15A NCAC 05H .0XX1 BASELINE SAMPLING AND TESTING REQUIREMENTS

This Section establishes the general and specific requirements for the collection of samples, testing of samples, and reporting of baseline analytical data including groundwater, surface water, and air quality in areas where oil and gas drilling, completion, workover or stimulation of wells takes place. The provisions of this Rule shall apply to all new oil and gas wells for which an initial drilling permit is issued on or after the effective date of this Rule and in accordance with § 113-391.

15A NCAC 05H .0XX2 DEFINITIONS

The terms used in this Subchapter shall have the definitions assigned by § 113-389. In addition, the words defined in this Rule shall have the following meanings:

15A NCAC 05H .0XX3 GROUNDWATER SAMPLING AND TESTING

(a) An operator of an oil or gas well shall provide a written notice to all surface landowners or owners of a water supply within the presumptive liability distance established pursuant to §113-420(a) and 113-421(a). The written notice shall include the following:
  (1) The operator may rebut the presumption established pursuant to §113-421(a) if the surface landowner or owner of the water supply refuses the operator access to conduct pre-drilling sampling and testing of a water well; and
  (2) The name, address, and telephone number of the Department, to which the surface landowner or owner of the water supply may respond.

(b) An operator shall provide written notice to the Department to rebut the presumption outlined in §113-421(a). The written notice must include the following:
  (1) The name, address, and telephone number of the well operator;
  (2) The desire to conduct pre-drilling sampling and testing of the water well;
  (3) The name of the person or firm who requested and was refused access to conduct the sampling and testing, the date of the request, and a copy of all documentation proving the request for access was denied; and
  (4) The name, address, and telephone number of the surface landowner or owner of the water supply.

(c) Any surface landowners' or owners' water supply with contamination as a result of the drilling, alteration or operation of an oil or gas well may notify the Department and request that an investigation be conducted.
  (1) The operator at the request of the Department shall obtain a water well sample and provide the analytical results to the Department; and
  (2) The Department may require the operator to replace the water well or provide an equivalent water supply.

(d) All water wells used for household, domestic, livestock, irrigation, public, and commercial purposes that are located within the presumptive liability distance, established pursuant to §113-421(a), of the proposed oil or gas wellhead shall be sampled and tested prior to commencement of drilling activities.
  (1) Initial water well sampling and testing shall be conducted no earlier than 12 months but no later than 30 days prior to commencement of drilling activities to establish a baseline;
  (2) Subsequent water well sampling and testing shall be conducted at all initial sample locations between 6 and 12 months, and a second subsequent sampling

Comment [RC1]: Highlighted comments throughout this rule set are recommendations provided by the Division of Water Quality, DENR Policy Development Analyst/Rulemaking Coordinator, & USGS. The recommendations were submitted per the request of the Assistant Secretary of NCDENR for consideration of the Environmental Standards Committee.

Comment [RC2]: Jennifer Everett: This needs to be defined. DWQ has streams and lakes that are classified (and put it rule) as Water Supply. Some little Ag pond that an operator wants to use may not be classified as Water Supply. Also, Div. of Water Resources may also have some input?

Ryan Channell: The water acquisition and management rules define water source as any of the following:
1.Waters of the State;
2.A source of water supply used by a water purveyor;
3.Mine pools and discharges; or
4.Any other waters that are used for drilling or completing an oil or gas well.

Perhaps we could use water source to replace water supply?

Comment [RC3]: Pre-drilling testing of water supplies G.S. 113-423(f). Discussion item regarding the presumptive liability of 5,000 feet from a wellhead.

event shall be conducted between 18 and 24 months after completion of all permitted oil or gas wells at a well pad;

(3) When multiple oil or gas wells will be permitted and constructed at a well pad, baseline sampling and testing shall be completed prior to drilling the initial oil or gas well. The sampling and testing analytical results conducted for the initial oil or gas well will serve as the baseline for all future oil or gas wells drilled at the well pad.

i. Interim sampling and testing must be completed every two years, in accordance with Paragraph (h) of this Rule, if all oil or gas well construction is not completed within 4 years of the installation of the initial oil or gas well;

(4) Water samples shall be collected from the sample tap at the well or the closest accessible collection point to the water source, provided the sampling point shall precede any water treatment devices.

(5) Water well sampling shall be conducted in accordance with the U.S. Environmental Protection Agency (EPA) Region IV SESD Operating Procedure for Groundwater Sampling, document number SESDPROC-301-R3;

(6) If an operator drills an oil or gas well, but does not install production casing and has abandoned the well in accordance with the plugging and abandonment requirements outlined in 15A NCAC 05H .0XX17; subsequent testing pursuant to Paragraph (h) of this Rule is not required; and

(7) The Department may require additional sampling and testing if degradation of water quality is identified within the presumptive liability distance established pursuant to §113-421(a) during subsequent sampling and testing.

