

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

Before Commissioners: Pat Apple, Chair
 Shari Feist Albrecht
 Jay Scott Emler

In the Matter of the Amended Application)	
of Lario Oil & Gas Company for an Order)	Docket No. 17-CONS-3516-CUNI
Authorizing the Unitization and Unit)	Conservation Division
Operations of the Feiertag Unit in Scott)	License No. 5214
County, Kansas.)	

UPDATED PREFILED REBUTTAL TESTIMONY

OF

JOHN P. HASTINGS

**ON BEHALF OF
LARIO OIL & GAS COMPANY**

PUBLIC VERSION

1 Q. Would you please state your name and by whom you are employed?

2 A. My name is John Hastings and I am employed by Lario Oil & Gas Company
3 (Lario).

4 Q. Have you previously submitted evidence in this hearing?

5 A. Yes. I submitted Prefiled Testimony on August 22, 2017. I will periodically refer
6 to this Prefiled Testimony in my Rebuttal Testimony.

7 Q. Would you please explain the purpose of your Rebuttal Testimony?

8 A. Yes. The purpose for my Rebuttal Testimony is to clarify some of my assertions
9 and opinions with the help of more information provided by Cholla in their Prefiled
10 Testimony. (Emily and Bill's Testimony here)

11 Q. Mr. Hastings, in your Prefiled Testimony on Behalf of Lario Oil & Gas Company
12 in this case (Docket No. 17-CONS-3516-CUNI), you gave a brief history of the
13 Millrich Southeast Oil Field (MSEOF) (pg.4-5, Phases 1-4). Is there anything that
14 you would like to add to that testimony?

15 A. Yes. I would like to clarify and discuss what a difficult and risky business
16 exploration for oil and gas is and the time it took to understand, develop and
17 exploit the MSEOF. It is important to understand that every time a new well is
18 drilled, the data that is obtained will change and add more clarity to the overall
19 nature of the sub-surface formations that produce economic quantities of oil. The
20 history and sequence of drilling in the MSEOF is important to take into account
21 when trying to understand why investments were made (or not made) in the long,
22 arduous development and exploitation of what is known as and is recognized by
23 the State of Kansas as the MSEOF.

1 In Phase 1 and Phase 2, between 1985 and 1992, K&E Petroleum and
2 Landmark Oil Exploration, drilled 4 wells (1 oil well and 3 dry holes) on the west
3 flank of what is now known to be the MSEOF, and chose not to make any more
4 investment based on the outcomes of those 4 wells.

5 It wasn't until June 1992 (Phase 3), 7 ½ years after the K&E Hutchins #1 well
6 was drilled, and after two exploration companies gave up, that McCoy Petroleum
7 Corporation drilled the Feiertag "A" 1-15. This well is the first economically
8 successful well and is the defining exploration discovery well of the MSEOF.

9 In November 2003 (Phase 4), Lario purchased the McCoy operated assets
10 covering the known extent of the MSEOF at that time. Lario continued to
11 develop and grow this well-defined oil accumulation called the MSEOF and has
12 extended the economic life of the MSEOF.

13 Q. Mr. Hastings, Have you read the Pre-Filed Testimony of Emily M. Hundley-Goff
14 (Emily) and William T. Goff (Bill)?

15 A. Yes.

16 Q. Based on their Prefiled Testimony, is there anything you would like to add?

17 A. Yes. After reviewing Cholla's Prefiled Testimony I would like to add the
18 following:

19 My opinions and assertion that the MSEOF support Lario's position that Unit
20 Tracts 8 and 9 (see Exhibit 3, Producing Zones Map) are part of and should be
21 included in Lario's Unitization in order to prevent economic waste have not
22 changed.

23 Q. What is the basis for your statement? Can you please clarify or explain why you

1 would like to add the above statement to your rebuttal testimony?

2 A. Yes. Cholla contends that the Metzger 2-16 (proposed Lario Unit Tract 8) should
3 be used as an injector well for a hypothetical, Cholla operated enhanced
4 recovery project by water flood in the Marmaton "C" zone. (See Emily's
5 testimony, pg.5, line 13-15 and Bill's testimony, pg. 5, lines 17-18, also pg. 7,
6 lines 9-13). Also, Cholla claims that, "If Lario's water flood unit is approved as
7 proposed; this very economic opportunity would be taken away from Cholla and
8 its land owners, causing economic waste and loss of protection of correlative
9 rights." (Bill's testimony, pg. 9, lines 14-15)

10 I disagree with Cholla's interpretation of the evidence. Much information has
11 been clarified by Cholla's Prefiled Testimony and helps to confirm Lario's position as
12 follows:

- 13 1. "Cumulative production for the Metzger lease as of July 2017 is 31,606 BO,
14 with the majority of this production from the Marmaton C." (Emily's testimony
15 pg. 6, Lines 7-8) The Metzger 2-16 well was completed in the Cherokee
16 Limestone for 18 BOPD and 2 BWPD (Emily's testimony pg. 6, Lines 2-3).
17 The Cherokee Limestone oil production from the Metzger 2-16 well, in my
18 opinion, has added a small and inconsequential amount to the total oil
19 produced from the Metzger Lease. Based on the information provided by
20 Cholla's own Prefiled Testimony, we now know that the majority of the
21 cumulative 31,606 barrels oil produced through July 2017 from the Metzger
22 Lease was produced from the Metzger 1-16 and not from the Metzger 2-16.
23 2. Cholla claims that results from DST #3 taken over the Marmaton C zone on

1 March 24, 2011 in the Metzger 2-16 "recovered Shut-in pressures of 704-
2 710# showing pressure depletion and communication from production in the
3 Metzger 1-16 after 6 months, similar to the communication McCoy and Lario
4 experienced on the MSEOF in the Marmaton B." (See Emily's testimony, pg.
5 5, lines 17-20)

6 I disagree. The test results clearly shows low permeability reservoir
7 characteristics with classic "s curve" patterns to both shut in pressures with
8 very low recovery of fluid (40 ft. of oil cut mud that was 70% mud). The
9 sampler recovery was 2000 ml of oil (1/2 gal) for total recovery of less than 9
10 ½ gallons of fluid that was mostly drilling mud. (Please see Exhibit 11 - Cholla
11 Marmaton C zone DSTs Comparison)

12 Because of the low permeability in the Marmaton C (See Exhibit 12, Cholla
13 Production LLC Metzger 2-16 Daily Report, DST #3 results at the top of page
14 3) and the failed completion attempt in the Marmaton C due to behind pipe
15 communication with zones above the Marmaton C, (See Emily's Testimony
16 pg. 6, lines 1-5) it is my opinion that the Metzger 2-16 does not represent a
17 good candidate as an injector for the Marmaton C zone.

