

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

In the Matter of the Application of Shakespeare	)	Docket No. 25-CONS-3411-CUIC
Oil Company, Inc. for a permit to authorize	)	
injection into the Whitehorse and Cedar Hills	)	CONSERVATION DIVISION
formations at the Wells #2-27 well in Section 27,	)	
Township 16 South, Range 35 West, Cowley	)	License No. 7311
County, Kansas	)	
_____	)	

PREFILED REBUTTAL TESTIMONY

OF

JEFF SCARBROUGH

ON BEHALF OF APPLICANT,

SHAKESPEARE OIL COMPANY, INC.

1 Q. Please state your name.

2 A. My name is Jeff Scarbrough.

3 Q. Are you the same Jeff Scarbrough who is employed as Operations Manager for
4 Shakespeare Oil Company, Inc. (“Shakespeare”) and who submitted prefiled testimony in
5 this docket on September 26, 2025?

6 A. Yes, I am.

7 Q. Have you read and reviewed the prefiled testimony of Mr. Todd Bryant and Mr. Kenny
8 Sullivan that was filed in this docket on behalf of KCC Staff?

9 A. Yes, I have read and reviewed their prefiled testimony, including the exhibits thereto.

10 Q. On page 10, line 20 through page 11, line 5 of Mr. Bryant’s testimony and on page 16,
11 lines 11 – 15 of Mr. Sullivan’s testimony, they discount the credibility of the analysis by
12 ChampionX of the water samples from the Wells #2-27 claiming that those samples may
13 have been contaminated by water from the Cedar Hills formation. Does the evidence
14 show that those water samples had been contaminated by water from the Cedar Hills
15 formation?

16 A. No, it does not. The only “evidence” that Staff’s witnesses relied upon to conclude that
17 those water samples may have been contaminated is the length of time between perforating
18 the Cedar Hills formation and when the water samples were collected. Specifically, the
19 well was perforated in December 2024 and the water samples were taken in April 2025.
20 Based on that length of time, they speculate that the water samples from the upper
21 perforations could have been contaminated by water that entered the wellbore from the
22 lower perforations in the Cedar Hills formation. The following evidence leads me to
23 conclude with a very high level of confidence that the water samples from the upper
24 perforations were not contaminated with water from the Cedar Hills formation. Attached

1 hereto as Scarbrough Exhibit No. 8 is a highlighted copy of the Completion Report for the
2 Wells #2-27. That report shows that the Cedar Hills formation from 1,900' – 2,000' was
3 perforated on December 16, 2024. Then, on December 18, 2024, the Cedar Hills
4 formation was perforated from 1,800' to 1,900'. Next, the well was swabbed down with
5 both of those zones open and had no fill up, i.e., no fluid was recovered from that
6 formation. The well was then shut-in for twelve (12) days and swab tested again on
7 December 30, 2024. Again, there was no fill-up and no fluid was recovered. Thus, after
8 the Cedar Hills perforations had been open for fourteen (14) days, the Cedar Hills
9 formation gave up no fluid. This clearly shows that those perforations in the Cedar Hills
10 are not connected to any effective permeability. As a result, I can only conclude that there
11 is no evidence to support Staff's theory that fluid from the Cedar Hills could have
12 contaminated the water samples that were taken from the Whitehorse formation or the
13 Day Creek formation.

14 Q. What about the possibility of water from the Whitehorse formation contaminating the
15 water sample taken from the Day Creek formation?

16 A. No, I do not believe that could have happened. As shown in the Drilling Report
17 (Scarbrough Exhibit No. 8), the Day Creek formation (1,452' – 1,476') and the
18 Whitehorse (1,522' – 1,582') were perforated on December 30, 2024. After cleaning up
19 those zones, the rig moved off the well on January 3, 2025, and the well was shut-in. On
20 April 3, 2025, Shakespeare moved the rig back onto the well to collect the water samples
21 that were analyzed by ChampionX. Swab testing was initiated on April 9, 2025. On the
22 initial swab run with both formations open the static fluid level was 800' from surface.
23 The next two days, with both the Whitehorse and the Day Creek perforations contributing
24 fluid, the overnight static fluid level in the well was 800' from surface. On April 11, 2025,

