Kenny Lake Ventures, LLC

November 12, 2019

Kent Jones, P. E.
Utah State Engineer
Utah Division of Water Rights
646 North Main Street
P.O. Box 506
Cedar City, Utah 84720

Dear Kent,

This letter is intended to express my comments to drafts entitled "Cedar City Valley Groundwater Management Plan" and "Cedar City Valley Applications to Appropriate and Change Applications Policy." I attended a meeting In Cedar City on Monday, October 15, 2019, in which the drafts were presented and reviewed by several local interested parties.

CEDAR CITY VALLEY GROUNDWATER MANAGEMENT PLAN

Comments on Introduction

The stated objectives are (1) to ensure that groundwater withdrawals do not exceed safe yield; (2) to safeguard the physical integrity of the aquifer; and (3) to protect water quality in the groundwater basin of Cedar City Valley in Iron County. Safe yield was estimated to be 21,000 acre-feet per year, while current average depletion is approximately 28,000 acre-feet per year. Average annual depletion should be reduced by 7,000 acre-feet per year to balance recharge and depletion. However, existing water rights, if all used, would allow for depletion of 50,000 acre-feet per year.

The area of the Cedar Valley drainage basin is approximately 580 square miles, or 371,200 acres. Annual rainfall in the lowlands is on the order of 12 inches, or one foot. The minimal amount of precipitation each year would then be 371,200 acre-feet. If that amount of precipitation were restricted to the valley floor (about 450 square miles or 288,000 acres) precipitation would be 288,000 acre-feet.

Infiltration from precipitation generally ranges from 5% to 15%. Therefore, likely infiltration each year from precipitation in Cedar Valley lowlands would be:

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At 5%:	14,400 acre-feet
At 10%:	28,800 acre-feet
At 15%:	43,200 acre-feet

Recharge of 21,000 acre-feet would equal infiltration of 7.29%, or .0729 times 288,000 acre-feet. Recharge at that relatively low percentage is heavily influenced by use of most of the water for irrigation, with the agricultural plants consuming about 85% of the water. It is apparent that production of groundwater from the Cedar City Valley groundwater basin must be restricted.

Comments on Affected Area

The groundwater aquifers underlying Cedar City Valley are distinct from bedrock aquifers within the mountains that surround Cedar City Valley. Virtually no bedrock aquifer water has been produced, except from the development of natural springs on the western edge of the Markagunt Plateau and from springs along Quichapa Creek at the eastern edge of the Harmony Hills.

Comments on Priority Regulation

Water rights have long been issued and enforced on a "first come, first served" basis. The best way the priority regulation schedule could be revised would be by development of bedrock aquifers with water rights transferred into the mountains from the Cedar City Valley aquifer system. Production of additional water from within the mountainous portions of Area 73 would not deplete the Cedar City Valley aquifer system. On the contrary, water pumped into Coal Creek and other streams entering Cedar City Valley could be used for additional artificial recharge of the Valley aquifers.

Comments on Depletion Calculations

Reporting requirements are acceptable and necessary for accurate assessment of recharge and depletion of the Cedar City Valley aquifers. Quantities of water from bedrock aquifers now crossing faults into the valley aquifers are not known. However, the boundary faults are lined with clay-rich gouge materials of low permeability and most groundwater is retained in the bedrock where it flows away from the valley aquifer system along bedding planes and fracture systems.

Comments on Voluntary Arrangements

Voluntary arrangements to manage withdrawals may be beneficial to groups that agree to utilize water for reasons other than priority dates. However, importation of large quantities of water from Pine and Wah Wah Valleys would be prohibitively expensive compared to development of surrounding bedrock aquifer systems. If the Central Iron County Water Conservancy District were to spend on the order of $300,000,000 for permits, wells, pipelines, power sources, etc. to bring water from western Beaver County, then the initial capital cost for each of the 15,000 acre-feet would be about $20,000. At a lower estimate of $150,000,000, each new acre-foot would still cost $10,000.

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For comparison, each well and its related facilities in the bedrock near Woods Ranch, Ashdown Gorge, and surrounding areas would cost on the order of $150,000 to produce 441.8 acre feet per year, if pumped into Coal Creek and its tributaries at 1,000 gallons per minute for 100 days each year. The initial capital cost of each acre-foot would be only $340.

Production estimates are based on the following rates:

1000 gallons per minute = 2.228 cubic feet per second (cfs).
1 cfs all day = 1.983 acre-feet per day
1 cfs all year = 723.795 acre-feet

2.228 cfs all day = 4.418 acre-feet per day
2.228 cubic feet per second (cfs) for 100 days = 441.8 acre-feet
2.228 cfs all year = 1,612.615 acre-feet

Given these rates, 23 bedrock wells, each pumped at 1,000 gallons per minute for 100 days each year, would provide more than 10,000 acre-feet of new water to reverse the Cedar Valley aquifer depletion for a capital cost of less than $3.5 million. If the actual costs were proven to be twice what I have estimated, then the CAPEX (capital expense) would still be less than $7 million, or about $700 per acre-foot.

Comments on Adaptive Management

Accurate measurements of depletion are necessary for effective management. This paragraph should be completed and highlighted in the final Groundwater Management Plan.

One Additional Comment

The owner of Peterson Drilling made an excellent comment in the Water Management Plan meeting held on October 15, 2019, with Kent Jones of the UDWR. He stressed that the relatively recent construction of gravel packed wells across large intervals has caused water from the shallowest aquifers to flow downward in the wells, thereby lowering aquifer levels without producing the water. In his mind, much of the water is still present, just at lower levels.

COMMENTS ON APPLICATIONS TO APPROPRIATE AND CHANGE APPLICATIONS POLICY

1. The boundary between North and South subareas is changed. No comment.

2. Changes to points of diversion from south to north subarea or vice versa. No comment.

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3. Recharge water is not affected by the boundary change. No comment

4. New applications to appropriate water. No comment.

5. Applications to move existing surface water rights to a groundwater source. No comment.

Respectfully Submitted,

Gary F. Player

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