

June 27, 2019

David M. Traster
Foulston Siefkin LLP
1551 N. Waterfront Parkway, Suite 100
Wichita, Kansas 67206-4466

RE: Stipulation of dismissal

Dear David:

Per your request, this letter shall serve as a response to your letter dated October 29, 2018 sent on behalf of your clients, including Alan and Rachel Crane, as well as some of their previous correspondence (attached to your letter) regarding the impairment of the Quivira National Wildlife Refuge and Water Right File No. 7,571.

Your concerns can be summarized under two headings:

- **Mystery River** – What is the basis of the Division of Water Resources’ (“DWR”) Response Zone Map; why does DWR assert that groundwater pumping within the Mystery River drainage impacts flows on the Rattlesnake Creek at Zenith; and a formal request that the Mystery River area be removed from consideration under Groundwater Management District No. 5’s (“GMD5”) proposed Local Enhanced Management Area (“LEMA”).
- **Prior Appropriation in the proposed LEMA.** Wells subject to minimal desirable streamflow (“MDS”) administration should be administered as part of any remedy for the impairment (before other, more senior wells); and generally, how is the prior appropriation doctrine being used to solve the impairment.

I. Groundwater pumping impacts from the Mystery River area on Rattlesnake Creek.

As part of our process to work with GMD5 on a remedy for the impairment, DWR developed the Response Zone Map, the most recent version of which is dated February 14, 2018, to show what areas and wells were impacting Rattlesnake Creek streamflows at Zenith and to what degree of impact.

First, with respect to the previous research cited in your letter and its attachments, below is a summary of these works and comments from our review:

1. *Figure 3 from the Kansas Geological Survey's ("KGS") Mineral Intrusion Report of 1992 (OFR 92-25).* The map depicts the KGS's estimates of 1991 groundwater level contours of the area. The map provides a general sense of the overall movement of groundwater at that point in time. It appears the area of the Mystery River is between arrows indicating a movement dominantly northeast while including some areas with a more easterly movement. In any case, the map scale is too coarse to be definitive with respect to potential impacts of pumping on Rattlesnake Creek flows at Zenith.
2. *Figure 16 from the KGS Final Model Report for the Middle Arkansas River, June 2006.* The comment above applies here as well. In addition, the area in question is on the southeast boundary of the model, with water levels and resulting flow paths along this boundary largely determined by the boundary conditions assumed in the groundwater model's development.
3. *Bedrock map of the area.* While interesting, bedrock elevations cannot be assumed to control groundwater movement, except for bedrock highs that impede such flow. I do not see evidence of this condition in the attachment.
4. *Former Chief Engineer David Pope's 1999 letter* changing the Mystery River drainage from tributary to the Rattlesnake Creek to tributary to the Middle Arkansas River with his conclusions on the implications of this change to the Rattlesnake Creek Partnership's Program. The NRCS/U.S. Geological Survey work referenced was with respect to surface water drainage, not groundwater flow. While as a general matter, there is often a general correlation between surface water flow direction and groundwater flow direction, they are not the same. While Mr. Pope did make certain conclusions as to the implication of this change to the Partnership's Program, I did not read this as a finding of no impact or a decision that went beyond the Partnership's program.
5. *Reference to statements in my final impairment report* finding that junior groundwater pumping within the Rattlesnake Creek is impairing the Refuge's water right. I would acknowledge our model runs for the impairment investigation were restricted to junior groundwater pumping within the surface drainage of the Rattlesnake Creek above the Refuge. This modeling was done to determine if impairment was occurring and found impairment to be occurring regularly and significantly. Since that report, we have been working with GMD5 to develop a remedy for the impairment. As we began this remedy modeling work, we found that groundwater pumping from within the Rattlesnake Creek accounted for only 75% of total impacts of groundwater pumping at Zenith. See my July 2017 presentation on remedy requirements on our impairment web page (<https://www.agriculture.ks.gov/Quivira>), slides 3-6, reporting of our initial findings on this point. This led us to use a method employed by GMD5's consultant, Balleau Groundwater ("BGW"), to create the Response Map, which determines which wells are impacting streamflow at Zenith and to what degree. This process allowed us to determine the specific areas outside the Rattlesnake Creek drainage with a significant impact on Zenith flows and further, we found wells at the upper end of the Rattlesnake Creek drainage had minimal impact.

6. *Anecdotal and actual evidence of water depths of the area* believed to support the conclusion that groundwater in the Mystery River Drainage is not flowing east to Zenith. Without more detailed information, I have no way of assessing this information.
7. *Statements and questions on the model run(s)* done to develop the Response Zone map. See below.

