BEFORE THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the Application of R.T. Enterprises of Kansas, Inc. for Multiple Well Location Exceptions for Wells Upon the Pearson and Finnerty Leases Located in Section 11, Township 15 South, Range 20 East in Douglas County Kansas	)))))	Docket No.14-CONS-550- CWLE License No. 33715 Conservation Division

PRE-FILED DIRECT TESTIMONY OF DWAYNE MCCUNE

Q. STATE YOUR NAME AND BUSINESS ADDRESS FOR THE RECORD.

A. My name is Dwayne McCune. My business address is Cedar Technical Services, P.O. Box 656, Baldwin City, Kansas 66006.

Q. WHAT IS YOUR PROFESSION?

A. I am a Kansas licensed petroleum engineer.

Q. HAVE YOU BEEN RETAINED IN THIS MATTER BY R.T. ENTERPRISES OF KANSAS, INC. ("R.T.")?

A. Yes.

Q. SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A. I received a BS in petroleum engineering from the University of Kansas. For the past 37 years, I have operated McCune Engineering and/or Cedar Technical Services, performing various consulting activities, primarily in Kansas. The tasks have included; reservoir studies, reserve estimates and evaluations, enhanced oil recovery processes and applications, expert witness testimony and operational functions.

Prior to consulting, I was employed by Petroleum, Inc. of Wichita in their engineering office in Great Bend, Kansas performing various engineering duties in the mid-continent and

Rocky Mountain areas.

Q. SUMMARIZE YOUR EXPERIENCE IN EASTERN KANSAS OIL FIELDS AND SPECIFICALLY IN DOUGLAS COUNTY, KANSAS?

A. I have been actively involved in the eastern Kansas oil and gas industry for nearly four decades and I have been involved in the initial and redevelopment of many oil and gas fields in eastern Kansas during that time.

I am an independent petroleum engineer and therefore have worked on behalf of many different operators acquiring, developing and operating oil and gas properties in Douglas County, Kansas.

Q. HAVE YOU TESTIFIED BEFORE THE KANSAS CORPORATION COMMISSION ("COMMISSION" OR "KCC") ON PREVIOUS OCCASIONS AND WERE YOUR QUALIFICATIONS AS AN EXPERT IN THE FIELD OF PETROLEUM ENGINEERING ACCEPTED ON THOSE OCCASIONS?

A. Yes.

Q. WHAT IS THE PURPOSE THIS TESTIMONY?

A. The purpose of this testimony is to support R.T.'s request for multiple well location exceptions for wells upon the Pearson and Finnerty Leases located in Section 11, Township 15 South, Range 20 East in Douglas County, Kansas.

Q. IN ITS APPLICATION R.T. PROPOSES TO LOCATE SEVERAL OIL WELLS APPROXIMATELY 330 FEET APART AND TO ASSIGN AN ACREAGE ATTRIBUTION UNIT OF 2.5 ACRES TO EACH WELL; IS IT COMMON TO LOCATE OIL WELLS THIS CLOSELY TOGETHER IN EASTERN KANSAS?

A. Absolutely. In fact, virtually all oil leases in eastern Kansas which have been developed to any significant degree have been developed on 2.5 acre well spacing, and in many instances said leases have been developed on LESS than 2.5 acre well spacing. It is a common belief among industry participants, KCC field staff, and even attorneys practicing in eastern Kansas that existing KCC regulations provide for 2.5 acre well spacing for oil wells drilled to depths of less than 2,000 feet in those counties listed in K.A.R. 82-3-108(b).

Q. IS THIS PRACTICE OF CLOSE WELL SPACING A NEW DEVELOPMENT IN EASTERN KANSAS OR HAS IT EXISTED FOR A LONG PERIOD OF TIME?

A. Historically, eastern Kansas reservoirs have been developed with close well spacing. A review of Bureau of Mines publications printed in the 1940s and 1950s indicates oil wells were drilled on very close spacing. As an example in 1942, on the average, one oil well was located every 2.06 acres. If injection wells are included the spacing was one well (producer or injector) per 1.29 acres. These publications include an abundance of charts and maps giving clear evidence of the historical importance of close well spacing in eastern Kansas oil reservoirs for many years.

