

**BEFORE THE OIL CONSERVATION DIVISION
EXAMINER HEARING MARCH 7, 2019**

CASE NO. 20271

*HARRIER WELLS (W/2) (101H, 102H, 103H,
201H, 202H, 301H, 302H, 303H, 304H, 305H)*

LEA COUNTY, NEW MEXICO



**STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION**

**APPLICATION OF COG OPERATING LLC
FOR COMPULSORY POOLING,
LEA COUNTY, NEW MEXICO.**

CASE NO. 20271

AFFIDAVIT OF MATTHEW SOLOMON

Matthew Solomon, of lawful age and being first duly sworn, declares as follows:

1. My name is Matthew Solomon. I work for COG Operating LLC ("COG") as a Landman.
2. I have previously testified before the New Mexico Oil Conservation Division as an expert witness in petroleum land matters. My credentials as a petroleum landman have been accepted by the Division and made a matter of record.
3. I am familiar with the applications filed by COG in these matters and familiar with the status of the lands in the subject areas.
4. None of the parties proposed to be pooled in these cases has indicated opposition, therefore I do not expect any opposition at the hearing.
5. COG seeks an order pooling all uncommitted interests in the Bone Spring formation underlying a 640-acre horizontal spacing unit comprised of the W/2 of Section 35, Township 25 South, Range 32 East and the W/2 of Section 2, Township 26 South, Range 32 East Lea County. This horizontal spacing unit will be dedicated to the following ten proposed initial wells:
 - The **Harrier Federal Com #101H** well to be drilled from a surface hole location in SE/4 SW/4 (Unit N) of Section 2 to a bottom hole location in the NE/4 NW/4 (Unit C) of Section 35.

- The **Harrier Federal Com #102H** well to be drilled from a surface hole location in SW/4 SW/4 (Unit M) of Section 2 to a bottom hole location in the NW/4 NW/4 (Unit D) of Section 35.
- The **Harrier Federal Com #103H** well to be drilled from a surface hole location in NW/4 NW/4 (Unit D) of Section 35 to a bottom hole location in the SW/4 SW/4 (Unit M) of Section 2.
- The **Harrier Federal Com #201H** well to be drilled from a surface hole location in SE/4 SW/4 (Unit N) of Section 2 to a bottom hole location in the NW/4 NW/4 (Unit D) of Section 35.
- The **Harrier Federal Com #202H** well to be drilled from a surface hole location in NW/4 NW/4 (Unit D) of Section 35 to a bottom hole location in the SW/4 SW/4 (Unit M) of Section 2.
- The **Harrier Federal Com #301H** well to be drilled from a surface hole location in SE/4 SW/4 (Unit N) of Section 2 to a bottom hole location in the NE/4 NW/4 (Unit C) of Section 35.
- The **Harrier Federal Com #302H** well to be drilled from a surface hole location in SE/4 SW/4 (Unit N) of Section 2 to a bottom hole location in the NE/4 NW/4 (Unit C) of Section 35.
- The **Harrier Federal Com #303H** well to be drilled from a surface hole location in SE/4 SW/4 (Unit N) of Section 2 to a bottom hole location in the NE/4 NW/4 (Unit C) of Section 35.
- The **Harrier Federal Com #304H** well to be drilled from a surface hole location in SW/4 SW/4 (Unit M) of Section 2 to a bottom hole location in the NW/4 NW/4 (Unit D) of Section 35.
- The **Harrier Federal Com #305H** well to be drilled from a surface hole location in SW/4 SW/4 (Unit M) of Section 2 to a bottom hole location in the NW/4 NW/4 (Unit D) of Section 35.

6. The completed intervals for the proposed **Harrier Federal Com #101H, 201H and 303H** wells will each be within 330 feet of the quarter-quarter line separating the W/2 W/2 and the E/2 W/2 of Sections 35 and 2 to allow inclusion of this acreage as proximity tracts into a standard 640-acre horizontal well spacing unit.

7. The completed interval for the **Harrier Federal Com #102H, 301H, 302H, 304H and 305H** wells will remain within the standard setback as required by the statewide

rules for oil wells. The completed intervals for the **Harrier Federal Com #103H and 202H Wells** will be closer to the outer boundary of the spacing unit that rules allow and, therefore, will be at unorthodox locations. COG has separately filed for and obtained orders approving non-standard well locations for these wells.

8. **COG Exhibit No. 1A** contains draft Form C-102s for the proposed wells.

9. **COG Exhibit No. 1B** identifies the tracts of land comprising the proposed spacing and proration unit in this case. This exhibit also identifies the interest ownership by tract and ultimately by spacing unit. COG is seeking to pool the interests identified under each Pooling Notification List in the exhibit. COG is seeking to pool working interest owners and two overriding royalty interest owners.

10. All interest owners that COG seeks to pool are locatable. COG has conducted a diligent search of all public records in Lea County, including phone directories and computer databases.

11. **COG Exhibit No. 1C** contains a sample of the well proposal letter along with an AFE provided to the working interest owners COG is seeking to pool. In addition to this letter, COG has made a diligent effort to reach agreement with the parties it is seeking to pool.

12. The costs reflected in the AFE are consistent with what other operators have incurred for drilling similar horizontal wells in the area in each of these formations.

13. In my opinion, COG has made good faith efforts to reach agreement with the parties it is seeking to pool. If COG reaches an agreement with any of the proposed pool parties before the Division enters an order, I will let the Division know that COG is no longer seeking to pool those parties.

14. No ownership depth severances exist within these proposed spacing and proration units, and there are no unleased mineral interests in the subject acreage.

15. COG has estimated the overhead and administrative costs for drilling and producing the proposed wells at \$7,000 per month while drilling and \$700 per month while producing. These costs are consistent with what other operators are charging in this area for similar wells.

16. I provided the law firm of Holland & Hart LLP a list of names and addresses for the owners that COG seeks to pool and instructed that they be notified of this hearing.

17. COG Exhibit Nos. 1A through 1C were either prepared by me or compiled under my direction and supervision.

FURTHER AFFIANT SAYETH NOT.


Matthew Solomon

STATE OF TEXAS)

COUNTY OF Midland)

SUBSCRIBED and SWORN to before me this 6th day of March 2019 by
Matthew Solomon.




NOTARY PUBLIC

My Commission Expires:

9/9/2021

DISTRICT I
1825 N. FRENCH DR., HORBS, NM 86240
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DISTRICT IV
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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	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 101H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3246.1'

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	2	26-S	32-E		375	SOUTH	1490	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
C	35	25-S	32-E		50	NORTH	1380	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	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

<p>Y=398638.1 N X=711779.3 E</p> <p>LTP 100' FNL & 1380' FWL Y=398538.5 N X=711830.5 E LAT.=32.093851° N LONG.=103.649307° W</p> <p>LEASE X-ING LAT.=32.079585° N LONG.=103.649311° W</p> <p>FTP 100' FSL & 1380' FWL Y=388100.6 N X=711893.8 E LAT.=32.065158° N LONG.=103.649316° W GRID AZ. TO FTP 201°13'56"</p> <p>Y=388000.3 N X=711851.2 E</p>	<p>1380'</p> <p>50' B.H.</p> <p>Y=398647.1 N X=713108.4 E</p> <p>NAD 27 NME <u>PROPOSED BOTTOM HOLE LOCATION</u> Y=398588.5 N X=711830.2 E LAT.=32.093989° N LONG.=103.649307° W</p> <p>GRID AZ. - 359°39'10" HORZ. DIST. - 10488.0'</p> <p>SECTION 35 SECTION 2</p> <p>S.L. 1490'</p> <p>Y=388009.8 N X=713187.4 E</p> <p>NAD 27 NME <u>SURFACE LOCATION</u> Y=388376.4 N X=712001.0 E LAT.=32.065914° N LONG.=103.648965° W</p>	<p>OPERATOR CERTIFICATION</p> <p>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 unless 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.</p> <p>BEFORE THE OIL CONSERVATION DIVISION Santa Fe, New Mexico Exhibit No. 1A Submitted by: COG OPERATING LLC Hearing Date: March 7, 2019 Case Nos. 20271</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey</p> <p>Signature & Seal of Professional Surveyor</p> <p> Chad L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR</p> <p>12/17/18 Certificate No. CHAD HARCROW 17777 W.O. # 18-1707 DRAWN BY: AM</p>
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DISTRICT I
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DISTRICT II
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Form C-102
Revised August 1, 2011
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 102H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3247.3'

Surface Location


UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	2	26-S	32-E		330	SOUTH	750	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
D	35	25-S	32-E		640	NORTH	690	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
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<p>Y=398629.2 N X=710450.2 E</p> <p>Y=398638.1 N X=711779.3 E</p> <p>690' B.H.</p> <p>GRID AZ. - 359°38'48" HORZ. DIST. - 10298.3'</p> <p>LEASE X-ING LAT.=32.079585° N LONG.=103.651541° W</p> <p>SECTION 35 SECTION 2</p> <p>FTP 100' FSL & 690' FWL Y=388095.7 N X=711203.8 E LAT.=32.065157° N LONG.=103.651543° W GRID AZ. TO FTP 194°02'03"</p> <p>Y=387990.8 N X=710514.9 E</p> <p>Y=388000.3 N X=711851.2 E</p> <p>750' 1330'</p>	<p>NAD 27 NME <u>PROPOSED LTP & BOTTOM HOLE LOCATION</u> Y=398393.8 N X=711140.4 E LAT.=32.093466° N LONG.=103.651538° W</p> <p>NAD 27 NME <u>SURFACE LOCATION</u> Y=388326.2 N X=711261.5 E LAT.=32.065789° N LONG.=103.651353° W</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p></p> <p>12/17/18 Certificate No. CHAD HARCROW 17777 W.O. # 18-1703 DRAWN BY: AM</p>
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WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 103H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3369.5'

Surface Location

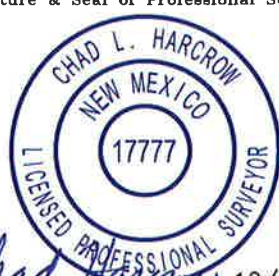
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	35	25-S	32-E		435	NORTH	232	WEST	LEA

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
M	2	26-S	32-E		50	SOUTH	10	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
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<p>Y=398629.2 N X=710450.2 E</p> <p>FTP 100' FNL & 10' FWL Y=398529.2 N X=710460.3 E LAT.=32.093850° N LONG.=103.653731° W GRID AZ. TO FTP 326°12'53"</p> <p>LEASE X-ING LAT.=32.079584° N LONG.=103.653735° W</p> <p>LTP 100' FSL & 10' FWL Y=388090.9 N X=710524.1 E LAT.=32.065155° N LONG.=103.653738° W</p> <p>Y=387990.8 N X=710514.9 E</p>	<p>435' 232'</p> <p>GRID AZ. - 179°38'59" HORZ. DIST. - 10488.5'</p> <p>SECTION 35 SECTION 2</p>	<p>NAD 27 NME SURFACE LOCATION Y=398195.6 N X=710683.5 E LAT.=32.092929° N LONG.=103.653018° W</p> <p>NAD 27 NME PROPOSED BOTTOM HOLE LOCATION Y=388040.9 N X=710524.4 E LAT.=32.065018° N LONG.=103.653738° W</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p></p> <p>12/17/18</p> <p>Certificate No. CHAD HARCROW 17777</p> <p>W.O. # 18-1700 DRAWN BY: AM</p>
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 201H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3249.3'

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	2	26-S	32-E		375	SOUTH	1400	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
D	35	25-S	32-E		640	NORTH	1140	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.

