STATE OF COLORADO

GROUND WATER COMMISSION
Division of Water Resources
Department of Natural Resources

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June 15, 2010

Sean Mueller, Administrative Rules Program
Colorado Secretary of State
1700 Broadway, Suite 200
Denver, CO 80290

RE: Statement of Basis and Purpose
Rule Filing Tracking No. 2009-00799

Dear Mr. Mueller:

Attached is the Statement of Basis and Purpose for the Colorado Ground Water Commission's May 21, 2010 adoption of Rulemaking to amend Rule 5.2.5.2 of the Rules and Regulations for the Management and Control of Designated Ground Water, 2 CCR 410-1, effective June 30, 2010. This Statement of Basis and Purpose was adopted by the Ground Water Commission on May 21, 2010 along with the amendment to Rule 5.2.5.2.

I inadvertently omitted the Statement from the rule filing confirmation I submitted on May 27, 2010. It should have been provided at that time. Please accept the Statement for filing at this time.

Sincerely,

Keith Vander Horst

Keith Vander Horst, P.E.
Designated Basins Team Leader

cc: Scott Steinbrecher, Assistant A.G.
Jennifer Mele, Assistant A.G.

KVH

STATEMENT OF BASIS AND PURPOSE FOR THE MAY 21, 2010 RULEMAKING TO AMEND 5.2.5.2 OF THE RULES AND REGULATIONS FOR THE MANAGEMENT AND CONTROL OF DESIGNATED GROUND WATER,RULE 2 C.C.R. 410-1

I. STATEMENT OF BASIS

Data demonstrates that the net average annual rate of depletion of ground water in the Hay Gulch Subbasin of the Lost Creek Designated Basin is in excess of the allowable net average annual depletion rate. Therefore the conditions of the aquifer warrant a designation of an overapproprated aquifer.

A. Specific Statutory Authority

The Commission's Rules and any amendments thereto are promulgated pursuant to section 37-90-111 (1)(h), C.R.S. to carry out the authority and responsibilities of the Commission to supervise and control the exercise and administration of rights acquired to the use of designated ground water. The proceedings were conducted pursuant to the Commission's Rules for Procedure for All Hearings before the Colorado Ground Water Commission, 2 CCR 402-3, as modified herein.

The Commission published the required Section 24-4-103 notice and invited public comment and participation during the adoption process. The proposed rule, and the Statement of Basis, Purpose and Specific Statutory Authority were made available to the public at least five (5) days prior to the hearing as required by Section 24-4-103 (4), C.R.S.

The Commission complied with the Sections 24-4-103 (3) and 103.5, C.R.S. notice requirements by providing a notice to the Office of the Secretary of State and publication thereof in the Colorado Register. Any written comments from the public concerning or resulting from the Notice of Rulemaking are included as an exhibit in the Rule hearing record.

On March 15 – 19 and 22-23, 2010 the Hearing Officer for the Commission conducted a public fact finding hearing, concerning the proposed amendment to the rule and received submissions, testimony, and evidence from interested parties. On May 21, 2010, the Commission held a public hearing concerning the proposed amendment. Parties to the fact finding hearing as well as the general public were invited to make written and oral statements. All comments were considered and responded to by the Commission, both in oral testimony at the hearing and by exhibits which were made part of the rulemaking record. The specific reasons for the Commissions action is described in the record testimony and exhibits. All rule provisions resulting from these proceedings will be based upon the record of the May 21, 2010 public hearing.

The Commission states that each of the five standards required by Section 24-4-103 (4) (b), C.R.S. has been met. The record of this proceeding demonstrates the need for and the benefit to be derived from the adoption of the amendment to the Rule, and demonstrates that the amendment to the Rule needs to be adopted as directed by Colorado statutes pursuant to Section 37-90-111 (1)(h), C.R.S. To the extent practicable, the amendment is clearly and simply stated. The amendment to the Rule does not conflict with other provisions of law.

II. PURPOSE

The purpose of the amendment to the Rule 5.2.5.2 is to designate the portion of the Lost Creek Designated Basin knows as the Hay Gulch Subbasin as overappropriated, and to require replacement plans for new large capacity wells in that subbasin.

