The Grandview Estates Rural Water Conservation District

12460 North Third Street, P.O. Box 4292, Parker CO 80134, (303) 805-1690 Phone, (303) 805-2340 Fax

"Working to Preserve Water Resources for Future Generations"

November 9, 2012

COGCC
Attention: Hearings Department,
1120 Lincoln Street, Suite 801,
Denver, Colorado 80203.

REF: Water Sampling and Monitoring
Docket Number: 1211-RM-03
Full Name: Grandview Estates Rural Water Conservation District
Mailing Address: P.O. Box 4292, Parker, Colorado 80134
Phone Number: 303-805-1690
E-Mail: jerrihill@bucknam.com

RE: Pre-Hearing Statement and Alternate Rule Proposal

Summary of Policy, Facts and Legal Issues with Proposed Regulations

1. Jurisdiction. Grandview Estates Rural Water Conservation District ("GERWCD") is a State of Colorado Water Conservancy District representing the water interests of the residents of the Grand View Estates Subdivision, Section 7, in Douglas County. Chesapeake Exploration L.L.C. has received approval from the COGCC for a drilling plan on the section adjacent to the GERWCD subdivision. The well or wells are contemplated to be placed in Section 8, the Stonegate Community subdivision. Section 8 is a high density area with residential homes, apartments, a high school, a senior assisted living facility, an Arapahoe County College learning center, and shopping centers. The GERWCD section 7 is a community of 1 to 2 acre "ranchette" properties, all of which depend on individual domestic wells, with the water source derived from alluvial, Upper and Lower Dawson, and Denver aquifers.

2. Baseline Testing. For the above-described and similar sites, retained regulatory baseline standards on monitoring for high density should precede the case by case analysis of what further standards apply to the site specific data. The retention and strengthening of baseline high density standards can help to protect such communities from particulate, gaseous and liquid emissions, underground contamination of water supplies, road degradation, and other effects of placing industrial activity in a residential and business zoned area. Current sampling and monitoring regulations are obsolete with respect to the approved hydraulic fracturing plan involving operations in a suburban community dependant upon Denver Basin aquifers for their domestic water supply.

3. Notice and Disclosure of Testing . Jurisdictions such as GERWCD with a local governmental designee need to be included in notice, consultation and testing result disclosures, if surface or underground oil and gas exploration, development or production operations are within a one mile radius of the jurisdiction.

4. Timing and Location for Testing. More extensive pre-operational sampling and monitoring should commence from the time of approval of drilling plans to establish more scientifically valid base line conditions. Monitoring wells should be established up gradient and down gradient from the planned drilling location and need to be installed and maintained by the operator throughout the life of the exploration, hydraulic fracturing, oil and gas operation and closure of the operation based on site specific requirement targeted at the each potable water aquifer prone to contamination by drilling through the aquifer.

5. Content of Analysis. Analysis of solutions must include complete characterization and public disclosure of all fluids injected through and produced by the surface and underground wells which could potentially impact potable water aquifers due to contamination based on primary and secondary drinking water maximum contamination limits established by the USEPA and State of Colorado. The American Society of Testing and Materials (ASTM) International has recently established a subcommittee D18.26 on Hydraulic Fracturing to develop consensus based standards on issues including base line sampling. ASTM sampling and analytical standards should be observed in addition to the industry and USEPA methods.

Please see attached copy of the proposed rule with GERWCD proposed inclusions in red. See also table with GERWCD stated legal and factual positions. .

Sincerely yours,

Jerri L. Hill, Esq., Colorado State Bar # 29746
Director and Treasurer
Grandview Estates Rural Water Conservation District
A State of Colorado Water Conservancy District

SERIES SAFETY
REGULATIONS

609. STATEWIDE GROUNDWATER BASELINE SAMPLING AND MONITORING:

Except coalbed methane wells, which are subject to Rule 608, new Oil and Gas Locations shall be subject to the following groundwater baseline sampling and monitoring requirements:

a. **Sampling locations**: Initial baseline samples and subsequent monitoring samples shall be collected from two (2) groundwater sources or springs within a one (1) mile radius of the proposed Oil and Gas Location. Sampling locations shall be up gradient and down gradient of the proposed well location based on the prevailing ground water flow at the site. Where aquifers providing domestic potable water supplies are to be intersected by the drilling, two sampling locations shall be established in each potable water aquifer Sampling locations shall be established and maintained by the oil and gas operator beginning in the exploration phase, during development and throughout operation and closure of the oil and gas operation.

