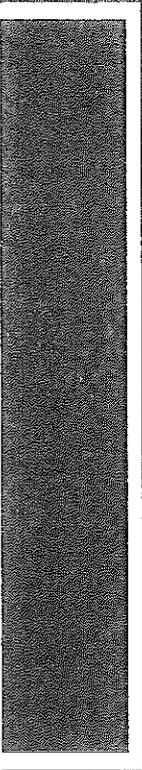


Update on Groundwater
Sampling Rules

April 24, 2013

1



Overview of Presentation

- o Groundwater Rules
 - o Rule 609
 - o Rule 318A.e.(4)
- o Question/Answer Session



COGCC Groundwater Rulemaking

- Adopted on January 7, 2013
- Effective on May 1, 2013
- New Rule 609 and Modified Rule 318A.e.(4)
- Strongest Groundwater Sampling Rules in Nation
 - WHY? – Only state to require post drilling sampling

COGCC Groundwater Rulemaking

Rule 609

- Requires samples from all **Available Water Sources** (max of 4) within a ½ mile radius of Well
- Available Water Source
 - Water well (household, domestic, commercial, livestock)
 - Permitted or adjudicated springs
 - Monitoring Well
- Well
 - Oil Well
 - Gas Well
 - Multi-Well Site
 - Dedicated Injection Well
 - Production Facilities excluded unless directed by COGCC

COGCC Groundwater Rulemaking

Rule 609

- **ONE** initial baseline and **TWO** subsequent samples are required
 - Initial = 12 months prior to setting conductor pipe or first Well on Multi-Well site
 - First Post = 6-12 months after completion
 - Second Post = 60-72 months after completion
 - Can use other well sampling data if within 18 months
- Sampling Location Criteria:
 - Available Water Sources closest to Well
 - Well maintained domestic water wells
 - Upgradient/Downgradient versus radial
 - Deepest and shallowest aquifer
 - Condition of water source (if poor, do not test)

COGCC Groundwater Rulemaking

Rule 609

- Exceptions from Sampling Requirements
 - No Available Water Source within ½ mile
 - Only Available Water Sources are unsuitable
 - Owners deny access or public disclosure
- Operator must seek exception from COGCC Director
 - File Form 4 (Sundry)
 - If no COGCC action on Sundry within 10 days, then exception deemed approved

COGCC Groundwater Rulemaking

Rule 609

- Full analytical suite for baseline samples and reduced analytical suite for subsequent samples
 - COGCC to post model Sampling and Analysis Plan
- The Director and owner of the water well shall be notified immediately if:
 - Thermogenic or a mix of thermogenic and biogenic gas is detected.
 - Methane increases by more than 5.0 mg/L between sampling periods.
 - Methane is detected at or above 10 mg/L
- The Director shall be notified immediately if BTEX compounds or TPH is detected.
- Results provided to COGCC within 3 months

COGCC Groundwater Rulemaking

Rule 318A.e.(4).

- **ONE** initial baseline and **ONE** subsequent sample from **ONE** Available Water Source within the same governmental quarter section as the Well
- If cannot find an Available Water Source in the quarter section, then expand sampling to ½ mile radius from Well
- If quarter section already tested within 60 months prior to spud, no sampling required
- Initial = 12 months prior to setting conductor pipe or first Well on Multi-Well site
- First Post = 6-12 months after completion

COGCC Groundwater Rulemaking

Rule 318A.e.(4).

- Sampling Location Criteria:
 - Available Water Sources closest to Well
 - Well maintained domestic water wells
 - Deepest and shallowest aquifer
 - Condition of water source (if poor, do not test)
- Same exceptions apply
- Same SAP/analytes apply
- Same result submission procedures apply

****Results in a significant amount of samples due to location and number of water wells in each quarter section in GWA**

COGCC Groundwater Rulemaking

Rule 609 and Rule 318A.e.(4).

