



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

HOBBS OCD

NOV 01 2013

May 7, 2013

RECEIVED

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

RE: Lightning 1 State SWD #1
3480' FSL & 2300' FEL
Sec. 1, T21S, R33E
Lea County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

Very truly yours,

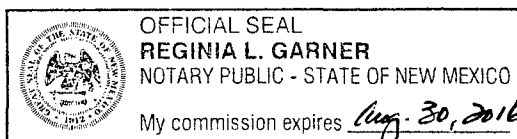
A handwritten signature in cursive script, appearing to read "Chris Graham".

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 7th day of May, 2013.

A handwritten signature in cursive script, appearing to read "Regina L. Garner".

Notary Public

Lightning 1 State SWD #1

Date	Depth	Deviation	Direction
4/21/2013	444	0.70	
4/21/2013	938	0.10	
4/22/2013	1444	0.90	
4/25/2013	1837	0.79	353.90
4/25/2013	2624	1.49	39.46
4/25/2013	2212	1.32	43.89
4/25/2013	2399	1.49	37.21
4/25/2013	2586	1.58	36.41
4/25/2013	2774	1.58	31.49
4/25/2013	2962	1.85	30.16
4/26/2013	3148	2.29	35.21
4/26/2013	3243	2.64	38.67
4/26/2013	3431	2.99	38.40
4/26/2013	3525	1.76	46.89
4/26/2013	3618	1.49	43.44
4/27/2013	3744	1.49	35.37
4/28/2013	3931	1.85	16.63
4/28/2013	4115	2.20	353.56
4/28/2013	4211	2.37	352.48
4/28/2013	4305	3.58	343.98
4/28/2013	4493	1.58	19.02
4/28/2013	4680	1.58	355.66
4/28/2013	4837	1.76	347.04
4/28/2013	4963	1.49	343.92
4/29/2013	5451	1.06	357.28
5/3/2013	5885	0.20	
5/3/2013	6385	0.40	
5/4/2013	6855	0.30	
5/4/2013	7305	0.30	



A Schlumberger Company

DIRECTIONAL SURVEY REPORT

HOBBS OCD

NOV 01 2013

RECEIVED

COG OPERATING
LIGHTNING 1 STATE SWD 1
LEA COUNTY, NEW MEXICO

PREPARED BY: KIRK DAVIS

NOV 25 2013

DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY: A) MAGSUD ALIYEV
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 4/25/13 TO 4/29/13
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: LEA COUNTY
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

COG OPERATING
LIGHTNING 1 STATE SWD 1
LEA COUNTY, NM
RIG: SILVER OAK 1

9. SURVEY CERTIFIED FROM: 1837 TO 5451 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE
DISPLACED AT 106.05 FEET ON A BEARING OF 17.16 DEGREES FROM THE
CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 5500.00 FEET,
ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.



KIRK DAVIS
M/LWD SERVICE COORDINATOR

PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 04/24/2013
Date Completed: 04/29/2013

COG OPERATING, LLC
LIGHTNING 1 STATE SWD #1 / 30-025-40917
LEA COUNTY, NM
Rig:SILVER OAK #1
PathFinder Office Supervisor: MARCUS MITCHAM
PathFinder Field Engineers:MAGSUD ALIYEV

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.30.36.0066 N LON:103.31.36.3654 W
GRID Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 748640.6000 Y: 550191.9000
North Aligned To:GRID NORTH
Total Magnetic Correction: 6.92° EAST TO GRID
Vertical Section Plane: 0.00
Survey Vert. Reference: 17.00' Kelly Bushing To Ground
Altitude:3783.80' Ground To MSL

Measured Depth	5500.00	(feet)
Inclination	1.06	(deg)
Azimuth	357.28	(deg)
True Vertical Depth	5498.09	(feet)
Vertical Section	101.33	(feet)
Survey X cord	748671.88	(feet)
Survey Y cord	550293.23	(feet)
Survey Lat	32.51027968 N	(deg)
Survey Lon	103.52666420 W	(deg)
Rectangular Corr. N/S	101.33 N	(feet)
Rectangular Corr. E/W	31.28 E	(feet)
Closure Distance	106.05	(feet)
Direction of Closure	17.16	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
LIGHTNING 1 STATE SWD #1 / 30-025-40917
LEA COUNTY, NM
Rig:SILVER OAK #1
PathFinder Office Supervisor: MARCUS MITCHAM
PathFinder Field Engineers: MAGSUD ALIYEV

