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# **LONGS PEAK RESOURCES, LLC**

Docket No. 170700466



BEFORE THE OIL & GAS CONSERVATION COMMISSION  
OF THE STATE OF COLORADO

|                                    |   |                      |
|------------------------------------|---|----------------------|
| IN THE MATTER OF THE PROMULGATION  | ) | CAUSE NO. 535        |
| AND ESTABLISHMENT OF FIELD RULES   | ) |                      |
| TO GOVERN OPERATIONS FOR THE       | ) | DOCKET NO. 170700466 |
| NIOBRARA, FORT HAYES, CODELL AND   | ) |                      |
| CARLILE FORMATIONS, UNNAMED FIELD, | ) | TYPE: SPACING        |
| WELD COUNTY, COLORADO              | ) |                      |

REQUEST FOR RECOMMENDATION OF  
APPROVAL OF APPLICATION WITHOUT A HEARING

Longs Peak Resources, LLC, Operator No. 10611 ("LPR" or "Applicant"), by and through its undersigned attorneys, hereby requests pursuant to Rule 511.a. of the Rules and Regulations of the Colorado Oil and Gas Conservation Commission for the Director to recommend approval of its May 25, 2017 (amended July 12, 2017) verified application ("Application") and the supporting exhibits without a hearing.

Applicant requests that the above-captioned matter be approved based upon: (i) the merits of the Application, and (ii) Applicant's sworn written testimony verifying sufficient facts along with exhibits that adequately support the relief requested in the Application. To Applicant's information and belief, no protests were timely filed in this matter.

WHEREFORE, Applicant requests that its request for a recommendation for approval of its Application without a hearing be granted.

DATED this 15 day of August, 2017.

Respectfully submitted,

LONGS PEAK RESOURCES, LLC

By: \_\_\_\_\_

  
James Parrot  
Jillian Fulcher  
Evan Bekkedahl  
Beatty & Wozniak, P.C.  
Attorneys for Applicant  
216 16<sup>th</sup> Street, Suite 1100  
Denver, Colorado 80202  
(303) 407-4499

**Land Testimony – Kent Snider**  
Cause No. 535; Docket No. 170700466  
Spacing and Density Application – Carlile, Fort Hayes, Niobrara and Codell Formations  
Unnamed Field, Weld County, Colorado

September 2017 Colorado Oil and Gas Conservation Commission Hearing

My name is Kent Snider, and I am currently employed as the Vice President of Land for Vertex Energy Partners, LLC, as agent for Longs Peak Resources, LLC, Operator No. 10611 ("LPR" or "Applicant"). I have over 35 years of experience in oil and gas land work. I am familiar with the matters set forth in the May 25, 2017 (amended June 15, 2017, and again July 12, 2017), verified application (the "Application") filed herein, and the lands subject to said application, consisting of Sections 3 and 10, Township 11 North, Range 66 West, 6th P.M. ("Application Lands").

LPR filed the verified Application pursuant to §34-60-116, C.R.S., for an order establishing an approximate 1280-acre drilling and spacing unit for the Carlile and Fort Hayes Formations, authorizing a total of six (6) horizontal wells within the Application Lands for production from the Carlile, Fort Hayes, and Codell Formations, and establishing an approximate 1280-acre drilling and spacing unit for the Application Lands, and authorizing the drilling of up to seven (7) horizontal wells within the proposed unit, for the production of oil, gas and associated hydrocarbons from the Niobrara Formation.

In support of LPR's Application and my sworn testimony herein, I am submitting four (4) exhibits, which provide the basis for approval of LPR's request.

Exhibit L-1: Leasehold Ownership Map:

Exhibit L-1 is a map showing the location and leasehold ownership of the Application Lands, which consist of fee mineral interests. LPR owns a leasehold in the Application Lands.

Exhibit L-2: Topographic Map:

Exhibit L-2 is a topographical map of the Application Lands.

Exhibit L-3: Aerial Map:

Exhibit L-3 is an aerial map of the Application Lands.

Exhibit L-4: Interested Parties:

Attached as Exhibit L-4 is a list of interested parties within the Application Lands.

The Application will not result in a requirement for consultation with the Colorado Department of Public Health and Environment or Colorado Parks and Wildlife pursuant to 306.c.(1)B. or 306.d.(1)B.

Based on the examination of relevant contracts and records, the interested parties (owners within the proposed drilling and spacing unit) have been duly served with the Application and associated Notice of Hearing. Further, as of the date of this testimony, Applicant has not received any notice of objection or protest to the Application.

## Affirmation

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct, and accurate.

DATED this 22<sup>nd</sup> day of JULY, 2017.

Kent Snider, Vice President of Land  
Vertex Energy Partners, LLC, as agent for  
Longs Peak Resources, LLC

STATE OF COLORADO )  
 ) ss.  
CITY AND COUNTY OF DENVER )

The foregoing instrument was subscribed and sworn to before me this 27 day of July, 2017, by Kent Snider, Vice President of Land for Vertex Energy Partners, LLC, as agent for Longs Peak Resources, LLC.

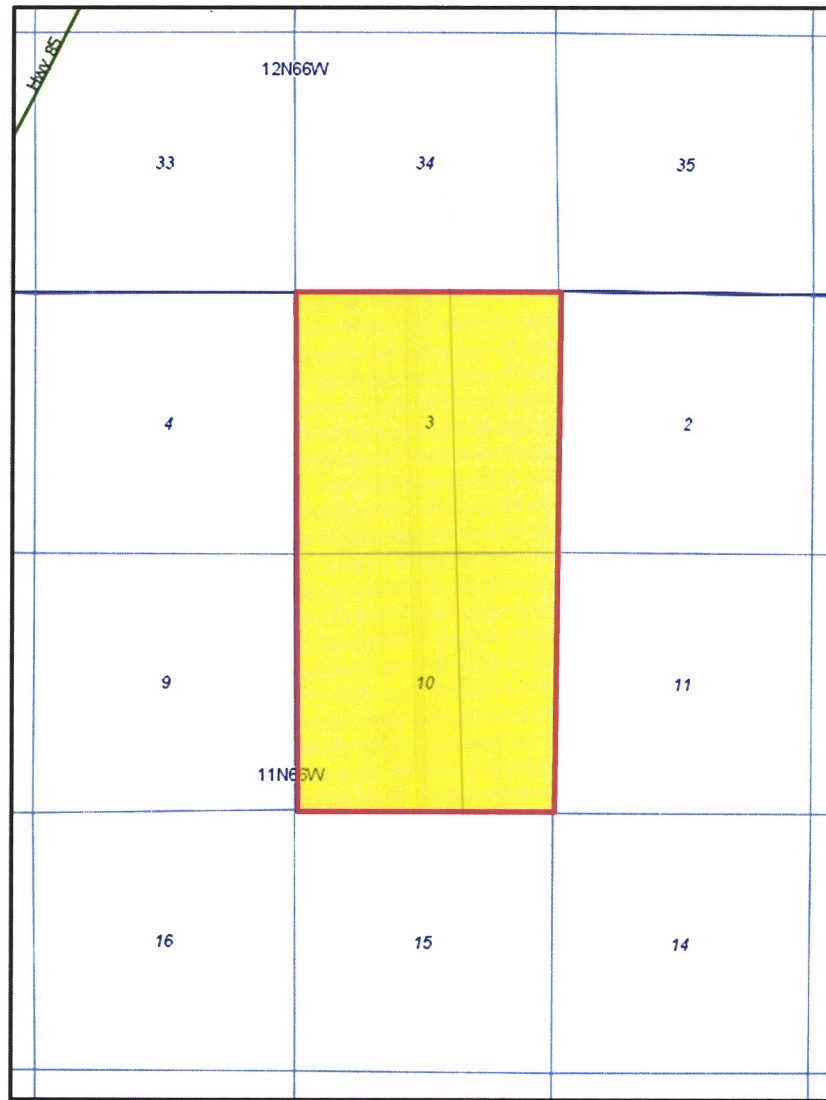
**Witness my hand and official seal.**

My commission expires: July 8, 2020

**Notary Public**

**NAOMI HATA**  
**Notary Public - State of Colorado**  
**Notary ID: 20164025944**  
**COMM. EXP. JULY 8, 2020**

Exhibit L-1  
Leasehold Ownership Map





-  = Application Lands
-  = LPR leasehold

Exhibit L-2  
Topographic Map

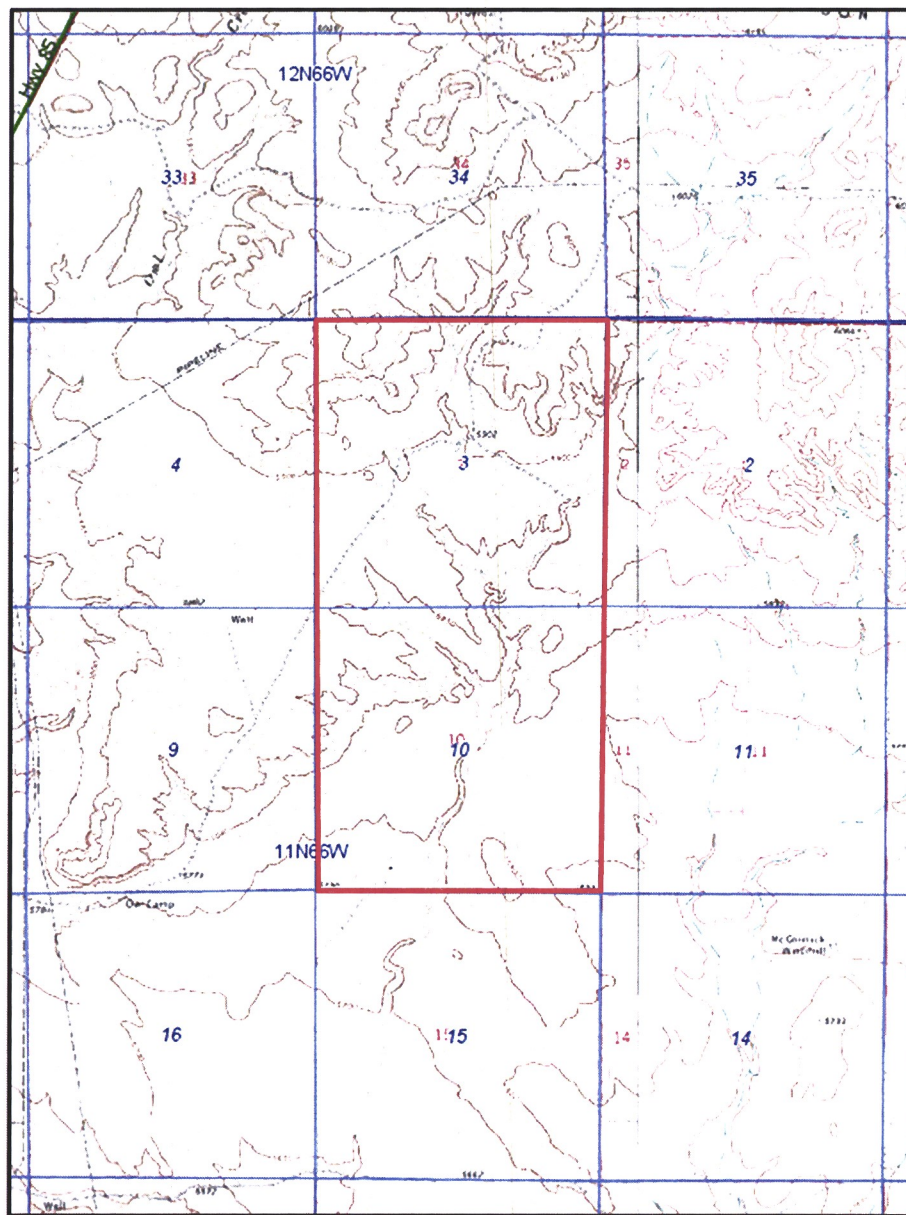
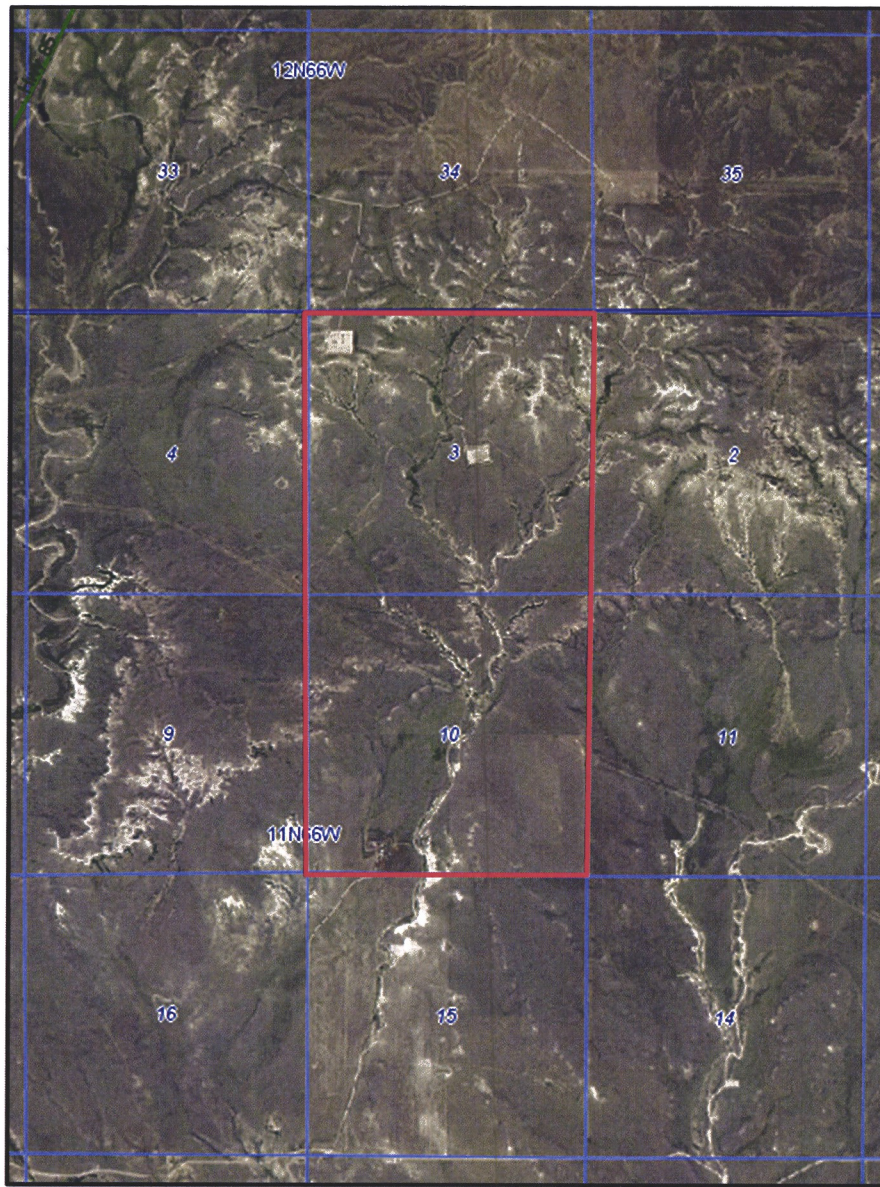




Exhibit L-3  
Aerial Map



**Exhibit L-4  
Interested Parties**

**Brandon Marette, Energy Liaison  
Colorado Parks and Wildlife  
Northeast Region Office  
6060 Broadway  
Denver, CO 80216**

**Troy Swain  
Weld County  
Department of Planning Services  
1555 North 17<sup>th</sup> Avenue  
Greeley, CO 80631**

**Frank E. Horton & Dorothy L. Horton  
18007 CR 128  
Nunn, CO 80648**

**Kent Kuster  
Oil & Gas Consultant Coordinator  
Colorado Department of  
Public Health & Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530**

**Longs Peak Resources, LLC  
10701 Melody Dr., Suite 515  
Northglenn, CO 80234**

**Etchepare, LLC  
PO BOX 848  
Cheyenne, WY 82003**



**Engineering Testimony – Mark McNamee**  
Cause 535, Docket Nos. 170700464, 170700465, 170700466, 170700467  
Spacing and Density, Carlile, Fort Hayes, Niobrara and Codell Formations  
Unnamed Field, Weld County, Colorado

**September 2017 Colorado Oil and Gas Conservation Commission Hearing**

My name is Mark McNamee, and I am currently employed as a Petroleum Engineer for Windmill Energy Services working for Longs Peak Resources, LLC ("Longs Peak"). I graduated from the University of Wyoming in 1979 with a Bachelor of Science in Petroleum Engineering. I am a Registered Engineer in the State of Colorado and I have over 38 years of experience in the oil and gas industry. I am familiar with the lands subject to, and the matters set forth in the May 25, 2017, (amended June 15, 2017, and again July 12, 2017) verified application (the "Application").

**Request for Administrative Notice of Engineering Evidence**

*Niobrara Formation*

Applicant is requesting to 1) authorize up to 7 horizontal Niobrara wells in the Application Lands, and 2) amend the setbacks for such horizontal Niobrara wells such that (a) any horizontal wells to be drilled under the Application for production from the Niobrara Formation will be drilled from the surface of the drilling unit, or on adjacent lands with consent of the landowner, from no more than 4 surface locations, unless an exception is granted by the Director, (b) the wellbores of any horizontal wells to be drilled under the Application may enter the Niobrara Formation anywhere within the unit, or on adjacent lands, without exception being granted by the Director, (c) for any permitted wells to be drilled under the Application for production from the Niobrara Formation, the treated intervals of the wells shall be not less than 150 feet from the treated interval of another well producing from the same formation, without exception being granted by the Director, and (d) for any permitted wells to be drilled under the Application for production from the Niobrara Formation, the productive interval of any permitted well shall be located no closer than 300 feet from the unit boundary.

In support of its Verified Application, Longs Peak requests that the Commission take administrative notice (as provided for by Rule 519.c.(4)2) of Commission Order No. 535-706 as to the relief requested for horizontal wells in the Niobrara Formation. I have personally reviewed the engineering testimony and exhibits submitted in support of Order No. 535-706. From this review, I conclude that such testimony and evidence are applicable to, and provide persuasive precedent for, Applicant's requests for relief as to the Niobrara Formation.

The engineering testimony calculated the average drainage areas for wells drilled in the Niobrara Formation offsetting the Application Lands, with 8,500' – 9,500' laterals to be 115 acres. A total of 7 Niobrara wells will drain  $7 \times 115 = 805$  acres, which is less than the size of the 1,280 acre DSU. Furthermore, with a calculated effective drainage radius of 256 feet, a treated interval setback of 300 feet from the boundaries of the drilling and spacing unit will prevent the drainage of reserves in adjacent lands and will allow the production of reserves that otherwise would not be recovered from the Niobrara, thus protecting correlative rights and preventing waste.

### *Codell Formation*

Applicant is requesting to 1) establish a drilling and spacing unit for the Carlile and Codell Formations, 2) authorize up to 6 horizontal Carlile, Fort Hayes, and Codell wells in the Application Lands, and 3) establish the setbacks for such horizontal Carlile, Fort Hayes, and Codell wells such that (a) any horizontal wells to be drilled under the Application for production from the Carlile, Fort Hayes, and Codell Formations will be drilled from the surface of the drilling unit, or on adjacent lands with consent of the landowner, from no more than 4 surface locations, unless an exception is granted by the Director, (b) the wellbores of any horizontal wells to be drilled under the Application may enter the Carlile, Fort Hayes, and Codell Formations anywhere within the unit, or on adjacent lands, without exception being granted by the Director, (c) for any permitted wells to be drilled under the Application for production from the Carlile, Fort Hayes, and Codell Formations, the treated intervals of the wells shall be not less than 150 feet from the treated interval of another well producing from the same formation, without exception being granted by the Director, and (d) for any permitted wells to be drilled under the Application for production from the Carlile and Fort Hayes Formations, the productive interval of any permitted well shall be located no closer than 300 feet from the unit boundary, as currently established by prior Order for the Codell Formation.

In support of its Verified Application, Longs Peak requests that the Commission take administrative notice (as provided for by Rule 519.c.(4)2) of Commission Order No. 535-669 as to the relief requested for horizontal wells in the Carlile, Fort Hayes, and Codell Formations. I have personally reviewed the engineering testimony and exhibits submitted in support of Order No. 535-669. From this review, I conclude that such testimony and evidence are applicable to, and provide persuasive precedent for, Applicant's requests for relief as to the Carlile, Fort Hayes, and Codell Formations.

The engineering testimony calculated the average drainage areas for wells drilled in the Carlile, Fort Hayes, and Codell Formations offsetting the Application Lands, with 8,500' – 9,600' laterals to be 163 acres. A total of six (6) wells will drain  $6 \times 163 = 978$  acres, which is less than the size of the smallest 1280 acre DSU. Applicant is not requesting to amend the setbacks for the Codell Formations so no additional drainage calculations for the Codell are necessary. Furthermore, no drainage calculations for the Carlile and Fort Hayes Formations are necessary, as these are not target formations, and are included in the Application, and therefore included in this portion of the testimony referring to the Codell Formation, only because wellbores may deviate from the Codell Formation into the Carlile and Fort Hayes Formations due to the thickness of the Codell Formation in this area. However, in any event, the wells targeting the Codell Formation will not drain an area larger than the proposed unit. Any deviation of the Codell Formation wellbores into the Carlile and Fort Hayes Formations will not affect the economics and drainage calculations contained herein for the Codell Formation wells.

### **Conclusions**

Based on my review of the above-referenced Commission Orders together with my experience in the Carlile, Fort Hayes, Codell and Niobrara Formations in the DJ Basin, I believe that establishing the proposed well counts and setbacks will allow the most efficient and economic method to develop the resource potential for this formation. The approval of the Application will prevent waste, protect correlative rights, and assure the greatest ultimate recovery of oil, gas and associated hydrocarbons from the reservoirs.

To the best of my knowledge, all of the matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct and accurate.

Dated this 1<sup>ST</sup> day of August, 2017

Mark McNamee

Mark McNamee  
Petroleum Engineer  
Longs Peak Resources, LLC

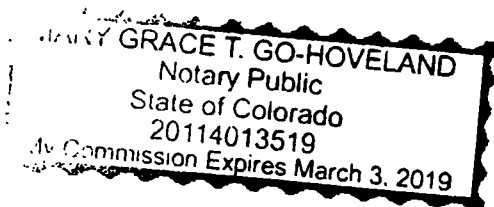
STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 1<sup>ST</sup> day of August, 2017, by Mark McNamee, Petroleum Engineer for Longs Peak Resources, LLC.

Witness my hand and official seal.

My commission expires: 2/27/19

Atty Grace T. Go-Hoveland  
Notary Public



**Geology Testimony – Derek Sondergaard**

Cause 535, Docket Nos. 170700464, 170700465, 170700466, 170700467  
Spacing and Density; Carlile, Fort Hayes, Niobrara and Codell Formations  
Unnamed Field, Weld County, Colorado

**September 2017 Colorado Oil and Gas Conservation Commission Hearing**

My name is Derek Sondergaard, and I am currently employed as a Geologist for Windmill Energy Services working for Longs Peak Resources, LLC ("Longs Peak"). I graduated from Central Michigan University with a Bachelor of Science degree in Geology in 1997 and a Master's degree in Geological Engineering from Michigan Technological University in 2000. I have over 18 years of experience in the oil and gas industry. I am familiar with the lands subject to, and the matters set forth in the April 13, 2017 (amended June 15, 2017, and again July 12, 2017), verified application (the "Application").

**Request for Administrative Notice of Engineering Evidence**

In support of its Verified Application, Longs Peak requests that the Commission take administrative notice (as provided for by Rule 519.c.(4)2) of Commission Order Nos. 535-706 and 535-669 and associated geologic evidence as support for drilling 13 horizontal wells for production from the Carlile, Fort Hayes, Niobrara and Codell Formations, and amending setbacks for horizontal wells in the Carlile, Fort Hayes, Niobrara and Codell Formations. I have personally reviewed the geology testimony and exhibits submitted in support of Order Nos. 535-706 and 535-669. From this review, I conclude that such testimony and evidence are applicable to, and provide persuasive precedent for, Applicant's requests for relief as to the Carlile, Fort Hayes, Codell and Niobrara Formations. The Carlile and Fort Hayes Formations are addressed in the Application, and therefore this testimony, as wellbores my deviate from the Codell Formation into the Carlile and Fort Hayes Formations due to the thickness of the Codell Formation in this area. Any deviation of the Codell Formation wellbores into the Carlile and Fort Hayes Formations will not affect the economics of the Codell wells and ultimately the conclusions within this testimony.

**Conclusions**

Based on my review of the above-referenced Commission Orders together with my experience in the Carlile, Fort Hayes, Codell and Niobrara Formations in the DJ Basin, I believe that establishing the proposed well counts and setback will allow the most efficient and economic method to develop the resource potential for this formation. The approval of the Application will prevent waste, protect correlative rights, and assure the greatest ultimate recovery of oil, gas and associated hydrocarbons from the reservoirs.

