

IN THE DISTRICT COURT OF OKLAHOMA COUNTY
STATE OF OKLAHOMA

SEP 24 2015

TIM RHODES
COURT CLERK

31_____

OKLAHOMA FARM BUREAU LEGAL)
FOUNDATION, et al.,)

Petitioners,)

v.)

OKLAHOMA WATER RESOURCES BOARD,)

Respondent,)

v.)

TISHOMINGO NATIONAL FISH)
HATCHERY, et al.,)

Other Parties of Record.)

Case No. CV-2013-2414

District Judge Barbara Swinton

**ORDER GRANTING AGREED MOTION TO SUPPLEMENT THE ADMINISTRATIVE
RECORD OUT OF TIME**

The above-captioned matter comes on for the Motion of Respondent Oklahoma Water Resources Board (“OWRB”), Petitioners Pontotoc County Farm Bureau, Oklahoma Farm Bureau Legal Foundation, Oklahoma Independent Petroleum Association, Oklahoma Aggregates Association, Environmental Federation of Oklahoma, Oklahoma Cattlemen’s Association, TXI, and Arbuckle-Simpson Aquifer Protection of Oklahoma, Inc. (collectively “Petitioners”), and Respondent Citizens for the Protection of the Arbuckle-Simpson Aquifer (“CPASA”) hereby jointly request that the Court allow certain documents to be included as part of the Administrative Record on appeal. The joint request also includes a stipulation that no prejudice has resulted or will result from the inadvertent omission of the missing pages in question. The Court, being advised that the motion is not opposed by any other parties to this proceeding, and

further finding that the relief requested in the motion is substantiated by law and fact, hereby GRANTS the parties' Agreed Motion to Supplement the Administrative Record Out of Time.

Therefore, it is hereby ORDERED, ADJUDGED, AND DECREED as follows:

The pages attached hereto as "Exhibit 1" are to be included in the Administrative Record on appeal in the above-captioned matter, and are to be considered a part of "Petitioners Exhibit 10," located in the Administrative Record in Volume 6, Tab 88 following Bates-stamp numbered page 1728. The attached pages are to be given Bates-stamp numbers 1728.1 through 1728.9, respectively.

IT IS SO ORDERED, this 23rd day of September, 2015.


Barbara Swinton, DISTRICT JUDGE

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SEP 24 2015

TIM RHODES Court Clerk
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A handwritten signature in black ink, appearing to read 'James R. Barnett', is written over a horizontal line. The signature is stylized with a large loop at the beginning and a long, sweeping tail.

James R. Barnett, OBA #547

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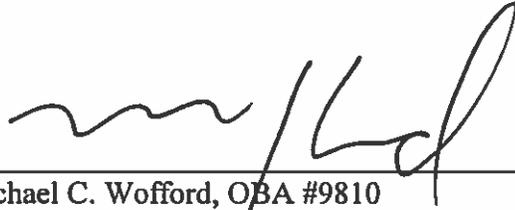
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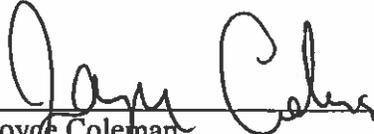
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CERTIFICATE OF SERVICE

This is to certify that on the 24th day of Sept., 2015, a true and correct copy of the above and foregoing instrument was mailed by regular US mail, postage prepaid, to all persons listed below and on the following pages.



