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COGCC

Fifth Creek Energy Operating Company, LLC

Cause No. 421

Docket No. 170900554

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

IN THE MATTER OF THE APPLICATION OF) CAUSE NO. 421
FIFTH CREEK ENERGY OPERATING)
COMPANY, LLC FOR AN ORDER) DOCKET NO. 170900554
AUTHORIZING ADDITIONAL WELLS IN SIX (6)) TYPE: ADDITIONAL WELLS
APPROXIMATE 1,280-ACRE DRILLING AND)
SPACING UNITS ESTABLISHED FOR)
SECTIONS 31 AND 32, TOWNSHIP 12 NORTH,)
RANGE 62 WEST, 6th P.M., AND SECTIONS 5,)
6, 7, 8, 17, 18, 19, 20, 29 AND 30, TOWNSHIP)
11 NORTH, RANGE 62 WEST, 6TH P.M., FOR)
PRODUCTION FROM THE NIOBRARA)
FORMATION, HERFORD FIELD, WELD)
COUNTY, COLORADO.)

**REQUEST FOR RECOMMENDATION OF
APPROVAL OF APPLICATION WITHOUT A HEARING**

Fifth Creek Energy Operating Company, LLC ("Applicant"), by and through its undersigned attorneys, hereby requests pursuant to Rule 511.a. of the Rules of Regulations of the Colorado Oil and Gas Conservation Commission for the Director to recommend approval of its July 13, 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 17th day of August 2017.

Respectfully submitted,

FIFTH CREEK ENERGY OPERATING COMPANY, LLC

By: 

Jamie L. Jost
Kelsey Wasylenky
Jost Energy Law, P.C.
Attorney for Applicant
1401 17th St., Suite 370
Denver, Colorado 80202
(720) 446-5620

Fifth Creek Energy Operating Company, LLC
Teale Stone - Land Testimony
Cause No. 421; Docket No. 170900554
Increased Density –Niobrara Formation
Wattenberg Field, Weld County, Colorado

September 2017 Colorado Oil and Gas Conservation Commission Hearing

My name is Teale Stone, and I am currently employed as a Senior Landman at Fifth Creek Energy Operating Company, LLC (“Applicant”). I have over five years of professional experience in oil and gas land work and I am familiar with the lands subject to, and matters set forth in, the verified application (“Application”).

In support of Applicant’s Application and my sworn testimony herein, I am submitting six (6) exhibits. This testimony and exhibits provide the supporting basis for approval of the Applicant’s request for an order to authorize an additional seven (7) horizontal wells, for a total of fifteen (15) horizontal wells, in each of six (6) approximate 1,280-acre drilling and spacing units established by Order No. 421-83 for Sections 31 and 32, Township 12 North, Range 62 West, 6th P.M., and Sections 5, 6, 7, 8, 17, 18, 19, 20, 29 and 30, Township 11 North, Range 62 West, 6th P.M., for the efficient and economic development of oil, gas and associated hydrocarbons from the Niobrara Formation underlying the below-described lands.

Township 12 North, Range 62 West, 6th P.M.

Section 31: All

Township 11 North, Range 62 West, 6th P.M.

Section 6: All

1,280 acres, more or less, Weld County, Colorado

Township 12 North, Range 62 West, 6th P.M.

Section 32: All

Township 11 North, Range 62 West, 6th P.M.

Section 5: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 7: All

Section 18: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 8: All

Section 17: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 19: All

Section 30: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 20: All

Section 29: All

1,280 acres, more or less, Weld County, Colorado

Exhibit 1: Leasehold Ownership Map:

Exhibit 1 is a map showing the location of the Application Lands and the leasehold ownership. Upon information and belief, the following parties own leasehold or unleased mineral interests in the Application Lands:

Anadarko E&P Company
8 North, LLC
Canyon Oil and Gas, LLC
CD Land & Cattle, LLC
E. Ray Reichley
Lincoln Energy Partners

Exhibit 2: Mineral Ownership Map:

Exhibit 2 is a map showing the mineral ownership of the Application Lands, which is owned in fee.

Exhibit 3: Property Location Plat:

Attached as Exhibit 3 is a Property Location Plat. The Applicant will conform to its statement that the treated perforation of the Wells within the Niobrara Formation will not be closer than 300 feet from the unit boundaries of the 1,280.00-acre drilling and spacing unit and not less than 150 feet from the treated interval of another well within the unit.

Exhibit 4: Surface Ownership Map:

Exhibit 4 is a map showing the surface ownership of the Application Lands, which is owned in fee.

Exhibit 5: Topographic Map:

Exhibit 5 is a map showing the topography of the Application Lands. Approval of the Application for a drilling and spacing unit would allow for a less impactful surface development plan.

Exhibit 6: Interested Parties:

Attached as Exhibit 6 are interested parties within the Application Lands. Based upon our examination of relevant documents all of the interested parties received proper notice. As of the date of this testimony, the Applicant is not aware of any unresolved protests or objections 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.

Teale Stone

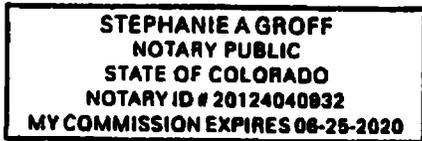
Teale Stone
Senior Landman
Fifth Creek Energy Operating Company, LLC

STATE OF COLORADO)
) ss.
COUNTY OF ARAPAHOE)

The foregoing instrument was subscribed and sworn to before me this 1st day of August 2017, by Teale Stone, Senior Landman for Fifth Creek Energy Operating Company, LLC.

Witness my hand and official seal.

[SEAL]



My commission expires: June 22, 2020

Stephanie A Groff

Notary Public

Teale Philip Stone

1850 Bassett Street #401
Denver, CO 80202
(918) 694-3231 teale.stone@gmail.com

EDUCATION

B.S. in Business Administration – 2011
UNIVERSITY OF DENVER

Major: Management through the Daniels College of Business

- Dean's List
- Academic All Conference (Soccer)

Petroleum Land Management Certificate – Expected 2017
UNIVERSITY OF DENVER

CASCIA HALL PREPARATORY SCHOOL - 2007
Tulsa, Oklahoma

EXPERIENCE

Fifth Creek Energy Operating Company, LLC

Denver, Colorado

Senior Landman

March 2017 – Present

- Oversee all Land Operation tasks, including but not limited to managing brokers, ordering and curing title, clearing surface locations for drill sites, assisting in acquisitions, and planning for all future development.