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<p>Y=398629.2 N X=710450.2 E</p> <p>NAD 27 NME PROPOSED LTP & BOTTOM HOLE LOCATION Y=397996.8 N X=711590.6 E LAT.=32.092367° N LONG.=103.650093° W</p> <p>LEASE X-ING LAT.=32.079585° N LONG.=103.650092° W</p> <p>NAD 27 NME SURFACE LOCATION Y=388375.8 N X=711910.9 E LAT.=32.065914° N LONG.=103.649255° W</p> <p>FTP 100' FSL & 1140' FWL Y=388098.9 N X=711653.8 E LAT.=32.065157° N LONG.=103.650091° W GRID AZ. TO FTP 222°52'41"</p> <p>Y=388000.3 N X=711851.2 E</p>	<p>Y=398638.1 N X=711779.3 E</p> <p>1140' B.H.</p> <p>GRID AZ. - 359°38'02" HORZ. DIST. - 9898.1'</p> <p>SECTION 35 SECTION 2</p> <p>1400' S.L. 375'</p> <p>Y=388009.8 N X=713187.4 E</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p></p> <p>Chad L. Harcrow 12/17/18</p> <p>Certificate No. CHAD HARCROW 17777</p> <p>W.O. # 18-1705 DRAWN BY: AM</p>
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WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 202H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3369.5'

Surface Location


UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	35	25-S	32-E		435	NORTH	262	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
M	2	26-S	32-E		50	SOUTH	240	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.

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<p>Y=398629.2 N X=710450.2 E</p> <p>FTP 100' FNL & 240' FWL Y=398530.8 N X=710690.3 E LAT.=32.093850° N LONG.=103.652989° W GRID AZ. TO FTP 356°02'20"</p> <p>LEASE X-ING LAT.=32.079584° N LONG.=103.652992° W</p> <p>LTP 100' FSL & 240' FWL Y=388092.5 N X=710754.1 E LAT.=32.065156° N LONG.=103.652995° W</p> <p>Y=387990.8 N X=710514.9 E</p>	<p>435' 262' S.L.</p> <p>GRID AZ. = 179°38'59" HORZ. DIST. = 10488.4'</p> <p>SECTION 35</p> <p>SECTION 2</p> <p>Y=388000.3 N X=711851.2 E</p>	<p>NAD 27 NME SURFACE LOCATION Y=398195.9 N X=710713.5 E LAT.=32.092929° N LONG.=103.652921° W</p> <p>NAD 27 NME PROPOSED BOTTOM HOLE LOCATION Y=388042.5 N X=710754.4 E LAT.=32.065018° N LONG.=103.652995° W</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p> Chad L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR</p> <p>12/17/18 Certificate No. CHAD HARCROW 17777 W.O. # 18-1701 DRAWN BY: AM</p>
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District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 301H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3252.6'

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	2	26-S	32-E		375	SOUTH	1910	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
C	35	25-S	32-E		50	NORTH	2310	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	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

<p>Y=398638.1 N X=711779.3 E</p> <p>LTP 100' FNL & 2310' FWL Y=398544.7 N X=712760.5 E LAT.=32.093852° N LONG.=103.646304° W</p> <p>NAD 27 NME <u>PROPOSED BOTTOM HOLE LOCATION</u> Y=398594.7 N X=712760.2 E LAT.=32.093990° N LONG.=103.646304° W</p> <p>LEASE X-ING LAT.=32.079586° N LONG.=103.646309° W</p> <p>NAD 27 NME <u>SURFACE LOCATION</u> Y=388379.4 N X=712420.9 E LAT.=32.065915° N LONG.=103.647609° W</p> <p>Y=388000.3 N X=711851.2 E</p>	<p>2310'</p> <p>50'</p> <p>Y=398647.1 N X=713108.4 E</p> <p>B.H.</p> <p>GRID AZ. - 359°39'10" HORZ. DIST. - 10487.7'</p> <p>SECTION 35</p> <p>SECTION 2</p> <p>S.L.</p> <p>Y=388009.8 N X=713187.4 E</p> <p>FTP 100 FSL & 2310' FWL Y=388107.3 N X=712823.8 E LAT.=32.065160° N LONG.=103.646314° W GRID AZ. TO FTP 124°02'23"</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p></p> <p>12/17/18</p> <p>Certificate No. CHAD HARCROW 17777</p> <p>W.O. # 18-1709 DRAWN BY: AM</p>
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DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (576) 393-6161 Fax: (576) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (576) 746-1283 Fax: (576) 746-8720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87606
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, New Mexico 87505

Form C-102
Revised August 1, 2011
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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 302H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3250.3'

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	2	26-S	32-E		375	SOUTH	1790	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
C	35	25-S	32-E		50	NORTH	1650	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
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	<p>NAD 27 NME <u>PROPOSED BOTTOM HOLE LOCATION</u> Y=398590.3 N X=712100.2 E LAT.=32.093989° N LONG.=103.648435° W</p> <p>NAD 27 NME <u>SURFACE LOCATION</u> Y=388378.6 N X=712300.9 E LAT.=32.065915° N LONG.=103.647996° W</p>	<p>OPERATOR CERTIFICATION</p> <p>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 unless 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.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p> 12/17/18</p> <p>Certificate No. CHAD HARCROW 17777 W.O. # 18-1708 DRAWN BY: AM</p>
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DISTRICT I
1625 N. FRENCH DR., HOBBES, NM 88240
Phone: (575) 393-6181 Fax: (575) 393-0720

DISTRICT II
611 S. FIRST ST., ARTESIA, NM 88210
Phone: (505) 748-1283 Fax: (505) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3480 Fax: (505) 476-3482

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Santa Fe, New Mexico 87505

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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number		Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM		Well Number 303H
OGRID No.	Operator Name COG OPERATING, LLC		Elevation 3246.8'

Surface Location


UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	2	26-S	32-E		375	SOUTH	1460	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
C	35	25-S	32-E		50	NORTH	1360	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
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<p>Y=398638.1 N X=711779.3 E LTP 100' FNL & 1360' FWL Y=398538.3 N X=711810.5 E LAT.=32.093851° N LONG.=103.649371° W</p> <p>LEASE X-ING LAT.=32.079585° N LONG.=103.649376° W</p> <p>FTP 100' FSL & 1360' FWL Y=388100.5 N X=711873.8 E LAT.=32.065158° N LONG.=103.649381° W GRID AZ. TO FTP 199°24'00"</p> <p>Y=388000.3 N X=711851.2 E</p>	<p>1360' 50' B.H. Y=398647.1 N X=713108.4 E Y=398588.3 N X=711810.2 E LAT.=32.093989° N LONG.=103.649371° W</p> <p>GRID AZ. - 359°39'10" HORZ. DIST. - 10488.0'</p> <p>SECTION 35 SECTION 2</p> <p>NAD 27 NME PROPOSED BOTTOM HOLE LOCATION Y=398588.3 N X=711810.2 E LAT.=32.093989° N LONG.=103.649371° W</p> <p>NAD 27 NME SURFACE LOCATION Y=388376.2 N X=711970.9 E LAT.=32.065914° N LONG.=103.649062° W</p>	<p>OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>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.</p> <p>DECEMBER 12, 2018 Date of Survey</p> <p>Signature & Seal of Professional Surveyor</p> <p> Chad L. Hargrow 12/17/18 Certificate No. CHAD HARGROW 17777 W.O. # 18-1706 DRAWN BY: AM</p>
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DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 395-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
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DISTRICT IV
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Santa Fe, New Mexico 87505

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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 304H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3247.1'

Surface Location


UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	2	26-S	32-E		330	SOUTH	780	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
D	35	25-S	32-E		640	NORTH	840	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
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<p>Y=398629.2 N X=710450.2 E</p> <p>NAD 27 NME PROPOSED LTP & BOTTOM HOLE LOCATION Y=398394.8 N X=711290.4 E LAT.=32.093466° N LONG.=103.651054° W</p> <p>LEASE X-ING LAT.=32.079585° N LONG.=103.651057° W</p> <p>NAD 27 NME SURFACE LOCATION Y=388326.4 N X=711291.5 E LAT.=32.065789° N LONG.=103.651256° W</p> <p>Y=387990.8 N X=710514.9 E</p>	<p>Y=398638.1 N X=711779.3 E</p> <p>840' B.H.</p> <p>GRID AZ. - 359°38'48" HORZ. DIST. - 10298.2'</p> <p>SECTION 35 SECTION 2</p> <p>FTP 100' FSL & 840' FWL Y=388096.8 N X=711353.8 E LAT.=32.065157° N LONG.=103.651059° W GRID AZ. TO FTP 164°47'45"</p> <p>Y=388000.3 N X=711851.2 E</p> <p>S.L.</p> <p>780' 330'</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p></p> <p>Chad Harcrow 12/17/18</p> <p>Certificate No. CHAD HARCROW 17777</p> <p>W.O. #18-1704 DRAWN BY: AM</p>
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DISTRICT I
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Phone: (505) 393-6161 Fax: (505) 393-0720

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WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name HARRIER FEDERAL COM	Well Number 305H
OGRID No.	Operator Name COG OPERATING, LLC	Elevation 3247.6'


Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	2	26-S	32-E		330	SOUTH	720	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
D	35	25-S	32-E		50	NORTH	540	WEST	LEA
Dedicated Acres	Joint or Infill	Consolidation Code	Order No.						

