73	9.47	2.556
1,400.00	1,400.00	1,399.75	1,399.33	5.76	5.35	116.27	-11.12	22.53	25.13	15.38	9.74	2.579
1,500.00	1,500.00	1,500.01	1,499.57	6.12	5.36	119.61	-12.73	22.40	25.77	15.69	10.07	2.558
1,600.00	1,600.00	1,600.04	1,599.60	6.48	5.36	119.64	-12.75	22.40	25.77	15.34	10.43	2.471
1,700.00	1,700.00	1,700.04	1,699.60	6.84	5.36	119.64	-12.75	22.40	25.77	14.99	10.79	2.389
1,800.00	1,800.00	1,800.04	1,799.60	7.20	5.36	119.64	-12.75	22.40	25.77	14.63	11.15	2.312
1,900.00	1,900.00	1,900.04	1,899.60	7.56	5.37	119.64	-12.75	22.40	25.77	14.27	11.51	2.240

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

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well601H
TVD Reference: RKB @ 3351.70usft (Scandril Quest)
MD Reference: RKB @ 3351.70usft (Scandril Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Plan 2 12-16-19													Offset Site Error:	0.00 usft
Survey Program: 50-MWD 1202-Scientific Keeper, 12250-MWD+IFR1+FDIR													Offset Well Error:	1.00 usft
Reference		Offset		Semi Major Axis		Highside Tooface (")	Distance		Between Centres (usft)	Between Ellipses (usft)	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)						
2,000.00	2,000.00	2,000.04	1,999.60	7.92	5.38	119.64	-12.75	22.40	25.77	13.90	11.87	2.171		
2,100.00	2,100.00	2,100.04	2,099.60	8.28	5.40	119.64	-12.75	22.40	25.77	13.54	12.24	2.106		
2,200.00	2,200.00	2,200.04	2,199.60	8.64	5.41	119.64	-12.75	22.40	25.77	13.17	12.61	2.045		
2,300.00	2,300.00	2,300.04	2,299.60	9.00	5.43	119.64	-12.75	22.40	25.77	12.80	12.98	1.986		
2,400.00	2,400.00	2,400.04	2,399.60	9.36	5.45	119.64	-12.75	22.40	25.77	12.43	13.35	1.931		
2,500.00	2,500.00	2,500.04	2,499.60	9.72	5.48	119.64	-12.75	22.40	25.77	12.05	13.72	1.879 ES, SF		
2,600.00	2,599.99	2,600.03	2,599.59	10.04	5.50	-160.89	-12.75	22.40	26.83	12.71	14.12	1.900		
2,700.00	2,699.93	2,699.97	2,699.53	10.35	5.53	-163.02	-12.75	22.40	30.08	15.57	14.51	2.073		
2,800.00	2,799.87	2,799.91	2,799.47	10.67	5.57	-164.77	-12.75	22.40	33.42	18.52	14.90	2.243		
2,900.00	2,899.81	2,899.85	2,899.41	10.98	5.60	-166.19	-12.75	22.40	36.80	21.50	15.29	2.406		
3,000.00	2,999.75	2,999.79	2,999.35	11.31	5.64	-167.38	-12.75	22.40	40.19	24.50	15.69	2.562		
3,100.00	3,099.69	3,099.73	3,099.29	11.63	5.68	-168.38	-12.75	22.40	43.60	27.52	16.08	2.711		
3,200.00	3,199.63	3,199.67	3,199.23	11.96	5.73	-169.23	-12.75	22.40	47.01	30.55	16.47	2.855		
3,300.00	3,299.57	3,299.61	3,299.17	12.29	5.77	-169.97	-12.75	22.40	50.44	33.58	16.86	2.992		
3,400.00	3,399.51	3,399.55	3,399.11	12.62	5.82	-170.62	-12.75	22.40	53.88	36.63	17.25	3.124		
3,500.00	3,499.45	3,499.49	3,499.05	12.95	5.88	-171.19	-12.75	22.40	57.32	39.68	17.63	3.251		
3,600.00	3,599.38	3,599.43	3,598.98	13.28	5.93	-171.69	-12.75	22.40	60.76	42.74	18.02	3.372		
3,700.00	3,699.32	3,699.36	3,698.92	13.62	5.99	-172.14	-12.75	22.40	64.21	45.80	18.41	3.488		
3,800.00	3,799.26	3,799.30	3,798.86	13.96	6.05	-172.54	-12.75	22.40	67.67	48.87	18.80	3.600		
3,900.00	3,899.20	3,899.24	3,898.80	14.30	6.11	-172.91	-12.75	22.40	71.12	51.94	19.18	3.707		
4,000.00	3,999.14	3,999.18	3,998.74	14.64	6.18	-173.24	-12.75	22.40	74.58	55.01	19.57	3.810		
4,100.00	4,099.08	4,099.12	4,098.68	14.98	6.24	-173.54	-12.75	22.40	78.04	58.08	19.96	3.910		
4,200.00	4,199.02	4,199.06	4,198.62	15.32	6.31	-173.81	-12.75	22.40	81.51	61.15	20.35	4.005		
4,300.00	4,298.96	4,299.00	4,298.56	15.67	6.38	-174.07	-12.75	22.40	84.97	64.23	20.74	4.097		
4,400.00	4,398.90	4,398.94	4,398.50	16.01	6.45	-174.30	-12.75	22.40	88.44	67.30	21.13	4.185		
4,500.00	4,498.84	4,498.88	4,498.44	16.36	6.53	-174.52	-12.75	22.40	91.90	70.38	21.52	4.270		
4,600.00	4,598.78	4,598.82	4,598.38	16.71	6.61	-174.72	-12.75	22.40	95.37	73.46	21.92	4.352		
4,700.00	4,698.72	4,698.76	4,698.32	17.07	6.68	-174.90	-12.75	22.40	98.84	76.54	22.31	4.431		
4,800.00	4,798.66	4,798.70	4,798.26	17.42	6.76	-175.08	-12.75	22.40	102.31	79.61	22.70	4.507		
4,900.00	4,898.60	4,898.64	4,898.20	17.78	6.85	-175.24	-12.75	22.40	105.79	82.69	23.09	4.581		
5,000.00	4,998.53	4,998.58	4,998.13	18.13	6.93	-175.39	-12.75	22.40	109.26	85.77	23.49	4.652		
5,100.00	5,098.47	5,098.51	5,098.07	18.49	7.01	-175.53	-12.75	22.40	112.73	88.85	23.88	4.720		
5,200.00	5,198.41	5,198.45	5,198.01	18.85	7.10	-175.67	-12.75	22.40	116.21	91.93	24.28	4.786		
5,300.00	5,298.35	5,298.39	5,297.95	19.21	7.19	-175.79	-12.75	22.40	119.68	95.01	24.68	4.850		
5,400.00	5,398.29	5,398.33	5,397.89	19.57	7.28	-175.91	-12.75	22.40	123.16	98.08	25.07	4.912		
5,500.00	5,498.23	5,498.27	5,497.83	19.93	7.37	-176.02	-12.75	22.40	126.63	101.16	25.47	4.972		
5,600.00	5,598.17	5,598.21	5,597.73	20.29	7.41	-176.09	-13.12	23.63	131.41	105.57	25.84	5.085		
5,700.00	5,698.11	5,698.15	5,697.67	20.66	7.43	-176.15	-13.66	25.42	136.76	110.54	26.22	5.216		
5,800.00	5,798.05	5,798.09	5,797.57	21.02	7.45	-176.20	-14.21	27.21	142.10	115.50	26.60	5.342		
5,900.00	5,897.99	5,898.03	5,897.47	21.38	7.47	-176.25	-14.75	28.99	147.44	120.46	26.98	5.464		
6,000.00	5,997.93	5,997.97	5,997.37	21.74	7.49	-176.29	-15.29	30.78	152.79	125.41	27.37	5.582		
6,100.00	6,097.87	6,097.91	6,097.31	22.11	7.52	-176.33	-15.84	32.57	158.13	130.37	27.76	5.696		
6,200.00	6,197.81	6,197.85	6,197.25	22.47	7.55	-176.37	-16.38	34.36	163.47	135.32	28.15	5.806		
6,300.00	6,297.75	6,297.79	6,297.19	22.83	7.58	-176.41	-16.92	36.15	168.82	140.27	28.55	5.913		
6,400.00	6,397.69	6,397.73	6,397.09	23.20	7.61	-176.44	-17.47	37.94	174.16	145.21	28.95	6.017		
6,500.00	6,497.62	6,497.66	6,497.02	23.56	7.64	-176.47	-18.01	39.73	179.51	150.16	29.35	6.116		
6,600.00	6,597.56	6,597.60	6,596.96	23.92	7.68	-176.50	-18.55	41.51	184.85	155.10	29.75	6.213		
6,700.00	6,697.50	6,697.54	6,696.90	24.28	7.71	-176.53	-19.10	43.30	190.19	160.04	30.16	6.307		
6,800.00	6,797.44	6,797.48	6,796.84	24.65	7.75	-176.55	-19.64	45.09	195.54	164.97	30.57	6.397		
6,900.00	6,897.38	6,897.42	6,896.78	25.01	7.79	-176.58	-20.18	46.88	200.88	169.91	30.98	6.485		
7,000.00	6,997.32	6,997.36	6,996.72	25.37	7.83	-176.60	-20.73	48.67	206.23	174.84	31.39	6.570		
7,100.00	7,097.26	7,097.30	7,096.66	25.74	7.87	-176.63	-21.27	50.46	211.57	179.77	31.80	6.652		