1 a bridge plug was set at 1,507' between the Whitehorse perforations and the Day Creek
2 perforations. The Day Creek was then swab tested over the next two days and 300 barrels
3 of fluid were recovered. On both April 14 & 15, 2025, the static fluid level in the well
4 was 750' from surface. Because the static fluid level with only the Day Creek open was
5 50' higher than when both the Day Creek and the Whitehorse were open, that shows that
6 the Day Creek has a greater reservoir pressure than the Whitehorse. Based on the pressure
7 differential, I do not believe that water from the Whitehorse could have contaminated the
8 Day Creek water samples.

9 Q. So, in conclusion, what do the water samples that were tested by ChampionX show?

10 A. They show that the water samples that were collected from upper perforations in the Wells
11 #2-27 from 1,452' - 1,476' and tested by ChampionX do not contain "usable" water.

12 Q. On page 10, lines 17 – 19 of his prefilled testimony Mr. Bryant states that "the Permian
13 interval exhibits elevated formation pressures." Do you agree with this statement?

14 A. No, I do not.

15 Q. What is the basis for your disagreement with Mr. Bryant's conclusion that the Permian
16 interval exhibits elevated formation pressures?

17 A. It is a fact that gravity acts to the center of the earth and that pressure gradients for strata
18 below the earth that contain fluid are typically fairly consistent. Attached hereto as
19 Scarbrough Exhibit. No. 9 is a chart showing my calculations of the pressure gradients for
20 all of the drill stem tests of permeable strata that were run on the Wells #2-27 and on
21 Shakespeare's nearby Jantz #1-22. As you will see from that chart, the calculated pressure
22 gradients ranged from a low of 0.252 psi/ft to a high of 0.280 psi/ft. Using the lowest
23 calculated pressure gradient of 0.252 psi/ft you can then calculate the expected height of
24 the fluid column in the Day Creek and Whitehorse formations. Doing that calculation you

1 get an expected fluid level for the Day Creek formation of 630 feet, and an expected fluid
2 level of 675 feet for the Whitehorse formation. As is shown in Scarbrough Exhibit No. 8,
3 the actual overnight fill-ups/fluid level for the Day Creek was 750 feet and for the
4 Whitehorse was 800 feet. So even using the lowest calculated pressure gradient the actual
5 fluid levels for those formations are lower than the calculated fluid levels. This leads me
6 to conclude that those two Permian zones do not exhibit elevated formation pressures but
7 instead are shown to be under-pressured.

8 Q. If the Permian formations are under-pressured, how does that impact the positions of the
9 parties in this docket?

10 A. If the Permian formations, which are below the top of the Red Beds, are under-pressured
11 (as opposed to over-pressured as alleged by Mr. Bryant) then there are no extenuating
12 circumstances due to pressure that would cause fluids injected into the Permian formations
13 to migrate upward into zones potentially containing usable water.

14 Q. Does this conclude your testimony?

15 A. Yes, it does. However, I reserve the right to submit additional rebuttal testimony if Staff
16 files or introduces any additional testimony in this docket.

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_____	)	

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on November 7, 2025, I caused a true and correct copy of the foregoing Pre-Filed Rebuttal Testimony of Jeff Scarbrough to be electronically filed with the Kansas Corporation Commission, and that I caused a copy to be served via electronic mail to the following parties:

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/s/ David E. Bengtson

David E. Bengtson

SHAKESPEARE OIL COMPANY, INC.**Wells #2-27**

Timber Canyon West Prospect
 1540' FSL & 1360' FWL, SW/4, Sec. 27-16S-35W
 Wichita County, KS
 API# 15-203-20394
 EGL 3197'; EKB 3206'

Drilling Rig:	Duke Drilling Rig #4	620-793-0833
Toolpusher:	Hector Torres	620-682-3927
Wellsite Geologist:	Kent Matson	316-644-1975

DAILY DRILLING REPORT

11/06/24 MIRU Duke Drilling Rig #4. Spud at 5:15 pm. Drilled 12 1/4" hole to 237'. SHT @ 236' = 0°. **Ran 5 jts. used MPW LS 8 5/8", 23# csg., tally 226', set @ 237'.** Strapped 3 joints and welded all collars. **RU Swift Services and pumped 170 sx Class A, 2% gel, 3% cc. PD 11:05 pm. Cmt did circulate.**

11/07/24 Depth 237'. Drill out cmt plug w/ 7 7/8" PDC bit. SHT's @ 836' & 1181' = 3/4°.