BILL BARRETT CORPORATION

Denver, Colorado

Landman I – Uinta Basin and DJ Basin

August 2014 to March 2017

- Nearly 5 years of professional in house land experience with a primary focus in the Rocky Mountain Region (Utah, Colorado, Wyoming and New Mexico).
- Prepare and present Uinta Basin and DJ Basin Asset Status Reports directly to Senior Management on a weekly basis.
- Perform aspects of title research, fee and federal leasing, purchasing fee working interests and aid in the maintenance of multiple drilling prospects throughout the Uinta and DJ Basin.
- Operations Land Lead on BBC's recent divestiture of over 120,000 net acres in the Uinta Basin which closed in July of 2016.
- Source and evaluate potential acquisitions and acreage swaps of all sizes within the DJ Basin.
- Negotiate and draft JOAs, acquire various surface and subsurface contracts from fee mineral owners, Bureau of Land Management, and Bureau of Indian Affairs.
- Extensive work dealing with Exploration Development Agreements, Joint Development Agreements and Farmout Agreements throughout BBC's assets in the Uinta and DJ Basin
- Calculate Net Revenue Interests, Gross Working Interests, and Acreage Totals for multiple drilling prospects throughout the Uinta and DJ Basin.
- Manage all Operated and Non-Operated Wells still owned by BBC within the Uinta Basin.
- Point of contact for multiple attorneys and coordinating the ordering of Drilling and Division Order Title Opinions.
- Manage two field brokerage firms to direct leasing efforts, help with Surface Use Agreements and Right of Ways across Public, Private, BIA, and Division of Wildlife lands.
- Testified before the Utah Division of Oil, Gas and Mining several times regarding Compulsory Force Pooling and various Spacing Orders.
- Maintain and manage company owned surface property throughout the Uinta Basin. Recently started assisting on the DJ Basin Surface Team.
- Certified Registered Landman with the AAPL. Seeking RPL Certificate in 2017.

BILL BARRETT CORPORATION

Denver, Colorado

Land Technician I & II – Uinta Basin

March 2012 to August 2014

- Help manage various assets within the Uinta Basin

Teale Philip Stone

1850 Bassett Street #401

Denver, CO 80202

(918) 694-3231 teale.stone@gmail.com

- Help draft Operating Agreements, AFE's, Fee Assignments, and Leases & Assignments for the Bureau of Indian Affairs
- Performance of regular data entry tasks (Oildex, Wellview, and Excalibur)
- Proficient in Microsoft Excel

KROENKE SPORTS & ENTERTAINMEN

October 2011 – March 2012

Denver, Colorado

Marketing Team

- In game marketing before, during and after all sporting events located at the Pepsi Center
- Promoted Altitude Sports Network

COMMUNITY SERVICE/LEADERSHIP

2014 ENGEN CLASS GRADUATE

- Colorado Oil and Gas Association sponsored group for Young Professionals in Energy
- Currently serving as board member for the program.

AAPL

- Registered Landman

UNIVERSITY OF DENVER SOCCER

- Team Captain
- NCAA Tournament Appearances 2008 and 2010

CAMBUUR SOCCER CLUB

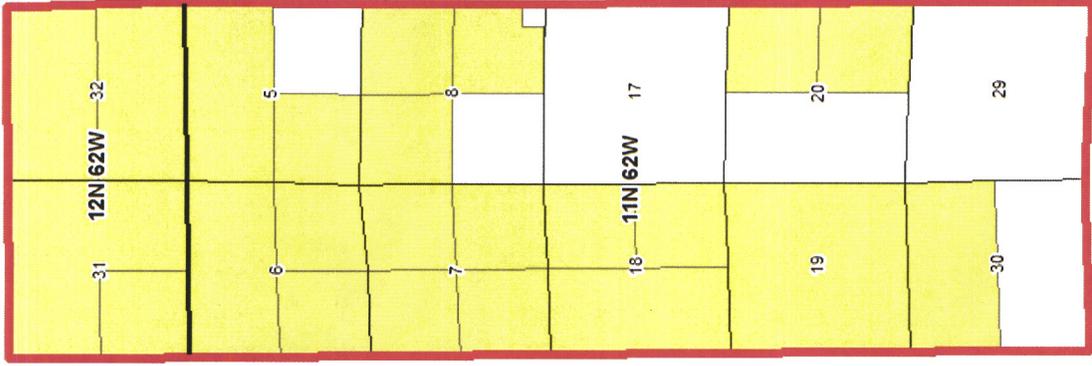
- Played for Professional Soccer Team located in Leeuwarden, Netherlands in 2008

YOU CAN PLAY PROJECT

- Manager of College Operations. Served as the liaison between the organization, various College and Universities, and the NCAA. "You Can Play" is a Community Service/Non-Profit Organization visit youcanplayproject.org for more information.

