

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

IN THE MATTER OF THE SECOND	)	Cause No. 535
AMENDED APPLICATION OF AXIS	)	
EXPLORATION, LLC FOR AN ORDER	)	Docket No. 180300216
ESTABLISHING AN APPROXIMATE	)	
1,588.82-ACRE DRILLING AND SPACING	)	Type: SPACING
UNIT, AND ESTABLISHING WELL	)	
LOCATION RULES APPLICABLE TO THE	)	
DRILLING AND PRODUCING OF WELLS	)	
FROM THE NIOBRARA FORMATION	)	
COVERING CERTAIN LANDS IN	)	
SECTIONS 2, 3, AND 4, TOWNSHIP 3	)	
SOUTH, RANGE 66 WEST, 6TH P.M.,	)	
UNNAMED FIELD, DENVER AND ADAMS	)	
COUNTIES, COLORADO.	)	

REQUEST FOR RECOMMENDATION OF  
APPROVAL OF APPLICATION WITHOUT A HEARING

Axis Exploration, LLC (“Applicant” or “Axis”), Operator No. 10646, by its attorneys, Welborn Sullivan Meck & Tooley, P.C., hereby requests pursuant to Rule 511.a. of the Rules and Regulations of the Colorado Oil and Gas Conservation Commission (“Commission”) for the Director to recommend approval of its application (“Application”) 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 by the Application.

To Applicant’s information and belief, as of the date of this Request, there are no outstanding protests in this matter.

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

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DATED this 15 day of July 2020

Respectfully submitted,

AXIS EXPLORATION, LLC

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

Joseph C. Pierzchala  
Geoffrey W. Storm  
Welborn Sullivan Meck & Tooley, P.C.  
Attorneys for Applicant  
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SOUTH, RANGE 66 WEST, 6TH P.M.,	)	
UNNAMED FIELD, DENVER AND ADAMS	)	
COUNTIES, COLORADO.	)	

SUMMARY OF RULE 511 WRITTEN TESTIMONY

Axis Exploration, LLC (“Applicant” or “Axis”), Operator No. 10646, by and through its attorneys, Welborn Sullivan Meck & Tooley, P.C., respectfully submits this written testimony and the accompanying Exhibits A, B C, and D to the Oil and Gas Conservation Commission of the State of Colorado (“Commission”) in support of its Application for an order establishing an approximate 1,588.82-acre drilling and spacing unit, and establishing well location rules applicable to the drilling of wells and producing of oil, gas and associated hydrocarbons from the Niobrara Formation.

Township 3 South, Range 66 West, 6th P.M.

Section 2: All  
Section 3: All  
Section 4: E½

Based upon work supervised by Ms. Pam Kingery, Applicant listed in Exhibit A to the Application in this matter the names and addresses of the interested parties and each of those parties was notified as indicated in the Certificate of Service filed in this matter. Ms. Kingery prepared the written land testimony, Exhibit A hereto. Ms. Alicia Branch prepared the written geologic testimony, Exhibit B hereto. Mr. Mathew Dolezal prepared the written engineering testimony, Exhibit C hereto. Mr. Nathan Bennett prepared the written regulatory testimony, Exhibit D hereto. Copies of the affiants’ respective resumes are included with their testimony.

Attached to Exhibit A is a plat depicting the Application Lands, a plat depicting leasehold in which Axis is an owner, and a plat depicting the proposed location and laterals for 16 planned horizontal wells.

Attached to Exhibit B are geologic exhibits that include: a type log that shows the composition of the Niobrara Formation in this area, and that it is continuous under the Application Lands; a subsea structure map constructed on top of the Niobrara Formation which shows regional dip for the Niobrara Formation underlying the Application Lands is approximately 46 feet per mile, up to the east toward the structural basin axis; an isopach map of the Niobrara Formation showing an average thickness of 215 to 235 feet from the top of the Niobrara Formation through the base of the Niobrara Formation across the Application Lands; a geologic cross section across the Application Lands showing the continuity and thickness of the Niobrara A, B, C and D as well as the Fort Hays Member across the Application Lands and logs characteristic of productive targets, and further showing that the Niobrara is approximately 215 to 235 feet across the Application Lands.

Attached to Exhibit C are engineering exhibits based on data from offset wells located in the vicinity of the Application Lands that are producing from the Niobrara Formation. These exhibits show that the estimated drilling and completion economics for the unit and well density would produce favorable economics for the proposed operations. Further, the exhibits contained a volumetric analysis demonstrating that the average drainage area is 49.1 acres for Niobrara wells in the unit, that Niobrara wells within the unit have a calculated drainage radius of 88 feet, and that 16 horizontal wells are therefore appropriate within the 1588.82-acre drilling and spacing unit drilled to the requested well setbacks.

Attached to Exhibit D are regulatory exhibits developed based off of Axis's surface locations for the proposed 1588.82-acre drilling and spacing unit. The exhibits and testimony show that Axis has evaluated its surface locations for the proposed unit in light of SB 19-181 and the Director's Draft Criteria. The testimony shows that the Commission has determined that best management practices employed at Axis's Locations are consistent with reasonable protection of public health, safety, and welfare, the environment, and wildlife resources, and protection against adverse environmental impacts on any air, water, soil, or biological resources in satisfaction of Section 34-60-106(2.5)(a), C.R.S.

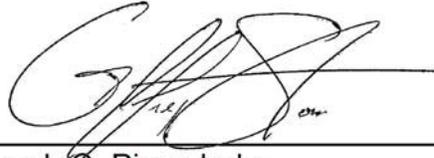
Based upon the geologic and engineering information, Applicant believes that establishing an approximate 1,588.82-acre drilling and spacing unit, and establishing well location rules applicable to the drilling of wells and producing of oil, gas and associated hydrocarbons from the Niobrara Formation, will result in efficient and economic development of the Niobrara Formation without causing waste, injuring correlative rights, and consistent with protection of public health, safety, welfare, the environment, and wildlife resources, and protection against adverse environmental impacts on any air, water, soil, or biological resources.

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Dated: July 15 2020

Respectfully submitted,

AXIS EXPLORATION, LLC

A handwritten signature in black ink, appearing to read 'Joseph C. Pierzchala', written over a horizontal line.

Joseph C. Pierzchala  
Geoffrey W. Storm  
Welborn Sullivan Meck & Tooley, P.C.  
Attorneys for Applicant  
1125 17th Street, Suite 2200  
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gstorm@wsmtlaw.com

<b>AXIS EXPLORATION, LLC</b>  <b>Pamela Kingery</b>	<b>Docket No. 180300216</b>  <b>Land Testimony – Cause 535</b>  <b>Adams and Denver Counties, Colorado</b>
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**Application Lands**

**Township 3 South, Range 66 West, 6th P.M.**

Section 2: All

Section 3: All

Section 4: E/2

My name is Pamela Kingery, and I am currently employed as a Land Advisor with Axis Exploration, LLC (“Axis”). I have over 30 years of experience in land, and I have worked on all land matters related to the Applications Lands. A summary of my qualifications is attached to this testimony.

In support of our Application today, I have prepared three (3) exhibits. The exhibits are attached to my sworn testimony and form the basis for Axis’s Application to gain approval to drill and complete up to sixteen wells in the approximate 1588.82-acre drilling and spacing unit for the Niobrara Formation covering the Applications Lands.

**Exhibit L-1** is an aerial plat depicting the lands in the vicinity of the Application Lands. The lands which are the subject of this application are shown inside the red boundary.

**Exhibit L-2** is a plat depicting Axis’s leasehold interest in the Application Lands. All of the surface and minerals within the Application Lands are owned in fee. Axis owns more than 45% of the leasehold/mineral interests in the Application Lands.

**Exhibit L-3** is a plat depicting the proposed location and lateral for sixteen (16) wells within the Application Lands. The location is permitted by a signed surface use agreement with the surface owner.

Axis believes that the rules in the proposed drilling and spacing unit will allow development of the Niobrara Formation to occur, will not promote waste, will not violate correlative rights and will assure the greatest ultimate recovery of oil, gas and associated hydrocarbon substances from the reservoir.

Based upon our examination of relevant records, and under my direction and control, all of the unleased mineral interest owners and mineral lessees within the Application Lands have received notice of this Application.

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

*-Signatures next page-*



# Exhibit L-1

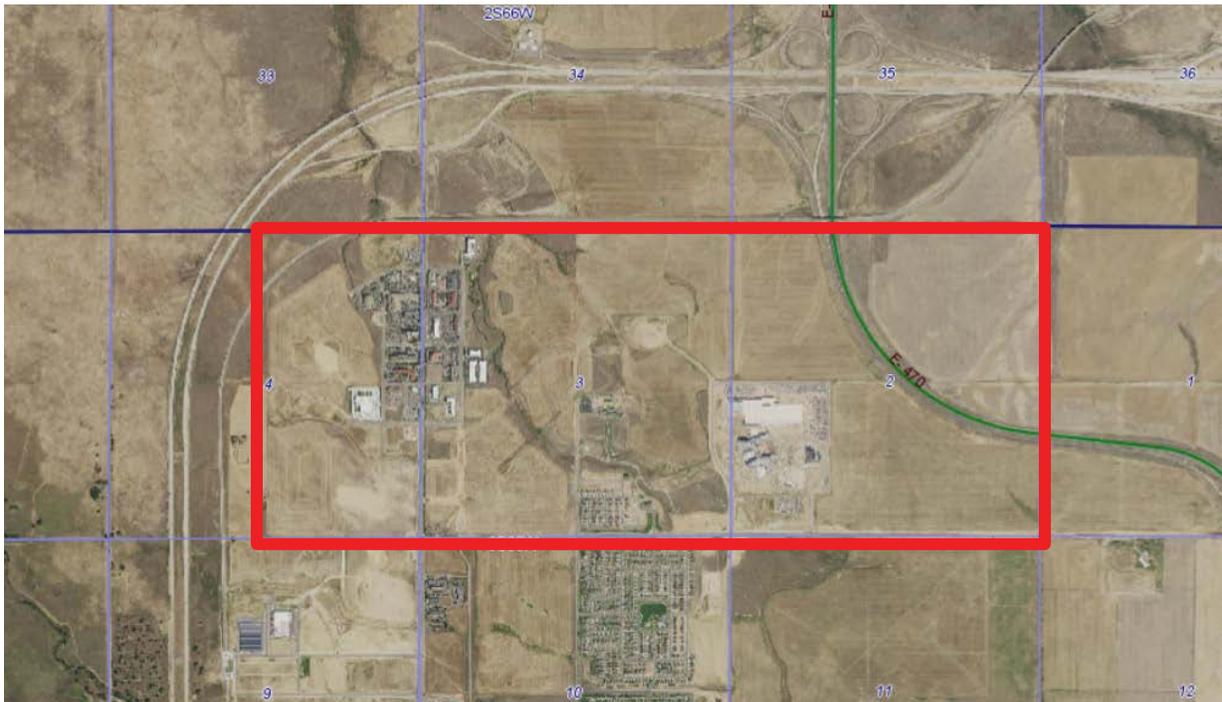
## Township 3 South, Range 66 West, 6th P.M.

Section 2: All

Section 3: All

Section 4: E/2

Adams and Denver Counties, Colorado

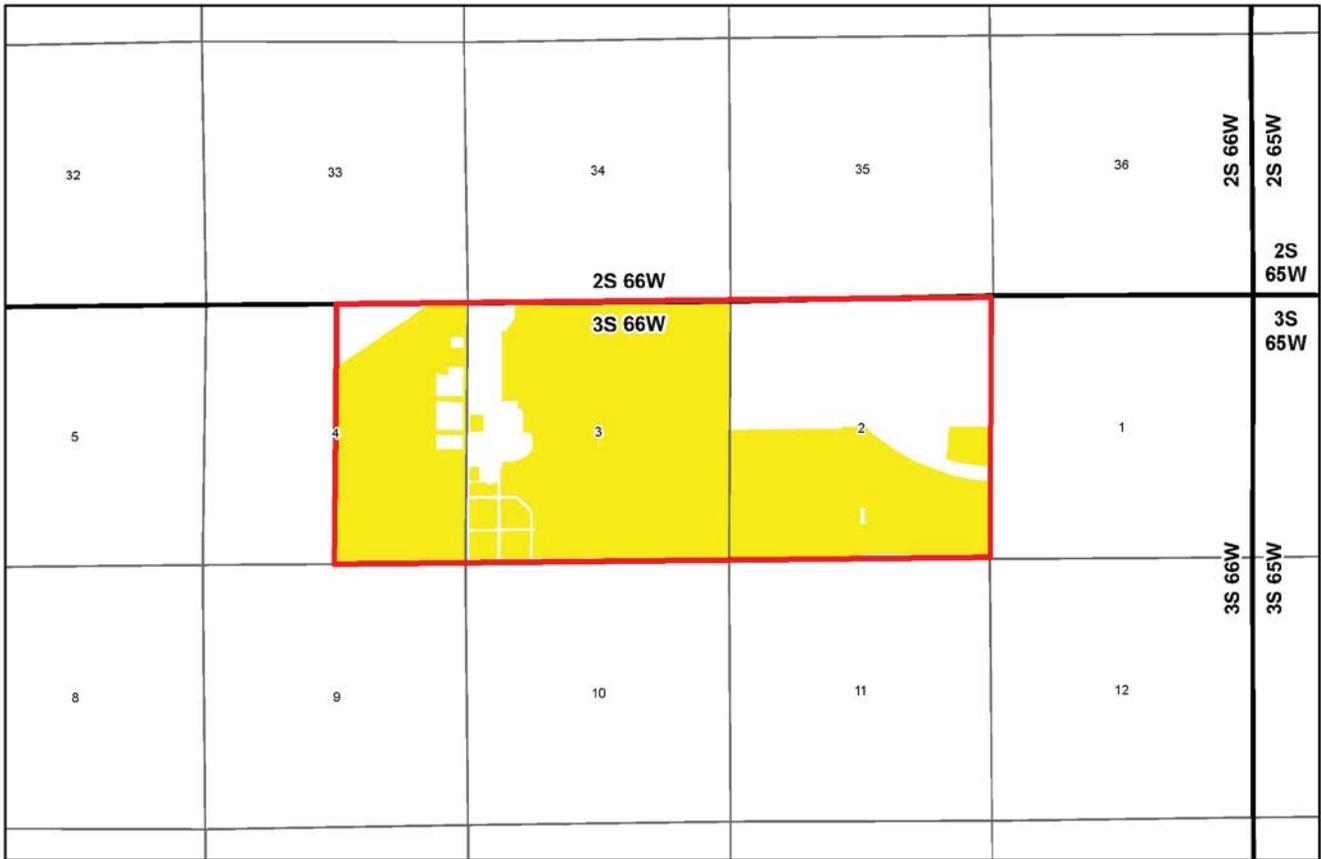


DSU Outline



# Exhibit L-2

Adams and Denver Counties, Colorado



**EXTRACTION**  
Moose Unit  
T3S-R66W-Sec. 23/4  
DATE: 11/13/2019 PRJ:GCS NAD83  
SCALE: 1:30,000 AUTHOR: CMB

1 inch = 2,500 feet  
0 1,250 2,500 5,000 Feet

 Moose Unit  XOG Leasehold

\\g:\work\110524\ecm\m\m\unit\m\_u\_2\201906\_23\unit\unit\_01\_11132019

**Exhibit L-3**

**Township 3 South, Range 66 West, 6th P.M.**

Section 2: All

Section 3: All

Section 4: E/2

Adams and Denver Counties, Colorado

(See Attached)



# **Pamela B. Kingery, CPL**

6885 W. Princeton Avenue  
Denver, Colorado 80235

Thirty years experience in petroleum land work, including twelve years of leadership roles. Responsible for all land management functions including negotiation, acquisition, and preparation of all contractual agreements relative to acquisition, divestiture, development, and joint ventures.

## **PROFESSIONAL EXPERIENCE**

### **Land Advisor**

January 2017 to Present

Extraction Oil & Gas, Inc./Axis Exploration, LLC

Responsible for several active regions in the DJ Basin. Currently administer and support horizontal drilling programs in the DJ Basin. Additionally manage acquisition and due diligence projects. Oversee land brokers, in-house landman and land techs.

### **Land Manager**

2011 to 2016

BAYSWATER EXPLORATION & PRODUCTION, LLC

Responsible for several active regions including DJ Basin, Wyoming, California, Montana and Kansas. Oversaw, managed, planned and supported 2 rig horizontal well program in the DJ Basin. Coordinated the acquisition, due diligence and assimilation of several properties valued at several million dollars. Actively closed divestitures totaling over \$200 million. Set-up land processes for new property acquisitions and new wells. Oversaw maintenance of the Bolo land system, rentals, well and lease file system. Manage land brokers, in-house landman and land techs.

### **Land Manager**

2004 to 2011

ANDERSON OIL COMPANY

Solely managed all aspects of Anderson's land department. Responsible for identifying buyers, negotiating contracts, preparing documents and organizing divestitures of 200 wells valued at \$25 million in Wyoming, Colorado and New Mexico. Coordinated lease purchases, well permitting, right-of-ways, spacing hearings. Prepared title curative and division/transfer orders. Negotiated and implemented a 45 well drilling program in Wyoming that grossed 15,000 Mcfd and 250 BOPD. Maintained land system and files. Prepared maps on Petra mapping system. Handled delay rental payments and bills on joint interest properties. Managed land consultants and outside attorneys.

### **Land Manager**

1998 to 2004

AVIVA, INC.

Responsible for all aspects of land work for multiple partnerships owning minerals and royalties in over 10,000 wells in several U.S. regions including

Texas, Oklahoma, Colorado and Louisiana. Instrumental in two major acquisitions of over 1000 wells each and divestitures of over 500 wells at auction. Negotiated leases, purchase and sale agreements, operating agreements, gas balancing settlements, spacing, farmouts. Responsible for State regulatory matters. Converted DOS based land system to GWIZ. Managed division order analyst, outside attorneys and contract landmen. Coordinated with engineers and accountants.

**Land Manager** 1992 to 1998

ANDERSON OIL COMPANY

Negotiated and prepared 20 well farmout agreement covering 13,000 acres and associated operating agreements. Coordinated and negotiated gas gathering and marketing agreements. Nominated gas and maintained gas balancing records. Purchased oil and gas leases of over \$5 million. Reviewed and cured title, negotiated right-of-ways. Provided regulatory testimony to down-space the Dakota and Frontier formations in the Moxa Arch. Responsible for divesting over 35 producing properties. Maintained all of Anderson's lease records, delay rentals and division orders. Supervised contract landmen and brokers.

**Landman – Unit Formation** 1987 to 1992

JOHN L. MOORE & COMPANY

**Senior Landman – Rocky Mountain Division** 1985 to 1987

KAISER ENERGY, INC.

**Senior Landman – Colorado and Wyoming** 1985

HARVEY OPERATING AND PRODUCTION COMPANY

**Division Landman – Rocky Mountain Division** 1982 to 1984

TRIGG DRILLING COMPANY, INC.

**Lease Reporter – Covered Wyoming** 1981 to 1982

PETROLEUM INFORMATION CORP.