III. ANALYTICAL EVALUATION OF THE RATIONAL JUSTIFYING THE RULE

Rule 4.J.6 requires that after considering the relevant data presented at the public hearing, the Commission shall include as part of a rule or incorporate by reference in the rule adopted, a detailed, analytical evaluation of the scientific or technological rationale justifying the rule, if the proposed rule involves scientific or technological issues. Because the data supporting the amendment involves scientific and/or technological issues, the analytical evaluation is set forth below.

Geology and hydrogeology of Hay Gulch

1. Present data strongly suggests that the Hay Gulch aquifer is geologically and hydrologically separate from Lost Creek and Kiowa Creek.

2. The Hay Gulch aquifer contains a buried paleochannel. The bedrock is overlain by fluvial deposits from an ancient stream, which fluvial deposits are overlain by Aeolian sands.

3. The center area of the Hay Gulch channel running north to south contains the greatest saturated thickness. The saturated thickness declines toward the east and west edges of the aquifer.

4. The fluvial deposits are not uniform across Hay Gulch.

5. Some areas of the Hay Gulch aquifer are in a semi-confined condition, if that condition is defined as lying below deposits that are relatively less permeable.

6. Average annual rainfall in Hay Gulch is approximately 12 to 15 inches.

Hay Gulch inflows and outflows

7. Current data suggest there is an insignificant amount of subsurface inflow to the Hay gulch alluvial aquifer from the underlying bedrock aquifers, Lost Creek, Kiowa Creek and areas south of approximately 40 degrees 10 minutes.

8. Inflows into the basin consist only of recharge from precipitation, for which we have no basis to expect a change over time as a long-term average condition.

9. Outflows from the Hay Gulch alluvial aquifer from stock wells, evapotranspiration from plants and direct evaporation from standing water are not believed to be significant and are not expected to change significantly as water levels change.

10. Outflow from the northern end of Hay Gulch is the only significant subsurface outflow.

11. The aquifer water budget is based on the equation: inflow to the aquifer minus outflow from the aquifer equals change in storage to the aquifer.

Wells in Hay Gulch

12. Krause Well Nos. 1through 5 are located, and Krause Well Nos. 6 is conditionally permitted to be located, in Hay Gulch within the area subject to this rulemaking.

13. The only existing permitted large capacity wells located within Hay Gulch are Krause Well Nos. 1 through 5.

14. The Commission has issued final permits for Krause Well Nos. 1 through 5 and a conditional permit for Krause Well No. 6.

15. Historically and presently, the only significant well pumping from Hay gulch is from Krause Well Nos.1 through 4.

16. Pumping from Krause Well Nos. 1 through 4 has increased from approximately 600 acre-feet in 1980 to approximately 1,380 acre-feet in recent years.

17. Krause Well No. 4 was not pumped from September 2008 to the present. It was redrilled in February 2010.

Water Levels in Hay Gulch

18. Prior to initiation of large capacity well pumping by Petitioner, ground water outflow equaled inflow, storage did not change, and the aquifer was essentially in a steady state balance.

19. Monthly water level observations at the North Monitor Well and South Monitor Well provide a data set for the analysis of the Krause well field area in Hay Gulch. The water level data set includes monitoring across an area of Hay Gulch outside of the Krause well field and is also a data set for the analysis of Hay Gulch as are recent pumping tests performed by the engineers.

20. The water levels in Hay gulch in the vicinity of the Krause well filed have been declining at a relatively uniform rate in excess of approximately 0.62 feet per year.

21. Pumping of Krause Well Nos. 1 through 4 have caused declines in water levels, depletions in aquifer storage and a reduction in outflow out of the Hay Gulch basin.

Petitioner's Use of the water produced from Hay Gulch

22. All of the water produced from the Krause Well Nos. 1 through 4 is exported from the Hay Gulch basin and no return flows accrue to the Hay Gulch basin.

Layering

23. The aquifer contains a generally gradually fining upward sequence of fluvial sediments containing gravels and sands with lenticular clays and sandy-clays/clayey-sands of limited lateral extent, beneath a top layer of aeolian (wind deposited) deposits of fine to medium sand. The most productive material in the aquifer is alluvial sand and gravel deposits that overlay bedrock.