Exhibit 1

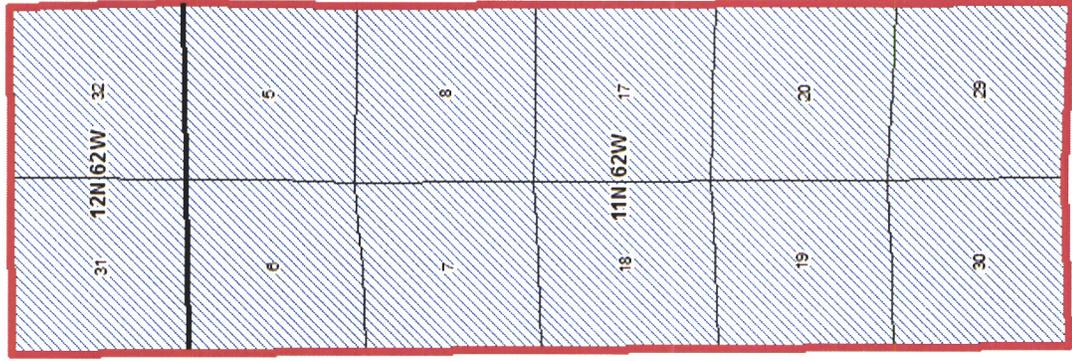
Leasehold Ownership



-  Fee Leasehold
-  Application Lands

Exhibit 2

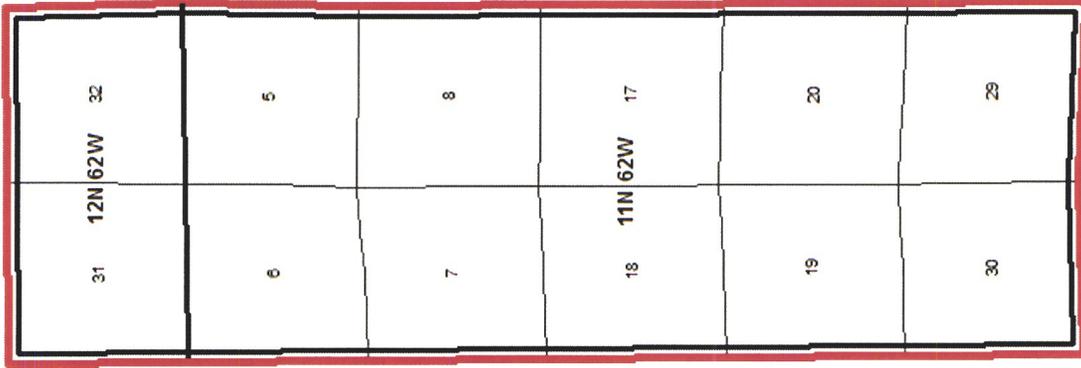
Mineral Ownership



Fee Minerals
Application Lands

Exhibit 3

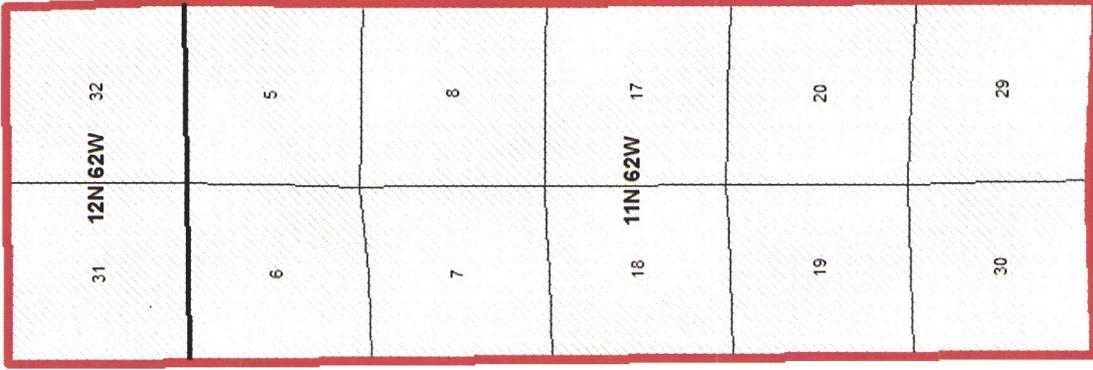
Property Location Plat



-  300' Setback
-  Application Lands

Exhibit 4

Surface Ownership

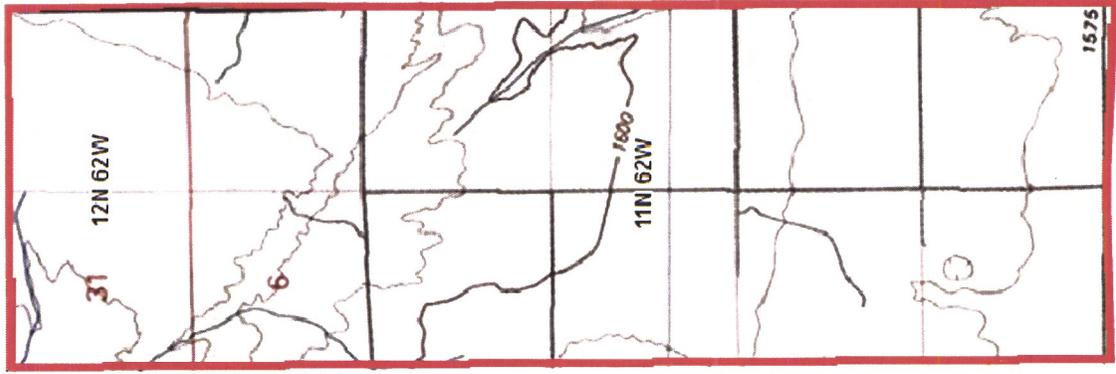


Fee Surface

Application Lands

Exhibit 5

Topography



 Application Lands

Exhibit 6
ID - T11-12N-R62W - 6 Units

FIFTH CREEK ENERGY OPERATING
COMPANY
5251 DTC PARKWAY SUITE 420
ATTN: TRICIA DIGRAPPA
GREENWOOD VILLAGE, CO 80111

BURNELL HARRIS
516 PERSONS RD
CHEYENNE, WY 820070000

DAVID L SORENSEN AND
PEGGY L SORENSEN
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GREELEY, CO 806340000

EDWARD D SORENSEN AND
MARGARET JEAN SORENSEN
325 S 28TH AVE
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ETTIE P BLAKE LIVING TRUST
DTD 8-15-88 C/O FRANCIS W BLAKE
5700 E COUNTY ROAD 48
FORT COLLINS, CO 805240000

FIFTH CREEK ENERGY OPERATING
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ESTHER JOANNE BLAKE
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SALLY WATKINSON
205 ORILLA DEL LAGO
FORT COLLINS, CO 805250000

LARRY SORENSEN
P O BOX 102
NEW RAYMER, CO 807420000

LOYD FARMS
66732 WCR 87
GROVER, CO 807290000

NUSSBAUM RANCHING C E NUSSBAUM,
D L NUSSBAUM AND C P NUSSBAUM
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GROVER, CO 807290000

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CHARLENE LAYCOCK
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HOWARD E BICKING & SHARRON A
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AND ERIC SHIRLEY TSTES
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JAMES M KONIG MANAGING MEMBER
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OMAHA, NE 681300000

DIANA RICKARD
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NORMA J SMITH
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C/O JAMES R CONN
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LEWIS, IA 515440000

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REDDING, CA 960030000

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WILLA CHARLENE DEWITT CONKLIN
TRUSTEE FOR THE DEWITT-CONKLIN
TRUST
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ANDREW L PEABODY
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NATCHEZ, MS 391210000

ARNOLD GLEIT
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BOCA RATON, FL 334310000

ARTHUR G RICE
328 OLDE POINT LOOP
HAMPSTEAD, NC 284430000

BAMBI FERNANDEZ 2004 TRUST
1637 EDMONTON AVE
SUNNYVALE, CA 940875202

BANKIM PATEL AND HEMMA PATEL
9162 CEDAR RIDGE DR
GRANITE BAY, CA 957460000

BELD OIL & MINERALS COMPANY
1738 S POPLAR ST
CASPER, WY 826010000

BERNARD CAPUTO
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BOXFORD, MA 19210000

BLACK BEAR OIL & GAS LLC
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LITTLETON, CO 801620000

BRIAN H DAVIS
628 AQUA CIRCLE
LINO LAKES, MN 550140000

BRUCE FULLER
3049 CLARION DR
SPRINGFIELD, OH 455030000

BUTKIN INVESTMENT COMPANY, LLC
P O BOX 2090
DUNCAN, OK 735340000

C THREE J LLC
13705 HWY 11
ALLENDALE, IL 624100000

CHARLES FULLER
CHARLES FULLER 2006 TRUST
MORGAN STANLEY 101-088923-066
101 CALIFORNIA ST 3RD FLOOR
SAN FRANCISCO, CA 941110000

DALE HARLAN
7005 WAGON TRAIN RD
P O BOX 348
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DANIEL STUBBLEFIELD
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ODESSA, MO 640760000

DANNY POSS
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DENIS M DESMOND TRUSTEE
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DOMESTIC INVESTMENT
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BOGGS
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GERALD WERNER
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IRA RESOURCES INC
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DATED 06/17/1997
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TRUSTEE
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PO BOX 611
BILLINGS, MT 59103

THE BOARD OF REGENTS OF THE
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Fifth Creek Energy Operating Company, LLC
Benjamin C. Burke - Geology Testimony
Cause No. 421; Docket No. 170900554
Increased Density –Niobrara Formation
Wattenberg Field, Weld County, Colorado

September 2017 Colorado Oil and Gas Conservation Commission Hearing

My name is Benjamin C. Burke, and I am currently employed as the Geoscience Manager for Fifth Creek Energy Operating Company, LLC (“Applicant”). I earned a Bachelors of Arts in Geology from Bowdoin College, a Masters of Business Administration from Texas A&M University, and a PhD in Earth Sciences from Dartmouth College. I have 14 years of private sector geology experience, 12 of which is in the oil and gas industry. I am familiar with the lands described, and the matters set forth in, the verified application (“Application”) subject to the above-referenced docket.