## EDUCATION

Bachelor of Science in Business, Minerals Land Management, 1980,  
University of Colorado, Boulder, Colorado

DAPL/AAPL Minerals Land Management Scholarship, fall, 1979 and spring, 1980

Certified Professional Landman, exam certified 1988

## PROFESSIONAL ORGANIZATIONS

Denver Association of Petroleum Landmen  
American Association of Petroleum Landmen

## Axis

**Alicia Branch** – Geologic Testimony  
Cause No. 407, Docket No. 180300216

*Request for an order to establish an approximate 1588.82 -acre drilling and spacing unit Sections 2, 3 and 4, Township 3 South, Range 66 West, 6th P.M., and authorize the drilling of 16 horizontal wells within the proposed unit, for production of oil, gas and associated hydrocarbons from the Niobrara Formation*

My name is Alicia Branch and I am currently employed as Geologist for Axis (“Axis”). I received a Bachelor of Science degree in Petroleum Geology from the University of Oklahoma in 2005, and Master of Science degree in Geology from the University of Oklahoma in 2007. I have over 15 years of experience in the oil and gas industry. I am familiar with the lands subject to, and the allegations and facts set forth in, the verified amended application (the “Application”) filed herein. My resume/c.v. is attached to this submission. See Appendix.

In support of the Application, I am submitting the following five exhibits. These exhibits are attached to my sworn testimony and form the basis for the Application, which request an order to establish an approximate 1588.82 acre drilling and spacing unit, authorizing the drilling of up to 16 horizontal well for production of oil, gas and associated hydrocarbons from the Niobrara Formation for the below-listed lands (“Application Lands”):

Township 3 South, Range 66 West, 6th P.M.  
Section 2: All  
Section 3: All  
Section 4: E/2

### *List of Exhibits*

#### 1. Exhibit G-1 – Offset Well Locations

Exhibit G-1 shows existing well locations on the Application Lands and surrounding area. These wells have been drilled on (or very near) the Application lands. The geological cross section (Exhibit G-3) is designated as W-E on this map.

#### 2. Exhibit G-2 –Type Log

Exhibit G-2 shows a vertical well log through the Niobrara Formation on (or very near) the Application Lands. The well log is from the Paine Joseph J C 1 Anadarko well, located in the SENE of T3S-R65W-S7. The well API # is 05-001-09718. Niobrara A, B and C are present in the well and should be encountered underlying

the Application Lands. The type log illustrates that the Niobrara Formation under the Application Lands will consist of an alternating sequence of chalks and marls.

### 3. Exhibit G-3 – Correlation Cross Section

Exhibit G-3 shows a stratigraphic cross section, flattened on the top of the Niobrara A Marl, across the proposed drilling and spacing unit. This cross section represents the vertical distribution of the chalk benches within the Niobrara, commonly referred to as the A, B, C and D Chalks, as well as the Fort Hayes member. The cross section shows that the A, B and C chalk benches of the Niobrara Formation are present in potentially productive thicknesses under the proposed drilling and spacing unit.

### 4. Exhibit G-4 – Niobrara Structure Map (-TVDSS)

Exhibit G-4 is a subsea true vertical depth structure map constructed on the top of the Niobrara Formation. The regional dip for the Niobrara Formation underlying the Application Lands is approximately 0.51 degree up-dip to the east approximately 46 feet per mile.

### 5. Exhibit G-6 – Niobrara Isopach Map

Exhibit G-6 is an isopach map of the gross productive thickness of the Niobrara Formation. This thickness excludes the Fort Hayes and D Lime. The gross productive thickness of the Niobrara underlying the Application Lands ranges from 215 to 235 feet.

## **Conclusions**

The Niobrara Formations were deposited in the Western Interior Seaway during Cretaceous time. This seaway was vast in extent and covered much of present day North America from the Gulf of Mexico north to the Arctic. These rocks were deposited as shallow water sediments and underlie most of the DJ Basin in parts of northeastern Colorado, southeastern Wyoming and southwestern Nebraska. The Niobrara Formation exist under the entirety of the Application Lands and are a common source of hydrocarbon production.

The Niobrara formation is both a hydrocarbon source rock and a reservoir. Permeability of the reservoir, as characterized by published data, is less than 0.001 md and this is offered as characterization for the Niobrara reservoir under the Application Lands.

**Affirmation**

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

Dated December 2<sup>nd</sup> , 2019.



Alicia Branch  
Geologist  
Axis Oil & Gas, Inc.

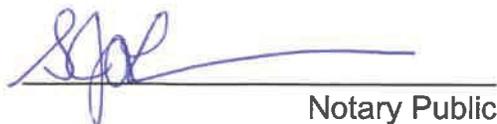
**VERIFICATION**

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

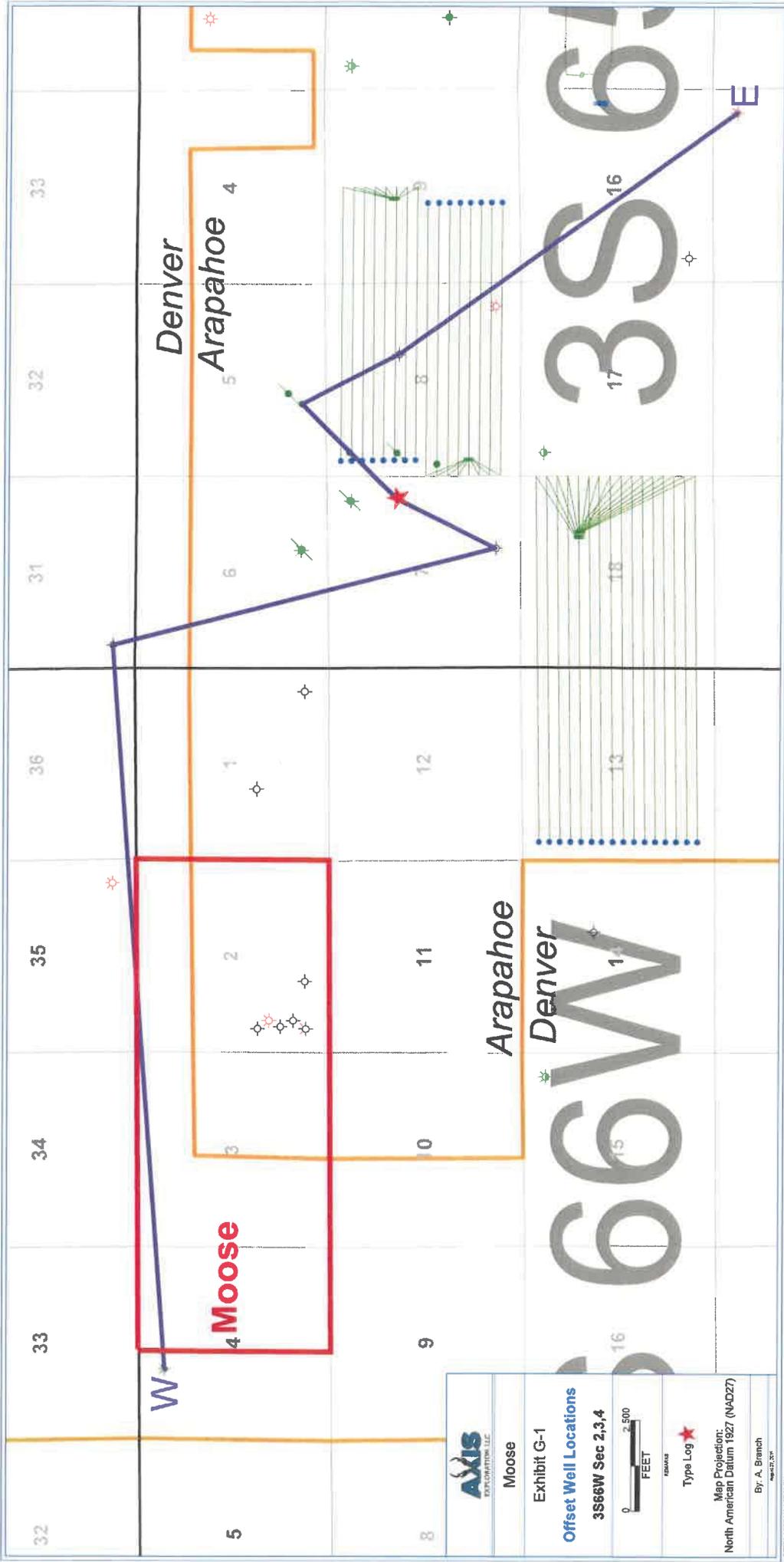
The foregoing instrument was subscribed and sworn to before me on December 2<sup>nd</sup> 2019, by Alicia Branch, Geologist for Axis Oil & Gas, Inc.

Witness my hand and official seal.

My commission expires: 7/8/2020.

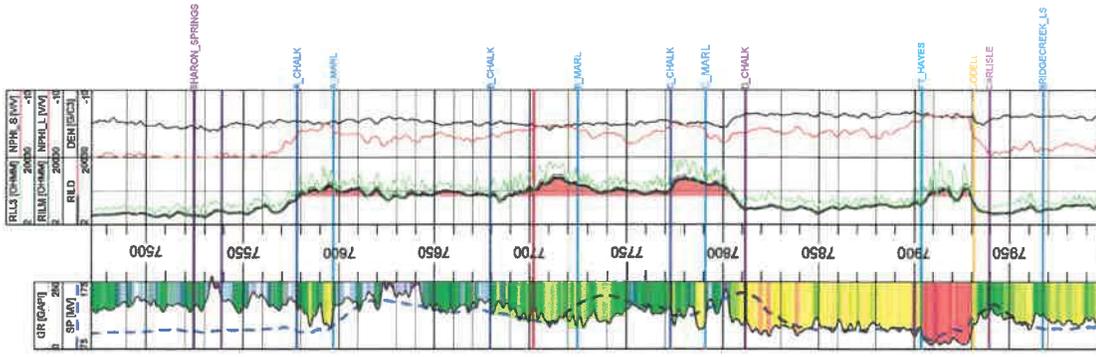


Notary Public



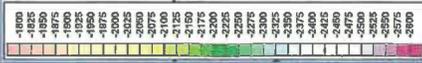
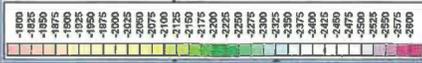
Moose	
Exhibit G-1	
Offset Well Locations	
3S66W Sec 2,3,4	
Type Log	
Map Projection: North American Datum 1927 (NAD27)	
By: A. Branch <small>April 17, 2017</small>	
<small>PETRA 4420018 1.3718 PN</small>	

PAINÉ JOSEPH J C 1 ANADARKO  
 05001097180000  
 T3S R65W S7



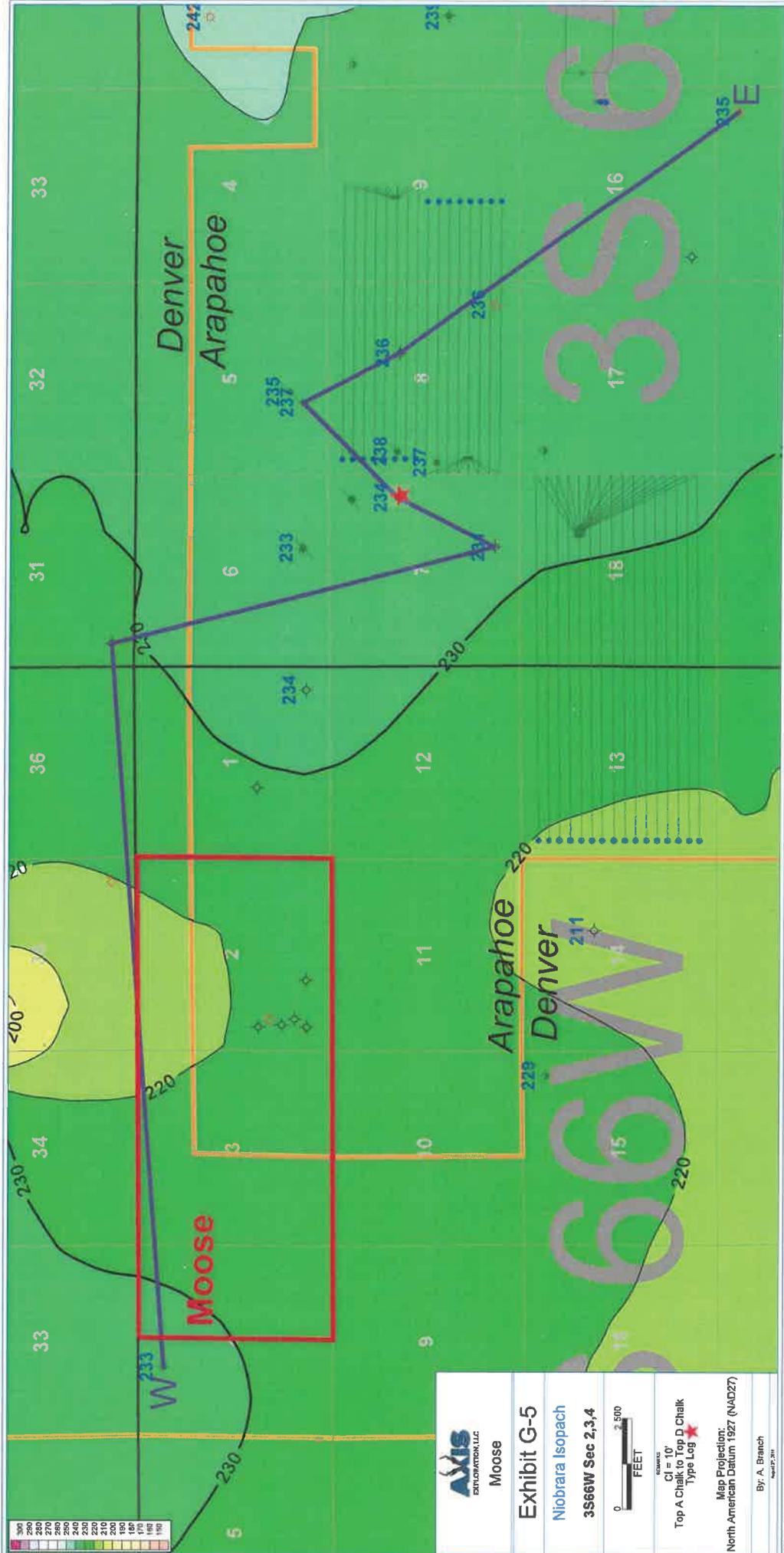
TD : 8,500

 AXIS Geophysical, LLC Moosonee
Geology Exhibit G-2
Type Log
3568W
Sheet 23,4
Prepared by: [Name] Checked by: [Name] Approved by: [Name]
By: A. Baruch August 27, 2018 3:07 PM



Moose	
Exhibit G-4	
Top Niobrara Structure	
(-SSTVD)	
3S66W Sec 2,3,4	
SOURCE: City of 25' Type Log	
Map Projection: North American Datum 1927 (NAD27)	
By: A. Branch April 22, 2019	

PETRA-0202018-152349.PK



<p><b>Axis</b> EXPLORATION, LLC Moose</p>	<p><b>Exhibit G-5</b> Niobrara Isopach 3S66W Sec 2,3,4</p>	<p>0 2,500 FEET</p>	<p>Map Projection: North American Datum 1927 (NAD27)</p>
<p>By: A. Branch</p>			<p>North 1/2, 2011</p>
<p>PTBA 4070011 24024 PM</p>			



# ALICIA BRANCH

Denver, Colorado

Mobile 281-686-0655

Email [branch.alicia@yahoo.com](mailto:branch.alicia@yahoo.com)

## EXPERTISE SUMMARY

- Twelve years industry experience supervising exploration and development projects in emerging plays.
- Self-motivated individual with drive to excel through continuously improving and learning new skills.
- Strong leadership experience with multidisciplinary teams, project management and business planning.
- Demonstrated success aggressively cutting costs while delivering timely projects.
- Building on-going relationships with key stakeholders.
- Extensive operations background specializing in Cretaceous and Devonian shales, carbonates and tight gas sand plays in Colorado, Oklahoma, Texas and New Mexico.
- Recent experience onshore Europe in conventional exploration in Rotliegend Permian Basin fairway.

## PROFESSIONAL EXPERIENCE

### **AB Consulting, Inc., Denver, CO**

**6/2016 - present**

#### *Owner, Geologist*

Geologic consulting services for various operators around Denver.

- Acreage evaluations
- Operations
- Regional & detailed mapping
- Well planning & Permitting
- Geologic exhibits & Testimony

### **Palomar Natural Resources, Lakewood, CO**

**7/2014 – 2/2016**

#### *Vice President of Global Operations*

*1/2015 – 2/2016*

Oversaw execution of all operations within the company. Most recent focus was redevelopment of 16,335 acres in Verde Gallup oil field in New Mexico on the Ute Mountain Ute Reservation. Deployed \$13.5MM of capex to date and \$1.3MM of net revenue. Duties included:

- Supervise technical teams that plan and execute drilling, completions and workovers
- Manage multiple regulatory agencies (BIA, BLM, NMOCD) and Sovereign Nation relationships
- Negotiate and award contracts with vendors
- Establish high level processes that ensure streamlined development of assets
- Responsible for creation and delivery of timelines and budgets related to all operations
- Ensure creation of data room and solicit capital investment from various banks
- Demonstrated a 28% reduction of New Mexico permit timeline and a 70% reduction in well permit costs in one year

#### *Poland Country Manager*

*7/2014 – 1/2015*

Responsible for over 1MM acres (7 Concessions) in the Polish Permian Basin. Drilled and tested two wells in Rawicz field, leading to field recoverable reserves of 50.3 Bscf. Reduction of per well costs by \$1.9MM over 2 years. Progress full field development plan. Identification of significant on trend upside oil and gas prospects. Designed a 3 horizontal well work-over program in the largest gas field in Poland (Estimated 2P reserves of 210 Bscf and upside of 420 Bscf). Duties included:

- Propose and manage PNR/JV budgets and cash calls
- Liaise with Polish authorities, including Ministry, Mining Authority and Local Government
- Represent PNR with JV Partners (TCM/OCM meetings)
- Work closely with JV partners to build consensus on strategic business decisions

## Alicia Branch Resume

- Direct the execution of all operations within Poland
- Ensure PNR compliance with JVA reporting requirements
- Collaborated with stakeholders in field commercialization negotiations
- Ensured creation of data room and solicit capital investment from various banks
- Charged with directing Ryder Scott on work scope and delivery of Estimated Future Reserves and Income Report

### **Noble Energy, Inc., Denver, CO**

**9/2008 – 7/2014**

#### ***DJ Basin Business Unit, Prospect Development Team Lead, Sr Geologist***

*2/2012 – 7/2014*

Oversaw delivery of Development Plans that deliver budget production. Duties included:

- Project manage multidisciplinary technical team that identified, evaluated and progressed new drill prospects
- Build and manage Integrated Development Plans (DPs) that utilize cross functional teams
- Progressed IDPs through upper management approval and ensure validity of key assumptions and economic uplifts throughout the life of development
- Ensure effective analysis and preparation of IDPs, DPs and new drill prospects, including reserve adds, reservoir characterization, EUR projection, type curve application, GOR estimates, offset production review, execution strategy
- Managed the forecasting of IPs, EURs and initial cost estimates for new projects and establish project level economics
- Ensured application of best available completions, drilling, production and reservoir technologies to projects
- Select and prioritize the best projects based on BU strategy, ROR, risk ranked projects, and PUDs
- Delivered wells that contribute to corporate goal of 23% CAGR in 2014

#### ***Niobrara Integration Team, Geologist III***

*8/2010 – 2/2012*

Emphasis was to understand and mitigate key uncertainties for Niobrara and Codell. Focus on variation in well performance, basin stress anisotropy, seismic acquisition, appraisal program, optimizing completions, production facility consolidation, schedule and cost management. Compiled, evaluated and shared Niobrara horizontal key learnings and implemented best practices with the BU. Duties included:

- Charged with planning and acquisition of all horizontal petrophysical data
- Designed & executed an 8 well coring program to calibrate petrophysical model
- Developed Mechanical Earth Model program & regional stress maps for the field
- Lead geologist for Root Cause Analysis on mechanical well failures, coil tubing and frac complications
- Lead NIT geologist in design of first comprehensive downspacing test
- Creation of key NIT maps & criteria for picking horizontal well locations
- Responsible for determining target zone for all horizontal wells in the 10 rig program (up to 300 wells per year)
- Lead Geologist in selection of extended reach lateral locations
- Responsible for geologic recommendation on Non-Op participation in all horizontal wells
- Initiated production comparison study with NIT completions team leading to determination of target bench over Wattenberg High

#### ***Wattenberg Business Unit, Geologist II***

*4/2009 – 8/2010*

Oversaw vertical and horizontal operations of ~300 mi<sup>2</sup> area of Wattenberg Field. Including determining target formations, geosteering horizontal wells, completion intervals, petrophysical evaluation, correlation, fault picking, etc. The asset had a field wide drilling program of 500+ vertical and horizontal wells per year. Also collaborated on evaluation of new exploration targets within the greater Denver-Julesburg Basin. Duties included:

- Developed standardized workflow for pre-drill planning and post-drill deliverables for horizontal Niobrara and Codell wells that is still used in the DJ Basin BU and has been adopted by the Rockies BU.
- Conducted analysis of Greenhorn and Graneros, proposed three vertical exploration wells, designed and oversaw data acquisition program
- Worked with integrated team and vendors on acquisition design and interpretation of microseismic on 7 vertical wells

## Alicia Branch Resume

### **Mid Continent Business Unit, Geologist II**

9/2008 – 4/2009

In charge of planning and geosteering 6 horizontal wells in the Upper Pennsylvanian Cleveland Tight Gas Sandstone. Designed coring program for first pilot hole in the Shattuck Field, Ellis County, Oklahoma. Duties included:

- Pre-drill planning & post-drill geologic interpretation of horizontal wells
- Geologic testimony at Oklahoma Corporation Commission
- Select and prioritize packer placement in laterals
- Collaborate in development of Mechanical Earth Model
- Research drilling reports for wellbore stability issues related to Marmaton Shale
- Design of multiple sidetracks with Drilling Engineer

### **BP America, Inc., Houston, TX**

8/2007 – 9/2008

#### **North America Gas Reserves and Renewal, Geologist**

Carried out basin scale evaluation of shale gas resources. Work formed foundation of basin ranking based on potential. Development of standardized workflow approach to shale gas evaluation. Calibration of workflow in basins with substantial production. Areas of work included Arkoma & Anadarko Basins, OK, Permian & Ft. Worth Basins, TX and Alberta Basin, Canada.