(e) An operator electing to preserve a defense pursuant to §113-423(f) shall retain an independent laboratory certified by the state to analyze all initial and subsequent water well samples. Laboratory certification shall be in accordance with 15A NCAC 2H .0800 and laboratory analytical procedures shall be pursuant to 15A NCAC 02L .0112.

(f) A person independent of the operator shall collect the water well sample.

(g) The initial baseline analytical results shall include pH, specific conductance, total dissolved solids (TDS), turbidity, nitrate, alkalinity, calcium, chloride, magnesium, potassium, sodium, sulfate, arsenic, barium, boron, bromide, chromium, iron, manganese, selenium, strontium, lithium, lead, zinc, uranium, isotopic radium (^{226}Ra and ^{228}Ra), isotopic strontium (^{87}Sr and ^{86}Sr), benzene, toluene, ethyl benzene, xylenes (BTEX), diesel range organics (DRO), dissolved methane, gasoline range organics (GRO), and total petroleum hydrocarbons (TPH), nitrate, strontium, lithium, lead, zinc, isotopic radium (^{226}Ra and ^{228}Ra), and isotopic strontium (^{87}Sr and ^{86}Sr).

(h) The first series of subsequent sampling and testing, of all water wells tested during the initial baseline procedure, shall occur between 6 and 12 months following the completion of all oil or gas wells at a well pad. The testing shall include pH, specific conductance, total dissolved solids (TDS), turbidity, nitrate, alkalinity, calcium, chloride, magnesium, potassium, sodium, sulfate, arsenic, barium, boron, bromide, chromium, iron, manganese, selenium, strontium, lithium, lead, zinc, uranium, isotopic radium (^{226}Ra and ^{228}Ra), isotopic strontium (^{87}Sr and ^{86}Sr), benzene, toluene, ethyl benzene, xylenes (BTEX), diesel range organics (DRO), dissolved methane, gasoline range organics (GRO), and

Comment [RC4]: DWQ: taken from the private well sampling rules (with slight modification) - assures that the sample is reflective of the resource, not the plumbing. This is also referenced in the EPA operating procedure document inserted in the next line, so may be redundant here.

Comment [RC5]: Jennifer Everett: This may need to be defined?

Comment [RC6]: USGS: recommended adding to the list.
-radium isotopes (226Ra and 228Ra) because these may be present in elevated concentrations in deep groundwater and the 5pCi/L drinking water standard. Found in other black organic-rich shales.
-strontium isotopes 87Sr/86Sr have been elevated in deep groundwater and could be used to distinguish more brackish groundwater.
-Also, we found elevated dissolved metals: - strontium, lithium naturally occurring in wells.
-Nitrate would be important to establish background agricultural conditions and with the 10 mg/L drinking water standard; not sure it would be influenced by drilling/gas well production activities.
-Zinc/lead – may want to add these to establish any existing steel casing effects on background groundwater quality.

total petroleum hydrocarbons (TPH), nitrate, strontium, lithium, lead, zinc, isotopic radium (^{226}Ra and ^{228}Ra), and isotopic strontium (^{87}Sr and ^{86}Sr).

(i) The second series of subsequent testing, of all water wells tested during the initial baseline procedure, shall occur between 18 and 24 months following the completion of all oil or gas wells at the well pad. If the results from the first series of subsequent sampling and testing, listed in paragraph (h) of this section, did not exceed the permissible concentrations outlined in 15A NCAC 02L .0202 then the operator may sample and test for pH, specific conductance, total dissolved solids (TDS), and dissolved methane. If there is an increase in the concentration or the occurrence of pH, specific conductance, total dissolved solids (TDS), or dissolved methane, the operator shall test for all parameters outlined in Paragraph (h) of this Rule.

(j) If a concentration of dissolved methane is found to be greater than 1.0 milligram per liter (mg/l) in a water sample, then an operator shall conduct a gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen – ^{12}C, ^{13}C, ^{1}H and ^{2}H) to determine the gas type.

(k) The operator shall notify the Department immediately if BTEX compounds or TPH are detected in a water well sample exceeding the permissible concentrations outlined in 15A NCAC 02L .0202.

15A NCAC 05H .0XX4 SURFACE WATER SAMPLING AND TESTING

(a) An operator of an oil or gas well shall provide a written notice to all surface landowners or owners of a water supply within the presumptive liability distance established pursuant to §113-420(a) and 113-421(a). The written notice shall include the following:
   (1) The operator may rebut the presumption established pursuant to §113-421(a) if the surface landowner or owner of the water supply refuses the operator access to conduct pre-drilling sampling and testing of a water well; and
   (2) The name, address, and telephone number of the Department, to which the surface landowner or owner of the water supply may respond.

(b) An operator shall provide written notice to the Department to rebut the presumption outlined in §113-421(a). The written notice must include the following:
   (1) The name, address, and telephone number of the well operator;
   (2) The desire to conduct pre-drilling sampling and testing of the water well;
   (3) The name of the person or firm who requested and was refused access to conduct the sampling and testing, the date of the request, and a copy of all documentation proving the request for access was denied; and
   (4) The name, address, and telephone number of the surface landowner or owner of the water supply.