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<p>Y=398629.2 N X=710450.2 E</p> <p>LTP 100' FNL & 540' FWL Y=398532.8 N X=710990.6 E LAT.=32.093850° N LONG.=103.652019° W</p> <p>LEASE X-ING LAT.=32.079585° N LONG.=103.652023° W</p> <p>FTP 100' FSL & 540' FWL Y=388094.7 N X=711053.9 E LAT.=32.065156° N LONG.=103.652028° W GRID AZ. TO FTP 217°30'40"</p> <p>Y=387990.8 N X=710514.9 E</p>	<p>540' B.H.</p> <p>Y=398638.1 N X=711779.3 E</p> <p>GRID AZ. - 359°39'09" HORZ. DIST. - 10488.3'</p> <p>SECTION 35 SECTION 2</p> <p>Y=388000.3 N X=711851.2 E</p>	<p>NAD 27 NME <u>PROPOSED BOTTOM HOLE LOCATION</u> Y=398582.8 N X=710990.3 E LAT.=32.093988° N LONG.=103.652019° W</p> <p>NAD 27 NME <u>SURFACE LOCATION</u> Y=388326.0 N X=711231.4 E LAT.=32.065789° N LONG.=103.651450° W</p>	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p> <p>SURVEYOR CERTIFICATION</p> <p>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.</p> <p>DECEMBER 12, 2018</p> <p>Date of Survey _____</p> <p>Signature & Seal of Professional Surveyor</p> <p></p> <p>12/17/18 Certificate No. CHAD HARCROW 17777 W.O. #18-1702 DRAWN BY: AM</p>
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Case No. 20271
Harrier Federal Com 101H, 102H, 103H, 201H, 202H, 301H, 302H, 303H, 304H, 305H
W2 of Section 35, T25S-R32E, NMPM & W2 of Section 2, T26S-R32E, NMPM,
Lea County, New Mexico

Tract 1:



Federal lease
NMNM-108973

Tract 2:

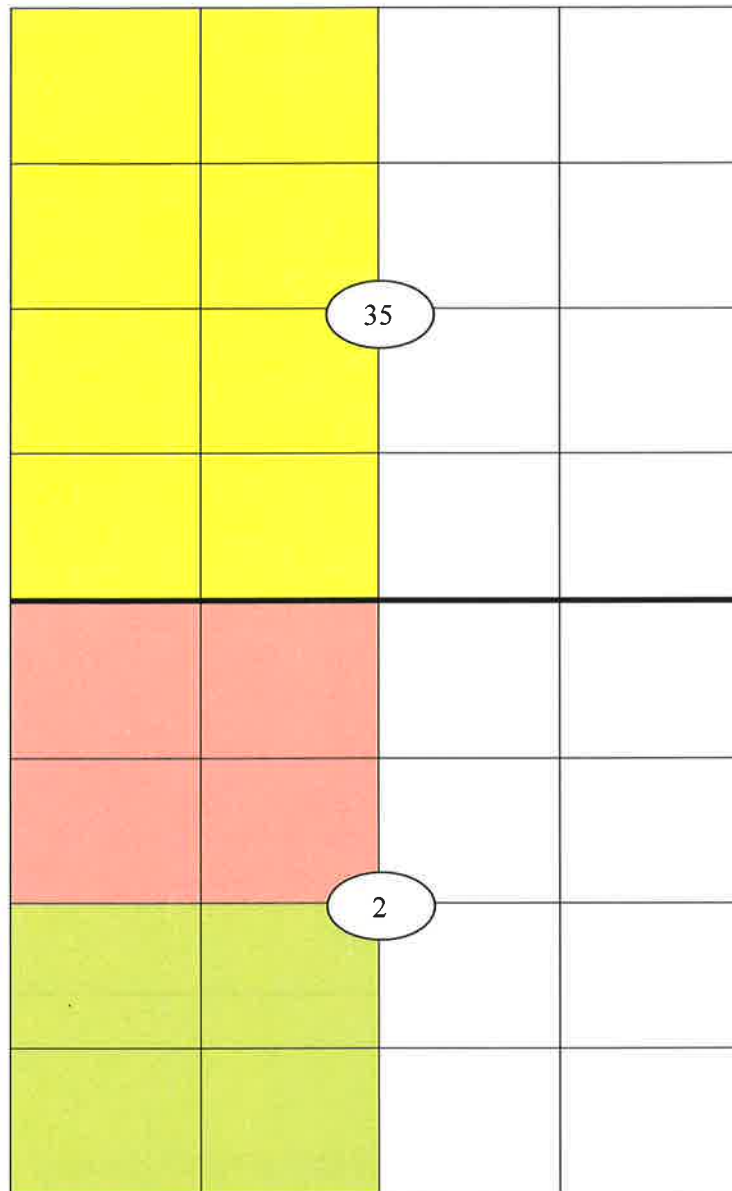


State Lease
VB-853

Tract 3:



State Lease
VB-845



Unit Working Interest

COG Operating LLC	85.070010%
OXY Y-1	12.982600%
Sharbro Energy LLC	1.947390%
Total	100.000000%

Tract 1 – W2 of Section 35

COG Operating LLC	100.000000%
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Tract 2 –NW4 of Section 2

COG Operating LLC	68.841760%
OXY Y-1	27.263460%
Sharbro Energy LLC	3.894780%
Total	100.000000%

Tract 3 –SW4 of Section 2

COG Operating LLC	68.841760%
OXY Y-1	27.263460%
Sharbro Energy LLC	3.894780%
Total	100.000000%

Pooling Notification List**Working Interest Owners**

Sharbro Energy, LLC/Sharbro Holdings, LLC
P.O. Box 840
Artesia, NM 88211

OXY USA Inc.
5 Greenway Plaza, Suite 110
Houston, TX 77046

Overriding Royalty Owners

Crownrock Minerals LP
P. O. Box 51933
Midland, TX 79710

Cornerstone Family Trust
John Kyle Thoma, Trustee
P. O. Box 558
Peyton, CO 80831-0558



December 13, 2018

Via Certified Mail: 91 7199 9991 7039 1751 7271

OXY Y-1 Company
P. O. Box 27570
Houston, TX 77227

Re: Harrier Federal Com Wells

Sec 35: W2 - T25S-R32E

Sec 2: W2 - T26S-R32E

Lea County, New Mexico

Dear Sir/Madam:

COG Operating LLC ("COG"), as Operator, hereby proposes to drill the following wells located in the W2 of Section 35, 25S-36E and W2 of Section 2, 26S-32E, Lea County, New Mexico:

The **Harrier Federal Com #101H** well has a surface hole location of 375' FSL and 1400' FWL of Section 2, 26S-32E, and a bottom hole location of 50' FNL and 1380' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,200' and a MD of approximately 19,500' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,094,330, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #102H** well has a surface hole location of 375' FSL and 750' FWL of Section 2, 26S-32E, and a bottom hole location of 640' FNL and 690' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,200' and a MD of approximately 19,500' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,074,330, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #103H** well has a surface hole location of 435' FNL and 232' FEL of Section 35, 25S-32E, and a bottom hole location of 50' FSL and 10' FWL of Section 2, 26S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,200' and a MD of approximately 19,500' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,094,330, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #201H** well has a surface hole location of 375' FSL and 1400' FWL of Section 2, 26S-32E, and a bottom hole location of 640' FNL and 1140' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,400' and a MD of approximately 19,600' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,094,330, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

BEFORE THE OIL CONSERVATION DIVISION

Santa Fe, New Mexico

Exhibit No. 1C

Submitted by: **COG OPERATING LLC**

Hearing Date: March 7, 2019

Case Nos. 20271

The **Harrier Federal Com #202H** well has a surface hole location of 435' FNL and 262' FWL of Section 35, 25S-32E, and a bottom hole location of 50' FSL and 240' FWL of Section 2, 26S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,400' and a MD of approximately 19,600' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,074,330, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #301H** well has a surface hole location of 375' FSL and 1910' FWL of Section 2, 26S-32E, and a bottom hole location of 50' FNL and 2310' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,800' and a MD of approximately 20,000' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,194,130, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #302H** well has a surface hole location of 375' FSL and 1790' FWL of Section 2, 26S-32E, and a bottom hole location of 50' FNL and 1650' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,600' and a MD of approximately 19,500' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,174,130, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #303H** well has a surface hole location of 375' FSL and 1460' FWL of Section 2, 26S-32E, and a bottom hole location of 50' FNL and 1360' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,800' and a MD of approximately 20,000' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,194,130, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #304H** well has a surface hole location of 375' FSL and 780' FWL of Section 2, 26S-32E, and a bottom hole location of 640' FNL and 840' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,600' and a MD of approximately 20,000' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,174,130, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

The **Harrier Federal Com #305H** well has a surface hole location of 375' FSL and 690' FWL of Section 2, 26S-32E, and a bottom hole location of 50' FNL and 540' FWL of Section 35, 25S-32E, or at a legal location as approved by the governing regulatory agency, to a TVD of approximately 9,800' and a MD of approximately 20,000' to test the Bone Spring formation ("Operation"). The total cost of the Operation is estimated to be \$11,174,130, and a detailed description of the cost is set out in the enclosed Authority for Expenditure ("AFE").