### **Pathfinder Exploration, Norman, OK**

2/2004 – 5/2005 & 8/2005 – 8/2007

#### **Geologist, GeoTech**

Involved in planning and drilling of 5 wells. Delivered an 8 well drilling program in Arkansas and Oklahoma in 4Q '05.

### **Marathon Oil Company, Houston, TX**

5/2005 – 8/2005

#### **Alaska Asset Team, Geologic Intern**

Project: Swanson River Field, Alaska. Work formed basis of a recommendation for a gas storage project and potential field extension.

## EDUCATION

**MS Geology 2007.** University of Oklahoma, Norman, OK.

Thesis: Comprehensive characterization of a core from an over-mature Woodford Shale in LeFlore County, Oklahoma and comparison with data from other studies of the Woodford Shale across the Arkoma Basin.

**BS Petroleum Geology 2004.** University of Oklahoma. Norman, Oklahoma.

## SOFTWARE SKILLS

Power user for Petra, MS Office suite, Petrel, Oracle, Access, Geolog, Petrosys (dbMap), UNIX and Zmap. Competent user for ArcGIS, Techlog, GeoFrame, Spotfire, Seisworks, BasinMod and Kingdom 3D. Familiar with Wellspring, PEEP, Aries, and Fekete.

## OTHER ACTIVITIES/ACCOMPLISHMENTS/MEMBERSHIPS

- Field trip leader for Wattenberg Field Operations course at 2015 AAPG Annual Convention
- Geology Mentor of the Year – 2014 Noble Tech Conference
- Business Innovation Award for Integrated Development Plan Process – 2014 Noble Tech Conference
- Noble Energy Lead Campus Recruiter University of Oklahoma 2009 - 2014
- Charity Coordinator Noble Activity Committee 2010 – 2014

**Axis Exploration, LLC**

**Mathew Dolezal – Engineering Testimony**

Cause No.535, Docket No. 180300216

Niobrara Formation

Adams and Denver Counties, Colorado

Colorado Oil and Gas Conservation Commission Hearing

My name is Mathew Dolezal, and I am currently employed as a Reservoir Engineer with Axis Exploration, LLC. I received a Bachelor of Science Degree from the University of Wyoming in Petroleum Engineering & Chemical Engineering in 2009. I have 11 years of experience in the oil and gas industry. I am familiar with the lands described, and the matters set forth in the verified application (“Application”).

In support of the Application in the above referenced docket, I am submitting the following 2 exhibits. These exhibits are attached to my sworn testimony and form the basis for the Application for an order establishing a 1588.82 acre spacing unit for the drilling of up to sixteen (16) horizontal wells (16 wells/section equivalent) for production of oil, gas and associated hydrocarbons from the Niobrara Formation underlying the following lands (hereinafter the “Application Lands”).

Drilling and Spacing Unit – 1588.82 acres

Township 3 South, Range 66 West, 6<sup>th</sup> P.M.

Section 2: All

Section 3: All

Section 4: E/2

Exhibit E-1 – OOIP Calculations

Exhibit E-1 shows OOIP calculations for the Application Lands. Calculations show that the OOIP is estimated at 108,126,119 bbls for the Niobrara per approximate 1588.82 acre unit. The current oil recovery type curve for the reservoir is 44,000 bbl per 1,000’ of completed lateral for the Niobrara. These type curve recoveries are dependent upon completion design and volume. Estimated ultimate oil recoveries for the spacing unit with these type curves are predicted at 8,588,800 bbls from 16, 12,200’ laterals in the Niobrara. This results in a recovery factor of 7.94% for the Niobrara, which is within the reasonable expected range for tight carbonate shale oil development.

Exhibit E-2 – Analog Well Evaluation

Exhibit E-2 is a tabular summary of analogous Niobrara horizontal well results, including EUR’s and estimated drainage radii from available public data. Based upon the available public data, the analog Niobrara wells have estimated drainage radius average of 88’. For a 12,200’ lateral, this equates to 49.1 acres per well. For the Niobrara formation, drainage radius appears to be significantly influenced by completion design and intensity (volume). These drainage estimates

are within a reasonable expected range and support the proposed well development on the Application Lands. These drainage radii are supportive of 16 Niobrara wells per section for ~16 horizontal wells per section total. The proposed drilling and spacing unit therefore is not smaller than the maximum possible drainage area with 16 Niobrara producing from their respective benches. Additionally, the analog wells support that lands outside of the Application will not be drained.

**Conclusions**

Axis Exploration, LLC believes that drilling and completing horizontal wells in the Niobrara Formations underlying the Application Lands is the most efficient and economic method to develop the resource potential. Based on publicly available production data from other operators, Axis believes that the placement of up to sixteen (16) horizontal wells under the Application Lands is a proven way to efficiently maximize reservoir drainage and thereby prevent waste, protect correlative rights, and can be done in an efficient and economic matter.

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

Dated this 17th day of June 2020.



Mathew Dolezal  
Reservoir Engineer  
Axis Exploration, LLC

## PROFESSIONAL EXPERIENCE

### Extraction Oil & Gas

#### **Reservoir and Portfolio Lead – 2017 to Current**

- Tasked with acreage development planning to maximize economics in the DJ Basin
- Work with development leads to optimize the subsurface planning of wells, which includes spacing, bench placement, recovery, completion design, orientation, and other considerations that will affect performance.
- Help maintain Extraction's acreage portfolio and assist with trades, acquisitions, and divestitures.

### Noble Energy (2012 to 2017)

#### **Lead Engineer (Reservoir) – 2014 to 2017**

- Team Lead for development in the DJBU focusing on Niobrara and Codell development over ~150,000 net acres.
- Tasked with managing and integrated team to develop and implement a long term development strategy that maximizes value across the acreage. Long term development strategy consists of development order, infrastructure and facility design, strategic trades and acquisitions, oil and gas marketing, scenario planning, and overall economics associated with the IDP.
- Team is responsible for delivering drill ready projects that align with corporate strategy and metrics such as economics, GOR, production, etc.
- Devised a permitting strategy to prevent acreage from being “busted up” by non-op development, which preserved economics.
- Business unit technical lead for many A&D projects:
  - \$505MM divestiture of 33,000 net acres to Synergy Resources
  - ~22,000 acre swap with PDC Energy (~10k acres to Noble and ~12K acres to PDC)
  - ~5,000 acre divestiture to Anadarko Petroleum
  - Multiple small trades and or farm-outs to PDC, Synergy, Bill Barrett, Great Western, and Bayswater
  - Multiple small acquisitions including strategic leasing

#### **Reservoir Engineer – 2012 to 2014 (DJBU - Colorado)**

- Project lead for field development plans targeting the Niobrara and Codell formations in the DJBU.
- Performed decline curve, economic, and statistical analyses on producing horizontal wells to find the most economic areas to develop to accomplish the goals of the business unit and Company.
- Performed acquisitions of PDP, PUD, mineral leases, and surface locations.
- Discovered that lateral orientation was significantly affecting EUR's and ultimately the economics over a four township area, with a gained NPV10 of ~\$10MM/section by changing orientation.

### Baker Hughes

#### **Field Engineer – 2010 to 2012 (North Dakota)**

- Oversaw chemical programs in new and existing mature oil and gas fields.

- Worked with operators to identify problems, propose tests, and identify corrections to decrease downtime and increase revenues.
- Introduced new methods and products to increase profitability with effective chemical treatment programs that decrease non-mechanical failures.
- Led company's project for Tracking Results Using System Trends (TRUST), oversaw a team of 5 that managed failures and associated economics for more than 400 wells.

## ConocoPhillips

### Engineer – 2009 to 2010 (Alaska)

- Managed failure tracking and gas lift design of wells for the Alpine Field.
- Performed reservoir analysis for a water pipeline (waterflood) in the Kuparuk Field based on simulations and economics, producing a 13% internal rate of return that justified replacement.
- Integrated into company software a failure tracking mechanism for subsurface safety valves, calculating economics associated with the failures and recommending chemical treatments and valve cycling that would loosen foreign debris, lead to reduced well downtime, and prevent revenue losses of \$300M.
- Designed and implemented ConocoPhillips Alaska's largest multi-stage completion system, increasing production by 300+ barrels per day.

### Engineering Intern – 2008 (Wyoming)

- Reviewed well injection rates and hydrate curves, developing the economics of a switch from methanol to low-dosage kinetic hydrate inhibitor and predicting cost savings of 20%.
- Developed recommendations to address meter tap freezes and lost revenue associated with the freezes.
- Identified an accounting discrepancy between gas production and sales, ascertaining the source as ineffective dehydration and measurements of wet gas at wellheads.
- Used American Petroleum Institute and American Gas Association guidelines to develop spreadsheet for orifice plate size and meter run length for gas measurement.

## Wyoming Casing

### Casing Hand – 2007 (North Dakota)

- Worked on a clean and drift crew responsible for cleaning, drifting, tallying, and preparing casing to be run in the well.

## EDUCATION

B.S. in Petroleum Engineering  
University of Wyoming, Laramie, WY

B.S. in Chemical Engineering  
University of Wyoming, Laramie, WY

**Exhibit E-1**

Date: 6/15/2020

Engineer: Mathew Dolezal

**NIOBRARA FORMATION****Formation Variables**

Porosity	9%	
Sw	30%	
Area	1,589	acres
Thickness (h)	225	feet
Bo	1.58	RB/STB
GOR	3	MCF/STB

**Estimated Resources (OOIP & GIP)**

Oil in Place	108,126,119	BO
Gas in Place	324,378,358	MCF

**Vertical Well Performance**

# of existing wells	0	wells
Total EUR	-	BO

**Horizontal Well Performance**

Oil EUR per Horizontal Well per 1,000'	44,000	BO
Avg Well Spacing (well to well)	273	ft
# of Horizontal Wells in Unit*	16	wells
Avg Lateral Length*	12,200	ft
Total EUR	8,588,800	BO

**Recovery Factor**

Vertical Well RF	0.00%	
Horizontal Well RF	7.94%	
Total RF	7.94%	

Exhibit E-2

Date: 6/15/2020  
 Mathew Dolezal

EUR = Rf \* OOIP

EUR - Estimated Ultimate Recovery (bbbls)

Rf - Recovery factor (%)

OOIP - Original Oil in Place (bbbls)

A - Area (acres)

h - net pay (ft)

phi - porosity (%)

So - Oil Saturation (%)

Sw - Water Saturation (%)

Bo - Formation Volume Factor

So = 1 - Sw

Analog Well	Formation	Location	Lateral Length (ft)	Oil EUR (Mbbbl)	Oil EUR per 1,000' (Mbbbl)	Net Pay (ft)	Porosity (%)	Oil Saturation (%)	Formation Volume Factor (RB/STB)	Recovery Factor (%)	Estimated Drainage Acres (Acres)	Estimated Drainage Radius (Feet)
1 Reserve 3-65-26	Niobrara	3S 65W, Sec 26	3816	260	68	225	8.8%	75%	1.58	15%	24	136
2 Aspen 3-65 15-14 2DH	Niobrara	3S65W, Sec 15	7324	393	54	225	8.8%	75%	1.58	15%	36	107
2 Bear 3-65 22-23 3AH	Niobrara	3S 65W, Sec 22	9622	451	47	225	8.8%	75%	1.58	15%	41	93
3 Bear 3-65 22-23 3C	Niobrara	3S 65W, Sec 22	9831	374	38	225	8.8%	75%	1.58	15%	34	76
4 Florida 3-65 27-26 3AH	Niobrara	3S 65W, Sec 27	9775	458	47	225	8.8%	75%	1.58	15%	42	93
5 Florida 3-65 27-26 3BH	Niobrara	3S 65W, Sec 27	9796	270	28	225	8.8%	75%	1.58	15%	25	55
6 Florida 3-65 27-26 3CH	Niobrara	3S 65W, Sec 27	9784	283	29	225	8.8%	75%	1.58	15%	26	58
7 Florida 3-65 27-26 3DH	Niobrara	3S 65W, Sec 27	9708	296	30	225	8.8%	75%	1.58	15%	27	61
8 Blue 3-65 32-33 1H	Niobrara	3S 65W, Sec 33	9319	402	43	225	8.8%	75%	1.58	15%	37	86
9 Reserve 3-65 34-35 1H	Niobrara	3S 65W, Sec 35	6900	389	56	225	8.8%	75%	1.58	15%	36	112

8587.5

44

88 ft

49.1 ac

Nio Avg

Nio Avg

Lat Length

12200

<b>Exhibit D</b>  <b>AXIS EXPLORATION, LLC</b>  Nathan Bennett	<b>Docket No. 180300216</b>  <b>Testimony – Cause 535</b>  <b>Denver and Adams Counties, Colorado</b>
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My name is Nathan Bennett, and I am currently employed as the Regulatory Supervisor for Axis Exploration, LLC, a wholly owned subsidiary of Extraction Oil & Gas, Inc. (“Axis”). I graduated from Shippensburg University in 2010 with a Master’s degree in Geoenvironmental Studies. I have 15 years of experience in and with the oil and gas industry. In addition, I have over 3 years of experience working in the Denver-Julesberg Basin, and am familiar with the rules, regulations, and requirements of the Colorado Oil and Gas Conservation Commission. I have worked on and/or overseen all regulatory matters related to the below-described Application Lands, including Axis’s anticipated surface locations for development. A summary of my qualifications is attached to my testimony.

Axis’s Application seeks an order establishing an approximate 1,588.82-acre drilling and spacing unit covering the following described lands, and approving up to sixteen horizontal wells within the unit, with well location rules applicable to the drilling of wells and producing of oil, gas and associated hydrocarbons from the Niobrara Formation covering the following lands in Denver and Adams Counties, Colorado:

- Township 3 South, Range 66 West, 6th P.M.
- Section 2: All
- Section 3: All
- Section 4: E½

In support of the Application, I submit the following sworn testimony and exhibits.

**A. C.R.S. § 34-60-116 – Local Siting Permit**

In support of the Application and my sworn testimony herein, attached is Exhibit R-1, prepared under my direction, supervision, and control. Exhibit R-1 is a surface map depicting Axis’s agreed-upon surface locations for development of this project, including the Application Lands. As shown on Exhibit R-1, Axis’s Location, the ACM Highpoint Pad (Location ID #460204), is located within the W½ of Section 1, Township 3 South, Range 66West, 6th P.M., all within the City of Aurora. The City of Aurora is the local government with local siting jurisdiction over the Location. On July 24<sup>th</sup>, 2019, Axis entered into that Oil and Gas Operator Agreement with the City of Aurora, Colorado, a municipal corporation. The Oil and Gas Operator Agreement provides for certain locations within the city of Aurora, including the ACM Highpoint Pad. A copy of Axis’s Oil and Gas Operator Agreement is attached as Exhibit R-2. The Oil and Gas Operator Agreement satisfies the local siting requirement as provided for Section 34-60-116(1)(b), C.R.S.

**B. C.R.S. § 34-60-106(2.5)(a) – Protection and Minimization of Adverse Impacts to Public Health, Safety, and Welfare, the Environment, and Wildlife Resources**

In support of the Application and my sworn testimony herein, attached is Exhibit R-2, prepared under the direction, supervision, and control of Axis's Environmental, Health, Safety and Regulatory department. As shown on Exhibit R-2, Axis has entered into the Oil and Gas Operator Agreement with the City of Aurora. As part of the Oil and Gas Operator Agreement, Axis has agreed to certain locations within the City of Aurora, including the ACM Highpoint Pad. Axis has reviewed the existing ACM Highpoint Pad in light of the Director's Objective Criteria, published by the Commission. According to Axis's review, the Location is subject to the following Draft Objective Criteria:

- Criteria #2 – Oil and Gas Location within a municipality
- Criteria #3 – Oil and Gas Location within 1500' of a municipal boundary
- Criteria #5(c) – Oil and Gas Location within a Sensitive Area for water resources

Exhibit B to the Oil and Gas Operator Agreement provides for Best Management Practices ("BMPs") that will be implemented by Axis at the ACM Highpoint Pad. The BMPs listed in Exhibit B to the Oil and Gas Operator Agreement comprehensively address all phases of development at the ACM Highpoint Pad, including:

- Quiet Completions Technology;
- Mitigation Barriers using Berms, Bales, and Sound Walls;
- Use of pipelines for transportation of water and hydrocarbons from wellsite.
- Notification to City of Aurora regarding Commencement of Operations;
- Plugged and Decommissioned Well Testing;
- Flowline procedures;
- Closed-Loop Pitless Systems for Containment and/or Recycling of Drilling Fluids;
- No open burning at wellsite;
- Chemical Disclosure and Storage Procedures;
- Visual mitigation including facilities color, low profile equipment, minimal tree removal, lighting, landscaping, maintenance weed control, and removal of equipment;
- Use of Open-ended discharge valves on all storage tanks, pipelines, and other containers;
- Fugitive Dust Suppression;
- Electric Equipment;
- Emergency Action Plans;
- Air Quality and Air Quality Monitoring Plan;
- Reduced Emission Completions;
- Fencing;
- Use of Combustion Devices;
- Noise Mitigation;

Exhibit D – Regulatory Testimony  
Docket 180300216

- Road Repair;
- Stormwater and Wastewater management;
- Odor Mitigation;
- Water Quality Monitoring;
- Spills Plan;
- Wildlife Mitigation;
- Other BMPs.

