

DATE IN 4.27.12 SUSPENSE ENGINEER DB LOGGED IN 4.27.12 TYPE NSL APP NO. 1211857753 PTGW

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



COPY

Jack Federal #14

ADMINISTRATIVE APPLICATION CHECKLIST 30-015-38643

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

- [NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
 [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
 [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
 [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
 [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
 [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]

- [A] Location - Spacing Unit - Simultaneous Dedication
☒ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

- [B] Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

- [D] Other: Specify _____

[2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or Does Not Apply

- [A] ☐ Working, Royalty or Overriding Royalty Interest Owners
 [B] ☒ Offset Operators, Leaseholders or Surface Owner
 [C] ☐ Application is One Which Requires Published Legal Notice
 [D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
 [E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or,
 [F] ☐ Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

William Miller

Print or Type Name

W. Miller

Signature

Landman

Title

3/5/12

Date

WMiller@concho.com
 e-mail Address



April 26, 2012

RECEIVED OCD
2012 APR 27 A 11:00

New Mexico Oil Conservation Division
Attn: David Brooks
1220 South St. Francis Drive
Santa Fe, NM 87505

Re: Unorthodox Location
Jack Federal #1H
Section 31, Township 25 South, Range 27 East, N.M.P.M.
SHL: 330' FNL & 380' FWL
BHL: 660' FSL & 660' FWL
Eddy County, New Mexico

Dear Mr. Brooks:

COG Operating LLC respectfully requests administrative approval for an unorthodox location of the Jack Federal #1H well as referenced above. Attached is an OCD Form C-102 showing the proposed oil/gas well spacing unit along with a map showing the adjoining spacing units. This well is unorthodox to the North & West boundary in the NW/4NW/4 in Sec. 31. The affected spacing unit is the NE/4NE/4 of Sec. 36, T25S - R26E, the SE/4SE/4 of Sec. 25, T25S - R26E, and the SW/4SW/4 of Sec. 30, T25S - R27E.

This well was drilled at this location due to the Bureau of Land Management selecting this site to minimize surface damage due to sensitive soils and topography. COG is asking for authorization for perforations to begin at 477' FWL & 790' FNL. There is approx. 604 feet of lateral that COG would like to complete and maximize well performance. Enclosed are the letters to offset operators and they will be provided a copy of this application. Thank you for your consideration of this matter.

Please do not hesitate to contact me at (575) 748-6953 should you have any questions.

Sincerely,

William Miller
Landman

WM/sw
Enclosures



COPY

April 26, 2012

Yates Petroleum Corporation
105 South 4th Street
Artesia, NM 88210

Re: Unorthodox Location
Jack Federal #1H
Section 31, Township 25 South, Range 27 East, N.M.P.M.
SHL: 330' FNL & 380' FWL
BHL: 660' FSL & 660' FWL
Eddy County, New Mexico

To Whom It May Concern:

Enclosed for your review is a copy of COG's Administrative Approval Request for an unorthodox location on the above referenced well. Yates Petroleum Corporation is a Working Interest Owner within the notice area of this proposed location. This letter serves as notice of our application for approval of this project. Any objections must be submitted in writing to NMOCD, 1220 S. St. Francis Drive, Santa Fe, New Mexico 87505. Objections must be received within twenty (20) days of receipt of this letter.

Please do not hesitate to contact me at 575-748-6953 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "WAC", written over a horizontal line.

William Miller
Landman

WM/sw
Enclosures



COPY

April 26, 2012

Chesapeake Exploration, L.L.C.
Attn: Jerris Johnson
P.O. Box 18496
Oklahoma City, OK 73154

Re: Unorthodox Location
Jack Federal #1H
Section 31, Township 25 South, Range 27 East, N.M.P.M.
SHL: 330' FNL & 380' FWL
BHL: 660' FSL & 660' FWL
Eddy County, New Mexico

Dear Mr. Johnson:

Enclosed for your review is a copy of COG's Administrative Approval Request for an unorthodox location on the above referenced well. Chesapeake Exploration, L.L.C. is a Working Interest Owner within the notice area of this proposed location. This letter serves as notice of our application for approval of this project. Any objections must be submitted in writing to NMOCD, 1220 S. St. Francis Drive, Santa Fe, New Mexico 87505. Objections must be received within twenty (20) days of receipt of this letter.

Please do not hesitate to contact me at 575-748-6953 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "W. Miller", with a stylized flourish at the end.

