

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

In the Matter of the Application of)
TDR Construction, Inc. to Authorize) Docket No. 19-CONS-3167-CUIC
Injection of Saltwater into the)
Squirrel Formation at the McCoy) CONSERVATION DIVISION
#4WA, #8W, and #9W Wells Located)
in Section 32, Township 15 South,) License No. 32218
Range 21 East, Franklin County,)
Kansas.)

PREFILED TESTIMONY OF Roxanne Mettenburg

1. Q. Please state your name and address.

A. My name is Roxanne Mettenburg. My residence is located at 1824 Nevada Rd.,
Princeton, Kansas 66078

2. Q. What is your education and areas of expertise that would be relevant to
this testimony?

A. Education and training: (1) University of Missouri-Kansas City: BS in Biology
with major in microbiology and minor in chemistry. (2) University of Missouri
Medical Center: Certificate in Medical Laboratory Science (formerly called
Medical Technology) with subsequent national board exam and certification from
American Society of Clinical Pathologists. (3) University of Kansas: MA in
Physiology and Cell Biology (4) University of Kansas (Dept of Preventive
Medicine): Master of Public Health, with Honors.

3. Q. What is your experience that is relevant to this testimony?

A. I am a 6th generation Kansan and Franklin countian who has resided on and
been involved with the management of a farm in Franklin County all of my life
with the exception of 13 years. Currently I am the principle operator of our farm.
I am a patron of RWD #6 and have been since its creation in the 1970's. My

1 children were raised here drinking this water. My 10 grandchildren spend time
2 here and consume this water, as do other children in our summer “Girl’s Camp”
3 and “Boy’s Camp”. In addition, we regularly host training events, native prairie
4 audits, and school visits as part of our farm business and mission, the participants
5 of which also consume this water. Many of the animals we raise for food
6 consume this water at various times. Some must consume it exclusively. Both by
7 training and by inclination, I am a biologist. A farm is a complex of interactive
8 biological systems and natural “cycles” (e.g. water cycle and various mineral
9 cycles, many of which are driven by soil microbes). For the past decade or so we
10 have intensified our commitment to managing our farm in a regenerative and
11 holistic manner understanding that all natural processes are linked. In that
12 endeavor, I spend several hours most every day “in the field” literally so to speak.
13 Much of my time there is spent in monitoring and documenting soil health, water
14 sources quantity and quality, plant community density and composition and
15 domestic and wild animal population dynamics. We have paid particular
16 attention to implementing practices that build soil quality to increase water
17 infiltration, eliminate/reduce erosion and run-off, increase diversity of flora and
18 fauna. We have eliminated the majority of chemical applications to the soil, the
19 plants and the animals. We refrain from disruption and interference with natural
20 processes and have been rewarded with the return of nature’s resilience. For all
21 living things from micro-organisms to macro-organisms, both plant and animal,
22 water is the single most vital requirement. Water is the majority component of
23 all living cells. Thus the quality of the water we consume, indeed the water
24 consumed by all living things, is of primary importance. On our own farm, we
25 have over the past couple of decades systematically fenced water sources (pond,
26 springs, streams and the major creek) to restrict domestic livestock access in
27 order to promote water quality, not only for our property and its inhabitants (wild
28 and domestic) but for those downstream of our watershed as well. Over the
29 course of a lifetime, we have learned that all we do or in some cases don’t do has
30 consequences on all of the life around us. No action ever exists in a vacuum.
31 And all life is interdependent. Destruction of soil microbes for example destroys
32 recycling of nutrients for plant growth. One of the things for example that few
33 microbes in the soil or fresh water environment can tolerate is increasing salinity.
34 Increasing salinity in fresh water lowers oxygen content as well.

1 4. Q. What are your qualifications that is relevant to this testimony

2 A. I speak "laboratory" in general terms as well as speak "medical" and am
3 intimately familiar with the collection and analysis of laboratory data of all kinds.
4 In my professional capacity as a board-certified Medical Laboratory Scientist, I
5 worked some 20 years in various laboratory specialties performing a variety of
6 chemical and biological analyses on body fluids. This career encompassed skills in
7 calibrating a wide variety of instruments, trouble shooting instruments, writing
8 SOP's, performing and evaluating quality control and quality assurance measures,
9 analyzing, verifying and releasing data. In addition, I designed and implemented
10 laboratory testing protocols for my research project while completing my MA in
11 Physiology and Cell Biology. After leaving the bench work of medical laboratories,
12 I taught general biology, microbiology, anatomy and physiology at a local
13 community college in Franklin County. During that time, a colleague from
14 environmental studies and I wrote a grant for a local water quality testing project.
15 We were funded and conducted the project in collaboration with several local
16 high schools and the local conservation district. We developed all the protocols
17 for collection and testing the samples using standard methods for water testing.
18 For two years, we sampled each target stream (8-9 total) once a month. The
19 grant provided monies for supplies and equipment. Among the tests performed
20 were the following:, conductivity, TDS (total dissolved solids), hardness, fecal
21 coliforms, atrazine, nitrate, phosphorous, ammonia, total suspended solids,
22 dissolved oxygen, temperature at collection time, stream velocity. After 12 years
23 at the community college, I accepted a position as Assistant Professor at the
24 University of Kansas Medical Center, where I taught for another 15 years in the
25 Department of Clinical/Medical Laboratory Sciences. Again in that capacity I
26 wrote SOP's and laboratory manuals for student training labs, as well as taught
27 Immunology, Hematology, Immunohematology. I retired from that position a few
28 years ago.