- 18 3. The Vulgamore 1-21 oil well has primary cumulative production of 3,464 BO
19 from Marmaton C. This well, currently, produces less than 2 bopd and is no
20 longer economic to produce. (See Cholla's discussion of the Vulgamore 1-21,
21 Emily's testimony, pg. 5 and pg. 6, lines 9-20, pg. 7, lines 1-2).
- 22 4. Based on clarification provided in Cholla's prefled testimony, my conclusion
23 is that primary oil recovery in the Marmaton C zone is from two wells, the

1 Metzger 1-16 and the Vulgamore 1-21 and is 35,070 BO. Both leases are un-
2 economic and very near the end of their productive life.

3 Q. Does Lario plan to include the Marmaton C zone as part of its Proposal for
4 Unitization?

5 A. No. It is not one of the 11 targeted formations identified for MSEOF water flood
6 project.

7 Q. Is it still your opinion, after reading the Prefiled Testimonies of Bill and Emily
8 Goff that the Metzger 2-16 well is in close proximity to and part of the
9 accumulation of oil identified by you as a Combination Structural-Stratigraphic
10 Trap and has been recognized by the State of Kansas as the Millrich Southeast
11 Oil Field (MSEOF)?

12 A. Yes.

13 Q. Is it also your opinion that the Metzger 2-16 well and the surrounding 40 acres
14 labeled Tract #8 of Lario's proposed Feiertag Unit (Please see Exhibit #3 of my
15 Prefiled Testimony) should be included as part of the Feiertag Unit and will
16 substantially prevent economic waste as an injector well for several formations in
17 the MSEOF water flood project.

18 A. Yes. On Exhibit 13(a), I have drawn arrows showing the direction of dip with red
19 arrows and the amount of dip displayed as negative red numbers between the
20 Metzger 2-16 and the wells that surround it. Based on the proximity of the
21 Metzger 2-16 to the Feiertag Unit (as proposed) and the close structural
22 relationship to the Feiertag A 10-15 well (1046'), it is my that a structural low of
23 -1400' or lower separates the Metzger 2-16 from the Metzger 1-16, 2290' to the

1 west (see Exhibit 13(b) Marmaton C Structure Map with John's interpreted
2 contours). I have supported this position well in my Prefiled Testimony.

3 Finally, because of the length of distance of the Metzger 2-16 to the only two
4 Marmaton C zone producers (over twice as far as the Metzger 2-16 is from the
5 Feiertag A 10-15) and the low permeability of the Marmaton C zone in the
6 Metzger 2-16(see Page 4, Lines 5-23 above), the Metzger 2-16 would not be a
7 good injector for a future Cholla Marmaton C water flood project. Conversely, the
8 Metzger would be used by Lario as an injector well for 8 of the 11 proposed
9 zones in the Feiertag Unit (See Exhibit 1 in John's Prefiled Testimony). They are:

10 1. Stage 1: Marmaton B zone.

11 2. Stage 2: Lansing L & K zones

12 3. Stage 3: Lansing I & H zones

13 4. Stage 4: Lansing B & C zones (See Exhibit 12, Cholla Production LLC
14 Metzger 2-16 Daily Report, Page 2, Lansing B zone show description and
15 discussion underlined in Red and DST #1 results that clearly show
16 pressure depletion from the Lansing B zone production to the east as
17 discussed above.)

18 5. Stage 5: Oread A zone

19 The economic benefit from the number of zones to be flooded in the Feiertag
20 Unit and the anticipated recovery factors in each zone are significant. Using the
21 Metzger 2-16 as an Injector well will prevent economic waste.

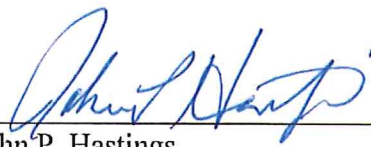
22 Q. Does this conclude your Rebuttal Testimony?

23 A. Yes.

VERIFICATION

STATE OF KANSAS)
) ss:
COUNTY OF SEDGWICK)

John P. Hastings, of lawful age, being first duly sworn upon my oath, state that I am a Petroleum Geologist employed with Lario Oil & Gas Company; that I have read the above prefiled rebuttal 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.



John P. Hastings

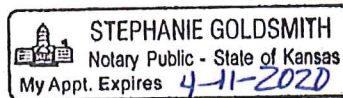
SUBSCRIBED AND SWORN to before me this 6th day of September, 2017.



Notary Public

My Appointment Expires:

4-11-2020



Cholla's Marmaton C Zone DSTs

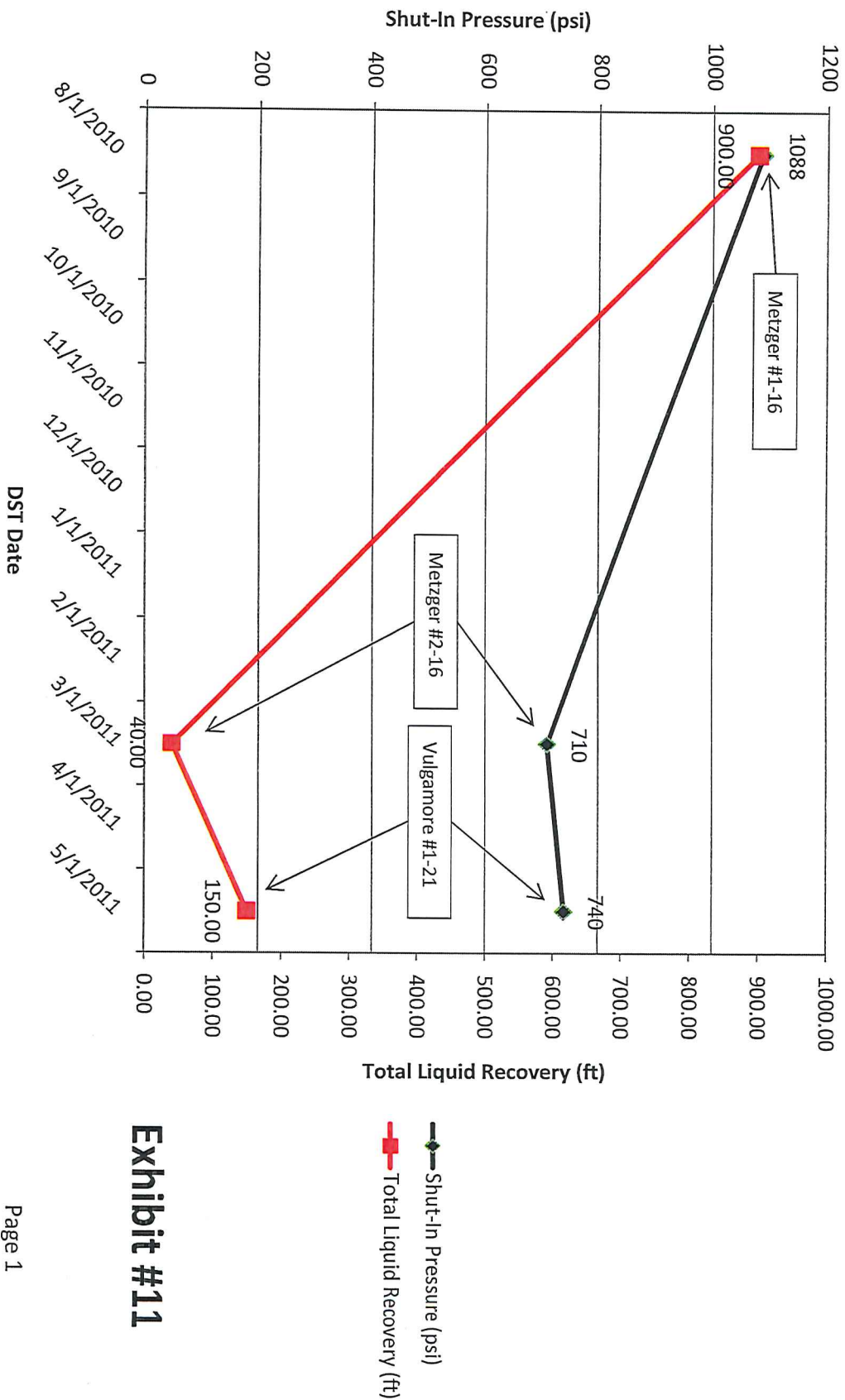


Exhibit #11

Exhibit 12

Cholla Production, LLC

METZGER No. 2-16
Sec. 16-T19S-R33W
Scott County, Kansas
Elevation: 2961' Gr.; 2966' KB

02-23-11: Current Operations: Fall and Associates Stake location. 660' FEL and 660' FSL. Sec. 16-T19S-33W. Elevation: 2961' GR.

03-09-11: Current Operations: Discussed access into well with landowner David Metzger. MI Pfeffer Dozer MI and building location and dig fresh water pit.

03-10-11: Current Operations: Decision made to drill water source well. Drilled 280' got good flow rate.

03-17-11: Current Operations: Rig Service. MIRU WW Drlg Rig # 2. Service rig.

03-18-11: Current Operations: Preparing to spud well.

03-19-10: Current Operations: TD 1150', Drilling. Last 24 hours made 1150'. 0945 hrs (CST) spud 12 1/4" surface hole. Received & unloaded 5 jts 8 5/8", 23#, LS csg from Midwestern Supply. and an additional jt. from Sunrise Supply.(255.63'). 1215 hrs - TD 12 1/4" @ 263'. CTCH 1/4 hr - drop survey & TOOH for csg. 1300 hrs ran 6 jts 8 5/8" csg (255.63'); strapped & welded connections. 1400 RU Allied to cmt - pumped 170 sks common w/2% gel, 3% CaCl. Cement did circulate with good returns. Displaced w/15 BFW & SI @ 1500 hrs. WOC 8 hrs. Set pipe @ 262'. 2300 hrs. GIH w/ bit no. 2. Drlg 7175 hrs to 1150. Last 24 hours made 1150'. Bit no. 2; Smith 7 7/8" F-27. PS6682; 7.75 hrs on bit. MW 9.3; vis 28

03-20-11: Current Operations: TD 2625', Drilling. Last 24 hours made 1475'. 24 hours drlg; 32.25 Hours on bit No. 2 - . Footage on bit 2362'. MW 9.3; vis 28 ; CI 35,000 ppm; LCM Trace #. Anhydrite 2193-2210' (T/+773; B/ +756 -base +13 to prog and 7' high to Metzger 1-16; 1' high to Landmark Hutchins 1-16 in NESE)

03-21-11: Current Operations: TD 3305', Drilling. Last 24 hours made 680'. 23 hours drlg; 55.25 Hours on bit No. 2 - . Footage on bit 3042'. MW 9.4; vis 29 ; CI 36,000 ppm; LCM Trace #.

03-22-11: Current Operations: TD 3930', Short trip for DST No. 1 in Lansing "B". Last 24 hours made 625'. 23 hours drlg; 1.0 hrs CFS. 75.75 Hours on bit No. 2 - . Footage bit No.2 3662'. MW 8.9; vis 54; WL 8.8; CI 4,300 ppm; LCM 0.5 #.

TOPS:	METZGER 2-16	METZGER 1-16	FIERTAG 15-15
B/ANHYD	2210(+756)	(+751)	(+760)
HEEBNER	3822(-856)	(-870)	(-851)
LANSING	3867(-901)	(-916)	(-902)

Lansing "B" Show Description (3923'-27'): Lt Tan; Fxln, occ fossiliferous, occ vuggy, g interparticle porosity, vg vuggy porosity when developed, SFO on water in sample cup, gd odor, spotty to gd even stn, with shows from 3920-3930' samples. Some vugs w/ free oil show visible with naked eye. Drlg break 3.5-4.5 min/ft to 1.5-2.5 min/ft over three feet. Zone is productive to the east in Millrich Field.

03-23-11: Current Operations: TD 4115', CFS DST No. 2 in Lansing zone above Stark shale. Last 24 hours made 185'. 14.25 hours testing; 9.75 hrs Drlg;. 85.5 Hours on bit No. 2 - . Footage bit No.2 3852'. MW 9.0; vis 55; WL 8.0 Cl 4100 ppm; LCM 1.0 #. Displaced mud at 3440', did 25 stdn ST before DST No. 1 at 3950'.

DST No. 1: Lansing "B" -3920'- 3950'. 10-40-20-90.

IF: Weak surface Blow	17-23 psi
ISIP: No Blowback	595 psi *
FF: No blow	23-30 psi
FSIP: No Blowback	595 psi *
IHP: 1891 psi	FHP: 1856 psi

Recovery: 15' Mud with oil specks; Sampler 2000 ml mud. Sampler pressure 0 psi. Temp 112 deg.

03-24-11: Current Operations: TD 4275', Drilling. Last 24 hours made 160'. 15.5 hours testing; 8.5 hrs Drlg;. 94. Hours on bit No. 2 - . Footage bit No.2 4012'. MW 9.1; vis 65; WL 8.0 Cl 4500 ppm; LCM 1.0 #. Displaced mud at 3440', did 15 stdn. ST before DST No. 2 at 4142'.