In support of Applicant's Application 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 an order to authorize an additional seven (7) horizontal wells, for a total of fifteen (15) horizontal wells, in each of six (6) approximate 1,280-acre drilling and spacing units established by Order No. 421-83 for Sections 31 and 32, Township 12 North, Range 62 West, 6th P.M., and Sections 5, 6, 7, 8, 17, 18, 19, 20, 29 and 30, Township 11 North, Range 62 West, 6th P.M., for the efficient and economic development of oil, gas and associated hydrocarbons from the Niobrara Formation underlying the below-described lands.

Township 12 North, Range 62 West, 6th P.M.

Section 31: All

Township 11 North, Range 62 West, 6th P.M.

Section 6: All

1,280 acres, more or less, Weld County, Colorado

Township 12 North, Range 62 West, 6th P.M.

Section 32: All

Township 11 North, Range 62 West, 6th P.M.

Section 5: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 7: All

Section 18: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 8: All

Section 17: All
1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 19: All

Section 30: All

1,280 acres, more or less, Weld County, Colorado

Township 11 North, Range 62 West, 6th P.M.

Section 20: All

Section 29: All

1,280 acres, more or less, Weld County, Colorado

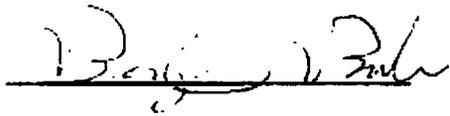
1. Exhibit G-1 – Structure Contour Map – Top Niobrara with offset well locations
Exhibit G-1 is a structure map constructed on the top of the Niobrara Formation. The contour interval of the map is 25 feet. The Niobrara is gently dipping to the west in the mapped area.
2. Exhibit G-2 – Isopach Map – Niobrara with offset well locations
Exhibit G-2 is an isopach map of the Niobrara Formation measured in feet. The contour interval of Niobrara thickness is 10 feet. Total thickness across the Application Lands ranges from approximately 230-260 feet.
3. Exhibit G-3 – Cross Section showing Niobrara section.
Exhibit G-3 is a cross section that includes the entire Niobrara Formation. This cross section and the isopach maps show the Niobrara intervals to be present and continuous throughout the Application Lands.
4. Exhibit G-4 – Hereford Field Type Log.
Exhibit G-4 is a type log showing the Formations and Members of the Cretaceous-aged lithology present in the Lamotta 5-01M (05-123-30556). The Lamotta well is located in Section 1, 11N 63W and has wireline logs that are typical of the geology of the Hereford Field. The wireline logs shown in the type section are the gamma ray, deep resistivity, and density porosity.
5. Exhibit G-5 – Offset Well Locations
Exhibit G-5 shows well locations on and in the vicinity of the Application Lands, according to the COGCC reference base map as of August 3, 2017.

The stratigraphy, geochemistry, and pressure data reviewed show that the additional wells in the Niobrara are necessary to adequately and economically recover the oil, gas and associated hydrocarbons from the Niobrara Formation.

Dated this 14th day of August 2017

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.



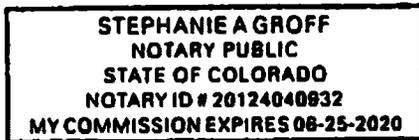
Benjamin C. Burke
Geoscience Manager
Fifth Creek Energy Operating Company, LLC

STATE OF COLORADO)
) ss.
COUNTY OF Arapahoe)

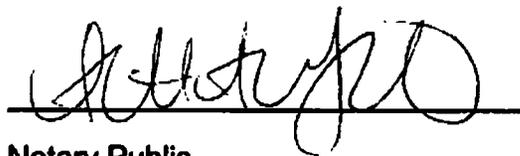
The foregoing instrument was subscribed and sworn to before me this 14th day of August, 2017, by Benjamin C. Burke, Geoscience Manager for Fifth Creek Energy Operating Company, LLC.

Witness my hand and official seal.

[SEAL]