Further, based on my examination of the geological testimony and exhibits submitted in support of the application in Order No. 535-669, the thickness of the Codell Formation in the Application Lands is set forth in the table below:

| Docket No. | Lands  | Codell Thickness |
|------------|--|------------------|
| 170700464  | <u>Township 12 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 27: All<br>Section 34: All | 18-19ft          |

|           |  |         |
|-----------|--|---------|
| 170700465 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 4: Lot 1 (80.78 acres), Lot 3 (40.95 acres), Lot 4 (41.33 acres), S½N½, S½ [All]<br>Section 9: All | 18-19ft |
| 170700466 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 3: Lot 1 (79.80 acres), Lot 2 (79.92 acres), S½NE¼, S½NW¼, S½ [All]<br>Section 10: All             | 19-20ft |
| 170700467 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 15: All<br>Section 22: All   | 19-20ft |

Also, based on my examination of the geological testimony and exhibits submitted in support of the application in Order No. 535-706, the thickness of the Niobrara Formation in the Application Lands is set forth in the table below:

| Docket No. | Lands  | Niobrara Thickness |
|------------|--|--------------------|
| 170700464  | <u>Township 12 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 27: All<br>Section 34: All   | 145-146            |
| 170700465  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 4: Lot 1 (80.78 acres), Lot 3 (40.95 acres), Lot 4 (41.33 acres), S½N½, S½ [All]<br>Section 9: All | 146-147            |
| 170700466  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 3: Lot 1 (79.80 acres), Lot 2 (79.92 acres), S½NE¼, S½NW¼, S½ [All]<br>Section 10: All             | 145-146            |
| 170700467  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 15: All<br>Section 22: All   | 146-147            |

To the best of my knowledge, all of the matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct and accurate.

Dated this 1 day of August, 2017



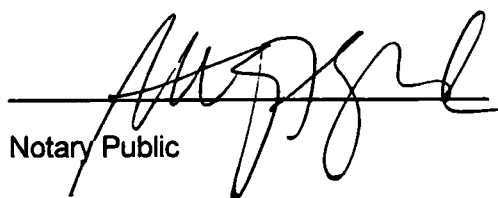
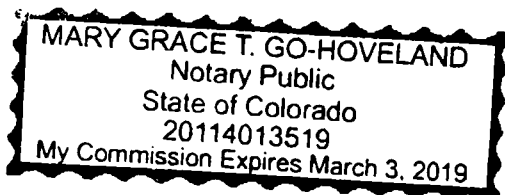
Derek Sondergaard  
Geologist  
Windmill Energy Services,  
on behalf of Longs Peak Resources

STATE OF COLORADO                     )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 18<sup>th</sup> day of August, 2017, by Derek Sondergaard, for Windmill Energy Services, on behalf of Longs Peak Resources, LLC.

Witness my hand and official seal.

My commission expires: 3/31/19

  
Notary Public

ORIGINAL

RECEIVED  
AUG 22 2017  
COGCC

**Supplemental Geology Testimony – Derek Sondergaard**  
Cause 535, Docket Nos. 170700464, 170700465, 170700466, 170700467  
Spacing and Density; Carlile, Fort Hayes, Niobrara and Codell Formations  
Unnamed Field, Weld County, Colorado

**September 2017 Colorado Oil and Gas Conservation Commission Hearing**

My name is Derek Sondergaard, and I am currently employed as a Geologist for Windmill Energy Services working for Longs Peak Resources, LLC ("Longs Peak"). I graduated from Central Michigan University with a Bachelor of Science degree in Geology in 1997 and a Master's degree in Geological Engineering from Michigan Technological University in 2000. I have over 18 years of experience in the oil and gas industry. I am familiar with the lands subject to, and the matters set forth in the April 13, 2017 (amended June 15, 2017, and again July 12, 2017), verified application (the "Application").

**Request for Administrative Notice of Engineering Evidence**

In support of its Verified Application, Longs Peak requests that the Commission take administrative notice (as provided for by Rule 519.c.(4)2) of Commission Order Nos. 535-706 and 535-669 and associated geologic evidence as support for drilling 13 horizontal wells for production from the Carlile, Fort Hayes, Niobrara and Codell Formations, and amending setbacks for horizontal wells in the Carlile, Fort Hayes, Niobrara and Codell Formations. I have personally reviewed the geology testimony and exhibits submitted in support of Order Nos. 535-706 and 535-669. From this review, I conclude that such testimony and evidence are applicable to, and provide persuasive precedent for, Applicant's requests for relief as to the Carlile, Fort Hayes, Codell and Niobrara Formations. The Carlile and Fort Hayes Formations are addressed in the Application, and therefore this testimony, as wellbores my deviate from the Codell Formation into the Carlile and Fort Hayes Formations due to the thickness of the Codell Formation in this area. Any deviation of the Codell Formation wellbores into the Carlile and Fort Hayes Formations will not affect the economics of the Codell wells and ultimately the conclusions within this testimony.

**Conclusions**

Based on my review of the above-referenced Commission Orders together with my experience in the Carlile, Fort Hayes, Codell and Niobrara Formations in the DJ Basin, I believe that establishing the proposed well counts and setback will allow the most efficient and economic method to develop the resource potential for this formation. The approval of the Application will prevent waste, protect correlative rights, and assure the greatest ultimate recovery of oil, gas and associated hydrocarbons from the reservoirs.

Further, based on my examination of the geological testimony and exhibits submitted in support of the application in Order No. 535-669, the thickness of the Codell Formation in the Application Lands is set forth in the table below:

| Docket No. | Lands  | Codell Thickness |
|------------|--|------------------|
| 170700464  | <u>Township 12 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 27: All<br>Section 34: All | 18-19ft          |



|           |  |         |
|-----------|--|---------|
| 170700465 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 4: Lot 1 (80.78 acres), Lot 3 (40.95 acres), Lot 4 (41.33 acres), S½N½, S½ [All]<br>Section 9: All | 18-19ft |
| 170700466 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 3: Lot 1 (79.80 acres), Lot 2 (79.92 acres), S½NE¼, S½NW¼, S½ [All]<br>Section 10: All             | 19-20ft |
| 170700467 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 15: All<br>Section 22: All   | 19-20ft |

Also, based on my examination of the geological testimony and exhibits submitted in support of the application in Order No. 535-706, the thickness of the Niobrara Formation in the Application Lands is set forth in the table below:

| Docket No. | Lands  | Niobrara Thickness |
|------------|--|--------------------|
| 170700464  | <u>Township 12 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 27: All<br>Section 34: All   | 145-146            |
| 170700465  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 4: Lot 1 (80.78 acres), Lot 3 (40.95 acres), Lot 4 (41.33 acres), S½N½, S½ [All]<br>Section 9: All | 146-147            |
| 170700466  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 3: Lot 1 (79.80 acres), Lot 2 (79.92 acres), S½NE¼, S½NW¼, S½ [All]<br>Section 10: All             | 145-146            |
| 170700467  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 15: All<br>Section 22: All   | 146-147            |

Also, based on my examination of the Carlile Formation in this area, the thickness of the Carlile Formation in the Application Lands is set forth in the table below:

| Docket No. | Lands  | Carlile Thickness |
|------------|--|-------------------|
| 170700464  | <u>Township 12 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 27: All<br>Section 34: All | 37-39ft           |

|           |  |         |
|-----------|--|---------|
| 170700465 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 4: Lot 1 (80.78 acres), Lot 3 (40.95 acres), Lot 4 (41.33 acres), S½N½, S½ [All]<br>Section 9: All | 38-39ft |
| 170700466 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 3: Lot 1 (79.80 acres), Lot 2 (79.92 acres), S½NE¼, S½NW¼, S½ [All]<br>Section 10: All             | 37-38ft |
| 170700467 | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 15: All<br>Section 22: All   | 38-40ft |

Also, based on my examination of the Fort Hayes Formation in this area, the thickness of the Fort Hayes Formation in the Application Lands is set forth in the table below:

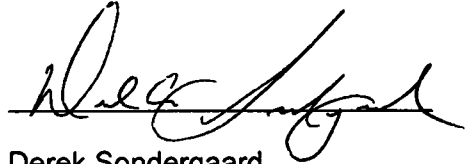
| Docket No. | Lands  | Fort Hayes Thickness |
|------------|--|----------------------|
| 170700464  | <u>Township 12 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 27: All<br>Section 34: All   | 16-17ft              |
| 170700465  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 4: Lot 1 (80.78 acres), Lot 3 (40.95 acres), Lot 4 (41.33 acres), S½N½, S½ [All]<br>Section 9: All | 16-18ft              |
| 170700466  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 3: Lot 1 (79.80 acres), Lot 2 (79.92 acres), S½NE¼, S½NW¼, S½ [All]<br>Section 10: All             | 16-18ft              |
| 170700467  | <u>Township 11 North, Range 66 West, 6<sup>th</sup> P.M.</u><br>Section 15: All<br>Section 22: All   | 18-21ft              |

To the best of my knowledge, all of the matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct and accurate.

Dated this 23 day of August, 2017



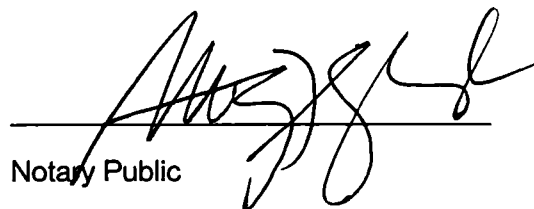
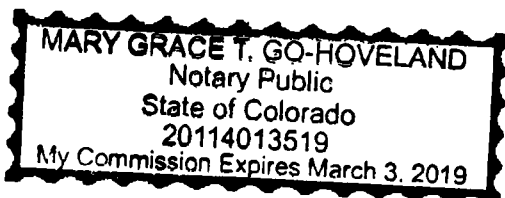
Derek Sondergaard  
Geologist  
Windmill Energy Services,  
on behalf of Longs Peak Resources

STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 23rd day of August, 2017, by Derek Sondergaard, for Windmill Energy Services, on behalf of Longs Peak Resources, LLC.

Witness my hand and official seal.

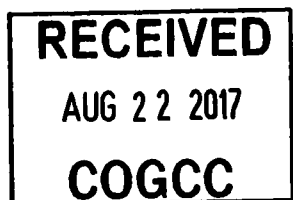
My commission expires: 3/3/19

  
Notary Public

466



4.28.15



511 DOCUMENTS

Order No. 535-669

**RECEIVED**

APR 28 2015

**COGCC**

BEFORE THE OIL & GAS CONSERVATION COMMISSION  
OF THE STATE OF COLORADO

|                                     |   |                      |
|-------------------------------------|---|----------------------|
| IN THE MATTER OF THE PROMULGATION   | ) | CAUSE NO. 535        |
| AND ESTABLISHMENT OF FIELD RULES TO | ) |                      |
| GOVERN OPERATIONS FOR THE CODELL    | ) | DOCKET NO. 150500267 |
| AND NIOBRARA FORMATIONS, UNNAMED    | ) |                      |
| FIELD, WELD COUNTY, COLORADO        | ) | TYPE: SPACING        |

REQUEST FOR RECOMMENDATION OF  
APPROVAL OF APPLICATION WITHOUT A HEARING

**ORIGINAL**

Anadarko E&P Onshore LLC (Operator No. 2800) ("Applicant"), by and through its undersigned attorneys, hereby requests pursuant to Rule 511.a. of the Rules and Regulations of the Colorado Oil and Gas Conservation Commission for the Director to recommend approval of its March 10, 2015 verified application ("Application") and the supporting exhibits without a hearing.


Applicant requests that the above-captioned matter be approved based upon: (i) the merits of the Application, and (ii) Applicant's sworn written testimony verifying sufficient facts along with exhibits that adequately support the relief requested in the Application. To Applicant's information and belief, no protests were timely filed in this matter.

WHEREFORE, Applicant requests that its request for a recommendation for approval of its Application without a hearing be granted.

DATED this 27 day of April, 2015.

Respectfully submitted,

ANADARKO E&P ONSHORE LLC

By:   
James P. Parrot  
Jillian Fulcher  
Beatty & Wozniak, P.C.  
Attorneys for Applicant  
216 16<sup>th</sup> Street, Suite 1100  
Denver, Colorado 80202  
(303) 407-4499

# **ANADARKO E&P ONSHORE LLC**

Cause No. 535  
Docket No. 150500267

## **Land Testimony – Jason Rayburn**

Cause No. 535; Docket No. 150500267

Spacing and Density Application, Codell and Niobrara Formations  
Unnamed Field, Weld County, Colorado

### **May 2015 Colorado Oil and Gas Conservation Commission Hearing**

My name is Jason Rayburn, and I am currently employed as a Senior Landman for Anadarko E&P Onshore LLC ("Applicant"). I graduated from the University of Oklahoma in 2008 with a Bachelor of Science in Business Administration with an emphasis in Energy Management. I have over 8 years of experience in petroleum land management and administrative areas of the oil and gas business. I am familiar with the lands subject to, and the matters set forth in the March 10, 2015, verified application (the "Application") filed herein.

In support of Applicant's Application and my sworn testimony herein, I am submitting four (4) exhibits. This testimony and exhibits provide the supporting basis for approval of the Applicant's request for an order to: (1) vacate an approximate 732.00-acre drilling and spacing unit established by Order No. 535-5, but only as to Sections 15 and 22, Township 12 North, Range 65 West, 6th P.M.; (2) establish an approximate 1,372.00-acre drilling and spacing unit for the below-described lands, and authorize the drilling of up to seven (7) horizontal wells within the proposed unit, for the production of oil, gas and associated hydrocarbons from the Niobrara Formation; and (3) authorize an additional five (5) horizontal wells for a total of six (6) horizontal wells in an existing drilling and spacing unit established by Order No. 535-571 for production from the Codell Formation, for the below-described lands:

#### **Township 12 North, Range 65 West, 6th P.M.**

Section 15: Lots 1-4 (a/d/a All)

Section 22: All

Section 27: All

1,372 acres, more or less, Weld County, Colorado ("Application Lands")

### **Exhibit L-1: Leasehold Ownership Map:**

Exhibit L-1 is a map showing the location of the Application Lands and the leasehold ownership. The Application Lands consist of fee and federal mineral interests. The following parties own leasehold or unleased mineral interests in the Application Lands:

#### **INTEREST OWNER(S)**

Anadarko E&P Onshore LLC  
Other working interest owners  
**TOTAL:**

#### **UNIT WI<sup>1</sup>**

53.0%  
47.0%  
**100.000000%**

---

<sup>1</sup> Interests are approximate.

**Exhibit L-2: Topographic Map:**

Exhibit L-2 is a topographical map of the Application Lands.

**Exhibit L-3: Aerial Map:**

Exhibit L-3 is an aerial map of the Application Lands.

**Exhibit L-4: Interested Parties:**

Attached as Exhibit L-4 is a list of interested parties within the Application Lands.

The Application will not result in a requirement for consultation with the Colorado Department of Public Health and Environment or Colorado Parks and Wildlife pursuant to 306.c.(1)B. or 306.d.(1)B.

Based on the examination of relevant contracts and records, the interested parties (owners within the proposed drilling and spacing unit) have been duly served with the Application and associated Notice of Hearing. Further, as of the date of this testimony, Anadarko has not received any notice of objection or protest to the Application.



**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct, and accurate.

DATED this 22<sup>nd</sup> day of April, 2015.

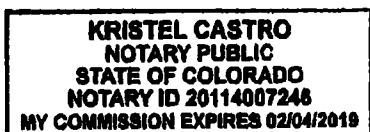
\_\_\_\_\_  
Jason Rayburn, Senior Landman  
Anadarko E&P Onshore LLC

STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 22<sup>nd</sup> day of April, 2015, by Jason Rayburn, Landman for Anadarko E&P Onshore LLC.

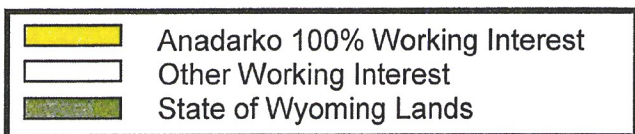
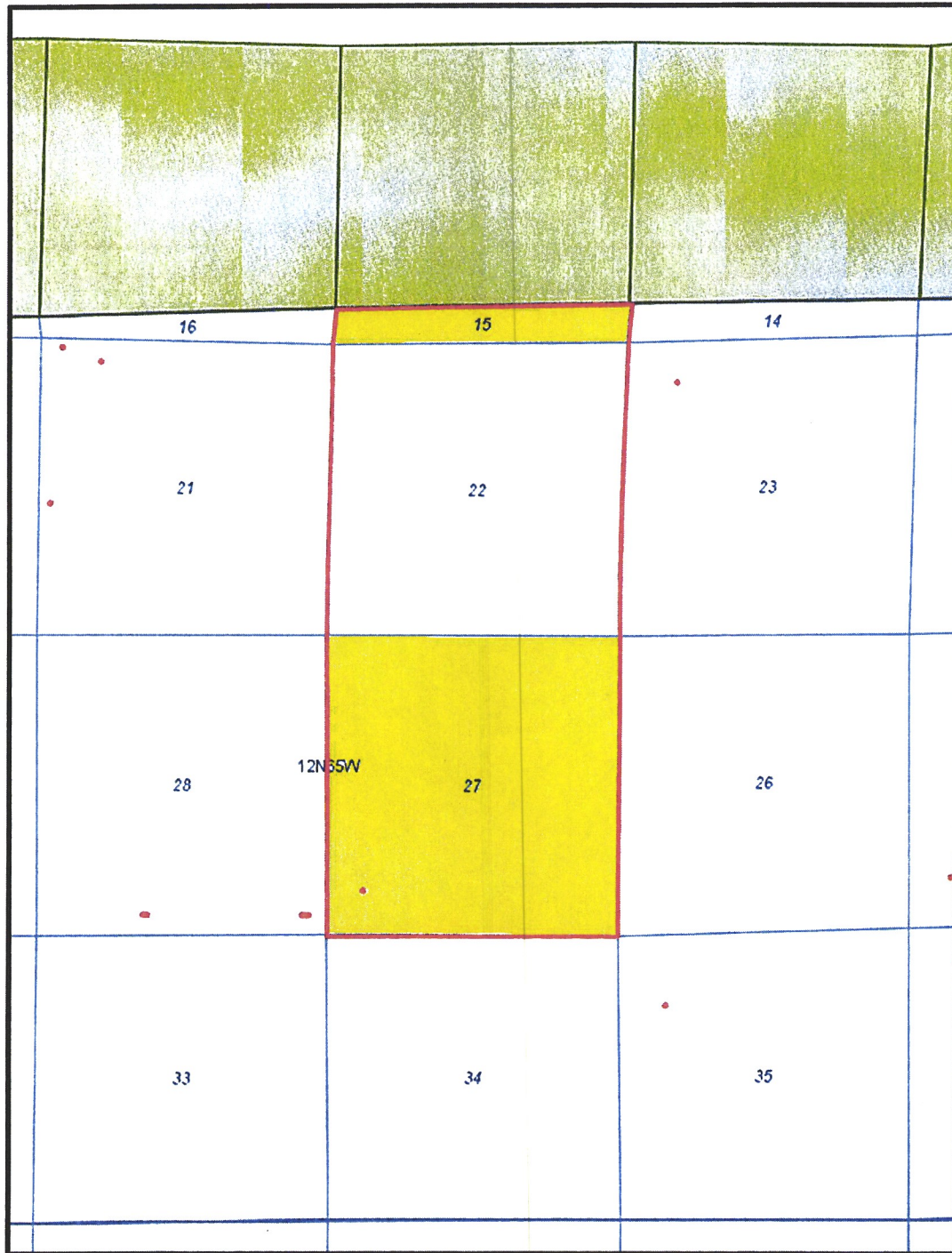
Witness my hand and official seal.

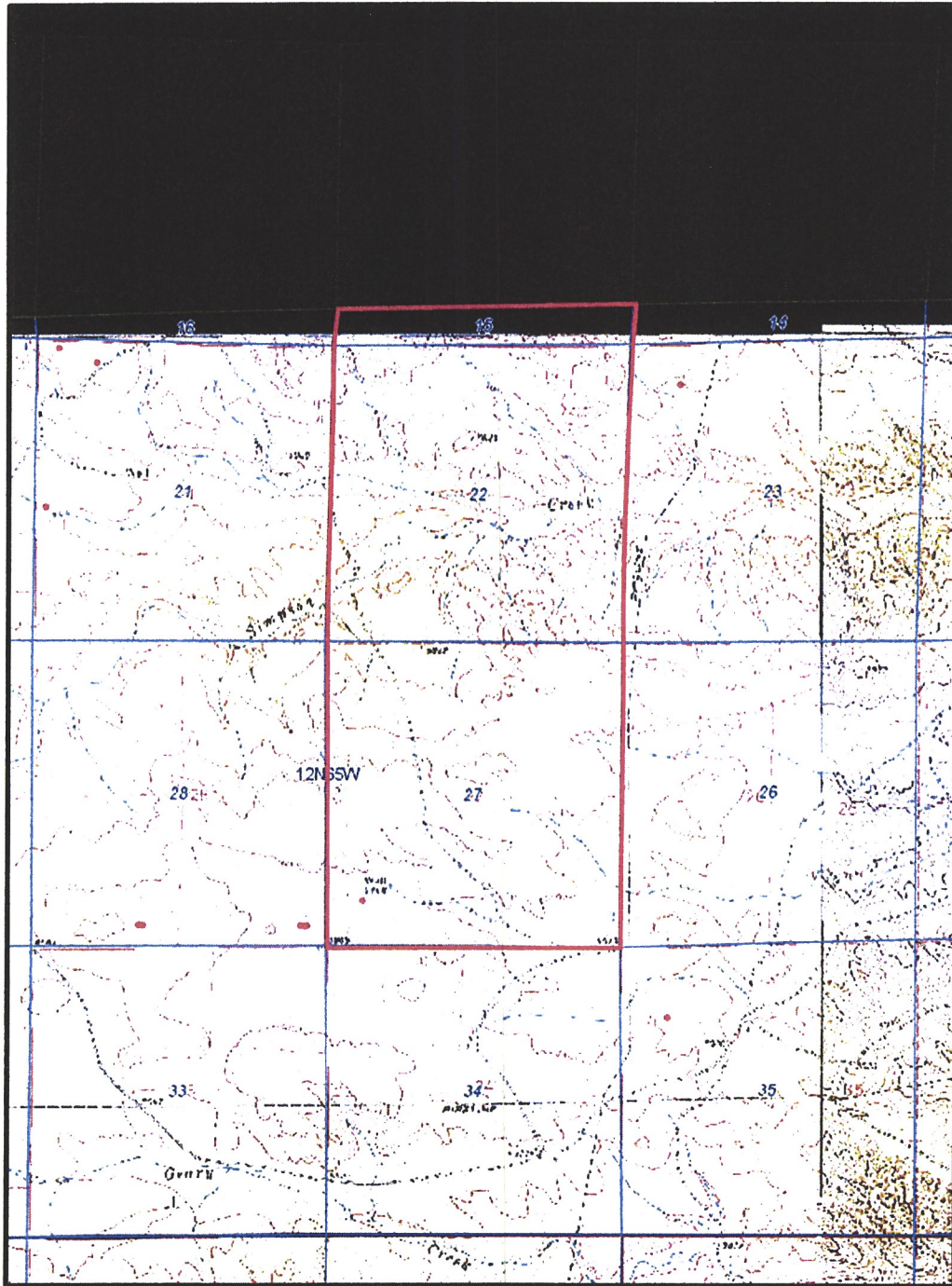
My commission expires: 2/4/2019



Kristel Castro  
Notary Public

Exhibit L-1  
Leasehold Ownership Map

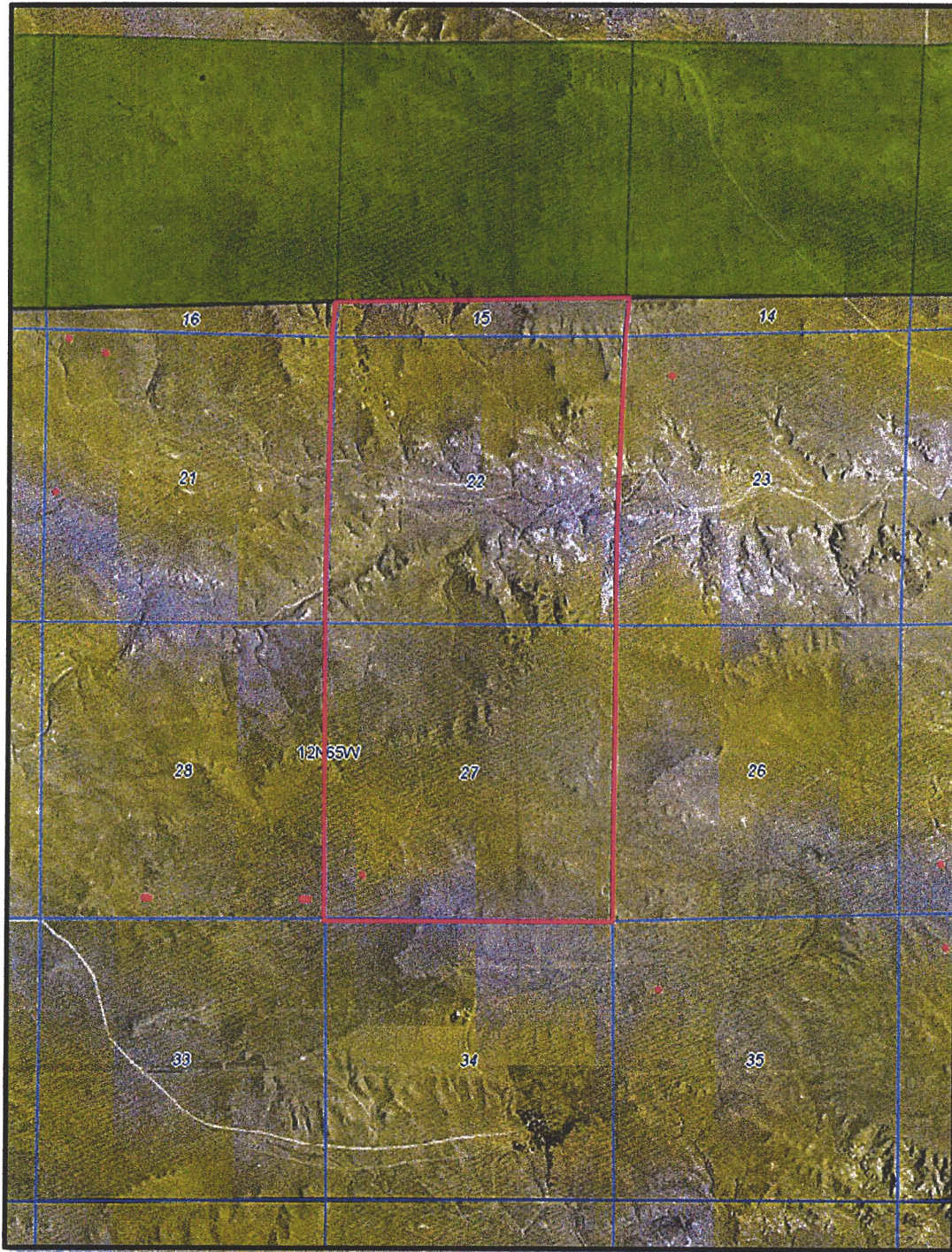




<sup>2</sup> The dark green areas of the map cover lands within the State of Wyoming. The black areas of the map cover lands for which the Colorado Oil and Gas Conservation Commission's GIS website apparently does not have topographic data.