- o New rules supplement existing rules
- o Surface Casing – Rule 317.d., e., f., g., 317A.a., 317A.b.
- o Well Cementing – Rule 317.h., i.
- o Bradenhead Testing – Rule 317.j., 34
- o MIT Testing – Rule 326
- o Pit Lining – Rule 904
- o Lining Production Facilities – proposed Rule 604.c.2.G.
- o Form 2A Process for Siting and Constructing Surface Facilities – Rule 303.d.

100 Series Definitions

AVAILABLE WATER SOURCE shall mean a water source for which the water well owner, owner of a spring, or a land owner, as applicable, has given consent for sampling and testing and has consented to having the sample data obtained made available to the public, including without limitation, being posted on the COGCC website.

WATER SOURCE shall mean water wells that are registered with Colorado Division of Water Resources, including household, domestic, livestock, irrigation, municipal/public, and commercial wells, permitted or adjudicated springs, or monitoring wells installed for the purpose of complying with groundwater baseline sampling and monitoring requirements under Rules 318A.e.(4), 608, or 609.

600 SERIES SAFETY REGULATIONS

609. STATEWIDE GROUNDWATER BASELINE SAMPLING AND MONITORING:

a. Applicability and effective date.

- (1) This Rule 609 applies to Oil Wells, Gas Wells (hereinafter, Oil and Gas Wells), Multi-Well Sites, and Dedicated Injection Wells as defined in the 100-Series Rules, for which a Form 2.Application for Permit to Drill is submitted on or after May 1, 2013.
- (2) This Rule 609 does not apply to an existing Oil or Gas Well that is re-permitted for use as a Dedicated Injection Well.
- (3) This rule does not apply to Oil and Gas Wells, Multi-Well Sites, or Dedicated Injection Wells that are regulated under Rule 608.b., Rule 318A.e.(4), or Orders of the Commission with respect to the Northern San Juan Basin promulgated prior to the effective date of this Rule that provide for groundwater testing.
- (4) Nothing in this Rule is intended, and shall not be construed, to preclude or limit the Director from requiring groundwater sampling or monitoring at other Production Facilities consistent with other applicable Rules, including but not limited to the Oil and Gas Location Assessment process, and other processes in place under 900-series E&P Waste Management Rules (Form 15, Form 27, Form 28).
- (5) An operator may elect to install one or more groundwater monitoring wells to satisfy, in full or in part, the requirements of Rule 609.b., but installation of monitoring wells is not required under this Rule.

- b. **Sampling locations.** Initial baseline samples and subsequent monitoring samples shall be collected from all Available Water Sources, up to a maximum of four (4), within a one-half (1/2) mile radius of a proposed Oil and Gas Well, Multi-Well Site, or Dedicated Injection Well. If more than four (4) Available Water Sources are present within a one-half (1/2) mile radius of a proposed Oil and Gas Well, Multi-Well Site, or Dedicated Injection Well, the operator shall select the four sampling locations based on the following criteria:
- (1) Proximity. Available Water Sources closest to the proposed Oil or Gas Well, a Multi-Well Site, or Dedicated Injection Well are preferred.
 - (2) Type of Water Source. Well maintained domestic water wells are preferred over other Available Water Sources.
 - (3) Orientation of sampling locations. To extent groundwater flow direction is known or reasonably can be inferred, sample locations from both downgradient and up-gradient are preferred over cross-gradient locations. Where groundwater flow direction is uncertain, sample locations should be chosen in a radial pattern from a proposed Oil and Gas Well, Multi-Well Site, or Dedicated Injection Well.
 - (4) Multiple identified aquifers available. Where multiple defined aquifers are present, sampling the deepest and shallowest identified aquifers is preferred.
 - (5) Condition of Water Source. An operator is not required to sample Water Sources that are determined to be improperly maintained, nonoperational, or have other physical impediments to sampling that would not allow for a representative sample to be safely collected or would require specialized sampling equipment (e.g. shut-in wells, wells with confined space issues, wells with no tap or pump, non-functioning wells, intermittent springs).
- c. **Inability to locate an Available Water Source.** Prior to spudding, an operator may request an exception from the requirements of this Rule 609 by filing a Form 4 Sundry Notice for the Director's review and approval if:
- (1) No Available Water Sources are located within one-half (1/2) mile of a proposed Oil and Gas Well, Multi-Well Site, or Dedicated Injection Well;
 - (2) The only Available Water Sources are determined to be unsuitable pursuant to subpart b.5, above. An operator seeking an exception on this ground shall document the condition of the Available Water Sources it has deemed unsuitable; or
 - (3) The owners of all Water Sources suitable for testing under this Rule refuse to grant access despite an operator's reasonable good faith efforts to obtain consent to conduct sampling. An operator seeking an exception on this