COG is proposing to drill these wells under the terms of the modified 1989 AAPL form of Operating Agreement which is enclosed for your review and approval. The Operating Agreement covers Sec 35: W2 - T25S-R32E and Sec 2: W2 - T26S-R32E. It has the following general provisions:

- 100/300 Non-Consenting Penalty
- \$7,000/\$700 Drilling and Producing Rate
- COG Operating LLC named as Operator

Please indicate your participation elections in the spaces provided below, sign and return this letter, along with a signed copy of the enclosed AFEs and a copy of your geologic well requirements. A self-addressed, postage paid envelope is enclosed for your convenience. If you do not wish to participate, COG proposes to acquire your interest via term assignment. It has the following general provisions:

- 3 year primary term
- Delivering a 75% NRI, proportionately reduced
- \$5,000 per net acre bonus consideration

The Term Assignment offer terminates February 1, 2019 and is subject to the approval of COG's management and verification of title. If an agreement cannot be reached within 30 days of the date of this letter, COG will apply to the New Mexico Oil Conservation Division for compulsory pooling of your interest into a spacing unit for the proposed well if uncommitted at such time.

If you have any questions, please do not hesitate to contact the undersigned at (432) 685-4352 or msolomon@concho.com.

Respectfully,

A handwritten signature in black ink, appearing to read 'MS', is written above the printed name.

Matt Solomon
Staff Landman

_____ I/We hereby elect to participate in the **Harrier Federal Com #101H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #101H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #102H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #102H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #103H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #103H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #201H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #201H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #202H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #202H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #301H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #301H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #302H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #302H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #303H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #303H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #304H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #304H**

_____ I/We hereby elect to participate in the **Harrier Federal Com #305H**

_____ I/We hereby elect **not** to participate in the **Harrier Federal Com #305H**

Company: _____

By: _____

Name: _____

Title: _____

Date: _____

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #101H	PROSPECT NAME:	LEA 2632 (717019)
SHL:	Sec 2: 375 FSL & 1490 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 35: 50 FNL & 1380 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Upper Avalon Shale	DEPTH:	19,500
LEGAL:	Sec 2: 26S-32E	TVD:	9,200

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constrctn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curative/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303	351		20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	185,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	600,000				600,000
Directional Drilling Services	210	205,000				205,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	114,000	311	68,000	354	182,000
Water	212	60,000	312	1,019,000		1,079,000
Bits	213	92,000	313	12,000		104,000
Mud & Chemicals	214	70,000	314	20,000	370	90,000
Drill Stem Test	215	0	315			0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323		372	0
Geologic/Engineering	224	6,000	324		373	6,000
Contract Labor	225	6,500	325	40,000	356	153,000
Company Supervision	226	37,800	326	15,000	357	52,800
Contract Supervision	227	96,000	327	182,000	358	283,000
Testing Casing/Tubing	228	30,000	328	5,000		35,000
Mud Logging Unit	229	30,000	329			30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000		542,000
Stimulation/Treating			332	12,000		12,000
Completion Unit			333	90,000		98,800
Swabbing Unit			334			0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	135,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342			0
Contingency	243	45,000	343	250,000	363	295,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Coil Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	20,000
TOTAL INTANGIBLES		2,508,300	6,198,000	275,000	550,300	9,531,600
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	337,000				337,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
Couplings/Fittings/Valves	415			515	95,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522		7,000
Miscellaneous	419		519		535	3,000
Contingency	420		520		538	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	75,000
TOTAL TANGIBLES		619,000	146,730	616,000	181,000	1,562,730
TOTAL WELL COSTS		3,127,300	6,345,000	891,000	731,300	11,094,330

COG Operating LLC

% of Total Well Cost

28% 57% 8% 7%

Date Prepared 12/4/18

COG Operating LLC

We approve:
_____% Working Interest

By: CB-RL-JM-SM

Company:
By:

Printed Name:
Title:
Date:

This AFE is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME: HARRIER FED COM #102H	PROSPECT NAME: LEA 2632 (717019)
SHL: Sec 2: 375 FSL & 750 FWL	STATE & COUNTY: New Mexico, Lea
BHL: Sec 35: 640 FNL & 690 FWL	OBJECTIVE: DRILL AND COMPLETE
FORMATION: Upper Avalon Shale	DEPTH: 19,500
LEGAL: Sec 2: 26S-32E	TVD: 9,200

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constrctn(TB)	Pmpq Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curative/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303			20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	185,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	600,000				600,000
Directional Drilling Services	210	205,000				205,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	114,000	311	68,000	354	182,000
Water	212	60,000	312	1,019,000		1,079,000
Bits	213	92,000	313	12,000	368	104,000
Mud & Chemicals	214	70,000	314	20,000	369	90,000
Drill Stem Test	215	0	315		370	0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323			0
Geologic/Engineering	224	6,000	324		372	6,000
Contract Labor	225	6,500	325	40,000	355	153,000
Company Supervision	226	37,800	326	15,000	356	52,800
Contract Supervision	227	96,000	327	182,000	357	283,000
Testing Casing/Tubing	228	30,000	328	5,000	358	35,000
Mud Logging Unit	229	30,000	329		377	30,000
Logging	230	0				0
Perforating/Wireline Services	231	4,000	331	536,000		542,000
Stimulation/Treating			332	12,000		12,000
Completion Unit			333	90,000		90,000
Swabbing Unit			334			0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	695,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342			0
Contingency	243	45,000	343	250,000	363	295,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Cell Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	0
TOTAL INTANGIBLES		2,508,300	6,198,000	275,000	530,300	9,511,600
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	337,000				337,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	85,000	534	87,000
Couplings/Fittings/Valves	415			515	95,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522		7,000
Miscellaneous	419		519		529	3,000
Contingency	420		520		535	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	86,000
TOTAL TANGIBLES		619,000	146,730	616,000	181,000	1,562,730
TOTAL WELL COSTS		3,127,300	6,345,000	891,000	711,300	11,074,330

COG Operating LLC

We approve:
_____% Working Interest

Company:
By: _____

Printed Name:
Title:
Date: _____

Date Prepared: 12/4/18

COG Operating LLC

By: CB-RL-JM-SM

This AFE is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #103H	PROSPECT NAME:	Bulldog 2532 (717114)
SHL:	Sec 35: 435 FNL & 232 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 2: 50 FSL & 10 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Upper Avalon Shale	DEPTH:	19,500
LEGAL:	Sec 35: 25S-32E	TVD:	9,200

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constrctn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curative/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303	351		20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	165,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	600,000				600,000
Directional Drilling Services	210	205,000				205,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	114,000	311	68,000	354	182,000
Water	212	60,000	312	1,019,000		1,079,000
Bits	213	92,000	313	12,000	368	104,000
Mud & Chemicals	214	70,000	314	20,000	370	90,000
Drill Stem Test	215	0	315			0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323		372	0
Geologic/Engineering	224	6,000	324	355	373	6,000
Contract Labor	225	6,500	325	40,000	356	153,000
Company Supervision	226	37,800	326	15,000	357	52,800
Contract Supervision	227	96,000	327	182,000	358	283,000
Testing Casing/Tubing	228	30,000	328	5,000	377	35,000
Mud Logging Unit	229	30,000	329			30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000	379	542,000
Stimulation/Treating			332	12,000	380	12,000
Completion Unit			333	90,000	381	98,800
Swabbing Unit			334		382	0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	695,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342		389	0
Contingency	243	45,000	343	250,000	363	295,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Cell Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	20,000
TOTAL INTANGIBLES		2,508,300	6,198,000	275,000	550,300	9,531,600
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	337,000				337,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
Couplings/Fittings/Valves	415			515	95,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522		7,000
Miscellaneous	419		519		523	3,000
Contingency	420		520		524	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	86,000
TOTAL TANGIBLES		619,000	146,730	616,000	181,000	1,562,730
TOTAL WELL COSTS		3,127,300	6,345,000	891,000	731,300	11,094,330

COG Operating LLC

% of Total Well Cost

28% 57% 8% 7%

Date Prepared: 12/4/18

COG Operating LLC

We approve:
_____% Working Interest

By: CB-RL-JM-SM

Company:
By:

Printed Name:
Title:
Date:

This AFF is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #201H	PROSPECT NAME:	LEA 2632 (717019)
SHL:	Sec 2: 375 FSL & 1400 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 35: 640 FNL & 1140 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Middle Avalon Shale	DEPTH:	19,600
LEGAL:	Sec 2: 26S-32E	TVD:	9,400

