

## CHAPTER 3

### OPERATIONAL RULES, DRILLING RULES

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#### **Section 46. Groundwater Baseline Sampling, Analysis and Monitoring**

**Note: Effective date of Chapter 3, Section 46 is March 1, 2014.**

(a) All operators are required to submit a groundwater baseline sampling, analysis and monitoring plan with an Application for Permit to Drill or Deepen a Well (Form 1). The groundwater monitoring program will consist of initial baseline water sampling and testing followed by a series of subsequent sampling and testing after setting the production casing or liner. This Rule will not apply to an existing oil or gas well that is converted to an injection well for enhanced recovery or disposal purposes.

(b) If four (4) or fewer available water sources are present within a one-half (1/2) mile radius of the location of a proposed oil well, gas well (including coalbed methane wells), dedicated injection well, or Commission approved monitoring well, the operator shall collect a sample from each available water source.

(c) If more than four (4) available water sources are present within the one-half (1/2) mile radius, the operator shall submit a plan for approval to the Supervisor for selecting the available water sources based on all of the following criteria:

(i) Available water sources closest to the location of the proposed oil well, gas well (including coalbed methane wells), dedicated injection well, Commission approved monitoring well or multi-well pad are preferred.

(ii) Sample locations shall be chosen in a radial pattern around the permitted location.

(iii) Where available water sources are completed in different aquifers, a sample shall be collected from each aquifer. Where multiple available water sources are present in a single aquifer, an operator shall give adequate consideration to vertical separation and aquifer zones in selecting available water sources for sampling.

(iv) If groundwater flow direction is known or reasonably can be inferred, samples from both up-gradient and down-gradient available water sources are required, if available.

(d) An operator may request a variance from the requirements of this Rule, by filing a Sundry Notice (Form 4), along with necessary supporting documentation. The Supervisor may approve a variance based on the following criteria:

(i) No water sources are located within a one-half (1/2) mile radius of a proposed oil well, gas well (including coalbed methane wells), dedicated injection well, Commission approved monitoring well or multi-well pad; or

(ii) Available water sources are determined to be improperly maintained, non-operational, or other issues exist that would not allow the operator to obtain a representative sample. An operator seeking a variance on these grounds shall document the condition of the water source it considers unsuitable for sampling and provide that information to the Supervisor and owner of the water source; or

(iii) The owner of a water source declines to grant access or requires payment for access, despite an operator's reasonable efforts to obtain consent to conduct sampling. For purposes of this section, reasonable efforts shall mean notice to an owner of a water source eligible for sampling and testing under this program. If the operator's attempts to obtain access fail, the operator shall provide final notice by certified mail. If the owner of a water source does not respond within 30 days, the operator shall be considered to have made a reasonable effort. Any operator seeking a variance on these grounds shall document the efforts used to obtain access to the water source from the owner.

(e) The initial sampling and testing shall be conducted within the twelve (12) month period prior to spudding the well or the first well on a multi-well pad. The first round of subsequent sampling and testing shall be conducted between twelve (12) and twenty-four (24) months after setting the production casing or liner. A second subsequent sampling and testing shall be conducted between thirty-six (36) and forty-eight (48) months after setting the production casing or liner. The second subsequent sampling shall be conducted at least twenty-four (24) months after the first subsequent sampling. An operator shall make a reasonable attempt to conduct all sampling during the same month of the year. An operator may request in writing approval from the Supervisor to deviate from the subsequent sampling and testing timeframes in its Application for Permit to Drill or Deepen a Well (Form 1) based on site specific geologic and hydrologic conditions (e.g., flow rate and direction). Previously sampled water sources, including samples obtained by other operators, may be used if collection of the sample or samples meet all of the requirements of this rule and are approved by the Supervisor by Sundry Notice (Form 4). If additional development requiring an Application for Permit to Drill or Deepen a Well (Form 1) occurs on a well pad or multi-well pad after all subsequent sampling and testing has been completed, an operator shall be required to comply with all provisions of Chapter 3, Section 46, Groundwater Baseline Sampling, Analysis and Monitoring.

(f) All sampling, analysis, evaluation, and reporting shall be conducted pursuant to the requirements and protocols of the sampling and analysis procedures contained in Appendix K, unless the operator receives approval from the Supervisor to deviate from such requirements and protocols after submitting a request in writing citing the circumstances that render compliance with the sampling and analysis procedures technically infeasible or demonstrating that a deviation would meet or exceed the sampling and analysis procedures contained in Appendix K. Appendix K shall be updated periodically to remain current with evolving industry, government, and scientific standards.

(g) Copies of all final laboratory analytical results developed per the sampling and analysis procedures contained in Appendix K and spatial coordinates of the available water source shall be provided by the operator or its representative to the Commission and water source owner within three (3) months of sample collection. All analytical results and spatial coordinates of the available water source will be made available to the public unless the data is otherwise considered confidential under Wyoming statute.

(h) The initial and subsequent sampling and testing described in this section shall at a minimum include temperature, pH, oxidation-reduction potential, specific conductance, turbidity, dissolved oxygen, 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), BTEX compounds (benzene, toluene, ethylbenzene and xylenes), and naphthalene. Field observations such as odor, water color, sediment, bubbles, and effervescence shall also be documented.

(i) If free gas or a dissolved methane concentration greater than 5.0 milligrams 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.

(j) The operator shall provide verbal and send written notification to the Supervisor, the Director of the Department of Environmental Quality, and water source owner within twenty-four (24) hours if test results indicate:

(i) The presence of thermogenic or a mixture of thermogenic and biogenic gas;

(ii) The dissolved methane concentration increases by more than 5.0 mg/L between sampling periods;

(iii) The dissolved methane concentration is detected at or above 10.0 mg/L; or

(iv) BTEX compounds or TPH is detected at or above Department of Environmental Quality action levels in the water sample as noted in Appendix K.

(k) Nothing in this Rule is intended, and shall not be construed, to preclude or limit the Supervisor from requiring other sampling or monitoring consistent with Commission rules, regulations and statutes.

(l) The operator may submit a master groundwater baseline sampling, analysis and monitoring plan for a geographic area of development. The Supervisor may approve the operator's plan if the Supervisor determines that the plan meets or exceeds the

requirements of Chapter 3, Section 46, Groundwater Baseline Sampling, Analysis and Monitoring.

(m) The sampling results obtained to satisfy the requirements of this Rule, including any changes in the constituents or concentrations of constituents present in the samples, shall not create a presumption of or against liability, fault, or causation against the owner or operator of a well or multi-well pad who conducted the sampling, or on whose behalf sampling was conducted by a third-party. The admissibility and probative value of any such sampling that results in an administrative or judicial proceeding shall be determined by the presiding body according to applicable administrative, civil, or evidentiary rules.