



## **COGCC OPERATOR GUIDANCE**

### **RULE 318A.f GROUNDWATER BASELINE SAMPLING AND MONITORING**

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#### **Document Control:**

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#### **Background**

Rule 318A.f. 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. Operators in the Greater Wattenberg Area (GWA) are required to collect a groundwater sample from either a water well or an adjudicated spring prior to setting conductor pipe for an Oil and Gas Well or Dedicated Injection Well.

Rule 318.A.e.(4) went in to effect on May 1, 2013 and was subsequently changed to Rule 318.A.f on 09/30/2014 during a Rule Cleanup. Rule 318.A.e.(4) and 318.A.f are equivalent rules, the language and intent of the rules is exactly the same. Therefore the compliance requirements of Rule 318A.f. have been in place since May 1, 2013.

Consistent with the February 2015 recommendations of the Governor's Task Force on Oil and Gas for a compliance assistance program, this guidance is being developed to clarify the requirements of Rule 318A.f to operators, COGCC staff, and other stakeholders, including the general public.

#### **Current Rule**

Rule 318A.f - Groundwater baseline sampling and monitoring

- (1) Definitions
- (2) Applicability and effective date
- (3) Sampling Locations

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- (4) Exceptions
- (5) Timing of sampling
- (6) Sampling and analysis
- (7) Initial baseline sampling analysis
- (8) Subsequent Sampling and Analysis
- (9) Methane detections
- (10) BTEX or TPH Detections
- (11) Sampling Results
- (12) Liability

### Guidance for Operators

#### 1. Definitions

- a. The following terms are described in the 100 Series Rules

- I. Water Source
- II. Available Water Source
- III. Greater Wattenberg Area (GWA)
- IV. Dedicated Injection Well
- V. Oil Well
- VI. Gas Well
- VII. Completion

#### 2. Applicability and effective date

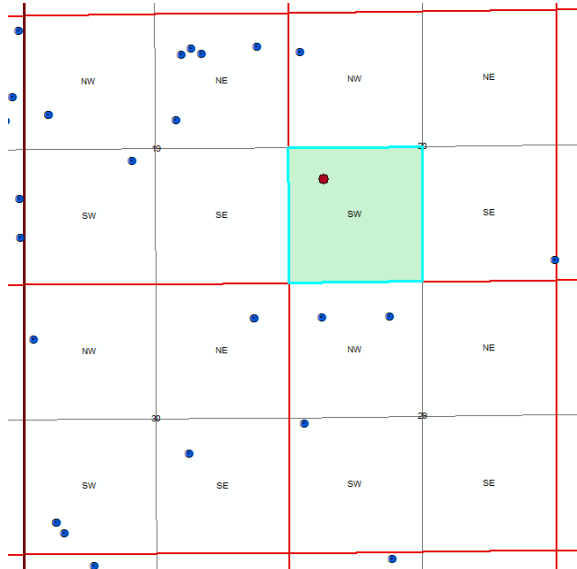
- a. Rule 318A.f applies to all Oil and Gas Wells, Multi-Well Sites, and Dedicated Injection Wells which required a Form 2 (Application for Permit to Drill (APD)) on or after May 1, 2013 in the GWA.
- b. The rule applies to re-filed APDs and APDs to re-enter plugged and abandoned wells with the intent of putting the well on production. The rule does not apply to existing oil and gas wells that are re-permitted for use as a Dedicated Injection Well. Rule 318A.f does not apply to wells that are being re-entered to meet the well bore integrity requirements of the [COGCC Horizontal Offset - DJ Basin Policy](#) and for which the proposed work does not require a Form 2.

#### 3. Sampling locations

- a. Initial and subsequent samples shall be collected from an Available Water Source, as defined in the 100 series Rules, in the same governmental quarter section as the oil and gas well. If there is not an Available Water

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Source within the quarter section, then the search is expanded outward to any un-sampled quarter section that intersects a ½ mile radius from the oil and gas well. The diagrams below show both the preferred search area and expanded search areas.

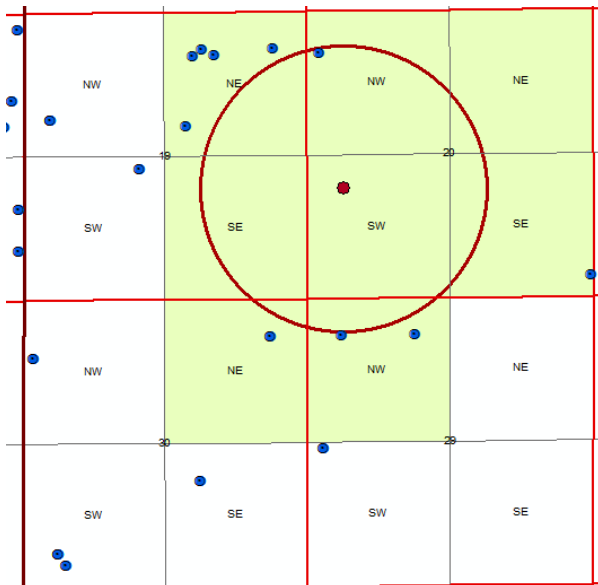


The red dot indicates the oil and gas well. The initial ¼ section search area is highlighted in green.