William Miller
Landman

WM/sw
Enclosures



COPY

April 26, 2012

Cimarex Energy Company
Attn: Mike Wallace
600 N. Marienfeld, Ste. 600
Midland, TX 79701

Re: Unorthodox Location
Jack Federal #1H
Section 31, Township 25 South, Range 27 East, N.M.P.M.
SHL: 330' FNL & 380' FWL
BHL: 660' FSL & 660' FWL
Eddy County, New Mexico

Dear Mr. Wallace:

Enclosed for your review is a copy of COG's Administrative Approval Request for an unorthodox location on the above referenced well. Cimarex Energy Company is a Working Interest Owner within the notice area of this proposed location. This letter serves as notice of our application for approval of this project. Any objections must be submitted in writing to NMOCD, 1220 S. St. Francis Drive, Santa Fe, New Mexico 87505. Objections must be received within twenty (20) days of receipt of this letter.

Please do not hesitate to contact me at 575-748-6953 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to be "W. Miller", written over a horizontal line.

William Miller
Landman

WM/sw
Enclosures



COPY

April 26, 2012

Three Rivers Acquisition LLC
1122 S. Capital of TX Hwy 325
Austin, TX 78746

Re: Unorthodox Location
Jack Federal #1H
Section 31, Township 25 South, Range 27 East, N.M.P.M.
SHL: 330' FNL & 380' FWL
BHL: 660' FSL & 660' FWL
Eddy County, New Mexico

To Whom It May Concern:

Enclosed for your review is a copy of COG's Administrative Approval Request for an unorthodox location on the above referenced well. Three Rivers Acquisition LLC is a Working Interest Owner within the notice area of this proposed location. This letter serves as notice of our application for approval of this project. Any objections must be submitted in writing to NMOCD, 1220 S. St. Francis Drive, Santa Fe, New Mexico 87505. Objections must be received within twenty (20) days of receipt of this letter.

Please do not hesitate to contact me at 575-748-6953 should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to be "W. Miller", written over a horizontal line.

William Miller
Landman

WM/sw
Enclosures

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

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015-38643		² Pool Code	³ Pool Name Wildcat; Wolfcamp
⁴ Property Code 38565	⁵ Property Name Jack Federal		⁶ Well Number 1H
⁷ OGRID No. 229137	⁸ Operator Name COG Operating LLC		⁹ Elevation 3241' GR

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
1	31	25S	27E	1	330	North	380	West	Eddy

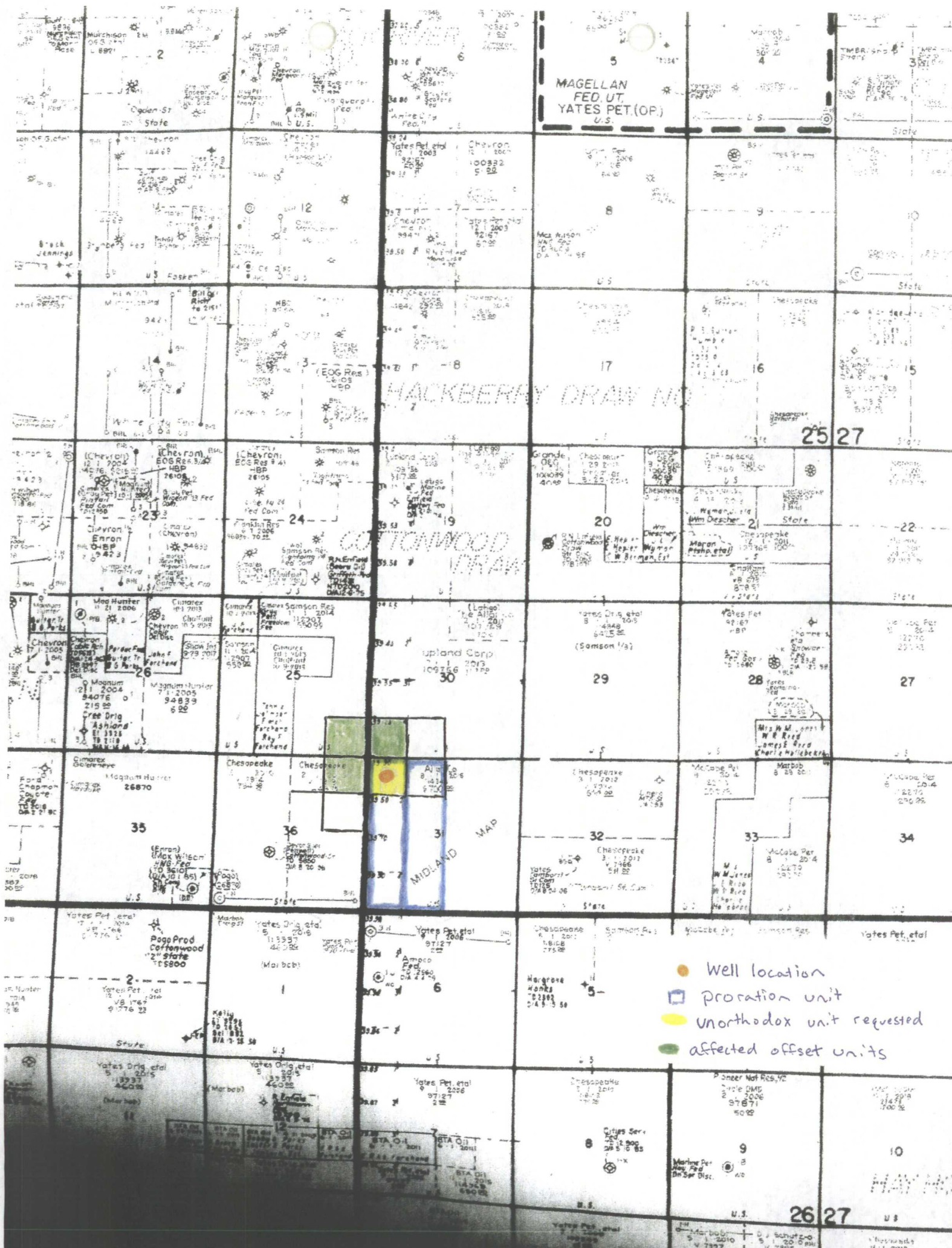
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
4	31	25S	27E	4	689	South	634	West	Eddy