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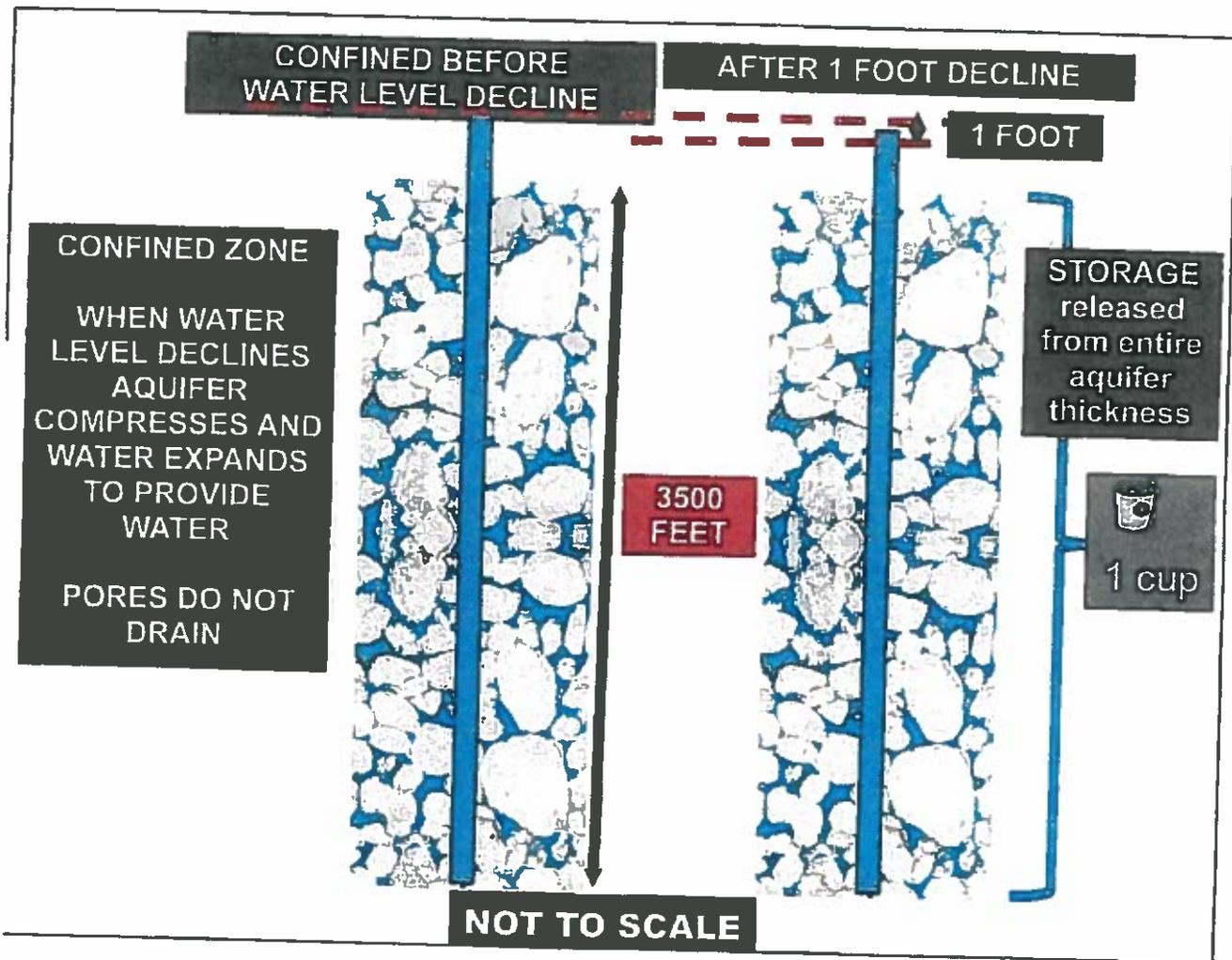
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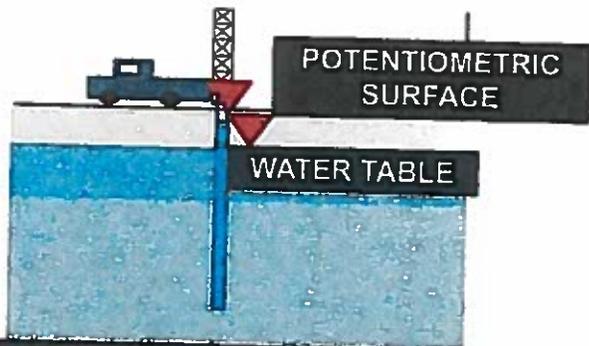


001728.1



FEW WELLS ARE COMPLETED IN THE UNCONFINED ZONE IN THE STUDY AREA BECAUSE LOW K MAKES THEM LESS DESIRABLE FOR WATER SUPPLY