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

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Stove Pipe Federal Com
 Site Error: 0.00 usft
 Reference Well: 601H
 Well Error: 1.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well601H
 TVD Reference: RKB @ 3351.70usft (Scandril Quest)
 MD Reference: RKB @ 3351.70usft (Scandril Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Plan 2 12-16-19														Offset Site Error: 0.00 usft
Survey Program: 50-MWD, 1202-Scientific Keeper, 12250-MWD+IFR1+FDIR														Offset Well Error: 1.00 usft
Reference	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor		
7,200.00	7,197.20	7,193.48	7,192.75	26.10	7.92	-176.65	-21.81	52.25	216.92	184.69	32.22	6.732		
7,300.00	7,297.14	7,293.34	7,292.59	26.46	7.96	-176.67	-22.36	54.03	222.26	189.62	32.64	6.809		
7,400.00	7,397.08	7,393.19	7,392.43	26.83	8.01	-176.69	-22.90	55.82	227.60	194.54	33.06	6.884		
7,500.00	7,497.02	7,493.05	7,492.27	27.19	8.06	-176.71	-23.44	57.61	232.95	199.46	33.49	6.956		
7,600.00	7,596.96	7,592.91	7,592.11	27.55	8.11	-176.72	-23.99	59.40	238.29	204.38	33.91	7.027		
7,700.00	7,696.90	7,692.76	7,691.95	27.91	8.16	-176.74	-24.53	61.19	243.64	209.30	34.34	7.095		
7,800.00	7,796.83	7,792.62	7,791.78	28.28	8.21	-176.76	-25.07	62.98	248.98	214.21	34.77	7.161		
7,900.00	7,896.77	7,892.48	7,891.62	28.64	8.27	-176.77	-25.61	64.77	254.33	219.13	35.20	7.225		
8,000.00	7,996.71	7,992.33	7,991.46	29.00	8.32	-176.79	-26.16	66.55	259.67	224.04	35.63	7.287		
8,100.00	8,096.65	8,092.19	8,091.30	29.37	8.38	-176.80	-26.70	68.34	265.02	228.95	36.07	7.347		
8,200.00	8,196.59	8,192.05	8,191.14	29.73	8.44	-176.82	-27.24	70.13	270.36	233.86	36.51	7.406		
8,300.00	8,296.53	8,291.91	8,290.98	30.09	8.50	-176.83	-27.79	71.92	275.71	238.76	36.94	7.463		
8,400.00	8,396.47	8,391.76	8,390.82	30.45	8.56	-176.84	-28.33	73.71	281.05	243.67	37.38	7.518		
8,500.00	8,496.41	8,491.62	8,490.66	30.82	8.62	-176.85	-28.87	75.50	286.40	248.57	37.82	7.572		
8,600.00	8,596.35	8,591.48	8,590.50	31.18	8.69	-176.86	-29.42	77.29	291.74	253.47	38.27	7.624		
8,700.00	8,696.29	8,691.33	8,690.34	31.54	8.75	-176.88	-29.96	79.07	297.08	258.38	38.71	7.675		
8,800.00	8,796.23	8,791.19	8,790.18	31.90	8.82	-176.89	-30.50	80.86	302.43	263.28	39.15	7.724		
8,900.00	8,896.17	8,891.05	8,890.02	32.27	8.89	-176.90	-31.05	82.65	307.77	268.17	39.60	7.772		
9,000.00	8,996.11	8,990.91	8,989.86	32.63	8.96	-176.91	-31.59	84.44	313.12	273.07	40.05	7.819		
9,100.00	9,096.05	9,090.76	9,089.70	32.99	9.03	-176.92	-32.13	86.23	318.46	277.97	40.50	7.864		
9,200.00	9,195.98	9,190.62	9,189.54	33.35	9.10	-176.93	-32.68	88.02	323.81	282.86	40.94	7.908		
9,300.00	9,295.92	9,290.48	9,289.38	33.72	9.17	-176.94	-33.22	89.81	329.15	287.76	41.40	7.951		
9,400.00	9,395.86	9,390.33	9,389.22	34.08	9.25	-176.95	-33.76	91.59	334.50	292.65	41.85	7.993		
9,500.00	9,495.80	9,490.19	9,489.06	34.44	9.32	-176.95	-34.31	93.38	339.84	297.54	42.30	8.034		
9,600.00	9,595.74	9,590.05	9,588.90	34.80	9.40	-176.96	-34.85	95.17	345.19	302.43	42.75	8.074		
9,700.00	9,695.68	9,689.90	9,688.74	35.17	9.47	-176.97	-35.39	96.96	350.53	307.32	43.21	8.112		
9,800.00	9,795.62	9,789.76	9,788.58	35.53	9.55	-176.98	-35.94	98.75	355.88	312.21	43.66	8.150		
9,900.00	9,895.56	9,889.62	9,888.42	35.89	9.63	-176.99	-36.48	100.54	361.22	317.10	44.12	8.187		
10,000.00	9,995.50	9,989.48	9,988.25	36.25	9.71	-176.99	-37.02	102.33	366.57	321.99	44.58	8.223		
10,100.00	10,095.44	10,089.33	10,088.09	36.61	9.80	-177.00	-37.57	104.11	371.91	326.87	45.04	8.258		
10,200.00	10,195.38	10,189.19	10,187.93	36.98	9.88	-177.01	-38.11	105.90	377.26	331.76	45.50	8.292		
10,300.00	10,295.32	10,289.05	10,287.77	37.34	9.96	-177.01	-38.65	107.69	382.60	336.64	45.96	8.325		
10,400.00	10,395.26	10,388.90	10,387.61	37.70	10.05	-177.02	-39.20	109.48	387.95	341.53	46.42	8.358		
10,500.00	10,495.20	10,488.76	10,487.45	38.06	10.14	-177.03	-39.74	111.27	393.29	346.41	46.88	8.390		
10,600.00	10,595.13	10,588.62	10,587.29	38.43	10.22	-177.03	-40.28	113.06	398.64	351.29	47.34	8.421		
10,700.00	10,695.07	10,688.48	10,687.13	38.79	10.31	-177.04	-40.83	114.85	403.98	356.18	47.80	8.451		
10,800.00	10,795.01	10,788.33	10,786.97	39.15	10.40	-177.05	-41.37	116.63	409.32	361.06	48.27	8.481		
10,900.00	10,894.95	10,888.19	10,886.81	39.51	10.49	-177.05	-41.91	118.42	414.67	365.94	48.73	8.509		
11,000.00	10,994.89	10,988.05	10,986.65	39.87	10.58	-177.06	-42.46	120.21	420.01	370.82	49.20	8.538		
11,100.00	11,094.83	11,087.90	11,086.49	40.24	10.68	-177.06	-43.00	122.00	425.36	375.70	49.66	8.565		
11,200.00	11,194.77	11,187.76	11,186.33	40.60	10.77	-177.07	-43.54	123.79	430.70	380.58	50.13	8.592		
11,300.00	11,294.71	11,287.62	11,286.17	40.96	10.86	-177.07	-44.09	125.58	436.05	385.46	50.59	8.619		
11,400.00	11,394.65	11,387.47	11,386.01	41.32	10.96	-177.08	-44.63	127.37	441.39	390.33	51.06	8.645		
11,500.00	11,494.59	11,487.33	11,485.85	41.69	11.05	-177.08	-45.17	129.15	446.74	395.21	51.53	8.670		
11,600.00	11,594.53	11,587.19	11,585.69	42.05	11.15	-177.09	-45.72	130.94	452.08	400.09	52.00	8.695		
11,700.00	11,694.47	11,687.05	11,685.53	42.41	11.25	-177.09	-46.26	132.73	457.43	404.96	52.46	8.719		
11,800.00	11,794.41	11,786.90	11,785.37	42.77	11.34	-177.10	-46.80	134.52	462.77	409.84	52.93	8.743		
11,900.00	11,894.35	11,886.76	11,885.21	43.13	11.44	-177.10	-47.35	136.31	468.12	414.72	53.40	8.766		
12,000.00	11,994.28	11,986.62	11,985.05	43.50	11.54	-177.11	-47.89	138.10	473.46	419.59	53.87	8.789		
12,100.00	12,094.01	12,086.29	12,084.70	43.84	11.64	-92.07	-48.43	139.88	477.62	423.22	54.40	8.781		
12,200.00	12,191.47	12,183.79	12,182.18	44.25	11.74	-86.26	-48.96	141.63	478.56	423.64	54.92	8.714		
12,279.73	12,265.56	12,257.98	12,256.36	44.59	11.77	-87.56	-49.36	142.96	478.35	423.06	55.29	8.652		

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

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
TVD Reference: RKB @ 3351.70usft (Scandrill Quest)
MD Reference: RKB @ 3351.70usft (Scandrill Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Plan 2 12-16-19													Offset Site Error:
Survey Program: 50-MWD, 1202-Scientific Keeper, 12250-MWD+IFR1+FDIR													Offset Well Error:
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	
12,300.00	12,283.69	12,276.15	12,274.53	44.68	11.78	-88.20	-49.46	143.28	478.39	423.01	55.38	8.638	
12,400.00	12,367.88	12,360.95	12,359.30	45.06	11.79	-92.28	-50.39	144.80	480.87	425.05	55.82	8.615	
12,500.00	12,441.49	12,448.01	12,445.62	45.37	11.81	-96.86	-60.93	146.42	489.25	433.01	56.25	8.698	
12,600.00	12,502.27	12,544.87	12,538.53	45.60	11.84	-101.64	-87.86	148.27	503.94	447.18	56.76	8.878	
12,700.00	12,548.38	12,656.13	12,637.86	45.78	11.90	-106.58	-137.53	150.39	524.10	466.56	57.54	9.109	
12,800.00	12,578.41	12,788.75	12,741.02	45.93	12.03	-111.73	-220.37	152.82	547.77	489.07	58.70	9.332	
12,900.00	12,591.46	12,952.32	12,837.80	46.07	12.28	-116.95	-351.53	155.46	571.53	511.40	60.13	9.505	
13,000.00	12,591.69	13,157.46	12,900.80	46.25	12.80	-121.84	-545.58	157.95	587.96	526.52	61.44	9.570	
13,100.00	12,591.25	13,302.19	12,905.75	46.49	13.27	-122.30	-690.08	159.05	589.29	527.16	62.13	9.485	
13,200.00	12,590.81	13,402.19	12,905.35	46.78	13.66	-122.31	-790.07	159.74	589.28	526.59	62.69	9.400	
13,300.00	12,590.37	13,502.19	12,904.96	47.13	14.09	-122.31	-890.07	160.43	589.28	525.96	63.32	9.306	
13,400.00	12,589.94	13,602.19	12,904.57	47.52	14.56	-122.32	-990.07	161.12	589.28	525.26	64.02	9.205	
13,500.00	12,589.50	13,702.19	12,904.17	47.96	15.06	-122.32	-1,090.06	161.81	589.28	524.50	64.77	9.098	
13,600.00	12,589.06	13,802.19	12,903.78	48.44	15.60	-122.33	-1,190.06	162.51	589.28	523.68	65.59	8.984	
13,700.00	12,588.62	13,902.19	12,903.38	48.96	16.17	-122.33	-1,290.06	163.20	589.27	522.80	66.47	8.865	
13,800.00	12,588.18	14,002.19	12,902.99	49.52	16.76	-122.34	-1,390.05	163.89	589.27	521.87	67.40	8.743	
13,900.00	12,587.74	14,102.19	12,902.60	50.11	17.38	-122.34	-1,490.05	164.58	589.27	520.88	68.39	8.616	
14,000.00	12,587.31	14,202.19	12,902.20	50.74	18.02	-122.35	-1,590.05	165.27	589.27	519.84	69.43	8.488	
14,100.00	12,586.87	14,302.19	12,901.81	51.41	18.67	-122.35	-1,690.04	165.97	589.27	518.75	70.51	8.357	
14,200.00	12,586.43	14,402.19	12,901.42	52.10	19.34	-122.36	-1,790.04	166.66	589.26	517.62	71.65	8.225	
14,300.00	12,585.99	14,502.19	12,901.02	52.83	20.03	-122.36	-1,890.04	167.35	589.26	516.44	72.82	8.092	
14,400.00	12,585.55	14,602.19	12,900.63	53.58	20.73	-122.37	-1,990.04	168.04	589.26	515.22	74.04	7.958	
14,500.00	12,585.11	14,702.19	12,900.23	54.36	21.44	-122.37	-2,090.03	168.74	589.26	513.96	75.30	7.825	
14,600.00	12,584.68	14,802.19	12,899.84	55.17	22.16	-122.38	-2,190.03	169.43	589.26	512.66	76.60	7.693	
14,700.00	12,584.24	14,902.19	12,899.45	56.00	22.89	-122.39	-2,290.03	170.12	589.26	511.33	77.93	7.561	
14,800.00	12,583.80	15,002.19	12,899.05	56.86	23.63	-122.39	-2,390.02	170.81	589.25	509.96	79.30	7.431	
14,900.00	12,583.36	15,102.19	12,898.66	57.74	24.38	-122.40	-2,490.02	171.50	589.25	508.56	80.69	7.302	
15,000.00	12,582.92	15,202.19	12,898.26	58.64	25.14	-122.40	-2,590.02	172.20	589.25	507.13	82.12	7.175	
15,100.00	12,582.48	15,302.19	12,897.87	59.57	25.90	-122.41	-2,690.01	172.89	589.25	505.67	83.58	7.050	
15,200.00	12,582.04	15,402.19	12,897.48	60.51	26.67	-122.41	-2,790.01	173.58	589.25	504.18	85.07	6.927	
15,300.00	12,581.61	15,502.19	12,897.08	61.47	27.44	-122.42	-2,890.01	174.27	589.24	502.67	86.58	6.806	
15,400.00	12,581.17	15,602.19	12,896.69	62.45	28.22	-122.42	-2,990.00	174.96	589.24	501.13	88.11	6.687	
15,500.00	12,580.73	15,702.19	12,896.30	63.45	29.00	-122.43	-3,090.00	175.66	589.24	499.57	89.67	6.571	
15,600.00	12,580.29	15,802.19	12,895.90	64.47	29.79	-122.43	-3,190.00	176.35	589.24	497.99	91.25	6.457	
15,700.00	12,579.85	15,902.19	12,895.51	65.50	30.58	-122.44	-3,289.99	177.04	589.24	496.38	92.86	6.346	
15,800.00	12,579.41	16,002.19	12,895.11	66.54	31.38	-122.44	-3,389.99	177.73	589.23	494.76	94.48	6.237	
15,900.00	12,578.98	16,102.19	12,894.72	67.61	32.17	-122.45	-3,489.99	178.43	589.23	493.11	96.12	6.130	
16,000.00	12,578.54	16,202.19	12,894.33	68.68	32.98	-122.45	-3,589.98	179.12	589.23	491.45	97.78	6.026	
16,100.00	12,578.10	16,302.19	12,893.93	69.77	33.78	-122.46	-3,689.98	179.81	589.23	489.77	99.45	5.925	
16,200.00	12,577.66	16,402.19	12,893.54	70.87	34.59	-122.46	-3,789.98	180.50	589.23	488.08	101.15	5.825	
16,300.00	12,577.22	16,502.19	12,893.15	71.98	35.40	-122.47	-3,889.97	181.19	589.22	486.37	102.85	5.729	
16,400.00	12,576.78	16,602.19	12,892.75	73.10	36.21	-122.47	-3,989.97	181.89	589.22	484.65	104.58	5.634	
16,500.00	12,576.35	16,702.19	12,892.36	74.23	37.02	-122.48	-4,089.97	182.58	589.22	482.91	106.31	5.542	
16,600.00	12,575.91	16,802.19	12,891.96	75.38	37.84	-122.49	-4,189.97	183.27	589.22	481.16	108.06	5.453	
16,700.00	12,575.47	16,902.19	12,891.57	76.53	38.65	-122.49	-4,289.96	183.96	589.22	479.39	109.83	5.365	
16,800.00	12,575.03	17,002.19	12,891.18	77.69	39.47	-122.50	-4,389.96	184.65	589.22	477.62	111.60	5.280	
16,900.00	12,574.59	17,102.19	12,890.78	78.87	40.29	-122.50	-4,489.96	185.35	589.21	475.83	113.39	5.197	
17,000.00	12,574.15	17,202.19	12,890.39	80.05	41.12	-122.51	-4,589.95	186.04	589.21	474.03	115.18	5.115	
17,100.00	12,573.72	17,302.19	12,889.99	81.23	41.94	-122.51	-4,689.95	186.73	589.21	472.22	116.99	5.036	
17,200.00	12,573.28	17,402.19	12,889.60	82.43	42.77	-122.52	-4,789.95	187.42	589.21	470.40	118.81	4.959	
17,300.00	12,572.84	17,502.19	12,889.21	83.64	43.59	-122.52	-4,889.94	188.11	589.21	468.57	120.64	4.884	
17,400.00	12,572.40	17,602.19	12,888.81	84.85	44.42	-122.53	-4,989.94	188.81	589.20	466.73	122.47	4.811	