DST No. 2: Stark-4120'- 4142'. 10-40-40-120.

IF: Bldg Blow 3.5" in 10 min	22-76 psi
ISIP: No Blowback	856 psi
FF: BOB 23"	79-161 psi
FSIP: No Blowback	853 psi
IHP: 2017 psi	FHP: 1992 psi

Recovery: 15' Mud with oil specks; 365' MCW with oil specks (30% mud, 70% water); chlorides 45,000 ppm. BHT 120 degrees. Sampler 2000 ml mud. Sampler pressure 0 psi. Temp 112 deg.

03-25-11: Current Operations: TD 4405', Drilling. Last 24 hours made 130'. 15.5 hours testing; 8.5 hrs Drlg;. 102.5. Hours on bit No. 2 - . Footage bit No.2 4142'. MW 9.1; vis 56; WL 8.8 Cl 5000 ppm; LCM tr. Ran DST nos. 2 & 3. Minor shows in the Pawnee Limestone will be evaluated on logs.

4C (Emily's testimony pg. 4, Lns. 20-21 and pg. 5 Lns 1-6)

DST No. 3: Marmaton "B" -4359' - 4370'. 10-40-40-120.

IF: Bldg Blow 1.5" in 10 min	17-25 psi
ISIP: No Blowback	705 psi
FF: 4.5" Blow	41-38 psi
FSIP: No Blowback	710 psi
IHP: 2182 psi	FHP: 2097 psi

Recovery: 40' OCM (30% oil, 70% mud) recovery vol = .118 bbls. BHT 118 degrees. Sampler 4000 cc oil. Sampler pressure not reported. API grav. 28 deg. Temp 112 deg.

Test results indicate a relatively low perm oil reservoir.

03-26-11: Current Operations: TD 4610', Running DST No. 4 in Morrow Sand. Last 24 hours made 205'. 0130 hrs TOOH for DST # 4, interval from 4576' to 4610' w/10-40-20-120 minute test; 0550 hrs open tool for 1st flow; 0900 hrs TOOH w/DST No.4 recovered 10' mud w/trace of oil; 1130 hrs TIH; 1345 hrs & resume drlg; 2130 hrs TD 7 7/8" hole @ 4700'. CFS 1/2 hr & short trip bit 16 stds up to 3650'. 2315 hrs CTCH on btm 1 1/2 hrs. Hour Details 9.75 hours testing; 14.25 hrs Drlg; 102.5. Hours on bit No. 2 - 116.75. Footage bit No.2 4347'. MW 9.3; vis 56; WL 9.6 Cl 5400 ppm; LCM 0.5#. Good show in Morrow sand, running approx. 10' high to Metzger 1-16.

DST No. 4: Morrow Sandstone- 4576' - 4610'. 10-40-20-120.

IF: Bldg Blow 0.5" in 10 min	20-23 psi
ISIP: No Blowback	48 psi
FF: No Blow	22-22 psi
FSIP: No Blowback	48 psi
IHP: 2366 psi	FHP: 2264 psi

Recovery: 10' OCM (30% oil, 70% mud) BHT 119 degrees. Sampler 2000 cc mud. Sampler pressure 20 psi. Test results indicate a very low perm.

03-27-11: Current Operations: Finish Long String Cement at TD 4740'. 0045 hrs TOOH for logs; 0245 hrs RU Weatherford to log; LTD 4700'; 0815 hrs Finished logging; RD Weatherford; 0900 hrs TIH; 1045 hrs drilled 40' additional hole to space out casing; NEW TD: 4740'; 1220 hrs CTCH 1 3/4 hrs; 1515 hrs LDDP & DCs. 1815 hrs RU csg crew & installed csg head; 1845 hrs run 111 jts 5 1/2", 15.5#, new API STC csg, used float shoe, latch down baffle, 2 cmt baskets & 12 centralizers. 2100 hrs RD csg crew - circ on btm 1.5 hrs while WO Basic Services to cmt; 2330 hrs pumped 500 gals mud flush & 140 sks AA-2 blend; released plug, wash pump & lines to pit; displaced w/50 BFW & 60 bbls mud with 100% returns.

03-28-11: Current Operations: Rig Released. 0030 hrs landed plug; pumped up to 1800 psi & held; released pressure & float held; dropped DV opening tool & pressure to 1100 psi; opened DV tool & circ thru DV tool 3 1/2 hrs w/rig pump; plugged Rat hole & Mouse hole w/50 sks neat cmt; 0400 hrs pump 400 sks A-Conn blend followed by 200 sks class C cmt w/ 2% CaCl, 1/4# floreal; excellent returns w/ cmt circ to pit; released DV closing plug;

displaced w/56 BFW; landed plug & closed DV tool @ 0545 hrs; pressure tested @ 2100 psi & held; pipe set @ 4730' w/ baffle @ 4688', DV tool @ 2386'. RD & release Basic Services. Cleaned pits, set slips & released rig @ 0800 hrs. Known Cost: 34 hrs day work, Basic \$28,338.

COMPLETION OPERATIONS

04-07-11: Current Operations: Finish drill out cement PBTD 4686'. MIRU Post & Mastin Well Service rig & rev circ unit. Received & unloaded 147 jts 2 3/8", J-55, EUE tbg (4800' OA); tally same. RIH w/4 7/8" bit, X-over, SN & 73 1/2" jts tbg; tagged cmt stringer @ 2376'. RU power swivel, drill out cmt stringer & tagged DV tool @ approximately 2385'. Drilled out DV tool & pressure tested to 500 psi, held steady. RIH & tagged btm @ 4378' w/174 1/4 jts tbg drilled approx 8' cmt stringer to solid btm @ 4686'. Pump 100 bbls 2% kcl wtr w/biocide to circ clean & displaced hole. SI & SDF darkness. EDC Post & Mastin Rig \$2850, \$2,600 (rev circ unit), Supervision \$660, Heat Waves \$350 (kcl wtr) – total \$6,460

04-08-11: Current Operations: Testing St. Louis at 4647-52'. TOOH w/tbg & bit. RU LogTech run GRC-CCL-CL from 4683' to 3200'. Logger PBTD @ 4684' & TOC @ 3312'. Had good to very good bond throughout. Also logged 2nd stage cmt – from 2480' to 300' – found DV tool @ 2384'. **RIH w/3 1/8" expendable gun & perf Mississippian St. Louis interval from 4647'-4752' (5') w/4spf, all charges fired.** RD & released LogTech. TIH w/2jts, tail pipe, model R pkr, SN & 141 jts tbg; set pkr @ 4585' w/btm of tail pipe @ 4650'. Ran swab w/ initial FL @ surface. Swab tbg dry recovering 16 BLW. Wait 1 hr rec 50' LW w/ vacuum behind swab. No show of oil or gas. SI & SDON – EDC LogTech \$3,550, Rig \$2,650, Supervision \$645, Sunrise Supply \$19,000 (4800' tbg) – total \$25,845 – CC \$32,305