		Drig - Rig		Tank Btty		Pmpq	
INTANGIBLE COSTS		Release(D)	Completion(C)	Constrctn(TB)	Equipment(PEQ)	TOTAL	
Title/Curative/Permit	201	20,000				20,000	
Insurance	202	2,500	302			2,500	
Damages/Right of Way	203	20,000	303	351		20,000	
Survey/Stake Location	204	7,000		352		7,000	
Location/Pits/Road Expense	205	135,000	305	10,000	353	185,000	
Drilling / Completion Overhead	206	7,500	306	15,000		22,500	
Turnkey Contract	207	0				0	
Footage Contract	208	0				0	
Daywork Contract	209	600,000				600,000	
Directional Drilling Services	210	205,000				205,000	
Frac Equipment			307	1,418,000		1,418,000	
Frac Chemicals			308	513,000		513,000	
Frac Proppant			309	404,000		404,000	
Frac Proppant Transportation			310	399,000		399,000	
Fuel & Power	211	114,000	311	68,000	354	182,000	
Water	212	60,000	312	1,019,000		1,079,000	
Bits	213	92,000	313	12,000		104,000	
Mud & Chemicals	214	70,000	314	20,000	370	90,000	
Drill Stem Test	215	0	315			0	
Coring & Analysis	216	0				0	
Cement Surface	217	25,500				25,500	
Cement Intermediate	218	35,000				35,000	
Cement 2nd Intermediate/Production	219	130,000				130,000	
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0	
Float Equipment & Centralizers	221	32,500				32,500	
Casing Crews & Equipment	222	39,000				39,000	
Fishing Tools & Service	223	0	323		372	0	
Geologic/Engineering	224	6,000	324	355	373	6,000	
Contract Labor	225	6,500	325	40,000	356	153,000	
Company Supervision	226	37,800	326	15,000	357	52,800	
Contract Supervision	227	96,000	327	162,000	358	263,000	
Testing Casing/Tubing	228	30,000	328	5,000	377	35,000	
Mud Logging Unit	229	30,000	329			30,000	
Logging	230	0			378	0	
Perforating/Wireline Services	231	4,000	331	536,000	379	542,000	
Stimulation/Treating			332	12,000	380	12,000	
Completion Unit			333	90,000	381	98,800	
Swabbing Unit			334		382	0	
Rentals-Surface	235	125,000	335	466,000	359	598,000	
Rentals-Subsurface	236	110,000	336	80,000		190,000	
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000	
Welding Services	238	3,000	338	5,000	361	8,000	
Water Disposal	239	0	339	60,000	362	695,000	
Plug to Abandon	240	0	340			0	
Seismic Analysis	241	0	341			0	
Miscellaneous	242	0	342		389	0	
Contingency	243	45,000	343	250,000	363	295,000	
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000	
Dyed Diesel	245		345	484,000			
Coil Tubing			346			0	
Flowback Crews & Equip			347	48,000		48,000	
Offset Directional/Frac	248		348		391	20,000	
TOTAL INTANGIBLES		2,508,300	6,198,000	275,000	550,300	9,531,600	
TANGIBLE COSTS							
Surface Casing	401	48,000				48,000	
Intermediate Casing	402	174,000				174,000	
Production Casing/Liner	403	337,000				337,000	
Tubing			504	52,030	530	57,030	
Wellhead Equipment	405	60,000	505	18,700	531	81,700	
Pumping Unit					506	96,000	
Prime Mover					507	0	
Rods					508	45,000	
Pumps-Sub Surface (BH)			509		532	5,000	
Tanks				510	40,000	40,000	
Flowlines				511	100,000	100,000	
Heater Treater/Separator				512	150,000	150,000	
Electrical System				513	100,000	115,000	
Packers/Anchors/Hangers	414		514	65,000	534	67,000	
Couplings/Fittings/Valves	415			515	95,000	95,000	
Dehydration				517		0	
Injection Plant/CO2 Equipment				518		0	
Pumps-Surface				521	10,000	10,000	
Instrumentation/SCADA/POC				522		7,000	
Miscellaneous	419		519		523	3,000	
Contingency	420		520		524	0	
Meters/LACT				525	30,000	30,000	
Flares/Combustors/Emission				526	16,000	16,000	
Gas Lift/Compression			527	11,000	516	86,000	
TOTAL TANGIBLES		619,000	146,730	616,000	181,000	1,562,730	
TOTAL WELL COSTS		3,127,300	6,345,000	891,000	731,300	11,094,330	

COG Operating LLC

% of Total Well Cost

28%

57%

8%

7%

Date Prepared: 12/4/18

COG Operating LLC

By: CB-RL-JM-SM

We approve:
% Working Interest

Company

By

Printed Name:

Title

Date:

This AFE is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #202H	PROSPECT NAME:	Bulldog 2532 (717114)
SHL:	Sec 35: 435 FNL & 262 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 2: 50 FSL & 240 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Middle Avalon Shale	DEPTH:	19,600
LEGAL:	Sec 35: 25S-32E	TVD:	9,400

		Orig - Rig Release(D)	Completion(C)	Tank Btty Constrctn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Cursive/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303	351		20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	185,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	600,000				600,000
Directional Drilling Services	210	205,000				205,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	114,000	311	68,000	354	182,000
Water	212	80,000	312	1,019,000		1,079,000
Bits	213	82,000	313	12,000	358	104,000
Mud & Chemicals	214	70,000	314	20,000	369	90,000
Drill Stem Test	215	0	315		370	0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323		372	0
Geologic/Engineering	224	6,000	324	355	373	6,000
Contract Labor	225	6,500	325	40,000	356	153,000
Company Supervision	226	37,800	326	15,000	357	52,800
Contract Supervision	227	96,000	327	182,000	358	283,000
Testing Casing/Tubing	228	30,000	328	5,000	377	35,000
Mud Logging Unit	229	30,000	329			30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000	379	542,000
Stimulation/Treating			332	12,000	380	12,000
Completion Unit			333	90,000	381	98,800
Swabbing Unit			334		382	0
Rentals-Surface	235	125,000	335	466,000	359	568,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forklifts/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	135,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342		389	0
Contingency	243	45,000	343	250,000	363	295,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Coil Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	0
TOTAL INTANGIBLES		2,508,300	6,198,000	275,000	530,300	9,511,600
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	337,000				337,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
Couplings/Fittings/Valves	415			515	95,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522	7,000	7,000
Miscellaneous	419		519		535	3,000
Contingency	420		520		536	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	86,000
TOTAL TANGIBLES		619,000	146,730	616,000	181,000	1,562,730
TOTAL WELL COSTS		3,127,300	6,345,000	891,000	711,300	11,074,330

COG Operating LLC

We approve:
_____% Working Interest

Company:
By: _____

Printed Name:
Title:
Date: _____

Date Prepared: 12/4/18

COG Operating LLC

By: CB-RL-JM-SM

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**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #301H	PROSPECT NAME:	Lea 2632 (717019)
SHL:	Sec 2: 375 FSL & 1910 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 35: 50 FNL & 2310 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Lower Avalon Shale	DEPTH:	20,000
LEGAL:	Sec 2: 26S-32E	TVD:	9,800

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constructn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curative/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Fright of Way	203	20,000	303	351		20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	165,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	648,000				648,000
Directional Drilling Services	210	224,000				224,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	125,000	311	68,000	354	193,000
Water	212	60,000	312	1,019,000		1,079,000
Bls	213	92,000	313	12,000	369	104,000
Mud & Chemicals	214	70,000	314	20,000	370	90,000
Drill Stem Test	215	0	315			0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323		372	0
Geologic/Engineering	224	7,200	324		373	7,200
Contract Labor	225	6,500	325	40,000	356	153,000
Company Supervision	226	41,400	326	15,000	357	56,400
Contract Supervision	227	104,000	327	182,000	358	291,000
Testing Casing/Tubing	228	30,000	328	5,000		35,000
Mud Logging Unit	229	30,000	329			30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000		542,000
Stimulation/Treating			332	12,000		12,000
Completion Unit			333	90,000		98,800
Swabbing Unit			334			0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	135,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342		389	0
Contingency	243	47,000	343	250,000	363	297,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Coil Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	20,000
TOTAL INTANGIBLES		2,601,100	6,198,000	275,000	550,300	9,624,400
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	344,000				344,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
Couplings/Fittings/Valves	415			515	95,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522		7,000
Miscellaneous	419		519		523	3,000
Contingency	420		520		524	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	66,000
TOTAL TANGIBLES		626,000	146,730	616,000	181,000	1,569,730
TOTAL WELL COSTS		3,227,100	6,345,000	891,000	731,300	11,194,130

COG Operating LLC

% of Total Well Cost

29% 57% 8% 7%

Date Prepared: 12/4/18

COG Operating LLC

We approve:
% Working Interest:

By CB-RL-JM-SM

Company:
By:

Printed Name:
Title:
Date:

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**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #302H	PROSPECT NAME:	Lea 2632 (717019)
SHL:	Sec 2: 375 FSL & 1790 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 35: 50 FNL & 1650 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Lower Avalon Shale	DEPTH:	19,500
LEGAL:	Sec 2: 26S-32E	TVD:	9,600

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constructn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curative/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303			20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	185,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	648,000				648,000
Directional Drilling Services	210	224,000				224,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	125,000	311	66,000	354	193,000
Water	212	60,000	312	1,019,000		1,079,000
Bits	213	92,000	313	12,000	368	104,000
Mud & Chemicals	214	70,000	314	20,000	369	90,000
Drill Stem Test	215	0	315		370	0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323		372	0
Geologic/Engineering	224	7,200	324		373	7,200
Contract Labor	225	6,500	325	40,000	374	153,000
Company Supervision	226	41,400	326	15,000	375	56,400
Contract Supervision	227	104,000	327	182,000	376	291,000
Testing Casing/Tubing	228	30,000	328	5,000	377	35,000
Mud Logging Unit	229	30,000	329			30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000	379	542,000
Simulation/Treating			332	12,000	380	12,000
Completion Unit			333	90,000	381	98,800
Swabbing Unit			334		382	0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	695,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342		389	0
Contingency	243	47,000	343	250,000	363	297,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Coil Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	0
TOTAL INTANGIBLES		2,601,100	6,198,000	275,000	530,300	9,604,400
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	344,000				344,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
Couplings/Fittings/Valves	415			515	95,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522		7,000
Miscellaneous	419		519		529	3,000
Contingency	420		520		536	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	86,000
TOTAL TANGIBLES		626,000	146,730	616,000	181,000	1,569,730
TOTAL WELL COSTS		3,227,100	6,345,000	891,000	711,300	11,174,130

COG Operating LLC

% of Total Well Cost

28% 57% 8% 6%

Date Prepared: 12/4/18

COG Operating LLC

We approve:
_____% Working Interest

By: CB-RL-JM-SM

Company:
By:

Printed Name:
Title:
Date:

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**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #303H	PROSPECT NAME:	Lea 2632 (717019)
SHL:	Sec 2: 375 FSL & 1460 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 35: 50 FNL & 1360 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Lower Avalon Shale	DEPTH:	20,000
LEGAL:	Sec 2: 26S-32E	TVD:	9,800