Axis’s Highpoint Pad will be operated in accordance with the best management practices identified above. Axis maintains that the above-described best management practices, in addition to those required by the Colorado Oil and Gas Conservation Commission, will ensure the highest standards of operations at its Locations, and allow the Commission to determine that Axis’s operations are sufficient to reasonably protect against adverse impacts to public health, safety, and welfare, the environment, and wildlife resources, and to best protect against adverse environmental impacts on any air, water, soil, or biological resources in accordance with Section 34-60-106(2.5)(a), C.R.S.

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

- *Signatures on the next page* -

Dated this 18th day of June, 2020.



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Regulatory Supervisor  
Axis Exploration, LLC



**Legend**  
Application Lands  
Proposed Disturbance Area



0 0.1 0.2 0.4 0.6 0.8 Miles

\\fichobuh\GIS\Subarea\_ACM\Subarea\_ACM\Map\_Series\_020616.mxd

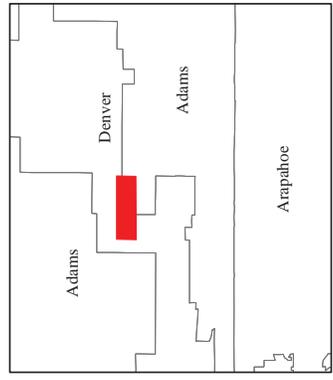
Moose DSU  
ACM Pad Surface Location  
TSS R66W Sec.2 All, 3 All, 4 E2  
1,588.82acres

Scale: 1:24,744

PRJGCS NAD83

Date: 6/10/2020

Author: ECP



## OIL AND GAS OPERATOR AGREEMENT

**THIS OIL AND GAS OPERATOR AGREEMENT** (the "Agreement") is made and entered into this 24th day of July 2019, by and between Axis Exploration, LLC Suite 5300, Denver, CO 80202 (the "Operator") a wholly owned subsidiary of Extraction Oil & Gas, Inc. ("Extraction"), and the City of Aurora, Colorado, a municipal corporation (the "City") with an address of 15151 E. Alameda Pkwy, Aurora, Colorado, 80012, which may be collectively referred to herein as the "Parties", or individually as a "Party".

### RECITALS

**WHEREAS**, Operator engages in the exploration, development, production and marketing of natural gas, oil and natural gas liquids, in Colorado including in Aurora, Colorado;

**WHEREAS**, by entering into this Agreement, Operator will be expending significant amounts of capital in order to implement the best management practices ("BMPs") set forth herein to develop the oil, gas and other hydrocarbon resources and associated infrastructure within the City;

**WHEREAS**, Operators investment shall have a significant positive impact on the City by increasing City tax revenue, increasing jobs and other economic development;

**WHEREAS**, the BMPs to be implemented are intended to be protective of health, welfare, safety and the environment;

**WHEREAS**, the Parties desire to enter into an Oil and Gas Operator Agreement to create a permitting and review process for New Wells on Well Sites that are located within the City which includes enhanced submittal, BMPs and notice requirements;

**WHEREAS**, the Colorado Oil and Gas Conservation Act, C.R.S. § 34-60-101 et. seq. (the "Act"), authorizes the Colorado Oil and Gas Conservation Commission ("COGCC" or "Commission") to adopt statewide rules and regulations and to amend existing rules and regulations or promulgate new rules and regulations;

**WHEREAS**, pursuant to the Act, the COGCC has previously adopted and currently enforces statewide rules and regulations and written policies and permit conditions that address technical engineering issues associated with the drilling, development, and production of oil and gas wells within the City and it is anticipated that COGCC will propose and adopt revisions to these requirements over time;

**WHEREAS**, the Colorado Air Pollution Prevention and Control Act ("APPCA" or the "Air Act"), C.R.S. § 25-7-101 et seq., authorizes the Colorado Department of Public Health and the Environment (the "CDPHE") through its Colorado Air Quality Control Commission ("AQCC") to adopt emission control regulations for sources of air pollutants. CDPHE has promulgated specific emission control requirements for oil and gas facilities and it is anticipated that CDPHE will propose and adopt revisions to these requirements over time;

**WHEREAS**, the Parties have proposed BMPs that are more protective than the COGCC or AQCC regulations for use at Operator’s Well Sites within the City; and

**WHEREAS**, local governments are authorized under state law to enact more protective rules in order to protect and minimize adverse impacts to public health, safety, and welfare and the environment than the COGCC, to impose fines for leaks, spills, and emissions, and to impose fees to cover monitoring and inspection programs necessary to address the impacts of development and to enforce local governmental regulations.

**NOW THEREFORE**, in consideration of the covenants and mutual promises set forth in this Agreement, including in the recitals, the Parties agree as follows:

### **ARTICLE I. GENERAL PROVISIONS**

1. **Effective Date.** This Agreement will be effective upon the date of the last signature (“Effective Date”).

2. **Term.** The term of this Agreement shall be from the Effective Date and will continue in effect as long as the Operator owns an interest in and operates wells at the Well Sites, and until the last New Well drilled during the Term of this Agreement is permanently plugged, abandoned and removed from the Well Sites in accordance with the rules and regulations of the COGCC and reclamation has been completed pursuant to COGCC requirements, or unless otherwise terminated by law (the “Term”).

3. **Development Schedule.** The Operator will provide a summary of planned operations and an operational timeline (together, the “Development Schedule”) to the City at least annually. The Operator may revise the Development Schedule from time to time as it deems appropriate. The City will provide the capital improvement project schedule to the Operator annually. The Operator and City agree that Operator will not commence drilling at a Well Site later than December 31, 2024 (the “Development Term”). However, Operator may request an extension to the Development Term. Operator may also amend this agreement pursuant to Article IV, 20 to add Well Sites and may amend the Development Term as will be noted in Exhibit D for each Well Site added pursuant to Article IV, 20.

4. **The Project.** Operator has developed a plan in consultation with the City that includes (a) the Well Sites that Operator plans to develop during the Development Term of this Agreement as identified on Exhibit A and Exhibit D and (b) the BMPs that shall be used at the Well Sites as identified on Exhibit B (together, the “Project”). The City, through Aurora Water, will identify water sources and water infrastructure (“Water Sources”) to be depicted by Operator on its Site Plan for a Well Site to be submitted with the OGP application. As long as Operator is in compliance with this Agreement, Operator may perform all surface and downhole well maintenance and operations on the New Wells and Wells Sites that the Operator deems prudent and necessary.

5. **Intent to Supplement State Rules and Regulations.** The Operator shall comply with all COGCC rules and regulations and AQCC rules regarding oil and gas development. The Parties recognize that pursuant to the Act, the COGCC regulates the development and production of oil and gas resources in Colorado. By the powers vested to the COGCC through the Act, the

COGCC has promulgated statewide rules and regulations for oil and gas development. Further, the Parties recognize that pursuant to the Air Act, AQCC regulates air quality in Colorado. By the powers vested to the AQCC through the Air Act, AQCC has promulgated statewide air quality rules and regulations over oil and gas development. The BMPs identified in this Agreement are intended to supplement and are in addition to these state rules and regulations. However, Operator shall comply with applicable federal and state rules, regulations and standards pertaining to public health, safety, welfare and the environment. Operator shall comply with the more protective of the BMPs contained in this Agreement or applicable federal or state rule or regulation and/or standards.

6. **Exercise of Local Land Use Authority.** The City has enacted land use regulations pursuant to the Local Government Land Use Enabling Act, C.R.S. § 31-15-401 et. seq., and the Land Planning Act, C.R.S. §29-20-101 et seq., which delegate to local governments the authority to enact land use regulations that regulate, *inter alia*, the impacts of oil and gas development. The Parties have engaged in a comprehensive and collaborative approach to develop terms and conditions for Operator's oil and gas development in the City included in this Agreement, that meet or exceed the protections of human health, safety and welfare and the environment contained in the City's oil and gas regulations. As between the Parties, if there are any conflicts between local government rules and this Agreement, this Agreement will control.

7. **New Wells and Well Sites.** The New Wells and the Well Sites depicted on Exhibit A and D will be subject to the terms of this Agreement as defined below.

A. **New Well(s).** "New Well(s)" shall mean any Operator-operated well spudded during the Term of this Agreement within the City at the Well Sites, including any production Facilities directly associated with such well. "Facilities" for purposes of this Agreement shall include wells, flowlines, storage, metering and all equipment appurtenant to such wells and pipelines. For purposes of this Agreement, a New Well shall not include the re-entry of a previously drilled well, which Operator shall remain free to work on subject to applicable COGCC requirements. Operator may perform all surface, re-entry and downhole well maintenance and operations on the New Wells and Well Sites that Operator deems prudent and necessary.

B. **Well Sites.**

i. **Well Sites.** The Parties agree that Operator's development of the New Wells will be on Well Sites identified and depicted on Exhibit A (the "Well Sites"). The term "Well Site" includes the well pads, including the well head, facilities, tanks, flowlines, meters, and any associated equipment on the pad necessary to operate a well.

ii. **Future Well Sites.** The Parties agree that Operator's development of New Wells at "Future Well Sites" may occur upon the effective date of an amendment to this Agreement, approved by City Council resolution following a public hearing, that adds any such Future Wells Sites to Exhibit A and Exhibit D and will be subject to a 5 year Development Term from the effective date of the amendment. Any prior Well Sites that have been approved by City Council will not be subject to further review by City Council upon an amendment to Exhibit A

and Exhibit D. Upon any such amendment to Exhibit A and Exhibit D, any Future Well Sites added to Exhibit A and Exhibit D shall become a Well Site under this Agreement.

8. **Operator's Best Management Practices at the Well Sites.** Operator shall comply with all applicable federal and state laws, rules, and regulations regarding its operations at the Well Sites. Operator agrees to comply with the BMPs of this Agreement on all New Wells at each Well Site. The Operator agrees to include on all Oil and Gas Assessments, COGCC Form 2As submitted to the COGCC for any New Wells or Well Sites those BMPs which (A) the COGCC has the ability to respond to and resolve potential complaints regarding the BMP and (B) the COGCC has enforcement ability to which it can exercise through inspection to ensure compliance with the BMPs.

9. **Plugging and Abandonment of Existing Wells.** In accordance with state law and this Agreement, Operator shall plug and abandon certain older wells in the City ("P&A Wells"). The Operator shall properly drain and decommission in accordance with City and COGCC rules and regulations all flowlines and pipelines associated with each P&A Well, unless the applicable surface owner or surface use agreement requires measures to be taken that differ from COGCC rules and regulations, and shall remove all facilities related to the P&A Wells. The plugging and abandoning of a particular P&A Well shall commence within ninety (90) days following the commencement of production from a New Well located in each of the drilling and spacing units or pooling units, as applicable, encompassing the leasehold originally drilled by such P&A Well.

10. **Prior Approved Jamaso Well Site Exception.** The Jamaso Well Site was approved by City Council on January 7, 2019. To the extent that the relevant operation at the Jamaso Well Site has not already occurred as of the Effective Date, Operator agrees to implement the Exhibit B BMPs on the Jamaso Well Site upon commencement of development of the Jamaso Well Site with the exception of the commitment to use pipelines to transport water or oil (and any BMPs incapable of being implemented without the use of said pipelines) until the applicable pipeline infrastructure is available to the Jamaso Well Site.

11. **ACP 8E Well Site Additional BMPs.** The ACP 8E Well Site is located near or in a floodway. The Parties agree that additional BMPs related to water preservation or protection shall be imposed by the City staff during the OGP application process in order to mitigate risks of potential contamination to the floodway.

12. **DIBC 18 Well Site Alternative.** If a Future Well Site becomes available for development as an alternative to the potential DIBC 18 Well Site in Section 16 and/or 7 of Township 3S, Range 65W, Operator may seek to have this Agreement amended in order to add the alternative locations pursuant to the process for adding Future Well Sites set forth in Article I, 7.B.ii.

13. **Well Site Analysis.** If legislation is passed allowing the City to require an analysis of alternate well sites be performed by Operator, any Well Site identified on Exhibit A will not require this analysis and will be deemed to have complied with any analysis requirement. The City shall honor existing contracts relating to surface use within boundaries of the City between Operator and other parties.

14. **Location of Future Well Sites.** The Operator shall include with any Amendment to this Agreement to add a Future Well Site that is either (A) within 500 feet of a Water Source or Critical Infrastructure or (B) within one mile of an existing or planned City reservoir (the “Increased Scrutiny Zone”):

- A. the proposed Well Site configuration and wellhead locations;
- B. the proximity of Water Sources and Critical Infrastructure within the Increased Scrutiny Zone as provided to Operator by the City; and
- C. technical information, *prepared by a qualified objective third party*, demonstrating that operations at the proposed Future Well Site protects and minimizes adverse impacts to the Water Sources and Critical Infrastructure within the Increased Scrutiny Zone.

Based on the City’s review of the information provided with the proposed Amended Exhibit A and D and accompanying information listed above, the City may request changes to the proposed Future Well Site location or orientation of the proposed Future Well Site and the implementation of additional BMPs at the Well Site to mitigate any adverse impacts to the Water Sources and Critical Infrastructure within the Increased Scrutiny Zone in advance of the Amendment being presented to the City Council for approval

For purposes of this Agreement, (A) “Water Sources” means all floodways, as defined by FEMA, and permanent City underground water storage facilities and (B) “Critical Infrastructure” means all existing or planned source water pipelines, potable waterlines of 16” diameter and greater, sanitary sewer pipelines of 24” diameter and greater, storm sewer pipelines (or box culverts) of 36” diameter or greater or City pump stations, lift stations, and bridges.

## ARTICLE II. OIL AND GAS PERMIT APPLICATIONS REVIEW PROCESS

1. **Applicability.** This review process will apply to any Well Site identified in Exhibits A and D that Operator develops pursuant to this Agreement within the Development Term(s).

2. **Pre-Application Process.**

A. **Pre-Application Meeting.** Operator shall request a pre-application meeting (a “Pre- Application Meeting”) with the Office of Development Assistance prior to submitting an application for any Well Site. The City shall schedule and hold the pre-application meeting within four (4) weeks of receipt of Operator’s request for a meeting. The City may waive the Pre-Application Meeting or Pre-Submittal requirement set forth below for any Well Site.

B. At the Pre-Application Meeting, Operator shall present the proposed project to the Office of Development Assistance to determine appropriate materials needed for the application, and any special conditions for the Well Site.

C. A sketch plan and detailed description of the Well Site must accompany the request for a Pre-Application Meeting.

D. The City shall provide Operator with comments from the Pre-Application Meeting within two (2) weeks of the meeting.

E. **Pre-Submittal Meeting.** Following the Pre-Application Meeting, the Operator shall request a pre-submittal meeting (a “Pre-Submittal Meeting”) with the City Staff to demonstrate the Operator’s ability to comply with BMPs. The City shall schedule and hold the Pre-Submittal meeting within seven (7) days of receipt of Operator’s request for a meeting. Operator will not be required to have a Pre-Application Meeting for the ACM and Hammer Well Sites.

F. At the Pre-Submittal Meeting, Operator shall request that a portal be opened to allow the application to be submitted. The City shall open the portal within seven (7) days of the Pre-Submittal Meeting if it has not already done so.

G. Operator may then submit the application. Operator shall not submit more than two OGP applications per three weeks. If Operator has more than one OGP application for a Well Site that has been deemed complete, it may provide a priority list for review of complete OGP applications.

H. **Required Application Contents.** An Oil and Gas Permit (“OGP”) application to the City contains the following (together, the “Submittal Requirements”):

- i. Site Plan which depicts the following:
  - a) Well Site layout
  - b) New Wells
  - c) Proposed location of Facilities
  - d) Road access
  - e) Haul route
  - f) Existing easements and rights-of-way
  - g) Visible improvements within 500 feet of the New Well
- ii. Vicinity or Context Map
  - a) Map must be topographic;
  - b) Must show Water Sources identified by the City; and
  - c) Must indicate distances to the nearest occupied structure, municipal boundary, and subdivision boundary.
- iii. Air Quality Plan
- iv. Fugitive Dust Suppression Plan
- v. Emergency Response Plan
- vi. Fluid Disposal Plan
- vii. Groundwater Quality Monitoring Plan
- viii. PHA-HAZOP Letter- The Operator will provide a letter that the PHA-HAZOP has been completed and the engineer of record has incorporated all applicable PHA-HAZOP recommendations in the design.
- ix. Interim Reclamation Plan

- x. Landscape Plan (including fencing and other criteria listed in the BMPs).
- xi. Lighting Plan
- xii. Noise Management Plan
- xiii. Operations Plan
- xiv. Project Development Schedule
- xv. Traffic Letter or other analysis requested in the Pre-Application Notes & Traffic Management Plan
- xvi. Visual Mitigation Plan
- xvii. Weed Control Plan
- xviii. Wildlife Impact Mitigation Plan (if applicable)
- xix. Water Delivery Agreement
- xx. Road Maintenance Agreement
- xxi. Application form submittal
- xxii. Submit to the City a copy of the Form 2A submitted to the COGCC which confirms the Operator's right to develop the mineral estate and confirms the ownership of the surface information and any BMPs imposed by COGCC, if already submitted to the COGCC.
- xxiii. Recorded Surface Use Agreement, if applicable
- xxiv. Storm Water Management Plan (Grading, Drainage and Erosion Plan)
- xxv. License Agreements, if applicable
- xxvi. Water Use Plan consistent with CDPHE Regulation 84

3. **Timing of Review Process, Completeness Determination Period.**

A. **City Completeness Determination.** Upon receipt of the Operator's OGP application, the City will initiate a Pre-Acceptance Review to determine whether the OGP application is sufficient to begin the review process. During the Pre-Acceptance Review, the City will identify any deficiencies in the OGP application and will notify the Operator within two (2) business days of receipt of the application. If no deficiencies are identified, an invoice of the OGP application fee listed in the City Code will be sent to the Operator. The OGP application fee must be paid prior to the City and outside agencies beginning review of the OGP application. If deficiencies to the OGP application are identified, the Operator shall address the deficiencies and resubmit the OGP application. The City will make a completeness determination within two (2) weeks of receipt of Operator's complete OGP.

B. **Timing of Review of Well Sites.** The City shall complete its review of all OGP Submittal Requirements and its decision on the OGP application within and in no greater than thirteen (13) weeks of receipt of the OGP application package ("Review Process"). The 13 week time period is dependent on the Operator and the City complying with their specified timeframes below. The OGP application must include all of the Submittal Requirements listed above, unless otherwise agreed to be the City and the Operator, and demonstrate that the Operator has incorporated all BMPs listed in Exhibit B. The aggregate thirteen (13) week timing of the Review Process will be divided as set forth below. The City shall complete its review of

the OGP application within three (3) weeks of receipt of the application. Operator shall have three (3) weeks to respond to Staff comments on the OGP application. Following receipt of the Operator's response to City's comments, the City shall have three (3) weeks to review Operator's responses to Staff's comments, and provide Operator with any subsequent comments, if any. Operator will have one (1) week to respond to any Staff subsequent comments ("Second Round of Operator Responses"). Following the Second Round of Operator Responses, the City will issue a decision on the OGP application within twenty-one (21) days of receipt of Operator's response to subsequent comments, if any.