¹² Dedicated Acres 320	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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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.

			¹⁷ OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>[Signature]</i> 3/13/12 Signature Date Stormi Davis Printed Name sdavis@concho.com E-mail Address	
			¹⁸ SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.	
			Date of Survey Signature and Seal of Professional Surveyor:	
			REFER TO ORIGINAL PLAT Certificate Number	



- Well location
- Protraction unit
- Unorthodox unit requested
- affected offset units



COG Operating LLC

Eddy County(NAD27)

Jack Federal

#1H

OH

Design: OH

Pathfinder X & Y Report

07 February, 2012



A Schlumberger Company



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Jack Federal
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project	Eddy County(NAD27)		
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	Jack Federal		
Site Position:	Northing:	397,388.500 usft	Latitude: 32° 5' 32.999 N
From: Map	Easting:	530,065.100 usft	Longitude: 104° 14' 10.500 W
Position Uncertainty: 0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.05 °

Well	#1H		
Well Position	+N/-S	0.0 usft	Northing: 397,388.500 usft
	+E/-W	0.0 usft	Easting: 530,065.100 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
			Latitude: 32° 5' 32.999 N
			Longitude: 104° 14' 10.500 W
			Ground Level: 3,241.0 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF200510	10/6/2011	(°) 7.83
			Dip Angle (°) 59.96
			Field Strength (nT) 48,472

Design	OH		
Audit Notes:			
Version: 1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°) 176.35



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Jack Federal
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey Program		Date 2/7/2012				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description		
100.0	9,100.0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s		
9,151.0	13,679.0	MWD #2 (OH)	MWD	MWD - Standard		

