

SOAH DOCKET NO. 952-19-0705

Application of Lower Colorado River Authority (LCRA) for Eight Operating and Transport Permits in Bastrop County, Texas (Well Nos. 58-55-5-0032; 58-55-4-0016; 58-55-4-0017; 58-55-4-0018; 58-55-4-0019; 58-55-4-0020; and 58-55-4-0021). § § § § § § §

BEFORE THE LOST PINES
GROUNDWATER
CONSERVATION DISTRICT

PREFILED TESTIMONY OF KEITH COPELAND

- 1 Q: Please identify yourself and how you are employed.
2
- 3 A: My name is Keith Copeland and I am a principal of Ranger Environmental Services, Inc.
4 which two other partners and I founded in 1992.
5
- 6 Q: Describe the type of work Ranger performs.
7
- 8 A: Ranger is an environmental and regulatory consulting firm with an emphasis on
9 groundwater assessment and remediation.
10
- 11 Q: Identify Exhibit “A” please.
12
- 13 A: Exhibit “A” is my resume which describes my education and professional experience.
14
- 15 Q: Briefly describe your professional experience with groundwater evaluation in Texas.
16
- 17 A: I have conducted groundwater evaluations and groundwater studies in every major
18 groundwater aquifer in the State of Texas. In the Carrizo-Wilcox aquifer, at issue here, I
19 have conducted field studies, groundwater investigations and geological field
20 investigations.
- 21 Q: Describe the Carrizo-Wilcox Aquifer and Simsboro formation in the Central Texas Area.
22
- 23 A: The Carrizo-Wilcox Aquifer in Central Texas is a very productive aquifer. The aquifer
24 stores a large amount of groundwater and several units within the Carrizo-Wilcox are quite
25 productive for groundwater wells. The Carrizo-Wilcox in Central Texas is made of four
26 units, from the shallowest to deepest, the Carrizo Sand, Calvert Bluff Formation,
27 Simsboro Formation, and the Hooper Formation. These units “dip” toward the Gulf of
28 Mexico, getting deeper toward the east and southeast in Bastrop County. The Simsboro
29 Formation is the middle portion of the Wilcox Aquifer. The Simsboro is typically highly
30 transmissive throughout the central portion of Texas and is often used for large-scale
31 public water supply production.
32
- 33 Q: What have you been asked to do in this proceeding?

1
2 A: I have been retained by the attorneys for the Brown Protestants to review the LCRA
3 applications and the data used by the LCRA to support the application.
4
5 Q: Are you familiar with the Permit Application filed by the LCRA?
6
7 A: Yes. The LCRA filed permit applications to produce up to 25,000 acre-feet per year of
8 groundwater specifically from the Simsboro. The permit applications identify eight wells
9 located on the southeastern side of the Griffith League Ranch property near State Highway
10 21 in Bastrop County, Texas.
11
12 Q: Are you familiar with the rules and management plan of the Lost Pines Groundwater
13 Conservation District?
14
15 A: Yes, I am familiar with the District's rules and management plan.
16
17 Q: Are you familiar with the Lost Pines Groundwater Conservation District rule that requires
18 consideration of section 36.113(d)(2) of the Texas Water Code prior to granting or denying
19 an operating permit?
20
21 A: Yes. My understanding of the rule and the corresponding section of the Water Code is that
22 the District must consider whether the proposed use of water unreasonably affects existing
23 groundwater and surface water resources or existing permit holders.
24
25 Q: What documents have you reviewed in preparing for your testimony?
26
27 A: The following is a list of the information upon which I have relied: (1) my own experience
28 as a hydrogeologist working in Texas for over 30 years, (2) Much of my prior work and
29 reports, which are identified in my resume, (3) documents produced to LCRA in this
30 proceeding by the Lost Pines Groundwater Conservation District and other in response to
31 discovery and deposition requests, (4) Rules of the District as amended April 20, 2016, (5)
32 the District Management Plan, Revised September 20, 2017, (6) General Manager's Draft
33 Operating Permit (LCRA Exhibit 5), (7) Prefiled Testimony and exhibits of other LCRA
34 witnesses in this case, (8) LCRA Draft Operating Permit (LCRA Exhibits 8-A and 8-B),
35 (9) LCRA Draft Transport Permit (LCRA Exhibit Nos. 9-A and 9-B), (10) LCRA Well
36 Drilling Applications (Form 200) for eight wells LCRA proposes to drill at the Boy Scouts
37 of America Capitol Area Council's (BSA) Griffith League Ranch (GLR) property,
38 (February 20, 2018) (collectively, Applications) (LCRA Exhibit No. 3) (11) Letter of
39 Administrative Completeness from Jim Totten (General Manager, Lost Pines Groundwater
40 Conservation District) to Karen Bondy (LCRA Senior Vice President, Water Resources)
41 dated August 20, 2018, (12) Kelley, V.A., N. Deeds, D.G. Fryar, and J.P. Nicot, 2004.
42 Groundwater Availability Model for the Queen City and Sparta Aquifers. Report to the
43 Texas Water Development Board, 867 p., (13) Young S., J. Jigmond, T. Jones, T. Ewing,
44 2018. Groundwater Availability Model for Central Portion of the Sparta, Queen City and
45 Carrizo-Wilcox Aquifer, Report to the Texas Water Development Board, September 2018
46 (14) Wade, S.C. and N. Ballew, 2017. GAM RUN 17-030 MAG: Modeled Available