C. **City Administrative Approvals.** If an OGP application meets all the requirements of Article II, 2.H. and includes all of the BMPs as described on Exhibit B, then approval of the OGP application will not be unreasonably withheld, conditioned or delayed. The City shall issue other administrative approvals for other local permits that may be required, including but not limited to, grading, stormwater and other permits necessary for the development of a Well Site. The City and the Operator may waive any step in the pre-application process or the Review Process by mutual agreement.

D. **Final Decision.** The City's decision with respect to any OGP application is final. For each day that the City's decision on an OGP application is delayed beyond the time frame provided for in the Pre-Application Process, the Completeness Determination and the Review Process, the City shall reimburse the Operator \$1,000 per day ("Delay Reimbursement"). This Delay Reimbursement is limited to 15 days per incident.

E. **Hearing Officer Process.**

If the City fails to meet the time requirements at any point in the overall OGP process, or fails to issue a decision on an OGP, the Operator may request a review by an independent third party selected in good faith by the Parties ("Hearing Officer"), in accordance with the following process:

- i. If Operator desires to request a review of the OGP application process by a Hearing Officer, Operator shall notify the City of that request, which shall include the specific, good-faith reason for the request.
- ii. The City will have ten (10) business days to respond to the request or to cure the breach by progressing the OGP application.
- iii. If the City fails to respond, or fails to progress the OGP application, or responds with a denial of the OGP application in breach of this Agreement, the Hearing Officer will then be chosen within seven (7) days.
- iv. The Hearing Officer must be qualified by education, training, and experience to hear and determine oil and gas disputes, permitting disputes, or must be a member of the International Institute for Conflict Prevention and Resolution's ("CPR") Energy, Oil & Gas Panel of Neutrals.

- v. If the Parties cannot mutually select the Hearing Officer within seven (7) days, the CPR will make the selection.
- vi. The Hearing Officer has fifteen (15) days to review the OGP application and provide a recommendation on what is needed to progress the application through the process (the "Recommendation"). The City will have ten (10) days to begin progressing the OGP application through the application process based on the Recommendation. If the Recommendation identifies a deficiency in the Operator's application, the Operator shall have ten (10) days to address the deficiency or communicate to the City how it plans to address the deficiency.
- vii. If the OGP application process is complete, but the City has not issued a decision, the Hearing Officer shall provide a Recommendation to the City on whether to approve or deny the OGP application.
- viii. If the City does not follow the Recommendation of the Hearing Officer within ten (10) days of the Hearing Officer's Recommendation, the City's failure to follow the Recommendation will be deemed a denial of the OGP application and constitute a final decision. Operator may appeal the decision pursuant to C.R.C.P. Section 106.

### **ARTICLE III. OTHER AGREEMENT TERMS AND CONDITIONS**

#### **1. Application Notices.**

A. **Notice of Application.** When Operator submits an OGP application to the City, the Operator shall include a list of all property owners (names, property addresses and mailing addresses) within one mile from the edge of a Well Site and all registered neighborhood organizations within one mile of the Well Site, and the surface owners of the property upon which the Well Site is located ("Notified Residents"). The City shall send out notices of the OGP application to Notified Residents when the review process commences for the purpose of receiving public comment.

B. **Notice of Administrative Decision.** The City shall provide Operator with a form letter for Notice of Administrative Decision for a pending OGP application. At least 10 calendar days prior to the scheduled decision on an OGP application, the Operator shall send out the Notice of Administrative Decision to the Notified Residents. The Operator shall provide proof to the City of mailed notices by affidavit or certificate of mailing.

2. **Resident Notification of Neighborhood Meeting.** When the City begins the OGP review process, the Operator shall send notification of a Neighborhood Meeting to all Notified Residents. The notice must include:

- Operator's contact information
- Approximate date to begin drilling
- Information on the Neighborhood Meeting

Operator shall send proof of mailed notices to the City by affidavit or certificate of mailing.

3. **Neighborhood Meeting.** Upon the City's completeness determination of the OGP application, the Operator shall hold a Neighborhood Meeting to facilitate engagement between the Operator and nearby Notified Residents of the applicable Well Site ("Neighborhood Meeting"). Operator shall notify all Notified Residents of the Neighborhood Meeting. Operator shall provide notice of a minimum of ten (10) days in advance of the Neighborhood Meeting. Notified Residents may submit written comments to the City about the OGP application including the BMPs. The City shall transmit those comments which require an Operator response to the Operator. Operator shall respond to those comments within 30 days in writing to the City. A Neighborhood Meeting may not be required if there are no residents within one mile of the Well Site, no comments are received from initial notice of filing of OGP application and both parties agree.

4. **Pre-Drilling Notice.** Operator will comply with the mailing requirements of the Move-In, Rig-Up Notice required by the COGCC rules.

5. **Notification of Submittal of COGCC Permits, Orders and Approvals.** At the time the Operator files any COGCC Forms 2 or 2A for a New Well or Well Site, the Operator will provide the City a copy of such filings and shall provide the City with notification of any decision with respect to any COGCC Forms 2 or 2A for a New Well or a Well Site and Operator's best estimate as to when the Construction Phase for such New Well or Well Site will begin.

6. **Use of Pipelines.** (Pipelines includes all pipelines subject to regulation by PHMSA and all flowlines subject to regulation by the COGCC.) Operator shall use pipelines as required by this Agreement and Exhibit B. The City acknowledges that an affiliate or subsidiary of Operator may be permitting and /or constructing the pipeline. The City agrees to cooperate with the Operator and its affiliates with obtaining the pipeline permits or licenses. Any necessary approvals associated with the pipeline will not be unreasonably delayed or withheld. Operator has provided the City with a confidential map showing the currently anticipated and approximate location and dimensions of all its proposed pipelines within the City, which will be incorporated in a diagram provided confidentially to the City.

7. **Lease Retention with Lease Holding Wells.** The Parties recognize that the Operator has certain leases that may shortly expire. In order for Operator to retain acreage, Operator will be permitted to drill, complete and produce wells ("Lease Holding Wells") on one or more Well Sites in a number not to exceed the minimum number required to prevent such acreage from expiring. Operator will not be required to utilize pipelines and other supporting infrastructure or BMPs on Exhibit B that support or require the use of pipelines and other supporting infrastructure on such Lease Holding Wells. Once the pipeline and other supporting infrastructure is available for implementation at Lease Holding Wells, Operator will be required to utilize the pipelines and all the BMPs on Exhibit B.

8. **Protests, Objections, and Minor Changes.** By entering into this Agreement, the Parties agree to the included BMPs that provide protections for public health, safety, welfare and the environment. So long as the Operator complies with the terms and conditions of this Agreement,

A. the City agrees that it shall not protest, request a hearing, oppose or object in any forum to any permits, applications or similarly related approvals related to the Operator's oil and gas operations and plan of development subject to this Agreement;

B. the Operator may seek a minor exception to strict application of the BMPs as provided in Exhibit B, BMP51. The City will not unreasonably withhold, condition, or delay approval of minor exceptions to BMPs.

9. **Inspections.**

A. The Operator will conduct its air, ground water and plugged and decommissioned well monitoring programs pursuant to the BMPs at its own cost. Additionally, the Operator agrees to allow the City access to the Well Sites for the purpose of undertaking compliance inspections, provided the City personnel are equipped with all appropriate personal protection equipment (PPE), that such personnel comply with the Operator's customary safety rules and are accompanied by an Operator's representative. The City shall provide twenty-four (24) hour advance notice to the Operator prior to an inspection of a stormwater event. For all other inspections the City shall provide forty-eight (48) hours' notice beforehand. The City agrees to provide the Operator with the results of any inspection within forty-eight (48) hours of the inspection. Additionally, the City reserves the right to contact the appropriate COGCC or CDPHE area inspector if non-compliance issues related to state laws, rules or regulations are identified as a result of field inspections or if non-compliance issues are not resolved expeditiously.

B. **Cost of Inspection.** Operator shall pay for the reasonable costs incurred from the compliance inspection. The City may choose one of the following means for recovering cost:

- i. The City may invoice Operator for the costs reasonably incurred during the inspection of the Well Sites. Operator shall pay the invoiced amount within 30 business days.
- ii. Alternatively, the City may impose an inspection fee on Operator as authorized by Section 4 of SB 19-181. The fee will cover the City's reasonable cost of the compliance inspection and will be in lieu of the per-well reimbursement payment provided by Operator stated above.

10. **Culverts.** Operator shall construct all necessary culverts for road construction, per any available City or County, as applicable, Drainage Plan. In the event no information is available the Operator shall complete any necessary studies or analysis to determine the appropriate culvert size.

11. **Enforcement of BMPs.** The Parties understand and agree that the BMPs shall be enforced as follows:

A. BMPs that impose requirements that go beyond or are not addressed by current state or federal requirements and for which the relevant state or federal agency does not have enforcement authority, may be enforced by the City under this Agreement pursuant to the enforcement, dispute resolution and default and remedies provisions included in this Agreement.

B. With respect to BMPs that duplicate current state or federal requirements, the City may monitor these BMPs and, if the City believes that the Operator is not complying with any of these BMPs, request investigation or enforcement of the corresponding state or federal requirements with the relevant state or federal agency, but the City shall not enforce on those BMPs under this Agreement unless the relevant state or federal agency fails to enforce any of these BMPs. If the relevant state or federal agency determines that no violation of the relevant state or federal agency requirements has occurred, then such determination by the relevant state or federal agency shall conclusively establish the Operator's compliance with the corresponding BMPs. If the relevant state or federal agency determines that the relevant state or federal agency requirements have been violated, then such agency's resolution of such alleged violation shall constitute all enforcement due with respect to the corresponding BMPs under this Agreement and the City shall not impose any further enforcement.

12. **New Technologies.** The City through the office of the City Manager may propose to Operator, in writing, new technologies for the BMPs reasonably believed to have a material benefit for public health, safety, welfare, and the environment within the City limits. Such proposal will describe in sufficient detail:

- A. the technology to be considered;
- B. the performance objective in the BMPs that is addressed by the technology; and
- C. support for why the technology will be materially beneficial.

Operator will consider the proposal in good faith and provide the City with a written response within thirty (30) business days stating whether and where Operator will employ the proposed technology within the City limits and providing a brief explanation for why Operator will or will not employ the proposed technology.

Operator on its part may notify the City in writing of any new technology that it seeks to implement that would have a material benefit to public health, safety, welfare, and the environment and will seek written approval from the City to modify one or more of the conditions set forth in the OGP or OGP application to employ the proposed technology at a particular identified Well Site. The use of the new technology will be a minor adjustment and will be approved administratively without being subject to a hearing.

Any dispute arising as to the use of a proposed new technology will be determined by a third party expert agreed upon by the Parties. The Parties agree to review the BMPs for the potential of implementing new technologies at least every 5 years.

## ARTICLE IV. OTHER PROVISIONS

1. **Vesting of Property Rights.** This Agreement constitutes a site specific development plan under C.R.S. Sec. 24-68-101, et. seq. and represents a vested property right for the Operator to develop the Well Sites so long as Operator is in compliance with the Agreement. So long as Operator is in compliance with this Agreement, the Parties agree that Operator will have a vested property right to develop the Well Sites for five years (A) from the Effective Date of this Agreement for those Well Sites included on Exhibit D as of the Effective Date and (B) from the date a Well Site is added to Exhibit D pursuant to Article I, Section 7(B)(ii).

2. **Future Regulations.** The City reserves the right in the future to enact and apply prospectively regulations that are general in nature and that are applicable to all commercial and industrial operations in the City, provided however that the application of such prospective regulations does not materially impede, preclude, or financially burden Operator's operations generally authorized by this Agreement and, further that such regulations are not preempted by state law.

3. **Force Majeure.**

A. Subject to the terms and conditions in this Paragraph, neither Party to this Agreement shall be liable for any delay or failure to perform under this Agreement due solely to conditions or events of Force Majeure, as that term is specifically defined herein; provided that:

- i. the non-performing Party gives the other Party prompt written notice describing the particulars of the occurrence of the Force Majeure;
- ii. the suspension of performance is of no greater scope and of no longer duration than is required by the Force Majeure event or condition; and
- iii. the non-performing Party proceeds with reasonable diligence to remedy its inability to perform and provides weekly progress reports to the other Party describing the actions taken to remedy the consequences of the Force Majeure event or condition.

B. As used herein, "Force Majeure" shall mean any delay or failure of a Party to perform its obligations under this Agreement caused by events beyond the Party's reasonable control, and without the fault or negligence of the Party, including, without limitation:

- i. changes in federal or state law or administrative practice concerning water rights administration, water quality or stream flow requirements;
- ii. changes in state water rights administrative practice concerning the reuse of reclaimed water through leases to others for use at locations outside the City limits, including, but not limited to, challenges to retained dominion and control;
- iii. acts of God, sudden actions of the elements such as floods, earthquakes, hurricanes, or tornadoes, sabotage, vandalism beyond that which can be

reasonably prevented by the Party, terrorism (including eco-terrorism), war, riots, fire, explosion, severe weather, snow, other extreme weather conditions, and drought or water curtailment;

- iv. blockages, insurrection, bans, moratoriums, strike, slow down or labor disruptions (even if such difficulties could be resolved by conceding to the demands of a labor group);
- v. actions by federal, state, municipal or any other government or agency (including but not limited to, the adoption or change in any rule or regulation or environmental constraint imposed by federal, state or local government bodies) but only if such requirements, actions, or failures to act prevent or delay performance;
- vi. inability, despite due diligence, to obtain required licenses, permits, approvals or water supplies, infrastructure, electricity, equipment, services materials (including sand) or fuel; and
- vii. changes of law relating to financial obligations, revenues and budgetary matters concerning Colorado local governments and their enterprises.

C. If permits to perform operations for New Wells from the state, the COGCC, or the City are not approved in a time frame which allows Operator to drill New Wells prior to the end of the applicable Development Term for the applicable Well Site, this will be deemed Force Majeure and the Development Term for the applicable Well Site will be extended to allow Operator sufficient time to receive approved permits and drill and complete the New Wells. Operator shall submit all OGP applications for the Well Sites that Operator plans to develop during the Development Term listed in Exhibit D within a reasonable amount of time in advance of the end of the respective Well Site Development Term to allow for compliance with Article I, 3.

4. **Authority to Execute Agreement.** Each Party represents that the undersigned individuals have the full right and authority to enter into this Agreement and bind the Parties to the terms and conditions contained herein.

5. **Assignment.** The City Manager shall approve assignment of this Agreement so long as the potential assignee can demonstrate that it can comply with all terms of this Agreement. The potential assignees must provide proof of insurance meeting the requirements set forth on Exhibit C to the satisfaction of the City's Risk Manager. Operator may assign this Agreement to a subsidiary without prior written consent but shall provide the City notice of any assignment. The City may not assign any right, duty, or obligation under this Agreement without the prior written consent of Operator.

6. **Successors and Assigns.** The terms and conditions of this Agreement shall bind and extend to the City and the Operator, and the Operator's successors and assigns, and the Operator shall require any successor and assign, by written agreement, to adhere to all terms and conditions of this Agreement, and to expressly assume the defense and indemnity insurance or bond obligations to the City as set forth herein in an assignment document reasonably acceptable

in form to the City. Such assignment shall not relieve the assignor of any obligations that accrued during the period of assignor's operation or otherwise arising out of the actions or inactions of the assignor during its period of operation.

7. **No Third-Party Beneficiaries.** This Agreement is not intended to, and does not create, any right, benefit, responsibility or obligation that may be enforced by any non-Party. Additionally, nothing in the Agreement shall entitle any third party to any claims, rights or remedies of any kind.

8. **Notices.** All notices and other correspondence related to this Agreement shall be in writing and shall be delivered by: (A) certified mail with return receipt, or (B) hand delivery with signature or delivery receipt provided by a third party courier service (such as FedEx, UPS, etc.) to the designated representative of the Party as indicated below, or (C) email to the designated representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Party. The initial representatives of the Parties are as follows:

City: **City of Aurora  
City Attorney's Office  
15151 E. Alameda Parkway, #5300  
Aurora, CO 80012**

**Attn: City Attorney  
Telephone: 303-739-7030  
Email: dbrotzma@auroragov.org**

Operator: **Extraction Oil & Gas, Inc.  
370 17th Street, Suite 5300  
Denver, CO 80202**

**Attn: Legal Department  
Telephone: 720-557-8300  
Email: legalnotices@extractionog.com**

9. **Default.**

A. If either Party fails to perform any of its obligations set forth in this Agreement, and the Party fails to cure such breach or failure within 30 days after notice of such breach ("Cure Period") by the non-breaching Party, this act or omission constitutes a breach.

B. If such breach or failure is of a nature which cannot reasonably be cured within the Cure Period, the Party shall commence within the Cure Period to cure and diligently pursue to resolve.

C. If a breach cannot be remedied, the Parties may determine that the breach is not material to the Agreement and continue without termination.

10. **Remedies.**

A. If any Party fails to make a payment when due under this Agreement, such Party shall pay the amount of damages plus any interest provided by law.

B. Neither Party is entitled to recover any special, consequential or punitive damages for the other Party's breach of this Agreement.

11. **Dispute Resolution.** Any dispute, or claim (of any kind) arising out of or relating in any way to this Agreement ("Dispute") other than a dispute or claim involving an OGP application, must be resolved as follows: if a Dispute relating to this Agreement arises among the Parties, the Parties shall first consider any proposed resolution by either Party on the matter. The Parties shall, in good faith, negotiate a resolution. If the Dispute is not resolved, the Parties shall promptly convene a meeting to be attended by persons with decision-making authority regarding the Dispute. The meeting attendees shall negotiate in good faith toward a resolution of the Dispute.

12. **Indemnity.**

A. **General Indemnity.** Operator shall indemnify, defend, and hold the City harmless from and against all losses, damages, claims, demands, and suits (including court costs and reasonable attorney's fees) that the City might incur or be liable for (collectively "Claims") to the extent that such Claims result directly from the Operator's Operations or failure to act under this Agreement, except to the extent any Claims result from or are attributable to the negligence, gross negligence, willful misconduct, or malicious acts (or omissions) of the City, its employees, or representatives. Claims are limited to those arising from or related to personal injury, physical damage to or loss of property, death, and Environmental Liabilities as defined below.

B. **Environmental Indemnity.** Operator hereby agrees to indemnify, defend and hold harmless the City and other Indemnified Parties from and against any and all Environmental Liabilities caused by Operator and imposed upon or asserted against an Indemnified Party and related to this Project whenever and by whomever asserted.

As used in this Section, "Environmental Liabilities" shall mean any obligations or liabilities (including any claims, demands, actions, suits, judgments, orders, writs, decrees, permits or injunctions imposed by any court, administrative agency, tribunal or otherwise, or other assertions of obligations and liabilities) that are related to contamination of the environment or human health or safety and involving Operator's Well Sites and operations pursuant to this Agreement (including, but not limited to, on site or off site contamination by pollutants and occupational safety and health).

The term "Environmental Liabilities" shall include, but not be limited to: (i) fines, penalties, judgments, awards, settlements, losses, damages, costs, fees (including attorneys' and consultants' fees), expenses and disbursements; (ii) defense and other responses to any administrative or judicial action (including claims, notice letters, complaints, and other assertions of liability); and (iii) financial responsibility for (1) cleanup costs and injunctive relief, including

any removal, remedial or other response actions and (2) any other compliance or remedial measures.

The terms "removal," "remedial" and "response" action shall include the types of activities covered by CERCLA, as amended, and whether the activities are those which might be taken by a governmental entity or those for which a governmental entity might seek to require of waste generators, storers, treaters, owners, operators, transporters, disposers or other persons under "removal," "remedial," or other "response" actions.