Q. WHY ARE EASTERN KANSAS RESERVOIRS DEVELOPED WITH CLOSE WELL SPACING?

A. The character of these reservoirs demands close spacing. These shallow sandstone reservoirs are very heterogeneous, typically low permeability, compartmentalized reservoirs, exhibiting very low initial pressure. In addition, the crude present in the reservoirs in quite viscous. Due to the relatively low solution gas present in the crude the pressure depletes rapidly with production, consequently the majority of the recoverable reserves must be recovered by

application of enhanced recovery processes - primarily water flooding. In short, a single well is not capable of efficiently and effectively draining a large area in these reservoirs, and therefore close well spacing is necessary in order to recover an acceptable amount of the oil in place, thereby preventing waste. Even with the application of hydraulic fracture treatments, it is still necessary to develop eastern Kansas shallow oil reservoirs on close well spacing, in most cases.

Q. IN YOUR OPINION IS R.T. REQUESTING "SPECIAL TREATMENT" ALLOWING IT TO DEVELOP THE PEARSON AND FINNERTY LEASES DIFFERENTLY THAN OTHER OPERATORS IN THE AREA HAVE DEVELOPED THEIR RESPECTIVE LEASES?

A. Not at all. Virtually all oil leases in eastern Kansas have been developed on the spacing R.T. is proposing, and R.T. is merely asking to be treated in the same manner as all other operators in eastern Kansas are being treated. For as long as I can remember the Commission, Commission staff, and industry participants have all interpreted existing KCC regulations to provide for 2.5 acre well spacing for oil wells drilled to a total depth of less than 2,000 feet in eastern Kansas. As I recall the conversation in the industry in the early 1980s, the purpose of K.A.R. 82-3-108(b) was to rule authorize the standard 2.5 acre well spacing common in eastern Kansas operations. The 165 foot setback representing the perpendicular distance from a well with a 2.5 acre spacing unit, to its spacing unit boundaries. In essence R.T.'s Application merely seeks authority to do what R.T. and the rest of the operators in eastern Kansas have been doing for decades, which is to produce these oil and gas reserves in a manner which prevents waste.

Q. ARE YOU AWARE OF ANY OTHER OPERATORS IN EASTERN KANSAS WHO DEVELOPED THEIR OIL LEASES ON CLOSE WELL SPACING, BEING REQUIRED TO FILE AN APPLICATION FOR WELL LOCATION EXCEPTIONS?

A. No I am not. This is the first instance I am aware of that an operator has been required to file an application for well location exceptions in order to develop their shallow eastern Kansas oil lease on 2.5 acre spacing.

Q. DO YOU BELIEVE THAT EXISTING REGULATIONS PROHIBIT R.T. FROM DEVELOPING THE PEARSON AND FINNERTY LEASES ON 2.5 ACRE SPACING?

A. No, I believe that existing KCC regulations authorize R.T. to develop the Pearson and Finnerty Leases on 2.5 acre well spacing. First, K.A.R. 82-3-108(b) expressly creates 165 foot set back requirements for shallow oil wells in eastern Kansas. It is obvious that by enacting K.A.R. 82-3-108(b), the Commission intended to authorize close well spacing for such wells, as it would be pointless to reduce the setback requirements from lease lines unless the spacing was also reduced to the same extent. Second, K.A.R. 82-3-207 merely provides that the standard drilling unit for an oil well is 10 acres, no where does it prohibit any well from being drilled on less than 10 acres, in fact subsection (c) expressly provides that if a well is drilled on less than the standard drilling unit the well's allowable will be reduced in the manner set forth in said regulation. Therefore, no existing regulation or order would be violated by drilling oil wells on 2.5 acre spacing; instead, at the very most the allowables for those wells would be determined by K.A.R. 82-3-207 rather than by K.A.R. 82-3-203.