Exhibit L-3  
Aerial Map<sup>3</sup>



<sup>3</sup> The green shaded areas of the map cover lands within the State of Wyoming.



**Exhibit L-4  
Interested Parties**

**Anadarko E&P Onshore LLC  
1099 18th Street, Suite 1800  
Denver, CO 80202**

**Gadeco, LLC  
3600 S Yosemite St, Ste 900  
Denver, CO 80237**

**Tom Schreiner, Energy Liaison  
Colorado Parks and Wildlife  
Northeast Region Office  
6060 Broadway  
Denver, CO 80216**

**Tom Parko  
Weld County  
1555 North 17th Street  
Greeley, CO 80631**

**U.S. Department of Interior  
Bureau of Land Management  
2850 Youngfield Street  
Lakewood, CO 80215**

**Kent Kuster  
Oil & Gas Consultant Coordinator  
Colorado Department of  
Public Health & Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530**



**Geologic Testimony – Thomas A. Berkman**

Cause No. 535; Docket Nos. 150400192, 150500252, 150500255, 1050500267,  
150500268, and 150500270

Spacing and Increased Density Applications  
Codell and Niobrara Formations  
Unnamed Field, Weld County, Colorado

**May 18 & 19, 2015 Colorado Oil and Gas Conservation Commission Hearing**

My name is Tom Berkman, and I am currently employed as a Senior Project Advisor for Anadarko E&P Onshore LLC ("Applicant"). I graduated from Colorado College in Colorado Springs with B.A. Degree in Geology, and from Oregon State University in Corvallis, OR with an M.S. in Geoscience. I have over 27 years of experience in the oil and gas industry. I am familiar with the lands subject to, and the matters set forth in the verified applications (the "Applications") described below and filed herein.

In support of Applicant's Applications and my sworn testimony herein, I am submitting five (5) exhibits. This testimony and exhibits provide the supporting basis for approval of the Applicant's request for orders to, among other things, (1) establish approximate 1280-acre drilling and spacing units<sup>1</sup> for the below-described lands, and authorize the drilling of up to seven (7) horizontal wells within the proposed units, for the production of oil, gas and associated hydrocarbons from the Niobrara Formation; and (2) authorize an additional five (5) horizontal wells for a total of six (6) horizontal wells in an existing drilling and spacing units established for production from the Codell Formation, for the below-described lands:

**Township 11 North, Range 65 West, 6th P.M.**

Section 2: Lots 1 and 2, S $\frac{1}{2}$ N $\frac{1}{2}$ , S $\frac{1}{2}$  (a/d/a All)

**Township 12 North, Range 65 West, 6th P.M.**

Section 35: All

***1,275.80 acres, more or less, Weld County, Colorado (Docket No. 150500270)***

**Township 12 North, Range 65 West, 6th P.M.**

Section 14: Lots 1-4 (a/d/a All)

Section 23: All

Section 26: All

---

<sup>1</sup> The lands subject to each respective application vary in acreage depending on the presence of irregular lots.



*1,360 acres, more or less, Weld County, Colorado (Docket No. 150500268)*

Township 12 North, Range 65 West, 6th P.M.

Section 15: Lots 1-4 (a/d/a All)

Section 22: All

Section 27: All

*1,372 acres, more or less, Weld County, Colorado (Docket No. 150500267)*

Township 11 North, Range 63 West, 6th P.M.

Section 6: Lots 1-7, S $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$  (a/d/a All)

Township 12 North, Range 63 West, 6th P.M.

Section 31: Lots 1-4, E $\frac{1}{2}$ , E $\frac{1}{2}$ W $\frac{1}{2}$  (a/d/a All)

*1,285.19 acres, more or less, Weld County, Colorado (Docket No. 150500255)*

Township 11 North, Range 64 West, 6th P.M.

Section 3: All

Township 12 North, Range 64 West, 6th P.M.

Section 34: All

*1,271.88 acres, more or less, Weld County, Colorado (Docket No. 150500252)*

Township 12 North, Range 65 West, 6th P.M.

Section 13: Lots 1 through 4 (a/d/a all that portion lying within Colorado)

Section 24: All

Section 25: All

*1,349 acres, more or less, Weld County, Colorado (Docket No. 150400192)*

#### Exhibit G-1

Exhibit G-1 is a Type Log of the Upper Cretaceous stratigraphy of the northern D-J Basin. The Niobrara Formation consists of 2 informal members, the Smokey Hill shale, and the Fort Hayes limestone, which directly overlies the Codell. The Pierre Shale overlies the Niobrara. The Carlisle shale is present below the Codell sandstone.

#### Exhibit G-2

Exhibit G-2 is a structure map on the top of the Codell/base Niobrara showing the proposed drilling and spacing units. The map shows the structure dipping gently to the west at approximately 50 ft / mile across the proposed units.

#### **Exhibit G-3**

Exhibit G-3 is a net pay isopach map of the Codell sandstone. Thickness of the Codell ranges from 16 ft in the south part of the map to approximately 20 ft along the Colorado – Wyoming border.

#### **Exhibit G-4**

Exhibit G-4 is a net pay isopach map of the Niobrara shale. Thickness of the Niobrara net pay ranges from less than 135 ft in the west to approximately 140 ft along the east portion of the map.

#### **Exhibit G-5**

Exhibit G-5 is a west to east stratigraphic cross-section across the proposed drilling and spacing units, hung on the top of the Codell sandstone. It is evident that the Codell sandstone and Niobrara shale exists under the Application Lands.

#### ***Conclusions***

The Codell sandstone consists of a very fine-grained laminated sandstone, interbedded with bioturbated sands and silts which were deposited in a marine setting during the Cretaceous Western Interior Seaway. This tight sandstone has been producing oil and gas in the DJ Basin for dozens of years, and exists under all of the drilling and spacing units proposed in this Application.

The Niobrara consists of 2 informal members, the Smoky Hill shale member and the Fort Hayes limestone member, deposited during a major marine transgression in the Cretaceous Western Interior Seaway. The Niobrara is a self-sourced resource play that is present throughout much of the Rocky Mountain region.

To the best of my knowledge, all of the matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

Dated 27 of April, 2015.

Thomas A. Berkman



Thomas A. Berkman  
Sr. Project Geological Advisor  
Anadarko Petroleum

**VERIFICATION**

STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 27<sup>th</sup> of April, 2015,  
by Thomas A. Berkman, Sr. Project Geological Advisor for Anadarko Petroleum

Witness my hand and official seal.

My commission expires: 9/21/2015



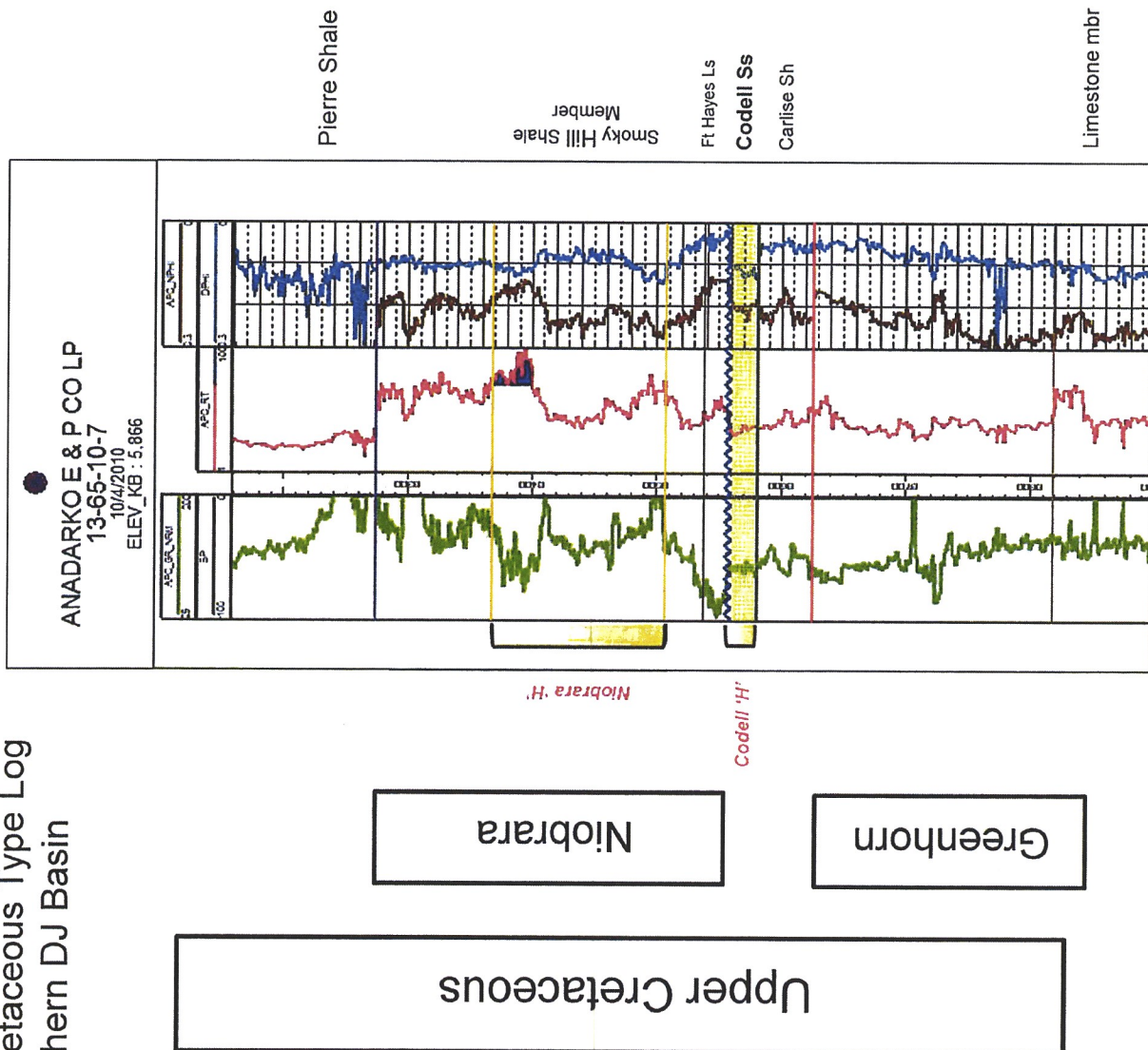
MY COMMISSION EXPIRES 9/21/2015

Notary Public Kathy Algiene

# Upper Cretaceous Type Log Northern DJ Basin

Exhibit G-1 Dockets:

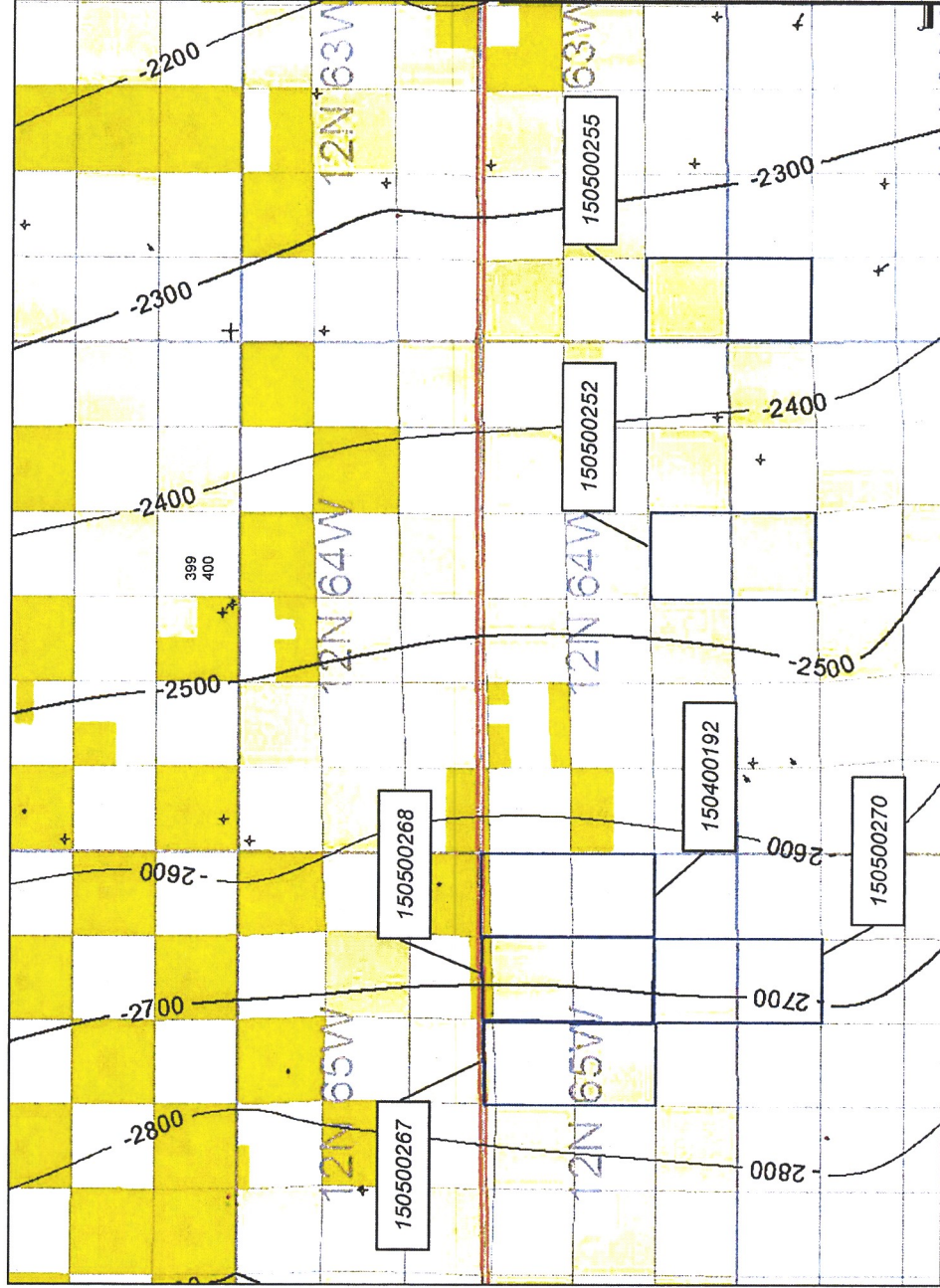
150500270  
150500268  
150500267  
150500255  
150500252  
150400192



# Top Codell (Base Niobrara) Structure Map (ss)

Exhibit G-2 Dockets:

- 150500270
- 150500268
- 150500267
- 150500255
- 150500252
- 150400192



Proposed  
Spacing Units

**Anadarko Petroleum**

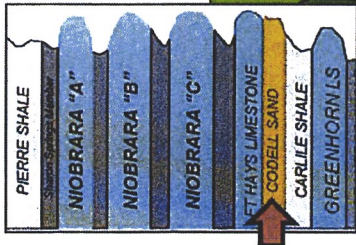
Northern DJ Basin  
Top Codell Structure Map  
Codell & Niobrara DSU Applications

0 25,000  
FEET

**WELL SYMBOLS**  
 DRY & ABANDON GAS SHOWS  
 DRY & ABANDON WITH OIL SHOWS  
 DRY & ABANDONED-OIL SHOWS  
 DRY AND ABANDON  
 Dry Hole  
 WATER INJECTION WELL  
 Microseismic Monitor Well  
 OBSERVATION WELL  
 OIL WELL  
 PLUGGED AND ABANDON OIL WELL  
 PLUGGED & ABANDONED  
 PLUGGED OIL  
 PILOT HOLE



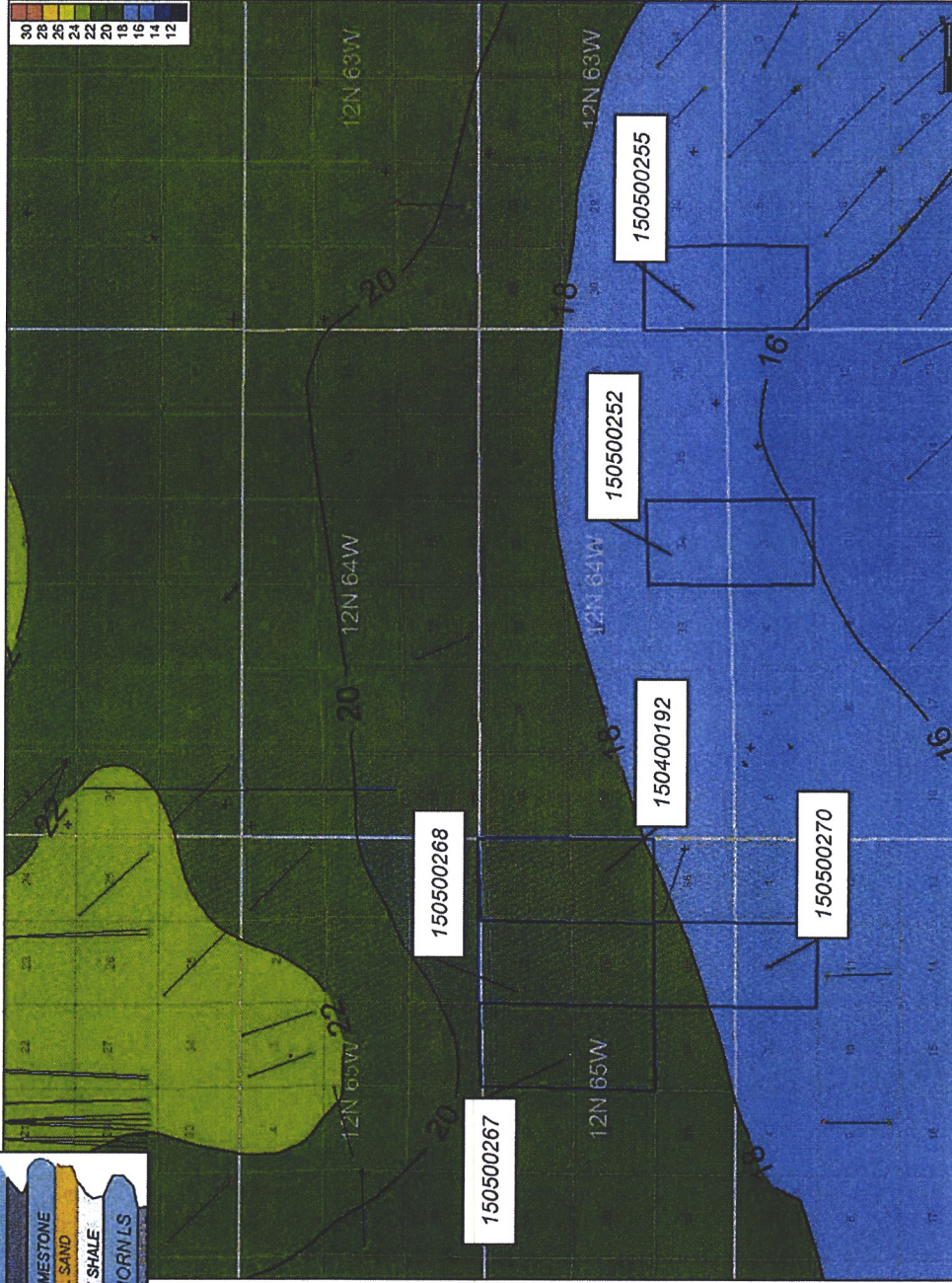




# Codell Net Pay Isopach Map (ft)

Exhibit G-3 Dockets:

- 150500270
- 150500268
- 150500267
- 150500255
- 150500252
- 150400192

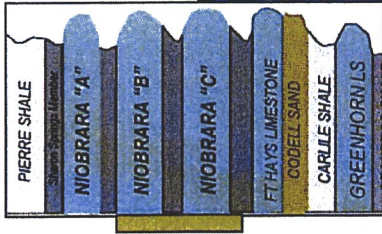


Proposed  
Spacing Units

|  |
|--|
| Anadarko Petroleum                     |
| Laramie County                         |
| Codell Net Pay Isopach Map             |
| Codell & Niobrara Spacing Applications |
| WELL SYMBOLS                           |
| DRY & ABANDON GAS SHOWS                |
| DRY & ABANDON WITH OIL SHOWS           |
| DRY & ABANDONED-OIL SHOWS              |
| DRY AND ABANDON                        |
| WATER INJECTION WELL                   |
| Microseismic Monitoring Well           |
| Oil & Gas                              |
| OIL WELL                               |
| PLUGGED AND ABANDON OIL WELL           |
| PLUGGED AND ABANDONED                  |
| Valuing on Permit                      |
| SERVICE WELL                           |
| TEMPORARILY ABANDON                    |
| TEMPORARILY ABANDON                    |
| 0 10,000 20,000<br>FEET                |





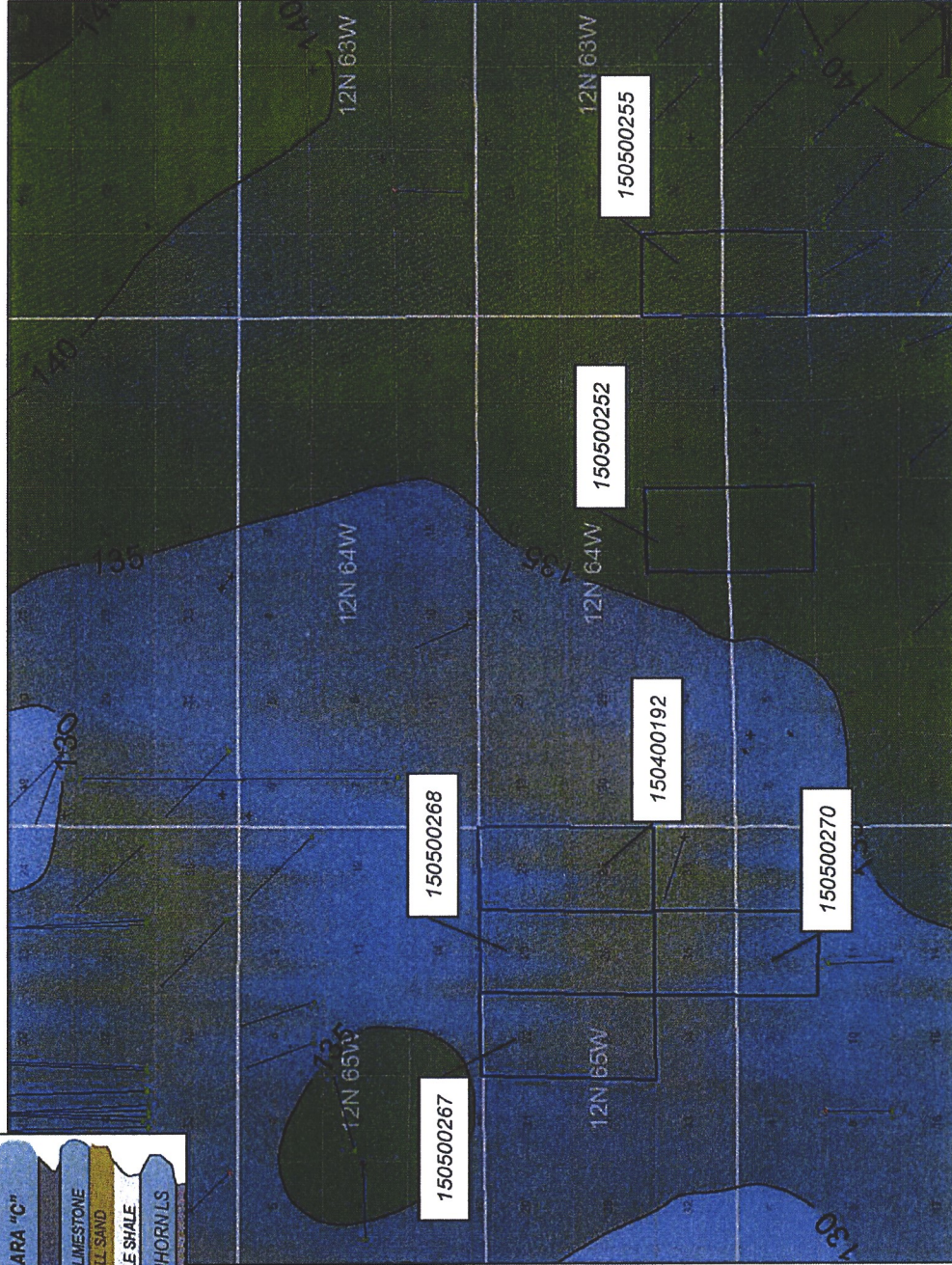


# Niobrara Net Pay Isopach Map (ft)

Exhibit G-4 Dockets:

- 150500270
- 150500268
- 150500267
- 150500255
- 150500252
- 150400192

Proposed  
Spacing Units



Anadarko Petroleum  
Laramie County

Niobrara Net Pay Isopach Map  
Codell & Niobrara Spacing Applications

**WELL SYMBOLS**

- WFE
- DRY & ABANDON GAS SHOWS
- DRY & ABANDON WITH OIL SHOWS
- DRY & ABANDON OIL SHOWS
- DRY AND ABANDON
- Dry Hole
- WATER INJECTION WELL
- Produced and Abandoned Horizontal Fractured Well
- OL & GAS
- OL & GAS
- OBSERVATION WELL
- PLUGGED AND ABANDON OIL WELL
- PLUGGED & ABANDONED
- PLUGGED OIL
- Waiting on Permit
- Service Well
- Service Well
- New Symbol
- TEMPORARILY ABANDON

0 10,000 20,000  
FEET

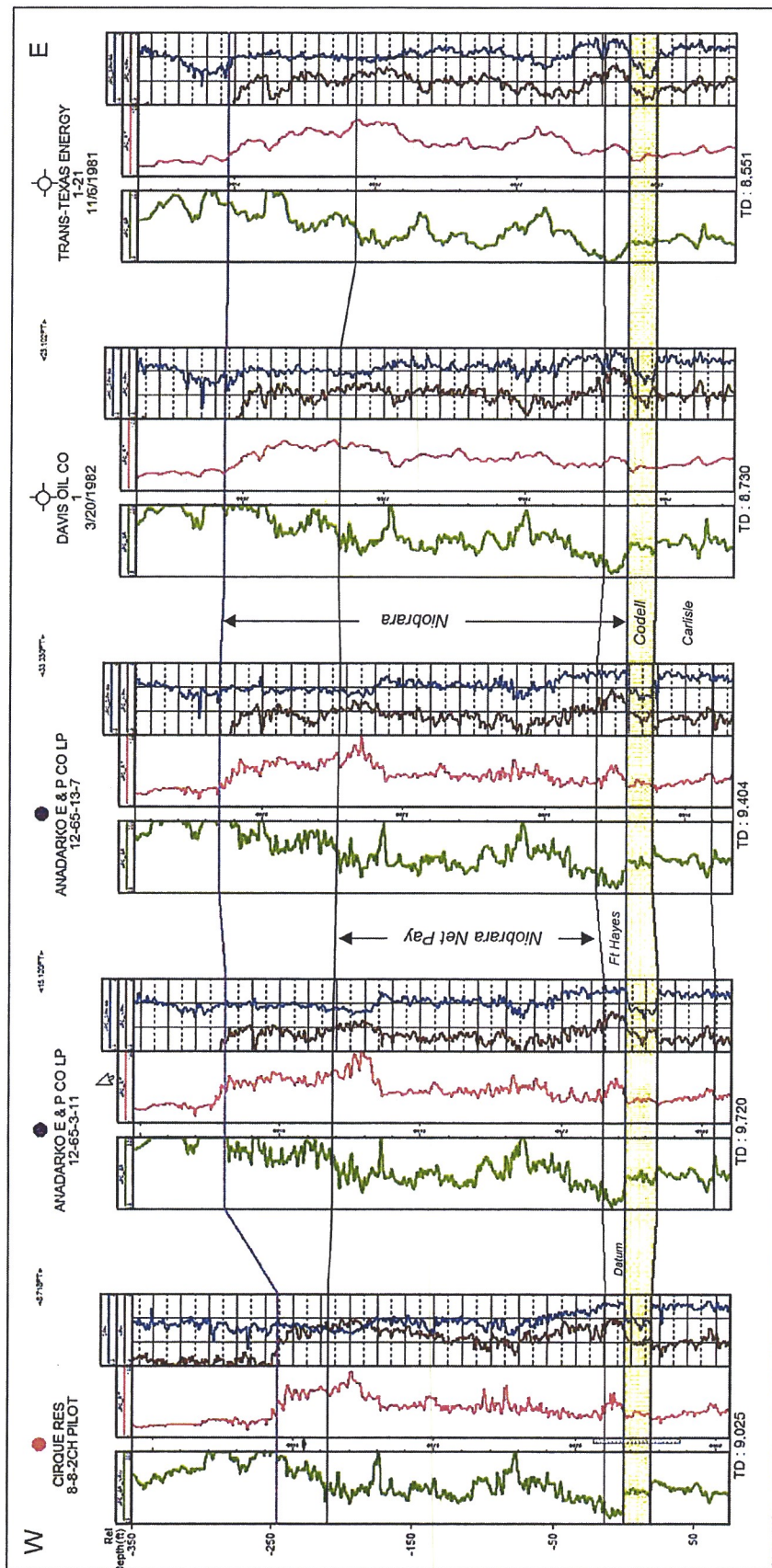




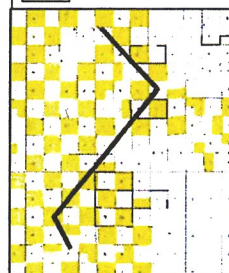
150500270  
150500268  
150500267  
150500255  
150500252  
150400192

Exhibit G-5 Dockets:

# Codell - Niobrara Stratigraphic Cross Section



Location Map



**Engineering Testimony – Emily Boecking**  
Cause No. 535; Docket Nos. 150400192, 150500252, 150500255, 1050500267,  
150500268, and 150500270  
Spacing and Increased Density Applications  
Codell and Niobrara Formations  
Unnamed Field, Weld County, Colorado

**May 2015 Colorado Oil and Gas Conservation Commission Hearing**

My name is Emily Boecking, and I am currently employed as a Reservoir Engineer for Anadarko E&P Onshore LLC ("Applicant"). I graduated from Duke University in 2007 with a Bachelor of Science in Mechanical Engineering. I have over 7 years of experience in the oil and gas industry of which 5 years have been spent as a reservoir engineer. I am familiar with the lands subject to, and the matters set forth in the verified applications (the "Applications") described below and filed herein.

In support of Applicant's Applications and my sworn testimony herein, I am submitting five (5) exhibits. This testimony and exhibits provide the supporting basis for approval of the Applicant's request for orders to, among other things, (1) establish approximate 1280-acre drilling and spacing units<sup>1</sup> for the below-described lands, and authorize the drilling of up to seven (7) horizontal wells within the proposed units, for the production of oil, gas and associated hydrocarbons from the Niobrara Formation; and (2) authorize an additional five (5) horizontal wells for a total of six (6) horizontal wells in an existing drilling and spacing units established for production from the Codell Formation, for the below-described lands:

Township 11 North, Range 65 West, 6th P.M.  
Section 2: Lots 1 and 2, S½N½, S½ (a/d/a All)

Township 12 North, Range 65 West, 6th P.M.  
Section 35: All

*1,275.80 acres, more or less, Weld County, Colorado (Docket No. 150500270)*

Township 12 North, Range 65 West, 6th P.M.  
Section 14: Lots 1-4 (a/d/a All)  
Section 23: All  
Section 26: All

*1,360 acres, more or less, Weld County, Colorado (Docket No. 150500268)*

Township 12 North, Range 65 West, 6th P.M.  
Section 15: Lots 1-4 (a/d/a All)

---

<sup>1</sup> The lands subject to each respective application vary in acreage depending on the presence of irregular lots.

Section 22: All  
Section 27: All

*1,372 acres, more or less, Weld County, Colorado (Docket No. 150500267)*

Township 11 North, Range 63 West, 6th P.M.  
Section 6: Lots 1-7, S $\frac{1}{2}$ NE $\frac{1}{4}$ , SE $\frac{1}{4}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$  (a/d/a All)

Township 12 North, Range 63 West, 6th P.M.  
Section 31: Lots 1-4, E $\frac{1}{2}$ , E $\frac{1}{2}$ W $\frac{1}{2}$  (a/d/a All)

*1,285.19 acres, more or less, Weld County, Colorado (Docket No. 150500255)*

Township 11 North, Range 64 West, 6th P.M.  
Section 3: All

Township 12 North, Range 64 West, 6th P.M.  
Section 34: All

*1,271.88 acres, more or less, Weld County, Colorado (Docket No. 150500252)*

Township 12 North, Range 65 West, 6th P.M.  
Section 13: Lots 1 through 4 (a/d/a all that portion lying within Colorado)  
Section 24: All  
Section 25: All

*1,349 acres, more or less, Weld County, Colorado (Docket No. 150400192)*

**Exhibit E-1: Codell Drainage Area Calculation:**

Exhibit No. E-1 is a table showing reservoir drainage area calculations for currently producing offsetting wells in the Northern DJ Basin closest to the proposed unit. Wells included in this table are producing from the Codell formation with production for 5 months or more and have horizontal completed lateral lengths ranging from 8,500'- 9,600'.

**Exhibit E-2: Codell Decline Curve Analysis:**

Exhibit No. E-2 shows the decline curves used to extrapolate estimated ultimate recovery for use in the drainage area calculations for the Codell.

**Exhibit E-3: Niobrara Drainage Area and Joshi Effective Vertical Drainage Radii:**

Exhibit No. E-3 is a table showing reservoir drainage area calculations and Joshi effective vertical drainage radii for currently producing offsetting wells in the Northern DJ Basin closest to the proposed unit. Wells included in this table are producing from the Niobrara formation with production for 12 months or more and have horizontal completed lateral lengths ranging from 3,400- 5,800.



**Exhibit E-4: Estimated Drainage for Proposed 9,000' Niobrara Horizontal Well:**

Exhibit No. E-4 shows the horizontal well drainage area calculation for a well with a 9,000' completed lateral length producing from the Niobrara using the Joshi method.

**Exhibit E-5: Niobrara Decline Curve Analysis:**

Exhibit No. E-5 shows the decline curves used to extrapolate estimated ultimate recovery for use in the drainage area and Joshi effective vertical drainage radii calculations for the Niobrara.

***Testimony and Conclusions***


Based on the preceding engineering analysis, the calculated drainage for wells listed on Exhibit E-1 ranges from 94 acres to 286 acres, with an average of 163 acres for the Codell Formation with 8,500'-9,600' laterals. Further, the calculated Joshi effective vertical drainage radii for wells listed on Exhibit E-3 ranges from 106 to 601 feet, with an average of 315 feet for the Niobrara Formation with 3,400'- 5,800' laterals. The estimated horizontal drainage area for a 9,000 lateral length well in the Niobrara Formation is calculated to be 137 acres.

Based on this analysis it is recommended that the Commission approve the above-referenced applications requesting approximate 1280-acre drilling and spacing units for the above-described lands for production of oil, gas and associated hydrocarbons from the Niobrara Formation, and authorize the drilling of up to seven (7) horizontal wells within the units. Further, it is my recommendation that the Commission authorize the drilling of five (5) additional horizontal wells, for a total of six (6) horizontal wells, for existing drilling and spacing units established for production of oil, gas and associated hydrocarbons from the Codell Formation for the above-described lands. In so doing, the development of the above-described lands will promote efficient drainage from the Niobrara and Codell Formations, protect correlative rights, and avoid waste of the resource.

**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct, and accurate.

DATED this 27 day of April, 2015.

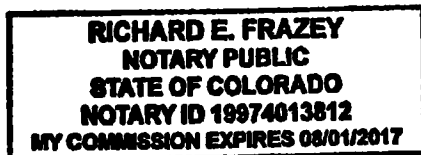
  
Emily Boecking, Reservoir Engineer  
Anadarko E&P Onshore LLC

STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this \_\_\_\_\_ day of April, 2015, by Emily Boecking, Reservoir Engineer for Anadarko E&P Onshore LLC.

Witness my hand and official seal.

My commission expires: 8/1/17



  
Notary Public

# Exhibit E-1: Codell Drainage Area Calculation

## Codell Horizontal Well Drainage Area Calculation

| API No                           | Lease      | Well No   | Reservoir | Operator      | Section | Township | Range | EUR Oil (bbl) | Cumulative EUR Oil (bbl) | Completed Interval | Average Porosity (phi, %) | Water Saturation (Sw, %) | Thickness (h, ft) | Drainage Area (acres) |
|----------------------------------|------------|-----------|-----------|---------------|---------|----------|-------|---------------|--------------------------|--------------------|---------------------------|--------------------------|-------------------|-----------------------|
| 49021210120000                   | JUBILEE    | 103-0433H | Codell    | Resources EOG | 4       | 13 N     | 65 W  | 170,560       | 307,075                  | 9,313              | 12                        | 50                       | 24                | 220                   |
| 49021210560000                   | JUBILEE    | 513-0820H | Codell    | Resources EOG | 8       | 13 N     | 65 W  | 115,259       | 216,748                  | 9,401              | 12                        | 51                       | 22                | 170                   |
| 49021210610000                   | JUBILEE    | 584-1705H | Codell    | Resources EOG | 17      | 13 N     | 65 W  | 70,866        | 183,223                  | 9,400              | 12                        | 51                       | 23                | 122                   |
| 49021210600000                   | JUBILEE    | 586-1705H | Codell    | Resources EOG | 17      | 13 N     | 65 W  | 63,850        | 125,086                  | 9,086              | 12                        | 51                       | 23                | 94                    |
| 49021210880000                   | JUBILEE    | 611-0706H | Codell    | Resources EOG | 7       | 13 N     | 65 W  | 63,840        | 206,659                  | 8,511              | 12                        | 51                       | 22                | 162                   |
| 49021209670000                   | REDSTONE   | 2-1-1CH   | Codell    | Resources EOG | 2       | 13 N     | 65 W  | 79,064        | 228,755                  | 9,467              | 12                        | 50                       | 24                | 163                   |
| 49021210150000                   | WINDY POLE | 504-1806H | Codell    | Resources EOG | 18      | 13 N     | 64 W  | 108,173       | 183,450                  | 9,116              | 12                        | 53                       | 22                | 147                   |
| 49021211280000                   | CREEK      | 525-2413H | Codell    | Resources EOG | 24      | 15 N     | 65 W  | 86,015        | 168,216                  | 8,897              | 12                        | 57                       | 30                | 112                   |
| 49021212270000                   | WINDY      | 509-1806H | Codell    | Resources EOG | 18      | 13 N     | 64 W  | 55,229        | 168,067                  | 9,488              | 12                        | 50                       | 24                | 118                   |
| 49021210270000                   | JUBILEE    | 531-2210H | Codell    | Resources EOG | 22      | 13 N     | 65 W  | 100,410       | 402,428                  | 9,549              | 12                        | 50                       | 24                | 286                   |
| 49021210260000                   | JUBILEE    | 528-2227H | Codell    | Resources EOG | 22      | 13 N     | 65 W  | 74,618        | 246,307                  | 9,004              | 12                        | 53                       | 22                | 200                   |
| 49021210830000                   | JUBILEE    | 553-1034H | Codell    | Resources EOG | 10      | 13 N     | 65 W  | 104,887       | 284,305                  | 9,431              | 13                        | 50                       | 25                | 180                   |
| 49021212260000                   | WINDY      | 502-1806H | Codell    | Resources EOG | 18      | 13 N     | 64 W  | 75,706        | 262,619                  | 9,026              | 12                        | 50                       | 24                | 185                   |
| 49021210840000                   | WINDY      | 554-1034H | Codell    | Resources EOG | 10      | 13 N     | 65 W  | 89,008        | 216,834                  | 9,369              | 13                        | 50                       | 25                | 137                   |
| 49021210850000                   | JUBILEE    | 555-1034H | Codell    | Resources EOG | 10      | 13 N     | 65 W  | 81,152        | 251,971                  | 9,355              | 13                        | 50                       | 25                | 158                   |
| Average Drainage Area: 163 Acres |            |           |           |               |         |          |       |               |                          |                    |                           |                          |                   |                       |

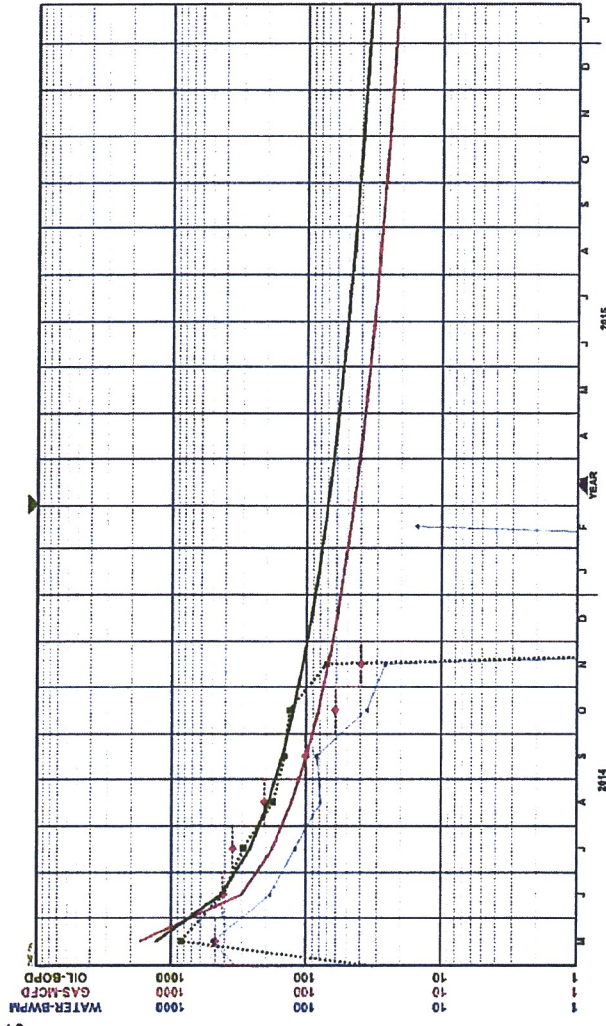
$$\text{Drainage area equation: } Area = \frac{EUR \cdot B_0}{7758 \cdot h \cdot \phi_i \cdot (1 - S_w) \cdot R_F}$$

$$B_0 = 1.4$$

$$R_F = 18\%$$

Exhibit E-2: Codell Decline Curve Analysis

Jubilee 586-1705H  
49021210600000  
Codell  
EOG Resources  
17 13N 65W  
Cum Oil (BO) 63,850  
EUR Oil (BO) 125,086



Jubilee 584-1705H  
49021210610000  
Codell  
EOG Resources  
17 13N 65W  
Cum Oil (BO) 70,866  
EUR Oil (BO) 163,223

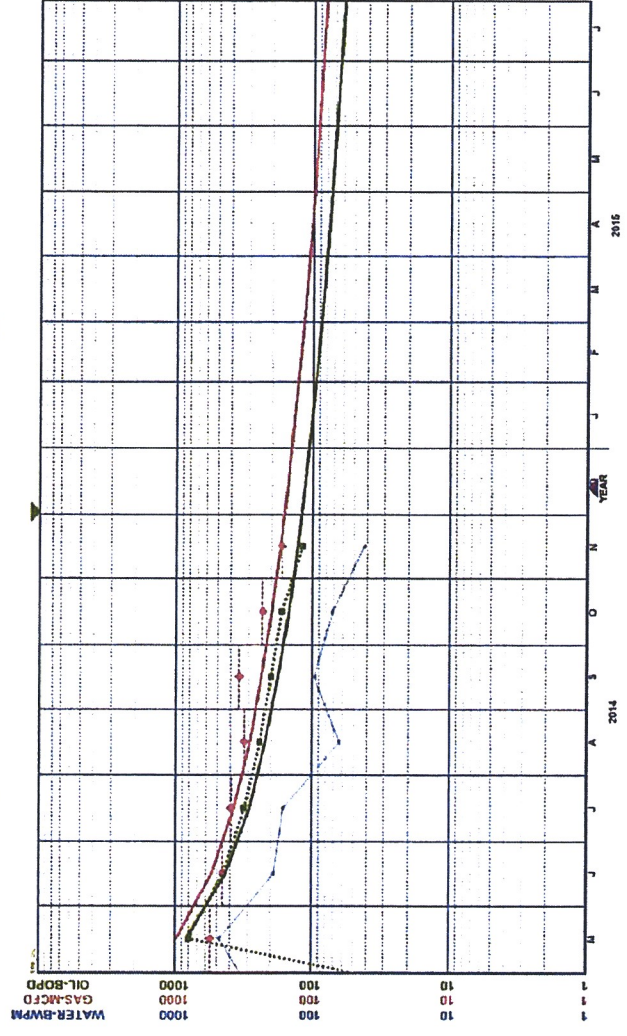
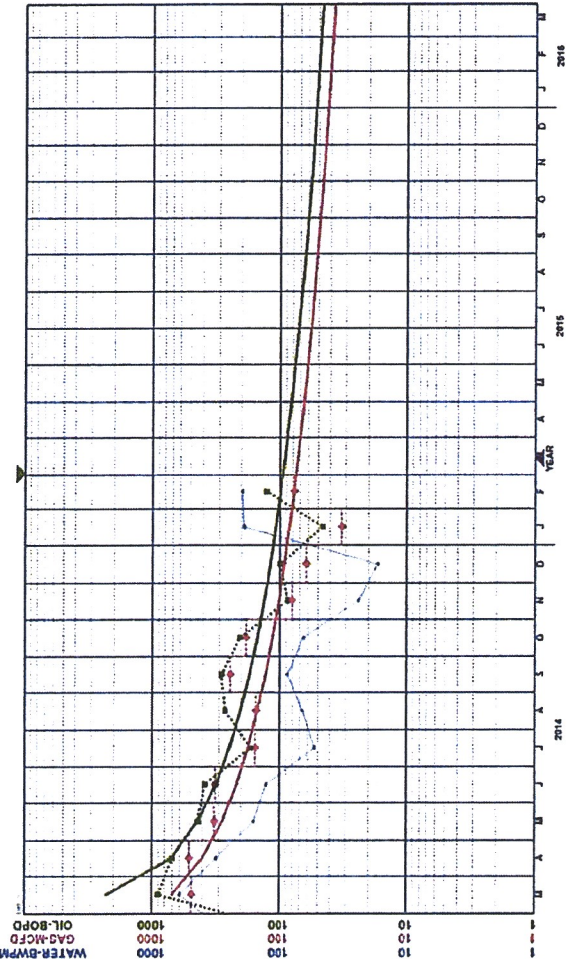


Exhibit E-2: Codell Decline Curve Analysis

Jubilee 513-0820H  
49021210560000  
Codell  
EOG Resources  
8 13N 65W  
Cum Oil (BO) 115,259  
EUR Oil (BO) 216,748



Jubilee 611-0706H  
49021210880000  
Codell  
EOG Resources  
7 13N 65W  
Cum Oil (BO) 63,840  
EUR Oil (BO) 206,659

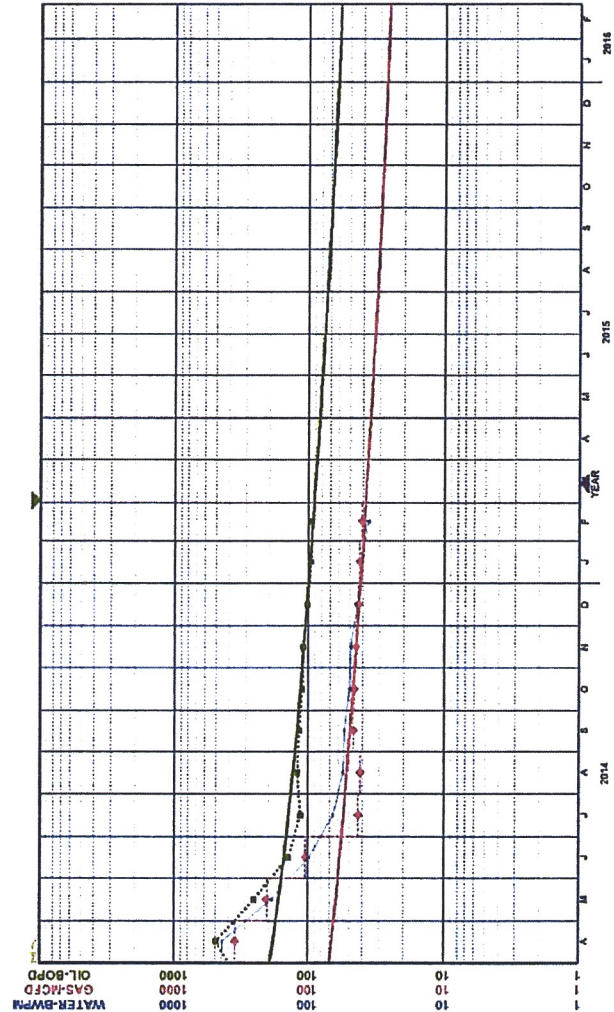
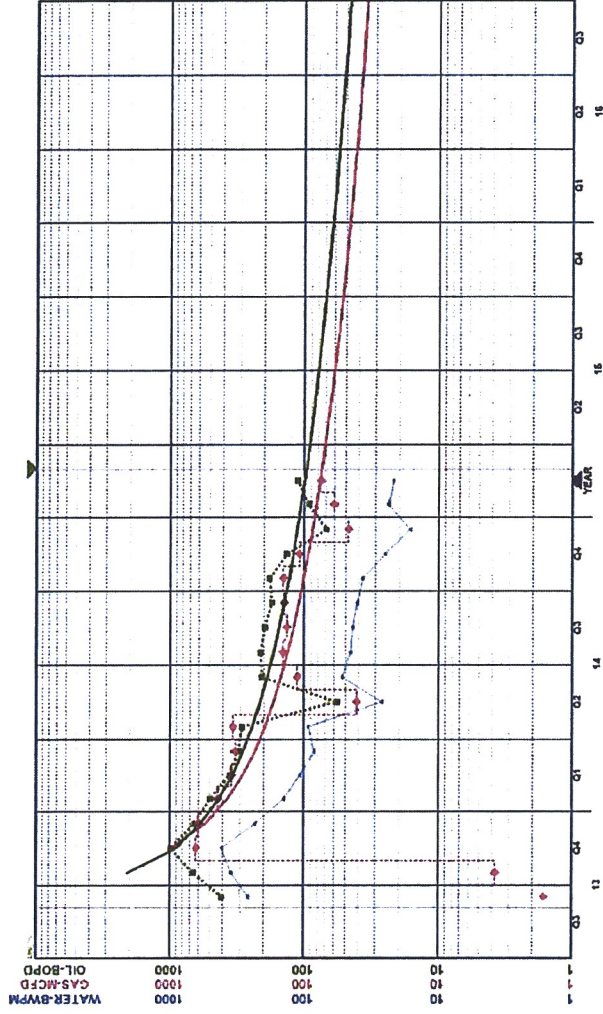




