

**BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS**

Before Commissioners: Shari Feist Albrecht, Chair
 Jay Scott Emler, Commissioner
 Dwight Keen, Commissioner

In the Matter of the Application of Brian L. Birk, dba Birk Petroleum to Authorize Injection of Saltwater into the Kansas City Formation at the Merritt #10, located in Section 7, Township 23 South, Range 15 East, Coffey County, Kansas.	)	Docket No. 19-CONS-3106-CUIC
	)	CONSERVATION DIVISION
	)	License No. 31280
	)	

PREFILED DIRECT TESTIMONY

OF

BRIAN L. BIRK

1 Q. Please state your full name and professional address for the Commission.

2 A. My name is Brian Lee Birk, and my business address is 874 12th Road, Burlington, Kansas,
3 66839.

4 Q. Mr. Birk, can you please describe your educational background and work experience in the
5 energy industry?

6 A. I have a K-12 education, all from Burlington, Kansas schools. My work experience in the
7 energy industry began while I was in school and continues to this date. I have experience
8 with drilling and cementing wells, well workover, building and installing oilfield service
9 lines, well plugging, etc.

10 Q. Mr. Birk, how long have you been a licensed operator in the State of Kansas?

11 A. Since 1990, and I have a well-established record of compliance with the Kansas
12 Corporation Commission.

13 Q. What is your connection to the Coffey County, Kansas area?

14 A. I am a 4th generation and life-long resident of Coffey County, where the well at issue in
15 this Application is located, so I have a direct interest in following good operating practices.

16 Q. Can you please describe your experience in oil and gas operations in the area of the Merritt
17 #10 well?

18 A. I have operated oil and gas wells in Coffey and Woodson Counties since 1990. The acreage
19 on which the Merritt #10 well is located was leased in 2006.

20 Q. Mr. Birk, are you the person who filed the Application with the Commission that is the
21 subject of this docket?

22 A. Yes.

1 Q. Please describe to the Commission the nature of what you seek to do with the Merritt #10
2 well; what the purpose is and how it would operate.

3 A. The Merritt #10 was drilled in 1967. We have applied to inject saltwater into the Kansas
4 City formation, located between 584 and 724 feet. There are perforations in the well in this
5 formation between 666 and 694 feet. The well is cased with 3½ casing and cemented from
6 TD of 724' to the surface. This completion method will protect the fresh and useable waters
7 if there are any present in the area, which I do not believe that there are. This form of
8 cementing the casing fully complies with the Commissions regulations to protect the fresh
9 and useable waters of the State. Further, as evidenced in Exhibit A to my testimony, this
10 well passed Mechanical Integrity Test on September 11, 2018.

11 Q. How is the Merritt #10 well intended to be utilized?

12 A. I propose to inject saltwater into the Kansas City formation. I doubt if the requested volume
13 and pressure will be used, but I have requested a maximum liquid injection rate of 100 bbl
14 per day and a maximum injection pressure of 300 psi, in order to avoid having to repeatedly
15 come back to the Commission and seek approval for increasing the amount of the volume
16 and pressure as time goes on.

17 Q. How is the injection of saltwater in the Merritt #10 well intended to benefit the production
18 of oil?

19 A. Waste water comes with the production of crude oil. It is proven in the industry that the
20 best way to limit pollution to our surface water and environment is to dispose or inject the
21 waste water back into the ground at depths that keep the surface water protected.

22 Q. Mr. Birk, given your experience in the area of the Merritt #10 well, do you see any risks
23 to the environment or the fresh and useable waters from the granting of this application?

1 A. No. I run a very good operation, I follow the Commission's rules and regulations strictly.

2 Q. Why do you wish to use the Merritt #10 to dispose or inject saltwater?

3 A. The purpose of this disposal well is to significantly lower water disposal costs. On a per
4 barrel basis, hauling water is the most expensive disposal method. I have requested
5 permission to dispose of water produced from twenty wells I operate nearby, which will
6 significantly improve the economics of those wells and royalties paid to the royalty owners.