04-09-11: Current Operations: Testing St. Louis 4647-52'. 14 hr SITP 0# w/ FL 4300'. Rec 300' slightly salty wtr w/ no show oil. Swabbed 40' fluid on 2nd swab run. RU Heat Waves to acidize w/400 gals NEFE 15% HCL; tbg loaded w/18 1/2 bbls. pressure to 100 psi; slowly increased pressure to 800 psi (over 1 1/2 hr period). Formation would not take fluid. Released pkr & pumped 2 BF via tbg (to spot acid on perfs). Reset pkr; pressure tbg slowly to 1700 psi; SD pump. Had slow leak off to 1200 psi. Engaged pump started injection @ 1/4 BPM @ 1500#. Pressure broke slowly back to 1000 @ 1/4 BPM. Pumped 18 bbls total displacement w/ ISIP 950 psi. Bleed down to 800 psi in 10 min, zone is tight. Bleed off pressure w/ 28 BTL. Ran swab w/ FL surface; swab tbg dry. Rec 19 BLW w/trace of acid gas; recovered 1 BF next 2 hrs, less than 1/4 bbl last hr w/ no trace oil or gas. SI & SD for weekend, lacking 8 BHLR. EDC Heat Waves \$1,850 (est), Rig \$2,250, Supervision \$695 – total \$4,795 – CC \$37,100

04-11-11: Current Operations: Replace bell nipple. Over weekend SITP TSTM (lite blow), Initial FL 3500', swab tbg dry in 1 hr recovering 4 BLW w/trace of foamer from acid treatment. **Recover 1/2 BF next 4 hrs w/ no trace of oil or gas.** Released pkr & swab down to

recover LW from annulus, initial FL 1300', swabbed tbg & csg down to 3400' recovering 44 BLW from annulus. TOOH w/tbg, SN & pkr. RU welder to replace 5 1/2" weld cplg (it was leaking) w/ 5 1/2" bell nipple. SI & SDON. EDC Rig \$2,750, CF Supply \$1,000 (pkr rental) – Supervision \$660, Welder \$350 – total \$4,760 – CC \$41,860

04-12-11: Current Operations: Swab testing First Cherokee Lime. RU LogTech & RIH w/ 3 1/8" expendable gun & perf First Cherokee Limestone interval from 4449' to 53' (4') & 4437' to 40' (3'); Marmaton "B" interval 4362' to 70' (8') & Marmaton "A" interval from 4342' to 44' w/4 spf; all charges fired. TIH w/5 1/2" RBP, model R pkr & 138 jts tbg – set RBP @ 4487'. Pulled 3 jts tbg & set pkr @ 4385' w/135 jts tbg. Ran swab w/ initial FL 3000' swabbed tbg dry w/3 swab runs w/ show of oil in samples. Swabbed 1 3/4 BO (no free wtr in samples) next 2 hrs. RU Chaosland Service to acidize Cherokee w/ 600 gals NEFE 15% HCL (MCA type acid) using 40 ball sealers. Tbg loaded w/17 bbls, pressure slowly to 2050 psi w/ slow break. Increased rate to 3 BPM @ 1300 psi up to 4 BPM @ 1620 psi, had small amount of ball action but did not ball off. Finished job @ 1520 psi and 4 BPM. ISIP 900 psi, down to 260# in 15 minutes. Bled remaining pressure off w/ 32 BTL. Ran swab (tbg full) swabbed 35 BF in 4 hrs. Good show of acid gas w/16 bbls recovered; show of oil w/18 bbls recovered. Avg 3 1/2 BPH last 2 hrs w/ FL @ 3950' (gas cut) last 2 hrs. Pulling vacuum behind swab last 2 hrs. SI & SDON. EDC LogTech \$3,500, Chaosland \$2,082, Rig \$2,800, Supervision \$645, CF Supply \$1,000 (RBP rental) – total \$10,027 – CC \$51,887

04-13-11: Current Operations: Swab back First Cherokee Retreat. 13 hr SITP 50 psi. RU and run swab, initial FL 1700'. Swabbed 33 BO in 6 hrs w/ avg 3 1/4 BPH last 5 hrs. FL holding @ 4000' (gas cut) last 5 hrs w/ no free wtr in samples and vacuum behind swab. RU Chaosland Services to retreat zone w/1500 gals gelled NE FE 15% HCL & displaced w/20 bbls kcl wtr using 40 ball sealers. Tbg loaded w/21 bbls – increased rate slowly 3 BPM @ 1120 psi, inc. rate to 4.0 BPM @ 1520 psi, 4 1/2 BPM @ 1800 psi. Had good ball action (up to 2340 psi @ 4 1/4 BPM) however, did not ball off. ISIP 740# down to 370# in 15 min, 56 BLW. Bled remaining pressure off & flowed back 1 1/2 BLF before dying. RU ran swab, tbg was full. Swabbed 42 BF in 3 hrs. 5 1/2 bbls last hr w/ hanging in at FL 3800' (gas cut last hr). No free wtr in samples last hr w/ good show of oil & strong acid gas @ 16 bbls recovered, vacuum behind swab last hr. SI & SDON, lacking 12 1/2 BHLR. EDC Rig \$2,850, Chaosland \$4,613, Supervision \$645 – total 8,108 – CC \$59,995

04-14-11: Current Operations: Swab Test Marmaton "B" 4362-70'. 13 hr SITP 20# w/ FL 2100'. Swabbed 42.5 BO in 6 hrs w/ stabile rate of 4 BPH last 2 hrs. FL 3850' last 2 hrs (gas cut). LD swab & released pkr. Ran 3 jts tbg, latched onto & released RBP. Pulled & lay down 3 jts tbg & reset RBP @ 4384'. Lay down 1 jt tbg & ran 10' tbg subs to set pkr @ 4352'. Ran swab FL 3100'. Swabbed tbg dry while rec 4 1/2 BF. Wait 1 hr, ran swab, found tbg dry. SI & SDON. EDC Rig \$2,650, Supervision \$645 – total \$ 3,295 – CC \$63,290