Exhibit E-2: Codell Decline Curve Analysis

Jubilee 103-0433H  
 49021210120000  
 Codell  
 EOG Resources  
 4 13N 65W  
 Cum Oil (BO) 170,560  
 EUR Oil (BO) 307,075



Windy 504-1806H  
 49021210150000  
 Codell  
 EOG Resources  
 18 13N 64W  
 Cum Oil (BO) 108,173  
 EUR Oil (BO) 183,450

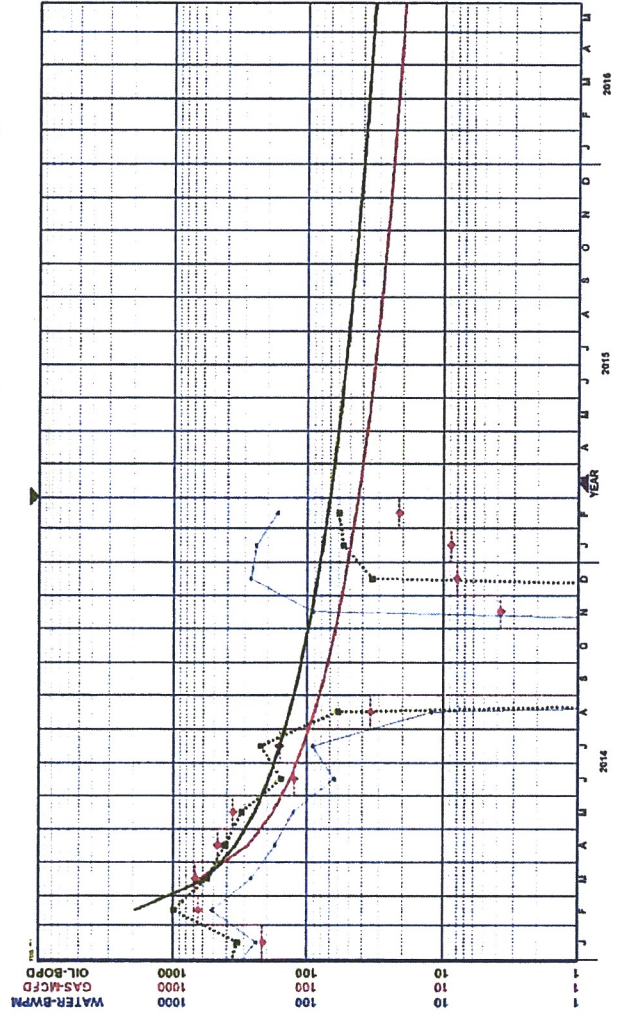
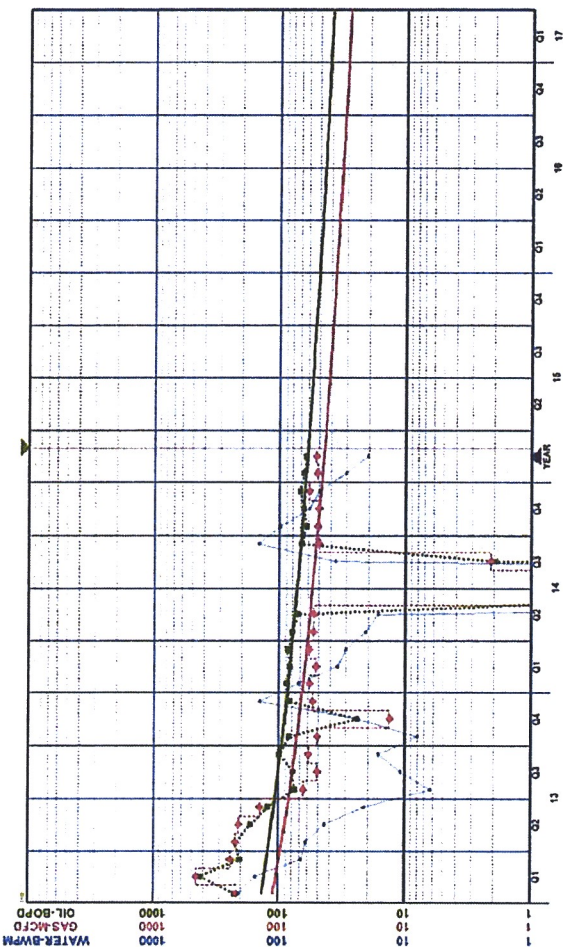


Exhibit E-2: Codell Decline Curve Analysis

Redstone 2-1-1 CH  
49021209670000  
Codell  
EOG Resources  
2 13N 65W  
Cum Oil (BO) 79,064  
EUR Oil (BO) 228,755



Pole Creek 525-2413H  
49021211280000  
Codell  
EOG Resources  
24 15N 65W  
Cum Oil (BO) 86,015  
EUR Oil (BO) 168,216

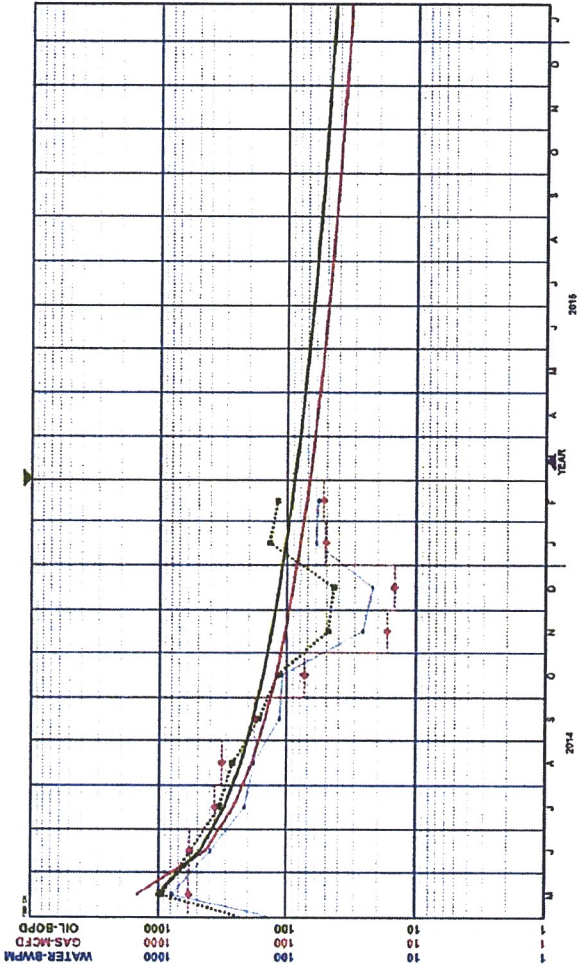
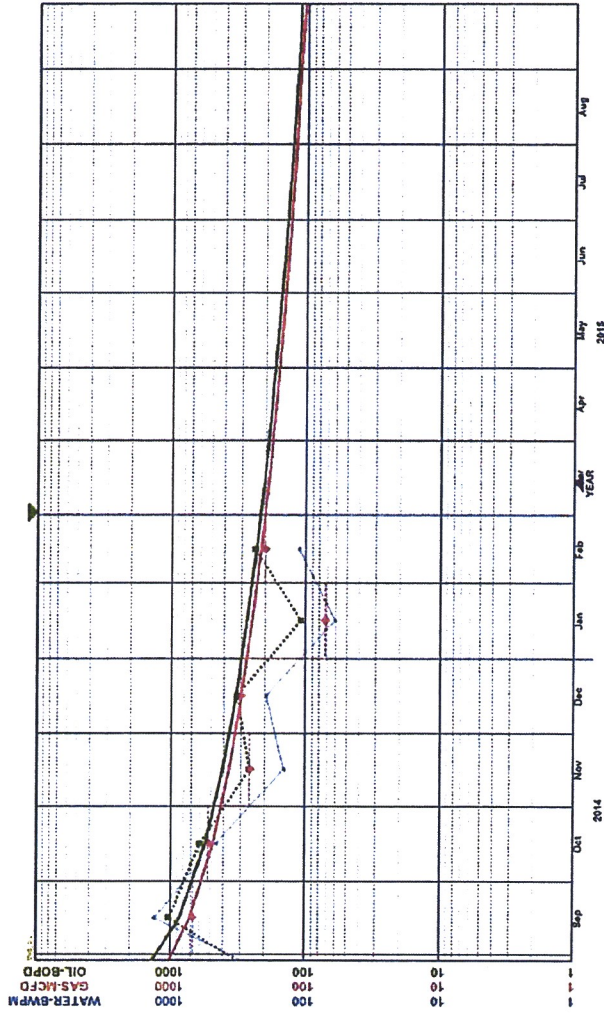




Exhibit E-2: Codell Decline Curve Analysis

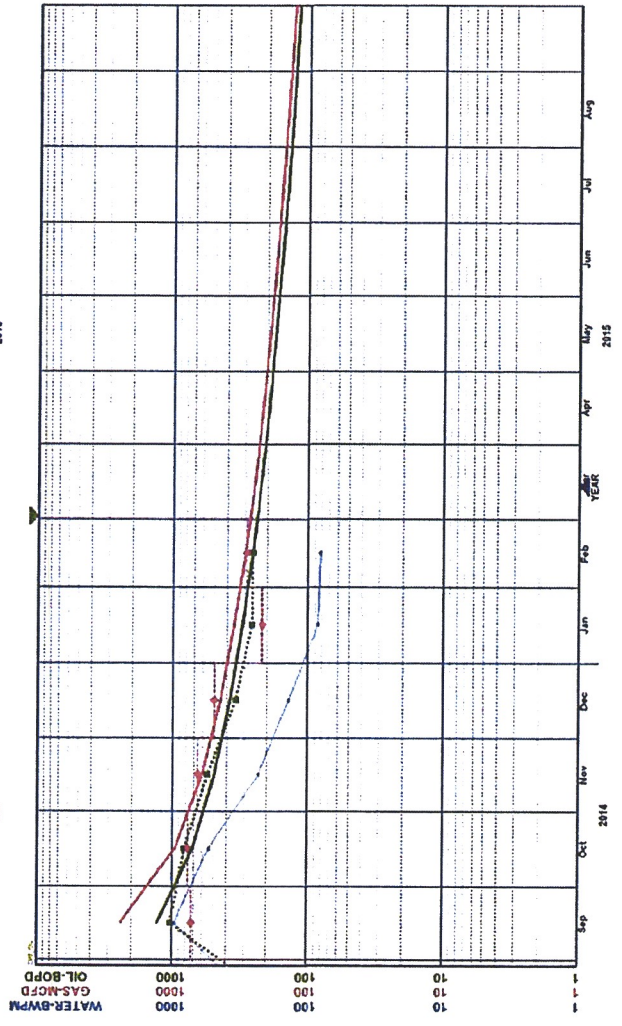
Jubilee 555-1034H  
49021210850000  
Codell  
EOG Resources  
10 13N 65W  
Cum Oil (BO)  
EUR Oil (BO)

81,152  
251,971



Jubilee 553-1034H  
49021210830000  
Codell  
EOG Resources  
10 13N 65W  
Cum Oil (BO)  
EUR Oil (BO)

104,887  
284,305





# Exhibit E-2: Codell Decline Curve Analysis

Jubilee 554-1034H  
 49021210840000  
 Codell  
 EOG Resources  
 10 13N 65W  
 Cum Oil (BO)  
 EUR Oil (BO)

89,009  
 216,834

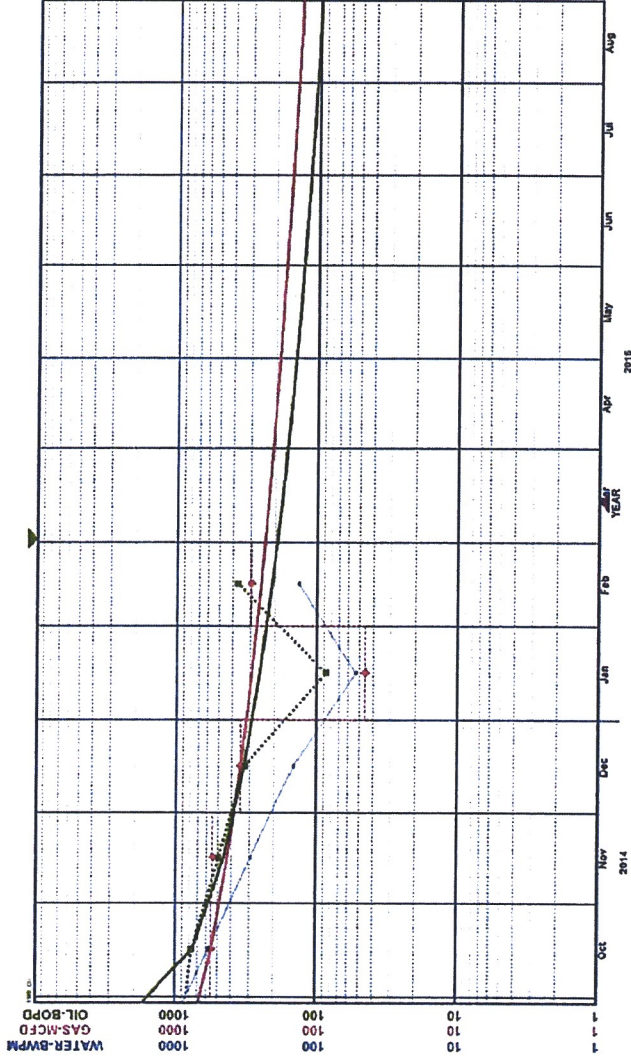
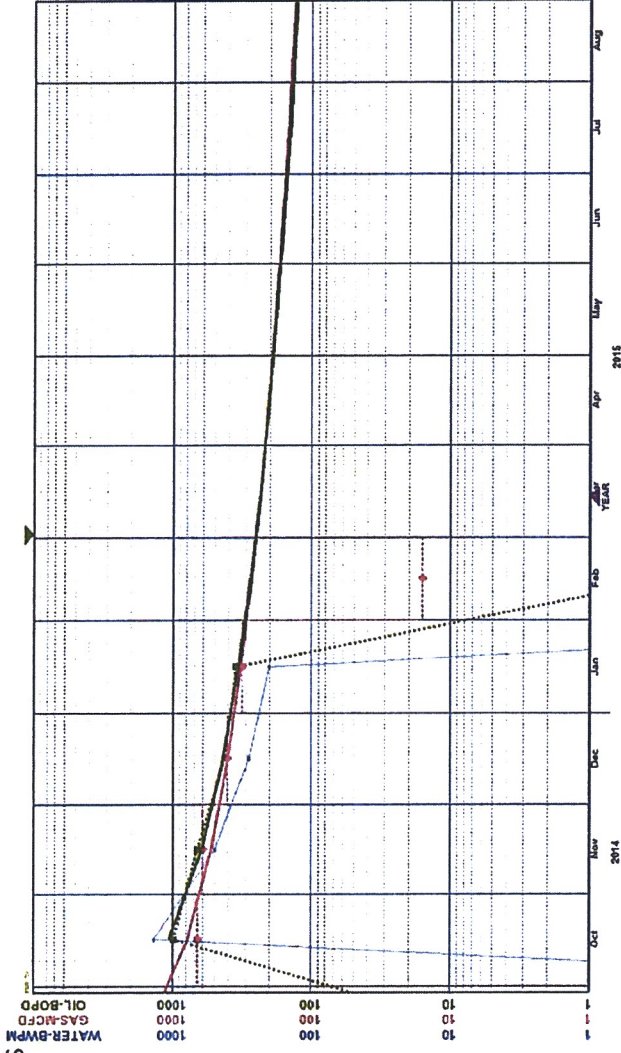


Exhibit E-2: Codell Decline Curve Analysis

Jubilee 529-2227H  
49021210260000  
Codell  
EOG Resources  
22 13N 65W  
Cum Oil (BO)  
EUR Oil (BO)

74,618  
246,307



Jubilee 531-2210H  
49021210270000  
Codell  
EOG Resources  
22 13N 65W  
Cum Oil (BO)  
EUR Oil (BO)

100,410  
402,429

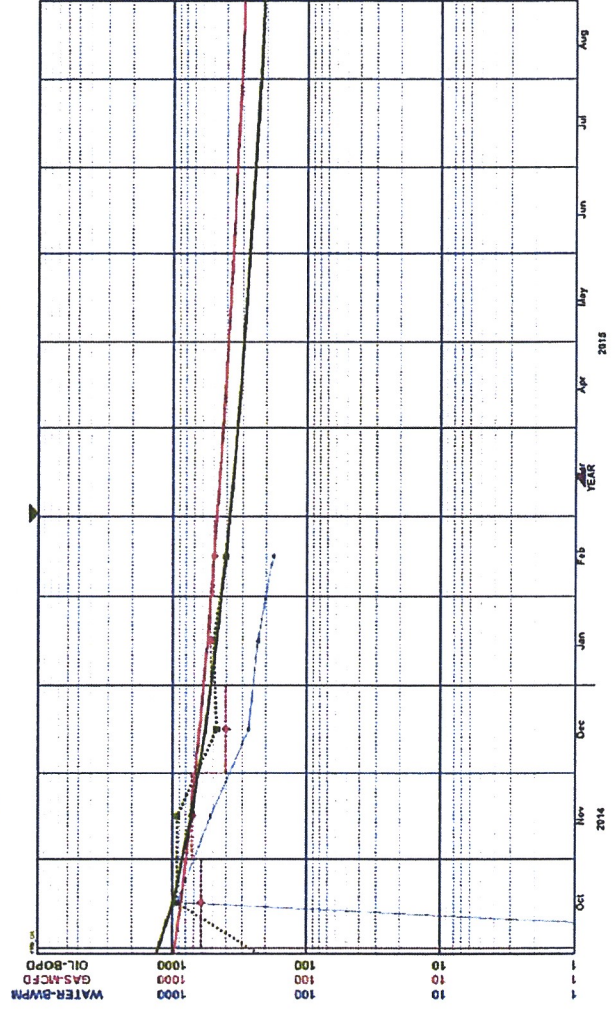
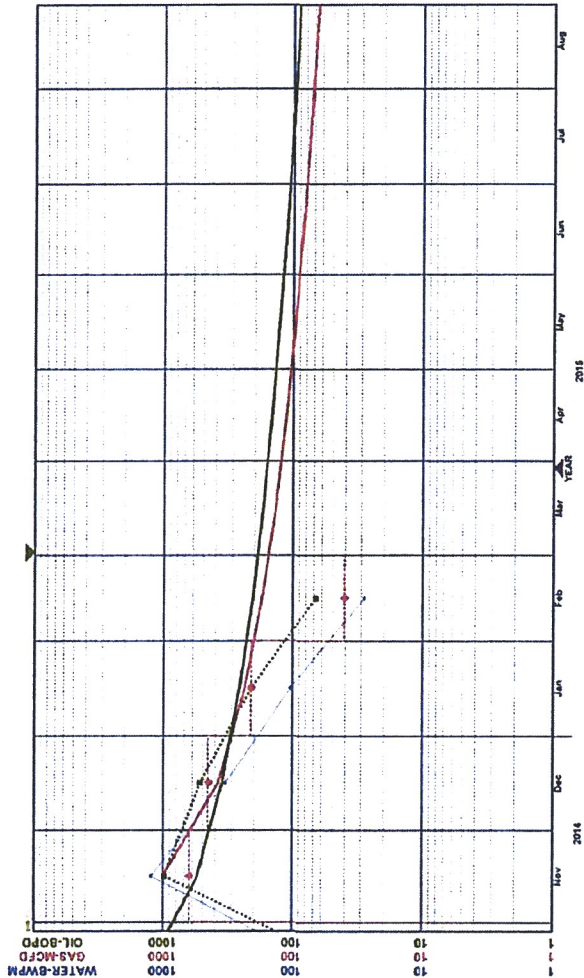
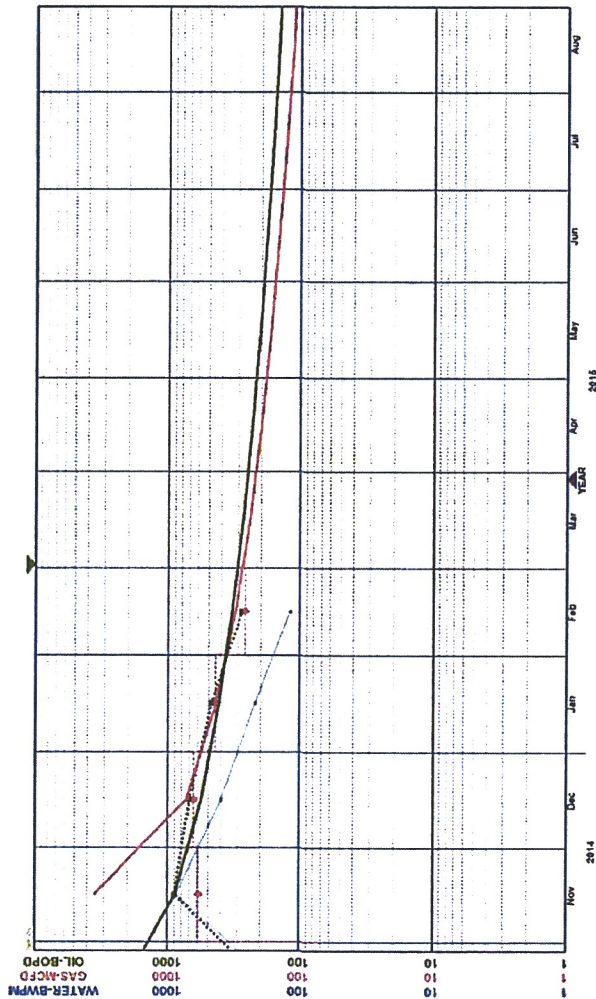


Exhibit E-2: Codell Decline Curve Analysis

Windy 509-1806H  
49021212270000  
Codell  
EOG Resources  
18 13N 64W  
Cum Oil (BO) 55,229  
EUR Oil (BO) 168,067



Windy 502-1806H  
49021212260000  
Codell  
EOG Resources  
18 13N 64W  
Cum Oil (BO) 75,706  
EUR Oil (BO) 262,619



# Exhibit E-3: Niobrara Drainage Area and Joshi Effective Vertical Drainage Radii

## Niobrara Horizontal Well Drainage Area Calculation

| API No         | Lease     | Well No     | Reservoir | Operator                       | Section | Town ship   | Cumulative Oil (bbl) | EUR Oil (bbl) | Completed Interval | Average Porosity (phi, %) | Water Saturation (Sw, %) | Thickness (h, ft) | Drainage Area (acres) | Joshi Effective Vertical Drainage Radius (feet) |
|----------------|-----------|-------------|-----------|--------------------------------|---------|-------------|----------------------|---------------|--------------------|---------------------------|--------------------------|-------------------|-----------------------|---|
| 49021206490000 | ATCHISON  | 13-65-35-4H | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 3513 N 65 W | 25,264               | 33,450        | 5,713              | 10                        | 45                       | 133               | 29                    | 106   |
| 49021206550000 | ATCHISON  | 12-65-13-4H | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 1312 N 65 W | 26,852               | 34,756        | 3,851              | 10                        | 45                       | 134               | 29                    | 156   |
| 49021207500000 | PATRIOT   | 1-19H       | Niobrara  | EOG RESOURCES INCORPORATED     |         | 1914 N 64 W | 24,314               | 34,345        | 4,216              | 9                         | 45                       | 146               | 28                    | 137   |
| 49021206810000 | ATCHISON  | 12-65-1-4H  | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 112 N 65 W  | 39,810               | 48,466        | 5,748              | 10                        | 45                       | 134               | 41                    | 150   |
| 49021206530000 | STATE     | 13-64-16-4H | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 1613 N 64 W | 40,452               | 56,086        | 5,480              | 10                        | 45                       | 136               | 47                    | 179   |
| 49021207610000 | MARLIN    | 12-65-3-4H  | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 312 N 65 W  | 50,782               | 61,678        | 4,203              | 10                        | 45                       | 134               | 49                    | 233   |
| 49021206530000 | SHATTO    | 13-65-10-4H | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 1013 N 65 W | 58,512               | 75,533        | 5,225              | 10                        | 45                       | 132               | 62                    | 241   |
| 49021208720000 | JUBILEE   | 69-04H      | Niobrara  | EOG RESOURCES INCORPORATED     |         | 413 N 65 W  | 74,716               | 96,003        | 3,540              | 10                        | 45                       | 136               | 77                    | 401   |
| 49021209810000 | BKG SANDY | 7-33H       | Niobrara  | EOG RESOURCES INCORPORATED     |         | 3314 N 65 W | 51,968               | 129,285       | 3,541              | 10                        | 45                       | 136               | 104                   | 522   |
| 49021207560000 | MARLIN    | 12-65-3-2H  | Niobrara  | ANADARKO E & P COMPANY LIMITED | PRTNR   | 312 N 65 W  | 91,596               | 133,860       | 4,407              | 10                        | 45                       | 134               | 109                   | 461   |
| 49021209800000 | JUBILEE   | 30-07H      | Niobrara  | EOG RESOURCES INCORPORATED     |         | 713 N 65 W  | 67,347               | 161,148       | 3,836              | 10                        | 45                       | 133               | 130                   | 595   |
| 49021208750000 | WINDY     | 01-18H      | Niobrara  | EOG RESOURCES INCORPORATED     |         | 1813 N 64 W | 76,552               | 135,612       | 3,401              | 9                         | 45                       | 132               | 120                   | 601   |
| AVERAGE        |           |             |           |                                |         |             | 83,352               | 4,430         | 10                 | 45                        | 135                      | 69                | 315                   |   |

$$\text{Drainage area equation: } Area = \frac{EUR * B_o}{7758 * h * phi * (1 - S_w) * R_F}$$

$$B_o = 1.4$$

$$R_F = 3\%$$

## Exhibit E-4: Estimated Drainage for Proposed 9000' Niobrara Horizontal Well

### Horizontal Well Drainage Area Joshi Method

$r$  = effective drainage radius from vertical well, ft

$L$  = lateral length, ft

$A$  = drainage area for horizontal well

$$A = \frac{\pi r^2 + 2r \cdot L}{43560}$$

$$r = 315 \text{ ft}$$

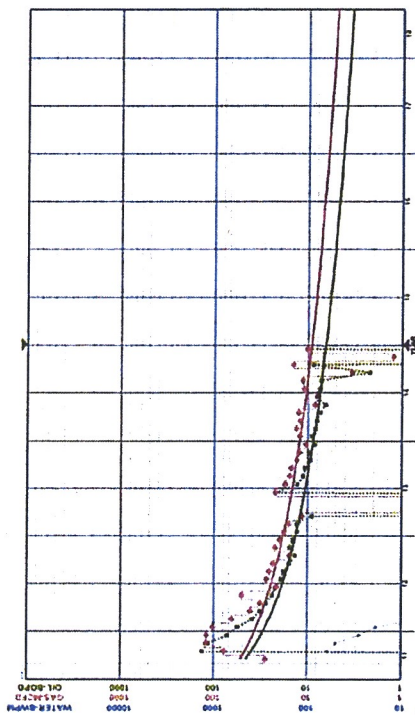
$$L = 9,000 \text{ ft}$$

$$A = 137 \text{ acres}$$

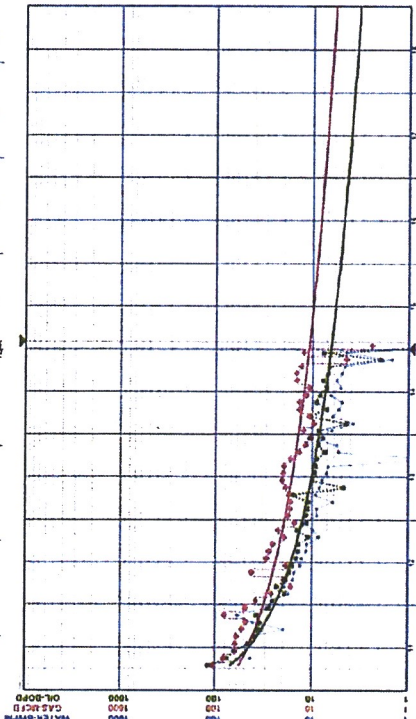


Exhibit E-5: Niobrara Decline Curve Analysis

ATCHISON 13-65-35-4H  
49021206490000  
Niobrara  
ANADARKO E & P COMPANY LIMITED PARTNER  
35 13 N 65 W  
25,264  
33,450  
Cum Oil (BO)  
EUR Oil (BO)