29
30 5. Q. Why do you think the activities of oil recovery and saltwater injection have
31 any influence on water quality of RWD #6?

32 A. The frequency of failed parameters on water quality testing from RWD#6 has
33 increased over time. RWD#6 and the city of Lane, Ks (that purchases water from
34 RWD#6) are the only water districts/sources in Franklin county listed as in
35 violation of federal water quality health by the Environmental Working Group for

1 the 3rd quarter of 2017. Data for that report is taken from KDHE and test results
2 from RWD #6. The question is what is different in RWD #6 source water than the
3 rest of the county? The majority of municipalities and rural water districts in the
4 county purchase their water from the City of Ottawa. Both the City of Ottawa and
5 RWD#6 obtain their water from the Marais des Cygnes. What activity occurs that
6 affects RWD #6, but not City of Ottawa?

7
8 In comparing the water quality test data from RWD#6 with the nearest upstream
9 water treatment facility, City of Ottawa, there are a few key parameters that
10 could certainly be linked with oil recovery and saltwater injection practices that
11 consistently show a significant increase from Ottawa to Rantoul, (RWD#6 intake
12 sight) within the same time frame. Whether or not these values exceed the
13 maximum limit is not the point. Rather I see them as “markers” for the increase
14 in “brine” from location A to B. The parameters I am referring to are
15 conductivity, TDS, sodium and chloride. All of these parameters are linked.
16 Conductivity can, in fact be used (if measured at a standard temperature of 25 C)
17 to calculate the precise w/v concentration of sodium chloride (“saltwater”), as
18 well as an indirect way to measure TDS (total dissolved inorganic solids).

19
20 Example. For Jan 1, 2017-Dec. 31 2017: Conductivity at RWD #6 is 2.5 times
21 greater than at Ottawa; TDS is 2 times greater than at Ottawa; sodium is 3 times
22 greater than at Ottawa, and chloride is 6 times greater than at Ottawa. Data from
23 2018 shows a similar pattern. The level of salinity is consistently greater in the
24 Marais des Cygnes at RWD #6 and in the Marais des Cygnes at Ottawa.

25
26 It is hard to make a case that there is much difference in agricultural practices
27 from the watersheds feeding into the Marais des Cygnes west of Ottawa than
28 from the watersheds east of Ottawa. Likewise in terms of industrial endeavors, it
29 is hard to find an industrial endeavor either in Ottawa or in the watersheds east
30 of Ottawa that could account for the dramatic difference in these specific
31 parameters – other than the “too many to count” oil and/or gas wells drilled for
32 over a century in the watersheds east of Ottawa that drain into the Marais des
33 Cygnes. Coupled with the sheer number of wells is the addition of saltwater
34 injection technology and the likelihood that many of these old wells are either not

1 plugged at all or improperly plugged and thus can act as a conduit for transfer of
2 brine injected nearby.

3
4 The applicant claims that it would be impossible for injection fluids to get to the
5 surface migrate “overground” into streams that eventually empty into the Marais
6 des Cygnes. That seems to me quite a superficial and illogical claim. I see
7 evidence on a daily basis on my own property of underground water channels and
8 flows. Water bubbles into a pool from under a rocky ledge at the top of a
9 particular slope on an adjacent property. From there it meanders down a shallow
10 stream for 800-1000 ft. where it abruptly disappears into a hole in the ground. A
11 quarter of a mile away, the “stream” once again appears at the surface in another
12 spring (now on my property), flows a ways, disappears again into the earth only to
13 reappear again in an even bigger spring another quarter of a mile away. I see this
14 phenomenon repeated in several places on and near my property in eastern
15 Franklin County. This behavior of water underground is not likely confined to just
16 my property in eastern Franklin county. Other markers of these underground
17 channels include sinkholes in the vicinity of the disappearing streams. And the
18 path of the disappearing and reappearing stream marches steadily towards the
19 major creek at the back of our property. In summary, anyone who has spent
20 some time in the natural environs and has been even minimally observant would
21 know water does not have to move solely on top of the ground to get from point
22 A to point B.

23
24 6. Q. If conductivity, TDS, sodium and chloride do not exceed maximum levels for
25 health, why is it even relevant to this hearing?

26 A. My concern is one of the “canary in the coal mine”. In addition to the
27 consistent elevation of markers for “brine” in RWD #6 source water as compared
28 to City of Ottawa, there are a number of other elements that are likewise
29 elevated at RWD #6 compared to Ottawa or are not detected at all at Ottawa that
30 do cause concern. That category includes, but is not limited to, arsenic, barium,
31 chromium, free copper, manganese, selenium, silica. If in fact injected salt water
32 fluids can travel up unplugged or degraded well casings in the vicinity, it would be
33 quite logical to infer that other substances, naturally occurring in the layers of
34 earth or perhaps derived from degraded and corroded aged casings could also be
35 dislodged and travel along with the brine.

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3 Respectfully submitted,
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6 /s/Roxanne Mettenburg
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8 Princeton, Kansas 66078
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13 **CERTIFICATE OF SERVICE**
14

15 I certify that a true copy of the above and foregoing was served to the following
16 parties electronically on March 11, 2019.
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VERIFICATION

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