ground shall document the efforts used to obtain access from the owners of suitable Water Sources.

- (4) If the Director takes no action on the Sundry Notice within ten (10) business days of receipt, the requested exception from the requirements of this Rule 609 shall be deemed approved.

d. **Timing of sampling.**

- (1) Initial sampling shall be conducted within 12 months prior to setting conductor pipe in a Well or the first Well on a Multi-Well Site, or commencement of drilling a Dedicated Injection Well; and
- (2) Subsequent monitoring: One subsequent sampling event shall be conducted at the initial sample locations between six (6) and twelve (12) months, and a second subsequent sampling event shall be conducted between sixty (60) and seventy-two (72) months following completion of the Well or Dedicated Injection Well, or the last Well on a Multi-Well Site. Wells that are drilled and abandoned without ever producing hydrocarbons are exempt from subsequent monitoring sampling under this subpart d.
- (3) Previously sampled Water Sources. In lieu of conducting the initial sampling required pursuant to subsection d.(1) or the second subsequent sampling event required pursuant to subsection d.(2), an Operator may rely on water sampling analytical results obtained from an Available Water Source within the sampling area provided:
 - A. The previous water sample was obtained within the 18 months preceding the initial sampling event required pursuant to subsection d.(1) or the second subsequent sampling event required pursuant to subsection d.(2); and
 - B. the sampling procedures, including the constituents sampled for, and the analytical procedures used for the previous water sample were substantially similar to those required pursuant to subparts e.(1) and (2), below. An operator may not rely solely on previous water sampling analytical results obtained pursuant to the subsequent sampling requirements of subsection d.(2), above, to satisfy the initial sampling requirement of subsection d.(1); and
 - C. the Director timely received the analytical data from the previous sampling event.
- (4) The Director may require additional sampling if changes in water quality are identified during subsequent monitoring.

e. **Sampling procedures and analysis.**

- (1) Sampling and analysis shall be conducted in conformance with an accepted industry standard as described in Rule 910.b.(2). A model Sampling and Analysis Plan ("COGCC Model SAP") shall be posted on the COGCC website, and shall be updated periodically to remain current with evolving industry standards. Sampling and analysis conducted in conformance with the COGCC Model SAP shall be deemed to satisfy the requirements of this subsection f.(1). Upon request, an operator shall provide its sampling protocol to the Director.
- (2) 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 forming), total petroleum hydrocarbons (TPH) and BTEX compounds (benzene, toluene, ethylbenzene and xylenes). Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be documented. The location of the sampled Water Sources shall be surveyed in accordance with Rule 215.
- (3) Subsequent sampling to meet the requirements of subpart d.(2) shall include total dissolved solids (TDS), dissolved gases (methane, ethane, propane), major anions (bromide, chloride, sulfate, and fluoride), major cations (potassium, sodium, magnesium, and calcium), alkalinity (total bicarbonate and carbonate as CaCO₃), BTEX compounds (benzene, toluene, ethylbenzene and xylenes), and TPH.
- (4) If free gas or a dissolved methane concentration greater than 1.0 milligram per liter (mg/l) is detected in a water sample, 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. The operator shall notify the Director and the owner of the water well immediately if:
 - A. the test results indicated thermogenic or a mixture of thermogenic and biogenic gas;
 - B. the methane concentration increases by more than 5.0 mg/l between sampling periods; or
 - C. the methane concentration is detected at or above 10 mg/l.
- (5) The operator shall notify the Director immediately if BTEX compounds or TPH are detected in a water sample.