No water sources are available in the ¼ section so the search is expanded to all water wells in ¼ sections that contact a ½ mile radius of the oil and gas wells.

The initial search shows that there are no water sources within the same ¼ section as the oil and gas well.

Figure1. Preferred Search Area



The ¼ sections that are part of expanded search area are highlighted.

The expanded search shows 10 water wells that are potential water sources for Rule 318.A.f sample collection

Figure 2. Expanded search area

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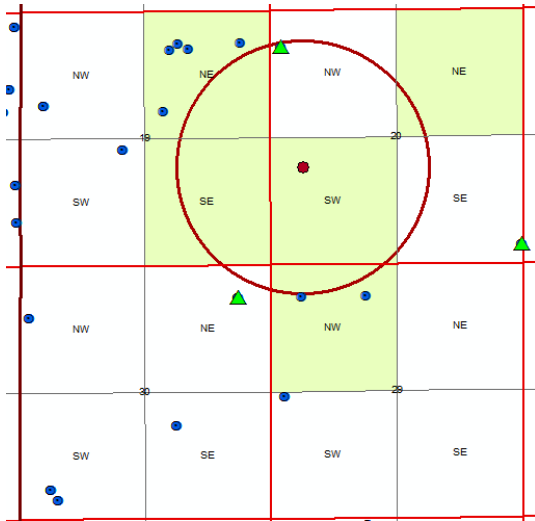


Figure 3. Quarter sections with existing Sample Locations

Quarter sections with established sample points (Green triangles) are eliminated from the search area as shown on the left.

Three quarters within the search area have been eliminated because of existing samples leaving seven potential water sources to collect a sample from.

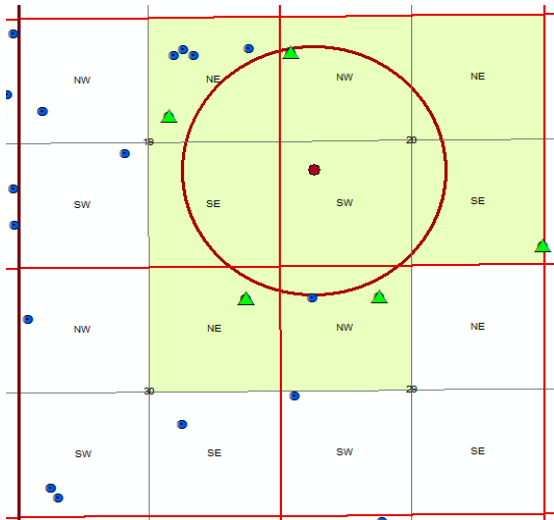


Figure 4. Well locations without an available water

If all quarter sections have been sampled or if no water sources are present within the search area then a Sundry Notice requesting relief from Rule 318A.f may be filed with the COGCC.

- b. A Sundry Notice (Form 4) should be filed if a previously established sampling location, within the same quarter section as the Oil and Gas Well has been sampled within the prior sixty (60) months before setting conductor casing and the operator is going to rely on that sample as the baseline. The Sundry should provide the Facility ID number and Sample ID number so Staff may verify that the sample may be relied on for Rule 318A.f. The Facility ID and Sample ID can be found through the COGCC online map tool.

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### 4. Exceptions

Prior to setting conductor pipe (Spud and setting conductor pipe were used interchangeably in Rule 318A.f, however a review of the Statement of Basis for the rule clearly shows that the timing requirements rely on setting conductor not Spudding the well), an operator may request an exception from the requirements of 318.A.f. by filing a Sundry Notice for the Director's review and approval if no water sources are available, if the water sources are not accessible do to a lack of owner permission, or if the potential water source is unsuitable for sampling as described in 318A.f.B.iii.dd.

- a. Documentation detailing attempts to contact well owners should be included as an attachment to the Sundry. An example may be a spreadsheet showing the DWR well permit number; quarter-quarter section, township and range of the water wells; the water well owner's name; and method of contact. Alternatively, maps displaying the water wells along with the contact information and attempts to contact may be provided.
- b. Documentation is required when an operator has determined that a Water Source is unsuitable for sampling. The documentation should thoroughly describe the condition of the water well and the reasoning behind the determination.

### 5. Timing of Sampling

- a. The initial sampling event shall be completed within 12 months prior to setting conductor pipe.
- b. The subsequent sampling event shall be completed between 6 and 12 months after completion of the oil and gas well or the last well on a multi-well pad. The COGCC considers the completion date to be the first date of production as reported by the operator on a Form 5A (Completed Interval Report).
- c. Wells that are abandoned without producing hydrocarbons are exempt from the subsequent sampling. No additional documentation is necessary.