Q. ARE YOU FAMILIAR WITH THE RESERVOIR CONDITIONS PRESENT BENEATH THE FINNERTY LEASE AND THE PEARSON LEASE, IN THE

GEOLOGICAL ZONE THAT R.T. IS TARGETING?

A. Yes I am. I have analyzed data and field studies from numerous wells in the vicinity of the Pearson Lease and the Finnerty Lease and have analyzed well data and other information for wells located upon both the Pearson Lease and the Finnerty Lease.

Q. IN YOUR OPINION CAN THE PEARSON LEASE OR THE FINNERTY LEASE BE EFFECTIVELY AND EFFICIENTLY DRAINED BY VERTICAL WELLS DRILLED ON TEN ACRE SPACING?

A. No. If either the Pearson Lease or the Finnerty Lease is developed using vertical wells drilled on ten acre spacing, significant amounts of oil would be left unrecovered in the reservoir. In my opinion the Pearson Lease and the Finnerty Lease should be developed on 2.5 acre production well spacing, drilled on a "five spot" pattern in order to efficiently and effectively produce the oil reserves beneath said leases.

Q. IN YOUR PROFESSIONAL OPINION WOULD WASTE OCCUR IF THE COMMISSION DOES NOT GRANT R.T.'S APPLICATION?

A. Yes. Neither the Pearson Lease nor the Finnerty Lease can be adequately drained by conventional vertical oil wells drilled on ten acre spacing. Therefore, if the Commission were to deny R.T.'s Application, substantial volumes of oil beneath the Pearson Lease and the Finnerty Lease would become unrecoverable and underground waste would occur. The "five spot" drilling pattern on 2.5 acre production well spacing being proposed by R.T. upon the Pearson Lease and the Finnerty Lease is the most reasonable and efficient development strategy that can be implemented upon said leases. Said pattern and well spacing will allow R.T. to recover a greater percentage of oil in place beneath the Pearson Lease and the Finnerty

Lease, thereby preventing waste.

Q. IN YOUR PROFESSIONAL OPINION WOULD R.T.'S CORRELATIVE RIGHTS BE VIOLATED IF THE COMMISSION DOES NOT GRANT R.T.'S APPLICATION?

A. Yes. As I indicated earlier, all of the other operators that I am aware of are being permitted to develop and operate their shallow eastern Kansas oil leases on close well spacing. Therefore if R.T. is prevented from also developing its leases on close well spacing, R.T. will be unable to protect the Pearson Lease and Finnerty Lease from drainage and R.T.'s correlative rights will be violated.

Q. HAVE YOU RELIED UPON ANY AUTHORITY IN REACHING THE ABOVE CONCLUSIONS?

A. Yes, I have relied upon the following authority:

Grandone, Peter: *History of Water-flooding of Oil Sands in Kansas,* Report of Investigation 3761, Bureau of Mines (1944)

Powell, J, P. & Eakin, J. L.: *Water Flooding in the Oil Fields of Anderson, Franklin, Linn, and Miami Counties, Kansas,* Report of Investigation 4991, Bureau of Mines (1953)

Powell, J, P.: *Survey of Water Flooding Projects in of Allen, Bourbon, Crawford, Labette, and Neosho Counties, Kansas,* Report of Investigation 5317, Bureau of Mines (1957)

Willhite, G. P.: *Waterflooding,* Society of PetroleumEngineers Textbook Series Vol. 1, Richardson, TX (1986) 145

Q. DOES THIS COMPLETE YOUR TESTIMONY TO THE COMMISSION?

A. Yes.

VERIFICATION

STATE OF KANSAS)
) ss:
COUNTY OF DOUGLAS)

I, Dwayne McCune, being first duly sworn on oath, depose and state that I am the witness identified in the foregoing testimony, that I have read the testimony and am familiar with its contents, and that the facts set forth therein are true and correct.

Dwayne McCune

Dwayne McCune

SUBSCRIBED AND SWORN to before me this 18th day of July, 2014.

Notary Public

Appointment/Commission Expires:

JESSICA D. BARNES
Notary Public - State of Kansas
My Appt. Expires 12-31-2015