- f. **Sampling Results.** Copies of all final laboratory analytical results shall be provided to the Director and the water well owner or landowner within three (3) months of collecting the samples. The analytical results, the surveyed sample Water Source locations, and the field observations shall be submitted to the Director in an electronic data deliverable format.
- (1) The Director shall make such analytical results available publicly by posting on the Commission's web site or through another means announced to the public.
 - (2) Upon request, the Director shall also make the analytical results and surveyed Water Source locations available to the Local Governmental Designee from the jurisdiction in which the groundwater samples were collected, in the same electronic data deliverable format in which the data was provided to the Director.
- g. **Liability.** The sampling results obtained to satisfy the requirements of this Rule 609, including any changes in the constituents or concentrations of constituents present in the samples, shall not create a presumption of liability, fault, or causation against the owner or operator of a Well, Multi-Well Site, or Dedicated Injection Well who conducted the sampling, or on whose behalf sampling was conducted by a third-party. The admissibility and probity of any such sampling results in an administrative or judicial proceeding shall be determined by the presiding body according to applicable administrative, civil, or evidentiary rules.

300 Series Drilling, Development, Production and Abandonment

318A.e

(4) Groundwater baseline sampling and monitoring.

A. Applicability and effective date.

- i. This Rule 318A.e.(4) applies to Oil Wells, Gas Wells (hereinafter, Oil and Gas Wells), Multi-Well Sites, and Dedicated Injection Wells as defined in the 100-Series Rules, for which a Form 2 Application for Permit to Drill is submitted on or after May 1, 2013.
- ii. This Rule 318A.e.(4) does not apply to an existing Oil or Gas Well that is re-permitted for use as a Dedicated Injection Well.
- iii. Nothing in this Rule is intended, and shall not be construed, to preclude or limit the Director from requiring groundwater sampling or monitoring at other Production Facilities consistent with other applicable Rules, including but not limited to the Oil and Gas Location Assessment process, and other processes in place under 900-series E&P Waste Management Rules (Form 15, Form 27, Form 28).

B. Sampling Locations.

- i. Initial baseline samples and a subsequent monitoring sample shall be collected from one (1) Available Water Source in the governmental quarter section in which a new Oil and Gas Well, the first well on a Multi-Well Site, or a Dedicated Injection Well is located. If a sampling location has previously been established within the governmental quarter section, and sampled within the prior sixty (60) months before spudding, no initial baseline sample is required.
- ii. If there is no Available Water Source within the governmental quarter section where a proposed new Oil and Gas Well, Multi-Well Site, or Dedicated Injection Well is located, then an Available Water Source from a previously unsampled governmental quarter section within a 1/2 mile radius of the Oil and Gas well, Multi-Well Site, or Dedicated Injection Well, if any, shall be sampled. Once a sample location is established in a governmental quarter section, no additional sample locations are required for that governmental quarter section.
- iii. If there is more than one Available Water Source in the governmental quarter section or, if applicable, within the half-mile radius around the Oil and Gas Well, the first well on a Multi-Well Site, or a Dedicated Injection Well, the sample location shall be selected based on the following criteria:

- aa. Proximity. Available Water Sources closest to the proposed Oil or Gas Well, a Multi-Well Site, or a Dedicated Injection Well are preferred.
- bb. Type of Water Source. Well maintained domestic water wells are preferred over other Available Water Sources.
- cc. Multiple identified aquifers available. Where multiple defined aquifers are present, sampling the deepest identified aquifer is preferred.
- dd. Condition of Water Source. An operator is not required to sample Water Sources that are determined to be improperly maintained, nonoperational, or have other physical impediments to sampling that would not allow for a representative sample to be safely collected or would require specialized sampling equipment (e.g. shut-in wells, wells with confined space issues, wells with no tap or pump, non-functioning wells, intermittent springs).