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

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well601H
TVD Reference: RKB @ 3351.70usft (Scandril Quest)
MD Reference: RKB @ 3351.70usft (Scandril Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Plan 2 12-16-19														Offset Site Error:	0.00 usft
Survey Program: 50-MWD 1202-Scientific Keeper, 12250-MWD+IFR1+FDJR														Offset Well Error:	1.00 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			
17,500.00	12,571.96	17,702.19	12,888.42	86.07	45.25	-122.53	-5,089.94	189.50	589.20	464.89	124.32	4.740			
17,600.00	12,571.52	17,802.19	12,888.03	87.29	46.08	-122.54	-5,189.93	190.19	589.20	463.03	126.17	4.670			
17,700.00	12,571.08	17,902.19	12,887.63	88.52	46.91	-122.54	-5,289.93	190.88	589.20	461.17	128.03	4.602			
17,800.00	12,570.65	18,002.19	12,887.24	89.76	47.74	-122.55	-5,389.93	191.58	589.20	459.30	129.90	4.536			
17,900.00	12,570.21	18,102.19	12,886.84	91.00	48.58	-122.55	-5,489.92	192.27	589.20	457.42	131.78	4.471			
18,000.00	12,569.77	18,202.19	12,886.45	92.25	49.41	-122.56	-5,589.92	192.96	589.19	455.54	133.66	4.408			
18,100.00	12,569.33	18,302.19	12,886.06	93.51	50.25	-122.56	-5,689.92	193.65	589.19	453.64	135.55	4.347			
18,200.00	12,568.89	18,402.19	12,885.66	94.76	51.08	-122.57	-5,789.91	194.34	589.19	451.75	137.44	4.287			
18,300.00	12,568.45	18,502.19	12,885.27	96.03	51.92	-122.57	-5,889.91	195.04	589.19	449.84	139.35	4.228			
18,400.00	12,568.02	18,602.19	12,884.88	97.30	52.75	-122.58	-5,989.91	195.73	589.19	447.93	141.25	4.171			
18,500.00	12,567.58	18,702.19	12,884.48	98.57	53.59	-122.59	-6,089.90	196.42	589.19	446.02	143.17	4.115			
18,600.00	12,567.14	18,802.19	12,884.09	99.85	54.43	-122.59	-6,189.90	197.11	589.18	444.10	145.09	4.061			
18,700.00	12,566.70	18,902.19	12,883.69	101.13	55.27	-122.60	-6,289.90	197.80	589.18	442.17	147.01	4.008			
18,800.00	12,566.26	19,002.19	12,883.30	102.42	56.11	-122.60	-6,389.90	198.50	589.18	440.24	148.94	3.956			
18,900.00	12,565.82	19,102.19	12,882.91	103.71	56.95	-122.61	-6,489.89	199.19	589.18	438.30	150.88	3.905			
19,000.00	12,565.39	19,202.19	12,882.51	105.00	57.79	-122.61	-6,589.89	199.88	589.18	436.36	152.81	3.856			
19,100.00	12,564.95	19,302.19	12,882.12	106.30	58.63	-122.62	-6,689.89	200.57	589.18	434.42	154.76	3.807			
19,200.00	12,564.51	19,402.19	12,881.72	107.60	59.48	-122.62	-6,789.88	201.26	589.17	432.47	156.70	3.760			
19,300.00	12,564.07	19,502.19	12,881.33	108.91	60.32	-122.63	-6,889.88	201.96	589.17	430.52	158.66	3.714			
19,400.00	12,563.63	19,602.19	12,880.94	110.21	61.16	-122.63	-6,989.88	202.65	589.17	428.56	160.61	3.668			
19,500.00	12,563.19	19,702.19	12,880.54	111.53	62.00	-122.64	-7,089.87	203.34	589.17	426.60	162.57	3.624			
19,600.00	12,562.76	19,802.19	12,880.15	112.84	62.85	-122.64	-7,189.87	204.03	589.17	424.63	164.54	3.581			
19,700.00	12,562.32	19,902.19	12,879.76	114.16	63.69	-122.65	-7,289.87	204.73	589.17	422.66	166.50	3.538			
19,800.00	12,561.88	20,002.19	12,879.36	115.48	64.54	-122.65	-7,389.86	205.42	589.16	420.69	168.47	3.497			
19,900.00	12,561.44	20,102.19	12,878.97	116.80	65.38	-122.66	-7,489.86	206.11	589.16	418.72	170.45	3.457			
20,000.00	12,561.00	20,202.19	12,878.57	118.12	66.23	-122.66	-7,589.86	206.80	589.16	416.74	172.42	3.417			
20,100.00	12,560.56	20,302.19	12,878.18	119.45	67.07	-122.67	-7,689.85	207.49	589.16	414.76	174.40	3.378			
20,200.00	12,560.12	20,402.19	12,877.79	120.78	67.92	-122.67	-7,789.85	208.19	589.16	412.77	176.39	3.340			
20,300.00	12,559.69	20,502.19	12,877.39	122.11	68.76	-122.68	-7,889.85	208.88	589.16	410.78	178.37	3.303			
20,400.00	12,559.25	20,602.19	12,877.00	123.45	69.61	-122.68	-7,989.84	209.57	589.15	408.79	180.36	3.267			
20,500.00	12,558.81	20,702.19	12,876.61	124.79	70.46	-122.69	-8,089.84	210.26	589.15	406.80	182.35	3.231			
20,600.00	12,558.37	20,802.19	12,876.21	126.13	71.31	-122.70	-8,189.84	210.95	589.15	404.81	184.34	3.196			
20,700.00	12,557.93	20,902.19	12,875.82	127.47	72.15	-122.70	-8,289.83	211.65	589.15	402.81	186.34	3.162			
20,800.00	12,557.49	21,002.19	12,875.42	128.81	73.00	-122.71	-8,389.83	212.34	589.15	400.81	188.34	3.128			
20,900.00	12,557.06	21,102.19	12,875.03	130.16	73.85	-122.71	-8,489.83	213.03	589.15	398.81	190.34	3.095			
21,000.00	12,556.62	21,202.19	12,874.64	131.50	74.70	-122.72	-8,589.83	213.72	589.14	396.80	192.34	3.063			
21,100.00	12,556.18	21,302.19	12,874.24	132.85	75.55	-122.72	-8,689.82	214.42	589.14	394.79	194.35	3.031			
21,200.00	12,555.74	21,402.19	12,873.85	134.20	76.39	-122.73	-8,789.82	215.11	589.14	392.78	196.36	3.000			
21,300.00	12,555.30	21,502.19	12,873.45	135.56	77.24	-122.73	-8,889.82	215.80	589.14	390.77	198.37	2.970			
21,400.00	12,554.86	21,602.19	12,873.06	136.91	78.09	-122.74	-8,989.81	216.49	589.14	388.76	200.38	2.940			
21,500.00	12,554.43	21,702.19	12,872.67	138.27	78.94	-122.74	-9,089.81	217.18	589.14	386.74	202.39	2.911			
21,600.00	12,553.99	21,802.19	12,872.27	139.62	79.79	-122.75	-9,189.81	217.88	589.13	384.73	204.41	2.882			
21,700.00	12,553.55	21,902.19	12,871.88	140.98	80.64	-122.75	-9,289.80	218.57	589.13	382.71	206.42	2.854			
21,800.00	12,553.11	22,002.19	12,871.49	142.34	81.49	-122.76	-9,389.80	219.26	589.13	380.69	208.44	2.826			
21,900.00	12,552.67	22,102.19	12,871.09	143.71	82.34	-122.76	-9,489.80	219.95	589.13	378.67	210.46	2.799			
22,000.00	12,552.23	22,202.19	12,870.70	145.07	83.19	-122.77	-9,589.79	220.64	589.13	376.64	212.49	2.773			
22,100.00	12,551.80	22,302.19	12,870.30	146.44	84.04	-122.77	-9,689.79	221.34	589.13	374.62	214.51	2.746			
22,200.00	12,551.36	22,402.19	12,869.91	147.80	84.89	-122.78	-9,789.79	222.03	589.12	372.59	216.54	2.721			
22,300.00	12,550.92	22,502.19	12,869.52	149.17	85.74	-122.78	-9,889.78	222.72	589.12	370.56	218.56	2.695			
22,400.00	12,550.48	22,602.19	12,869.12	150.54	86.60	-122.79	-9,989.78	223.41	589.12	368.53	220.59	2.671			
22,500.00	12,550.04	22,702.19	12,868.73	151.91	87.45	-122.80	-10,089.78	224.10	589.12	366.50	222.62	2.646			
22,600.00	12,549.60	22,802.19	12,868.33	153.28	88.30	-122.80	-10,189.77	224.80	589.12	364.47	224.65	2.622			