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.30:36.0066 N LON:103.31:36.3654 W
GRID Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 748640.6000 Y: 550191.9000
North Aligned To:GRID NORTH
Total Magnetic Correction: 6.92° EAST TO GRID
Vertical Section Plane: 0.00
Survey Vert. Reference: 17.00' Kelly Bushing To Ground
Altitude:3783.80' Ground To MSL

Survey Calculations by RX5 V6.04D using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
ASSUMED VERTICAL WELLBORE AT 1604'MD.										
1604.00	0.00	0.00	1604.00	0.00	0.00	0.00	0.00	0.00@	0.00	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
1837.00	0.79	353.99	1836.99	233.00	1.60	1.60 N	0.17 W	1.61@	353.99	0.34
2024.00	1.49	39.46	2023.96	187.00	4.76	4.76 N	1.24 E	4.92@	14.63	0.58
2212.00	1.32	43.89	2211.90	188.00	8.20	8.20 N	4.30 E	9.26@	27.64	0.11
2399.00	1.49	37.21	2398.85	187.00	11.69	11.69 N	7.26 E	13.76@	31.84	0.13
2586.00	1.58	36.41	2585.78	187.00	15.70	15.70 N	10.26 E	18.76@	33.16	0.05
2774.00	1.58	31.49	2773.71	188.00	20.00	20.00 N	13.15 E	23.94@	33.33	0.07
2962.00	1.85	30.16	2961.62	188.00	24.83	24.83 N	16.03 E	29.56@	32.84	0.14
3148.00	2.29	35.21	3147.50	186.00	30.47	30.47 N	19.68 E	36.27@	32.86	0.26
3243.00	2.64	38.67	3242.41	95.00	33.72	33.72 N	22.14 E	40.35@	33.29	0.40
3337.00	2.55	39.66	3336.32	94.00	37.03	37.03 N	24.83 E	44.58@	33.85	0.11
3431.00	2.99	38.40	3430.21	94.00	40.56	40.56 N	27.69 E	49.11@	34.32	0.47
3525.00	1.76	46.89	3524.12	94.00	43.46	43.46 N	30.27 E	52.96@	34.85	1.36
3618.00	1.49	43.44	3617.09	93.00	45.32	45.32 N	32.14 E	55.56@	35.34	0.31
3744.00	1.49	35.37	3743.04	126.00	47.84	47.84 N	34.21 E	58.82@	35.57	0.17
3931.00	1.85	16.63	3929.97	187.00	52.72	52.72 N	36.49 E	64.11@	34.69	0.35
4115.00	2.20	353.56	4113.85	184.00	59.07	59.07 N	36.94 E	69.67@	32.02	0.48
4211.00	2.37	352.48	4209.78	96.00	62.87	62.87 N	36.47 E	72.69@	30.12	0.18
4305.00	3.52	343.98	4303.65	94.00	67.57	67.57 N	35.42 E	76.29@	27.66	1.30
4399.00	3.25	351.33	4397.49	94.00	72.98	72.98 N	34.22 E	80.61@	25.12	0.54
4493.00	1.58	19.02	4491.40	94.00	76.84	76.84 N	34.24 E	84.13@	24.02	2.12
4680.00	1.58	355.66	4678.33	187.00	81.85	81.85 N	34.89 E	88.97@	23.09	0.34
4837.00	1.76	347.04	4835.27	157.00	86.36	86.36 N	34.18 E	92.88@	21.60	0.20
4963.00	1.49	343.92	4961.22	126.00	89.82	89.82 N	33.30 E	95.79@	20.34	0.23

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
 LIGHTNING 1 STATE SWD #1 / 30-025-40917
 LEA COUNTY, NM
 RIG:SILVER OAK #1

Page 02/02

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
5451.00	1.06	357.28	5449.10	488.00	100.42	100.42 N	31.33 E	105.19@	17.32	0.11
STRAIGHT LINE PROJECTION TO BIT AT 5500'MD.										
5500.00	1.06	357.28	5498.09	49.00	101.33	101.33 N	31.28 E	106.05@	17.16	0.00