C. Exceptions. Prior to spudding, an operator may request an exception from the requirements of this Rule 318.A.e.(4) by filing a Sundry Notice (Form 4) for the Director's review and approval if:

- i. No Available Water Sources are located within the governmental quarter section or a previously unsampled quarter section within a 1/2 mile radius of a proposed Oil and Gas Well, Multi-Well Site, or Dedicated Injection Well;
- ii. The only Available Water Sources are determined to be unsuitable pursuant to subpart (4)B.ii.dd, above. An operator seeking an exception on this ground shall document the condition of the Available Water Sources it has deemed unsuitable; or
- iii. The owners of all Water Sources suitable for testing under this Rule refuse to grant access despite an operator's reasonable good faith efforts to obtain consent to conduct sampling. An operator seeking an exception on this ground shall document the efforts used to obtain access from the owners of suitable Water Sources.
- iv. If the Director takes no action on the Sundry Notice within ten (10) business days of receipt, the requested exception from the requirements of this Rule 318A.e.(4) shall be deemed approved.

D. Timing of Sampling.

- i. Except as provided in subpart (4)B.i, above, initial sampling shall be conducted within 12 months prior to setting conductor pipe in an Oil and Gas Well or the first well on a Multi-Well Site, or commencement of drilling a Dedicated Injection Well.
- ii. One subsequent sampling event shall be conducted at the initial (or previously established) sample location between six (6) and twelve (12) months following completion of the Well or Dedicated Injection Well, or the last Well on a Multi-Well Site. Wells that are drilled and abandoned without ever producing hydrocarbons are exempt from subsequent monitoring sampling under this subpart (4)D.ii.

E. Initial Baseline Sampling Analysis. The initial baseline sampling required pursuant to subpart (4)D.i 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 forming), total petroleum hydrocarbons (TPH) and BTEX compounds (benzene, toluene, ethylbenzene and xylenes). Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be documented. The location of the sampled Water Source shall be surveyed in accordance with Rule 215.

F. Subsequent Sampling Analysis. Subsequent sampling to meet the requirements of subpart (4)D.ii shall include total dissolved solids (TDS), dissolved gases (methane, ethane, propane), major anions (bromide, chloride, sulfate, and fluoride), major cations (potassium, sodium, magnesium, and calcium), alkalinity (total bicarbonate and carbonate as CaCO₃), BTEX compounds (benzene, toluene, ethylbenzene and xylenes), and TPH.

G. Methane Detections. If free gas or a dissolved methane concentration greater than 1.0 milligram per liter (mg/l) is detected in a water sample, 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. The operator shall notify the Director and the owner of the water well immediately if:

- i. the test results indicated thermogenic or a mixture of thermogenic and biogenic gas;

- ii. the methane concentration increases by more than 5.0 mg/l between sampling periods; or
 - iii. the methane concentration is detected at or above 10 mg/l.
- H. BTEX or TPH Detections.** The Operator shall notify the Director immediately if BTEX compounds or TPH are detected in a water sample.
- I. Sampling Results.** Copies of all final laboratory analytical results shall be provided to the Director and the water well owner or landowner within three (3) months of collecting the samples. The analytical results, the surveyed sample Water Source location, and the field observations shall be submitted to the Director in an electronic data deliverable format.
- i. The Director shall make such analytical results available publicly by posting on the Commission's web site or through another means announced to the public.
 - ii. Upon request, the Director shall also make the analytical results and surveyed Water Source location available to the Local Governmental Designee from the jurisdiction in which the groundwater samples were collected, in the same electronic data deliverable format in which the data was provided to the Director.
- J. Liability.** The sampling results obtained to satisfy the requirements of this Rule 318A.e.(4), including any changes in the constituents or concentrations of constituents present in the samples, shall not create a presumption of liability, fault, or causation against the owner or operator of a Well, Multi-Well Site, or Dedicated Injection Well who conducted the sampling, or on whose behalf sampling was conducted by a third-party. The admissibility and probity of any such sampling results in an administrative or judicial proceeding shall be determined by the presiding body according to applicable administrative, civil, or evidentiary rules.