ATCHISON 12-65-13-4H  
49021206650000  
Niobrara  
ANADARKO E & P COMPANY LIMITED PARTNER  
13 12 N 65 W  
26,852  
34,756  
Cum Oil (BO)  
EUR Oil (BO)



PATRIOT 1-19H  
49021207500000  
Niobrara  
EOG RESOURCES INCORPORATED  
19 14 N 64 W  
24,314  
34,345  
Cum Oil (BO)  
EUR Oil (BO)

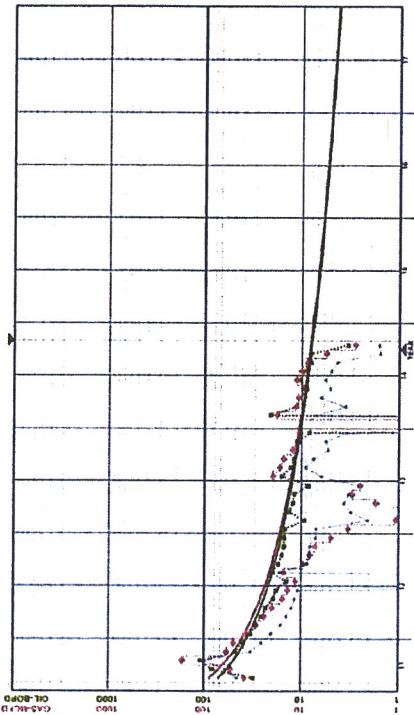
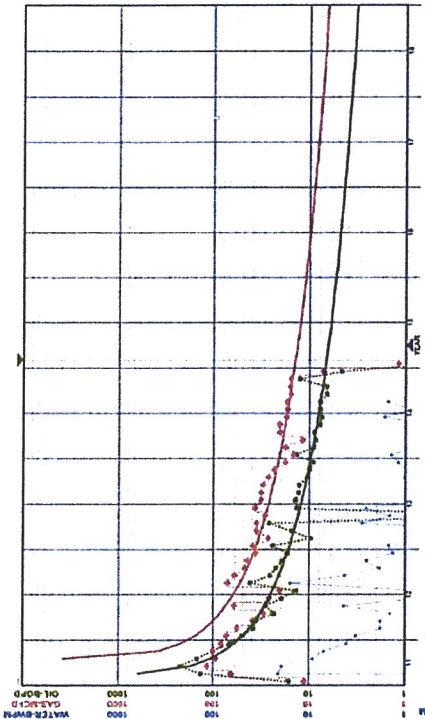
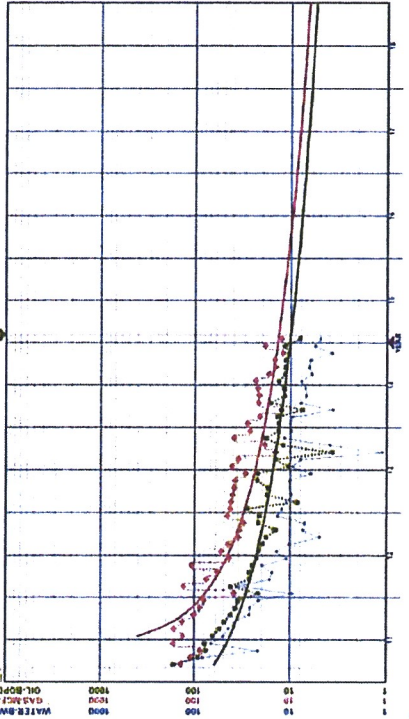


Exhibit E-5: Niobrara Decline Curve Analysis

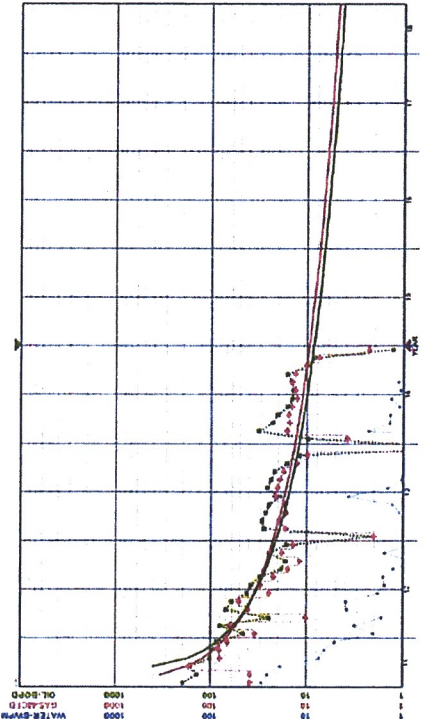
ATCHISON 12-65-1-4H  
49021206810000  
Niobrara  
ANADARKO E & P COMPANY LIMITED PARTNER  
1 12 N 65 W  
39,810  
48,466  
Cum Oil (BO)  
EUR Oil (BO)



STATE 13-64-16-4H  
49021206630000  
Niobrara  
ANADARKO E & P COMPANY LIMITED PARTNER  
16 13 N 64 W  
40,452  
56,086  
Cum Oil (BO)  
EUR Oil (BO)

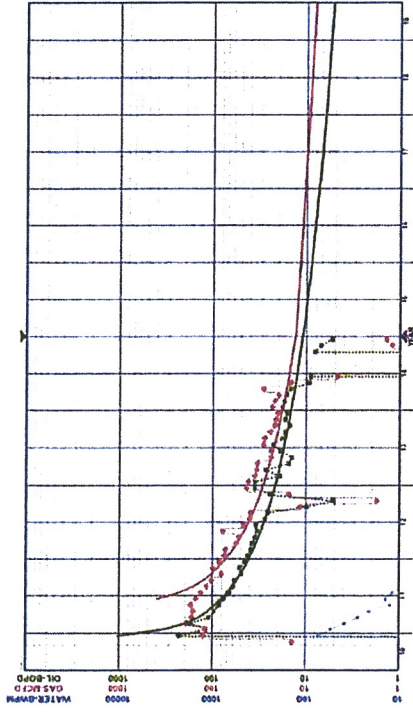


MARLIN 12-65-3-4H  
49021207610000  
Niobrara  
ANADARKO E & P COMPANY LIMITED PARTNER  
3 12 N 65 W  
50,782  
61,678  
Cum Oil (BO)  
EUR Oil (BO)

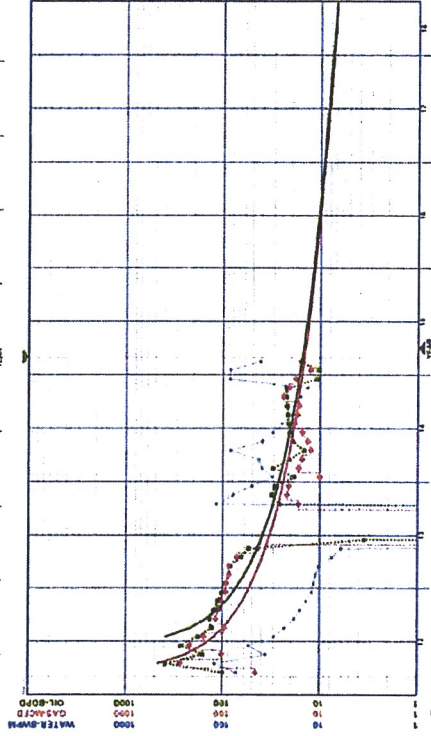


# Exhibit E-5: Niobrara Decline Curve Analysis

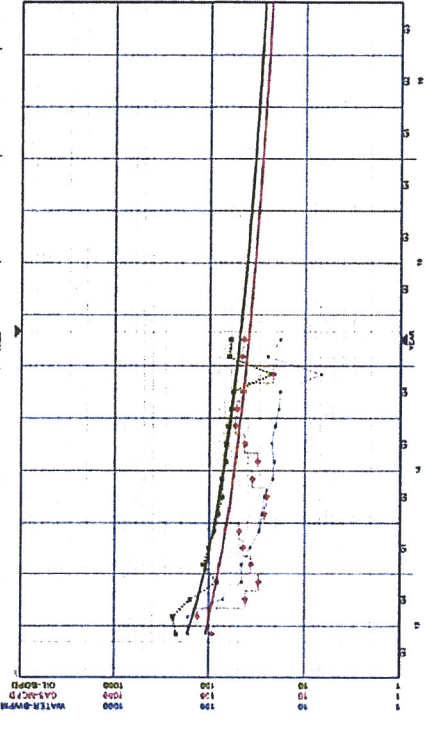
SHATTO 13-65-10-4H  
 49021206520000  
 Niobrara  
 ANADARKO E & P COMPANY LIMITED PRTR  
 10 13 N 65 W  
 58,512  
 75,533  
 Cum Oil (BO)  
 EUR Oil (BO)



JUBILEE 69-04H  
 49021208720000  
 Niobrara  
 EOG RESOURCES INCORPORATED  
 4 13 N 65 W  
 74,716  
 96,003  
 Cum Oil (BO)  
 EUR Oil (BO)



BIG SANDY 7-33H  
 49021209810000  
 Niobrara  
 EOG RESOURCES INCORPORATED  
 33 14 N 65 W  
 51,968  
 129,285  
 Cum Oil (BO)  
 EUR Oil (BO)

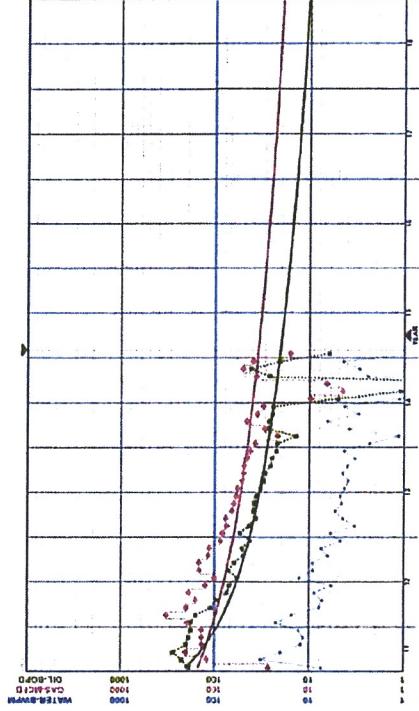




# Exhibit E-5: Niobrara Decline Curve Analysis

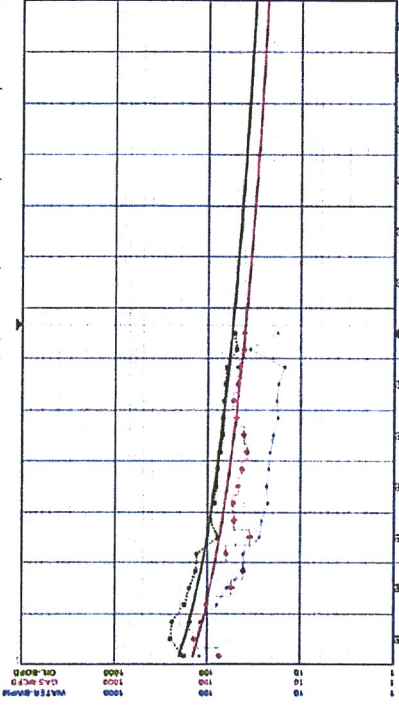
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 49021207560000  
 Niobrara  
 ANADARKO E & P COMPANY LIMITED PARTNERSHIP  
 3 12 N 65 W  
 91,596  
 133,860

Cum Oil (BO)  
 EUR Oil (BO)



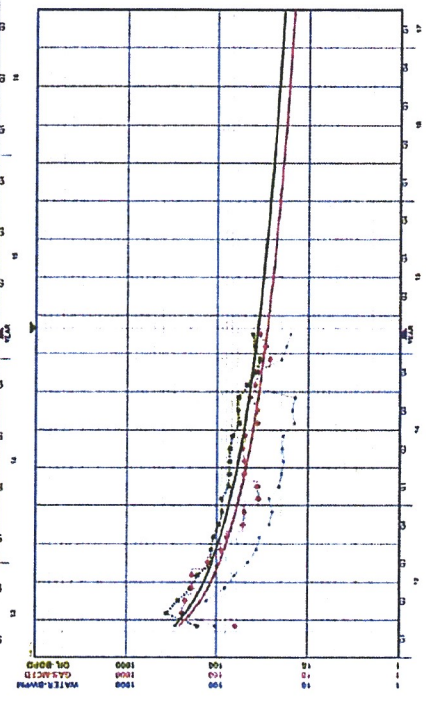
JUBILEE 30-07H  
 49021209800000  
 Niobrara  
 EOG RESOURCES INCORPORATED  
 7 13 N 65 W  
 67,347  
 161,148

Cum Oil (BO)  
 EUR Oil (BO)



WINDY 01-18H  
 49021208750000  
 Niobrara  
 EOG RESOURCES INCORPORATED  
 18 13 N 64 W  
 67,347  
 76,552

Cum Oil (BO)  
 EUR Oil (BO)



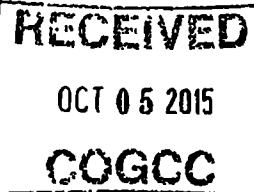
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COGCC

511 DOCUMENTS

Order no. 535-706



BEFORE THE OIL & GAS CONSERVATION COMMISSION  
OF THE STATE OF COLORADO

|                                     |   |                      |
|-------------------------------------|---|----------------------|
| IN THE MATTER OF THE PROMULGATION   | ) | CAUSE NO. 535        |
| AND ESTABLISHMENT OF FIELD RULES TO | ) |                      |
| GOVERN OPERATIONS FOR THE CODELL    | ) | DOCKET NO. 151000562 |
| AND NIOBRARA FORMATIONS, UNNAMED    | ) |                      |
| FIELD, WELD COUNTY, COLORADO        | ) | TYPE: SPACING        |

REQUEST FOR RECOMMENDATION OF  
APPROVAL OF APPLICATION WITHOUT A HEARING

Anadarko E&P Onshore LLC, Operator No. 2800 ("Applicant"), by and through its undersigned attorneys, hereby requests pursuant to Rule 511.a. of the Rules and Regulations of the Colorado Oil and Gas Conservation Commission for the Director to recommend approval of its August 27, 2015 verified application ("Application") and the supporting exhibits without a hearing.

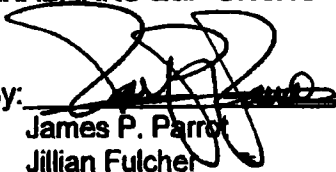
Applicant requests that the above-captioned matter be approved based upon: (i) the merits of the Application, and (ii) Applicant's sworn written testimony verifying sufficient facts along with exhibits that adequately support the relief requested in the Application. To Applicant's information and belief, no protests were timely filed in this matter.

WHEREFORE, Applicant requests that its request for a recommendation for approval of its Application without a hearing be granted.

DATED this 5 day of October, 2015.

Respectfully submitted,

ANADARKO E&P ONSHORE LLC

By: 

James P. Parrot  
Jillian Fulcher  
Beatty & Wozniak, P.C.  
Attorneys for Applicant  
216 16<sup>th</sup> Street, Suite 1100  
Denver, Colorado 80202  
(303) 407-4499

# **ANADARKO E&P ONSHORE LLC**

Cause No. 535  
Docket No. 151000562

**Land Testimony – Jason Rayburn**  
Cause No. 535; Docket No. 151000562  
Increased Density Application, Niobrara Formation  
Hereford Field, Weld County, Colorado

**October 2015 Colorado Oil and Gas Conservation Commission Hearing**

My name is Jason Rayburn, and I am currently employed as a Senior Landman for Anadarko E&P Onshore LLC ("Applicant"). I graduated from the University of Oklahoma in 2008 with a Bachelor of Science in Business Administration with an emphasis in Energy Management. I have over 8 years of experience in petroleum land management and administrative areas of the oil and gas business. I am familiar with the lands subject to, and the matters set forth in the August 21, 2015, verified application (the "Application") filed herein.

On August 21, 2015, Applicant filed the verified Application pursuant to §34-60-116, C.R.S., for an order to:

A. Establish an approximate 1,262.83-acre drilling and spacing unit for Section 31, Township 12 North, Range 65 West, 6th P.M. and Section 6, Township 11 North, Range 65 West, 6th P.M.

B. Authorize the drilling of up to seven (7) horizontal wells in the proposed drilling and spacing unit for production from the Niobrara Formation.

In support of Applicant's Application and my sworn testimony herein, I am submitting four (4) exhibits. This testimony and exhibits provide the supporting basis for approval of the Applicant's request for an order to: establish an approximate 1,262.83-acre drilling and spacing unit for Section 31, Township 12 North, Range 65 West, 6<sup>th</sup> P.M. and Section 6, Township 11 North, Range 65 West, 6<sup>th</sup> P.M., and authorize the drilling of up to seven (7) horizontal wells within the proposed unit, for the production of oil, gas and associated hydrocarbons from the Niobrara Formation, for the following described lands:

Township 12 North, Range 65 West, 6th P.M.  
Section 31: All

Township 11 North, Range 65 West, 6th P.M.  
Section 6: All

Approximately 1,262.83-acres, more or less, Weld County, CO  
("Application Lands").

**Exhibit L-1: Leasehold Ownership Map:**

Exhibit L-1 is a map showing the location of the Application Lands and the leasehold ownership. The Application Lands consist of fee mineral interest. The

following parties own leasehold or unleased mineral interests in the Application Lands:

| <b><u>INTEREST OWNER(S)</u></b> | <b><u>UNIT WI<sup>1</sup></u></b> |
|---------------------------------|-----------------------------------|
| Anadarko E&P Onshore LLC        | 50.30%                            |
| Other working interest owners   | <u>49.70%</u>                     |
| <b>TOTAL:</b>                   | <b>100.00%</b>                    |

**Exhibit L-2: Topographic Map:**

Exhibit L-2 is a topographical map of the Application Lands.

**Exhibit L-3: Aerial Map:**

Exhibit L-3 is an aerial map of the Application Lands.

**Exhibit L-4: Interested Parties:**

Attached as Exhibit L-4 is a list of interested parties within the Application Lands.

The Application will not result in a requirement for consultation with the Colorado Department of Public Health and Environment or Colorado Parks and Wildlife pursuant to 306.c.(1)B. or 306.d.(1)B.

As stated in the Application, some of the minerals underlying the proposed drilling and spacing unit are owned by the United States of America. As such, Applicant will seek a Communitization Agreement from the Bureau of Land Management upon approval of the proposed drilling and spacing unit.

Based on the examination of relevant contracts and records, the interested parties (owners within the proposed drilling and spacing unit) have been duly served with the Application and associated Notice of Hearing. Further, as of the date of this testimony, Anadarko has not received any notice of objection or protest to the Application.

---

<sup>1</sup> Interests are approximate.

**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct, and accurate.

DATED this 2<sup>nd</sup> day of October, 2015.

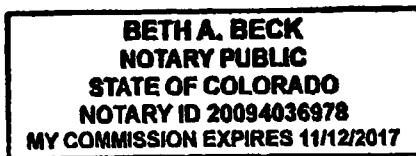
  
\_\_\_\_\_  
Jason Rayburn, Senior Landman  
Anadarko E&P Onshore LLC

STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 2<sup>nd</sup> day of October, 2015, by Jason Rayburn, Senior Landman for Anadarko E&P Onshore LLC.

Witness my hand and official seal.