1 Groundwater for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Brazos
2 River Alluvium Aquifers in Groundwater Management Area, 12, 45 p (15) Donnelly, A.,
3 2018. Technical Memorandum – Review of LCRA Permit Application Package, April 6,
4 2018, 6 p., (16) George P.G., R.E. Mace and R. Petrossian, Aquifers of Texas, Texas Water
5 Development Board Report 380, 172 p., (17) Bureau of Economic Geology (BEG), 1974.
6 Geologic Atlas of Texas, Austin Sheet, (18) LBG-Guyton and Associates, 2010. The Boy
7 Scout Ranch Well, 34 p., and (19) Thornhill Group, Inc., 2003. Ground-water Availability
8 Assessment and Preliminary Well-Siting Investigations – Boy Scouts of America Property
9 Near Bastrop, Texas, 49 p.

10
11 Q: Can you give us a summary of your testimony and opinions, if any, which you have reached
12 after reviewing those documents?

13
14 A: First, it is undisputed that the Hooper and Calvert Bluff formations are semi confining units
15 and therefore communicate with the Simsboro. Consequently, any drawdown in the
16 Simsboro will impact those water wells in these other formations. Second, with regard to
17 the applications, the LCRA has not conducted adequate hydrological studies at the GLR
18 area to support granting the permits. It is impossible to evaluate the impact of granting the
19 permits and consequently the applications fail to meet the requirements under the District
20 rules and the Texas Water Code. The formulas utilized by the LCRA are based on
21 inaccurate and incomplete data. Applying this erroneous data has a cumulative effect on
22 the modeled predictions. The data only reflects regional conditions and detriment to the
23 groundwater quality and accessibility but wholly fails to address local, specific conditions.

24
25 Q: What is the significance of the formation being characterized as semi confining?

26
27 A: Semi confining units allow for hydrogeologic communication or migration between the
28 formations. So, by dewatering the Simsboro in the GLR area, it also dewateres the Calvert
29 Bluff Formation. Any water well owners whose wells are in the Calvert Bluff are subject
30 to an adverse impact of drawdown and water quality.

31
32 Q: Is this opinion supported by any other studies, models, or testimony?