04-15-11: Current Operations: Swab back initial Marm "B" breakdown. 14 1/2 hr SITP 50# w/ FL @ 4000'. Rec 1.5 BF (55% wtr) w/ tbg dry on 2nd swab run. RU Chaosland Services to treat w/500 gals NEFE (MCA) 15% HCL, displaced w/17 bbls kcl wtr. Tbg loaded w/17 bbls initial injection rate @ 0.75 BPM @ 440 psi. Increased rate to 1 BPM @ 540psi w/ pressure breaking back, increased rate to 3.2 BPM @ 550psi. ISIP vacuum w/ 29

BTL. Ran swab w/ FL 1800'. Swabbed 33 BF in 1 ½ hrs. During swab operations have developed vacuum on annulus, showing spent acid in samples w/ show of oil. FL 3300'. Very high winds caused swab line to roll out of crown sheave, unable to repair safely in wind. SI & SDON. EDC Rig \$1,400, Supervision \$480, Chaosland \$1,950 – total \$3,830 – CC \$67,120

04-16-11: Current Operations: Swabbing all Marmaton perfs. Put swab line in proper alignment. Ran swab w/ FL 3300'. Swab 6 BF w/2 swab runs pulling vacuum on annulus. Released pkr, POOH & LD 40' tbg & subs. Reset pkr @ 4310' & GIH w/ swab, FL 3700'. Tbg dry on 2nd swab run and no vacuum on annulus. Apparent communication between Marmaton "A" and "B" perfs behind pipe (?). Released pkr & lowered tbg, pumped 3 bbls acid & let fall to spot across perfs. Pulled tbg & set pkr @ 4310' to acidize both Marmaton perfs w/ 1500 gal NEFE gelled 15% HCL, 35 ball sealers & 20 bbls kcl displacement. Tbg loaded w/18 bbls w/ injection rate of 0.5 BPM @ 320 psi. Increased rate slowly to 3.5 BPM @ 1320 psi. got ball action to 1500 psi @ 3.5 BPM. Increased rate to 4.5 BPM @ 1650 psi w/ more ball action up to 1820 psi @ 4 ½ BPM, did not ball off. ISIP 550 psi w/ vac in 8 minutes, 56 BTL. Ran swab w/ FL @ 500'. Swabbed 94 BF in 6 hrs avg. 14 BPH last 4 hrs. Avg oil cut at 17% in samples last 4 hrs. FL steady @ 3600' last 4 hrs w/ vac behind swab. Annulus remains dead. SI & SD for weekend. EDC Rig \$ 2,900, Chaosland \$4,370, Supervision \$ 690 – total \$7,960 – CC \$75,080

04-18-11: Current Operations: Prep to Squeeze Marm Perfs. SITP TSTM w/ lite blow. FL @ 2500'. 150' free oil on top of fluid column. Swab 24 ¾ BF in 1 ¼ hrs w/ FL 3300'. LD swab, released pkr & lower tbg w/1 jt tbg & subs - set pkr @ 4354' to isolate Marm "B". Ran swab w/ FL @ 3100'. Swab 15 ¾ BF in 1 hr w/ samples avg 10% oil - FL 3300' last 1/2 hr. Vacuum on annulus w/ every swab run indicating communication between Marmaton perfs behind pipe. LD swab & released pkr. RIH & latch onto & rel RBP. TOO H w/tbg & tools. TIH w/redress pkr & RBP, SN & 135 jts tbg - set RBP @ 4400' - set pkr @ 480', used lease wtr to spot sand on RBP in preparation for squeeze of all Marm perfs in AM. SI & SDON. EDC Rig \$2,700, CF Supply \$850 (redress tool) - Supervision \$690 - total \$4,240

04-19-11: Current Operations: Prep to Squeeze Marm Perfs. RU Allied Cementing to squeeze perfs @ 4342-44' & 4362-70'. Set pkr @ 4384', RBP @ 4400'. Pressure test to 1500 psi – held. Release pkr & POOH w/3 jts tbg. Set pkr @ 4280' & loaded annulus w/lse wtr. Pressure to 500 psi. Established injection rate 2 ¼ BPM @ 800 psi. Mix & pump 50 sks class C w/1% CaCl follow 16 bbls displacement volume. SD pump - no squeeze pressure; gravity feed additional 1/2 bbl displacement. Pump cmt away w/25 bbls total displacement. Over displaced 7 bbls, mix & pump additional 50 sks cmt w/2% CaCl. Caught pressure w/3 bbls in perfs. Pressure slowly increased to 1600 psi w/16 bbls displacement pumped. Squeezed off @ 1600 psi w/est 93 sks cmt in perfs. Released pressure, no movement. Release pkr & rev circ tbg clean. Circ 1/2 bbl cmt to pit. Pulled 1 jt tbg & set pkr @ 4238' pressure tbg to 800 psi & SI 1 hr. Released pressure. TOO H w/tbg & pkr. TIH w/ 4 7/8" bit, SN & 131 jts tbg. SI & SDON. EDC Rig \$ 2,500, Allied \$5,636, Wtr Truck \$ 400, CF Supply \$800 (redress pkr & RBP), Supervision \$650 - total \$9,986

04-20-11: Current Operations: Prep to Run pump and rods: Lower tbg 42' & tag cmt @ 4290'. RU rev circ unit & drilled hard cmt. from 4290' to 4370' (80'), fell thru at this point. Pressure test @ 500 psi, - held. RIH & wash sand off RBP, circ clean. TOOH w/tbg & bit. TIH w/retrieving head & tbg, tag RBP. Swab tbg & csg down to 3000' to rel RBP & TOOH. TIH w/SN, 4 jts tbg, TAC & 100 jts tbg. SI & SDF darkness. EDC Rig \$2,950, Drill out equip \$2,200, Supervision \$650, total \$5,800.

04-21-11: Current Operations: SI WO Pumping unit: RIH w/remaining tbg (139 jts total). Set TAC @ 4380'; SN @ 4512'. Ran swab, found FL 2300'. Swabbed 30 BF (mostly load wtr) in 2 hrs w/ FL 3200' last 1 hr. PU & RIH w/2" X 1 1/2" X 14' RWBC DV pump, 179 3/4" rods, 2', 4, 6, & 8' pony rods, 1 1/4" X 22' polish rod w/10' liner. Spaced & seated pump. Longstroked pump got good pump action. Loaded tbg w/swab oil. Pulled wtr from swab tanks leaving 10' swab oil (140 bbls) to treat for sales. SI W/O on pumping equipment. Released rig. EDC Rig \$2,300, Supervision \$680, Wtr Truck \$400 - total \$3,380 - CC \$98,496

04-27/29-11: Current Operations: Setting Pumping Unit. Bojack Roustabout crew prep pumping unit grade, haul unit from Sunrise yard in Ness City and set same. Pumping is new Sentry 114-64. Trench flowline to tank battery.