6. Sampling and analysis shall be conducted in conformance with generally accepted environmental industry practices. A model sampling and analysis plan (SAP) can be found at the link below:

[http://cogcc.state.co.us/COGIS\\_Help/COGCC\\_Model\\_SAP\\_05012013.pdf](http://cogcc.state.co.us/COGIS_Help/COGCC_Model_SAP_05012013.pdf)

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The model SAP should be treated as an example. The methods included in the SAP are not the only acceptable methods to conduct groundwater sampling.

### 7. Analysis

- a. The table below shows the required laboratory analytes for Rule 318A.f. Requirements for the initial baseline sampling are displayed on the left and the subsequent sampling requirements are displayed on the right.

Analyte	Initial Baseline	Subsequent Sampling	Analyte	Initial Baseline	Subsequent Sampling
pH	X		magnesium	X	X
specific conductance	X		manganese	X	
total dissolved solids (TDS)	X	X	potassium	X	X
dissolved methane	X	X	sodium	X	X
dissolved ethane	X	X	barium	X	
dissolved propane	X	X	boron	X	
total bicarbonate as CaCO <sub>3</sub>	X	X	selenium	X	
carbonate as CaCO <sub>3</sub>	X	X	strontium	X	
bromide	X	X	iron related bacteria	X	
chloride	X	X	sulfate reducing bacteria	X	
fluoride	X	X	slime forming bacteria	X	
sulfate	X	X	TPH	X	X
nitrate and nitrite as N	X		benzene	X	X
phosphorus	X		toluene	X	X
calcium	X	X	ethylbenzene	X	X
iron	X		xylenes	X	X

- b. 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 (thermogenic, biogenic or a mix of thermogenic and biogenic). Additional sampling may be required if a sample is determined to be thermogenic in origin.
- c. All analytical results must be submitted to the COGCC through the EDD upload process. If assistance is needed with the EDD upload process please see [Submitting Laboratory Analytical Data Electronically](#).

### 8. Field parameters

- a. Field Parameters including odor, water color, sediment, and effervescence should also be documented in the field. Field parameters should be collected for both the initial baseline and subsequent samples. Field parameters can be uploaded through the EDD process or they may be attached to the Facility record as a PDF file.

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- b. The latitude and longitude of the water well should be recorded with a global positioning system while in the field.
  - I. Per Rule 215, the latitude and longitude of the well should be provided to the COGCC with an accuracy of five (5) decimal degrees in the North American Datum 1983 (NAD 83). It is not an acceptable practice to take the well location from the Division of Water Resources data. The coordinates should come from actual measurements taken at the wellhead in the field.
9. Reporting Detection of methane, Total Petroleum Hydrocarbons (TPH) and Benzene, Toluene, Ethyl-Benzene and Xylenes (BTEX)
  - a. Rule 318A.f requires immediate notification to the COGCC and the water well owner for the following methane detections:
    - I. The methane concentration increased by more than 5.0 mg/l between sampling events;
    - II. The methane concentration is detected at or above 10mg/l; or the compositional/isotopic data test results indicate thermogenic gas or a mixture of thermogenic and biogenic gas in the water sample.
  - b. COGCC must be notified immediately if BTEX or TPH are detected in any sample collected as part of this Rule. COGCC encourages prompt reporting to the water well owner of any analytical results which are indicative of a health risk. However, for concentrations at or slightly above method detection limits or laboratory reporting limits, the COGCC and the Operator may confer as to whether confirmation sampling should be conducted prior to notification, who should conduct the additional sampling, and what other factors may be influencing the results. For reports of higher concentrations indicative of a health risk, COGCC may require immediate reporting to the water well owner.
  - c. The proper way to report the detection to the COGCC is through the Form 42 (Notice of Field Operations). The operator may use any reasonable means to provide notifications to the water well owners. In person or verbal notifications should be followed with written correspondence; written correspondence may be provided through e-mails or formal letters, but COGCC recommends requesting delivery or receipt confirmation.
  - d. Immediate notification is considered within 24-hours of receipt of analytical data from the laboratory. The COGCC understands that there are times when analytical results must be sent back to the lab for re-analysis, in

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which case, timely reporting is expected after the results have been confirmed. However, delays in timely reporting due to third party consultants or additional internal data review should be avoided; the raw data can be reported immediately, with a caveat that additional review may be undertaken and the results are therefore to be considered preliminary.

- e. Information required for the notification include, the API number of the oil and gas well or the location ID number for the pad for which water sample was collected and the COGCC facility ID number for the sample location and the sample date.
  - I. If a Facility ID has not been assigned to the sample location, enter the required facility information into the COENV database in order to obtain a valid facility ID number. The Form 42 must not be filed without the facility ID number or there will be no referenced or related facility and notice will not be credited or assigned.

### 10. Sampling Results

- a. Copies of all laboratory results that the COGCC receives will be made available on the COGCC website. If a sample is collected and the well owner does not wish the data to be publically available, then the sample may not be used to meet the requirements under Rule 381A.f.

### **Document Change Log**

<b>Change Date</b>	<b>Description of Changes</b>
August 18, 2015	Draft Document Created and Finalized
September 16, 2015	Clarifying language was added or modified in Sections 2b, 3b, 4, 4b, and 5b. Section 9 was re-written.