My commission expires: 11/12/2017



Beth A. Beck  
Notary Public

Exhibit L-1  
Leasehold Ownership Map

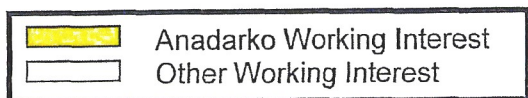
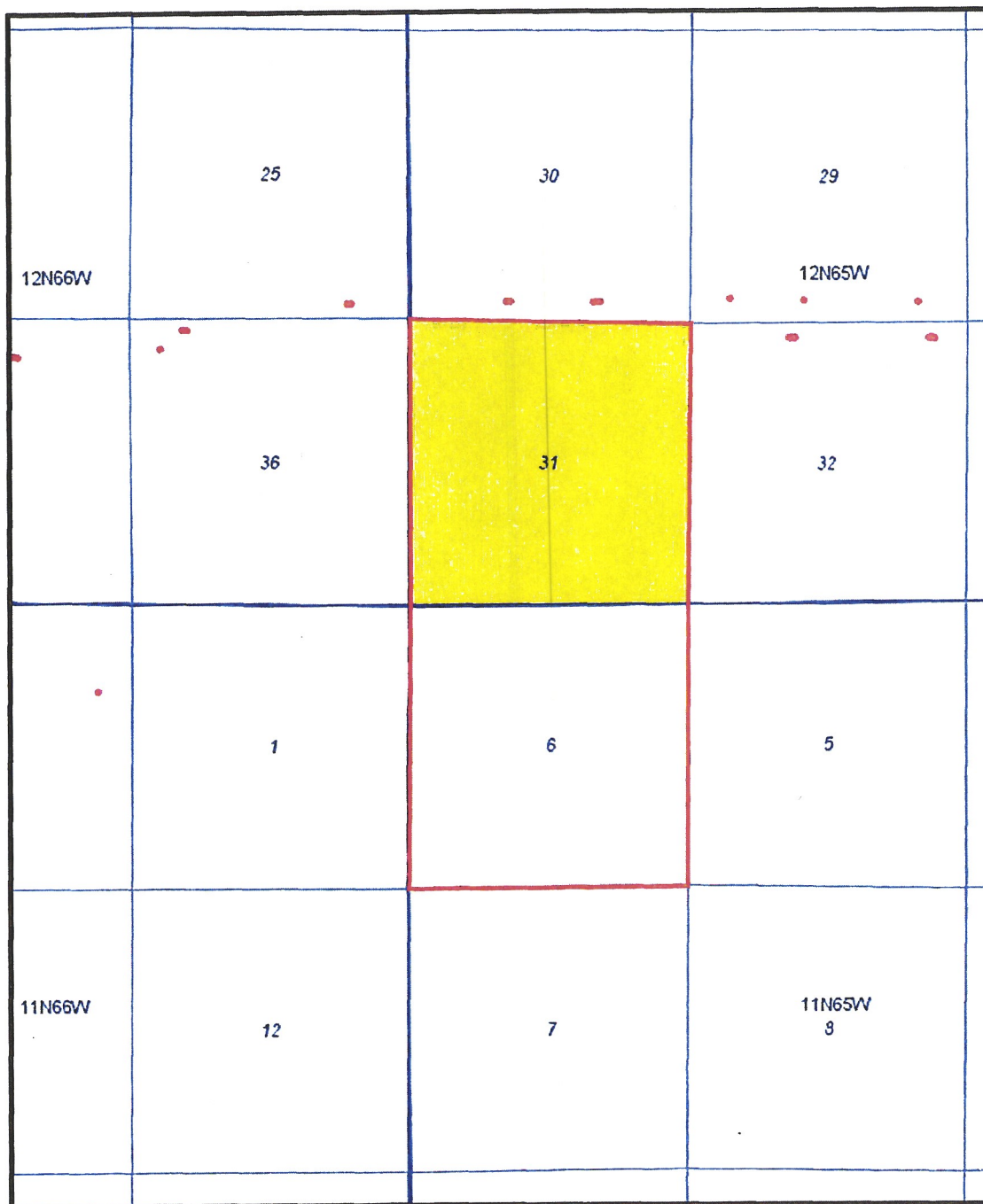




Exhibit L-2  
Topographic Map

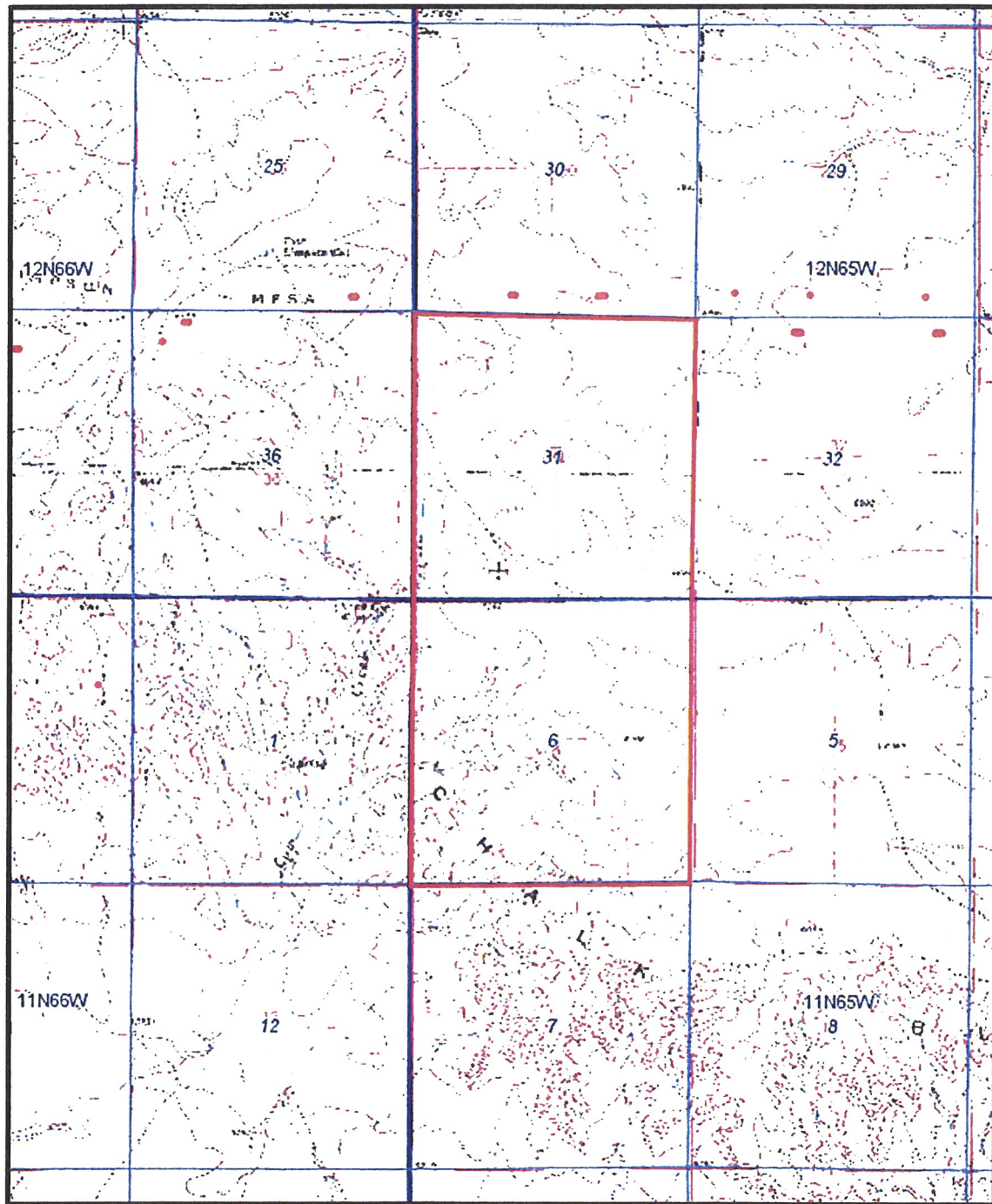
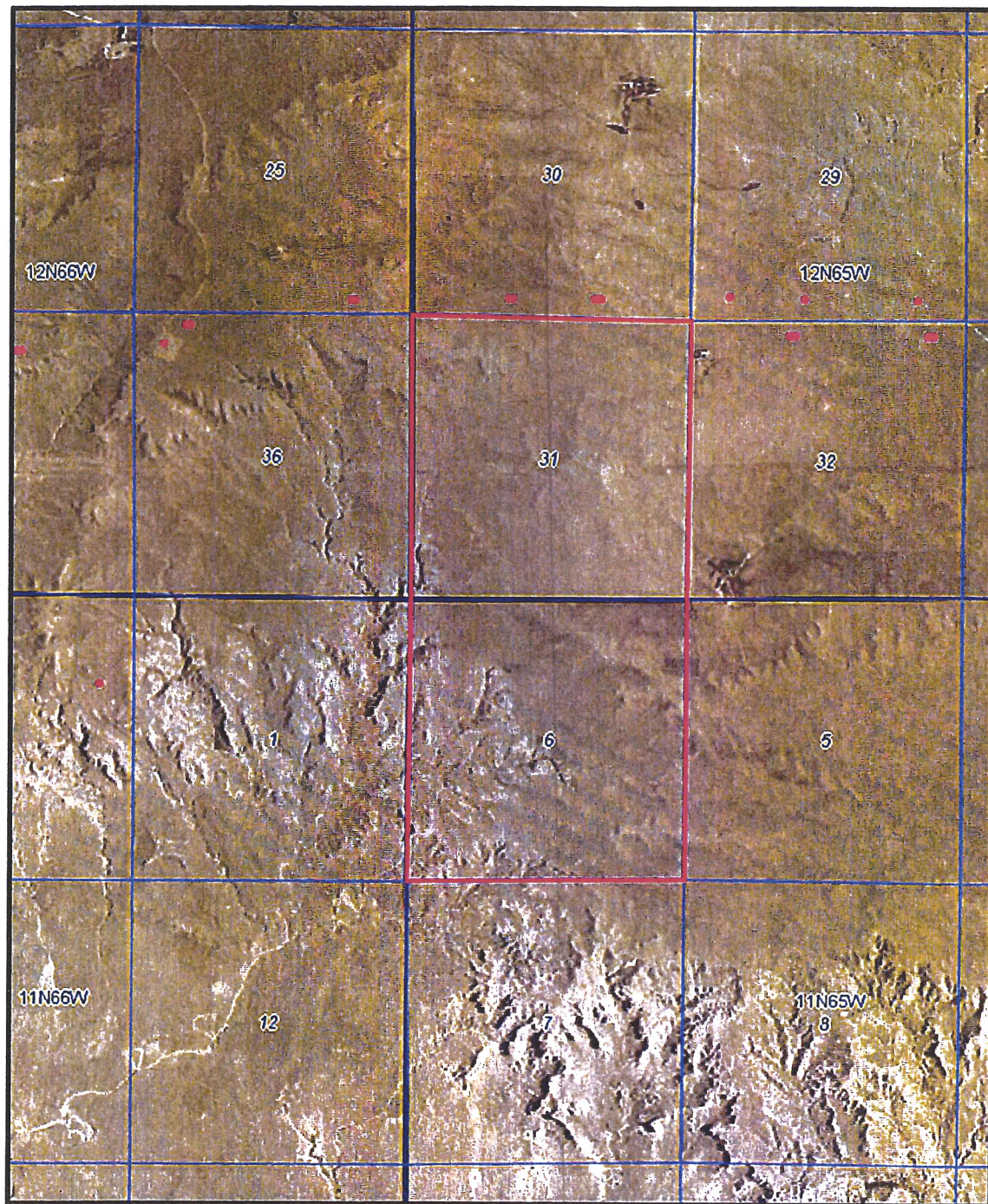




Exhibit L-3  
Aerial Map





**Exhibit L-4  
Interested Parties**

ABO Petroleum Corporation  
105 S. 4th St.  
Artesia, NM 88210-2177

Anadarko Oil & Gas, LLC  
1099 18th Street, Suite 1800  
Denver, CO 80202

Chesapeake Exploration, L.L.C.  
6100 North Western  
P.O. Box 18496  
Oklahoma City, OK 73154-0496

Cirque Brennsee, LLC  
475 Seventeenth Street, Suite 1600  
Denver, CO 80202

Elizabeth J. Cox  
P. O. Box 47  
Cheyenne, WY 82003

Elizabeth J. Cox as Personal Representative of the Estate  
of Mark T. Cox III  
P. O. Box 47  
Cheyenne, WY 82003

EOG Resources, Inc.  
P.O. Box 4362  
Houston, TX 77210-4362

Estate of Elizabeth S. Cashman, deceased  
Unknown  
Cheyenne, WY 82009

Futura, LLC  
9302 S. 83rd Ct.  
Hickory Hills, IL 60457

Hydrocarbon Minerals II, LLC  
9302 S. 83rd Ct.  
Hickory Hills, IL 60457

Mariemont Properties, Inc  
3429 Southwestern Blvd.  
Dallas, TX 75225

Midland Trust  
P. O. Box 9257  
Dallas, TX 75209

MYCO Industries, Inc.  
105 S. 4th St.  
Artesia, NM 88210-2177

Noble Energy, Inc.  
Attn: COGCC Land Coordinator  
1625 Broadway St., Suite 2200  
Denver, CO 80202

OOGC America, Inc.  
c/o CNOOC International Limited,  
P.O. Box 4705, No. 25 Chaoyangmenbei Dajie  
(Dongcheng District)  
Beijing, P.R. China 100010

POCO Minerals, LLC  
P. O. Box 601673  
Dallas, TX 75360

Robert E. Wagner and Jan G. Wagner  
5607 Laura Dawn Avenue  
Cheyenne, WY 82009

Sabre Exploration, Inc.  
P. O. Box 4848  
Wichita Falls, TX 76308-0848

State of Colorado  
1127 Sherman St.  
Denver, CO 80203

Thomas Walker Cox  
29007 Palmetto Drive  
Big Pine Key, FL 33043

Yates Petroleum Corporation  
105 S. 4th St.  
Artesia, NM 88210-2177

Tom Schreiner, Energy Liaison  
Colorado Parks and Wildlife  
Northeast Region Office  
6060 Broadway  
Denver, CO 80216

Kent Kuster  
Oil & Gas Consultant Coordinator  
Colorado Department of  
Public Health & Environment  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530

Troy Swain  
Weld County  
Department of Planning Services  
1555 North 17th Avenue  
Greeley, CO 80631

Bureau of Land Management  
2850 Youngfield Street  
Lakewood, Colorado 80215-7093



**Exhibit L-4  
Interested Parties**

Albert Lloyd Cashman And Sharon D. Cashman  
9728 Branding Iron Drive  
Cheyenne, Wy 82009

Anadarko Land Corp.  
1099 18<sup>th</sup> Street, Suite 1800  
Denver, Co 80202

Carol Ann Strukel  
17249 Sundance Dr.  
College Station, Tx 77845

Etchpare, Llc  
P.O. Box 848  
Cheyenne, Wy 82003

Frank E Horton And Dorothy L. Horton, Husband  
And Wife  
18007 County Road 128  
Nunn, Co 80648

Steven Layne Pursley  
5146 N. Granite Reef Road  
Scottsdale, Az 85250

Sylvia Childers And Buster Childers, Wife And  
Husband  
Campstool Rout, Box 64  
Cheyenne, Wy 82007

Wadad Harlow Cashman  
501 Los Angeles Dr.  
El Paso, Tx 79902

Wadad Harlow Cashman  
4305 Okeegge Dr.  
El Paso, Tx 79902

Junior F. Stephan, And Loreen Stephan, Husband  
And Wife  
P.O. Box 692  
Cheyenne, Wy 82003





## **Geologic Testimony – Thomas A. Berkman**

**Cause No. 535; Docket Nos. 151000628, 151000561, & 151000562  
Spacing and Setback Applications  
Niobrara Formations  
Unnamed Field, Weld County, Colorado**

**October 26<sup>th</sup> & 27<sup>th</sup>, 2015 Colorado Oil and Gas Conservation Commission Hearing**

My name is Tom Berkman, and I am currently employed as a Senior Project Advisor for Anadarko E&P Onshore LLC ("Applicant"). I graduated from Colorado College in Colorado Springs with B.A. Degree in Geology, and from Oregon State University in Corvallis, OR with an M.S. in Geoscience. I have over 27 years of experience in the oil and gas industry. I am familiar with the lands subject to, and the matters set forth in the verified applications (the "Applications") described below and filed herein.

In support of Applicant's Applications and my sworn testimony herein, I am submitting four (4) exhibits. This testimony and exhibits provide the supporting basis for approval of the Applicant's request for orders to, among other things: (1) establish approximate 1280-acre drilling and spacing units<sup>1</sup> for the below-described lands<sup>2</sup>; (2) authorize the drilling of up to seven horizontal wells within the proposed units for the production of oil, gas and associated hydrocarbons from the Niobrara Formation; and (3) reduce well setbacks to 330' from the unit boundary.

**Township 12 North, Range 65 West, 6th P.M.**

Section 17: Lots 1-4  
Section 20: All  
Section 29: All

***1,343 acres, more or less, Weld County, Colorado (Docket No. 151000628)***

**Township 12 North, Range 65 West, 6th P.M.**

Section 18: Lots 1-4  
Section 19: All  
Section 30: All

***1,299.82 acres, more or less, Weld County, Colorado (Docket No. 151000561)***

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<sup>1</sup> The lands subject to each respective application vary in acreage depending on the presence of irregular lots.

<sup>2</sup> Docket No. 151000628 is limited to a request for a reduction in setbacks.

**Township 12 North, Range 65 West, 6th P.M.**  
**Section 31: All**

**Township 11 North, Range 65 West, 6th P.M.**  
**Section 6: All**

***1,262.83 acres, more or less, Weld County, Colorado (Docket No. 151000562)***

**Exhibit G-1**

Exhibit G-1 is a Type Log of the Upper Cretaceous stratigraphy of the northern D-J Basin. The Niobrara Formation consists of 2 informal members, the Smokey Hill shale, and the Fort Hayes limestone, which directly overlies the Codell. The Pierre Shale overlies the Niobrara. The Carlisle shale is present below the Codell sandstone.

**Exhibit G-2**

Exhibit G-2 is a structure map on the top of the Codell / base Niobrara showing the proposed application lands. The map shows the structure dipping gently to the west at approximately 50 ft / mile across the proposed units. The synclinal basin axis is also shown inside the -3000 ss contour interval along the west side of the map.

**Exhibit G-3**

Exhibit G-3 is a net pay isopach map of the Niobrara shale. Thickness of the Niobrara net pay ranges from less than 130 ft in the northwest to approximately 140 ft along the east portion of the map. The net pay portion of the Niobrara is shown in the stratigraphic column in the upper left, and encompasses the productive "B" and "C" chalk benches of the Niobrara interval.

**Exhibit G-4**

Exhibit G-4 is a west to east stratigraphic cross-section across the proposed application lands, hung on the base of the Niobrara Formation. It is evident that the full Niobrara shale interval exists under the Application lands.



**Conclusions**

The Niobrara consists of 2 informal members, the Smoky Hill shale member and the Fort Hayes limestone member, deposited during a major marine transgression in the Cretaceous Western Interior Seaway.

The Niobrara is a self-sourced resource play that is present throughout much of the Rocky Mountain region. The Niobrara shale has been producing oil and gas in the DJ Basin for dozens of years, and exists under the entirety of the Application Lands.

To the best of my knowledge, all of the matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

Dated this 22 day of September, 2015.

Thomas A. Berkman

Thomas A. Berkman  
Sr. Project Geological Advisor  
Anadarko Petroleum

**VERIFICATION**

STATE OF COLORADO            )  
  ) SS.  
CITY AND COUNTY OF DENVER    )

The foregoing instrument was subscribed and sworn to before me this 22nd day of ~~September~~, 2015, by Thomas A. Berkman, Sr. Project Geological Advisor for Anadarko Petroleum

Witness my hand and official seal.

My commission expires: 10/17/2016

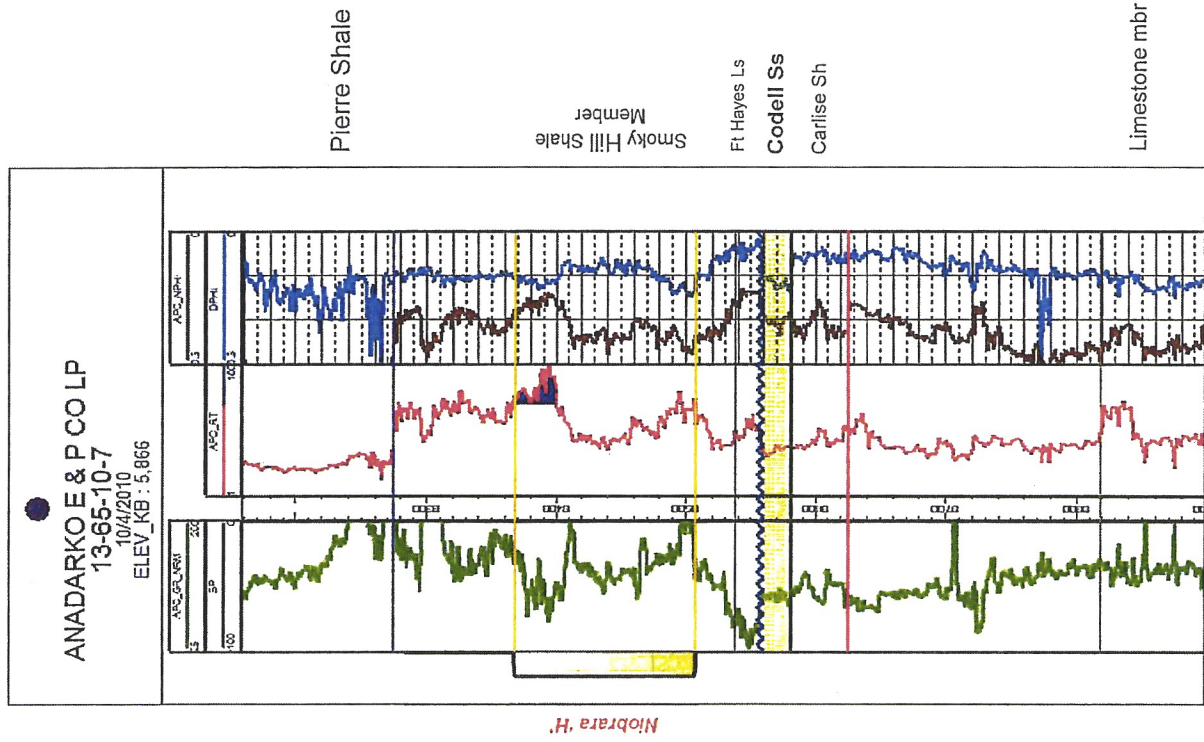


Notary Public Rachel Marie Cruz

# Upper Cretaceous Type Log Northern DJ Basin

Exhibit G-1 Dockets:

151000628  
151000561  
151000562



Upper Cretaceous

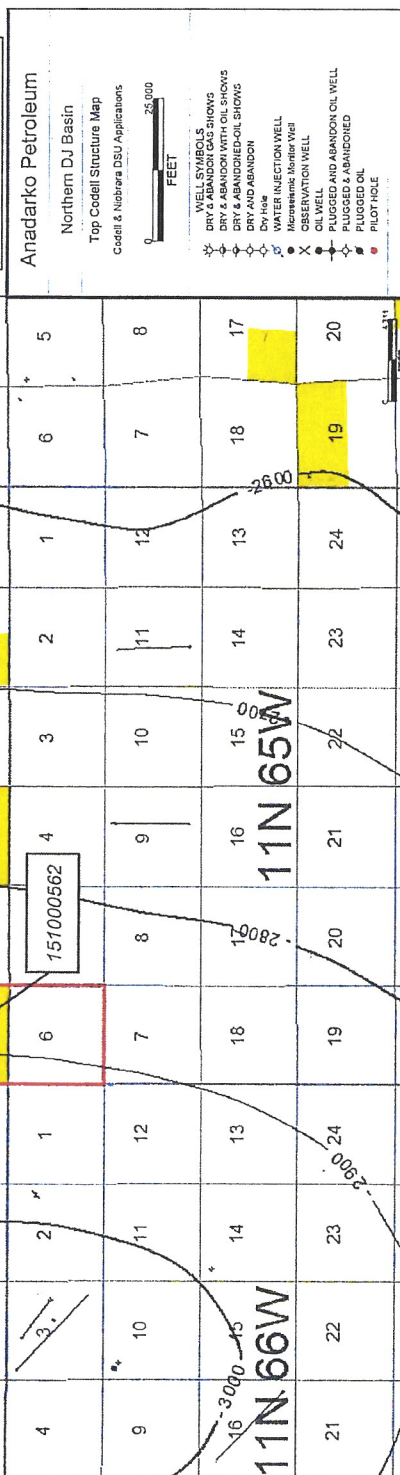
Niobrara

Greenhorn

### Top Codell (Base Niobrara) Structure Map (ss)

151000562

Proposed Spacing Units



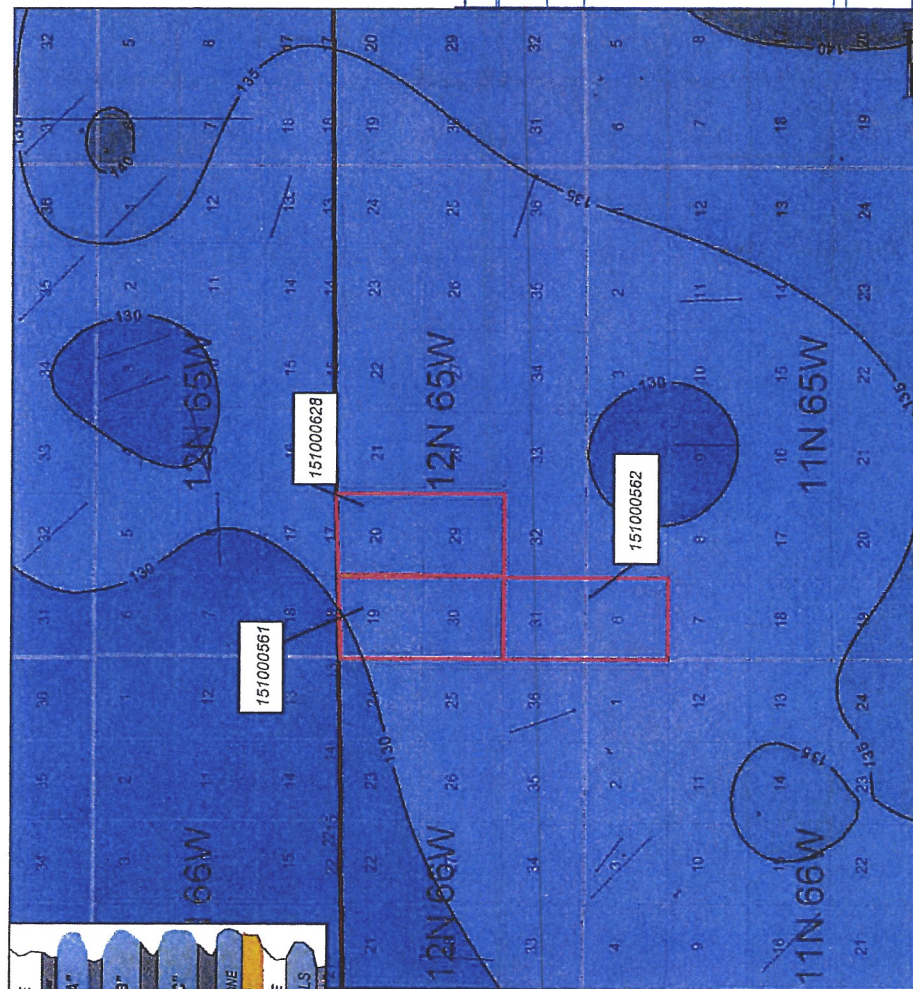
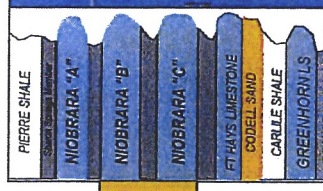