11/08/24 Depth 1220'. SHT @ 1682' = 1/4° & 2180' = 3/4°.

11/09/24 Depth 2400'. SHT @ 2681' = 3/4°.

11/10/24 Depth 3410'. **Displace mud @ 3465'. TOH for 7 7/8" tri-cone bit @ 3548'.** SHT = 1/2°. **Pipe strap 2.31' long to board.**

11/11/24 Depth 3810'. **TOH @ 3940' & RU Trilobite Testing for DST #1.**

DST #1	Lecompton/Oread	3864' – 3940'	15 – 30 – 30 – 30
IF: Blow built to 4 3/4" – No return			
FF: Blow built to 6 1/4" – No return			
Rec: 80' OSM			
Total Fluid: 80'			
IFP: 17-41#	FFP: 42-78#	Chlorides: N/A	
ISIP: 1074#	FSIP: 1046#	BHT: 102° F	Oil Gravity: N/A

11/12/24 Depth 3980'. **TOH @ 4050' & RU Trilobite Testing for DST #2.**

DST #2 Toronto/Lansing A	3984' – 4050'	15 – 30 – 30 – 40
IF: Blow built to 5 ¾" – No return		
FF: Blow built to 8" – No return		
Rec: 70' WCM (15% W, 85% M)		
60' SWCM (5% W, 95% M)		
40' OSM		
Total Fluid: 170'		
IFP: 21-48#	FFP: 51-95#	Chlorides: 41,000 PPM
ISIP: 1068#	FSIP: 1025#	BHT: 105° F
		Oil Gravity: N/A

11/13/24 Depth 4101'. **TOH @ 4135' & RU Trilobite Testing for DST #3.**

DST #3 Lansing D	4115' – 4135'	15 – 30 – 30 – 30
IF: Blow built to 1" – No return		
FF: Blow built to 1" – No return		
Rec: 30' Mud		
Total Fluid: 30'		
IFP: 13-23#	FFP: 25-36#	Chlorides: N/A
ISIP: 1073#	FSIP: 1043#	BHT: 106° F
		Oil Gravity: N/A

11/14/24 Depth 4230'. **TOH @ 4260' & RU Trilobite Testing for DST #4.**

DST #4 Lansing H -- I	4196' – 4260'	15 – 30 – 30 – 30
IF: Blow built to 1 ½" – No return		
FF: Blow built to 1 ½" – No return		
Rec: 30' Mud		
Total Fluid: 30'		
IFP: 22-25#	FFP: 27-37#	Chlorides: N/A
ISIP: 1068#	FSIP: 920#	BHT: 107° F
		Oil Gravity: N/A

11/15/24 Depth 4315'. **TOH & RU Trilobite Testing for DST #5.**

DST #5	Lansing J -- K	4266' – 4315'	15 – 30 – 30 – 40
IF: Blow built to 5 ¼" – surface return			
FF: Blow built to 7 ¼" – surface return			
Rec: 100' MCW (15% M, 85% W)			
60' SWCM (5% W, 95% M)			
40' VSOCM (1% O, 99% M)			
Total Fluid: 200'			
IFP: 21-43#	FFP: 46-97#	Chlorides: 39,000 PPM	
ISIP: 1207#	FSIP: 1201#	BHT: 110° F	Oil Gravity: N/A

11/16/24 Depth 4486'. **TOH @ 4510' & RU Trilobite Testing for DST #6.**

DST #6	Marmaton A – C	4444' – 4510'	15 – 30 – 30 – 30
IF: Blow built to 1" – no return			
FF: Blow built to 2 ¼" – no return			
Rec: 15' GMCO (10% G, 15% M, 75% O)			
15' GO (10% G, 90% O)			
Total Fluid: 30'			
IFP: 23-30#	FFP: 30-30#	Chlorides: N/A	
ISIP: 1191#	FSIP: 1072#	BHT: 107° F	Oil Gravity: 24° API

11/17/24 Depth 4555'.