C. **Indemnification Procedures.**

i. If any claim relating to the matters indemnified against pursuant to this Agreement is asserted against a Party that may result in any damage for which that Party is entitled to indemnification under this Agreement ("Indemnified Party"), then the Indemnified Party shall promptly give notice of such claim to Operator.

ii. Upon receipt of such notice, Operator shall have the right to undertake, by counsel or representatives of its own choosing, the good faith defense, compromise or settlement of the claim, such defense, compromise or settlement to be undertaken on behalf of Operator.

iii. The Indemnified Party shall cooperate with Operator in such defense at Operator's expense and provide Operator with all information and assistance reasonably necessary to permit the Operator to settle and/or defend any such claim.

iv. The Indemnified Party may, but shall not be obligated to, participate at its own expense in a defense of the claim by counsel of its own choosing, but Operator shall be entitled to control the defense unless the Indemnified Party has relieved Operator from liability with respect to the particular matter.

v. If the Operator elects to undertake such defense by its own counsel or representatives, Operator shall give notice of such election to the Indemnified Party within ten (10) business days after receiving notice of the claim from the Indemnified Party.

vi. If Operator does not so elect or fails to act within such period of ten (10) business days, the Indemnified Party may, but shall not be obligated to, undertake the sole defense thereof by counsel or other representatives designated by it, such defense to be at the expense of Operator.

vii. The assumption of such sole defense by the Indemnified Party shall in no way affect the indemnification obligations of Operator; provided, that no settlement of any claim shall be effected without Operator's consent.

13. **Integration Clause.** This Agreement, along with all Exhibits attached hereto, represents the entire agreement of the Parties, and neither Party has relied upon any fact or representation not expressly set forth herein. All prior and contemporaneous conversations, negotiations, possible alleged agreements, representations, covenants and warranties concerning the subject matter hereof, are merged in this Agreement, and this Agreement supersedes all previous understandings and agreements between the Parties, whether oral or written.

14. **Conflicts.** In the event that conflicts exist within the terms and conditions of this Agreement and the attached Exhibits, the terms of this Agreement control.

15. **Governing Law and Venue.** This Agreement shall be governed and construed in accordance with the laws of the State of Colorado without reference to its conflicts of laws provisions. Should it be necessary to initiate court proceedings concerning this Agreement, the Parties agree that venue shall be in the District Court for Arapahoe County, Colorado.

16. **Insurance.** The Operator agrees to provide insurance under the conditions, and in the amounts, set forth on Exhibit C.

17. **Severability.**

A. If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it conflicts with such laws; however, the remainder of this Agreement shall be in full force and effect.

B. In the event that any part of this Agreement would otherwise be unenforceable or in conflict with applicable laws due to the term or period for which such part is in effect, the term or period for which such part of this Agreement shall be in effect shall be limited to the longest period allowable which does not cause such part to be unenforceable or in conflict with applicable laws.

C. If any section, paragraph, provision, or portion thereof of this Agreement is held by any Court to be void and/or unenforceable for any reason, such section, paragraph, provision, or portion thereof shall be excised from the Agreement and shall be replaced with terms and provisions that are most consistent with, and which reflect, the Parties' intention. All remaining sections, paragraphs, provisions, or portions thereof shall remain in full force and effect.

18. **No Attorneys' Fees.** In the event of any litigation, mediation, arbitration or other dispute resolution process arising out of or related to this Agreement, each Party agrees to be responsible for its own attorneys' and other professional fees, costs and expenses associated with any such proceedings.

19. **No Presumption.** The Parties to this Agreement and their attorneys have had a full opportunity to review and participate in the drafting of the final form of this Agreement. Accordingly, this Agreement shall be construed without regard to any presumption or other rule of construction against the Party causing the Agreement to be drafted.

20. **Amendments.** This Agreement may be amended only by an instrument executed by both Parties and approved by City Council following a public hearing.

21. **Waiver.** No failure on the part of any party hereto to exercise and no delay in exercising any right hereunder shall operate as a waiver of such right. The remedies provided for herein are cumulative and not exclusive of any remedies provided by law or at equity. No waiver of or failure to exercise any right hereunder shall operate to prevent future enforcement of such right.

23. **Third Party Consultant.** This Agreement and accompanying BMPs listed in Exhibit B contain provisions establishing that the Operator shall undertake certain action items “to the maximum extent practicable” or where “practicable.” If Operator does not fully undertake any such action because the Operator informs the City it is not “practicable,” and provides the City with a written statement and documentation to support lack of practicability, the Operator agrees that the City has the right to obtain an independent third party expert’s opinion as to practicability and Operator shall reimburse the City any reasonable costs associated with such third party’s opinion if such opinion finds that further implementation is indeed practicable and such opinion was sought by the City in good faith and within reason. The City and the Operator together will select the consultant to ensure that the consultant has the required expertise to undertake the “practicability” analysis.

24. **Headings.** The descriptive headings of the sections of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any provisions herein.

*[Signature pages to follow.]*

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by a duly authorized representative on the day and year first written above.

**THE CITY:**

THE CITY OF AURORA, COLORADO

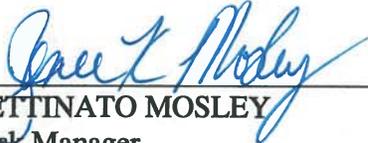


BOB LEGARE  
Mayor

ATTEST:



STEPHEN RUGER  
City Clerk



PETTINATO MOSLEY  
Risk Manager

APPROVED AS TO FORM:



CHRISTINE MCKENNEY  
Interim Client Manager

**THE OPERATOR:**



ERIC J. CHRIST  
Vice President, General Counsel &  
Corporate Secretary

[Acknowledgements on following page]

ACKNOWLEDGEMENTS

STATE OF COLORADO  
COUNTY OF ADAMS

This Agreement was acknowledged before me on, July 24, 2019 by, Bob LeGare as Mayor of the City of Aurora, Colorado, a municipal corporation.



Notary Public, State of Colorado  
My commission expires:

BARBARA L. SHAFER  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 20034031125  
MY COMMISSION EXPIRES 09/17/2019

STATE OF COLORADO  
COUNTY OF DENVER

This Agreement was acknowledged before me on July 17, 2019 by Eric J. Christ, as Vice President, General Counsel & Corporate Secretary of Axis Exploration, LLC, a Delaware limited liability company.

Notary Public, State of Colorado  
My commission expires: 11-20-2023

AMANDA EWING  
Notary Public  
State of Colorado  
Notary ID # 20114024382  
My Commission Expires 04-20-2023

**List of Exhibits:**

- Exhibit A: Map of Well Sites
- Exhibit B: Best Management Practices for New Wells and Well Sites
- Exhibit C: Insurance Requirements
- Exhibit D: Table of Well Sites, Location and Development Term

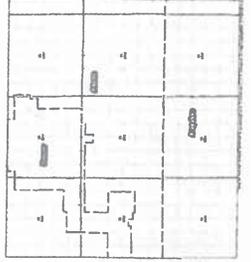
# EXHIBIT A

Scale: 1:13,869  
PROJECT: MACDS  
Date: 6/12/2019  
Author: CMB



1 inch = 13869 feet  
0 0.25 0.5 1

Legend



## EXHIBIT B

To the Operator Agreement  
between Axis Exploration and the City of Aurora dated June \_\_\_\_, 2019

### **BEST MANAGEMENT PRACTICES FOR NEW WELLS AND WELL SITES**

Operator shall include those BMPs listed in this Exhibit B which are within the jurisdiction of the COGCC on all Applications for Permit-to-Drill, Form 2 ("Form 2"), and Oil and Gas Location Assessments, Form 2A ("Form 2A"), submitted to the COGCC for a New Well at the Well Sites or a Sundry Notice for any Form 2 or Form 2A filed prior to the Effective Date.

#### **1. Definitions.**

- A. ***New Wells.*** New Well shall have the definition set forth for such term in the Agreement. The BMPs shall apply to all New Wells drilled by the Operator on the Well Sites.
- B. ***Residential Building Unit.*** For purposes of this Agreement, is defined the same as the COGCC rules.
- C. ***Phases of Operation.*** For purposes of this Agreement, the phases of operation at a Well Site shall be defined as follows:
  - i. **"Construction Phase"** shall mean the conducting of civil and earth work in connection with the construction and installation of drilling pads, visual mitigation measures, access routes, pipelines and launcher/receiver locations.
  - ii. **"Drilling Phase"** shall mean the period in which a drilling or spudder rig is utilized to penetrate the surface of the earth with a drill bit and the installation of well casing and cement at one or more wells.
  - iii. **"Completion Phase"** shall mean the period of hydraulic fracturing, coiling, workover, installation of tubing and flowback of one or more wells.
  - iv. **"Production Phase"** shall mean the period in which one or more wells is capable of producing hydrocarbons that flow through permanent separator facilities and, if applicable, into the pipeline gathering system.
  - v. **"Reclamation Phase"** shall mean the period as defined by COGCC rules.

For the avoidance of doubt, it is possible for multiple phases of operation to be occurring at the same time with respect to a single Well Site. Notwithstanding the foregoing, Operator agrees that it will not conduct the drilling phase and completion phase operations simultaneously at a single Well Site.

2. ***Quiet Completions Technology.*** As set forth in Exhibit D, Operator shall use quiet completions technology on any Well Site that is on a property located in zoning districts that allow for residential development or if a residential building unit is located within 1,320 feet from the edge of a Well Site located in a zoning district that does not allow for residential development unless Operator obtains waivers from all property owners within that distance regarding quiet completions technology use.
3. ***Mitigation Barriers using Berms, Bales and Sound Walls.*** During the Drilling and Completion Phases for mitigation of dust, noise and visual disturbance, the Operator shall use a combination of berms, bales and sound walls at the perimeter of any Well Site that is on property located in zoning districts that allow for residential development or if a residential building unit is located within 1,320 feet from the edge of a Well Site located in a zoning district that does not allow for residential development unless Operator obtains waivers from all property owners within that distance regarding the use of such mitigations.
4. ***Use of Pipelines.*** Except as otherwise provided for in this Agreement, the Operator agrees to use separate pipelines for the transportation of raw water to and from the Well Sites and the transportation of hydrocarbons and produced water from the Well Sites. Pipelines servicing a particular Well Site must be constructed before the Production Phase commences at such Well Site. During the Completions Phase, the Operator will use flowlines and pipelines for flowback to the maximum extent practicable. All raw water related to completions activities shall be transported to the Well Sites by pipeline. The Operator's obligation to build and utilize pipelines is contingent upon (a) the City and Operator, its affiliate or a third party contractor entering into all necessary license or easement agreements for road right-of-ways and water license agreements, (b) Operator or its affiliate acquiring all pipeline easements where necessary, and (c) the City issuing all necessary permits for work within the City. Operator shall be permitted to utilize temporary tanks during the drilling and completion phases and during maintenance operations, provided Operator has provided proper notice regarding location and required screening for temporary tanks if the maintenance or temporary tanks are present longer than a week. For maintenance operations that are expected to extend greater than seven days, Operator shall give the City's Planning Director or designee prior notice of maintenance activities within three days of commencing the maintenance operations and the planned number of temporary tanks. Operator may use temporary tanks for up to one month for a Well Site during any single maintenance operation without the need for adding appropriate temporary visual screening (e.g., hay bales).
5. ***Notifications to the City Regarding Commencement of Operations and Phases of Operations.*** Operator shall provide written notice to the City no less than thirty (30) days prior to the commencement of any of the following: Construction Phase (unless the Construction Phase commences within 45 days of the approval of the applicable Form 2 or Form 2A), Drilling Phase, Completion Phase, or any recompletion, re-drilling or plugging and abandonment of a New Well. Until commencement of the Production Phase at a Well Site, Operator shall notify the Office of the City Manager as to the status of development at each active Well Site monthly. Any notification provided by Operator to City pursuant to this Agreement may be used by the City for public notification.

6. ***Closed-Loop Pitless Systems for the Containment and/or Recycling of Drilling Fluids.*** New Wells shall be drilled, completed and operated using closed-loop pitless systems for containment and/or reuse of all drilling, completion, flowback and produced fluids. Operator shall reuse fluids to the maximum extent practicable, with the understanding that Operator is limited in its ability to reuse all fluids. All aboveground storage, including temporary tanks and separators, for use during drilling, completion, flowback and other produced fluids shall have secondary containment.
7. ***Burning.*** No open burning shall occur on any Well Site.
8. ***Chemical Disclosure and Storage.*** All hydraulic fracturing chemicals must be disclosed to Aurora Fire Rescue as part of the Emergency Response Plan pursuant to the process set forth below before bringing on a Well Site. The Operator shall make available to the City, in table format, the name, Chemical Abstracts Service (CAS) number and storage, containment and disposal methods for such chemicals to be used on the Well Sites, which the City may make available to the public as public records. Fracturing chemicals shall be uploaded onto the Frac Focus website within sixty days of the completion of fracturing operations. The Operator shall not permanently store fracturing chemicals, or flowback from hydraulic fracturing on a Well Site. Operator shall remove all unused hydraulic fracturing chemicals at a Well Site within thirty (30) days following the end of the Completion Phase at that Well Site.

In addition to any substances that are not permitted to be used in accordance with state or federal rules or regulations in place from time to time, the following chemicals shall not be utilized in the hydraulic fracturing fluid at the Well Sites:

<b>Ingredient Name</b>	<b>CAS #</b>
Benzene	71-43-2
Lead	7439-92-1
Mercury	7439-97-6
Arsenic	740-38-2
Cadmium	7440-43-9
Chromium	7440-47-3
Ethylbenzene	100-41-4
Xylene-f	1330-20-7

1,3,5-trimethylbenzene	108-67-8
1,4-dioxane	123-91-1
2-butoxyethanol	111-76-2
N,N-dimethylformamide	68-12-2
2-ethylhexanol	104-76-7
2-mercaptoethanol	60-24-2
benzene, 1, 1'-oxybis-, tetrapropylene derivatives, sulfonated, sodium salts (BOTS)	119345-04-9
Butyl glycidyl ether	8/6/2426
Polysorbate 80	9005-65-6
quaternary ammonium compounds, dicoco alkyldimethyl, chlorides (QAC)	61789-77-3
bis hexamethylene triamine penta methylene phosphonic acid (BMPA)	35657-77-3
FD&C blue no. 1	3844-45-9
Tetrakis(triethanolamino) zirconium (IV)(TTZ)	101033-44-7

9. **Color.** All permanent aboveground production equipment, structures and stationary equipment on each Well Site shall be painted in a tan or brown matte finish unless a different color is necessary for safety or per regulations.
10. **Low Profile Equipment.** If technically feasible, the Operator will use at its Well Sites low profile equipment, such as low profile tanks, associated production equipment and combustion devices.

11. ***Tree Mitigation.*** Well Sites should be constructed in a manner that minimizes the removal of and damage to existing trees in accordance with the City's tree mitigation ordinance.
12. ***Discharge Valves.*** Open-ended discharge valves on all storage tanks, pipelines and other containers within the Well Site shall be secured, capped, or blind-flanged and shall not be accessible to the general public. Open-ended discharge valves within the Well Site shall be placed within the interior of the secondary containment area.
13. ***Fugitive Dust Suppression.*** Dust associated with activities on Well Sites and traffic on access roads shall be minimized throughout construction, drilling and operational activities such that there are no visible dust emissions from access roads or the Well Sites to the maximum extent practicable given wind conditions. No untreated produced water or other process fluids shall be used for dust suppression. At the Well Site, sand, silica, or similar material must be stored in covered containers. Safety Data Sheets (SDS) for any chemical-based dust suppressant, other than magnesium chloride, shall be submitted to the City prior to use.
14. ***Electric Equipment.*** If technically and economically feasible, Operator shall use electric line power to power drilling equipment during the Drilling Phase and to power permanent production equipment, such as compressors, motors and pump jacks, in order to mitigate noise and to reduce emissions.
15. ***Emergency Action Plan.*** The Operator is required to complete a detailed Emergency Action Plan for all operations in City of Aurora, and a site-specific plan for each Well Site in accordance with the provisions of this BMP, and Operator agrees to notify and work with Aurora Fire Rescue and Aurora Public Safety to prepare for an emergency, if requested by them to do so. In case of an emergency, the Operator will have appropriate response foam available to respond to emergencies related to the Well Sites. The City and Aurora Fire Rescue must approve of the Emergency Action Plan before the Drilling Phase commences. As long as all requirements of this BMP are met, the City and Aurora Fire Rescue shall not unreasonably withhold approval and shall approve the Emergency Action Plan within thirty (30) days of submittal.

The Emergency Action Plan shall be filed with the City and Aurora Fire Rescue and updated on an annual basis or as conditions change (responsible field personnel changes, ownership changes, etc.).

The Emergency Action Plan shall consist of at least the following information:

- A. Name, address and phone number, including twenty-four (24) hour emergency numbers for at least two persons responsible for emergency field

operations as well as the contact information for any subcontractor of Operator engaged for well-control emergencies.

- B. An as-built facilities map, to be provided after the facilities are placed in service, in a format suitable for input into a GIS system depicting the location of above ground facilities and associated equipment for emergency response and management purposes. The information concerning flowlines shall be held confidentially by the City and shall only be disclosed in the event of an emergency or to emergency responders or for the training of emergency responders. The City shall deny the right of inspection of the as-built facilities maps to the public pursuant to C.R.S. § 24-72-204.
- C. A detailed plan for response to emergencies that may include any or all of the following: explosions, fires, gas, oil or water pipeline leaks, or ruptures. A provision that any spill outside of the containment area that has the potential to leave the Well Site or to threaten waters of the state, or as required by the City-approved Emergency Action Plan, shall be reported to the City's LGD and the COGCC in accordance with COGCC regulations.
- D. Detailed information identifying access or evacuation routes and healthcare facilities anticipated to be used.
- E. A statement and detailed information indicating that the Operator has adequate personnel, supplies and training to implement the Emergency Action Plan immediately at all times.
- F. The Operator shall have current Safety Data Sheets (SDS) for all chemicals available upon request. The SDS sheets shall be provided immediately upon request to City officials, a public safety officer, or a health professional as required by COGCC Rule 205. Operator's contractors are responsible for management of their own SDS sheets and are to be made available upon request.
- G. All "walk throughs" or trainings associated with the Emergency Action Plan shall be coordinated with the City or Aurora Fire Rescue, upon their request.
- H. Operator shall reimburse the appropriate emergency agencies for their reasonable expenses directly resulting from the Operator's operations, to the extent required by Colorado Revised Statutes.
- I. Operator shall provide the City with its emergency shutdown protocols and promptly notify the City of any emergency shutdowns related to onsite upset conditions that would have an impact to any area beyond the confines of the Well Site.