33
34 A: Yes. Mr. Van Kelley of the LCRA testified that the Calvert Bluff and the Hooper
35 formations were semi confining units. Also, the Thornhill study found that 22% of the
36 Simsboro formation was provided by the Calvert Bluff. This is shown in the most recent
37 GAM. The new GAM, even though it has two additional layers, shows less predicted
38 drawdown than the original GAM. It is my opinion that the less predicted drawdown is due
39 to the communication with the Calvert Bluff and Hooper formation providing water to the
40 Simsboro. Also, this is supported by the testimony of George Rice and the table he prepared
41 which illustrates this impact.

42
43 Q: What, in your experience, is deficient in the manner in which the LCRA conducted their
44 tests?

1 A: The LCRA has been utilizing the pump test data from the 2014 LPPP site. The LCRA did
2 not comply with the design specs for the pump test.
3

4 Q: What were those new design specifications?
5

6 A: The specifications required the use of downhole data loggers designed to measure
7 groundwater levels on one-minute increments.
8

9 Q: What is your understanding of what LCRA actually did?
10

11 A: It is my understanding that they did not utilize the required data loggers on one-minute
12 intervals to log water at one-minute intervals, but rather manually testing estimated to the
13 nearest five feet.
14

15 Q: Did the LCRA tests method meet industry standards?
16

17 A: No, industry standards utilizes computer assisted download data loggers for accurate water
18 measurements.
19

20 Q: Why is it important to accurately conduct these tests?
21

22 A: The information gathered while conducting these tests gives us data on transmissivity.
23

24 Q: Why is transmissivity important?
25

26 A: Transmissivity is important because it is utilized to characterize the aquifer and determine
27 the effect on the aquifer during pumping conditions.
28

29 Q: What is the result of this inaccurate data?
30

31 A: The LCRA has erroneous variable data which invalidates their conclusions.
32

33 Q: Does the Young testimony about the GAM address your concerns with the data?
34

35 A: No.
36

37 Q: What are the limitations if any?
38

39 A: Young acknowledges that the major limitations of the GAM as a regional planning tool.
40 The model limitations do not account for local hydrogeological conditions such as vertical
41 variation in the aquifer properties or changes to aquifer properties over distances of a few
42 miles, but he goes on to conclude that even give these limitations the GAM is an
43 appropriate tool to evaluate unreasonable impacts and that the GAM is the best tool
44 available to evaluate the aquifer. These statements are contradictory.
45

46 Q: What do you specifically find lacking in the GAM?

1
2 A: While the GAM may address the regional impacts, it does not evaluate the local
3 groundwater conditions. In a large scale proposed well field, the unreasonable local
4 impacts can only be evaluated by site specific hydrogeological studies. These studies
5 should evaluate local hydrogeological conditions including but not limited to site geology,
6 geomorphology, structure, net sand studies, adequate site aquifer tests, site specific aquifer
7 characteristics, and determine the level of hydrogeologic communication between the
8 Hooper, Simsboro, and Calvert Bluff formations by the use of long term aquifer tests.
9
10 Q: What opinion have you developed about the GAM models?
11
12 A: It is my opinion that the GAM models utilize regional aquifer and geologic information to
13 simulate groundwater conditions. The users of those models then use the regional data to
14 extrapolate conditions within the area of the well field. The assumptions and errors
15 contained within the regional basis are therefore carried over and presented as matter of
16 fact when stating predicted drawdown, groundwater availability, etc. My point is that
17 GAMs are vital for regional planning but large user applications should be investigated and
18 studied locally to evaluate the impact on the interests and rights in private property. This
19 should entail a site-specific comprehensive hydrogeological study of the area groundwater
20 system. This evaluation should be conducted prior to application approval.
21
22 Q: Are you familiar with the tests performed at the LCRA power plant?
23
24 A: Yes.
25
26 Q: What conclusion have you reached related to the power plant aquifer tests?
27
28 A: The aquifer tests performed at the LCRA power plant are flawed. First, this was a pump
29 test—not an aquifer test. The resulting transmissivity values are questionable. This data
30 has apparently been incorporated into the old GAM and new GAM. This flaw undermines
31 the accuracy and predictability of the models. Thornhill evaluated the tests and had
32 numerous concerns. LCRA did not adhere to the designed test specifications. Specifically,
33 the test required the use of a downhole data logger to record the water level measurements
34 during tests on one-minute intervals throughout the duration of the tests. This was not done.
35 Data loggers typically record water levels to the nearest 0.01 foot on one-minute intervals.
36 The LCRA measurements were collected essentially to the nearest 5 feet. Accurate water
37 level measurements are required to evaluate drawdown and the data is used to determine
38 aquifer transmissivity.
39
40 Q: Does Thornhill, in its August 2014 evaluation of the Simsboro aquifer for the LCRA lake
41 Bastrop resource, describe variabilities of the deposition of the aquifer?
42
43 A: Yes.
44
45 Q: Do you have an opinion as to what has contributed to the variability of the deposition?
46