## Exhibit G-3 Dockets:

151000628

151000561

151000562



Proposed Spacing Units

Anadarko Petroleum

Laramie County

Nidroma Net Pay Lease Map  
Costal & Nebraska Spacing Applications

WELL SYMBOLS

DRY 1 ANADARKO GAS SHOWING

DRY 2 ANADARKO GAS SHOWING

DRY 3 ANADARKO GAS SHOWING

DRY 4 ANADARKO GAS SHOWING

DRY 5 ANADARKO GAS SHOWING

DRY 6 ANADARKO GAS SHOWING

DRY 7 ANADARKO GAS SHOWING

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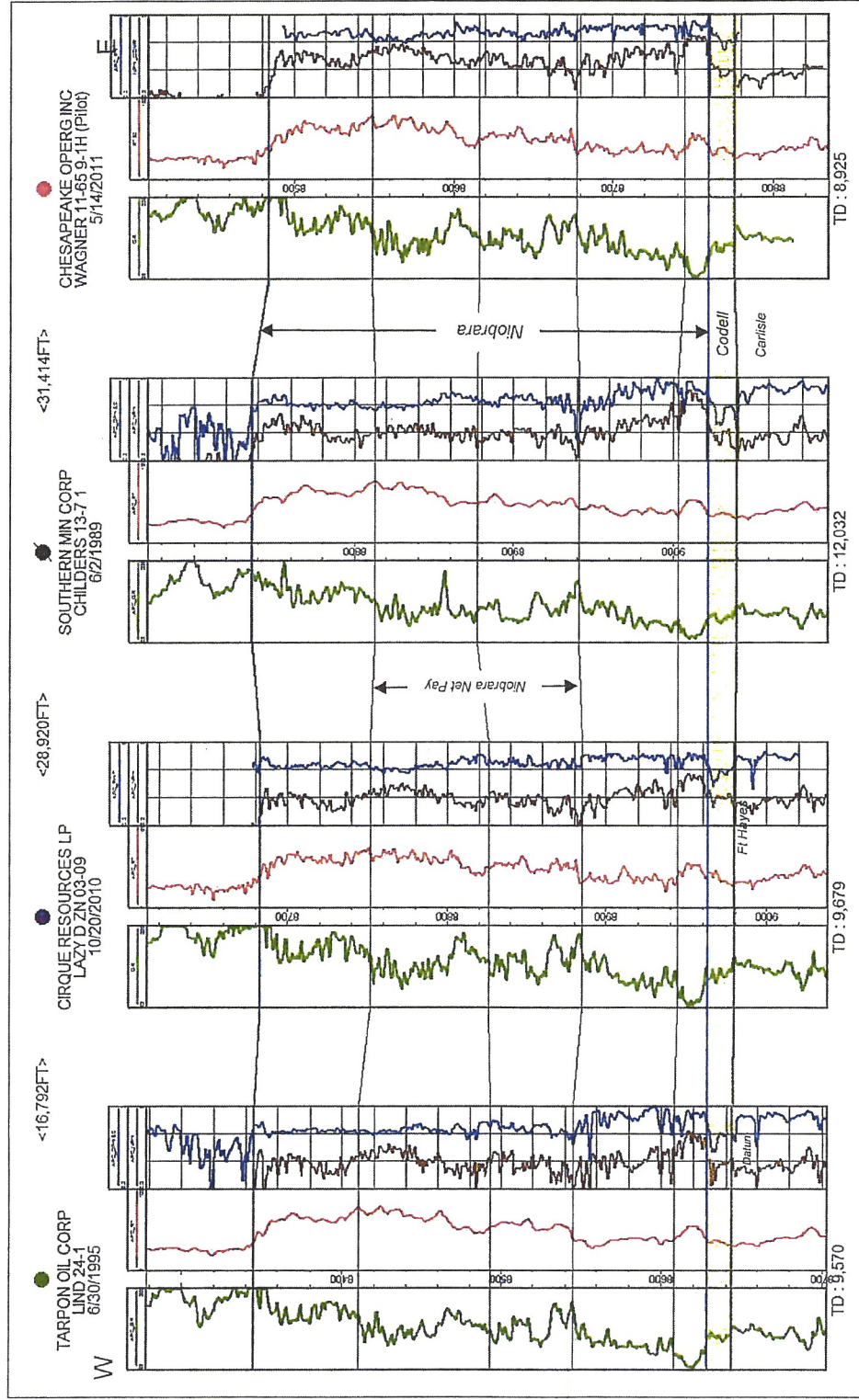
DRY 278 ANADARKO GAS SHOWING

DRY 279 ANADARKO GAS SHOWING

DRY 280 ANADARKO GAS SHOWING



# Niobrara Stratigraphic Cross Section



Location Map

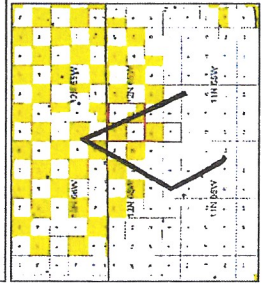


Exhibit G-4 Dockets: 151000628  
151000561  
151000562





**Cause No. 421, Docket No. 1412-SP-2204**





**Cause No. 535**  
**Docket No. 151000628, 151000561, & 151000562**

## **Anadarko Petroleum Corporation**

### **Emily Boecking – Engineering Testimony**

**Cause 535, Docket No. 151000628, 151000561, & 151000562**

**Spacing and Setback Applications**

**Niobrara Formations**

**Unnamed Field, Weld County, Colorado**

My name is Emily Boecking, and I am currently employed as a Senior Reservoir Engineer for Anadarko Petroleum Corporation (“Anadarko”). I graduated from the Duke University in 2007 with a Bachelor of Science in Mechanical Engineering. I have over 7 years of experience in the oil and gas industry of which 5 years have spent as a reservoir engineer. I am familiar with the lands subject to, and the matters set forth in the October 16, 2014, verified application (the “Application”). My resume/CV is attached to this submission. See Appendix.

In support of the Application, I am submitting two exhibits. The exhibits are attached to my sworn testimony and form the basis for the Application requesting for orders to, among other things, (1) establish approximate 1280-acre drilling and spacing units<sup>1</sup> for the below-described lands; (2) authorize the drilling of up to seven horizontal wells within the proposed units for the production of oil, gas and associated hydrocarbons from the Niobrara Formation; and (3) reduce well setbacks to 330’ from 600’ from the unit boundary.

**Township 12 North, Range 65 West, 6th P.M.**

Section 17: Lots 1-4  
Section 20: All  
Section 29: All

*1,275.80 acres, more or less, Weld County, Colorado (Docket No. 151000628)*

**Township 12 North, Range 65 West, 6th P.M.**

Section 18: Lots 1-4  
Section 19: All  
Section 30: All

*1,275.80 acres, more or less, Weld County, Colorado (Docket No. 151000561)*

**Township 12 North, Range 65 West, 6th P.M.**

Section 31: All

**Township 11 North, Range 65 West, 6th P.M.**

Section 6: All

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<sup>1</sup> The lands subject to each respective application vary in acreage depending on the presence of irregular lots.

*1,360 acres, more or less, Weld County, Colorado (Docket No. 150500562)*

**1. Exhibit No. E-1**

Exhibit No. E-1 is a table showing reservoir drainage area calculations for currently producing offsetting wells in the Northern DJ Basin closest to the proposed unit. Wells included in this table are producing from the Niobrara formation with production for 9 months or more and have horizontal completed lateral lengths ranging from 8,500'-9,500'.

**2. Exhibit No. E-2**

Exhibit No. E-2 shows the decline curves used to extrapolate estimated ultimate recovery for use in the drainage area calculations for the Niobrara.

*Testimony and Conclusions*

Anadarko believes that drilling and completion of seven horizontal well in the Niobrara Formation underlying the Application Lands is the most efficient and economic method to develop the resource potential for this formation.

The average drainage areas for the wells drilling in the Niobrara Formation offsetting the Application Lands, with 8,500- 9,500' laterals, was calculated to be 115 acres. A total of 7 Niobrara wells will drain  $7 \times 115 = 805$  acres, which is less than the size of the established 1,280 acre DSU. Furthermore, with a calculated effective drainage radius of 256 feet, a setback of 330 feet will allow the production of reserves that otherwise would not be recovered from the Niobrara, thus preventing waste.

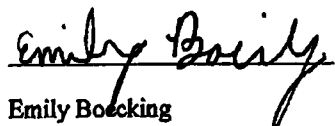
It is acknowledged that while these methods of calculation are widely accepted in the industry as sound approximations for reservoir volume and dimensions, there are statistical outliers. Furthermore, factors such as heterogeneity of reservoir, effective propped hydraulic fracturing, and elapsed production at the time analysis is performed affect the input parameters for the volumetric calculations. Therefore, the average drainage area and average drainage radius of the well set is utilized as the basis of support for the analysis and recommendation provided within this testimony.

Based on my engineering analysis, it is my recommendation the Commission authorize the establishment of the 1,280 acre DSUs, the drilling of up to seven Niobrara wells within the established DSU, and the reduced setback to 330' from 600' from the unit boundary. By so doing the development of said Application Lands will promote efficient drainage, protect correlative rights, and avoid waste of the resource.

To the best of my knowledge, all of the matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

**Affirmation**

The matters described herein were all conducted under my direction and control. I hereby swear that to the best of my knowledge and belief, all of the matters set forth herein and in the exhibits are true, correct, and accurate.



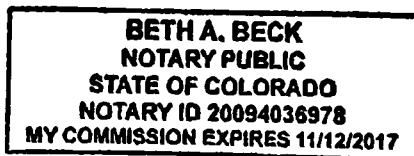
Emily Boecking  
Senior Reservoir Engineer  
Anadarko Petroleum Corporation

STATE OF COLORADO                    )  
  ) ss.  
CITY AND COUNTY OF DENVER        )

The foregoing instrument was subscribed and sworn to before me this 1<sup>st</sup> day of October, 2015, by Emily Boecking, Senior Reservoir Engineer for Anadarko Petroleum Corporation.

Witness my hand and official seal.

[SEAL]



My commission expires: 11/12/2017



Notary Public



Colorado Oil and Gas Conservation Commission Hearings

## Docket #'s

151000628  
151000561  
151000562

### Engineering Exhibits

Emily Boecking  
Sr Reservoir Engineer  
Anadarko Petroleum  
Denver, CO

## Exhibit E-1: Niobrara Drainage Area Calculation

### Niobrara Horizontal Well Drainage Area Calculation

| API No         | Lease   | Well No   | Reservoir | Operator      | Section | Township | Range | Cumulative Oil (bbl) | EUR Oil (bbl) (1) | Completed Interval | Average Porosity (phi, %) (2) | Water Saturation (Sw, %) (2) | Thickness s (ft, ft) (2) | Drainage Area (A, acres) (3) | Joshi Effective Drainage Radius (r, ft) (4) |
|----------------|---------|-----------|-----------|---------------|---------|----------|-------|----------------------|-------------------|--------------------|-------------------------------|------------------------------|--------------------------|------------------------------|---|
| 49021210820000 | JUBILEE | 153-1034H | NIOBRARA  | EOG Resources | 10      | 13N      | 65W   | 95,480               | 217,691           | 9,371              | 8                             | 55                           | 135                      | 134                          | 288   |
| 49021210860000 | JUBILEE | 154-1034H | NIOBRARA  | EOG Resources | 10      | 13N      | 65W   | 121,705              | 400,180           | 9,365              | 8                             | 54                           | 135                      | 242                          | 517   |
| 49021210870000 | JUBILEE | 151-1034H | NIOBRARA  | EOG Resources | 10      | 13N      | 65W   | 123,803              | 319,129           | 9,494              | 8                             | 54                           | 135                      | 193                          | 414   |
| 49021210890000 | JUBILEE | 152-1034H | NIOBRARA  | EOG Resources | 10      | 13N      | 65W   | 57,249               | 133,050           | 9,307              | 8                             | 54                           | 135                      | 80                           | 182   |
| 49021210910000 | JUBILEE | 183-2328H | NIOBRARA  | EOG Resources | 23      | 13N      | 65W   | 39,118               | 157,017           | 9,021              | 8                             | 54                           | 132                      | 97                           | 228   |
| 49021211080000 | JUBILEE | 155-2227H | NIOBRARA  | EOG Resources | 22      | 13N      | 65W   | 8,794                | 20,488            | 9,156              | 8                             | 53                           | 133                      | 12                           | 29  |
| 49021211100000 | JUBILEE | 155-2210H | NIOBRARA  | EOG Resources | 22      | 13N      | 65W   | 33,844               | 84,124            | 8,324              | 8                             | 51                           | 135                      | 48                           | 25  |
| <b>AVERAGE</b> |         |           |           |               |         |          |       |                      |                   |                    |                               |                              |                          |                              |   |
|                |         |           |           |               |         |          |       |                      | 190,240           | 9,147              | 8                             | 54                           | 134                      | 115                          | 256   |

Average Drainage Area: 115 Acres  
Average Effective Drainage Radius: 256 ft

(1) EUR projected using ARPS decline curve analysis

(2) Anadarko petrophysical analysis

$$(3) \text{ Drainage area equation: } A = \frac{EUR * B_o}{7758 * h * phi * (1 - S_w) * R_F}$$

$$(4) \text{ Joshi Method Effective Drainage Radius: } A = \frac{\pi r^2 + 2r * L}{43560}$$

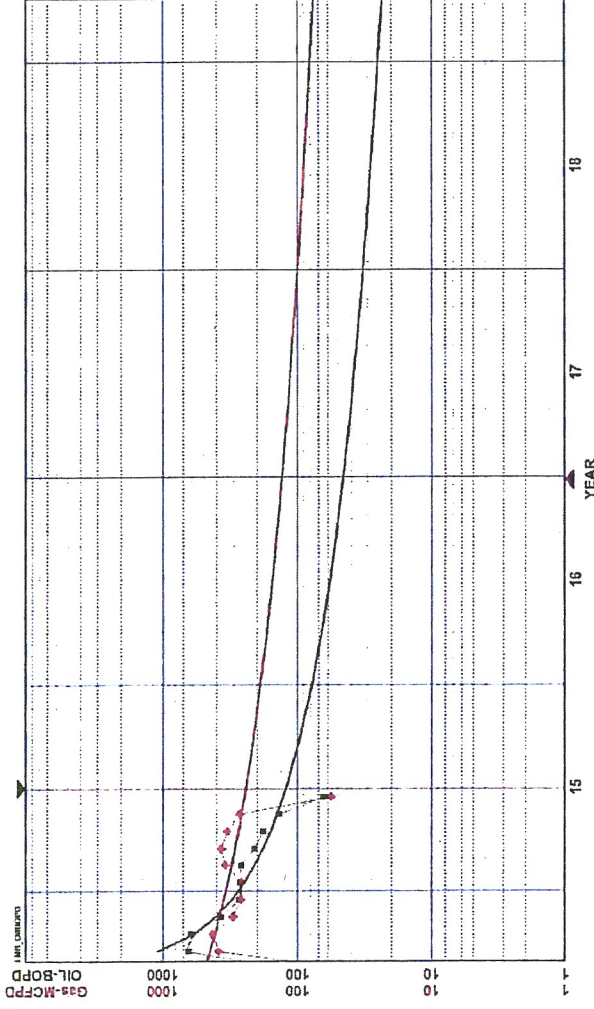
$$B_o = 1.4$$

$$R_F = 6\%$$



# Exhibit E-2: Niobrara Decline Curve Analysis

Jubilee 153-1034H  
 49021210820000  
 Niobrara  
 EOG Resources  
 10 13N 65W  
 Cum Oil (BO) 77,388  
 EUR Oil (BO) 240,095



Jubilee 154-1034H  
 49021210860000  
 Niobrara  
 EOG Resources  
 10 13N 65W  
 Cum Oil (BO) 88,048  
 EUR Oil (BO) 253,350

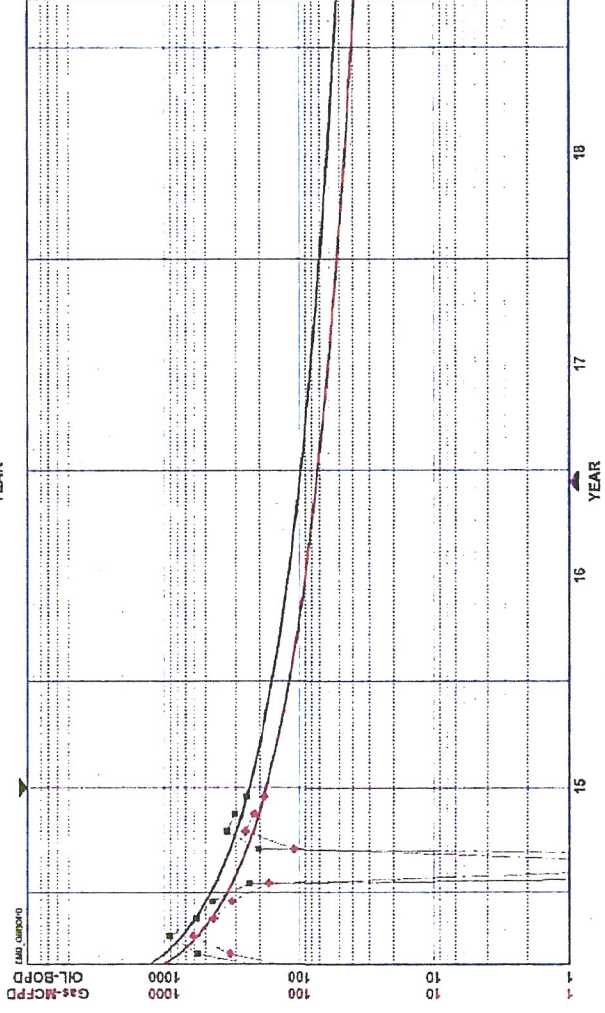
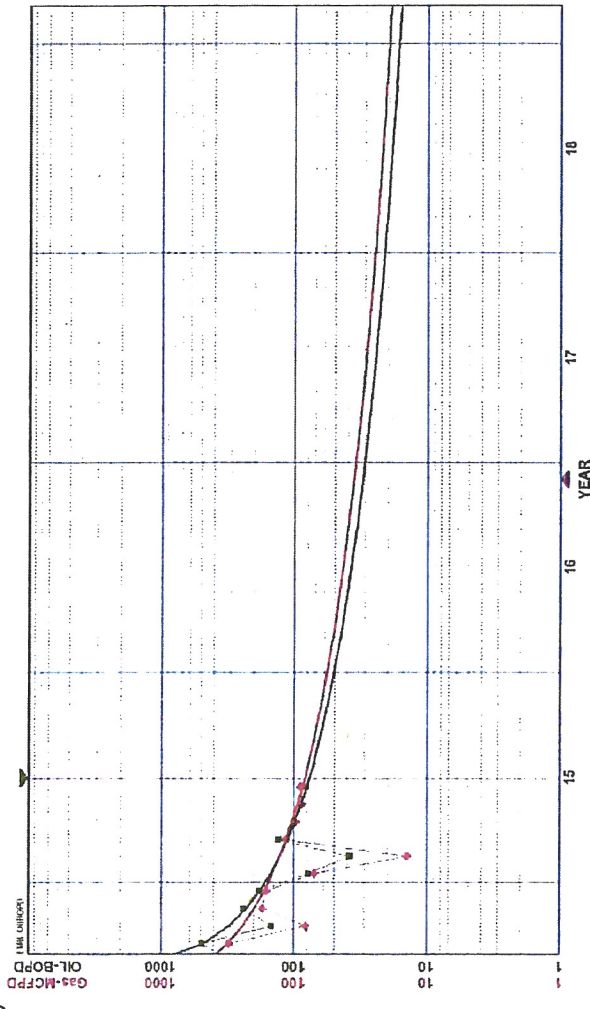


Exhibit E-2: Niobrara Decline Curve Analysis

Jubilee 152-1034H  
49021210890000  
Niobrara  
EOG Resources  
10 13N 65W  
Cum Oil (BO) 44,947  
EUR Oil (BO) 103,652



Jubilee 151-1034H  
49021210870000  
Niobrara  
EOG Resources  
10 13N 65W  
Cum Oil (BO) 102,680  
EUR Oil (BO) 331,226

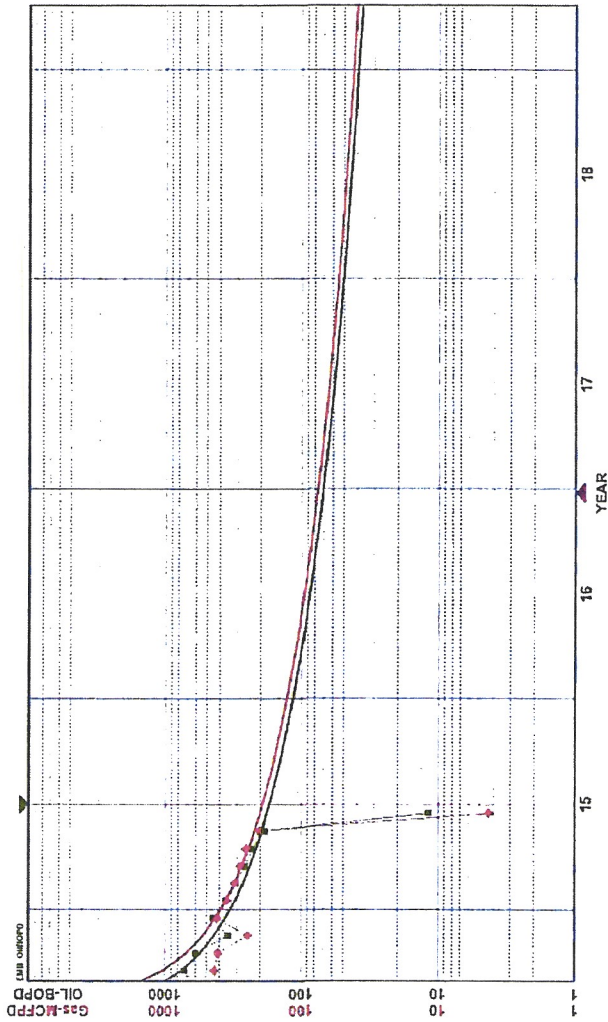
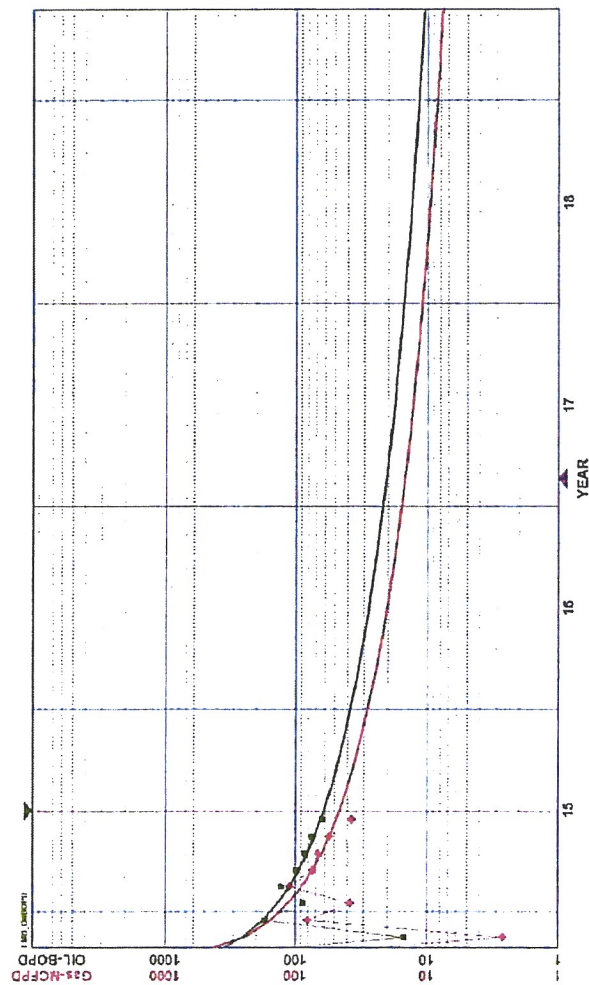
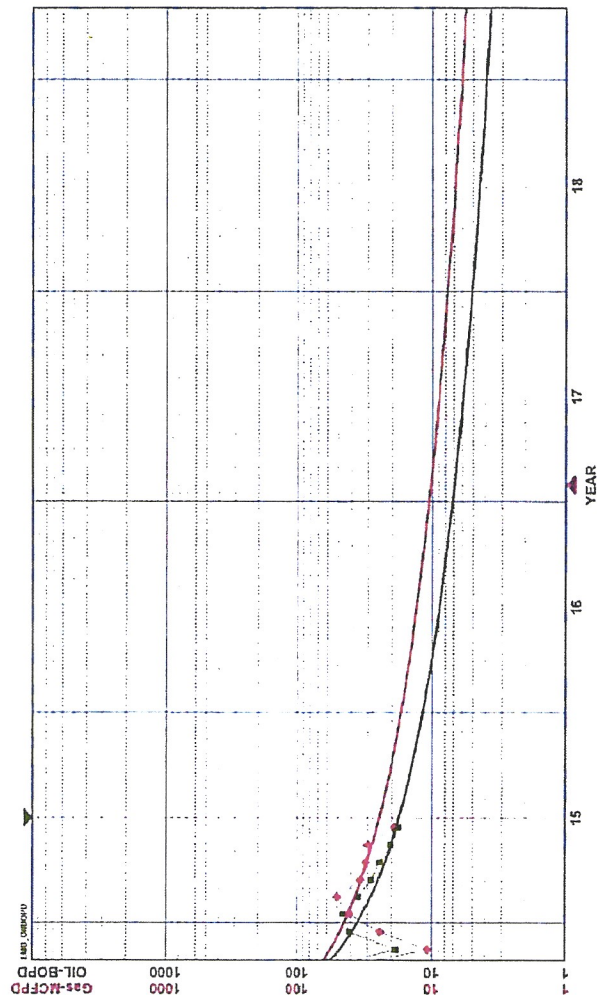


Exhibit E-2: Niobrara Decline Curve Analysis

Jubilee 155-2210H  
 49021211100000  
 Niobrara  
 EOG Resources  
 22 13N 65W  
 Cum Oil (BO) 24,086  
 EUR Oil (BO) 61,334



Jubilee 156-2227H  
 49021211080000  
 Niobrara  
 EOG Resources  
 22 13N 65W  
 Cum Oil (BO) 6,021  
 EUR Oil (BO) 36,345



# Exhibit E-2: Niobrara Decline Curve Analysis

Jubilee 193-2326H  
 49021210910000  
 Niobrara  
 EOG Resources  
 23 13N 65W  
 Cum Oil (BO) 24,086  
 EUR Oil (BO) 61,334