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

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Stove Pipe Federal Com
 Site Error: 0.00 usft
 Reference Well: 601H
 Well Error: 1.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandril Quest)
 MD Reference: RKB @ 3351.70usft (Scandril Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Plan 2 12-16-19													Offset Site Error: 0.00 usft
Survey Program: 50-MWD 1202-Scientific Keeper, 12250-MWD+IFR1+FDIR													Offset Well Error: 1.00 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	
22,700.00	12,549.16	22,902.19	12,867.94	154.65	89.15	-122.81	-10,289.77	225.49	589.12	362.43	226.68	2.599	
22,800.00	12,548.73	23,002.19	12,867.55	156.03	90.00	-122.81	-10,389.77	226.18	589.12	360.40	228.72	2.576	
22,900.00	12,548.29	23,102.19	12,867.15	157.40	90.85	-122.82	-10,489.76	226.87	589.11	358.36	230.75	2.553	
23,000.00	12,547.85	23,202.19	12,866.76	158.78	91.71	-122.82	-10,589.76	227.57	589.11	356.32	232.79	2.531	
23,100.00	12,547.41	23,302.19	12,866.37	160.15	92.56	-122.83	-10,689.76	228.26	589.11	354.28	234.83	2.509	
23,191.16	12,547.01	23,393.35	12,866.01	161.41	93.33	-122.83	-10,780.92	228.89	589.11	352.42	236.69	2.489	
23,193.78	12,547.00	23,395.03	12,866.00	161.44	93.35	-122.83	-10,782.60	228.90	589.11	352.39	236.72	2.489	

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Stove Pipe Federal Com
 Site Error: 0.00 usft
 Reference Well: 601H
 Well Error: 1.00 usft
 Reference Wellbore OH
 Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandril Quest)
 MD Reference: RKB @ 3351.70usft (Scandril Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Surveys (Scandril Quest)														Offset Site Error: 0.00 usft
Survey Program: 50-MWD 1300-MWD+HRGM														Offset Well Error: 1.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		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)	Ellipses (usft)	Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	1.00	1.00	89.62	0.20	30.00	30.00					
100.00	100.00	99.83	99.82	1.03	1.10	91.25	-0.63	29.01	29.02	26.91	2.11	13.753		
200.00	200.00	200.30	200.27	1.34	1.46	92.72	-1.33	27.90	27.94	25.41	2.54	11.023		
300.00	300.00	300.05	299.99	1.73	1.90	90.43	-0.19	25.66	25.66	22.54	3.12	8.217		
400.00	400.00	399.99	399.92	2.11	2.14	89.78	0.09	24.40	24.40	20.65	3.75	6.507		
500.00	500.00	499.97	499.88	2.48	2.54	87.04	1.19	23.11	23.14	18.77	4.38	5.286		
600.00	600.00	599.99	599.88	2.85	2.98	82.30	2.93	21.66	21.86	16.78	5.08	4.303		
658.33	658.33	658.06	657.93	3.07	3.19	78.10	4.40	20.87	21.32	15.79	5.54	3.850 CC		
700.00	700.00	699.47	699.33	3.22	3.34	75.47	5.42	20.92	21.61	15.74	5.87	3.683		
800.00	800.00	799.46	799.29	3.58	3.83	75.37	5.97	22.86	23.63	16.94	6.69	3.530		
900.00	900.00	899.94	899.72	3.95	4.32	82.64	3.03	23.47	23.67	16.19	7.48	3.163		
1,000.00	1,000.00	999.89	999.63	4.31	4.59	89.31	0.28	23.33	23.33	15.35	7.98	2.922		
1,032.98	1,032.98	1,032.85	1,032.58	4.43	4.68	91.43	-0.58	23.31	23.31	15.15	8.16	2.858		
1,100.00	1,100.00	1,099.87	1,099.58	4.67	4.89	95.94	-2.41	23.22	23.34	14.82	8.52	2.740		
1,200.00	1,200.00	1,199.84	1,199.50	5.03	5.20	103.02	-5.31	22.99	23.60	14.54	9.06	2.604		
1,300.00	1,300.00	1,300.00	1,299.63	5.40	5.42	109.16	-7.80	22.46	23.78	14.17	9.60	2.476		
1,400.00	1,400.00	1,400.15	1,399.76	5.76	5.62	113.91	-9.45	21.31	23.32	13.20	10.11	2.306		
1,500.00	1,500.00	1,500.16	1,499.74	6.12	5.70	118.74	-10.89	19.85	22.64	12.14	10.51	2.155		
1,600.00	1,600.00	1,600.12	1,599.68	6.48	5.78	124.19	-12.43	18.30	22.12	11.23	10.90	2.030		
1,700.00	1,700.00	1,700.08	1,699.61	6.84	5.90	130.27	-14.18	16.74	21.93	10.61	11.32	1.937		
1,716.25	1,716.25	1,716.32	1,715.85	6.90	5.92	131.31	-14.48	16.47	21.93	10.54	11.39	1.925		
1,800.00	1,800.00	1,800.01	1,799.51	7.20	6.03	136.64	-16.05	15.15	22.07	10.29	11.79	1.873 ES		
1,900.00	1,900.00	1,899.97	1,899.45	7.56	6.19	142.28	-17.93	13.87	22.67	10.38	12.29	1.844		
2,000.00	2,000.00	1,999.93	1,999.38	7.92	6.37	147.20	-19.69	12.69	23.42	10.59	12.83	1.826 SF		
2,100.00	2,100.00	2,099.86	2,099.30	8.28	6.56	151.85	-21.62	11.57	24.52	11.12	13.40	1.830		
2,200.00	2,200.00	2,199.81	2,199.21	8.64	6.77	156.34	-23.72	10.39	25.90	11.90	13.99	1.851		
2,300.00	2,300.00	2,220.00	2,219.40	9.00	6.82	157.22	-24.16	10.14	84.38	76.34	8.04	10.497		
2,400.00	2,400.00	2,220.00	2,219.40	9.36	6.82	157.22	-24.16	10.14	182.10	174.75	7.35	24.762		
2,500.00	2,500.00	2,220.00	2,219.40	9.72	6.82	157.22	-24.16	10.14	281.43	274.11	7.32	38.450		
2,600.00	2,599.99	2,220.00	2,219.40	10.04	6.82	-101.70	-24.16	10.14	381.14	373.76	7.38	51.645		
2,700.00	2,699.93	2,220.00	2,219.40	10.35	6.82	-94.85	-24.16	10.14	481.00	473.53	7.47	64.389		
2,800.00	2,799.87	2,220.00	2,219.40	10.67	6.82	-94.85	-24.16	10.14	580.92	573.35	7.57	76.732		
2,900.00	2,899.81	2,220.00	2,219.40	10.98	6.82	-94.85	-24.16	10.14	680.85	673.18	7.68	88.680		
3,000.00	2,999.75	2,220.00	2,219.40	11.31	6.82	-94.85	-24.16	10.14	780.81	773.02	7.79	100.244		
3,100.00	3,099.69	2,220.00	2,219.40	11.63	6.82	-94.85	-24.16	10.14	880.77	872.87	7.90	111.428		
3,200.00	3,199.63	2,220.00	2,219.40	11.96	6.82	-94.85	-24.16	10.14	980.74	972.72	8.02	122.241		
3,300.00	3,299.57	2,220.00	2,219.40	12.29	6.82	-94.85	-24.16	10.14	1,080.72	1,072.58	8.14	132.690		
3,400.00	3,399.51	2,220.00	2,219.40	12.62	6.82	-94.85	-24.16	10.14	1,180.70	1,172.43	8.27	142.780		
3,500.00	3,499.45	2,220.00	2,219.40	12.95	6.82	-94.85	-24.16	10.14	1,280.68	1,272.29	8.40	152.520		
3,600.00	3,599.38	2,220.00	2,219.40	13.28	6.82	-94.85	-24.16	10.14	1,380.67	1,372.14	8.53	161.916		
3,700.00	3,699.32	2,220.00	2,219.40	13.62	6.82	-94.85	-24.16	10.14	1,480.66	1,472.00	8.66	170.976		
3,800.00	3,799.26	2,220.00	2,219.40	13.96	6.82	-94.85	-24.16	10.14	1,580.65	1,571.85	8.80	179.707		
3,900.00	3,899.20	2,220.00	2,219.40	14.30	6.82	-94.85	-24.16	10.14	1,680.64	1,671.70	8.93	188.117		
4,000.00	3,999.14	2,220.00	2,219.40	14.64	6.82	-94.85	-24.16	10.14	1,780.63	1,771.56	9.07	196.214		
4,100.00	4,099.08	2,220.00	2,219.40	14.98	6.82	-94.85	-24.16	10.14	1,880.62	1,871.40	9.22	204.004		
4,200.00	4,199.02	2,220.00	2,219.40	15.32	6.82	-94.85	-24.16	10.14	1,980.62	1,971.25	9.36	211.497		
4,300.00	4,298.96	2,220.00	2,219.40	15.67	6.82	-94.85	-24.16	10.14	2,080.61	2,071.10	9.51	218.699		
4,400.00	4,398.90	2,220.00	2,219.40	16.01	6.82	-94.85	-24.16	10.14	2,180.61	2,170.94	9.67	225.618		
4,500.00	4,498.84	2,220.00	2,219.40	16.36	6.82	-94.85	-24.16	10.14	2,280.60	2,270.78	9.82	232.261		
4,600.00	4,598.78	2,220.00	2,219.40	16.71	6.82	-94.85	-24.16	10.14	2,380.60	2,370.62	9.98	238.637		
4,700.00	4,698.72	2,220.00	2,219.40	17.07	6.82	-94.85	-24.16	10.14	2,480.59	2,470.46	10.14	244.751		
4,800.00	4,798.66	2,220.00	2,219.40	17.42	6.82	-94.85	-24.16	10.14	2,580.59	2,570.29	10.30	250.613		

