

## 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.**

- (1) This rule 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.
- (2) 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.
- (3) 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).
- (4) An operator may elect to install one or more groundwater monitoring wells to satisfy the requirements of this Rule 609, 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. Water Sources closest to the proposed Location are preferred.
- (2) Type of Water Source. Well maintained domestic water wells are preferred over other 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).
- (6) Previously sampled Water Sources. An operator is not required to re-sample any Available Water Source that was sampled within 18 months preceding spudding a Well, the first Well on a Multi-Well Site, or a Dedicated Injection Well provided the Director received the analytical data from the previous sampling event and the constituents sampled for were substantially similar to those required pursuant to subpart f.(2), below.

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 suitable Water Sources 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.

**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) 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 CaCO<sub>3</sub>), 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 included. The sample location 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 (chloride, sulfate, and fluoride), major cations (potassium, sodium, magnesium, and calcium), alkalinity (total bicarbonate and carbonate

as CaCO<sub>3</sub>), BTEX compounds (benzene, toluene, ethylbenzene and xylenes), and Total Petroleum Hydrocarbons.

- (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 – <sup>12</sup>C, <sup>13</sup>C, <sup>1</sup>H and <sup>2</sup>H) 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.
- f. **Sampling Results.** Copies of all final laboratory analytical results shall be provided to the Director in an electronic data deliverable format, and to the water well owner or landowner within three (3) months of collecting the samples. The surveyed well locations shall also 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 well 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.** Results of sampling 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 liability or a presumption of liability 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.