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
0.0	0.00	0.00	0.0	-3,258.0	0.0	0.0	0.0	0.00	397,388.50	530,065.10	
100.0	0.64	185.93	100.0	-3,158.0	-0.6	-0.1	0.6	0.64	397,387.94	530,065.04	
200.0	0.76	192.16	200.0	-3,058.0	-1.8	-0.3	1.7	0.14	397,386.74	530,064.84	
300.0	0.94	201.50	300.0	-2,958.0	-3.2	-0.7	3.1	0.23	397,385.33	530,064.40	
400.0	0.52	232.20	400.0	-2,858.0	-4.2	-1.4	4.1	0.56	397,384.29	530,063.75	
500.0	0.38	235.91	500.0	-2,758.0	-4.7	-2.0	4.5	0.14	397,383.82	530,063.11	
600.0	0.62	231.95	600.0	-2,658.0	-5.2	-2.7	5.0	0.24	397,383.30	530,062.41	
700.0	0.78	225.46	700.0	-2,558.0	-6.0	-3.6	5.8	0.18	397,382.49	530,061.50	
800.0	0.83	224.11	799.9	-2,458.1	-7.0	-4.6	6.7	0.05	397,381.50	530,060.51	
900.0	1.08	236.76	899.9	-2,358.1	-8.0	-5.9	7.6	0.33	397,380.46	530,059.22	
1,000.0	1.25	242.89	999.9	-2,258.1	-9.1	-7.6	8.5	0.21	397,379.45	530,057.46	
1,100.0	1.26	244.49	1,099.9	-2,158.1	-10.0	-9.6	9.4	0.04	397,378.48	530,055.50	
1,200.0	1.16	238.22	1,199.9	-2,058.1	-11.0	-11.5	10.3	0.17	397,377.47	530,053.64	
1,300.0	0.78	215.80	1,299.9	-1,958.1	-12.1	-12.7	11.3	0.53	397,376.38	530,052.38	
1,400.0	0.44	202.98	1,399.8	-1,858.2	-13.0	-13.3	12.2	0.36	397,375.48	530,051.84	
1,500.0	0.24	172.88	1,499.8	-1,758.2	-13.6	-13.4	12.7	0.26	397,374.92	530,051.71	
1,600.0	0.60	106.15	1,599.8	-1,658.2	-13.9	-12.9	13.1	0.55	397,374.56	530,052.24	
1,700.0	0.91	86.91	1,699.8	-1,558.2	-14.0	-11.6	13.3	0.40	397,374.46	530,053.54	
1,800.0	0.40	81.90	1,799.8	-1,458.2	-13.9	-10.4	13.3	0.51	397,374.55	530,054.68	
1,900.0	0.16	341.78	1,899.8	-1,358.2	-13.8	-10.1	13.1	0.46	397,374.73	530,054.98	
2,000.0	0.24	311.63	1,999.8	-1,258.2	-13.5	-10.3	12.8	0.13	397,375.01	530,054.78	



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC.
Project: Eddy County(NAD27)
Site: Jack Federal
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well #1H
KB = 17 @ 3258.0usft (Original Well Elev)
KB = 17 @ 3258.0usft (Original Well Elev)
Grid
Minimum Curvature
EDM 5000.1 Single User Db

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
2,100.0	0.51	300.46	2,099.8	-1,158.2	-13.1	-10.9	12.4	0.28	397,375.37	530,054.24
2,200.0	0.44	307.80	2,199.8	-1,058.2	-12.7	-11.5	11.9	0.09	397,375.83	530,053.55
2,300.0	0.43	290.68	2,299.8	-958.2	-12.3	-12.2	11.5	0.13	397,376.20	530,052.90
2,400.0	0.40	288.62	2,399.8	-858.2	-12.1	-12.9	11.2	0.03	397,376.44	530,052.21
2,500.0	0.34	281.67	2,499.8	-758.2	-11.9	-13.5	11.0	0.07	397,376.61	530,051.59
2,600.0	0.37	279.30	2,599.8	-658.2	-11.8	-14.1	10.8	0.03	397,376.73	530,050.98
2,700.0	0.37	282.79	2,699.8	-558.2	-11.6	-14.7	10.7	0.02	397,376.85	530,050.35
2,800.0	0.39	279.98	2,799.8	-458.2	-11.5	-15.4	10.5	0.03	397,376.98	530,049.70
2,900.0	0.43	259.95	2,899.8	-358.2	-11.5	-16.1	10.5	0.15	397,376.97	530,049.00
3,000.0	0.45	244.85	2,999.8	-258.2	-11.8	-16.8	10.7	0.12	397,376.74	530,048.27
3,100.0	0.50	234.73	3,099.8	-158.2	-12.2	-17.5	11.0	0.10	397,376.32	530,047.56
3,200.0	0.49	229.71	3,199.8	-58.2	-12.7	-18.2	11.5	0.04	397,375.80	530,046.88
3,300.0	0.47	231.33	3,299.8	41.8	-13.2	-18.9	12.0	0.02	397,375.26	530,046.23
3,400.0	0.79	211.23	3,399.8	141.8	-14.1	-19.5	12.8	0.38	397,374.42	530,045.55
3,500.0	0.67	203.31	3,499.8	241.8	-15.2	-20.1	13.9	0.16	397,373.29	530,044.96
3,600.0	0.91	197.29	3,599.8	341.8	-16.5	-20.6	15.2	0.25	397,371.99	530,044.50
3,700.0	0.87	194.57	3,699.8	441.8	-18.0	-21.0	16.6	0.06	397,370.50	530,044.07
3,800.0	0.84	199.33	3,799.7	541.7	-19.4	-21.5	18.0	0.08	397,369.08	530,043.64
3,900.0	0.77	211.19	3,899.7	641.7	-20.7	-22.1	19.2	0.18	397,367.81	530,043.05
4,000.0	0.71	211.51	3,999.7	741.7	-21.8	-22.7	20.3	0.06	397,366.71	530,042.37
4,100.0	0.60	152.29	4,099.7	841.7	-22.8	-22.8	21.3	0.65	397,365.71	530,042.29
4,200.0	0.81	130.41	4,199.7	941.7	-23.7	-22.0	22.3	0.34	397,364.79	530,043.07
4,300.0	0.95	169.73	4,299.7	1,041.7	-25.0	-21.3	23.6	0.61	397,363.52	530,043.76
4,400.0	1.15	181.28	4,399.7	1,141.7	-26.8	-21.2	25.4	0.29	397,361.70	530,043.89
4,500.0	1.16	186.64	4,499.7	1,241.7	-28.8	-21.4	27.4	0.11	397,359.69	530,043.75
4,600.0	1.13	183.56	4,599.6	1,341.6	-30.8	-21.5	29.4	0.07	397,357.70	530,043.57
4,700.0	0.98	184.32	4,699.6	1,441.6	-32.6	-21.7	31.2	0.15	397,355.86	530,043.44