7 Q. In her letter of protest regarding your Application, the protestant expressed concerns about
8 the environmental impact of using the Merritt #10 as an injection or disposal well. Would
9 you please address her concerns?

10 A. Yes. Groundwater is protected by several methods and techniques. Surface equipment is
11 made of non-corrosive material: tanks are made of fiberglass rather than steel and transfer
12 lines are made of polyethylene. Protection of usable water below the service is further
13 achieved by the design of the casing in this well. The steel casings and cement are the first
14 barrier to protect usable water. Both strings of pipe in the Merritt #10 will be cemented all
15 the way from their base to the surface. Salt water will be delivered to the Kansas City area
16 from the surface down the casing.

17 Q. How will you report to the State on the status of the disposal well?

18 A. Kansas regulations require that disposal well operators perform a mechanical integrity test
19 (MIT) once every five years for injection wells. The MIT checks to see if there are any
20 casing leaks.

21 Q. Mr. Birk, the protestant in this matter has also expressed concerns about the possibility of
22 earthquakes from your proposed operation of the Merritt #10 well as an injection well.
23 What is your response to those concerns?

1 A. I believe that concern is unfounded in this instance and most other instances in Eastern
2 Kansas. Both wells for which I have filed Applications (the Merritt #10 and the Merritt #5)
3 would have a maximum operating pressure of 300 psi and a maximum injection rate of 100
4 bbls/day. The Merritt #5 well is already permitted at a maximum operating pressure of 100
5 psi and maximum injection rate of 50 bbls/day, and it has had no issues. According to
6 information obtained from the Kansas Geological Survey and attached to my testimony as
7 Exhibit B, the most recent earthquakes recorded in Kansas have been at a depth of 5 km or
8 more, or over 16,404 feet, have been between magnitudes of 2.0- 3.5 on the Richter Scale,
9 and were located in south central Kansas. The USGS states that "Earthquakes with
10 magnitude of about 2.0 or less are usually called microearthquakes; they are not commonly
11 felt by people and are generally recorded only on local seismographs. The Merritt #10 and
12 #5 wells are at a depth of 650-700 feet. It seems unlikely that disposal at the depths and
13 rates requested would be capable of causing earthquakes. Also, we intentionally inject
14 water at pressures and rates below the formation fracture pressure, which is the pressure
15 where rock fractures or breaks. This is in line with KCC regulations.

16 Q. Mr. Birk, if you are able to use the Merritt #10 as you propose, what are the likely economic
17 consequences for adjoining mineral rights owners?

18 A. The disposal well will significantly lower my operational costs in the area. By lowering
19 operational costs, I can economically produce more oil for a much longer time. This can
20 impact nearby mineral interests because the more the wells that I operate produce, then the
21 probability of an operator drilling an economic well on nearby properties increases
22 significantly. Operators will often evaluate the production from offsetting leases, along

1 with an interpretation of the subsurface and other factors, when determining whether to
2 drill future wells.

3 Q. Mr. Birk, have you applied to complete the Merritt #10 in a manner that complies with the
4 Corporation Commission's Rules and Regulations and the oversight of its Underground
5 Injection Control Department?

6 A. Yes. I intend to abide strictly by the Rules and Regulations and the oversight of the
7 KCC Staff. I certainly do not want to endanger the land, water, or other natural resources
8 in any way, and I do not believe that I will, if I am permitted to recomplete the Merritt #10
9 as my Application anticipates.

10 Q. Does this conclude your testimony?

11 A. Yes.

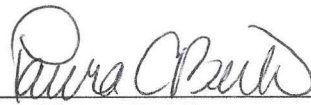
VERIFICATION

STATE OF KANSAS)
) ss:
COUNTY OF COFFEY)

Brian L. Birk, of lawful age, being first duly sworn upon my oath, state that I am the Applicant; that I have read the above pre-filed testimony; that I know the contents thereof and declare that the statements made therein are true and correct to the best of my knowledge and belief.

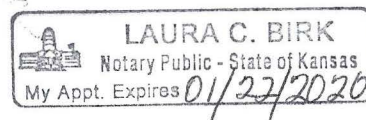

BRIAN L. BIRK

SUBSCRIBED AND SWORN to before me this 3rd day of December,
2018.