**Statement of Basis, Specific Statutory Authority, and Purpose
New Rules and Amendments to Current Rules of the Colorado Oil and Gas
Conservation Commission, 2 CCR 404-1**

**Cause No. 1R Docket No. 1211-RM-03
Statewide Water Sampling and Monitoring (new Rule 609 and amended Rule
318A.e.(4))**

This statement sets forth the basis, specific statutory authority, and purpose for new rules and amendments to the Rules and Regulations and Rules of Practice and Procedure ("Rules") promulgated by the Colorado Oil and Gas Conservation Commission ("COGCC") on January 7, 2013, concerning statewide water sampling and monitoring.

These rules are promulgated to protect public health, safety, and welfare, including the environment and wildlife resources, from the impacts resulting from oil and gas development in Colorado. They are intended to foster the responsible and balanced development of oil and gas resources in Colorado.

In adopting the new rules and amendments, the Commission will rely upon the entire administrative record for this rulemaking proceeding, which formally began on October 1, 2012 when the Commission directed COGCC Staff to proceed with rule making for purposes of considering new or amended rules requiring baseline monitoring and subsequent sampling of groundwater near new Oil and Gas Locations. The administrative record includes the proposed rules and numerous recommended modifications and alternatives; public comment, written testimony, and exhibits; and hours of public and party hearings.

Prior to initiating formal rule making, COGCC Staff conducted a stakeholder process, which commenced on September 21, 2012. Staff provided a conceptual overview of a proposed new groundwater sampling rule (Rule 609) to stakeholders on that date, and held a stakeholder meeting on September 27, 2012 to discuss the conceptual overview. COGCC released a first draft of Rule 609 to stakeholders on October 12, 2012, and extended invitations to stakeholders, including several local governments, to participate in a stakeholder meeting on October 18, 2012. At the October 18, 2012 stakeholder meeting, the overwhelmingly consensus among stakeholders was that no additional stakeholder meetings were necessary prior to the rule making hearing, scheduled for November 14, 2012. Pre-hearing conferences were held on October 26, 2012 and November 6, 2012 in advance of the first rule making hearing on November 14, 2012. In formulating its water sampling and monitoring rule, the Commission staff benefitted from experience with similar existing area-specific baseline sampling rules and discussions with stakeholders. The Colorado Oil and Gas Association voluntary baseline sampling and monitoring program provided insight into how a rule like Rule 609 would work.

Statutory Authority

Section 34-60-105(1), C.R.S. (Commission has the power to make and enforce rules); and § 34-60-106(2)(d), C.R.S. (Commission has authority to regulate "Oil and gas operations so as to prevent and

mitigate significant adverse environmental impacts on any air, water, soil, or biological resource resulting from oil and gas operations to the extent necessary to protect public health, safety, and welfare, including protection of the environment and wildlife resources, taking into consideration cost-effectiveness and technical feasibility.”).

Purpose

The purpose of the new and amended water sampling rules is to gather baseline water quality data prior to oil and gas development occurring in a particular area, and to gather additional data after drilling and completion operations. The water quality data generated under the rules will be publicly available on the Commission’s web site. Acquiring this data and making it publicly available will inform relevant stakeholders, including public officials, of baseline groundwater quality, and may aid in early detection of any adverse impacts related to oil and gas activity. Similarly, the sampling program may identify existing groundwater contaminants, which can then be properly treated. Commission Staff receives more complaints related to water quality than any other type of complaint.