11/18/24 Depth 4740'. **RTD 4897' @ 10:15 pm. TOH & RU ELI Wireline Services to run Triple-Combo OH Log Suite. LTD 4898'.**

We decided to set 5 ½" casing in the Anhydrite and make this a Cedar Hills SWD well for the Jantz 1-22.

COMPARISON of LOG TOPS

FORMATION	SOCO Wells #2-27 27-16S-35W LOG Tops KB 3206'		Reference A SOCO Wells #1-27 27-16S-35W D&A KB 3207'		Reference B SOCO Jantz #1-22 22-16S-35W Producer KB 3204'		Structural Comparison: Ref. A Ref. B	
B/Anhydrite	2505	+701	2505	+702	2491	+713	-1'	-12'
Heebner	3988	-782	3994	-787	3975	-771	+5'	-11'
Muncie Creek	4204	-998	4209	-1002	4192	-988	+4'	-10'
Stark	4299	-1093	4305	-1098	4288	-1084	+5'	-9'
Hushpuckney	4346	-1140	4351	-1144	4338	-1134	+4'	-6'
Marmaton	4453	-1247	4454	-1247	4449	-1245	Flat	-2'
Pawnee	4526	-1320	4529	-1322	4511	-1307	+2'	-13'
Cherokee	4608	-1402	4611	-1404	4589	-1385	+2'	-17'
Mississippian	4808	-1602	4804	-1597	4766	-1562	-5'	-40'
B/Anh-Heebner		1483		1489		1484	+6'	+1'
Heebner-Miss		820		810		791	-10'	-29'

DAILY MUD PROPERTIES

Day	Depth	Weight	Vis.	WL	PH	Chl	LCM
1				Native			
2							
3	1,329	9.0	28	N/C	7.0	890	2
4	2,597	9.7	29	N/C	7.0	29,000	2
5	3,457	9.7	29	N/C	7.0	31,000	2
6	3,805	8.8	56	5.8	11.0	8,200	2
7	4,050	9.0	54	10.0	11.0	9,100	2
8	4,135	9.1	57	6.8	11.0	10,500	2
9	4,260	9.2	58	10.0	11.5	11,800	2
10	4,315	9.2	59	9.6	11.0	9,000	2
11	4,491	9.1	63	8.0	11.5	10,000	2
12	4,570	9.2	67	9.6	10.0	11,000	2
13	4,708	9.4	67	10.4	9.0	10,000	1
14							