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Jack Federal
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
4,800.0	1.05	177.17	4,799.6	1,541.6	-34.4	-21.7	33.0	0.14	397,354.10	530,043.42
4,900.0	1.09	173.63	4,899.6	1,641.6	-36.3	-21.5	34.8	0.08	397,352.24	530,043.57
5,000.0	1.09	185.93	4,999.6	1,741.6	-38.2	-21.5	36.7	0.23	397,350.34	530,043.58
5,100.0	1.25	193.89	5,099.6	1,841.6	-40.2	-21.9	38.7	0.23	397,348.34	530,043.22
5,200.0	1.18	194.78	5,199.5	1,941.5	-42.2	-22.4	40.7	0.07	397,346.29	530,042.70
5,300.0	1.25	194.08	5,299.5	2,041.5	-44.3	-22.9	42.7	0.07	397,344.23	530,042.17
5,400.0	1.20	206.83	5,399.5	2,141.5	-46.3	-23.7	44.7	0.28	397,342.24	530,041.43
5,500.0	1.15	215.79	5,499.5	2,241.5	-48.0	-24.7	46.3	0.19	397,340.49	530,040.37
5,600.0	1.54	244.88	5,599.4	2,341.4	-49.4	-26.5	47.6	0.77	397,339.11	530,038.57
5,700.0	1.61	251.74	5,699.4	2,441.4	-50.4	-29.1	48.4	0.20	397,338.10	530,036.02
5,800.0	1.50	246.73	5,799.4	2,541.4	-51.4	-31.6	49.2	0.17	397,337.14	530,033.48
5,900.0	1.50	244.25	5,899.3	2,641.3	-52.4	-34.0	50.2	0.06	397,336.05	530,031.10
6,000.0	1.71	215.36	5,999.3	2,741.3	-54.2	-36.0	51.8	0.83	397,334.27	530,029.06
6,100.0	1.88	209.92	6,099.2	2,841.2	-56.9	-37.7	54.4	0.24	397,331.63	530,027.38
6,200.0	2.46	220.78	6,199.2	2,941.2	-59.9	-39.9	57.3	0.71	397,328.58	530,025.16
6,300.0	2.77	223.44	6,299.1	3,041.1	-63.3	-43.0	60.4	0.33	397,325.20	530,022.09
6,400.0	3.01	224.91	6,398.9	3,140.9	-66.9	-46.5	63.8	0.25	397,321.59	530,018.58
6,500.0	2.86	235.30	6,498.8	3,240.8	-70.2	-50.4	66.8	0.55	397,318.31	530,014.67
6,600.0	2.45	235.44	6,598.7	3,340.7	-72.8	-54.2	69.2	0.41	397,315.68	530,010.86
6,700.0	2.06	229.01	6,698.6	3,440.6	-75.2	-57.4	71.4	0.46	397,313.28	530,007.74
6,800.0	1.95	218.21	6,798.6	3,540.6	-77.7	-59.8	73.8	0.39	397,310.77	530,005.34
6,900.0	2.91	207.85	6,898.5	3,640.5	-81.3	-62.0	77.2	1.05	397,307.19	530,003.10
7,000.0	2.91	215.10	6,998.3	3,740.3	-85.6	-64.6	81.3	0.37	397,302.87	530,000.45
7,100.0	2.47	219.69	7,098.2	3,840.2	-89.4	-67.5	84.9	0.49	397,299.13	529,997.62
7,200.0	1.71	211.75	7,198.2	3,940.2	-92.3	-69.6	87.7	0.81	397,296.20	529,995.45
7,300.0	0.96	189.54	7,298.1	4,040.1	-94.4	-70.6	89.7	0.90	397,294.11	529,994.53
7,400.0	0.78	167.40	7,398.1	4,140.1	-95.9	-70.6	91.2	0.38	397,292.62	529,994.54