Because contaminants can occur in groundwater naturally (e.g., selenium, methane), and due to agricultural activity, septic system use, household chemical use/disposal, the age and composition of the plumbing pipes (e.g., lead), or industrial activity, it is important to collect groundwater samples prior to drilling and completion operations to establish baseline water quality conditions. Additional testing following drilling and completion activities is equally important to monitor for potential changes in water quality or the presence of contaminants over time.

Amendments and Additions to Rules by Series

300 Series Rules

Prior to this rulemaking, the Commission had not promulgated a statewide rule requiring baseline water sampling and monitoring of non-coal bed methane wells. However, it had previously passed an area-specific rule requiring water sampling in the Greater Wattenberg Area (“GWA”) as defined by the Commission Rules. Specifically, beginning in 2006, GWA water sampling was required under Commission Rule 318A.e(4). See Order of the Commission in Cause No. 1R-100 (amending GWA rule to require water sampling).

Rule 318A.e(4) has been amended in this rulemaking to expand the existing water sampling requirements within GWA, while also recognizing the unique conditions in GWA. Due to the high level of existing oil and gas development in the GWA, new oil and gas wells are frequently drilled in the same sections where several existing producing wells are already present and where baseline water samples were previously collected, analyzed and reported to the Commission. In addition, the aquifer systems are well understood and continuous over large areas. Given these considerations, the Commission believes that the amendments adopted reflect an appropriate balance of the competing considerations at this time.

Under Rule 318A.e.(4)B., operators will be required to obtain one baseline sample from a water source within the governmental quarter section in which a new Oil or Gas Well, the first well on a Multi-Well Site, or a Dedicated Injection Well is located. If a sampling location has previously been established within the governmental quarter section, and sampled within the prior sixty (60) months before spudding, no initial baseline sample is required. Operators, may, of course obtain groundwater samples if they wish, but have the option of relying on pre-existing data if they choose. If there is no suitable water source within the governmental quarter section, a water source from a previously unsampled governmental quarter section within a 1/2 mile radius of the Oil and Gas well, Multi-Well Site, or Dedicated Injection Well, if any, must be sampled. Sampling at least one water source within a quarter section of a new oil or gas well will facilitate determination of existing groundwater conditions prior to commencement of new drilling activity. Once a sample location is established in a governmental quarter section, no additional sample locations are required for that governmental quarter section. Rule 318A.e.(4)C. provides specific exceptions from the sampling requirements.

Under Rule 318A.e.(4)D., operators are required to take an initial sample within 12 months prior to setting conductor pipe in an Oil and Gas Well or the first well on a Multi-Well Site, or commencement of drilling a Dedicated Injection Well. One subsequent sampling event shall be conducted at the initial (or previously established) sample location between six (6) and twelve (12) months following completion of the Well or Dedicated Injection Well, or the last Well on a Multi-Well Site. Given the large number of Oil and Gas Wells being drilled within the GWA, the Commission anticipates that, over time, a groundwater sampling location will be established within the vast majority of the approximately 11,600 governmental quarter sections that comprise the GWA. This will allow the Commission to evaluate groundwater conditions with the GWA on a broad, system-wide scale, and to monitor systemic impacts, if any, associated with oil and gas activity.

Additional provisions of Rule 318A.e.(4), related to constituents to be sampled for, reporting of sampling results to the Director, water source owner, and the public, and the absence of presumed liability, causation, or fault based on conducting the required sampling or the results of the sampling, mirror the provisions of Rule 609, which are described below.