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

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
TVD Reference: RKB @ 3351.70usft (Scandril Quest)
MD Reference: RKB @ 3351.70usft (Scandril Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Surveys (Scandril Quest)													Offset Site Error:	0.00 usft
Survey Program: 50-MWD, 1300-MWD+HRGM													Offset Well Error:	1.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		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		
4,900.00	4,898.60	2,220.00	2,219.40	17.78	6.82	-94.85	-24.16	10.14	2,680.58	2,670.12	10.46	256.228		
5,000.00	4,998.53	2,220.00	2,219.40	18.13	6.82	-94.85	-24.16	10.14	2,780.58	2,769.95	10.63	261.604		
5,100.00	5,098.47	2,220.00	2,219.40	18.49	6.82	-94.85	-24.16	10.14	2,880.58	2,869.78	10.80	266.748		
5,200.00	5,198.41	2,220.00	2,219.40	18.85	6.82	-94.85	-24.16	10.14	2,980.57	2,969.60	10.97	271.668		
5,300.00	5,298.35	2,220.00	2,219.40	19.21	6.82	-94.85	-24.16	10.14	3,080.57	3,069.43	11.15	276.368		
5,400.00	5,398.29	2,220.00	2,219.40	19.57	6.82	-94.85	-24.16	10.14	3,180.57	3,169.25	11.32	280.857		
5,500.00	5,498.23	2,220.00	2,219.40	19.93	6.82	-94.85	-24.16	10.14	3,280.57	3,269.06	11.51	285.141		
5,600.00	5,598.17	2,220.00	2,219.40	20.29	6.82	-94.85	-24.16	10.14	3,380.57	3,368.88	11.69	289.226		
5,700.00	5,698.11	2,220.00	2,219.40	20.66	6.82	-94.85	-24.16	10.14	3,480.56	3,468.69	11.87	293.118		
5,800.00	5,798.05	2,220.00	2,219.40	21.02	6.82	-94.85	-24.16	10.14	3,580.56	3,568.50	12.06	296.824		
5,900.00	5,897.99	2,220.00	2,219.40	21.38	6.82	-94.85	-24.16	10.14	3,680.56	3,668.30	12.25	300.349		
6,000.00	5,997.93	2,220.00	2,219.40	21.74	6.82	-94.85	-24.16	10.14	3,780.56	3,768.11	12.45	303.699		
6,100.00	6,097.87	2,220.00	2,219.40	22.11	6.82	-94.85	-24.16	10.14	3,880.56	3,867.91	12.65	306.881		
6,200.00	6,197.81	2,220.00	2,219.40	22.47	6.82	-94.85	-24.16	10.14	3,980.55	3,967.71	12.84	309.899		
6,300.00	6,297.75	2,220.00	2,219.40	22.83	6.82	-94.85	-24.16	10.14	4,080.55	4,067.51	13.05	312.759		
6,400.00	6,397.68	2,220.00	2,219.40	23.20	6.82	-94.85	-24.16	10.14	4,180.55	4,167.30	13.25	315.466		
6,500.00	6,497.62	2,220.00	2,219.40	23.56	6.82	-94.85	-24.16	10.14	4,280.55	4,267.09	13.46	318.025		
6,600.00	6,597.56	2,220.00	2,219.40	23.92	6.82	-94.85	-24.16	10.14	4,380.55	4,366.88	13.67	320.442		
6,700.00	6,697.50	2,220.00	2,219.40	24.28	6.82	-94.85	-24.16	10.14	4,480.55	4,466.66	13.88	322.721		
6,800.00	6,797.44	2,220.00	2,219.40	24.65	6.82	-94.85	-24.16	10.14	4,580.55	4,566.45	14.10	324.867		
6,900.00	6,897.38	2,220.00	2,219.40	25.01	6.82	-94.85	-24.16	10.14	4,680.55	4,666.23	14.32	326.884		
7,000.00	6,997.32	2,220.00	2,219.40	25.37	6.82	-94.85	-24.16	10.14	4,780.54	4,766.00	14.54	328.778		
7,100.00	7,097.26	2,220.00	2,219.40	25.74	6.82	-94.85	-24.16	10.14	4,880.54	4,865.78	14.76	330.552		
7,200.00	7,197.20	2,220.00	2,219.40	26.10	6.82	-94.85	-24.16	10.14	4,980.54	4,965.55	14.99	332.211		
7,300.00	7,297.14	2,220.00	2,219.40	26.46	6.82	-94.85	-24.16	10.14	5,080.54	5,065.32	15.22	333.758		
7,400.00	7,397.08	2,220.00	2,219.40	26.83	6.82	-94.85	-24.16	10.14	5,180.54	5,165.08	15.46	335.199		
7,500.00	7,497.02	2,220.00	2,219.40	27.19	6.82	-94.85	-24.16	10.14	5,280.54	5,264.85	15.69	336.535		
7,600.00	7,596.96	2,220.00	2,219.40	27.55	6.82	-94.85	-24.16	10.14	5,380.54	5,364.61	15.93	337.773		
7,700.00	7,696.90	2,220.00	2,219.40	27.91	6.82	-94.85	-24.16	10.14	5,480.54	5,464.37	16.17	338.914		
7,800.00	7,796.83	2,220.00	2,219.40	28.28	6.82	-94.85	-24.16	10.14	5,580.54	5,564.12	16.42	339.963		
7,900.00	7,896.77	2,220.00	2,219.40	28.64	6.82	-94.85	-24.16	10.14	5,680.54	5,663.87	16.66	340.922		
8,000.00	7,996.71	2,220.00	2,219.40	29.00	6.82	-94.85	-24.16	10.14	5,780.54	5,763.62	16.91	341.796		
8,100.00	8,096.65	2,220.00	2,219.40	29.37	6.82	-94.85	-24.16	10.14	5,880.53	5,863.37	17.17	342.588		
8,200.00	8,196.59	2,220.00	2,219.40	29.73	6.82	-94.85	-24.16	10.14	5,980.53	5,963.11	17.42	343.300		
8,300.00	8,296.53	2,220.00	2,219.40	30.09	6.82	-94.85	-24.16	10.14	6,080.53	6,062.85	17.68	343.935		
8,400.00	8,396.47	2,220.00	2,219.40	30.45	6.82	-94.85	-24.16	10.14	6,180.53	6,162.59	17.94	344.497		
8,500.00	8,496.41	2,220.00	2,219.40	30.82	6.82	-94.85	-24.16	10.14	6,280.53	6,262.33	18.21	344.989		
8,600.00	8,596.35	2,220.00	2,219.40	31.18	6.82	-94.85	-24.16	10.14	6,380.53	6,362.06	18.47	345.412		
8,700.00	8,696.29	2,220.00	2,219.40	31.54	6.82	-94.85	-24.16	10.14	6,480.53	6,461.79	18.74	345.770		
8,800.00	8,796.23	2,220.00	2,219.40	31.90	6.82	-94.85	-24.16	10.14	6,580.53	6,561.51	19.02	346.065		
8,900.00	8,896.17	2,220.00	2,219.40	32.27	6.82	-94.85	-24.16	10.14	6,680.53	6,661.24	19.29	346.300		
9,000.00	8,996.11	2,220.00	2,219.40	32.63	6.82	-94.85	-24.16	10.14	6,780.53	6,760.96	19.57	346.476		
9,100.00	9,096.05	2,220.00	2,219.40	32.99	6.82	-94.85	-24.16	10.14	6,880.53	6,860.68	19.85	346.597		
9,200.00	9,195.98	2,220.00	2,219.40	33.35	6.82	-94.85	-24.16	10.14	6,980.53	6,960.39	20.14	346.665		
9,300.00	9,295.92	2,220.00	2,219.40	33.72	6.82	-94.85	-24.16	10.14	7,080.53	7,060.10	20.42	346.681		
9,400.00	9,395.86	2,220.00	2,219.40	34.08	6.82	-94.85	-24.16	10.14	7,180.53	7,159.81	20.71	346.648		
9,500.00	9,495.80	2,220.00	2,219.40	34.44	6.82	-94.85	-24.16	10.14	7,280.53	7,259.52	21.01	346.568		
9,600.00	9,595.74	2,220.00	2,219.40	34.80	6.82	-94.85	-24.16	10.14	7,380.53	7,359.22	21.30	346.442		
9,700.00	9,695.68	2,220.00	2,219.40	35.17	6.82	-94.85	-24.16	10.14	7,480.53	7,458.92	21.60	346.273		
9,800.00	9,795.62	2,220.00	2,219.40	35.53	6.82	-94.85	-24.16	10.14	7,580.52	7,558.62	21.91	346.062		
9,900.00	9,895.56	2,220.00	2,219.40	35.89	6.82	-94.85	-24.16	10.14	7,680.52	7,658.31	22.21	345.811		
10,000.00	9,995.50	2,220.00	2,219.40	36.25	6.82	-94.85	-24.16	10.14	7,780.52	7,758.01	22.52	345.522		