Sampling shall also be conducted on any water injected into the well and any water produced by the well at the wellhead.

Sampling of baseline locations shall be selected by the operator based on the following criteria:

(1) Proximity to the proposed Oil and Gas Location. Water features closest to the proposed Location are preferred, so long as they meet Section 609 a criteria.

(2) Type of water feature. ~~Domestic~~ Dedicated domestic water monitoring wells are preferred over other water features and domestic production wells. Springs may be sampled when no water wells are available if they provide suitable samples for monitoring the aquifer.

(3) Local topography and hydrogeology. Groundwater and surface water flow directions should be assessed in selecting sampling locations.

(4) Orientation of locations with respect to the Oil and Gas Location. Where possible, the sampling locations should be on opposite sides of the Oil and Gas Location, upgradient and down gradient.

(5) Multiple identified aquifers available. Where multiple defined aquifers are present, the sampling locations ~~should attempt to~~ shall sample from each of the different aquifers ~~when possible~~.

(6) Existing sample locations. Water wells for which the Commission has existing data may be selected provided they meet the criteria in 609 a..

b. **Denial of access to sampling locations**. Where the owners of all suitable sampling locations refuse to grant access despite an operator's best efforts to obtain consent to conduct sampling, the operator shall establish suitable alternate sampling

locations. ~~Director may modify or waive the requirements of this Rule 609.~~

c. **Timing of initial baseline sampling:** Initial baseline sampling shall be conducted:

(1) Sampling shall commence as soon as possible after the establishment of a drilling and spacing unit;

(2) Prior to commencement of drilling or, on Oil and Gas Locations where no wells are planned, prior to commencement of installation of an Oil and Gas Facility on the Location; and

(3~~2~~) Prior to re-stimulation of a well if more than twelve (12) months have passed since the initial, pre-drilling sampling event or the most recent re-stimulation sampling event was conducted.

d. **Subsequent baseline monitoring sampling:** Subsequent baseline monitoring sampling shall be conducted:

(1) Annually for four years prior to drilling, wherever possible;

(2) Annually, but not ~~Not less than 12 months, nor~~ more than 18 months, following any well completion or facility installation; and

(3~~2~~) Annually ~~Not less than sixty (60) months, nor more than seventy-eight (78) months,~~ after the last sampling event performed pursuant to Rule 609.d.i(1).

(3) Additional "post-completion" test(s) may be required if changes in water quality are identified during follow-up testing.

(4) The Director may require further water well sampling at any time in response to complaints from water well owners.

e. Sampling for characterization of well injection and production water will be carried out whever the injection solution is significantly modified for injection solutions and annually during oil and gas production for production waters.

e. **Sampling procedures and analytical:**

(1) Sampling and analysis shall be conducted in conformance with an accepted industry standard or the American Society for Testing and Materials Standards as described in Rule 910.b.(2).

(2) Were potable water aquifers are intersected by the drilling the baseline samples collected from each of those aquifers shall be analyzed for State of Colorado and USEPA primary and secondary drinking water standard analytes using methods with adequate sensitivity to below the maximum contaminant limits. Use of American Society of Testing and Materials International (ASTM) methods are preferred.

(3) The initial baseline testing described in this section shall include pH, specific conductance, total dissolved solids (TDS), dissolved gases (methane, ethane, propane), alkalinity (total bicarbonate and carbonate as CaCO3), major anions (bromide, chloride, fluoride, sulfate, nitrate and nitrite as N, phosphorus), major cations (calcium, iron, magnesium, manganese, potassium, sodium), other elements (barium, boron, selenium and strontium), presence of bacteria (iron related, sulfate reducing, slime and coliform), total petroleum hydrocarbons (TPH) and BTEX compounds (benzene, toluene, ethylbenzene and xylenes). Hydrogen sulfide shall also be measured using a field test method. Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be included. The sample location shall be surveyed in accordance with Rule 215. COGCC recommends that the latest version of EPA SW 846 or ASTM analytical methods be used where possible and that analyses of samples be performed by laboratories that maintain state or national accreditation programs.