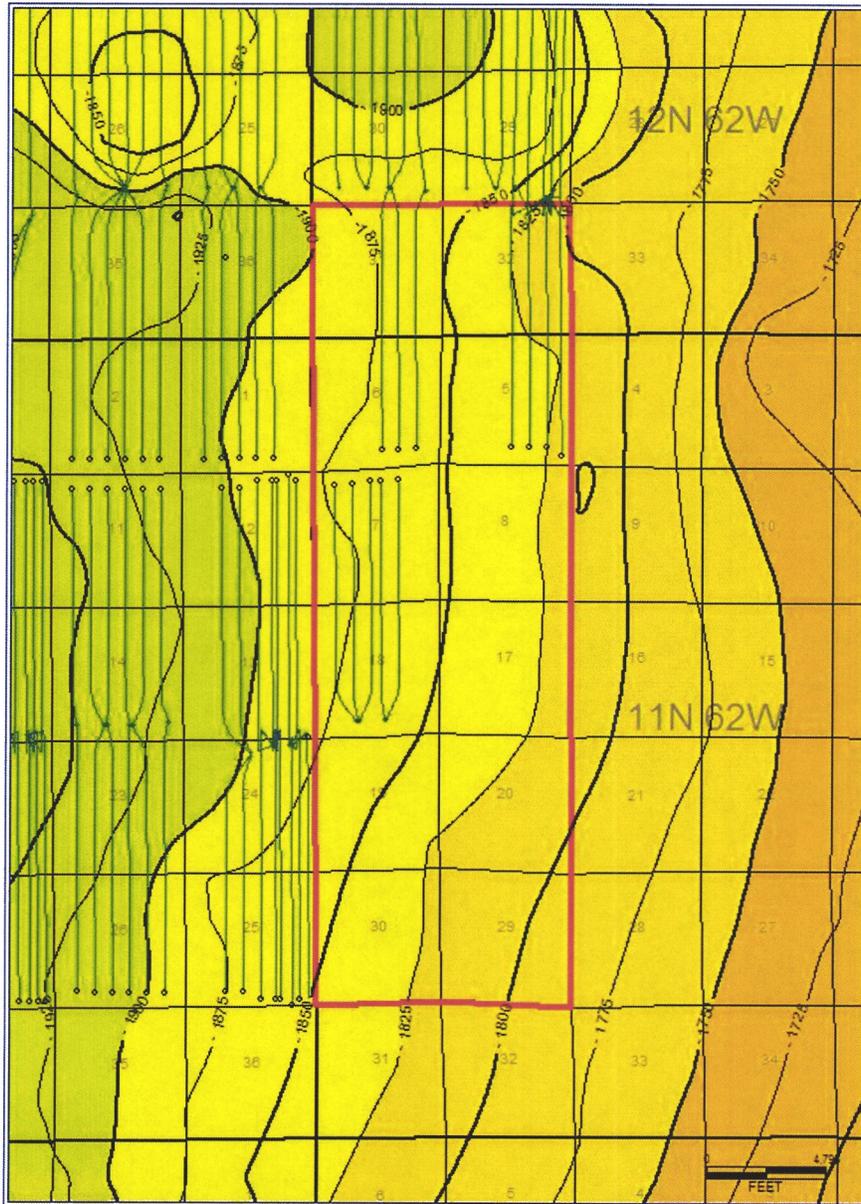
My commission expires: June 25, 2020



Notary Public

Exhibit G-1

Structure Contour Map on the top of the Niobrara Formation



25 ft contour intervals

Exhibit G-2

Isopach Map on the top of the Niobrara Formation



10 ft isopach intervals

Exhibit G-3

Cross section showing Niobrara section

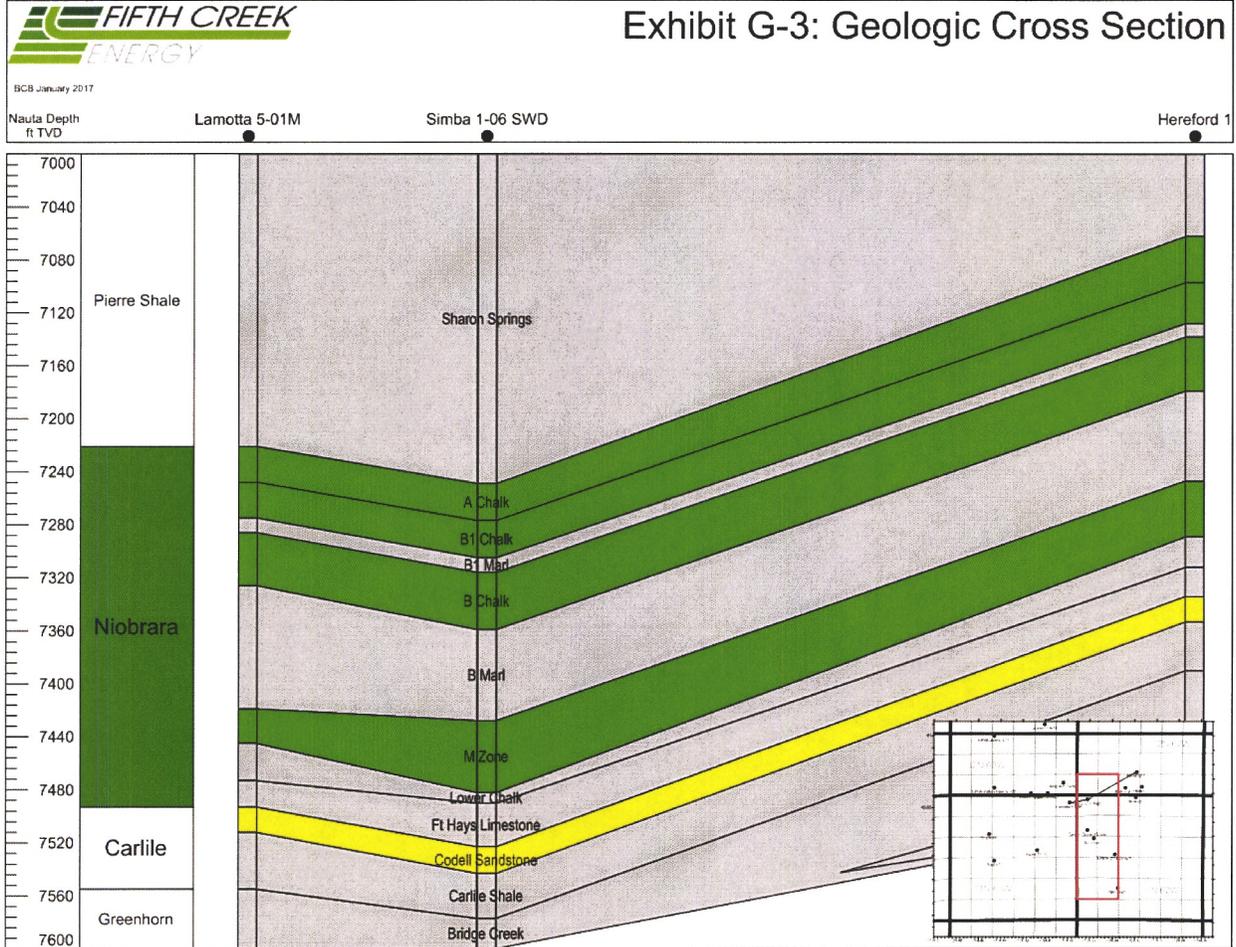


Exhibit G-4

Type log showing formations and lithology present

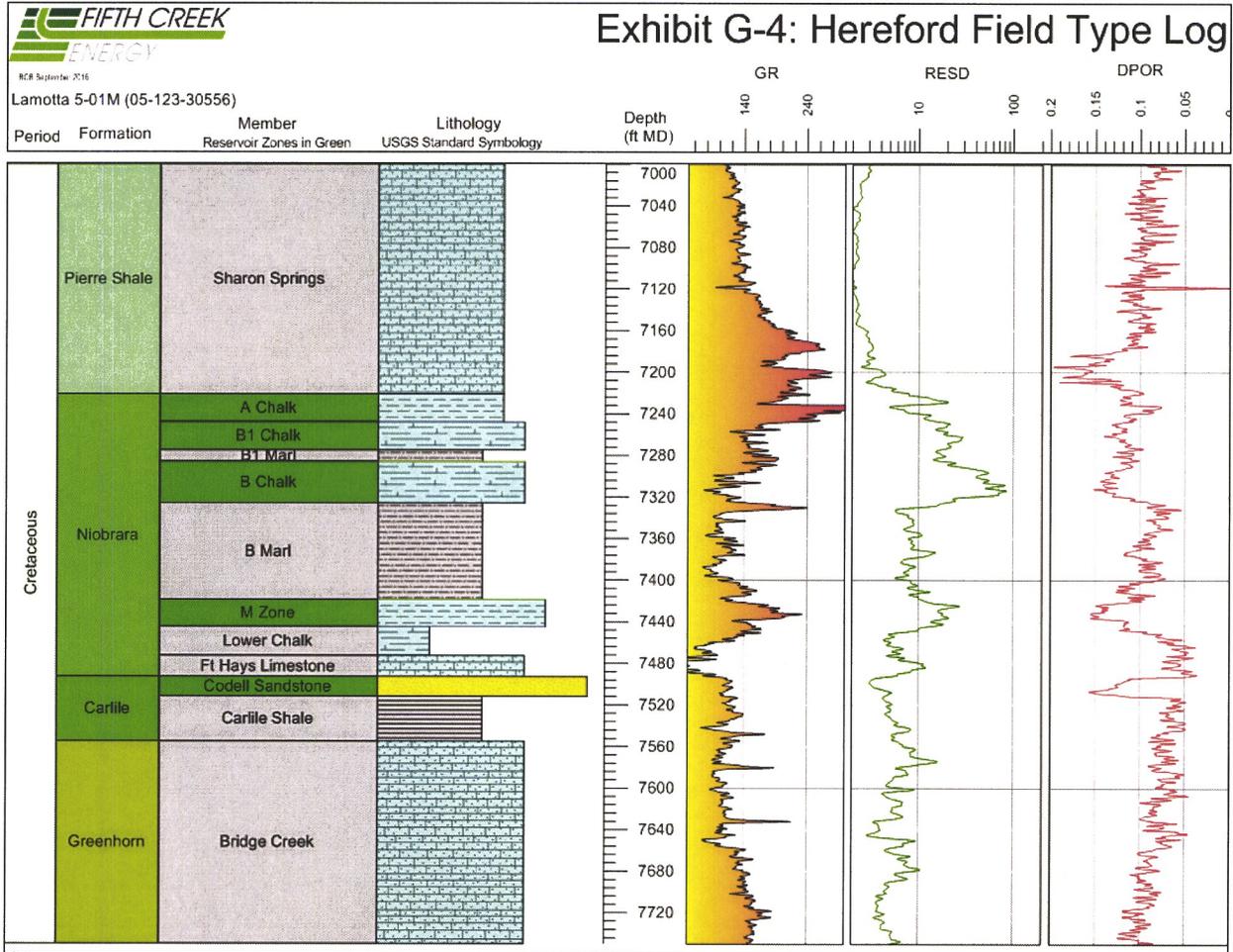
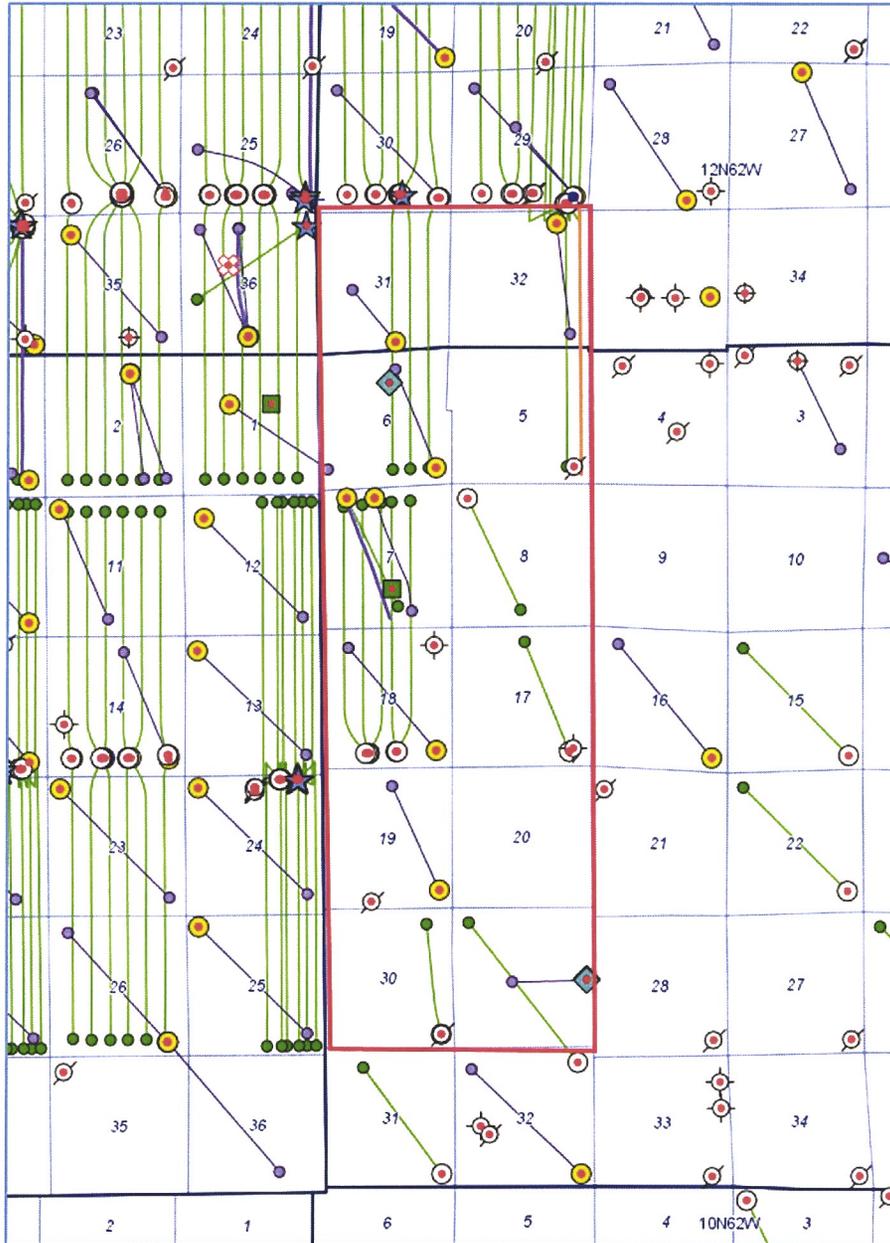


Exhibit G-5

Offset Well Locations



COGCC GIS Well Database, retrieved August 3, 2017

Fifth Creek Energy Operating Company, LLC
Engineering Testimony – William Irwin
Cause No. 421
Docket No. 170900554

September 2017 Colorado Oil and Gas Conservation Commission Hearing

My name is William Irwin and I am currently employed as the Engineering Advisor for Fifth Creek Energy Operating Company, LLC (“Fifth Creek”). I hold a Bachelor’s of Science in Petroleum Engineering from Montana Tech. I have 32 years of experience in oil and gas engineering. I am familiar with the lands subject to, and matters set forth in, the verified application (“Application”) subject to the above-referenced docket.