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

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Stove Pipe Federal Com
 Site Error: 0.00 usft
 Reference Well: 601H
 Well Error: 1.00 usft
 Reference Wellbore OH
 Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandriil Quest)
 MD Reference: RKB @ 3351.70usft (Scandriil Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Surveys (Scandriil Quest)													Offset Site Error: 0.00 usft
Survey Program: 50-MWD, 1300-MWD+HRGM													Offset Well Error: 1.00 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)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,100.00	10,095.44	2,220.00	2,219.40	36.61	6.82	-94.85	-24.16	10.14	7,880.52	7,857.69	22.83	345.197	
10,200.00	10,195.38	2,220.00	2,219.40	36.98	6.82	-94.85	-24.16	10.14	7,980.52	7,957.38	23.14	344.836	
10,300.00	10,295.32	2,220.00	2,219.40	37.34	6.82	-94.85	-24.16	10.14	8,080.52	8,057.06	23.46	344.442	
10,400.00	10,395.26	2,220.00	2,219.40	37.70	6.82	-94.85	-24.16	10.14	8,180.52	8,156.74	23.78	344.015	
10,500.00	10,495.20	2,220.00	2,219.40	38.06	6.82	-94.85	-24.16	10.14	8,280.52	8,256.42	24.10	343.558	
10,600.00	10,595.13	2,220.00	2,219.40	38.43	6.82	-94.85	-24.16	10.14	8,380.52	8,356.09	24.43	343.071	
10,700.00	10,695.07	2,220.00	2,219.40	38.79	6.82	-94.85	-24.16	10.14	8,480.52	8,455.77	24.76	342.557	
10,800.00	10,795.01	2,220.00	2,219.40	39.15	6.82	-94.85	-24.16	10.14	8,580.52	8,555.43	25.09	342.015	
10,900.00	10,894.95	2,220.00	2,219.40	39.51	6.82	-94.85	-24.16	10.14	8,680.52	8,655.10	25.42	341.448	
11,000.00	10,994.89	2,220.00	2,219.40	39.87	6.82	-94.85	-24.16	10.14	8,780.52	8,754.76	25.76	340.856	
11,100.00	11,094.83	2,220.00	2,219.40	40.24	6.82	-94.85	-24.16	10.14	8,880.52	8,854.42	26.10	340.242	
11,200.00	11,194.77	2,220.00	2,219.40	40.60	6.82	-94.85	-24.16	10.14	8,980.52	8,954.08	26.44	339.604	
11,300.00	11,294.71	2,220.00	2,219.40	40.96	6.82	-94.85	-24.16	10.14	9,080.52	9,053.73	26.79	338.946	
11,400.00	11,394.65	2,220.00	2,219.40	41.32	6.82	-94.85	-24.16	10.14	9,180.52	9,153.38	27.14	338.267	
11,500.00	11,494.59	2,220.00	2,219.40	41.69	6.82	-94.85	-24.16	10.14	9,280.52	9,253.03	27.49	337.569	
11,600.00	11,594.53	2,220.00	2,219.40	42.05	6.82	-94.85	-24.16	10.14	9,380.52	9,352.67	27.85	336.853	
11,700.00	11,694.47	2,220.00	2,219.40	42.41	6.82	-94.85	-24.16	10.14	9,480.52	9,452.31	28.21	336.120	
11,800.00	11,794.41	2,220.00	2,219.40	42.77	6.82	-94.85	-24.16	10.14	9,580.52	9,551.95	28.57	335.369	
11,900.00	11,894.35	2,220.00	2,219.40	43.13	6.82	-94.85	-24.16	10.14	9,680.52	9,651.59	28.93	334.603	
12,000.00	11,994.28	2,220.00	2,219.40	43.50	6.82	-94.85	-24.16	10.14	9,780.52	9,751.22	29.30	333.823	
12,100.00	12,094.01	2,220.00	2,219.40	43.84	6.82	-14.67	-24.16	10.14	9,880.26	9,850.60	29.67	333.044	
12,200.00	12,191.47	2,220.00	2,219.40	44.25	6.82	-6.48	-24.16	10.14	9,977.63	9,947.59	30.03	332.214	
12,300.00	12,283.69	2,220.00	2,219.40	44.68	6.82	-4.23	-24.16	10.14	10,069.76	10,039.36	30.40	331.202	
12,400.00	12,367.88	2,220.00	2,219.40	45.06	6.82	-3.21	-24.16	10.14	10,154.06	10,123.28	30.78	329.925	
12,500.00	12,441.49	2,220.00	2,219.40	45.37	6.82	-2.65	-24.16	10.14	10,228.17	10,197.01	31.15	328.315	
12,600.00	12,502.27	2,220.00	2,219.40	45.60	6.82	-2.32	-24.16	10.14	10,290.08	10,258.55	31.53	326.311	
12,700.00	12,548.38	2,220.00	2,219.40	45.78	6.82	-2.12	-24.16	10.14	10,338.16	10,306.23	31.92	323.866	
12,800.00	12,578.41	2,220.00	2,219.40	45.93	6.82	-2.00	-24.16	10.14	10,371.13	10,338.81	32.31	320.954	
12,900.00	12,591.46	2,220.00	2,219.40	46.07	6.82	-1.96	-24.16	10.14	10,388.14	10,355.43	32.71	317.586	
13,000.00	12,591.69	2,220.00	2,219.40	46.25	6.82	-1.95	-24.16	10.14	10,393.33	10,360.45	32.88	316.070	
13,100.00	12,591.25	2,220.00	2,219.40	46.49	6.82	-1.95	-24.16	10.14	10,398.82	10,365.79	33.03	314.811	
13,200.00	12,590.81	2,220.00	2,219.40	46.78	6.82	-1.95	-24.16	10.14	10,405.26	10,372.05	33.21	313.322	
13,300.00	12,590.37	2,220.00	2,219.40	47.13	6.82	-1.95	-24.16	10.14	10,412.66	10,379.24	33.41	311.631	
13,400.00	12,589.94	2,220.00	2,219.40	47.52	6.82	-1.95	-24.16	10.14	10,421.01	10,387.37	33.64	309.752	
13,500.00	12,589.50	2,220.00	2,219.40	47.96	6.82	-1.95	-24.16	10.14	10,430.32	10,396.42	33.90	307.700	
13,600.00	12,589.06	2,220.00	2,219.40	48.44	6.82	-1.95	-24.16	10.14	10,440.57	10,406.39	34.18	305.491	
13,700.00	12,588.62	2,220.00	2,219.40	48.96	6.82	-1.95	-24.16	10.14	10,451.77	10,417.29	34.48	303.141	
13,800.00	12,588.18	2,220.00	2,219.40	49.52	6.82	-1.95	-24.16	10.14	10,463.92	10,429.11	34.80	300.667	
13,900.00	12,587.74	2,220.00	2,219.40	50.11	6.82	-1.95	-24.16	10.14	10,477.00	10,441.85	35.15	298.085	
14,000.00	12,587.31	2,220.00	2,219.40	50.74	6.82	-1.95	-24.16	10.14	10,491.03	10,455.51	35.51	295.410	
14,100.00	12,586.87	2,220.00	2,219.40	51.41	6.82	-1.95	-24.16	10.14	10,505.98	10,470.08	35.90	292.660	
14,200.00	12,586.43	2,220.00	2,219.40	52.10	6.82	-1.95	-24.16	10.14	10,521.87	10,485.56	36.30	289.847	
14,300.00	12,585.99	2,220.00	2,219.40	52.83	6.82	-1.95	-24.16	10.14	10,538.68	10,501.95	36.72	286.987	
14,400.00	12,585.55	2,220.00	2,219.40	53.58	6.82	-1.95	-24.16	10.14	10,556.41	10,519.25	37.16	284.092	
14,500.00	12,585.11	2,220.00	2,219.40	54.36	6.82	-1.95	-24.16	10.14	10,575.05	10,537.44	37.61	281.176	
14,600.00	12,584.68	2,220.00	2,219.40	55.17	6.82	-1.95	-24.16	10.14	10,594.61	10,556.53	38.08	278.248	
14,700.00	12,584.24	2,220.00	2,219.40	56.00	6.82	-1.95	-24.16	10.14	10,615.07	10,576.52	38.56	275.320	
14,800.00	12,583.80	2,220.00	2,219.40	56.86	6.82	-1.95	-24.16	10.14	10,636.44	10,597.39	39.05	272.401	
14,900.00	12,583.36	2,220.00	2,219.40	57.74	6.82	-1.95	-24.16	10.14	10,658.70	10,619.15	39.55	269.500	
15,000.00	12,582.92	2,220.00	2,219.40	58.64	6.82	-1.95	-24.16	10.14	10,681.85	10,641.78	40.06	266.623	
15,100.00	12,582.48	2,220.00	2,219.40	59.57	6.82	-1.95	-24.16	10.14	10,705.88	10,665.29	40.59	263.779	
15,200.00	12,582.04	2,220.00	2,219.40	60.51	6.82	-1.95	-24.16	10.14	10,730.79	10,689.67	41.12	260.972	

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

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well 601H
TVD Reference: RKB @ 3351.70usft (Scandril Quest)
MD Reference: RKB @ 3351.70usft (Scandril Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Surveys (Scandril Quest)													Offset Site Error: 0.00 usft
Survey Program: 50-MWD, 1300-MWD+HRGM													Offset Well Error: 1.00 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 Tooface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
15,300.00	12,581.61	2,220.00	2,219.40	61.47	6.82	-1.95	-24.16	10.14	10,756.57	10,714.92	41.66	258.208	
15,400.00	12,581.17	2,220.00	2,219.40	62.45	6.82	-1.95	-24.16	10.14	10,783.22	10,741.02	42.21	255.492	
15,500.00	12,580.73	2,220.00	2,219.40	63.45	6.82	-1.95	-24.16	10.14	10,810.73	10,767.97	42.76	252.826	
15,600.00	12,580.29	2,220.00	2,219.40	64.47	6.82	-1.95	-24.16	10.14	10,839.09	10,795.78	43.32	250.215	
15,700.00	12,579.85	2,220.00	2,219.40	65.50	6.82	-1.95	-24.16	10.14	10,868.30	10,824.42	43.88	247.660	
15,800.00	12,579.41	2,220.00	2,219.40	66.54	6.82	-1.95	-24.16	10.14	10,898.35	10,853.90	44.45	245.165	
15,900.00	12,578.98	2,220.00	2,219.40	67.61	6.82	-1.95	-24.16	10.14	10,929.23	10,884.20	45.03	242.730	
16,000.00	12,578.54	2,220.00	2,219.40	68.68	6.82	-1.95	-24.16	10.14	10,960.93	10,915.33	45.60	240.357	
16,100.00	12,578.10	2,220.00	2,219.40	69.77	6.82	-1.95	-24.16	10.14	10,993.46	10,947.27	46.18	238.046	
16,200.00	12,577.66	2,220.00	2,219.40	70.87	6.82	-1.95	-24.16	10.14	11,026.79	10,980.03	46.76	235.799	
16,300.00	12,577.22	2,220.00	2,219.40	71.98	6.82	-1.95	-24.16	10.14	11,060.93	11,013.58	47.35	233.615	
16,400.00	12,576.78	2,220.00	2,219.40	73.10	6.82	-1.95	-24.16	10.14	11,095.86	11,047.93	47.93	231.494	
16,500.00	12,576.35	2,220.00	2,219.40	74.23	6.82	-1.95	-24.16	10.14	11,131.58	11,083.07	48.52	229.437	
16,600.00	12,575.91	2,220.00	2,219.40	75.38	6.82	-1.95	-24.16	10.14	11,168.09	11,118.98	49.10	227.443	
16,700.00	12,575.47	2,220.00	2,219.40	76.53	6.82	-1.95	-24.16	10.14	11,205.37	11,155.68	49.69	225.511	
16,800.00	12,575.03	2,220.00	2,219.40	77.69	6.82	-1.95	-24.16	10.14	11,243.41	11,193.13	50.27	223.641	
16,900.00	12,574.59	2,220.00	2,219.40	78.87	6.82	-1.95	-24.16	10.14	11,282.21	11,231.35	50.86	221.831	
17,000.00	12,574.15	2,220.00	2,219.40	80.05	6.82	-1.95	-24.16	10.14	11,321.76	11,270.32	51.44	220.082	
17,100.00	12,573.72	2,220.00	2,219.40	81.23	6.82	-1.95	-24.16	10.14	11,362.06	11,310.03	52.03	218.392	
17,200.00	12,573.28	2,220.00	2,219.40	82.43	6.82	-1.95	-24.16	10.14	11,403.08	11,350.48	52.61	216.759	
17,300.00	12,572.84	2,220.00	2,219.40	83.64	6.82	-1.95	-24.16	10.14	11,444.84	11,391.65	53.19	215.184	
17,400.00	12,572.40	2,220.00	2,219.40	84.85	6.82	-1.95	-24.16	10.14	11,487.31	11,433.55	53.76	213.664	
17,500.00	12,571.96	2,220.00	2,219.40	86.07	6.82	-1.95	-24.16	10.14	11,530.50	11,476.16	54.34	212.199	
17,600.00	12,571.52	2,220.00	2,219.40	87.29	6.82	-1.95	-24.16	10.14	11,574.39	11,519.48	54.91	210.787	
17,700.00	12,571.08	2,220.00	2,219.40	88.52	6.82	-1.95	-24.16	10.14	11,618.97	11,563.49	55.48	209.427	
17,800.00	12,570.65	2,220.00	2,219.40	89.76	6.82	-1.95	-24.16	10.14	11,664.24	11,608.19	56.05	208.118	
17,900.00	12,570.21	2,220.00	2,219.40	91.00	6.82	-1.95	-24.16	10.14	11,710.19	11,653.58	56.61	206.859	
18,000.00	12,569.77	2,220.00	2,219.40	92.25	6.82	-1.95	-24.16	10.14	11,756.81	11,699.64	57.17	205.648	
18,100.00	12,569.33	2,220.00	2,219.40	93.51	6.82	-1.95	-24.16	10.14	11,804.09	11,746.36	57.73	204.484	
18,200.00	12,568.89	2,220.00	2,219.40	94.76	6.82	-1.95	-24.16	10.14	11,852.03	11,793.75	58.28	203.366	
18,300.00	12,568.45	2,220.00	2,219.40	96.03	6.82	-1.95	-24.16	10.14	11,900.61	11,841.78	58.83	202.293	
18,400.00	12,568.02	2,220.00	2,219.40	97.30	6.82	-1.95	-24.16	10.14	11,949.84	11,890.46	59.37	201.264	
18,500.00	12,567.58	2,220.00	2,219.40	98.57	6.82	-1.95	-24.16	10.14	11,999.69	11,939.78	59.92	200.277	
18,600.00	12,567.14	2,220.00	2,219.40	99.85	6.82	-1.95	-24.16	10.14	12,050.17	11,989.72	60.45	199.331	
18,700.00	12,566.70	2,220.00	2,219.40	101.13	6.82	-1.95	-24.16	10.14	12,101.27	12,040.28	60.99	198.426	
18,800.00	12,566.26	2,220.00	2,219.40	102.42	6.82	-1.95	-24.16	10.14	12,152.97	12,091.45	61.52	197.559	
18,900.00	12,565.82	2,220.00	2,219.40	103.71	6.82	-1.95	-24.16	10.14	12,205.27	12,143.23	62.04	196.731	
19,000.00	12,565.39	2,220.00	2,219.40	105.00	6.82	-1.95	-24.16	10.14	12,258.17	12,195.61	62.56	195.939	
19,100.00	12,564.95	2,220.00	2,219.40	106.30	6.82	-1.95	-24.16	10.14	12,311.65	12,248.57	63.08	195.184	
19,200.00	12,564.51	2,220.00	2,219.40	107.60	6.82	-1.95	-24.16	10.14	12,365.71	12,302.12	63.59	194.463	
19,300.00	12,564.07	2,220.00	2,219.40	108.91	6.82	-1.95	-24.16	10.14	12,420.34	12,356.24	64.10	193.776	
19,400.00	12,563.63	2,220.00	2,219.40	110.21	6.82	-1.95	-24.16	10.14	12,475.53	12,410.93	64.60	193.122	
19,500.00	12,563.19	2,220.00	2,219.40	111.53	6.82	-1.95	-24.16	10.14	12,531.27	12,466.18	65.10	192.500	
19,600.00	12,562.76	2,220.00	2,219.40	112.84	6.82	-1.95	-24.16	10.14	12,587.57	12,521.98	65.59	191.910	
19,700.00	12,562.32	2,220.00	2,219.40	114.16	6.82	-1.95	-24.16	10.14	12,644.40	12,578.32	66.08	191.349	
19,800.00	12,561.88	2,220.00	2,219.40	115.48	6.82	-1.95	-24.16	10.14	12,701.77	12,635.20	66.56	190.818	
19,900.00	12,561.44	2,220.00	2,219.40	116.80	6.82	-1.95	-24.16	10.14	12,759.66	12,692.62	67.04	190.316	
20,000.00	12,561.00	2,220.00	2,219.40	118.12	6.82	-1.95	-24.16	10.14	12,818.07	12,750.55	67.52	189.841	
20,100.00	12,560.56	2,220.00	2,219.40	119.45	6.82	-1.95	-24.16	10.14	12,876.99	12,809.00	67.99	189.393	
20,200.00	12,560.12	2,220.00	2,219.40	120.78	6.82	-1.95	-24.16	10.14	12,936.42	12,867.96	68.46	188.972	
20,300.00	12,559.69	2,220.00	2,219.40	122.11	6.82	-1.95	-24.16	10.14	12,996.35	12,927.43	68.92	188.576	
20,400.00	12,559.25	2,220.00	2,219.40	123.45	6.82	-1.95	-24.16	10.14	13,056.76	12,987.39	69.38	188.204	