1 A: Faulting, sand, clay structures, thickness and distribution of the sands, and deposition
2 environments.
3

4 Q: What are those deposition environments? How are you describing those?
5

6 A: The Simsboro Formation is a complex formation of distributary channels resulting in
7 vertical and horizontal differences within the formation.
8

9 Q: What are those differences?
10

11 A: It is my opinion that this variability is a result of depositional environments and that these
12 variables have not been adequately studied to determine the effects of the proposed
13 application to area groundwater or surface water resources. This variability is evidenced
14 in the March 2011 LBG-Guyton Associates aquifer test on the Aqua Boy Scout Ranch
15 Monitoring Well. This well is located on the GLR and is the ONLY test conducted at the
16 proposed well field site. Transmissivity was 26,800 gpd/ft pumping and 30,500 gpd/ft
17 recovery. This is substantially lower than transmissivity values presented in the applicant
18 data. It is my opinion that the variable nature of the Simsboro and corresponding changes
19 in net sand thickness are possible reasons for the lower transmissivity. It is my opinion
20 that a site specific comprehensive hydrogeologic study should be conducted prior to
21 application consideration. The January 25, 2016 RW Harden & Associates Memo reported
22 Simsboro Aquifer Characteristics and estimated transmissivity values. The basis of the
23 estimate is based on hydraulic conductivity values from the LPPP wells and the Aqua Well
24 and then averaged to be used for GLR evaluation. It is my opinion that the estimated
25 transmissivity values are flawed. Site specific variability of the Simsboro has not been
26 considered and that further site-specific testing would be required to further evaluate the
27 potential lower transmissivity of the Simsboro at the GLR site. The referenced memo also
28 suggests additional testing would be required to fully evaluate the aquifer and potential
29 faulting.
30

31 Q: What conclusion have you drawn from these variables?
32

33 A: Due to the high-volume potential of the Simsboro production, it is in my opinion that long-
34 term aquifer pump tests should be conducted to accurately evaluate the aquifer, before
35 approving any permits.
36

37 Q: Are you familiar with Steve Young's testimony that it would not be unreasonable for water
38 wells to drop below the pumps?
39