16. ***Air Quality and Air Quality Monitoring Plan.*** In order to minimize degradation to air quality, Operator agrees to the provisions set forth in this BMP. Operator must minimize all potentially harmful emissions and minimize dust associated with onsite activities and traffic on access roads pursuant to the terms of this Agreement. Operator shall comply with all applicable state and federal regulations, including regulations promulgated by CDPHE, COGCC and US EPA.
- A. ***Air Modeling Study.*** Operator will contribute its proportionate share of collateral in a form of bond to the City for use in a dispersion model in an amount not to exceed \$25,000.00. Operator will post the bond ten (10) days following the Effective Date. The bond will be released by the City two (2) years after the Drilling and Completions phases have been completed for all Well Sites. Operator shall submit a written request to the City for the release of the bond.
- B. **Minimization of Emissions.**

To protect air quality, the following will be required:

- i. The use of electric equipment and electric line power for the drilling rig (which does not include the surface rig) and to operate all permanent production equipment where technically and economically feasible.
- ii. The use of Tier 2 and (liquefied or compressed) natural gas dual fuel hydraulic fracturing pumps. If Tier 4 fracturing pumps become technically and economically feasible and commercially available to the Operator, Operator will begin using Tier 4 fracturing pumps.
- iii. The use of no-bleed continuous and intermittent pneumatic devices that do not bleed natural gas to the atmosphere. This requirement can be met by replacing natural gas with electricity or instrument air, or routing the discharge emissions to a closed loop-system or process.
- iv. Any combustion device, auto ignition system, recorder, vapor recovery device or other equipment used to meet the hydrocarbon destruction or control efficiency used to meet the relevant BMP shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.
- v. Year-round compliance with the odor standards pursuant to COGCC and CDPHE regulations.

- vi. Reduction of emissions from oil and gas well maintenance activities. For planned maintenance activities involving the intentional venting of gas, the Operator shall provide forty-eight (48) hour advance written notice to the City of such proposed venting. Such notice shall identify the duration and nature of the venting event, a description as to why venting is necessary, a description of what vapors will likely be vented, what steps will be taken to limit the duration of venting, and what steps the Operator proposes to undertake to minimize similar events in the future.
- vii. If emergency venting is required, or if accidental venting occurs, the Operator shall provide notice to the City of such event as soon as, but in no event later than 24 hours from the time of the event, with the information listed above and with an explanation as to the cause and how the event will be avoided in the future.
- viii. Telemetric control and monitoring systems, to detect when pilot lights on control devices are extinguished.
- ix. Exhaust from all engines, motors, coolers, and all other equipment must be vented up and away from nearest residences.
- x. Operator agrees to participate in Natural Gas STAR program or other voluntary programs to encourage innovation in pollution control at the Well Sites.

C. Air Monitoring and Leak Detection.

- i. ***Leak Detection and Repair.*** During the Production Phase, the Operator shall develop and maintain a leak detection and repair ("LDAR") program as required by CDPHE using modern leak detection technologies such as infra-red cameras for equipment used on the Well Sites. For the first five (5) years of the Production Phase at a Well Site, the Operator shall conduct semi-annual IR camera monitoring of all equipment at the Well Sites. After the initial five (5) year period, the Operator can reduce 112 camera monitoring frequency to annually provided the Well Site is electrified.

Except when an emergency circumstance would necessitate an immediate repair, Operator must repair leaks as quickly as practicable. If more than five (5) days' repair time is needed after a leak is discovered, an explanation as to why additional time is required must be submitted to the City. At least once per year, the Operator shall notify the City five (5) business days prior to an

LDAR inspection of its facilities to provide the City the opportunity to observe the inspection.

- ii. **Continuous Air Monitoring.** During Drilling and Completion Phases, the Operator shall conduct continuous air monitoring capable of detecting hydrocarbons.
- iii. **Periodic Air Sampling.** During all phases of operation, the Operator shall have the ability to deploy and collect air samples for speciated hydrocarbon analysis when monitoring indicates elevated levels of hydrocarbons.
- iv. Data related to air monitoring or sampling during any phase shall be made available to the City upon request.

D. **Ozone Air Quality Action Days.** The Operator shall respond to Ozone Air Quality

Action Day advisories posted by the CDPHE for the Front Range Area by implementing their suggested air emission reduction measures as feasible. Emission reduction measures shall be implemented for the duration of an Ozone Air Quality Action Day advisory and may include measures such as:

- i. Minimization of vehicle and engine idling;
- ii. Reducing truck traffic and worker traffic;
- iii. Delaying vehicle refueling;
- iv. Postponement of construction activities to the maximum extent practicable.

Within thirty (30) days following the conclusion of each annual Ozone Air Quality Action Day season, Operator must submit a report to the City that details which measures it implemented during any Ozone Air Quality Action Day advisories.

- E. **Compliance.** The Operator must submit quarterly reports to the City certifying (i) compliance with these air quality requirements and documenting any periods of material non-compliance, including the date and duration of each such deviation and a compliance plan and schedule to achieve compliance and (ii) that the equipment at the Well Sites continues to operate within its design parameters, and if not, what steps will be taken to modify the equipment to enable the equipment to operate within its design parameters. The quarterly report must contain a certification as to the truth, accuracy and completeness of the reports, signed by a Responsible

Official, as defined by the CDPHE. The Operator will also provide the City with a copy of any self-reporting submissions that Operator provides to the CDPHE due to any incidence of non-compliance with any CDPHE air quality rules or regulations at the Well Sites.

F. For Lease Holding Wells that are drilled for lease retention the following Air Quality provisions will apply until the pipelines infrastructure is available:

i. ***Leak Detection and Repair.*** Operator shall develop and maintain an acceptable LDAR program as required by CDPHE using modern leak detection technologies such as infra-red cameras. For the five (5) year period beginning with the start of the Production Phase for each Lease Holding Well, Operator shall conduct IR camera monitoring of all equipment at the respective Well Site based on the following minimum frequency:

Year 1 — monthly

Year 2 — quarterly

Year 3-5 — semi-annually

After the initial five (5) year period, Operator will conduct semi-annual IR camera monitoring until all Lease Holding Wells at the Well Site are either connected to a pipeline and associated infrastructure or are plugged and abandoned. The first inspection will occur within 30 days of the facility commencing production. The Operator will maintain records of all leaks found, date the leaks were repaired, and the date the location is re-screened to verify that the leak has been repaired.

Such records must be maintained for five years and must be made available to the City upon request. Except when an emergency circumstance would necessitate an immediate repair, Operator must repair leaks as quickly as practicable. If more than 5 days repair time is needed after a leak is discovered, an explanation of why more time is required must be submitted to the City. At least once per year, the Operator shall notify the City five (5) business days prior to an LDAR inspection of its facilities to provide the City the opportunity to observe the inspection.

ii. ***Baseline Air Monitoring.*** Prior to construction activities, the Operator shall conduct baseline air monitoring capable of detecting hydrocarbons for a period of five (5) days.

- iii. **Continuous Air Monitoring.** During Drilling, Completion and Production Phases, the Operator shall conduct continuous air monitoring capable of detecting hydrocarbons.
  - iv. **Periodic Air Sampling.** During all phases of operation, the Operator shall have the ability to deploy and collect air samples for speciated hydrocarbon analysis when monitoring indicates elevated levels of hydrocarbons.
  - v. Data related to air monitoring or sampling during any phase shall be made available to the City upon request.
17. **Reduced Emission Completions (Commonly known as Green Completions).** Operator shall comply with EPA Reduced Emission Completion rules for oil and gas wells.
18. **Fencing.** Permanent opaque fencing shall be installed around production equipment, and shall be secured. Operator will not use chain link fencing.
19. **Flammable Material.** All ground within twenty-five (25) feet of any tank, or other structure containing flammable or combustible materials, shall be kept free of dry weeds, grass, rubbish or landscaping.
20. **Combustion Devices.** To the extent flares, thermal oxidizers, or combustion devices are utilized, all such flares shall be designed and operated as follows:
- A. A combustion device shall be available at each Well Site during the entire Production Phase for maintenance or emergencies only.
  - B. The combustion device must be fired with natural gas and designed to operate with a 98% or higher hydrocarbon destruction efficiency.
  - C. The combustion device must be designed and operated in a manner that will ensure no visible emissions during normal operation. Visible emissions means observations of smoke for any period or periods of duration greater than or equal to one (1) minute in any fifteen (15) minute period during normal operation, pursuant to EPA Method 22. Visible emissions do not include radiant energy or water vapor.
  - D. The combustion device must be operated with a flame present at all times when emissions may be vented to it, or other mechanism that does not allow uncontrolled emissions.

- E. The combustion device will have no visible flame, with the exception of the pilot light, from the Well Site boundary. The combustion device shall completely conceal the flame.
  - F. All combustion devices must be equipped with an auto-igniter unless manned while in use.
21. **Landscaping.** Operator shall submit a landscape plan for City approval during the Well Site OGP application review process. Operator shall implement the landscape plan when new development is constructed within 1,500 feet of a Well Site once access to City main water source is available.
22. **Lighting.** Lighting shall be downcast, and shall not shine beyond the boundaries of the Well Site. Operator shall submit a lighting plan for approval during the Well Site OGP application review process.
23. **Maintenance of Machinery.** Routine field maintenance of vehicles or mobile machinery shall not be performed within five hundred (500) feet of any navigable waters of the United States. All fueling must occur over impervious material.
24. **Mud Tracking.** In accordance with the stormwater management plan, the Operator shall take all practicable measures to ensure that vehicles do not track mud or debris onto City streets. If mud or debris is nonetheless deposited on City streets, in excess of *de minimus* levels, the streets shall be cleaned immediately by the Operator. If for some reason this cannot be done, or needs to be postponed, the Operator shall notify the City of its plan for mud removal.
25. **Noise Management Plan.** For any Well Site that is on property located in zoning districts that allow for residential development or if a residential building unit is located within 1,320 feet of a Well Site located in a zoning district that does not allow for residential development unless Operator obtains waivers from all property owners within that distance the following provisions shall apply:
- A. A Baseline Noise Mitigation Study will be conducted to ascertain baseline noise levels at the Well Site to demonstrate that noise is expected to be mitigated to the extent practicable and a copy will be provided to the City.
  - B. The Operator shall comply with all provisions of COGCC Rule 802 on Noise Abatement with respect to the Well Sites; provided, however, that the Operator and City agree that the maximum permissible noise levels to be applied under Rule 802 for the length of time indicated in Rule 802 shall be, other than during the Construction Phase, the greater of (i) the levels set forth for the land use type of "Residential/Agricultural/Rural" under Rule 802 if measurements are taken at 1,000 feet from the sound walls at the Well Site and (ii) 4 dB(A) higher than baseline ambient sound measured at

1,000 feet from the sound walls at the Well Site. During the Construction Phase, the Operator agrees that noise levels shall not exceed those produced by the construction of a typical commercial development. All measurements considered for compliance with this section shall be taken by a third party contractor using industry standard equipment and practices. The Operator shall address C scale noise/vibration through berming, capable sound walls, and other associated BMPs. During the Drilling and Completion Phases, the operator shall construct a sound wall and/or comparable measures to mitigate noise. Additional mitigations must be taken by the Operator if C-scale noise levels are increased to the larger of either (i) 5db over ambient or (ii) 65db at 25 feet from the nearest occupied building unit.

- C. All noise mitigation measures shall be paid for by the Operator.
- D. Unloading pipe. The Operator shall not unload pipe from delivery trucks between 8:00 p.m. and 7:00 a.m.

- 26. **Removal of Debris.** All construction-related debris shall be removed from the Well Site for proper disposal in a timely manner. The Well Site shall be maintained free of debris and excess materials at all times during operation. Operator shall also not stockpile debris at the Well Sites.
- 27. **Removal of Equipment.** All equipment used for drilling, re-completion and maintenance of the facility shall be removed from the Well Site within thirty (30) days of completion of the work, weather conditions permitting, unless otherwise agreed to by the applicable surface owner. Permanent storage of removable equipment on Well Sites shall not be allowed.
- 28. **Trailers.** A construction trailer(s) is permitted as an accessory use during active drilling and well completion or workover operations only. No permanent residential trailers shall be permitted at the Well Sites; provided, however, that until six (6) months following the end of the Completion Phase on a Well Site, temporary *residential* and/or security trailers are permitted, as needed for on-site operations, for exclusive use by the Operator's personnel and the personnel of its subcontractors on a temporary basis.
- 29. **Transportation and Circulation.** The Operator will submit a traffic management plan for the City to review during the Well Site OGP application review process that includes detailed descriptions of all proposed haul routes for equipment, water, sand, waste fluids, waste solids, mixed waste, and all other material to be hauled on the public and private streets and roads during phased well development and operations. The traffic management plan shall include the following:

- A. Estimated weights of vehicles when loaded, a description of the vehicles, including the number of wheels and axles of such vehicles and estimated trips per day.
  - B. Detail of access locations for the Well Site including sight distance, turning radius of vehicles and a template indicating this is feasible, sight distance, turning volumes in and out of the Well Site for an average day and what to expect during peak hours.
  - C. Estimated truck traffic volumes converted to equivalent single axle loads and compared to existing volumes..
  - D. Truck routing map and truck turning radius templates with a listing of required improvements that are necessary at intersections along the route.
  - E. Complete traffic letter, determining operational changes and geometric modifications necessary as a result of extraction activities.
  - F. Identification of the need for any additional traffic lanes, which would be subject to the final approval of the City's engineer.
  - G. Restriction of non-essential traffic to and from the Well Site to periods outside of peak am and pm traffic periods and during school hours of schools along the designated traffic routes (generally 7-9 a.m. and 3-6 p.m.).
  - H. City may request consolidated haul routes and roadway improvements or upgrades based on contents of traffic management plan to be covered in a Road Maintenance Agreement during the OGP review process.
30. **Access Roads.** Access points to public roads shall be located, improved and maintained to ensure adequate capacity for efficient movement of existing and projected traffic volumes and to minimize traffic hazards. Permanent access roads shall be improved a minimum distance of 200 feet onto the access road from the point of connection to a public road. All access roads shall be in conformance with the City's *current* Roadway Specification Manual. The access road shall be improved as a hard surface (concrete or asphalt) for the first 100 feet from the public road and then improved as a crushed surface (concrete or asphalt) for 100 feet past the hard surface in the appropriate depth to support the weight load requirements of the vehicles accessing the Well Site. A geotechnical report and pavement design will be submitted to the City for approval. If an access road intersects with a pedestrian trail or walk, the Operator shall pave the access road as a hard surface (concrete or asphalt) a distance of 100 feet either side of the trail or walk and if necessary, replace the trail or walk to address the weight load requirements of the vehicles accessing the Well Site. Temporary access roads associated with the operation shall

be reclaimed and revegetated to the original state within sixty (60) days after discontinued use of the temporary access roads.

31. **Road Repairs.** Road repairs will *be* addressed as set forth in the Road Maintenance Agreement.
32. **Stormwater Management.** Operator must apply for and receive a City stormwater quality discharge permit for each Well Site in accordance with the City of Aurora Rules and Regulations Regarding Stormwater Discharges Associated with Construction Activities. Erosion and sedimentation control is required for each Well Site. Operator must inspect stormwater BMPs annually as well as after storm events.
33. **Wastewater and Waste Management.** Operator must submit a waste management plan to the City that complies with the following:
  - A. All fluids shall be contained and there shall be no discharge of fluids with the exception of unimpacted stormwater per federal SPCC regulations.
  - B. Flowback and produced water shall be transported by pipeline once constructed and available.
  - C. No land treatment of oil impacted or contaminated drill cuttings is permitted. Disposal of oil impacted or contaminated drill cuttings shall be disposed of at licensed disposal or recycling sites.
  - D. A copy of the Operator's Spill Prevention, Control, and Countermeasure Plan (SPCC) will be given to the City, which describes spill prevention and mitigation practices.
  - E. The Operator shall not dispose of any wastewater within the City.
34. **Water Supply.** The Operator agrees to comply with applicable laws, rules and regulations concerning the source(s) of water used in the Drilling Phase, Completions Phase and Production Phase.
35. **Noxious Weed Control.** The Operator shall be responsible for ongoing noxious weed (as defined under state law) control at the *Well* Sites and along access roads per City or other applicable agency regulations.
36. **Class II Underground Injection Control Wells.** For operations associated with any Well Site, the Operator shall not develop, use, operate or contract with any third party for the use of any Class II underground injection control wells within the City Limits or within a four (4) mile buffer of the City's existing or planned critical infrastructure as of the effective date of the Operating Agreement. Notwithstanding the four (4) mile buffer, Operator may use the Class II underground injection facility located in

Section 5, T5S-R64W in Arapahoe County. The City to provide Operator with Exhibit E that defines the critical infrastructure as of the Effective Date of the Agreement.

37. **General Maintenance.** Operator shall operate and maintain all equipment pursuant to manufacturer specifications *consistent* with technological limitations and reasonable and customary maintenance practices.
38. **Odor.** Operator will prevent odors by routing to closed loop systems to the maximum extent practicable. Odors emitting from Well Sites must be controlled immediately. Operator must minimize odors by proactively *addressing* and resolving, to the maximum extent practicable, citizen concerns within 24 hours. Operator must use a filtration system or additives to drilling fluids to prevent or minimize odors but cannot mask odors. In order to meet the provisions of this section, Operator implements the following measures:
  - A. Wiping down the drill pipe each time that the drilling operation "trips" out of the hole.
  - B. Increasing additive concentrations during peak hours.
39. **Events or Incidents.** Any COGCC or OSHA reportable injuries, accidents or natural events shall be reported to the City within 24 hours. Once the applicable forms are submitted to the agency, a copy of that form will also be provided to the City. In the event of a fire that is not controllable by Operator personnel, explosion or need for emergency services response, 911 shall be called.
40. **Spills.** Operator must notify the City of any spill of any material on permeable ground on the Well Sites that has a *reportable* spill quantity under any law. The Operator will also provide the City with a copy of any self-reporting submissions that Operator provides to the COGCC due to any spills at the Well Sites.
41. **Reclamation.**
  - A. **Interim Reclamation.** Operator must submit a Well Site Interim Reclamation Plan to the City with each OGP.
  - B. **Final Reclamation Plan.** Operator must submit a Final Well Site Reclamation Plan to the City concurrently with submission of the COGCC permit to plug and abandon the last New Well at a Well Site.
42. **Containment Berms.** The Operator shall utilize steel-rim berms at the Well Sites with sufficient capacity to contain 1.5 times the maximum volume of the largest tank on location that such Well Site will contain at any given time plus sufficient freeboard to prevent overflow around all permanent facility *equipment*. All berms and

containment devices shall be inspected quarterly by the Operator and maintained in good condition. No potential ignition sources shall be installed inside the secondary containment area unless the containment area encloses a fired vessel or such sources are rated in accordance with industry codes and standards. Secondary containment such as duck ponds or lined earthen berms for temporary tanks may also be used.

- A. Permanent containment berms shall be constructed of steel rings, designed and installed to prevent leakage and resist degradation from erosion or routine operation.
  - B. Secondary containment for tanks shall be constructed with a synthetic or engineered liner that contains all primary containment vessels and is mechanically connected to the steel ring to prevent leakage.
  - C. For locations within five hundred (500) feet and up-gradient of a surface water body or flood plain, tertiary containment, such as an earthen berm, is required around production facilities.
43. **Anchoring.** New Well equipment and all existing equipment at the Well Sites shall be anchored to the extent *necessary* to resist flotation, collapse, lateral movement, or subsidence in compliance with applicable Federal Emergency Management Agency (FEMA) (as administered by this City) and COGCC rules and regulations. All guy line anchors left buried for future use shall be identified by a marker of bright color not less than four (4) feet in height and not greater than one (1) foot east of the guy line anchor.
44. **Flowlines.** Operator shall comply with the requirements for flowlines set forth in COGCC Rule 1101. All new flowlines shall have the legal description of the location recorded with the Clerk and Recorder of the applicable county within thirty (30) days of completion of their construction. Operator shall provide as-built GIS locations and maps of all Off-Location flowlines.
45. **Plugged and Decommissioned Well Testing.** Prior to and following the fracturing of any New Well, Operator shall assess the *integrity* of plugged and decommissioned, removed from use and dry, or removed from use wells ("Previously Abandoned Wells") within 1,500 feet of the projected track of the borehole of the proposed New Well.