In support of Fifth Creek’s Application in the above referenced docket, I am submitting three (3) exhibits along with this sworn testimony. This Application requests an order to approve an additional seven (7) horizontal wells, for a total of fifteen (15) horizontal wells, in DSU #1, DSU #2, DSU #3, DSU #4, DSU #5 and DSU #6 to require that the productive interval of each additional proposed horizontal well in each approximate 1,280-acre drilling and spacing unit shall be no closer than 300 feet from the boundaries of the unit (regardless of the lease lines within the unit) and all horizontal wells shall be no closer than 150 feet from the productive interval of another well producing from the same source of supply within the unit, unless an exception is granted by the Director, and providing that the wells will be drilled from no more than five well pads, including the existing wellpads, in each of the six drilling and spacing units to be located within such unit or adjacent thereto, unless an exception is granted by the Director, consistent with Order No. 421-83 underlying the following lands (“Application Lands”):

Township 12 North, Range 62 West, 6th P.M.
Section 31: All

Township 11 North, Range 62 West, 6th P.M.
Section 6: All

(“DSU #1”)

Township 12 North, Range 62 West, 6th P.M.
Section 32: All

Township 11 North, Range 62 West, 6th P.M.
Section 5: All

(“DSU #2”)

Township 11 North, Range 62 West, 6th P.M.
Section 7: All
Section 18: All

(“DSU #3”)

Township 11 North, Range 62 West, 6th P.M.

Section 8: All

Section 17: All

("DSU #4")

Township 11 North, Range 62 West, 6th P.M.

Section 19: All

Section 30: All

("DSU #5")

Township 11 North, Range 62 West, 6th P.M.

Section 20: All

Section 29: All

("DSU #6")

1. Exhibit E-1 – OOIP and EUR Calculations

Exhibit E-1 shows OOIP calculations, estimated ultimate recovery, and drainage area for fifteen Niobrara Formation wells drilled in a 1280-acre drilling and spacing unit within the underlying the Application Lands as compared to eight wells drilled in the same drilling and spacing unit. The improved recovery factor by 47% shows the drilling of up to fifteen wells will promote efficient drainage, protect correlative rights and prevent waste in a 1280-acre unit versus only drilling eight wells. These reserves would not be fully recovered without the application of horizontal well technology in a 1280-acre drilling and spacing unit.

2. Exhibit E-2 – Analog Well Evaluation

Exhibit E-2 reflects an evaluation of analog 2-section lateral well results in Table A and 1-section lateral well results in Table B. Estimated ultimate recovery and associated drainage area are calculated through decline curve analysis utilizing available public data and the inclusion of one new well drill by the Fifth Creek underlying the Application Lands. The 2-section lateral analog wells have an average lateral length of 9,261' and average estimated ultimate recovery of 431,333 bbl for the Niobrara Formation, for a drainage per well of 85 acres. The 1-section lateral analog wells have an average lateral length of 4,143' and average estimated ultimate recovery of 191,000 bbl for the Niobrara Formation, for a drainage area per well of 38 acres. These estimates are within a reasonable expected range and support the Application.

3. Exhibit E-3 – Economic Analysis

Economic calculations show in improved value of 50% by drilling on 1280-acre units with total of 15 wells versus not developing the resource in an efficient, scientific manner. This result leads to the conclusion that reserves will not be appropriately accessed or drained in

a tight unconventional resource with only eight wells per 1280 acre spacing unit, therefore leaving reserves under-developed and creating waste.

Conclusions

Based on each drilling and spacing unit area of 1,280 acres, the drainage calculations are consistent with the development of up to fifteen Niobrara horizontal wells. This testimony and attached exhibits support my conclusion that the drilling, completion, and production of up to fifteen horizontal wells within each proposed drilling and spacing unit will increase total recovery and reduce resource waste relative to an eight-well 1280-acre drilling and spacing unit. In addition, the proposed development plan can be accomplished in an economic and efficient manner while protecting correlative rights.

Affirmation

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



William Irwin
Engineering Advisor
Fifth Creek Energy Operating Company, LLC

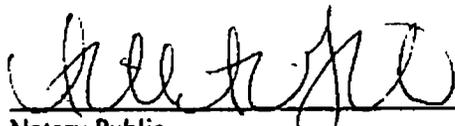
State of Colorado)
) ss.
County of)

The foregoing instrument was subscribed and sworn to before me this 16th day of August, 2017, by William Irwin as Engineering Advisor for Fifth Creek Energy Operating Company, LLC.

Witness my hand and official seal.

[SEAL]





Notary Public

My commission expires: June 25 2020

William (Bill) L. Irwin, P.E., Senior Engineering Advisor

Mr. Irwin has a Bachelor of Science Degree in Petroleum Engineering from Montana Tech, and over 30 years of oil industry experience. In his most recent role as Vice President of Operations with Bakken Hunter, LLC, a division of Magnum Hunter Resources Corporation (MHR), he was instrumental in developing significant Bakken and Three Forks shale oil assets; using modern unconventional resource drilling and completion techniques. These techniques include horizontal drilling and multistage hydraulic fracturing. In addition, his facilities team planned, permitted, constructed and commissioned numerous field gathering and processing facilities. These cutting edge facilities produced, in record time, a cross-border, FERC regulated gas pipeline.

Prior to joining the MHR, Mr. Irwin was the Founder, President, and CEO of Pinon Oil & Gas Ltd. (1997) and Red Mike Energy Inc. (2000). Both private exploration and production companies primarily operated in southern Alberta. From 2007 to 2010, he was the Vice President, Business Development and Board Advisor for Fractal Systems Inc.; an oil services company with proprietary heavy oil viscosity reduction, and partial upgrading technology.

From 1994 through 1997 he was the Operations Manager for Tidal Resources Inc. (Tidal) in Canada and North Dakota. Tidal was a leader in the implementation of horizontal drilling technology to legacy assets in North Dakota. Prior to 1994, Mr. Irwin held varying technical and management roles with Unocal Corp and Quintana Petroleum Corporation in Canada, Colorado, New Mexico, Texas, and Utah. Mr. Irwin is a registered Professional Engineer in Alberta and is an accepted professional engineering witness in North Dakota and New Mexico.

**Exhibit E-1 OOIP
OOIP and EUR Calculations**

Date: 8/1/17

Reference Sections:

Engineer: William L. Irwin

Key Variables & Assumptions	15 Niobrara wells		Median porosity for Niobrara
	8 Niobrara wells	10%	
Porosity (ϕ)	10%	10%	
Water Saturation (S_w)	75%	75%	Core-based corrected saturation
Area (A)	1280	1280	acres
Height (h)	272	272	feet
Oil Formation Volume Factor (B_o)	1.5	1.5	bbi/STB

Calculation Original Oil in Place

Estimated Oil Equivalent in Place:	45,017,088	45,017,088	Bbl oil
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Niobrara Well Performance

	8	15	Density of wells
Horizontal Well Count	8	15	
Drainage area for 1 well	85	85	acres
Average EUR per well	431,333	431,333	Bbl oil
Estimated Total Oil	3,450,667	6,470,000	Bbl of oil (total 8 wells, total 15 wells)
Estimated Rf of OOIP	7.7%	14.4%	

Comparison of Recovery Factors

Total increased Rf	47%	Increase in Recovery factor due to increase in well density
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Symbols, Terminology, and Equations