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

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Stove Pipe Federal Com
 Site Error: 0.00 usft
 Reference Well: 601H
 Well Error: 1.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 2 12-19-19

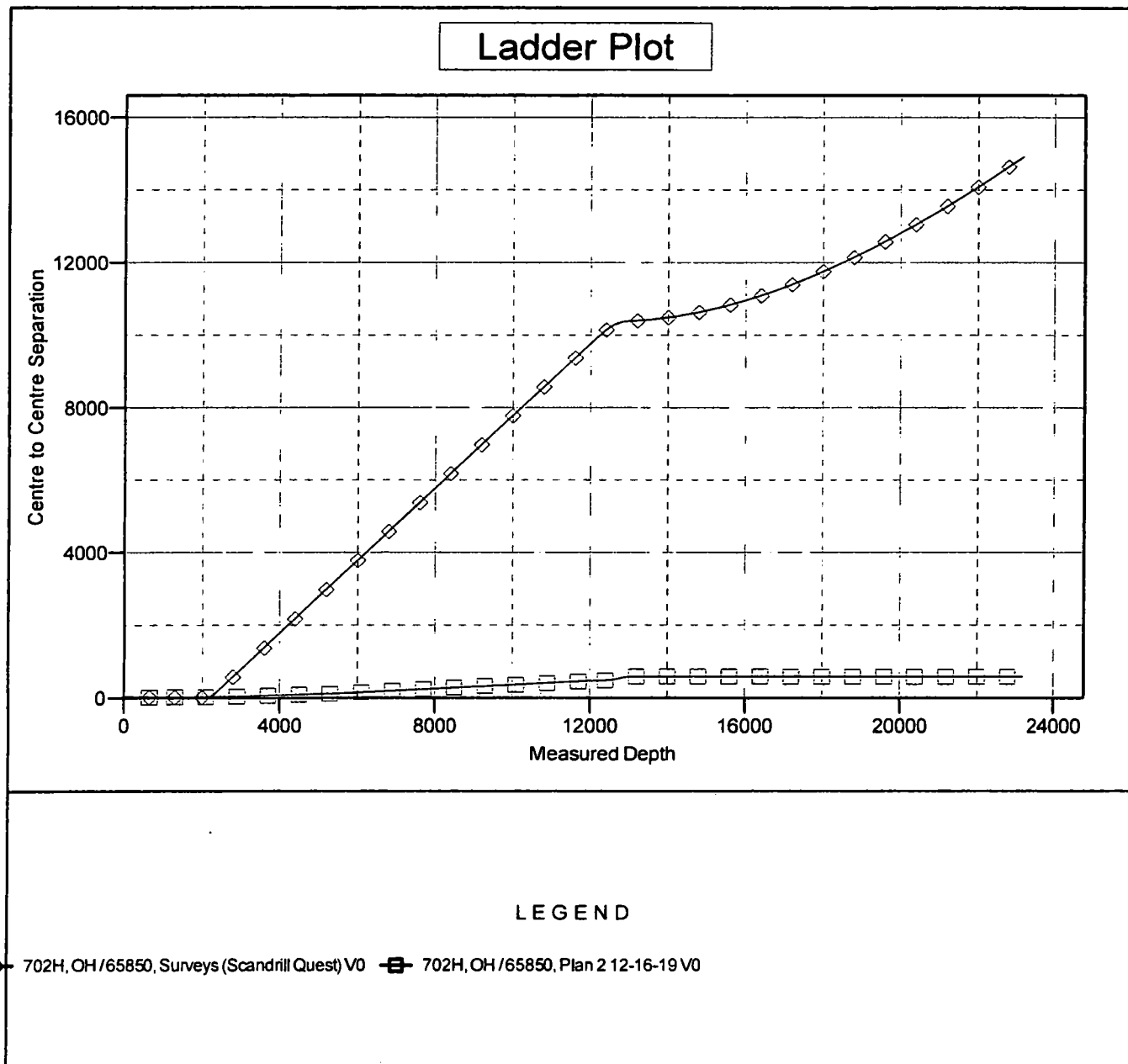
Local Co-ordinate Reference: Well 601H
 TVD Reference: RKB @ 3351.70usft (Scandril Quest)
 MD Reference: RKB @ 3351.70usft (Scandril Quest)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Stove Pipe Federal Com - 702H - OH / 65850 - Surveys (Scandril Quest)													Offset Site Error: 0.00 usft
Survey Program: 50-MWD 1300-MWD+HRGM													Offset Well Error: 1.00 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 Tooface (")	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
20,500.00	12,558.81	2,220.00	2,219.40	124.79	6.82	-1.95	-24.16	10.14	13,117.66	13,047.83	69.83	187.857	
20,600.00	12,558.37	2,220.00	2,219.40	126.13	6.82	-1.95	-24.16	10.14	13,179.04	13,108.76	70.28	187.533	
20,700.00	12,557.93	2,220.00	2,219.40	127.47	6.82	-1.95	-24.16	10.14	13,240.89	13,170.17	70.72	187.232	
20,800.00	12,557.49	2,220.00	2,219.40	128.81	6.82	-1.95	-24.16	10.14	13,303.20	13,232.04	71.16	186.953	
20,900.00	12,557.06	2,220.00	2,219.40	130.16	6.82	-1.95	-24.16	10.14	13,365.97	13,294.38	71.59	186.696	
21,000.00	12,556.62	2,220.00	2,219.40	131.50	6.82	-1.95	-24.16	10.14	13,429.19	13,357.17	72.02	186.459	
21,100.00	12,556.18	2,220.00	2,219.40	132.85	6.82	-1.95	-24.16	10.14	13,492.86	13,420.41	72.45	186.243	
21,200.00	12,555.74	2,220.00	2,219.40	134.20	6.82	-1.95	-24.16	10.14	13,556.96	13,484.09	72.87	186.046	
21,300.00	12,555.30	2,220.00	2,219.40	135.56	6.82	-1.95	-24.16	10.14	13,621.50	13,548.21	73.29	185.869	
21,400.00	12,554.86	2,220.00	2,219.40	136.91	6.82	-1.95	-24.16	10.14	13,686.46	13,612.76	73.70	185.710	
21,500.00	12,554.43	2,220.00	2,219.40	138.27	6.82	-1.95	-24.16	10.14	13,751.85	13,677.74	74.11	185.569	
21,600.00	12,553.99	2,220.00	2,219.40	139.62	6.82	-1.95	-24.16	10.14	13,817.64	13,743.13	74.51	185.446	
21,700.00	12,553.55	2,220.00	2,219.40	140.98	6.82	-1.95	-24.16	10.14	13,883.85	13,808.94	74.91	185.340	
21,800.00	12,553.11	2,220.00	2,219.40	142.34	6.82	-1.95	-24.16	10.14	13,950.46	13,875.15	75.31	185.251	
21,900.00	12,552.67	2,220.00	2,219.40	143.71	6.82	-1.95	-24.16	10.14	14,017.47	13,941.77	75.70	185.179	
22,000.00	12,552.23	2,220.00	2,219.40	145.07	6.82	-1.95	-24.16	10.14	14,084.86	14,008.78	76.08	185.122	
22,100.00	12,551.80	2,220.00	2,219.40	146.44	6.82	-1.95	-24.16	10.14	14,152.65	14,076.18	76.47	185.080	
22,200.00	12,551.36	2,220.00	2,219.40	147.80	6.82	-1.95	-24.16	10.14	14,220.81	14,143.96	76.85	185.053	
22,300.00	12,550.92	2,220.00	2,219.40	149.17	6.82	-1.95	-24.16	10.14	14,289.35	14,212.12	77.22	185.041	
22,400.00	12,550.48	2,220.00	2,219.40	150.54	6.82	-1.95	-24.16	10.14	14,358.25	14,280.66	77.59	185.043	
22,500.00	12,550.04	2,220.00	2,219.40	151.91	6.82	-1.95	-24.16	10.14	14,427.53	14,349.56	77.96	185.059	
22,600.00	12,549.60	2,220.00	2,219.40	153.28	6.82	-1.95	-24.16	10.14	14,497.16	14,418.83	78.33	185.088	
22,700.00	12,549.16	2,220.00	2,219.40	154.65	6.82	-1.95	-24.16	10.14	14,567.14	14,488.45	78.69	185.131	
22,800.00	12,548.73	2,220.00	2,219.40	156.03	6.82	-1.95	-24.16	10.14	14,637.47	14,558.43	79.04	185.186	
22,900.00	12,548.29	2,220.00	2,219.40	157.40	6.82	-1.95	-24.16	10.14	14,708.15	14,628.75	79.39	185.253	
23,000.00	12,547.85	2,220.00	2,219.40	158.78	6.82	-1.95	-24.16	10.14	14,779.16	14,699.42	79.74	185.332	
23,100.00	12,547.41	2,220.00	2,219.40	160.15	6.82	-1.95	-24.16	10.14	14,850.51	14,770.42	80.09	185.424	
23,193.78	12,547.00	2,220.00	2,219.40	161.44	6.82	-1.95	-24.16	10.14	14,917.72	14,837.31	80.41	185.520	

Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well601H
TVD Reference: RKB @ 3351.70usft (Scandril Quest)
MD Reference: RKB @ 3351.70usft (Scandril Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB @ 3351.70usft (Scandril Quest) Coordinates are relative to: 601H
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 19' 60.000000 W Grid Convergence at Surface is: 0.49°

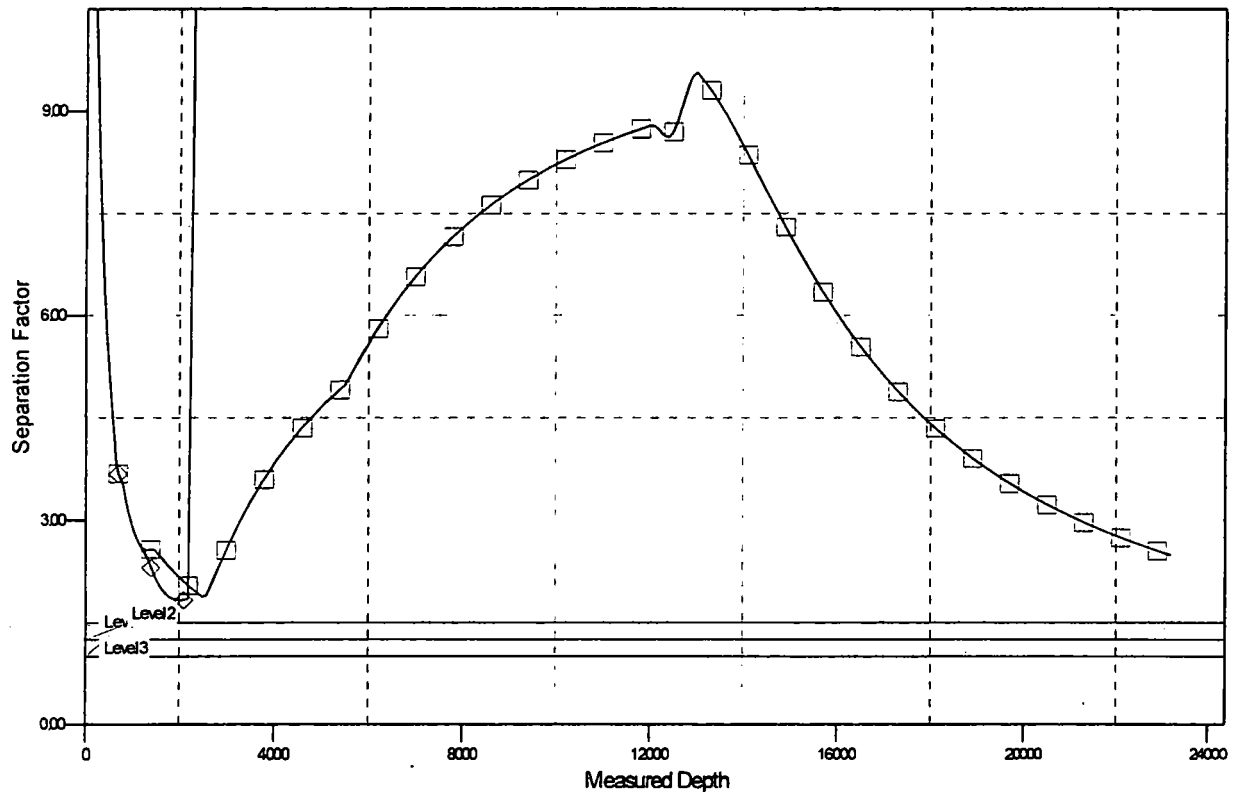


Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Reference Site: Stove Pipe Federal Com
Site Error: 0.00 usft
Reference Well: 601H
Well Error: 1.00 usft
Reference Wellbore: OH
Reference Design: Plan 2 12-19-19

Local Co-ordinate Reference: Well601H
TVD Reference: RKB @ 3351.70usft (Scandrill Quest)
MD Reference: RKB @ 3351.70usft (Scandrill Quest)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA Compass
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB @ 3351.70usft (Scandrill Quest) Coordinates are relative to: 601H
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.000000 W
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.49°

Separation Factor Plot



LEGEND

702H, OH/65850, Surveys (Scandrill Quest) V0 702H, OH/65850, Plan 2 12-16-19 V0

DISTRICT I
1620 N. FRENCH DR., BOBBS, NM 88240
Phone: (505) 893-6101 Fax: (505) 893-0700

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (505) 748-1289 Fax: (505) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 336-6178 Fax: (505) 336-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87605
Phone: (505) 478-3480 Fax: (505) 478-3482

State of New Mexico
Energy, Minerals & Natural Resources Department
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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015 46556	Pool Code	Pool Name Wildcat; Bone Spring
Property Code	Property Name STOVE PIPE FEDERAL COM	Well Number 601H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3321.7'

Surface Location

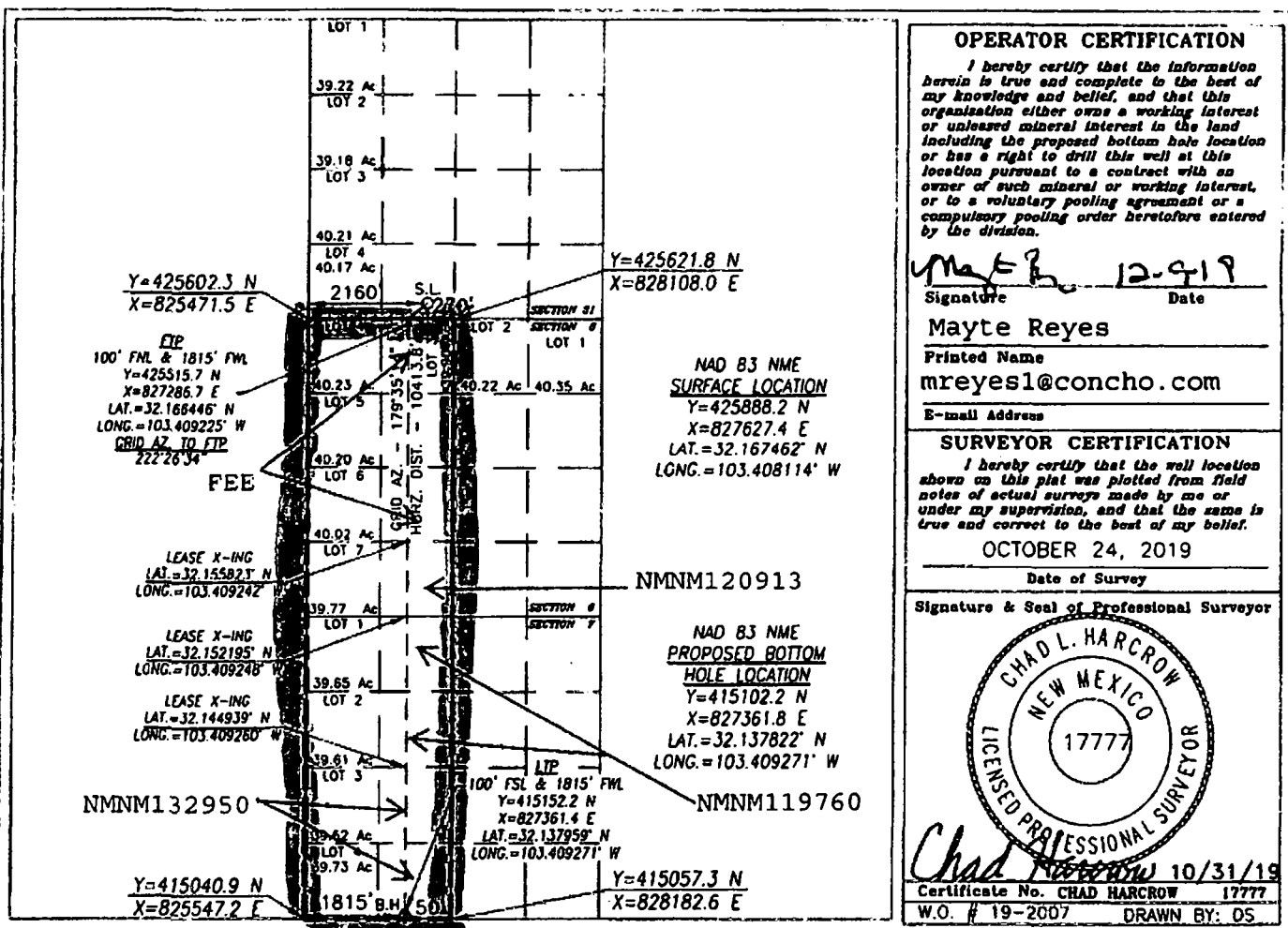
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	31	24-S	35-E		270	SOUTH	2160	WEST	LEA

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
N	7	25-S	35-E		50	SOUTH	1815	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
639.08			

**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**



Per LR2000 Sec. 6 Lot 3: 40.15 Lot 4: 40.36 Lot 5: 40.12 Lot 6: 39.94 Lot 7: 39.75
Sec. 7 Lot 1: 39.67 Lot 2: 39.68 Lot 3: 39.70 Lot 4: 39.71