ONE WELL IN THIS ZONE
 OWRB 85182, 53 FT DEEP
 STORAGE COEFFICIENT 0.075



NEARLY ALL WELLS OF STUDY AREA ARE IN THE CONFINED ZONE

MANY MEASUREMENTS OF THIS STORAGE COEFFICIENT RANGE FROM 0.002 to 0.02

0.075 is NOT a very small value as was stated yesterday
 It does NOT indicate a confined condition as was stated yesterday
 It is indicative of unconfined conditions

USGS used CONFINED MODFLOW layers to simulate the UNCONFINED portion of the Arbuckle-Simpson aquifer

STATED THIS WAS BECAUSE:

Storage coefficients similar

Drawdown would be small

The model solution will be more stable

Using confined MODFLOW layers is acceptable as long as storage in the top layer represents drainage of water from the pores, but this was not done in the USGS model, so the streams were too sensitive to pumping.

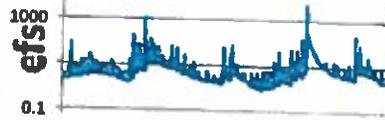
As three hydrologists noted yesterday Storage Coefficient is typically much higher in unconfined zone.

Even if the S values are both 0.008, the Ss value was entered incorrectly in MODFLOW, making S of the top layer only 2% of what it should be.

If S of top layer is 0.008, Ss should be $0.008/20\text{m} = 0.0004\text{m}^{-1}$, not 0.000008m^{-1}

This required procedure for input of S of the top layer is demonstrated by the SYTP parameter in the MODFLOW HUF2 package.

When the water table is not considered in the model stream base flow variation is larger because the buffer provided by unconfined storage is ignored



Unconfined layer ignored

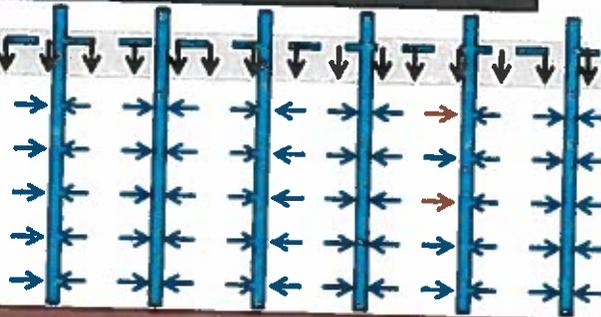


Drainage of pore water from the unconfined zone BUFFERS the stream base flow from seasonal pumping



Unconfined Included

Confined zone



I ran simulations to determine the influence
of representing the top layer as unconfined

SIMULATION INVOLVED:

Running the transient calibration model with the 0.392 (A-F/A)/Yr, eps
Repeating until the cumulative budget did not change