Casing Report

- 11/19/24 RTD 4897', LTD 4898'. RU Wyoming Casing Services. LDDP & DC. **Ran 59 jts new MWP 55 5 1/2" 15.5# R3 LTC 8rd. Tallied 2503', set @ 2500' KB.** Ran pkr shoe @ 2500', latch down @ 2457', turbolizers @ 2475', 2414', 2115', 2072', 2030', 1987', 1944', 1902', 1857' & 1817'. **Cmt baskets @ 2457' & 1693'.** CTCH 1 hr thru 5 1/2" w/ Desco. RU Swift. Set pkr shoe @ 1400#. **Cmt w/ 500 gal mud flush, 20 bbl 2% clafix wtr, 170 sx SMD @ 11.2 ppg, 200 sx SMD @ 12 ppg & 50 sx SMD @ 13 ppg. Circ. ~60 sx to the pit.** Landed plug w/ 1500# - latch down held. PD @ 9:50 pm. Set slips, jetted pits & released rig @ 11:30 pm. Plugged RH w/ 30 sx. **Total cmt 450 sx, 390 sx casing.** Left 3 jts MWP csg (tallied 103.23' threads off) on loc.
- 12/13/24 MIRU Wild West Well Service DD. SDFN.
- 12/16/24 **RU Midwest to run SCBL/GR, PBTD 2450', TOC 0'.** Have fair to good bond throughout. **Perforate Cedar Hills 1900-2000 (100') w/ 3 1/2" strip jets, 1 spf.** TIH w/ tbg & bit. RU AA Fishing Tools air foam unit. **Circ. 3 hrs & last 2 hrs no returns.** SDFN.
- 12/17/24 Ran bit to 2007'. **RU Tiger to acidize w/ 500 gal 15% DWA w/ extra surfactants.** Load casing & spot acid. Shut in backside - let sit 15 min. Pressured to 500# & lost 100# in 15 sec. Increased press. to 1000# & started feeding @ 0.3 bpm. Press. slowly dropped to 900# at 1/2 bpm at the end, ISIP 900#, 10 min 850#, TL 27 bbl. RU AA foam unit & circ for 2 hrs. 1st hr - good returns of red bed & cement. 2nd hr - clean. TOH w/ tbg & bit. SDFN.
- 12/18/24 RU Midwest Wireline. **Perforate Cedar Hills 1800-1900 (100') w/ 3 1/2" strip jets, 1 spf & 1850-60 (10') w/ 4" HSC, 1 spf.** RU casing swab - fluid @ surface. Swab down to 1800'. Rec 41.76 bbl. **Let sit 30 min - no fill up.** SD until Dec 30th.
- 12/30/24 RIH w/ casing swab and had no fillup. Loaded casing out of the swab tank. RU Midwest. **Perforate 1522-1582 (60') w/ 3 1/2" strip jets, 1 spf & White Horse 1452-76 (24') w/ 4" HSC, 2 spf.** Swab down to 1250' & let sit 30 min. Tag fluid @ 850' - some white sand in the cups. Very windy. SDFN.
- 12/31/24 TIH w/ tbg & bit to 1615'. RU AA Fishing Tools air foam unit. Foamed for 2 hrs. Had a little bit of sand at the beginning but cleaned up quick - not kicking in any fluid. RD AA & TOH w/ tbg & bit. RU casing swab. Made 6 pulls & started getting sand and foam. SDFN.
- 1/02/25 Tag fluid @ 750' from surface. **Swab steady & FL dropped to 1000'.** Rec. 3" red & white sand per pull then decreased to 1/2" sand per pull. HU csg to swab tank. **Took 168 bbl water in 40 min on vac.** SI csg. SDFN.

1/03/25 TIH w/ empty casing jars and had **PBTD @ 2350'**. RD casing swab & TIH w/ packer and tbg as follows:

2 3/8" Sealtite lined tailpipe	2.30'
5 1/2" x 2 3/8" Sealtite lined AD-1 packer	2.90'
44 jts used 2 3/8" Sealtite tbg	1428.20'
	1433.40'
3' KB adj	3.00'
	1436.40'

RU Walker Tank & flushed annulus w/ 40 bbl treated fresh water. **Set pkr @ 20K over and set in slips @ 1434'**. Loaded annulus & pressured to 340#. Held for 30 min. SDFWE.

4/03/25 MIRU Wild West Well Service DD. RU for tbg. Pulled slips & let pkr rubber relax. TOH w/ Sealtite tbg & 5 1/2" AD-1 packer. Workstring arrived & unloaded tbg. TIH w/ tbg & RBP to 1509'. Set RBP & TOH w/ tbg. Started to rain. SDFN.

4/04/25 SDFWE – too muddy.

4/07/25 Shut down.

4/08/25 Shut down.

4/09/25 TIH w/ tbg & catcher. **Rel. RBP & set RBP @ 1637'**. TOH w/ tbg & catcher. **RU casing swab to test the Whitehorse sand (1452-76) and top Cedar Hills perms (1520-82). Tag fluid @ 800' from surface.** Made 4 pulls & starting to recover sand. SDFN.