05-03-11: Current Operations: Electrification. SK Electric set variable speed drive, wire same to pumping unit. Contact Wheatland Electric COOP for service. Told it could be 2-3 weeks.

05-05-11: Current Operations: Preparing electric service. Wheatland Electric finishes hooking up service to lease. Bojack Roustabout finishing hook-up.

05-07-11: Current Operations: Start well up. Start well up Saturday Morning. Well pumped up fine at 6 SPM, filling lead line. Check system for leaks, found none. Well pumping to stock.

05-08-11: Current Operations: Well on production. Total lease made 71 BO and 60 BW. Assuming No. 1-16 is constant at 27 BO and 25 BW, the No. 2-16 made 44 BO into stock and 35 BW. We will monitor water situation as the zone did not test any water following treatment.

05-09-11: Current Operations: Well on production. Lease made 97 BO and 25 BW. No.2 well made 70 BO, 0 BW.

OPERATING HISTORY

08-31-11: Current Operations: Pump change. RU Post & Masten Well Service. Long Stroke pump, would not pump. POOH with to rods and pump, change out pump and rerun. Load tubing and pressure up to 30 psi. Hung off well and RD.

09/01/11: Current Operations: Gabel Lease Service: Shot fluid level, 132 jts down, 4092'.

10/11/11: Current Operations: Gabel Lease Service: Shot fluid level, 133 jts down, 4123'.

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08/16/12: Current Operations: Swab Cherokee Lime perfs (4449'-53' & 4437'-40'). MIRU Post & Mastin Rig #40. POOH with rods and pump. Released tubing anchor. POOH with tubing. Tubing had no scale buildup. RIH with B&B Tools 5 1/2" RBP & PKR. Set RBP at 4487'. Set PKR at 4385', isolating the Cherokee Lime perfs. Attempted to run tubing swab. Could not get swab past 250'. Shut down at 1930 hrs CST.

08/17/12: Current Operations: Prep to run rods and tubing. RU Heat Waves. Pumped 22 barrels hot lease crude down tubing. Tubing loaded with 17 barrels (tubing capacity). Pumped remaining hot oil into formation at 0.5 BPM at 400 psi. On vacuum in 1 min. RIH with tubing swab. Fluid 500' from surface. Recovered 14 BO on swab down. Swab test as follows:

<u>Hr</u>	<u>Runs</u>	<u>BF</u>	<u>% Oil</u>
1	3	1.16	100
2	2	.87	100

RU Pro-Stim Chemical Service. Treated with 1000 gal 20% NE DFE gelled acid with 1% mutual solvent, overflushed with 1000 gal 2% KCL water. AIR 1 BPM at 30 psi w/ Max pressure 50 psi, ISIP-Vacuum. Job completed at 1315 hrs. Total load 74 barrels. RIH with tubing swab. Fluid at 500'. Recovered 23.74 BF on swab down. Several good acid kicks. Good show of oil on last 3 runs. Swab test as follows:

<u>Hr</u>	<u>Runs</u>	<u>BF</u>	<u>% Oil</u>	<u>Comments</u>
1	4	4.64	100	Gassy oil
2	4	4.64	100	Gassy oil
3	4	4.06	100	Gassy oil

Shut down at 5:45 p.m.

08/18-19/12: Current Operations: Shut down for Weekend.

08/20/12: Current Operations: Return to production. SITP 0 psi. RIH with tubing swab. 650' FIH (100% oil). Recovered 2.32 BO on swab down. Released PKR. Retrieved RBP. POOH with tubing and tools. RIH with production tubing as follows: (top to bottom)

135 jts - 2 3/8" 8rd EUE tubing	4378.05'
1 - 5 1/2" x 2 3/8" rebuilt tubing anchor	3.00'
4 jts - 2 3/8" 8rd EUE tubing	129.72'
1 - 2 3/8" API seat nipple	1.10'
1 jt - 2 3/8" 8rd EUE slotted tubing mud anchor	15.00'
KB adjustment	5.00'
Tubing set at 4532'(4510')	
Seat Nipple at 4511'	

Tubing anchor set at 4378'

Average jt length 32.43'

RIH with rebuilt 2" x 1 1/2" x 14' RWBC pump with BDV (6' strainer), 179 - 3/4" x 25' steel rods, 1 - 2', 1 - 4', 1 - 6', 1 - 8' x 3/4" rod subs and 1 1/4" x 22' polish rod with 10' liner. Seated pump. Loaded tubing. Hung well on Resumed pumping. RDCT.

08/29/12: Current Operations: Pumped 12 BOPD.