RUN #1

USGS Model Storage Properties

Storage coefficient of 0.008 and a thickness of 1000m

ALL LAYERS $S_s = S/thk = 0.000008$

RUN #2

USGS Field Measured Storage Properties

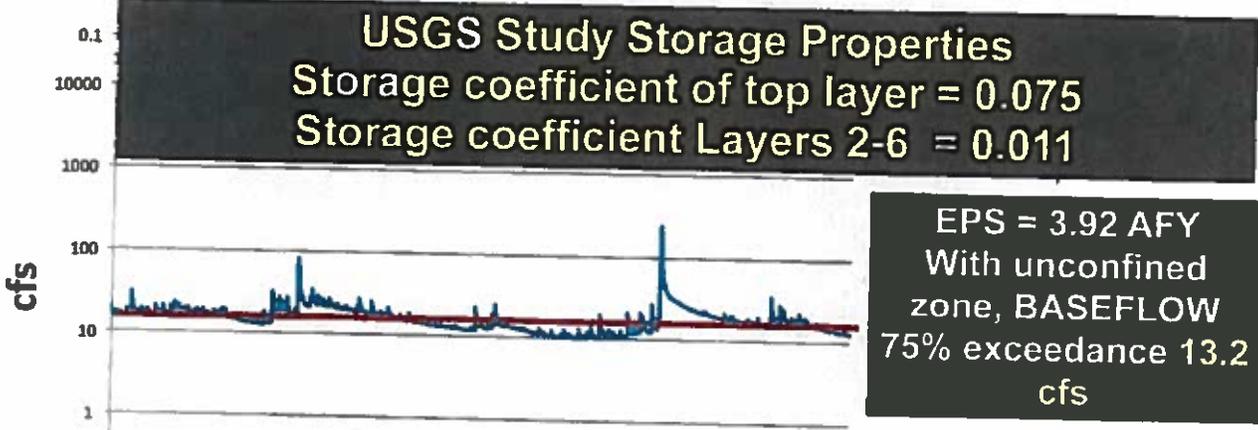
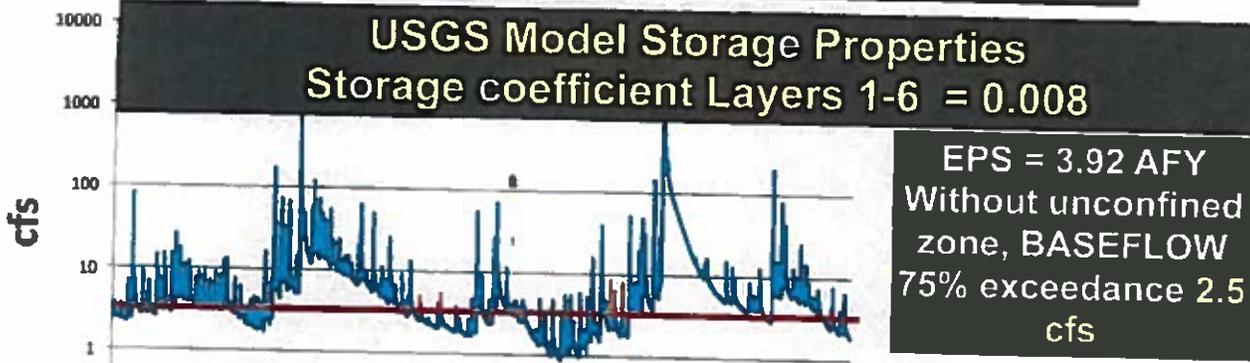
Storage coefficient of 0.075 and a thickness of 20m

TOP LAYER $S_s = S/thk = 0.00375$

Storage coefficient of 0.011 and a thickness of 1040m

LAYERS BELOW TOP $S_s = S/thk = 0.00001056$

Blue River @ Connerville Oct 2003 to Oct 2008



**RESULTS OF THE SIMULATION DO NOT PROVIDE
INFORMATION ON THE EXPECTED BASE FLOW**

The point is not that we have the right values, rather that including the unconfined zone while using reasonable S values, properly input, makes a substantial difference in low flow of streams

Storage coefficient of unconfined zone
needs to be better measured in the field
and properly input to MODFLOW

Storage Coefficients need to be included
in the calibration process.

Stream conductance

Units given in report were incorrect (m/d, should be m²/d)

A constant value of 1000 was used and not explained $C = KLW/b$

Steady State Calibration

Steady State simulation used 4 time steps, only one is needed

Unsubstantiated "steady-state" data for steady-state calibration

Multi-level nature of observation data was not included in the model

Parameter estimation process was not presented nor files provided

Residuals exhibited spatial bias

The guidance for effective model calibration of Hill and Tiedeman 2007 was not followed

Steady state and transient calibrations were not combined

Transient Calibration

Initial conditions for transient simulation were not generated properly

Only two transient calibration targets were used, transient head data were not used

Transient calibration did not optimize the value of storage coefficient

Prediction sensitivities were not provided so we do not know which parameters influenced the predictions

Uncertainty in predictions was not presented

CONCLUSION

Given the importance of determining a safe and fair equal proportionate share, the model evaluation should be rigorous.

The model is not ready for use in making policy decisions until

storage coefficients have been properly measured and incorporated in the model

shortcomings outlined in previous slide are addressed