4/10/25 Total Lease arrived & dug a 600 bbl pit w/ the excavator. Put in pit liner. **Tag fluid @ 800' from surface. Swab steady & fluid level dropped to 950' from surface. Started off w/ 2" of red sand** a run in the sample bucket. Swab approx. 300 bbl. **Took samples @ 210', 240', 270' & 300 bbls out.** SDFN.

4/11/25 **Tag fluid @ 800' from surface.** Champion arrived & tested water samples. Laid down swab & RU sand pump. Cleaned sand off the RBP. Laid down sand pump & TIH w/ tbg & catcher. Rel. RBP & **set RBP @ 1507'**. TOH w/ tbg and catcher. **RU casing swab to test the Whitehorse sand. Tag fluid @ 800'.** Swab steady & rec approx. 120 bbls. Fluid level steady @ 1050' & **rec white sand.** Took water samples & SDFWE.

4/14/25 **Tag fluid @ 750' from surface.** Swab steady & **took water samples at 120, 210, & 300 bbls out.** FL steady @ 1050' and **rec 1/2" white sand** in the sample bucket. SDFN.

4/15/25 Tag fluid @ 750' from surface. Lay down swab & RU sand pump. Cleaned out approx. 20 gal sand off RBP. TIH w/ tbg & catcher. Stacked out 2' high from the RBP. Circ sand off the RBP. Rel. RBP & TOH w/ tbg, catcher, and RBP. SDFN.

4/16/25 Load workstring on SOCO's trailer. TIH w/ packer and tbg as follows:

2 3/8" Sealtite lined tailpipe	2.30'
5 1/2" x 2 3/8" Sealtite lined AD-1 packer	2.90'
44 jts used 2 3/8" Sealtite tbg	1428.20'
	1433.40'
3' KB adj	3.00'
	1436.40'

RU Walker Tank & flushed annulus w/ 40 bbl treated fresh water. **Set pkr @ 18K over and set in slips @ 1434'**. Loaded annulus & pressured to 320#. After 20 min started to gain pressure. HU wellhead & RDMO.

WELL	DST	INTERVAL	PRESSURE	DEPTH of LOWEST	PRESSURE
		(ft)	(psi)	PERMEABLE ZONE (ft)	GRADIENT
Wells #2-27	1	3864-3940	1074	3940	0.273
Wells #2-27	2	3984-4050	1068	4043	0.264
Wells #2-27	3	4115-4135	1073	4135	0.259
Wells #2-27	4	4196-4260	1068	4230	0.252
Wells #2-27	5	4266-4315	1207	4315	0.280
Wells #2-27	6	4444-4510	1191	4504	0.264
Jantz #1-22	1	3890-4040	1099	4032	0.273
Jantz #1-22	2	4056-4280	1108	4274	0.259
Jantz #1-22	3	4288-4330	1207	4320	0.279

Pressure (P, psi)

Height of Fluid Column (H, ft)

Specific Gravity (SG), from ChampionX's analyses = 1.014

Density of Water (r, lbs/gal)

$$P = 0.052 \times H \times SG \times r$$

Solving for H:

$$H = P \div (0.052 \times SG \times r)$$

If the lowest calculated pressure gradient, 0.252 psi/ft is used to calculate the height of the fluid column in the Day Creek and Whitehorse and then the expected fluid level is calculated, you get:

Day Creek, 1452 ft - 1746 ft

$$P = 0.252 \text{ psi/ft} \times 1476 \text{ ft} = 372 \text{ psi}$$

$$H = 372 \text{ psi} \div (0.052 \times 1.014 \times 8.34 \text{ lbs/gal}) = 846 \text{ ft}$$

$$\text{Fluid Level (FL)} = 1746 - 846 = 630 \text{ ft}$$

Whitehorse, 1520 ft - 1582 ft

$$P = 0.252 \text{ psi/ft} \times 1582 \text{ ft} = 399 \text{ psi}$$

$$H = 399 \text{ psi} \div (0.052 \times 1.014 \times 8.34 \text{ lbs/gal}) = 907 \text{ ft}$$

$$\text{Fluid Level (FL)} = 1582 - 907 = 675 \text{ ft}$$