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constrctn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curtail/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303			20,000
Survey/Stake Location	204	7,000		352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	185,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	648,000				648,000
Directional Drilling Services	210	224,000				224,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	125,000	311	68,000	354	193,000
Water	212	80,000	312	1,019,000		1,079,000
Bits	213	92,000	313	12,000	368	104,000
Mud & Chemicals	214	70,000	314	20,000	369	90,000
Drill Stem Test	215	0	315		370	0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323			0
Geologic/Engineering	224	7,200	324		372	7,200
Contract Labor	225	6,500	325	40,000	373	153,000
Company Supervision	226	41,400	326	15,000	374	58,400
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Testing Casing/Tubing	228	30,000	328	5,000	376	35,000
Mud Logging Unit	229	30,000	329		377	30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000		542,000
Stimulation/Treating			332	12,000		12,000
Completion Unit			333	90,000		98,800
Swabbing Unit			334			0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000		190,000
Trucking/Forks/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	695,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342			0
Contingency	243	47,000	343	250,000	363	297,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Coil Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	20,000
TOTAL INTANGIBLES		2,601,100	6,198,000	275,000	550,300	9,624,400
TANGIBLE COSTS						
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Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	344,000				344,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
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Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
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Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522		7,000
Miscellaneous	419		519		529	3,000
Contingency	420		520		535	0
Meters/LACT				524		30,000
Flares/Combustors/Emission				525	30,000	16,000
Gas Lift/Compression			527	11,000	516	86,000
TOTAL TANGIBLES		626,000	146,730	616,000	181,000	1,569,730
TOTAL WELL COSTS		3,227,100	6,345,000	891,000	731,300	11,194,130
% of Total Well Cost		28%	57%	8%	7%	

COG Operating LLC

We approve:
_____% Working Interest

Company:
By: _____

Printed Name:
Title:
Date: _____

Date Prepared: 12/4/18

COG Operating LLC

By: CB-RL-JM-SM

This AFE is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME:	HARRIER FED COM #304H	PROSPECT NAME:	Lea 2632 (717019)
SHL:	Sec 2: 375 FSL & 780 FWL	STATE & COUNTY:	New Mexico, Lea
BHL:	Sec 35: 640 FNL & 840 FWL	OBJECTIVE:	DRILL AND COMPLETE
FORMATION:	Lower Avalon Shale	DEPTH:	20,000
LEGAL:	Sec 2: 26S-32E	TVD:	9,600

		Drig - Rig Release(D)	Completion(C)	Tank Btty Constrctn(TB)	Pmpg Equipment(PEQ)	TOTAL
INTANGIBLE COSTS						
Title/Curative/Permit	201	20,000				20,000
Insurance	202	2,500	302			2,500
Damages/Right of Way	203	20,000	303			20,000
Survey/Stake Location	204	7,000		351		7,000
Location/Pls/Road Expense	205	135,000	305	10,000	352	185,000
Drilling / Completion Overhead	206	7,500	306	15,000		22,500
Turnkey Contract	207	0				0
Footage Contract	208	0				0
Daywork Contract	209	648,000				648,000
Directional Drilling Services	210	224,000				224,000
Frac Equipment			307	1,418,000		1,418,000
Frac Chemicals			308	513,000		513,000
Frac Proppant			309	404,000		404,000
Frac Proppant Transportation			310	399,000		399,000
Fuel & Power	211	125,000	311	68,000	354	193,000
Water	212	60,000	312	1,019,000		1,079,000
Bits	213	92,000	313	12,000	368	104,000
Mud & Chemicals	214	70,000	314	20,000	369	90,000
Drill Stem Test	215	0	315		370	0
Coring & Analysis	216	0				0
Cement Surface	217	25,500				25,500
Cement Intermediate	218	35,000				35,000
Cement 2nd Intermediate/Production	219	130,000				130,000
Cement Squeeze & Other (Kickoff Plug)	220	0			371	0
Float Equipment & Centralizers	221	32,500				32,500
Casing Crews & Equipment	222	39,000				39,000
Fishing Tools & Service	223	0	323		372	0
Geologic/Engineering	224	7,200	324		373	7,200
Contract Labor	225	6,500	325	40,000	356	153,000
Company Supervision	226	41,400	326	15,000	357	56,400
Contract Supervision	227	104,000	327	162,000	358	266,000
Testing Casing/Tubing	228	30,000	328	5,000	377	35,000
Mud Logging Unit	229	30,000	329			30,000
Logging	230	0			378	0
Perforating/Wireline Services	231	4,000	331	538,000	379	542,000
Stimulation/Treating			332	12,000	380	12,000
Completion Unit			333	90,000	381	98,800
Swabbing Unit			334		382	0
Rentals-Surface	235	125,000	335	466,000	359	598,000
Rentals-Subsurface	236	110,000	336	80,000	384	190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	243,000
Welding Services	238	3,000	338	5,000	361	8,000
Water Disposal	239	0	339	60,000	362	695,000
Plug to Abandon	240	0	340			0
Seismic Analysis	241	0	341			0
Miscellaneous	242	0	342		389	0
Contingency	243	47,000	343	250,000	363	297,000
Closed Loop & Environmental	244	220,000	344	5,000	364	225,000
Dyed Diesel	245		345	484,000		
Cat Tubing			346			0
Flowback Crews & Equip			347	48,000		48,000
Offset Directional/Frac	248		348		391	0
TOTAL INTANGIBLES		2,601,100	6,198,000	275,000	530,300	9,604,400
TANGIBLE COSTS						
Surface Casing	401	48,000				48,000
Intermediate Casing	402	174,000				174,000
Production Casing/Liner	403	344,000				344,000
Tubing			504	52,030	530	57,030
Wellhead Equipment	405	60,000	505	18,700	531	81,700
Pumping Unit					506	96,000
Prime Mover					507	0
Rods					508	45,000
Pumps-Sub Surface (BH)			509		532	5,000
Tanks				510	40,000	40,000
Flowlines				511	100,000	100,000
Heater Treater/Separator				512	150,000	150,000
Electrical System				513	100,000	115,000
Packers/Anchors/Hangers	414		514	65,000	534	67,000
Couplings/Fittings/Valves	415			515	85,000	95,000
Dehydration				517		0
Injection Plant/CO2 Equipment				518		0
Pumps-Surface				521	10,000	10,000
Instrumentation/SCADA/POC				522	7,000	7,000
Miscellaneous	419		519		535	3,000
Contingency	420		520		536	0
Meters/LACT				525	30,000	30,000
Flares/Combustors/Emission				526	16,000	16,000
Gas Lift/Compression			527	11,000	516	86,000
TOTAL TANGIBLES		626,000	146,730	616,000	181,000	1,569,730
TOTAL WELL COSTS		3,227,100	6,345,000	891,000	711,300	11,174,130

COG Operating LLC

% of Total Well Cost

29%

57%

8%

6%

Date Prepared: 12/4/18

COG Operating LLC

We approve:
_____% Working Interest

By CB-RL-JM-SM

Company:

By:

Printed Name:

Title:

Date:

This AFE is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**COG OPERATING LLC
AUTHORITY FOR EXPENDITURE
DRILLING**

WELL NAME: HARRIER FED COM #305H
SHL: Sec 2: 375 FSL & 690 FWL
BHL: Sec 35: 50 FNL & 540 FWL
FORMATION: Lower Avalon Shale
LEGAL: Sec 2: 26S-32E

PROSPECT NAME: Lea 2632 (717019)
STATE & COUNTY: New Mexico, Lea
OBJECTIVE: DRILL AND COMPLETE
DEPTH: 20,000
TVD: 9,800

		Drig - Rig		Completion(C)	Tank Btty	Pmpq	
		Release(D)			Constrctn(TB)	Equipment(PEQ)	TOTAL
INTANGIBLE COSTS							
Title/Curative/Permit	201	20,000					20,000
Insurance	202	2,500	302				2,500
Damages/Right of Way	203	20,000	303				20,000
Survey/Stake Location	204	7,000			352		7,000
Location/Pits/Road Expense	205	135,000	305	10,000	353	40,000	185,000
Drilling / Completion Overhead	206	7,500	306	15,000			22,500
Turnkey Contract	207	0					0
Footage Contract	208	0					0
Daywork Contract	209	648,000					648,000
Directional Drilling Services	210	224,000					224,000
Frac Equipment			307	1,418,000			1,418,000
Frac Chemicals			308	513,000			513,000
Frac Proppant			309	404,000			404,000
Frac Proppant Transportation			310	399,000			399,000
Fuel & Power	211	125,000	311	68,000	354	367	193,000
Water	212	60,000	312	1,019,000		368	1,079,000
Bits	213	92,000	313	12,000		369	104,000
Mud & Chemicals	214	70,000	314	20,000		370	90,000
Drill Stem Test	215	0	315				0
Coring & Analysis	216	0					0
Cement Surface	217	25,500					25,500
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Mud Logging Unit	229	30,000	329				30,000
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Completion Unit			333	90,000		381	98,800
Swabbing Unit			334			382	0
Rentals-Surface	235	125,000	335	466,000	359	383	598,000
Rentals-Subsurface	236	110,000	336	80,000		384	190,000
Trucking/Forklift/Rig Mobilization	237	200,000	337	40,000	360	385	243,000
Welding Services	238	3,000	338	5,000	361	386	8,000
Water Disposal	239	0	339	60,000	362	387	695,000
Plug to Abandon	240	0	340				0
Seismic Analysis	241	0	341				0
Miscellaneous	242	0	342			389	0
Contingency	243	47,000	343	250,000	363	390	297,000
Closed Loop & Environmental	244	220,000	344	5,000	364	388	225,000
Dyed Diesel	245		345	484,000			
Coil Tubing			346				0
Flowback Crews & Equip			347	48,000			48,000
Offset Directional/Frac	248		348			391	0
TOTAL INTANGIBLES		2,601,100		6,198,000	275,000	530,300	9,604,400
TANGIBLE COSTS							
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Production Casing/Liner	403	344,000					344,000
Tubing			504	52,030		530	57,030
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Pumping Unit						506	96,000
Prime Mover						507	0
Rods						508	45,000
Pumps-Sub Surface (BH)			509			532	5,000
Tanks					510		40,000
Flowlines					511		100,000
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Electrical System					513		115,000
Packers/Anchors/Hangers	414		514	65,000		534	67,000
Couplings/Fittings/Valves	415				515		95,000
Dehydration					517		0
Injection Plant/CO2 Equipment					518		0
Pumps-Surface					521		10,000
Instrumentation/SCADA/POC					522		7,000
Miscellaneous	419		519		523		3,000
Contingency	420		520		524		0
Meters/LACT					525		30,000
Flares/Combustors/Emission					526		16,000
Gas Lift/Compression			527	11,000	516	528	86,000
TOTAL TANGIBLES		626,000		146,730	616,000	181,000	1,569,730
TOTAL WELL COSTS		3,227,100		8,345,000	891,000	711,300	11,174,130

COG Operating LLC

% of Total Well Cost

28%

57%

8%

8%

Date Prepared: 12/4/18

COG Operating LLC

By: CB-RL-JM-SM

We approve:
% Working Interest

Company:

By:

Printed Name:

Title:

Date:

This AFE is only an estimate. By signing you agree to pay your share of the actual costs incurred.

**STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION**

**APPLICATION OF COG OPERATING LLC
FOR COMPULSORY POOLING,
LEA COUNTY, NEW MEXICO.**

CASE NO. 20271

AFFIDAVIT OF JOHN BERTALOTT

John Bertalott, of lawful age and being first duly sworn, declares as follows:

1. My name is John Bertalott. I work for COG Operating LLC ("COG") as a geologist.
2. I have previously testified before the New Mexico Oil Conservation Division as an expert witness in petroleum geology. My credentials as a petroleum geology have been accepted by the Division and made a matter of record.
3. I am familiar with the applications filed by COG in these cases and I have conducted a geologic study of the targeted Avalon shale within the Bone Spring formation underlying the subject acreage.
4. COG is targeting Avalon shale within the Bone Spring formation with its proposed **Harrier Federal Com #101H, #102H, #103H, #201H, #202H, #301H, #302H, #303H, #304H, and #305H Wells.**
5. **COG Exhibit No. 2A** is a subsea structure map that I prepared on the top of the Avalon shale that is representative of the targeted intervals within the Bone Spring formation. The proposed wells are depicted by a green dashed line. Existing producing wells in the Avalon shale are represented by solid green lines. The structure map shows that the formation is

gently dipping to the southeast in this area. I do not observe any faulting, pinchouts, or other geologic impediments to developing the targeted Avalon shale with a horizontal well in this area.

6. **COG Exhibit No. 2B** overlays a cross-section line in red consisting of three wells penetrating the Bone Spring formation that I used to construct a stratigraphic cross-section from A to A'. I consider these wells to be representative of the geology in the area.

7. **COG Exhibit No. 2C** is a cross section using the representative wells depicted on Exhibit 2B. Each well in the cross-section contains gamma ray, resistivity, and porosity logs. The proposed target intervals in the Avalon shale are labeled and depicted with set of green brackets on the left-hand side of the exhibit. The cross-section demonstrates that the targeted intervals extend across the proposed spacing and proration unit in all cases.

8. In my opinion the stand-up orientation of the proposed wells is the preferred orientation for horizontal well development in this area and is appropriate to efficiently and effectively develop the subject acreage.

9. Based on my geologic study, the Bone Spring formation underlying the subject area, including the targeted Avalon shale, is suitable for development by horizontal wells and the acreage comprising the proposed spacing and proration units will contribute more-or-less equally to the production from the wellbores.

10. In my opinion, the granting of COG's application will be in the best interest of conservation, the prevention of waste, and protection of correlative rights.

FURTHER AFFIANT SAYETH NOT.


John Bertalott

STATE OF TEXAS)
COUNTY OF Midland)

SUBSCRIBED and SWORN to before me this 6th day of March 2019 by
John Bertalott.



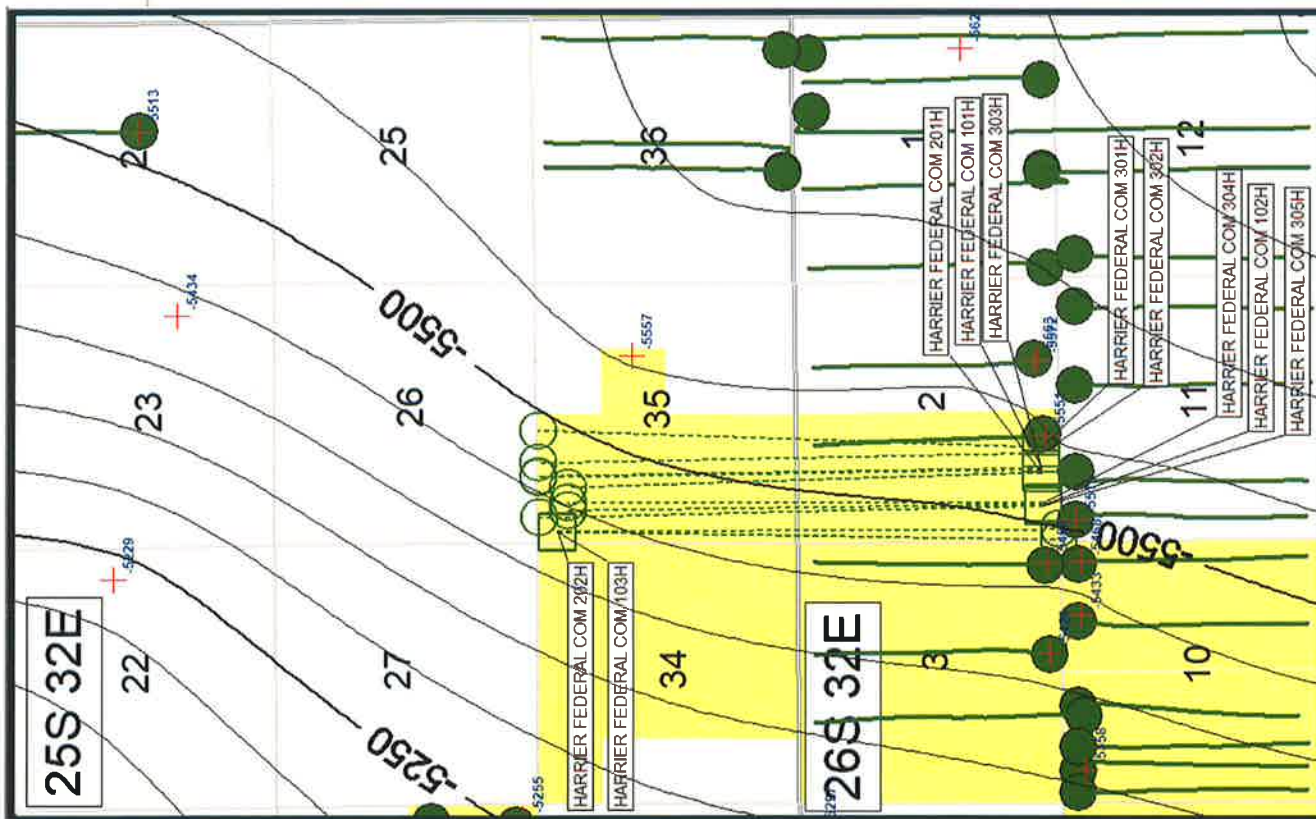

NOTARY PUBLIC

My Commission Expires:

9/9/2021

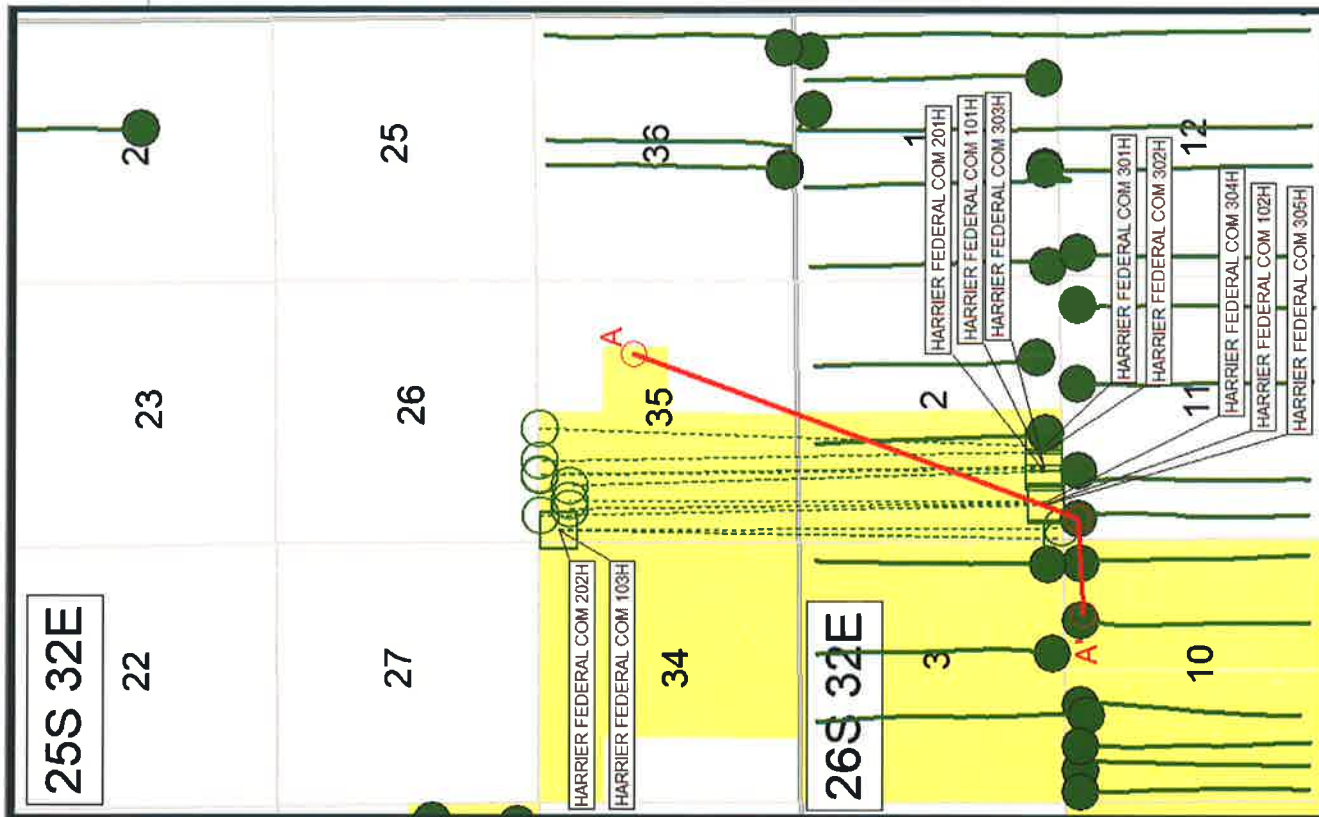
Bone Spring Pool

Harrier Federal Com 101H, 102H, 103H, 201H, 202H, 301H, 302H, 303H, 304H & 305H



Bone Spring Pool

Harrier Federal Com 101H, 102H, 103H, 201H, 202H, 301H, 302H, 303H, 304H & 305H



Map Legend

- SHL
- BHL
- COG – Avalon Shale Proposed Horizontal Location
- Producing Avalon Shale Wells
- Cross Section Line
- COG Acreage