Notary Public

My Appointment Expires:

January 22, 2020



CERTIFICATE OF SERVICE

I hereby certify that on this 3rd day of December, 2018, the above **Prefiled Direct Testimony of Brian L. Birk** was sent via electronic mail and/or United States Mail, postage prepaid, addressed to the following:

Lauren Wright
Kansas Corporation Commission
266 N. Main St., Suite 220
Wichita, KS 67202
l.wright@kcc.ks.gov

Michael Duenes
Kansas Corporation Commission
1500 SW Arrowhead Rd
Topeka, KS 66604-4027
m.duenes@kcc.ks.gov

Rene Stucky
UIC Director – Production Supervisor
Kansas Corporation Commission
266 N Main St Suite 220
Wichita KS 67202
r.stucky@kcc.ks.gov

Susan Royd-Sykes
504 S. 6th St.
Burlington, KS 66839
Moondrummer88@gmail.com

/s/ Amy Fellows Cline
Amy Fellows Cline, #19995

CASING MECHANICAL INTEGRITY TEST

Disposal Well ☐ Enhanced Recovery: ☐

Repressuring ☐

Flood ☐

Tertiary ☐

NW NP

Date injection started

API #15- 031-19151-00-00

DOCKET# D-32724

NESWSW, Sec 7, T 23, S, R 15 (E)W

1762 Feet from South Section Line

4319 Feet from East Section Line

Lease Merritt Well # 10

County Coffey

Operator: Birk Petroleum

Name & Address 874 12th Rd SW

Operator License# 31280

Contact Person Brian Birk

Burlington KS 66839

Phone 620 3141311

Max. Auth. Injection Press 300 Psi; Max Inj. Rate 50 bbl/d;

If Dual Completion - Injection above production ☐ Injection below production ☐

Size	Conductor	Surface	Production	Received	Tubing
Set at		<u>8.625</u>	<u>3.5</u>	<u>OCT 22 2018</u>	Size
Cement Top		<u>40</u>	<u>724</u>	<u>CONSERVATION DIVISION</u>	Set at
" Bottom		<u>Surface</u>	<u>Surface</u>	<u>WICHITA, KS</u>	Type
DV/Perf.		<u>40</u>	<u>724</u>		ft. depth
Packer type					Set at
Zone of injection	<u>Tele</u>	ft. to ft. <u>724</u>	Perf. or open hole <u>Perf</u>		

Type MIT: Pressure: ☒ Radioactive Tracer Survey: ☐ Temperature Survey: ☐

F Time: Start 20 Min 40 Min 60 Min

I Pressures: 260 260 260 Set up 1 System Pres. during test 7 200

L Set up 2 Annular Pres. during test

D Set up 3 Fluid loss during test bbls.

T Tested: Casing ☒ or Casing - Tubing Annulus ☐

A The bottom of the tested zone in shut in with

Test Date 9/11/10 Using B&B Company Tools Company's Equipment

The operator hereby certifies that the zone between 0 feet and 724 feet

was the zone tested [Signature] Signature [Signature] Title

The results were Satisfactory ☒ Marginal ☐ Not Satisfactory ☐

State Agent: Nick [Signature] Title: ECRS Witness: YES ☒ NO ☐

REMARKS: Annular 20' from surface 666-20 = 646-50 = 1576 X .43 = 256.28

☐ Origin. Conservation Div.: ☐ KDHE/T: mf ☐ Dist. Office SEP 17 2018

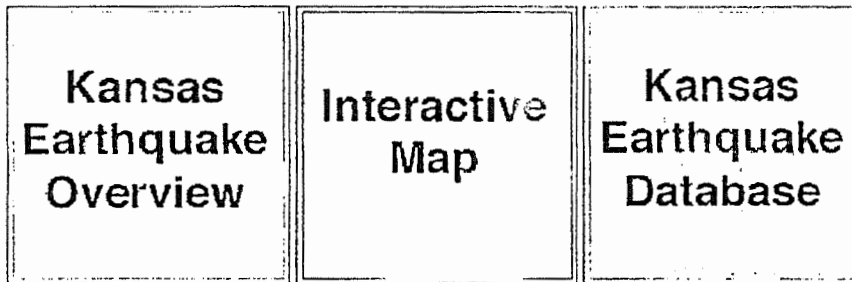
☐ Computer Update Is there Chemical Sealant or a Mechanical Casing patch in the annular space? (Y/N) ☐