HOBBS OCD

DISTRICT I

1625 N. FRANCH CO., HOBBS, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

JAN 11 2013

Form C-102

Revised October 12, 2010

Submit to Appropriate District Office

State Lease - 4 Copies

Fee Lease - 3 Copies

DISTRICT II

1301 N. GRAND AVENUE, ALBUQUERQUE, NM 87102

OIL CONSERVATION DIVISION

11885 SOUTH ST. FRANCIS DRIVE

Santa Fe, New Mexico 87505

DISTRICT III

1000 RIO BRAZOS RD., AZTEC, NM 87410

DISTRICT IV

11885 S. ST. FRANCIS DR., SANTA FE, NM 87505

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number 30-025-40917	Pool Code 97996	Pool Name SWD, Cherry Canyon - Bushy Canyon
Property Code 39623	Property Name LIGHTNING 1 STATE SWD	Well Number 1
GRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3783.8'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
14	1	21-S	33-E		3480	SOUTH	2300	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

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
			SWD 1373

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

LOT 4 Ac.=40.33	LOT 3 Ac.=40.23	LOT 2 Ac.=40.12	LOT 1 Ac.=40.01
LOT 5 Ac.=40.12	LOT 6 Ac.=40.13	LOT 7 Ac.=40.14	LOT 8 Ac.=40.15
LOT 12 Ac.=40.11	LOT 11 Ac.=40.13	LOT 10 Ac.=40.13	LOT 9 Ac.=40.14
LOT 13 Ac.=40.10	LOT 14 Ac.=40.12	LOT 15 Ac.=40.12	LOT 16 Ac.=40.13

NAD 27
SURFACE LOCATION
Y=550191.9 N
X=748640.6 E
LAT.=32.510002° N
LONG.=103.526768° W

OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or undivided mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Melanie Barker 1/10/13
Signature Date
Melanie Barker
Printed Name

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.

NOVEMBER 17, 2012

Date Surveyed

Signature & Seal of Professional Surveyor



Chad Harcrow 1/9/13
Certificate No. CHAD HARCROW 1777
W.O. # 12-124 2012-037

ELG 1-15-2013

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

HOBBS OCD

JAN 11 2013

RECEIVED

State of New Mexico

Energy Minerals and Natural Resources

Oil Conservation Division

1220 South St. Francis Dr.

Santa Fe, NM 87505

Form C-101
Revised November 14, 2012

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

1. Operator Name and Address COG Operating LLC 2208 West Main Street Artesia, NM 88210		2. OGRID Number 229137
3. Property Code 391623	4. Property Name Lightning 1 State SWD	5. API Number 30-025-40917
		6. Well No 1.

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
14	1	21S	33E		3480	South	2300	West	Lea

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County

9. Pool Information

SWD: Delaware	Pool Name Cherry Canyon - Bushy Canyon	Pool Code 97996
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Additional Well Information

11. Work Type New Well	12. Well Type SWD	13. Cable/Rotary	14. Lease Type State	15. Ground Level Elevation 3783.8'
16. Multiple N	17. Proposed Depth 7500'	18. Formation Delaware	19. Contractor	20. Spud Date 1/20/2013
Depth to Ground water		Distance from nearest fresh water well		Distance to nearest surface water

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surface	17.5	13.375	54.5	1800	1150	
Intemd	12.25	9.625	40	5500	1675	
Open Hole	8.75	7	26	7500	500	2500

Casing/Cement Program: Additional Comments

Plan to drill a 17-1/2" hole to 1800' with Fresh Water. Run 13-3/8", 54.5#, J-55 csg and cmt to surface. Drill 12-1/4" hole to 5500' with Brine, and run 9-5/8", 40#, J55/N80 and cement to surface in 2 stages. Drill 8-3/4" hole to 7500' with cut-brine and run 7", 26#, J55 and tie back cement 3,000' into previous casing string.

22. Proposed Blowout Prevention Program

Permit Expires 2 Years From Approval Date Unless Drilling Underway

Type	Working Pressure	Test Pressure	Manufacturer
Double Ram	3000	3000	Cameron

SWD: 1373

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. I further certify that I have complied with 19.15.14.9 (A) NMAC ☐ and/or 19.15.14.9 (B) NMAC ☐ , if applicable. Signature: <i>Mayte Reyes</i>		OIL CONSERVATION DIVISION	
Printed name: Mayte Reyes		Approved By: <i>[Signature]</i>	
Title: Regulatory Analyst		Title: <i>[Signature]</i>	
E-mail Address: mreyes1@concho.com		Approved Date: 1-15-2013	
Date: 1/10/2013		Expiration Date: 1-15-2015	
Phone: 575-748-6945		Conditions of Approval Attached	