600 Series Rules

The primary purpose of Rule 609 is to set forth a statewide rule for groundwater sampling and monitoring. The rule is entirely new. The quality of groundwater can affect not only human health, wildlife resources and the environment, but also society and the economy. Groundwater contamination can adversely affect property values, the image of a community, economic development, and the overall quality of life. The Commission proposed Rule 609 to protect and preserve Colorado's groundwater resources, detect potential contamination and inform all stakeholders of groundwater quality both before and after oil and gas development.

Rule 609 does not apply to water sampling and monitoring associated with coalbed methane wells, which is addressed under Rule 608 and numerous Commission orders. By passing Rule 609, the

Commission does not intend to alter or amend any of the requirements of Rule 608 and related orders concerning water sampling and monitoring associated with coalbed methane wells. As noted above, Rule 609 also does not apply in the GWA. Groundwater sampling within the GWA is governed by Rule 318A.e.(4), as amended by this rule making.

Rule 609.a describes the applicability of the Rule.

Rule 609.b. sets forth the regulatory requirements concerning the number of groundwater samples operators must obtain to satisfy the rule, the location of such samples relative to the proposed Oil and Gas Location, and the hierarchy of preferred sampling locations. Commission staff determined that a rule requiring operators to obtain water samples from all sample sites (up to a maximum of 4) within a one half mile radius of each oil and gas location would provide valuable information for Commission staff and the operators to assess water quality. Commission staff also determined that a rule requiring such samples to be taken within a half mile of the proposed Oil and Gas Location was appropriate because, should contamination from oil and gas activity occur, it would be detectable within a relatively close proximity of the location. Specific exceptions to the sampling requirements are set forth in Rule 609.c.

The hierarchy of preferred water sources set forth in Rule 609.b. reflects staff's vision of what constitutes the best sampling location. It is the intent of the rule that decisions made by the 609.b criteria are self executing by the operators, and that pre-approval of sample sites is not required.

Rule 609.d. provides the general timing requirements for baseline sampling and follow up monitoring. The initial sample will assess pre-development groundwater conditions. The first follow-up sample assesses whether any short-term impacts related to drilling and completion may have occurred, while the second subsequent sample evaluates potential long-term impacts. Under specific circumstances, operators may use water sample data previously obtained from an available water source to satisfy the initial baseline sampling or second subsequent sampling requirement. This provision is a reasonable cost-reducing measure that will not significantly impair the goals of the groundwater sampling program. As stated above, the Commission believes that baseline water sampling is critical to assessing groundwater quality prior to oil and gas development. Baseline testing will benefit all water users by informing them of the quality of the water source tested, including any potential existing contamination. In the event existing pollutants are identified, water users can take appropriate treatment and remediation measures. Knowing the pre-development groundwater quality will also be valuable in resolving conflicts that may arise over whether oil and gas operations have caused adverse impacts to groundwater resources.

Rules 609.e.(1) and (2) provide sampling procedures and a comprehensive set of analytical testing requirements applicable to all sampling conducted under the rule. The analytes to be sampled for in the initial baseline sample are those generally used by Commission staff to evaluate complaints regarding domestic well water quality. A reduced set of analytes, focused specifically on potential impacts of oil and gas operations, is required for the subsequent sampling events. Commission Rule 609.e.(4) also

addresses the potential presence of methane gas in any sample and requires the operator to notify the Commission and the relevant well owner of potentially dangerous levels of gas. Operators are also required to notify COGCC Staff if BTEX compounds or total petroleum hydrocarbons are detected in a water sample. Under Rule 609.f, sampling results must be provided to the Director in an electronic format; all data provided to the Director will be posted to a searchable water quality database accessible through the Commission's website.

The Commission does not intend for Operators to be presumed liable based on conducting the sampling required under Rules 609 or 318A.e.(4), or based on the results of such sampling. Rule 609.g. and Rule 318A.e.(4), respectively, expressly state that owners or operators shall not be presumed to be liable, at fault, or causally responsible, as a result of undertaking the sampling required by these Rules, or based on the sampling results.