Confining nature of the aquifer

24. The aquifer has areas of semi-confinement, created by the clay and sandy-clay/clayey-sand material, which act as a semi-confining layer, or aquitard, to the movement of water down to or up from the sand and gravel below it. The clay and sandy–clay/clayey-sand material does not act as an aquiclude, as water flows vertically within the aquifer, however it may affect the vertical flow of water to some extent. Generally, the lower portions of the aquifer are not under a pressure head as would be

associated with a traditional, fully confined aquifer as that concept is understood.

Recharge

25. The best estimate of a reasonable recharge rate is 1,632 AF per year. This number is based on an estimate of the amount of outflow from the basin during the steady state of the aquifer prior to large capacity well pumping. Because the aquifer was in a steady state, outflow was equal to inflow. Utilizing Darcy's Law of K*I*A = Outflow, where K = hydraulic conductivity, I = slope, A = area of the cross section at the northern boundary of the aquifer. The best evidence at the hearing showed the following:

    K = 46 ft/day
    I = 0.005
    A = 846,780 ft²

    Outflow is therefore 1,632 AF/year, so inflow in the steady state is 1,632 AF/year. Because recharge from precipitation is the primary source of recharge to Hay Gulch, this number represents the best estimated amount of recharge.

Well Production and Use

26. For all intents and purposes all historic production in the Hay Gulch basin has been by the Petitioner, who uses 4 wells (Krause Well Nos. 1 – 4) permitted for a combined withdrawal rate of 1,380 af/yr. Krause Well No. 5, also known as the State Land Board Well, has not historically been used by the Petitioner, but is permitted to allow for the withdrawal of 750 af/yr. The Petitioner also has a conditional permit for a sixth well that allows an annual withdrawal rate of 750 af/yr.

27. An Objector has applied to the Commission to withdraw 2,000 acre feet from six wells in the Hay Gulch alluvium. These proposed wells would be located south and upgradient in the Hay Gulch paleochannel from the Krause Well Field.

28. The source of water currently pumped by Petitioner is from depletions in storage from the aquifer and capture of water that recharges and flows through the aquifer. The majority of pumping sourced from depletions in storage is produced by the aquifer acting in an unconfined state.

Rate of Depletion of Storage, and Sustainability of current production levels

29. The Hay Gulch alluvial aquifer is estimated to have had approximately 200,000 acre-feet in storage in 1979 prior to initiation of pumping by the Petitioner's wells in July of 1979. The most conservative estimate of the rate of depletion is that 31% of the original water in storage will be depleted over a 100 year period, based on storage currently being depleted at a rate of 614 af/yr as derived from the Objector's report. The less conservative estimate is that 47% of the original water in storage will be depleted over 100 year period, based on storage currently being depleted at a rate of 930 af/yr as derived from the report produced by Petitioner's consultant. Looking at the rate of depletion starting with the amounts of water estimated to be remaining in storage as of 2009, the rates increase so that 34% of storage will be depleted in a future 100 year period using the more conservative estimate, and 54% of aquifer will be depleted in a future 100 year period using the less conservative estimate. The rates of depletion of the amount of water that can practically be removed from storage will actually be higher than these estimates considering that 100% of storage can never physically be completely removed.

30. Ground water modeling by Objector's consultant shows that in 77 years from 2009, or year 2086, Krause Well No. 2 will go dry, and that in 78 years from 2009, or year 2087, Krause Well No. 3 will go dry. Ground water modeling by Petitioner's consultant indicates water table declines within 100 years which would adversely affect the current rate of pumping by the Petitioner's wells. Therefore, neither the current production, nor permitted production, from the Petitioner's wells is sustainable in the foreseeable future. There is no certainty regarding whether Petitioner will be able to physically and/or legally drill and permit alternate or supplemental points of diversion for these wells.

31. In the longer term, once all storage that can practically be removed from storage has been withdrawn, estimates are that only 40 to 50 percent of the natural recharge into and underflow through the sub-basin could be intercepted by Petitioner's wells, which also indicates the current and permitted rates of pumping by the Petitioner's wells are not sustainable.