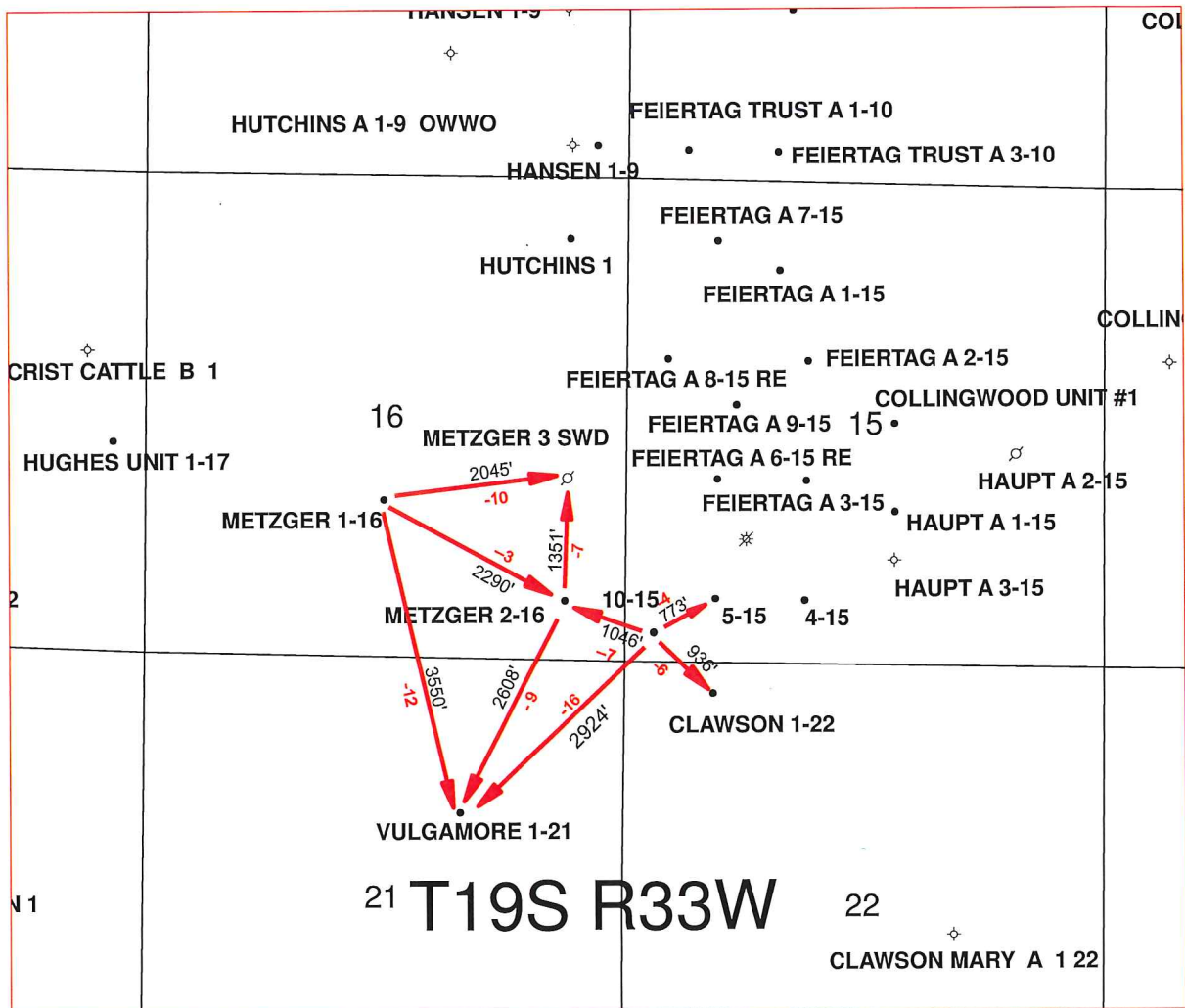


Exhibit #13 (a)



	<p>LARIO OIL & GAS COMPANY FEIERTAG UNIT MILLRICH SOUTHEAST POOL T 19 S - R 33 W SCOTT COUNTY, KANSAS</p>
<p>Marmaton "C" Zone Structure Map Contour = 5 Ft.</p>	
<p>Date: 6 September, 2017</p>	<p>Geologist: Hastings</p>

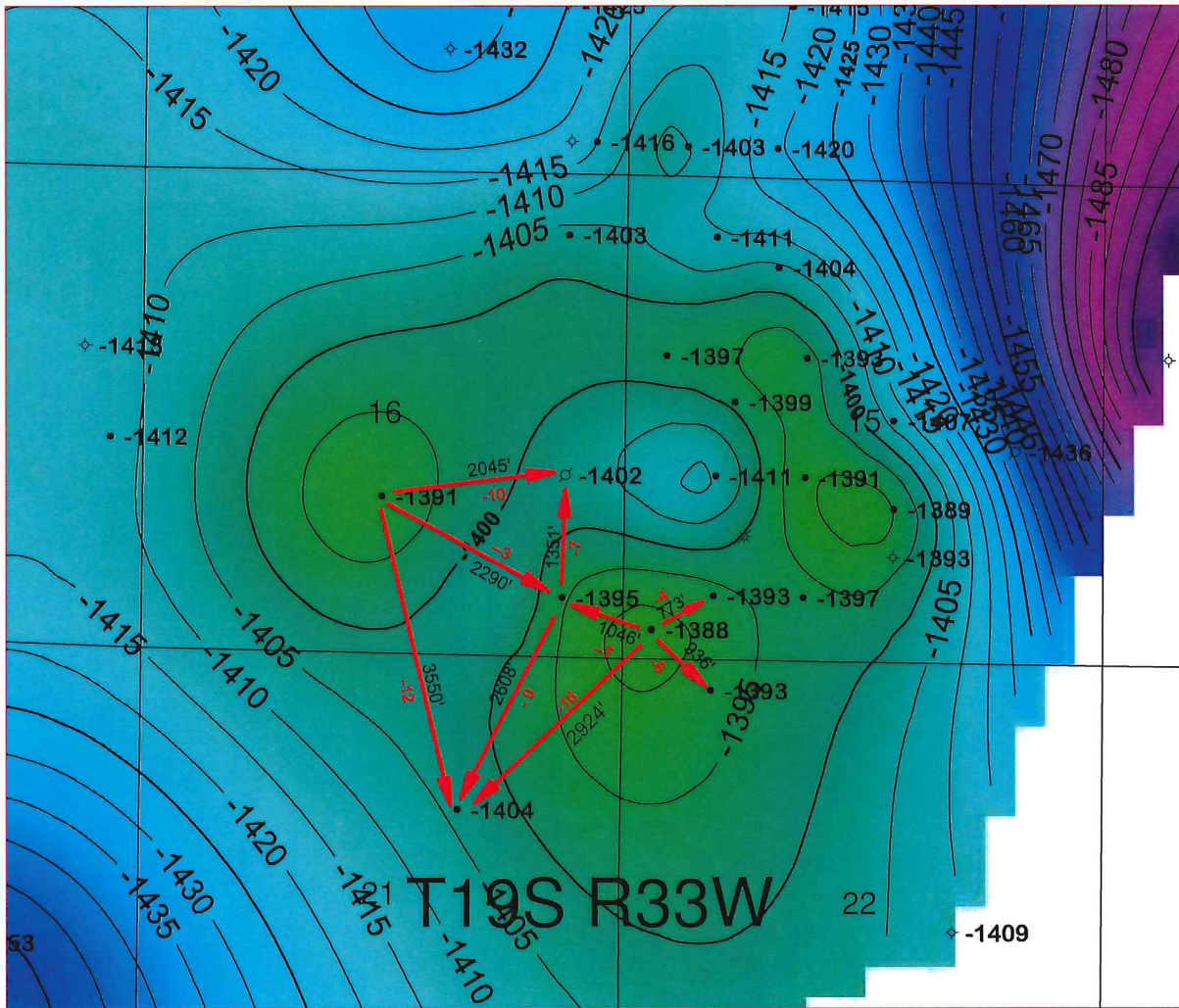
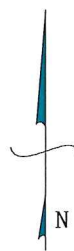


Exhibit #13 (b)



	<p>LARIO OIL & GAS COMPANY FEIERTAG UNIT MILLRICH SOUTHEAST POOL T 19 S - R 33 W SCOTT COUNTY, KANSAS</p>
<p>Marmaton "C" Zone Structure Map Contour = 5 Ft.</p>	
<p>Date: 6 September, 2017</p>	<p>Geologist: Hastings</p>