40 A: I am familiar with that testimony.
41

42 Q: Do you agree with that?
43

44 A: Absolutely not.
45

46 Q: Why don't you agree with that testimony?

1
2 A: Young goes into substantial detail comparing drawdown in named parties' wells using the
3 old GAM and the new GAM. Again, using a tool designed to evaluate regional
4 groundwater conditions for evaluating local conditions. It is my opinion that the variations
5 of the Simsboro Formation require a more precise hydrogeologic study to evaluate the
6 impacts to the local groundwater system. Young states the locations of faults between the
7 old and new GAM differ. This indicates the location, nature and structure of the faults is
8 not known with certainty, but the faults are used an interpretive tool in the models. It is
9 my opinion that since the exact locations of the faults are not known then their impacts to
10 groundwater movement is only speculation on his part. Faulting can impede groundwater
11 flow, can increase groundwater flow, can provide communication channels to other
12 formations, etc. This simply has to be evaluated scientifically if you are to effectively
13 evaluate a groundwater system.
14
15 Q: Are there any points that you agree with Mr. Young?
16
17 A: I agree with Mr. Young's conclusions that the Calvert Bluff and Hooper formations are
18 semi confining.
19
20 Q: Have you reviewed the prefiled testimony of Van Kelley?
21
22 A: Yes, I do not agree with the recommendation that the current Simsboro DFC be used for
23 the life of the permit. The District's DFCs are subject to change and it is my opinion that
24 the permit should allow for updated DFCs and require permit compliance with any and all
25 updated DFCs for the District.
26
27 Q: Have you reviewed prefiled testimony of Totten?
28
29 A: Yes I have.
30
31 Q: Have you formed an opinion as to his recommendations?
32
33 A: Yes.
34
35 Q: What is that opinion?
36
37 A: I do not agree with the recommendation for six monitor wells in the Draft Operating Permit.
38 The number and location of the monitoring wells in the Monitor Well System should be
39 based on science and not just past permits. I believe the Monitor Well System should be
40 designed on science-based hydrogeology and not convenience.
41
42 Q: Do you agree that his proposed design and spacing of monitor wells will accurately monitor
43 the effects on the formations?
44

1 A: No, because there is no plan – there is nothing I can evaluate. The LCRA’s permit and
2 application do not reflect the design and spacing of these monitoring wells and as such it
3 is impossible to evaluate their ability to measure groundwater conditions.
4

5 Q: Have you reviewed LCRA consultant RW Harden and Associates recommended testing
6 program at GLR?
7

8 A: Yes.
9

10 Q: Have you formed an opinion as to their recommendations?
11

12 A: It is my opinion that the GAM predictive results must be augmented with a detailed site
13 specific hydrogeologic study. The detailed site study should be conducted as part of the
14 application process and not after issuance of a permit. This site study would allow pilot
15 holes to determine geology, aquifer characteristics, net sand, geophysical logging, fault
16 determinations, determine actual site transmissivity values and monitor wells should be
17 utilized to monitor not just Simsboro but Hooper and Calvert Bluff formations as well.
18 When the site-specific study is complete the area drawdown could reliably be determined
19 and actual impacts to the area permitted wells and exempt wells could be evaluated.
20

21 Q: Are you familiar with the rules of the Lost Pines Groundwater Conservation District?
22

23 A: Yes.
24

25 Q: Have you formed an opinion as to whether the rules have been followed?
26

27 A: Granting of the LCRA permit does not adhere to the Rules of the Lost Pines Groundwater
28 Conservation District as amended April 20, 2016, specifically Rule 5.2.D(2). Under Rule
29 5.2.D.(2) the GM is required to consider whether the proposed use of water unreasonably
30 affects existing groundwater and surface resources of existing permit holder. Since no
31 detailed or accurate hydrogeologic study has been conducted, the predicted impacts to
32 existing permit holders have not been analyzed to the degree as to whether the proposed
33 permit will unreasonably affect existing permit holders.
34

35 Q: What about Rule 8.3.A?
36

37 A: The spacing requirements of Rule 8.3.A are not being followed because the LCRA has
38 requested a variance.
39

40 Q: Is variance for a 36-hour pump test exemption acceptable?
41

42 A: No. The fundamental principal of hydrogeology is to evaluate these wells to augment the
43 original prediction, which is a minimum tool used to evaluate the well development and
44 production. From that information one can accurately determine local draw down as well
45 as regional impacts. It is my opinion that not just 36 hour tests should be conducted but
46 rather long term pump and aquifer tests should be conducted to evaluate the aquifer.

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Q: Does LCRA’s application comport with district proposed future conditions?

A: It is impossible to determine since no adequate information has been provided in the LCRA’s GAM models.

Q: Has the LCRA addressed any private property rights?

A: No.

Q: Has the LCRA addressed any socio-economic impacts in their application?

A: No.