(~~3~~4) If free gas or a dissolved methane concentration greater than 1.0 milligram per liter (mg/l) is detected in a water well, gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen – 12C, 13C, 1H and 2H) shall be performed to determine gas type. If test results indicated thermogenic or a mixture of thermogenic and biogenic gas. If the methane concentration increases by more than 5.0 mg/l between sampling periods, or increases to more than 10. mg/l, the operator shall notify the Director and the owner of the water well immediately and any Local Government Designee registered within on mine of the site..

(~~4~~5) Copies of all test results described above shall be provided to the Commission, ~~and~~ the water well owner and any Local Government Designee registered within on mine of the ste.

within three (3) months of collecting the samples. The analytical data and surveyed well locations shall also be submitted to the Director in an electronic data deliverable format.

Issue	Fact	Legal	Position	Basis
Sample location for two sources	x		Up gradient and down gradient of location	Results need to be compared as groud water passes location
Sample location for two sources	x		Two sampling locations in each potable aquifer intersected by drilling	Protects human health and environment for users of each aquifer
Sample location for two sources	x		Sampling locations to be establihed and maintaned by the oil and gas operator	Available wells may not provide the best information and use may effect the usefullness for monitoring
Sample location for two sources	x		Sample and monitor all water injected into and extracted at the well head	Well water characterization forms basis to judge any impacts due to differences between monitoring wells. Fingerprints material passing through the operation.
Sample location for two sources		x	34-60-106 (2)(D) authorizes the Commission to prevent significant adverse environmental impacts	The Commission has the authority to regulate:...Oil and gas operations so as to prevent and mitigate significant adverse environmental inpacts on any air, water, soil of biological resource to the exent necessary to protect public health, safety, and welfare...
Criteria for location of sampling wells	x		location closest to well to be used provided they meet criterea above.	Sampling locations must provide the proper information for interpretation.
Criteria for location of sampling wells	x		Dedicated domestic water wells are preferred over domestic production wells.	Available wells may not provide the best information and use may effect the usefullness for monitoring

Criteria for location of sampling wells	x	Springs may be used where no wells are available if they provide suitable samples for monitoring of the aquifer.	Available springs may not provide the best information and use may effect the usefullness for monitoring
Criteria for location of sampling wells	x	Orientation should be up gradient and down gradient	Results need to be compared as groud water passes location
Criteria for location of sampling wells	x	Multiple aquifers all must be monitored	Impacts will be different tin the different aquifers since they are isolated
Criteria for location of sampling wells	x	Existing sampling locations may be used if they meet the other criterea.	Available wells may not provide the best information and use may effect the usefullness for monitoring
Denial to access of locations	x	Sampling locations to be establihed and maintaned by the oil and gas operator	Denied access wells may not provide the best information and use may effect the usefullness for monitoring
Timing of initial baseline sampling	x	As soon as possible after establishing a drilling and spacing unit	Predrilling water monitoring must commense after approval in order to establish a statistically significant base line condition.
Timing of initial baseline sampling	x	Annual sampling for four years prior to drilling	Predrilling water monitoring must commense after approval in order to establish a statistically significant base line condition.
Timing of initial baseline sampling	x	Annual sampling after completion or faciolity installation	Annual water monitoring must continue in order to establish a statistically significant operating condition to compare to base line.

Sampling and characterization of well injection and production waters	x	Sample when injection water changes significantly and annually of the produced water	Provides a basis to compare the differenceces between the up gradient and down gradient monitoring well concentrations to identify impacts from the operation to surface and ground water
Sampling procedures and analyical	x	Allow the use of ASTM Standard methods	ASTM is a consensus organization and has recently established a Subcommittee on Hydraulic Fracturing D-18.26 to develop appropriate standard methods for this purpose.
Sampling procedures and analyical		Include Colorado and USEPA primary and secondary analytes in the list where potable aquirers are intersected by the drilling.	Colorado and USEPA primary and secondary water standards protect human health and the environment.
Sampling procedures and analyical	x	Notify local governmental designee within one mile of sample result exceedances	Local corrective actions may need to be taken to protect human health and the environment.
Sampling procedures and analyical	x	Notify local governmental designee within one mile of all sample results	Local corrective actions may need to be taken to protect human health and the environment.