Pathfinder
Pathfinder X & Y Report



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Wellbore: OH
Design: OH

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North Reference:
Survey Calculation Method:
Database:

Well #1H
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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
7,500.0	0.48	172.03	7,498.1	4,240.1	-97.0	-70.4	92.3	0.30	397,291.54	529,994.75
7,600.0	0.62	221.96	7,598.1	4,340.1	-97.8	-70.7	93.1	0.48	397,290.72	529,994.44
7,700.0	1.04	197.95	7,698.1	4,440.1	-99.0	-71.3	94.3	0.54	397,289.46	529,993.80
7,800.0	1.65	180.16	7,798.1	4,540.1	-101.3	-71.6	96.6	0.73	397,287.15	529,993.52
7,900.0	2.05	161.69	7,898.0	4,640.0	-104.5	-71.0	99.7	0.71	397,284.02	529,994.08
8,000.0	1.56	150.56	7,998.0	4,740.0	-107.4	-69.8	102.7	0.60	397,281.13	529,995.31
8,100.0	0.75	125.76	8,098.0	4,840.0	-108.9	-68.6	104.3	0.93	397,279.57	529,996.51
8,200.0	0.60	106.08	8,198.0	4,940.0	-109.5	-67.6	104.9	0.27	397,279.04	529,997.54
8,300.0	0.25	70.16	8,298.0	5,040.0	-109.5	-66.9	105.1	0.42	397,278.97	529,998.25
8,400.0	0.31	35.45	8,397.9	5,139.9	-109.2	-66.5	104.8	0.18	397,279.26	529,998.61
8,500.0	0.30	18.88	8,497.9	5,239.9	-108.8	-66.2	104.3	0.09	397,279.73	529,998.85
8,600.0	0.30	29.12	8,597.9	5,339.9	-108.3	-66.0	103.9	0.05	397,280.21	529,999.07
8,700.0	0.36	33.37	8,697.9	5,439.9	-107.8	-65.7	103.4	0.06	397,280.70	529,999.37
8,800.0	0.94	32.73	8,797.9	5,539.9	-106.9	-65.1	102.5	0.58	397,281.65	529,999.98
8,900.0	0.96	33.66	8,897.9	5,639.9	-105.5	-64.2	101.2	0.03	397,283.04	530,000.89
9,000.0	1.06	11.53	8,997.9	5,739.9	-103.9	-63.6	99.6	0.40	397,284.64	530,001.54
9,100.0	1.09	1.88	9,097.9	5,839.9	-102.0	-63.3	97.8	0.18	397,286.50	530,001.76
9,151.0	1.41	124.93	9,148.9	5,890.9	-101.9	-62.8	97.7	4.32	397,286.62	530,002.29
9,183.0	4.84	143.73	9,180.8	5,922.8	-103.2	-61.7	99.1	11.05	397,285.31	530,003.41
9,215.0	7.74	151.09	9,212.6	5,954.6	-106.2	-59.9	102.1	9.39	397,282.33	530,005.25
9,247.0	10.82	156.02	9,244.2	5,986.2	-110.8	-57.6	106.9	9.93	397,277.70	530,007.51
9,277.0	14.07	158.16	9,273.5	6,015.5	-116.8	-55.1	113.0	10.94	397,271.74	530,010.01
9,309.0	17.67	158.89	9,304.3	6,046.3	-124.9	-51.9	121.3	11.27	397,263.60	530,013.21
9,340.0	21.72	159.05	9,333.5	6,075.5	-134.7	-48.1	131.3	13.07	397,253.85	530,016.96
9,372.0	25.59	158.79	9,362.8	6,104.8	-146.6	-43.5	143.6	12.10	397,241.87	530,021.58
9,404.0	29.11	156.25	9,391.2	6,133.2	-160.2	-37.9	157.5	11.59	397,228.30	530,027.21
9,436.0	32.45	154.20	9,418.7	6,160.7	-175.1	-31.0	172.7	10.94	397,213.44	530,034.09