We now have the GMD5 Groundwater model, built on these earlier data and model work you cite, peer reviewed as the model was being developed by a DWR-hired expert modeler as well as others involved in the modeling committee that oversaw the model development process. The GMD5 model is the best science we currently have. I believe the model can be used to determine groundwater effects on surface flows with sufficient certainty and resolution for the questions at hand in seeking to define a remedy of the impairment.

With respect to the Response Zone Map, we have been transparent about its development, regularly sharing our work with GMD5 and BGW, and posting the result of our work on the web site above. This includes the following link with documentation of the method, the back-up data and model data: http://dwr.kda.ks.gov/20170619.GMD5model_backup/ (note: this link includes almost 6 Gb of compressed data; the explanatory memos are technical, written principally for groundwater modelers to review). As is noted above, the method employed to develop this map was based on a method used by BGW and using one of BGW's baseline model runs for reference. We extracted and processed output from the model runs differently than BGW to allow us to get the streamflow impact at Zenith rather than to the stream system generally as BGW determined. The response zone map was refined over much of a year, with input from GMD5. The final map was based on 823 model runs, with each model run determining how groundwater pumping at that location impacted Zenith streamflows over the long-term. The percentage impact noted is to flows at Zenith; it does not include impacts to other streams.

In conclusion, while the Mystery River may be tributary to the Arkansas River with respect to surface flows, our groundwater modeling work demonstrates how groundwater pumping impacts flows to the Refuge, and thus which wells should be considered in any remedy to the impairment.

II. Prior appropriation in the proposed LEMA and MDS.

The other major issue raised in your letters is the role of priority of water right in addressing the impairment and, in particular, why MDS administration is not the starting point and principal means for reducing groundwater pumping to address the impairment.

This letter will principally respond to your MDS questions as at this point some of your initial concerns about reductions in water use are no longer applicable since GMD5 has changed their proposed LEMA since your first letter. The most recent GMD5 LEMA proposal only requires the removal of endguns and no longer requires reductions in water use. Regardless of the form that the impairment remedy takes, for any solution that requires a reduction in water use, as we maintain is necessary, such remedy will include the use of priority to the extent required by K.S.A. 82a-706b, 82a-1036, and 82a-1041.

As you are aware, in 1984, the Legislature amended the Kansas Water Appropriation Act to include MDS provisions on statutorily designated streams to protect streamflows from being further reduced (impaired) by subsequent appropriations. Monthly values are set in statute and we typically administer junior water rights on a weekly time step for MDS. Historically, KDA-DWR has declined to administer MDS in groundwater systems where there is an unclear or unknown connection between groundwater pumping and streamflow depletion. Where we have established a relationship between groundwater pumping near the river and its effect on streamflow, as on the Republican River, those groundwater water rights junior to MDS are administered when flow criteria are not met.

Now that we have the benefit of the GMD5 Model, we do have a quantifiable relationship between groundwater pumping and streamflow in Rattlesnake Creek. DWR is currently active in assessing this question. This includes the development of model runs to assess stream impact, but this time looking at the shorter-term impacts to streamflows. We hope to engage the basin on our work in the coming weeks.

We reviewed the quantities of water rights that are subject to potential MDS administration in your letter and its attachments. We developed the following numbers:

| Region | Water Rights | Points of Diversion | Authorized Acre-Feet |
|---|--------------|---------------------|----------------------|
| Within 1 mile of RSC and its tributaries | 85 | 84 | 6,320 |
| Within 2 miles of RSC and its tributaries | 150 | 149 | 12,131 |
| Zone A (>10% Response) | 263 | 269 | 21,404 |
| Zone D (>40% Response) | 70 | 71 | 5,620 |

These numbers are a bit less than your numbers derived from WIMAS as additional quantities. The “authorized quantity” at times includes water already authorized by an overlapping water right. The “additional quantity” is the portion not authorized by another file. While totaling the additional quantities from WIMAS comes close to the net amount authorizing junior to MDS when considering overlapping water rights, there remains some duplications as such quantities can be stored by water right, by point of diversion or by use made of water, depending on the water rights.

At this early stage of assessment, I would expect MDS administration to provide only a portion of the groundwater pumping reductions necessary to remedy the impairment. Both the legal nature of MDS, with its purpose focused on ensuring the target streamflows are met, and the factual considerations on the amount and timing of junior pumping impacts to the stream, will

lead to not all MDS wells being administered and not in every year. In addition, benefits to the stream will be a function of reduced groundwater use, which is less than the authorized quantities provided above.

Let me know if you have any additional questions.

Sincerely,

A handwritten signature in blue ink that reads "David W. Barfield". The signature is written in a cursive style with a large initial 'D'.

David W. Barfield, P.E.
Chief Engineer
Division of Water Resources

Cc: Orrin Feril, Manager GMD 5
Chris Beightel, Kansas Department of Agriculture
Lane Letourneau, Kansas Department of Agriculture
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