BEFORE THE OIL CONSERVATION DIVISION

Santa Fe, New Mexico

Exhibit No. 2B

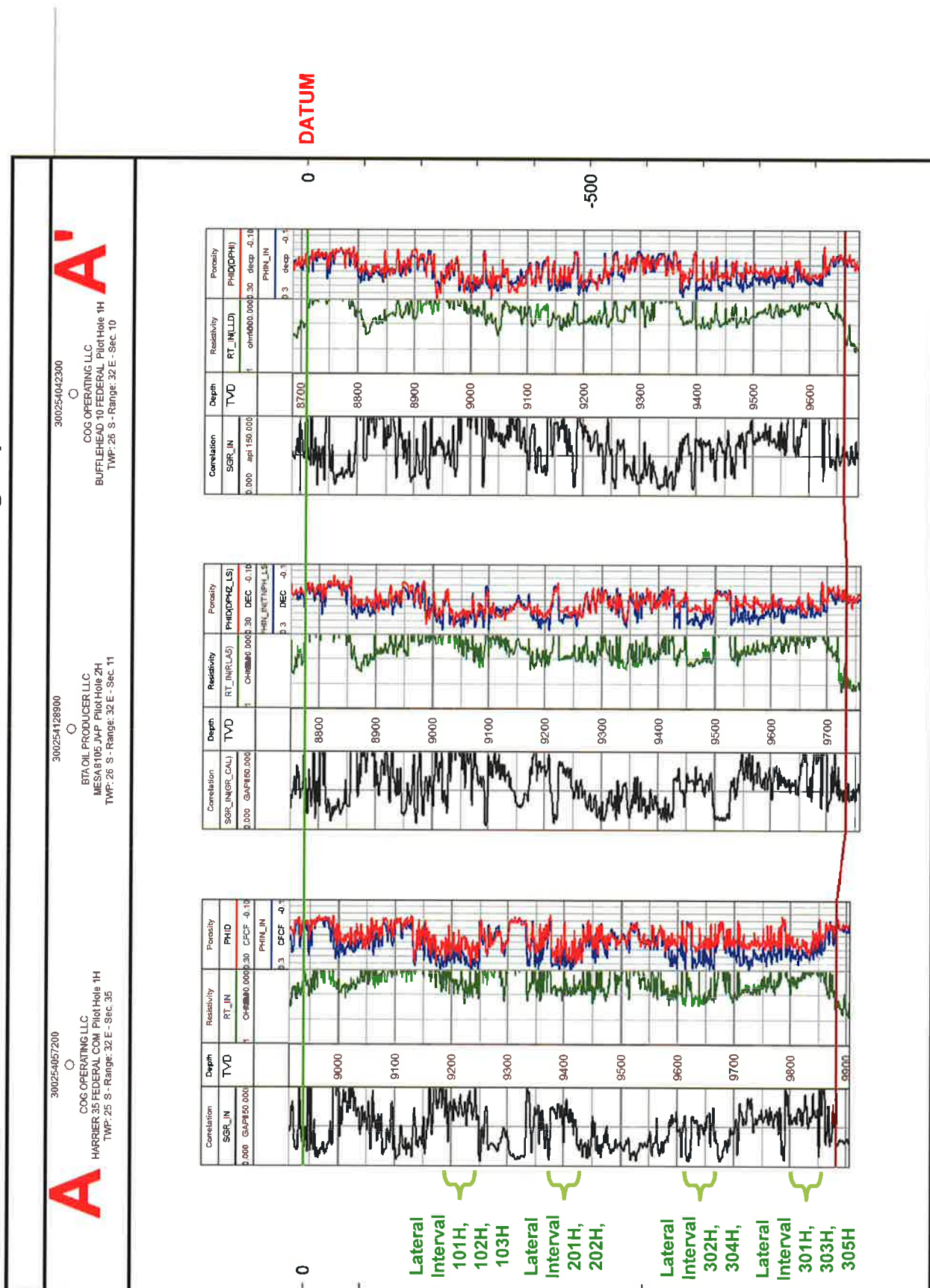
Submitted by: COG OPERATING LLC

Hearing Date: March 7, 2019

Case Nos. 20271



Stratigraphic Cross Section A – A'



**STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION**

**APPLICATION OF COG OPERATING, LLC
FOR COMPULSORY POOLING,
LEA COUNTY, NEW MEXICO.**

CASE NO. 20271

AFFIDAVIT

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

Adam G. Rankin, attorney for **COG Operating LLC** the Applicant herein, being first duly sworn, upon oath, states that the above-referenced Applications have been provided under the notice letters and proof of receipts attached hereto.

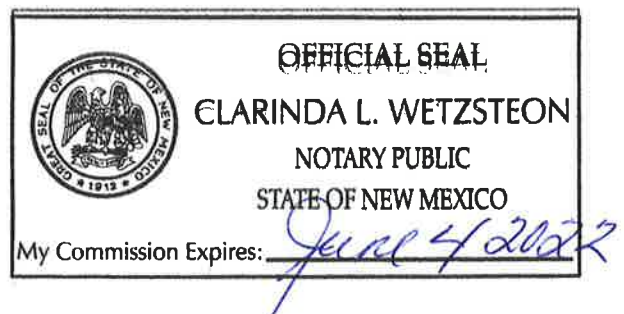


Adam G. Rankin

SUBSCRIBED AND SWORN to before me this 6th day of March 2019 by Adam G. Rankin.



Notary Public



BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. 3
Submitted by: **COG OPERATING LLC**
Hearing Date: March 7, 2019
Case Nos. 20271



February 15, 2019

VIA CERTIFIED MAIL
CERTIFIED RECEIPT REQUESTED

TO: ALL INTEREST OWNERS SUBJECT TO POOLING PROCEEDINGS

**Re: Application of COG Operating LLC for compulsory pooling, Lea County,
New Mexico.
Harrier Federal Com #101H-103H, #201H-202H and #301H-305H Wells**

Ladies & Gentlemen:

This letter is to advise you that COG Operating Inc. has filed the enclosed application with the New Mexico Oil Conservation Division. A hearing has been requested before a Division Examiner on March 7, 2019, and the status of the hearing can be monitored through the Division's website at <http://www.emnrd.state.nm.us/ocd/>. Division hearings will commence at 8:15 a.m. in Porter Hall at the Oil Conservation Division's Santa Fe Offices located at 1220 South Saint Francis Drive, Santa Fe, New Mexico 87505. You are not required to attend this hearing, but as an owner of an interest that may be affected by this application, you may appear and present testimony. Failure to appear at that time and become a party of record will preclude you from challenging the matter at a later date.

Parties appearing in cases are required by Division Rule 19.15.4.13.B to file a Pre-hearing Statement four business days in advance of a scheduled hearing. This statement must be filed at the Division's Santa Fe office at the above specified address and should include: the names of the parties and their attorneys; a concise statement of the case; the names of all witnesses the party will call to testify at the hearing; the approximate time the party will need to present its case; and identification of any procedural matters that are to be resolved prior to the hearing.

If you have any questions about this matter, please contact Matt Solomon at (432) 685-4352 or MSolomon@concho.com.

Sincerely,

Michael H. Feldewert
ATTORNEY FOR COG OPERATING LLC



Shipment Confirmation Acceptance Notice

A. Mailer Action

Note to Mailer: The labels and volume associated to this form online, **must** match the labeled packages being presented to the USPS® employee with this form.

COG - Harrier Wells
CM# 51500.0010
Notice List 20190307 Docket

Shipment Date: 02/11/2019

Shipped From:

Name: HOLLAND & HART LLP

Address: 110 N GUADALUPE ST # 1

City: SANTA FE

State: NM ZIP+4® 87501

Type of Mail	Volume
Priority Mail Express®	
Priority Mail®	0
First-Class Package Service®	
Returns	
International*	
Other	3
Total	3

*Start time for products with service guarantees will begin when mail arrives at the local Post Office™ and items receive individual processing and acceptance scans.

B. USPS Action

Note to RSS Clerk:

1. Home screen > Mailing/Shipping > More
2. Select Shipment Confirm
3. Scan or enter the barcode/label number from PS Form 5630
4. Confirm the volume count message by selecting Yes or No
5. Select Pay and End Visit to complete transaction

USPS EMPLOYEE: Please scan upon pickup or receipt of mail.
Leave form with customer or in customer's mail receptacle.

USPS SCAN AT ACCEPTANCE



9275 0901 1935 6200 0012 6798 80





Firm Mailing Book For Accountable Mail

[illegible]

Pieces

Search for:

Go

Advanced

Between

02/11/2019

And

02/11/2019

Clear Job Filter: 92750901193562000012679880



Barcode	Recipient	Status	Custom	User / Profile	Location / Department	Job ID
9214890194038378655903	Sharbro Energy LLC c/o Elizabeth Baker PO BOX 840 Artesia NM 88211	Delivered Signature Received	Ref#: C1214490.6952510 RetRef#:	clwetzsteon@hollandhart.com Label 4 x 2.5 (flat)		1214490
9214890194038378655910	Sharbro Holdings LLC PO BOX 840 Artesia NM 88211	Delivered Signature Received	Ref#: C1214490.6952511 RetRef#:	clwetzsteon@hollandhart.com Label 4 x 2.5 (flat)		1214490
9214890194038378655927	OXY USA Inc c/o Courtney Carr 5 Greenway Plaza Suite 110 Houston TX 77046	Delivered Signature Received	Ref#: C1214490.6952512 RetRef#:	clwetzsteon@hollandhart.com Label 4 x 2.5 (flat)		1214490

1

20

items per page

1 - 3 of 3 items