ϕ	Porosity as %	Rf	Recovery Factor, %
h	height, feet	bbl	barrel of oil, 42 gallons
A	Area, acres (1 acre is 42,560 ft ²)	STB	Stock Tank Barrel
B_o	Oil Formation Volume Factor, bbl/STB		
S_w	Water Saturation as %		
OOIP	Original Oil in Place, bbls	EUR	Estimated Ultimate Recovery, BBL of oil
	OOIP = 7758 A h ϕ (1- S_w) / B_o		EUR = 7758 (A) (Rf) (h) (ϕ) (1- S_w) / (Bo)

Exhibit E-2
Analog Well Evaluation

Date: 8/1/17

Reference Sections:

Engineer: William L. Irwin

Table A: 2-Section Laterals

	Type	Zone	API	Township	Range	Section	Lateral Length (ft)	EUR (MBO)	Net Thickness (h, ft)	Average Porosity (φ, %)	Average			
											Water Saturation (Sw, %)	Recovery Factor (Rf, %)	Bo (Rb/STB)	Drainage Area (A, acres)
JUBILEE 113-1609H	Horizontal	Niobrara	49-021-21078	13N	65W	16, 9	8,875	237,000	272	10%	75%	14.5%	1.50	46
JUBILEE 151-1034H	Horizontal	Niobrara	49-021-21087	13N	65W	10, 34	9,484	557,000	272	10%	75%	14.5%	1.50	109
JUBILEE 153-1034H	Horizontal	Niobrara	49-021-21082	13N	65W	10, 34	9,371	353,000	272	10%	75%	14.5%	1.50	69
JUBILEE 154-1034H	Horizontal	Niobrara	49-021-21086	13N	65W	10, 34	9,365	685,000	272	10%	75%	14.5%	1.50	134
JUBILEE 194-2311H	Horizontal	Niobrara	49-021-21094	13N	65W	23, 11	9,515	338,000	272	10%	75%	14.5%	1.50	66
Fox Creek 222-3422H	Horizontal	Niobrara	05-123-42582	12N	63W	34, 22	8,955	418,000	272	10%	75%	14.5%	1.50	82
Averages							9,261	431,333	272	10%	75%	14.5%	1.50	85

Table B: 1-Section Laterals

	Type	Zone	API	Township	Range	Section	Lateral Length (ft)	EUR (MBO)	Net Thickness (h, ft)	Average Porosity (φ, %)	Average			
											Water Saturation (Sw, %)	Recovery Factor (Rf, %)	Bo (Rb/STB)	Drainage Area (A, acres)
CASPER 1-26H	Horizontal	Niobrara	49-021-21111	16N	65W	25	4,468	241	272	10%	75%	14.5%	1.50	47
CRITTER CREEK 21-26H	Horizontal	Niobrara	05-123-31796	11N	63W	26	4,655	148	272	10%	75%	14.5%	1.50	29
CRITTER CREEK 22-27H	Horizontal	Niobrara	05-123-31507	11N	63W	27	4,955	52	272	10%	75%	14.5%	1.50	10
CRITTER CREEK 29-02H	Horizontal	Niobrara	05-123-33687	11N	63W	2	3,117	60	272	10%	75%	14.5%	1.50	12
CRITTER CREEK 30-26H	Horizontal	Niobrara	05-123-32328	11N	63W	26	4,266	94	272	10%	75%	14.5%	1.50	18
CRITTER CREEK 34-16H	Horizontal	Niobrara	05-123-33103	11N	63W	16	4,736	169	272	10%	75%	14.5%	1.50	33
ELMER 8-31H	Horizontal	Niobrara	05-123-30584	12N	62W	31	1,827	318	272	10%	75%	14.5%	1.50	62
ELSIE 7-34H	Horizontal	Niobrara	05-123-30631	12N	63W	34	4,930	473	272	10%	75%	14.5%	1.50	93
FOX CREEK 1-35H	Horizontal	Niobrara	05-123-31385	12N	63W	35	4,669	256	272	10%	75%	14.5%	1.50	50
FOX CREEK 2-25H	Horizontal	Niobrara	05-123-31400	12N	63W	25	3,776	168	272	10%	75%	14.5%	1.50	33
FOX CREEK 3-26H	Horizontal	Niobrara	05-123-31417	12N	63W	26	3,987	247	272	10%	75%	14.5%	1.50	48
FOX CREEK 6-33H	Horizontal	Niobrara	05-123-31558	12N	63W	33	4,140	37	272	10%	75%	14.5%	1.50	7
ROSIE 1-35H	Horizontal	Niobrara	49-021-21009	16N	65W	35	4,327	225	272	10%	75%	14.5%	1.50	44
Averages							4,143	191	272	10%	75%	14.5%	1.50	38

$$\text{Drainage Area (acres)} = \frac{(EUR_{\text{Net}} \cdot B_o)(5.615 \frac{ft^3}{bbl})}{(RF)(\phi)(1 - S_w)(h)(43,560 \frac{ft^2}{acre})}$$

- Where:
 RF = Recovery Factor, %
 φ = Porosity, %
 S_w = Water Saturation, %
 h = Net Thickness, ft
 B_o = Oil Formation Volume Factor, RB/STB
 EUR_{Net} = Estimated Ultimate Oil Recovery, bbls

Note: 1-section lateral average drainage area calculates to roughly half of 2-section lateral - check

**Exhibit E-3
Economic Analysis**

Date: 8/1/17

Reference Sections:

Engineer: William L. Irwin

Key Variables & Assumptions

	Type Well 8	Type Well 15	8 wells	15 wells	
Capex	\$ 5,800	\$ 5,600	\$ 46,400	\$ 84,000	M\$ Pad development and shared facilities lowers cost by \$200 M\$
LOE	\$ 13,000	\$ 13,000	\$ 13,000	\$ 13,000	Monthly operating expenses per well, \$
Total Equivalent EUR	503	503	4,026	7,548	Estimated ultimate recovery, MBOE
EUR, Oil	431	431	3,451	6,470	Estimated oil recovery, Mbbls
EUR, Gas	431	431	3,451	6,470	Estimated gas recovery, Mscf (assuming 1,000 scf/bbl)
WI	100	100	100	100	Estimated Working Interest
NRI	86	86	86	86	Estimated Net Revenue Interest
Oil Price	\$ 50.00	\$ 50.00	\$ 50.00	\$ 50.00	\$/bbl, Estimated realized price, includes differential from Nymex
Gas Price	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00	\$/Mcf, Estimated realized price, includes differential from Henry Hub
Economic Outputs					
BT NPV10	\$ 2,987	\$ 3,187	\$ 23,896	\$ 47,805	M\$, Net present value discounted at 10%
BT ROR	41%	57%	41%	57%	Rate of Return as %
Estimated Improved Value			50%		Due to improved Recovery Factor from increase in well density and pad development lowering per well cost.