



June 16, 2020

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by email: [mdepauli@depauliengineering.com](mailto:mdepauli@depauliengineering.com)

Re: Proposal, Gallup's State Engineer Application, File No. G-80

Dear Marc:

Thank you very much for the opportunity to offer a proposal for hydrogeologic services relating to Gallup's pending application to the State Engineer, File No. G-80. I recognize that action on the application is time-critical, and for that reason, and because a drawdown analysis was filed with the application in 1983, the technical approach will be somewhat different from that for a conventional application. I understand that the State Engineer staff has made requests for four items of further information about the predicted effects of exercise of the permit if issued. Although a brief drawdown analysis was filed 37 years ago, it should be recognized that the information the OSE has requested now is essentially the same as the well-by-well predictions that would be required in considering any new application.

The four requests from OSE, paraphrased below, and our proposals for responses, are as follows.

### **Proposal for Responses to State Engineer Requests**

**1. Confirm (or amend the report), that the 14 wells described in application G-80 are capable of producing a combined diversion of 2,600 acre-feet per annum (afa) over a 40-year period.**

We propose to use specific-capacity data for the existing G-97-S-8 and G-97-S-9 (Lewis and Allen) wells, and a specific capacity estimated from aquifer characteristics for wells at the other applied-for locations, and groundwater flow model projections (described below under Item 3) to estimate the 40-year pumping water levels in all of the wells, assuming that the G-97-S-8 and G-97-S-9 wells are also pumping a proportionate part of the production under the existing G-97 right. We would then compare the estimated pumping water levels with the maximum achievable pumping levels in the wells, and determine whether the necessary instantaneous-rate capacity and annual production from each well can be met.

**2. Confirm the production capability of wells G-97-S-8 and G-97-S-9 over a 40-year period. Estimate how much of the 2,600 afa these wells could produce on top of the 492 afa they are diverting under permit G-97 over a 40-year period.**

This request would be dealt with in the response to Request No. 1, above.

**3. Confirm, or amend the report, to include the impacts of pumping the fully exercised 2,600 afa over a 40-year period, including impacts to wells of other ownership based on the 2017 Morrison Criteria considering existing pumping.**

We propose to compile a list of the wells tapping the Dakota or Morrison, or both, in the region as they existed at the time of the filing of the G-80 application, October 14, 1981. Most or all of these wells are likely to be described in Appendix 1 of my doctoral thesis of 1995, which will be cross-checked against the OSE database, although some wells on Navajo lands may not be shown on either list. Rather than making the effort to complete and verify an inventory of tribal wells, which is likely to be very time-consuming, I would suggest that Gallup formally ask the Navajo Nation for a letter waiving impairment protection by the State Engineer.

We would estimate the current pumping from the then-existing wells, based on available information, recognizing that these estimates may be only rough approximations. We would also estimate the long-term water-level change in these wells attributable to pumping under existing rights, based on available water-level data or on model predictions.

I have prepared two groundwater flow models that would be suitable for representing pumping from the proposed G-80 wells. These are the model described in my 1983 report, which was submitted with the application, and my doctoral-thesis model completed in 1995. Both are simple superposition models, but only the 1995 model has the benefit of a history-matching calibration. In using the 1983 model, I would propose to estimate drawdowns in wells of other ownership from the contours given in illustrations in the report, based on the relationship between the proposed 2,600 ac-ft/yr diversion and the pumping schedule assumed in the report.

For the 1995 model, I would propose to develop a simplified version that represents only model-layers 3 and 4, the Mancos Shale above the Dakota-Morrison aquifer, which provides water to the aquifer by leakage, and the Dakota-Morrison layer itself. The incremental drawdown in each non-City of Gallup well, due to exercise of a G-80 permit, would be estimated using whichever of the two models is shown to have provided the better prediction of actual water-level history in the existing G-97-S-8 and G-97-S-9 wells.

The 40-year incremental drawdown due to full exercise of a G-80 permit, added to the estimated water-level change over time, would be compared against the 2017 Tom Morrison guidelines to determine whether the threshold of impairment might be reached.

**4. Simulate the impacts of pumping the fully exercised 2,600 afa on any surface water.**

Neither of the Gallup sub-basin models I prepared represents a large enough area to include a surface-water connection with the Dakota-Morrison aquifer. For that reason, we propose to use the OSE Morrison-Entrada model for the entire San Juan Basin, prepared by Eric Keyes of OSE in 2018, to estimate the effects over 100 years on the San Juan River and Gallinas Creek, the only recognized surface water related to the San Juan Basin aquifers, due to pumping 2,600 ac-ft/yr from the proposed G-80 wells. Although the Keyes model lacks

sufficient detail for drawdown predictions within the Gallup sub-basin, it has been accepted by OSE for stream-depletion predictions on a basin-wide scale.

### **Cost Proposal and Schedule**

We propose to carry out the tasks described above at our standard hourly rates, shown in the fee schedule attached, for an estimated cost not to exceed \$17,000 plus applicable New Mexico Gross-Receipts tax. This estimate includes expenses, and budget for up to ten hours of meetings or virtual meetings with Gallup officials, Gallup's consultants and attorneys, and State Engineer staff, but does not include any travel for meetings. This proposal includes preparation of a technical memorandum addressing the specific requests from the OSE; the proposal does not include preparation of formal exhibits and documentation for a State Engineer hearing, or participation in a hearing. The John Shomaker & Associates staff likely to be working on the project would be myself, Annie McCoy, and Jake Baggerman.

We understand that Gallup is hoping for action by the State Engineer within two months, and with that in mind, we propose to complete the work described above by July 10, 2020.

We look forward to working with you and the City on this project. Please let me know if there are questions, or if any further information would be helpful.

Sincerely,

JOHN SHOMAKER & ASSOCIATES, INC.



John W. Shomaker, Ph.D.  
Senior Principal Hydrogeologist

Cc: Jim Brockmann, Esq., Stein & Brockmann  
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