This shall include:

- A. Based upon examination of COGCC and other publicly available records, identification of all Previously Abandoned Wells located within 1,500 feet of the projected track of the borehole of a proposed New Well.

- B. Assessment of leaking gas or water to the ground surface or into subsurface water resources, taking into account plugging and cementing procedures described in any recompletion or plugged and abandoned report filed with the COGCC.
  - C. Notification to the City and COGCC of the results of the assessment of the plugging and cementing procedures.
  - D. Permission from the operator of record and each surface owner with a Previously Abandoned Well on their property to access the property to test the soil within a 10 foot radius of the Previously Abandoned Well. If an operator of record or a surface owner has not provided permission to access and test after thirty (30) days from receiving notice, the Operator shall not be required to test the Previously Abandoned Well. Notice to the surface owner will be sent by Certified US Mail, return receipt requested, to assure that the surface owner receives proper notice.
  - E. For each Previously Abandoned Well for which access and permission to test is granted by the surface owner and the operator of record, a soil gas survey to test the soil within a 10 foot radius of the Previously Abandoned Well shall be completed prior to production from the proposed New Well and again one (1) year after production has commenced on the New Well.
  - F. Notification of the results of the soil gas survey to the City and the COGCC within three (3) months of conducting the survey or advise the City that access to the Previously Abandoned Wells could not be obtained from the surface owner or the operator of record.
46. **Insurance.** The Operator agrees to provide liability and insurance under the conditions, and in the amounts, set forth on Exhibit C.
47. **PHA-Hazard and Operability Study.** A third party PHA-HAZOP certified facilitator shall coordinate a Hazard and Operability Study with cooperation of the Operator. If any of the findings by the PHA-HAZOP certified facilitator are applicable, this information will be added to the Emergency Action Plan and Aurora Fire Rescue training. The Operator will provide a letter that the engineer of record has incorporated all applicable PHA-HAZOP recommendations in the design of the applicable Well Sites.
48. **Automatic Safety Protective Systems and Surface Safety Valve.** An automated safety system, governed by safety devices and a programmable logic computer, will be installed at the Well Sites. The automated safety system shall include the

installation, monitoring and remote control of a Surface Safety Valve ("SSV") among many other engineered measures and devices that are implemented to greatly reduce or eliminate the potential for a well event. All New Wells will have a SSV installed prior to the commencement of the Production Phase connected to the production tubing at the surface. The SSV will be equipped to operate remotely via the automated safety protective system, which monitors multiple flowing pressures and rates which have predetermined maximum and/or minimum threshold values programmed and will remotely shut wells in should certain upset conditions be detected. Additionally, the automated safety system provides the ability to remotely shut-in wells on demand through operator remote intervention. The SSV will have documented quarterly testing to ensure functionality. The practice of utilizing automated safety protective systems, including SSV's, exceeds the current state regulations and requirements for wells operated within Colorado.

49. ***Water Quality Monitoring Plan.*** The Operator shall implement a water quality and well testing plan. Operator will submit water quality monitoring reports to the City. Operator shall avoid causing degradation to surface or ground waters within the City and to wetlands within the City. Certain aspects of the following standards set forth by the City are consistent with COGCC rules and regulations. Using records of the Colorado Division of Water Resources, Operator must implement a water quality monitoring and well testing plan that includes the following:
- A. Operator must obtain initial baseline samples from all available domestic water sources within a one-half (1/2) mile distance from the edge of the Well Sites. If no domestic water sources are available to specific Well Site, Operator shall drill one (1) down gradient monitoring well on that Well Site to sufficiently test the domestic water supply for the City groundwater source in each aquifer (Denver, Laramie-Fox, and Arapahoe) ("Operator Drilled Monitoring Well").
  - B. Operator must collect initial testing of baseline samples from available water sources prior to the commencement of the Drilling Phase at a Well Site, or prior to the re-stimulation of an existing New Well for which no samples were collected and tested during the previous twelve (12) months.
  - C. Post-stimulation samples of available domestic water sources shall be collected to test the domestic water supply for the City ground water source in each aquifer (Denver, Laramie-Fox and Arapahoe). If there is no available domestic water source then the Operator Drilled Monitoring Well at the Well Site will be tested annually for the duration of the Well Site. The representative water source locations will be mutually agreed upon by the City and the Operator.
  - D. Operator may rely on existing groundwater sampling data from any water source within the radii described above that was collected in accordance with accepted City standards, provided the data was collected within the twelve (12) months preceding

the commencement of Drilling Phase for such Well Site, the data includes measurement of all of the constituents measured in Table 1 below and there has been no significant oil and gas activity within a one-mile radius in the time period between the original sampling and the commencement of the Drilling Phase for such Well Site.

- E. Operator shall make reasonable efforts to obtain the consent of the owner of the water source. If the Operator is unable to locate and obtain permission of the water source, the Operator must advise the City that Operator could not obtain access to the water source from the surface owner. Operator shall drill one Operator Drilled Monitoring Well if no water sources are available within a one-half ( $\frac{1}{2}$ ) mile distance from the edge of the Well Site(s) due to inability of Operator to obtain permission from available water source owners.
- F. Baseline Water Quality Testing will be conducted for the analytes listed in Table 1 below. Subsequent water quality testing will be conducted on a yearly basis of the analytes in Table 2.
- G. Operator must follow standard industry procedures in collecting samples, consistent with the COGCC model Sampling and Analysis Plan.
- H. Operator must report the location of the water source using a GPS with submeter resolution.
- I. Operator must report results of field observations, including reporting on damaged or unsanitary well conditions, adjacent potential pollution sources, odor, water color, sediment, bubbles, and effervescence.
- J. Operator must provide copies of all test results described above to the City, the COGCC, and the water source owners within thirty (30) days after receiving the lab analytical.
- K. If sampling shows degradation of water quality, additional measures may be required including:
  - i. If free gas or a dissolved methane concentration level greater than one (1) milligram per liter (mg/l) is detected in a water source, determination of the gas type using gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen).
  - ii. If the test results indicate thermogenic or a mixture of thermogenic and biogenic gas, an action plan to determine the source of the gas.
  - iii. Immediate notification to the City, the COGCC, and the owner of the water source if the methane concentration increases by more than five (5) mg/l between sampling periods, or increases to more than ten (10) mg/l.

- iv. Immediate notification to the City, the COGCC and the owner of the water source if BTEX and/or TPH are detected as a result of testing. Such detections may result in required subsequent sampling for additional analytes.
- v. Further water well sampling in response to complaints from water source owners.
- vi. Timely production and distribution of test results in electronic deliverable format to the City, the COGCC and the water source owners.
- vii. All water source testing must be conducted by the Operator or, if requested by a surface owner, by a qualified independent professional consultant.
- viii. If Operator identifies degradation to water quality from the baseline testing as a result of its oil and gas development, Operator will be responsible to mitigate the degradation of water quality to the baseline levels.
- ix. Operator will submit a CDPHE Regulation 84 water use plan as described in section 84.11 sections B, D and F for all Well Sites.

**Table 1  
Inorganic Chemicals:**

<b>Contaminant</b>
Antimony
Arsenic
Asbestos
Barium
Beryllium
Cadmium
Chromium
Cyanide (as free Cyanide)
Fluoride
Mercury
Nitrate
Nitrite
Total Nitrate and Nitrite
Selenium
Thallium

**Volatile Organic Compounds:**

<b>Contaminant</b>
Vinyl chloride
Benzene
Carbon tetrachloride
1,2-Dichloroethane
Trichloroethylene
Para-Dichlorobenzene
1,1-Dichloroethylene
1,1,1-Trichloroethane
cis-1,2 Dichloroethylene
1,2-Dichloropropane
Ethylbenzene
Monochlorobenzene
o-Dichlorobenzene
Styrene
Tetrachloroethylene
Toluene
Trans-1,2 Dichloroethylene
Xylenes (total)
Dichloromethane(methylene chloride)
1,2,4-Trichlorobenzene
1,1,2-Trichloroethane

SOC's:

<b>Contaminant</b>
Alachlor
Aldicarb 1
Aldicarb sulfoxide
Aldicarb sulfone
Atrazine
Carbofuran
Chlordane
Dibromochloropropane
2,4-D
Ethylene dibromide
Heptachlor
Heptachlor epoxide
Lindane
Methoxychlor
Polychlorinated biphenyls
Pentachlorophenol
Toxaphene
2,4,5-TP (Silvex)
<b>Benzopyrene</b>
Dalapon
Di(2-ethylhexyl)adipate
Di(2-ethylhexyl)phthalate
Dinoseb
Diquat
Endothall
Endrin
Glyphosate
Hexachlorobenzene
Hexachlorocyclopentadiene
Oxamyl (Vydate)
Picloram
Simazine
2,3,7,8-TCDD (Dioxin)

**Radionuclides:**

<b>Contaminant</b>
Combined radium-226 and radium-2281
Gross alpha particle activity (including radium-226 but, excluding radon and uranium)
Beta particle and photon radioactivity <sup>2</sup>
Uranium

**Secondary Maximum Contaminant Levels:**

<b>Contaminant</b>
Aluminum
Chloride
Color
Copper
Corrosivity
Fluoride
Foaming agents (surfactants)
Iron
Manganese
Odor
pH
Silver
Sulfate
Total dissolved solids (TDS)
Zinc

**PFOA and PFOS**

<b>GENERAL WATER QUALITY</b> Alkalinity, Conductivity & TDS, pH, Dissolved Organic Carbon (or Total Organic Carbon), Bacteria, and Hydrogen Sulphide
<b>MAJOR IONS</b> Bromide, Chloride, Fluoride, Magnesium, Potassium, Sodium, Sulfate, and Nitrate + Nitrite as N
<b>METALS</b> Arsenic, Barium, Boron, Chromium, Copper, Iron, Lead, Manganese, Selenium, Strontium, Mercury, Uranium, and Radium
<b>DISSOLVED GASES and VOLATILE ORGANIC COMPOUNDS</b> Methane, Ethane, Propane, BTEX as Benzene, Toluene, Ethylbenzene and Xylenes, Total Petroleum, and Hydrocarbons (TPH)
<b>OTHER</b> Water Level, Stable isotopes of water (Oxygen, Hydrogen, Carbon), Phosphorus

**Table 2**

<p><b>GENERAL WATER QUALITY</b> Alkalinity, Conductivity &amp; TDS, pH, Dissolved Organic Carbon (or Total Organic Carbon), Bacteria, and Hydrogen Sulphide</p>
<p><b>MAJOR IONS</b> Bromide, Chloride, Fluoride, Magnesium, Potassium, Sodium, Sulfate, and Nitrate + Nitrite as N</p>
<p><b>METALS</b> Arsenic, Barium, Boron, Chromium, Copper, Iron, Lead, Manganese, Selenium, Strontium, Mercury, Uranium, and Radium</p>
<p><b>DISSOLVED GASES and VOLATILE ORGANIC COMPOUNDS</b> Methane, Ethane, Propane, BTEX as Benzene, Toluene, Ethylbenzene and Xylenes, Total Petroleum, and Hydrocarbons (TPH)</p>
<p><b>OTHER</b> Water Level, Stable isotopes of water (Oxygen, Hydrogen, Carbon), Phosphorus</p>

50. ***Cultural and Historical Resource Protection.*** The Operator agrees to comply with the City of Aurora Municipal Code, as amended, by not causing to be carried out any construction, alteration, removal, or *demolition* of a building or feature or make any changes that would impair the historic association of the landmark building, landmark site, or historic district, pursuant to those qualities depicted in the Code, without first obtaining approval. Operator will submit the permit application and await the planning department's approval following referral to the historic preservation commission, if applicable. If there is a discovery of historic artifacts, Operator will notify the City.
  
51. ***Strict Application of BMP Standards.*** Operator may seek a minor exception to strict application of the BMPs from the City, by making a written request to the City. The request must include the justifiable rationale supporting the request. As part of a granted exception request for the City, the City may require alternative mitigation measures to ensure compliance with the goals of the applicable BMPs. Such approval will not be unreasonably withheld, conditioned, or delayed.
  
52. ***Wildlife Impact Mitigation Plan.*** This BMP is only applicable in the event that a Well Site is located in a significant wildlife habitat, as defined by the State Division of Wildlife, or in a natural area or open space, as designated in the City's comprehensive plan. In such a case, the Operator shall consult with the State Division of Wildlife or the City Parks and Open Space Department to obtain recommendations for appropriate site-specific and cumulative impact mitigation procedures. If not applicable, Operator shall provide the City with a statement that it has investigated whether the Well Site is located near a significant wildlife habitat and that this BMP is not applicable.
  
53. ***Wellbore Integrity and Aquifer Protection.*** Operator shall protect fresh water producing zones from the intrusion of hydrocarbons or water from other formations that are penetrated

by the New Well. Operator shall comply with applicable COGCC regulations regarding well bore integrity and testing. The casing and cement for each New Well must prevent oil, gas, and water from migrating from one formation to another behind the casing.

Where the depth of water producing formations are clearly established, the Operator shall set and cement casing in a manner sufficient to protect fresh water aquifers.

A. Surface Casing

- i. All surface casing must be cemented with a continuous column from the bottom of the casing to the surface. Surface casing must be cemented to a depth to protect alluvial (surficial) aquifer.
- ii. If cement does not circulate to surface, Operator shall perform a cement bond log to determine top of cement. Operator shall follow COGCC procedures to ensure cement is to the surface and that integrity is managed.

B. Production Casing

- i. Cement must be pumped behind the production casing 200 feet above the top of the shallowest uncovered known commercial producing horizon.
- ii. Operator shall follow COGCC regulations regarding protecting any fresh water aquifers that are below the depth of the surface casing.

C. Integrity Testing and Monitoring

- i. During the Drilling Phase, Operator shall run temperature or cement log if surface casing cement is not circulated to the surface in order to ensure integrity.
- ii. Operator shall test the production casing to adequately test for the conditions anticipated during completion operations.
- iii. Operator currently installs pressure transmitters on surface and production casing and Operator shall monitor casing pressures during the Production Phase.
- iv. Operator shall perform Bradenhead tests on all wells at all Well Sites during the Completions Phase and the annually during the Production Phase of the well.

## EXHIBIT C

### Insurance Requirements

During the term of the Agreement with the City of Aurora (the "City"), Operator shall comply with the following requirements:

1. Operator shall maintain or cause to be maintained, with insurers authorized by the state of Colorado and carrying a financial strength rating from A.M. Best of no less than A- VII (or a similar rating from an equivalent recognized ratings agency), at a minimum, the following types of insurance with limits no less than the amounts indicated:

- A. Commercial General Liability insurance on an occurrence based form including coverage for bodily injury or property damage for operations and products and completed operations with limits of not less than \$1,000,000 each and every occurrence.
- B. Automobile Liability insurance with limits of not less than \$1,000,000 each and every occurrence.
- C. Workers' Compensation insurance- Statutory Workers' Compensation Coverage for the employee's normal State of employment/hire. Including Employer's Liability insurance - with limits of not less than \$1,000,000 Each Accident, Disease - Each Employee, Disease - Policy Limit.
- D. Control of Well/Operators Extra Expense insurance - with limits of not less than 10,000,000 covering the cost of controlling a well that is out of control or experiences a blowout, re-drilling or restoration expenses, seepage and pollution damage resulting from an out of control well or blowout as first party recovery for the operator and related expenses, including, but not limited to, loss of equipment and evacuation of residents.
- E. Umbrella/Excess Liability - in excess of General Liability, Employer's Liability, and Automobile Liability with limits no less than \$25,000,000 per occurrence; provided, however, that for so long as the Construction Phase, Drilling Phase or Completions Phase is ongoing at any of the Well Sites, Operator will maintain such insurance with limits no less than \$100,000,000 per occurrence.
- F. Environmental Liability/Pollution Legal Liability insurance- with limits of not less than \$5,000,000 per pollution incident, with coverage being required beginning with the date that is eight (8) years from the date of first production from the first New Well (the "Required Date"). Coverage must include gradual pollution events. This insurance may be on a claims-made basis, however the retroactive date must precede the Required Date in order to cover all New Wells and Well Sites.

2. Operator shall waive and cause its insurers under the above policies to waive for the benefit of the City any right of recovery or subrogation which the insurer may have or acquire against the City or any of its affiliates, or its or their employees, officers or directors for payments made or to be made under such policies.

3. As it pertains to the risks and liabilities assumed by Operator under this Agreement, Operator agrees to add the City and its elected and appointed officials and employees as Additional Insureds under general liability (including operations and completed operations), auto liability and umbrella liability.
4. Operator shall ensure that each of the policies are endorsed to provide that they are primary without right of contribution from the City or any insurance or self-insurance otherwise maintained by the City, and not in excess of any insurance issued to the City.
5. Operator shall ensure that each of the policies above (excluding workers' compensation and OCC/COW) are endorsed to state that the inclusion of more than one insured under such insurance policy shall not operate to impair the rights of one insured against another insured and that the coverage afforded by each insurance policy shall apply as though a separate policy had been issued to each insured.
6. All policies shall be endorsed such that they cannot be canceled or non-renewed without at least 30 days' advanced written notice to the Operator and the City, evidenced by return receipt via United States mail, except when such policy is being canceled for nonpayment of premium, in which case 10 days advance written notice is required. Language relating to cancellation requirements stating that the insurer's notice obligation is limited to "endeavor to" is not acceptable.
7. Operator shall, prior to permit issuance, deliver Certificates of Insurance reasonably acceptable to the City confirming all required minimum insurance is in full force and effect.
8. Deductibles or retentions shall be the responsibility of Operator. Deductibles or retentions must be listed on the Certificate of Insurance required herein and are subject to the reasonable approval of the City.
9. Operator shall require any of its subcontractors to carry the types of coverage and in the minimum amounts in accordance with the requirements set out in Section 1.A, 1.B. and 1.C. Operator agrees that it shall be responsible for any damage or loss suffered by the City as a result of non-compliance by Operator or any subcontractor with this section.
10. In the event that Operator's coverage lapses, is cancelled or otherwise not in force, the City reserves the right to obtain insurance required herein and charge all costs and associated expenses to Operator, which shall become due and payable immediately.
11. In the event that the coverage required by Section 1.F is not widely available to operators in the Denver-Julesburg Basin, in lieu of the coverage required by Section 1.F, Operator and the City shall establish a joint escrow account that shall be used to satisfy any obligations of Operator that would have otherwise have been covered by the coverage required by Section 1.F. Operator shall fund such account with an amount equal to \$5,000.00 per New Well then-producing (the "Per Well Amount"). The aggregate amount to be placed into the account shall be re-visited on an annual basis based on the then-number of producing New Wells. The Per Well Amount shall be adjusted each year by the increase or decrease in the Consumer Price Index issued by the United States Bureau of Labor Statistics for the Denver – Boulder metropolitan area. Any interest accrued in the account shall be credited towards the Operator's required contributions to the account and any excess amounts in the account above and beyond the amount required by this provision shall be promptly returned and released to Operator.

**Exhibit D:**

Identified Well Site Location Name	Township	Range	Section	Quarter, Quarter	Planned Well Count	Noise Mitigation BMP(s)	Development Window
ACM Highpoint	3S	66W	1	NW/4SW/4	32	2, 3	June 3, 2019 - December 31, 2024
Hammer	3S	66W	12	SW/4NE/4	32	2, 3	June 3, 2019 - December 31, 2024
ACP 8E	3S	65W	8	W/2SW/4	8	2, 3	June 3, 2019 - December 31, 2024
ACP 9W	3S	65W	9	NE/4NW/4	8	2, 3	June 3, 2019 - December 31, 2024