GPS Lat 38.05629 GPS Long 095.80947 (If YES please describe in REMARKS) KCC Form U-7

Exhibit A

[Kansas Earthquake History](#)

[Kansas Earthquake Database](#)



Topics...

[Home](#)

[Resources on Seismicity](#)

[Public Information Circular on Earthquakes](#)

[Kansas Earthquake History](#)

[Seismometer Network Data](#)

["Earthquake Highlights" newsletter](#)

[Kansas Earthquake Database](#)

[Oklahoma Geological Survey Earthquake Information](#)

Most Recent Quakes from the Survey's Network

ID: 1001454210
 UTC Date: 2018-10-14 12:10:27
 Local Date: OCT-14-2018, 07:55:27 AM
 Latitude: 37.079
 Longitude: -97.812
 Magnitude: 2.5
 County: Harper

ID: 1001454206
 UTC Date: 2018-10-14 06:10:10
 Local Date: OCT-14-2018, 01:21:10 AM
 Latitude: 37.092
 Longitude: -97.809
 Magnitude: 2
 County: Harper

ID: 1001454205

Received
 KANSAS CORPORATION COMMISSION
 OCT 22 2018
 CONSERVATION DIVISION
 WICHITA, KS

USGS Notifications

The following data are from alerts sent from the [U.S. Geological Survey](#) Earthquake Hazards Program. If you feel an earthquake you can report it to the USGS using the "Did You Feel It?" link on the page for the earthquake you felt. Reporting the quake helps the USGS get a more complete description of what people experienced, the effects of an earthquake, and the extent of damage.

Most Recent Earthquake

Oct. 11, 2018

Date: 10/11/2018, 5:30:27 AM
Latitude: 37.061
Longitude: -97.846
Depth (km): 5.0
Magnitude: 2.7
More info: [us1000haix](#)
Location: 3.1 km (1.9 mi) ESE of Bluff City, Kansas

Most Recent Earthquakes

Oct. 3, 2018

Date: 10/3/2018, 2:36:41 AM
Latitude: 38.336
Longitude: -96.826
Depth (km): 5.0
Magnitude: 3.5
More info: [us1000h656](#)
Location: 4.8 km (3.0 mi) W of Runnymede, Kansas

Date: 10/3/2018, 7:40:46 PM
Latitude: 37.364
Longitude: -97.983
Depth (km): 5.0
Magnitude: 2.4
More info: [us1000h6q2](#)
Location: 8.5 km (5.2 mi) WNW of Clements, Kansas

Received
KANSAS CORPORATION COMMISSION
OCT 22 2018
CONSERVATION DIVISION
WICHITA, KS

Most Recent Earthquakes

Sept. 30, 2018

Date: 09/30/2018, 3:39:08 AM
Latitude: 37.175
Longitude: -97.478
Depth (km): 5.0
Magnitude: 2.6
More info: [us1000h4jy](#)
Location: 2.4 km (1.5 mi) E of Perth, Kansas

Date: 09/30/2018, 7:33:23 PM
Latitude: 37.186
Longitude: -97.442
Depth (km): 5.8
Magnitude: 3.0
More info: [us1000h4tp](#)
Location: 5.7 km (3.6 mi) ENE of Perth, Kansas

Kansas Geological Survey, Exploration Services

Updated Oct. 13, 2018

Comments to webadmin@kgs.ku.edu

The URL for this page is <http://www.kgs.ku.edu/Geophysics/Earthquakes/index.html>



The Severity of
an Earthquake

The Severity of an Earthquake

The severity of an earthquake can be expressed in terms of both *intensity* and *magnitude*. However, the two terms are quite different, and they are often confused.

Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. It varies from place to place within the disturbed region depending on the location of the observer with respect to the earthquake epicenter.

Magnitude is related to the amount of seismic energy released at the hypocenter of the earthquake. It is based on the amplitude of the earthquake waves recorded on instruments which have a common calibration. The magnitude of an earthquake is thus represented by a single, instrumentally determined value.

Earthquakes are the result of forces deep within the Earth's interior that continuously affect the surface of the Earth. The energy from these forces is stored in a variety of ways within the rocks. When this energy is released suddenly, for example by shearing movements along faults in the crust of the Earth, an earthquake results. The area of the fault where the sudden rupture takes place is called the *focus* or *hypocenter* of the earthquake. The point on the Earth's surface directly above the focus is called the *epicenter* of the earthquake.



San Fernando, California, 1971. Highway interchange heavily damaged by the magnitude 6.5 earthquake

[Click on image for a larger view]

Received
KANSAS CORPORATION COMMISSION

OCT 22 2018

CONSERVATION DIVISION
WICHITA, KS

The Richter Magnitude Scale

Seismic waves are the vibrations from earthquakes that travel through the Earth; they are recorded on instruments called seismographs. Seismographs record a zig-zag trace that shows the varying amplitude of ground oscillations beneath the instrument. Sensitive seismographs, which greatly magnify these ground motions, can detect strong earthquakes from sources anywhere in the world. The time, location, and magnitude of an earthquake can be determined from the data recorded by seismograph stations.

The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included in the magnitude formula to compensate for the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude of 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.



Van Norman Dam, San Fernando, California, 1971. Earthquake-induced liquefaction of the earth-filled dam resulted in a landslide that caused partial collapse

[Click on image for a larger view]

At first, the Richter Scale could be applied only to the records from instruments of identical manufacture. Now, instruments are carefully calibrated with respect to each other. Thus, magnitude can be computed from the record of any calibrated seismograph.

Earthquakes with magnitude of about 2.0 or less are usually called microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. Events with magnitudes of about 4.5 or greater--there are several thousand such shocks annually--are strong enough to be recorded by sensitive seismographs all over the world. Great earthquakes, such as the 1964 Good Friday earthquake in Alaska, have magnitudes of 8.0 or higher. On the average, one earthquake of such size occurs somewhere in the world each year. Although the Richter Scale has no upper limit, the largest known shocks have had magnitudes in the 8.8 to 8.9 range. Recently, another scale called the moment magnitude scale has been devised for more precise study of great earthquakes.

The Richter Scale is not used to express damage. An earthquake in a densely populated area which results in many deaths and considerable damage may have the same magnitude as a shock in a remote area that does nothing more than frighten the wildlife. Large-magnitude earthquakes that occur beneath the oceans may not even be felt by humans.



(Top) San Francisco, California, 1906. Collapse of City Hall after the 8.3 magnitude earthquake. Most of the property destruction was caused by the fire that raged after the earthquake.



(Bottom) Anchorage, Alaska, 1964. Much of the damage after this magnitude 8.6 earthquake was due to huge landslides, such as this one under Government Hill elementary School.

[Click on image for a larger view]

Received
KANSAS CORPORATION COMMISSION
OCT 22 2018
CONSERVATION DIVISION
WICHITA, KS

The Modified Mercalli Intensity Scale

The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally--total destruction. Although numerous intensity scales have been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects.

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at that place. After the occurrence of widely-felt earthquakes, the Geological Survey mails questionnaires to postmasters in the disturbed area requesting the information so that intensity values can be assigned. The results of this postal canvass and information furnished by other sources are used to assign an intensity value, and to compile isoseismal maps that show the extent of various levels of intensity within the felt area. The maximum observed intensity generally occurs near the epicenter.



(Top) Mindanao, Phillippines, 1976. Apartment building destroyed by a magnitude 7.9 earthquake.



(Bottom) Long Beach, California, 1933. Exterior walls collapsed onto parked cars after this magnitude 6.3 earthquake (photo by Southern California Earthquake Pictures).

[Click on image for a larger view]

The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above.