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9,467.0	36.32	154.02	9,444.3	6,186.3	-190.8	-23.4	188.9	12.49	397,197.69	530,041.73
9,499.0	40.63	153.96	9,469.3	6,211.3	-208.7	-14.6	207.3	13.47	397,179.81	530,050.46
9,530.0	44.23	154.14	9,492.2	6,234.2	-227.5	-5.5	226.7	11.62	397,161.00	530,059.61
9,562.0	47.31	154.73	9,514.5	6,256.5	-248.2	4.4	248.0	9.72	397,140.32	530,069.50
9,593.0	50.39	155.22	9,534.9	6,276.9	-269.3	14.3	269.7	10.01	397,119.17	530,079.37
9,625.0	54.78	155.85	9,554.3	6,296.3	-292.5	24.8	293.4	13.81	397,096.04	530,089.89
9,657.0	58.74	155.82	9,571.9	6,313.9	-316.9	35.7	318.5	12.38	397,071.62	530,100.85
9,688.0	61.73	155.97	9,587.3	6,329.3	-341.4	46.7	343.7	9.65	397,047.06	530,111.83
9,719.0	64.28	156.22	9,601.3	6,343.3	-366.7	57.9	369.6	8.26	397,021.81	530,123.03
9,750.0	67.36	156.07	9,614.0	6,356.0	-392.5	69.4	396.2	9.95	396,995.95	530,134.46
9,828.0	72.81	158.23	9,640.6	6,382.6	-460.1	97.8	465.4	7.46	396,928.39	530,162.90
9,859.0	76.77	153.20	9,648.7	6,390.7	-487.4	110.1	493.4	20.20	396,901.15	530,175.21
9,891.0	81.34	152.80	9,654.8	6,396.8	-515.3	124.4	522.2	14.33	396,873.16	530,189.47
9,923.0	84.06	158.90	9,658.9	6,400.9	-544.3	137.3	551.9	20.73	396,844.21	530,202.45
9,954.0	85.03	159.14	9,661.8	6,403.8	-573.1	148.4	581.4	3.22	396,815.40	530,213.49
9,985.0	85.21	157.95	9,664.4	6,406.4	-601.8	159.7	610.8	3.87	396,786.65	530,224.79
10,017.0	86.44	161.50	9,666.8	6,408.8	-631.8	170.7	641.4	11.71	396,756.72	530,235.85
10,049.0	87.93	161.29	9,668.4	6,410.4	-662.1	180.9	672.3	4.70	396,726.43	530,246.05
10,080.0	88.99	161.06	9,669.2	6,411.2	-691.4	190.9	702.2	3.50	396,697.10	530,256.05
10,112.0	88.90	159.01	9,669.8	6,411.8	-721.5	201.9	732.9	6.41	396,667.03	530,266.97
10,144.0	88.90	161.57	9,670.4	6,412.4	-751.6	212.7	763.6	8.00	396,636.91	530,277.76
10,175.0	90.66	158.67	9,670.5	6,412.5	-780.7	223.2	793.4	10.94	396,607.76	530,288.30
10,239.0	91.01	161.57	9,669.6	6,411.6	-840.9	245.0	854.8	4.56	396,547.59	530,310.06
10,333.0	92.95	163.63	9,666.3	6,408.3	-930.5	273.0	946.0	3.01	396,457.95	530,338.15
10,429.0	91.10	174.17	9,662.9	6,404.9	-1,024.6	291.5	1,041.0	11.14	396,363.95	530,356.59
10,492.0	86.44	179.56	9,664.3	6,406.3	-1,087.4	294.9	1,104.0	11.31	396,301.09	530,360.03
10,618.0	92.07	183.94	9,665.9	6,407.9	-1,213.3	291.1	1,229.3	5.66	396,175.25	530,356.18



Pathfinder
Pathfinder X & Y Report



A Schlumberger Company

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10,713.0	89.52	185.64	9,664.6	6,406.6	-1,307.9	283.2	1,323.3	3.23	396,080.60	530,348.25
10,808.0	90.66	183.65	9,664.4	6,406.4	-1,402.6	275.5	1,417.3	2.41	395,985.92	530,340.56
10,903.0	92.07	185.73	9,662.2	6,404.2	-1,497.2	267.7	1,511.2	2.64	395,891.27	530,332.80
10,998.0	90.31	184.15	9,660.2	6,402.2	-1,591.9	259.5	1,605.1	2.49	395,796.65	530,324.62
11,093.0	89.25	181.99	9,660.6	6,402.6	-1,686.7	254.4	1,699.5	2.53	395,701.79	530,319.53
11,189.0	89.08	177.87	9,662.0	6,404.0	-1,782.7	254.5	1,795.3	4.29	395,605.82	530,319.65
11,284.0	89.43	179.21	9,663.2	6,405.2	-1,877.6	257.0	1,890.2	1.46	395,510.86	530,322.07
11,379.0	89.43	177.91	9,664.2	6,406.2	-1,972.6	259.4	1,985.1	1.37	395,415.90	530,324.45
11,473.0	89.52	178.00	9,665.0	6,407.0	-2,066.5	262.7	2,079.1	0.14	395,321.97	530,327.81
11,570.0	89.16	179.08	9,666.1	6,408.1	-2,163.5	265.2	2,176.0	1.17	395,225.00	530,330.28
11,665.0	88.90	177.46	9,667.7	6,409.7	-2,258.4	268.0	2,270.9	1.73	395,130.07	530,333.15
11,760.0	88.81	176.87	9,669.6	6,411.6	-2,353.3	272.7	2,365.9	0.63	395,035.20	530,337.85
11,856.0	89.78	178.93	9,670.8	6,412.8	-2,449.2	276.3	2,461.8	2.37	394,939.28	530,341.36
11,949.0	90.66	180.47	9,670.5	6,412.5	-2,542.2	276.7	2,554.7	1.91	394,846.28	530,341.85
12,045.0	90.48	179.99	9,669.5	6,411.5	-2,638.2	276.4	2,650.5	0.53	394,750.29	530,341.46
12,140.0	90.22	180.78	9,668.9	6,410.9	-2,733.2	275.7	2,745.2	0.88	394,655.30	530,340.83
12,235.0	90.57	180.11	9,668.3	6,410.3	-2,828.2	275.0	2,840.0	0.80	394,560.30	530,340.09
12,330.0	88.64	178.42	9,668.9	6,410.9	-2,923.2	276.2	2,934.8	2.70	394,465.32	530,341.31
12,425.0	89.60	178.63	9,670.4	6,412.4	-3,018.1	278.7	3,029.8	1.03	394,370.36	530,343.75
12,520.0	89.96	179.74	9,670.8	6,412.8	-3,113.1	280.0	3,124.6	1.23	394,275.37	530,345.10
12,615.0	90.31	180.23	9,670.5	6,412.5	-3,208.1	280.0	3,219.4	0.63	394,180.38	530,345.13
12,711.0	90.48	179.12	9,669.9	6,411.9	-3,304.1	280.6	3,315.3	1.17	394,084.38	530,345.67
12,806.0	91.19	181.13	9,668.5	6,410.5	-3,399.1	280.4	3,410.1	2.24	393,989.40	530,345.46
12,901.0	91.71	180.79	9,666.1	6,408.1	-3,494.1	278.8	3,504.7	0.65	393,894.44	530,343.87
12,996.0	91.01	180.39	9,663.8	6,405.8	-3,589.0	277.8	3,599.4	0.85	393,799.47	530,342.90
13,091.0	90.84	181.75	9,662.3	6,404.3	-3,684.0	276.0	3,694.1	1.44	393,704.50	530,341.12
13,186.0	91.01	181.91	9,660.8	6,402.8	-3,778.9	273.0	3,788.6	0.25	393,609.57	530,338.09



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13,282.0	91.80	182.80	9,658.4	6,400.4	-3,874.8	269.0	3,884.1	1.24	393,513.68	530,334.15
13,377.0	90.40	184.20	9,656.6	6,398.6	-3,969.6	263.2	3,978.3	2.08	393,418.88	530,328.35
13,471.0	89.87	183.02	9,656.4	6,398.4	-4,063.4	257.3	4,071.6	1.38	393,325.07	530,322.43
13,566.0	90.57	180.22	9,656.0	6,398.0	-4,158.4	254.6	4,166.2	3.04	393,230.11	530,319.74
13,679.0	90.57	180.22	9,654.9	6,396.9	-4,271.4	254.2	4,278.9	0.00	393,117.12	530,319.31

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,183.0	9,180.8	-103.2	-61.7	KOP - 9183.0 'MD, 9180.8 'TVD, 143.73 'AZI, 4.84 'INC, -103.2 'N, -61.7 'E
10,080.0	9,669.2	-691.4	190.9	LP - 10080.0 'MD, 9669.2 'TVD, 161.06 'AZI, 88.99 'INC, -691.4 'N, 190.9 'E
13,679.0	9,654.9	-4,271.4	254.2	BHL - 13679.0 'MD, 9654.9 'TVD, 180.22 'AZI, 90.57 'INC, -4271.4 'N, 254.2 'E

Checked By: _____ Approved By: _____ Date: _____