(c) Any surface landowners' or owners' water supply with contamination as a result of the drilling, alteration or operation of an oil or gas well may notify the Department and request that an investigation be conducted.
   (1) The operator at the request of the Department shall obtain a surface water sample and provide analytical results to the Department; and
   (2) The Department may require the operator to provide an equivalent water supply.

(d) All named and unnamed surface waters used for household, domestic, livestock, irrigation, public, and commercial purposes that are located within the presumptive

Comment [RC7]: USGS: recommended adding to the list.
-radium isotopes (226Ra and 228Ra) because these may be present in elevated concentrations in deep groundwater and the 5pCi/L drinking water standard. Found in other black organic-rich shales.
-strontium isotopes 87Sr/86Sr have been elevated in deep groundwater and could be used to distinguish more brackish groundwater.
-Also, we found elevated dissolved metals: -strontium, lithium naturally occurring in wells.
-Nitrate would be important to establish background agricultural conditions and with the 10 mg/L drinking water standard; not sure it would be influenced by drilling/gas well production activities.
-Zinc/lead – may want to add these to establish any existing steel casing effects on background groundwater quality.

liability distance, established pursuant to §113-421(a), of the proposed oil or gas wellhead shall be sampled and tested prior to commencement of drilling activities.

(1) Initial surface water sampling and testing shall be conducted no earlier than 12 months but no later than 30 days prior to commencement of drilling activities to establish a baseline;

(2) Subsequent surface water sampling and testing shall be conducted at all initial sample locations between 6 and 12 months, and a second subsequent sampling event shall be conducted between 18 and 24 months after completion of all permitted oil or gas wells at a well pad;

(3) When multiple oil or gas wells will be permitted and constructed at a well pad, baseline sampling and testing shall be completed prior to drilling the initial oil or gas well. The sampling and testing analytical results conducted for the initial oil or gas well will serve as the baseline for all future oil or gas wells drilled at the well pad.

i. Interim sampling and testing must be completed every two years, in accordance with Paragraph (h) of this Rule, if all oil or gas well construction is not completed within 4 years of the installation of the initial oil or gas well;

(4) A person independent of the operator shall develop an Ambient Monitoring Systems -Quality Assurance Project Plan (QAPP), and receive Departmental approval prior to surface water quality sampling.

(5) Surface water sampling shall be conducted in accordance with the U.S. EPA Region IV SESD Operating Procedure for Surface Water Sampling, document number SESDPROC-201-R3;

(6) If an operator drills an oil or gas well, but does not install production casing and has abandoned the well in accordance with the plugging and abandonment requirements outlined in 15A NCAC 05H .0XX17; subsequent testing pursuant to Paragraph (h) of this Rule is not required; and

(7) The Department may require additional sampling and testing if degradation of water quality is identified within the presumptive liability distance established pursuant to §113-421(a) during subsequent sampling and testing.

(e) An operator electing to preserve a defense pursuant to §113-423(f) shall retain an independent laboratory certified by the state to analyze all initial and subsequent surface water samples. Laboratory certification shall be in accordance with 15A NCAC 2H .0800 and laboratory analytical procedures shall be pursuant to 15A NCAC 02B .0103.

(f) A person independent of the operator shall collect the surface water sample.

(g) The initial baseline analytical results shall include pH, specific conductance, total dissolved solids (TDS), alkalinity, calcium, chloride, magnesium, fluoride, sodium, sulfate, arsenic, barium, chromium, iron, selenium, benzene, toluene, ethyl benzene, xylenes (BTEX), diesel range organics (DRO), gasoline range organics (GRO), total petroleum hydrocarbons (TPH), and polycyclic aromatic hydrocarbons (PAH) (including benzo(a)pyrene), boron, bromide, manganese, trihalomethanes, nitrate, strontium, lithium, lead, zinc, isotopic radium (^{226}Ra and ^{228}Ra), isotopic strontium (^{87}Sr and ^{86}Sr), and dissolved methane.

(h) The first series of subsequent sampling and testing, of all surface water tested during the initial baseline procedure, shall occur between 6 and 12 months following the completion

Comment [RC8]: Jennifer Everett: This is important for surface water quality data collection to be considered defensible. The QAPP manual was developed by DWQ and approved by EPA. More info is here: http://portal.ncdenr.org/web/wq/ess/eco/ams/qapp
-Delete item (5) U.S. EPA Region IV SESD Operating Procedure for Surface Water Sampling, document number SESDPROC-201-R3

Comment [RC9]: Jennifer Everett: This may need to be defined?

Comment [RC10]: DWQ: recommend adding to list. Trihalomethanes are formed by combination of bromide with dissolved organic material is bromide is discharged to surface waters.

Comment [RC11]: USGS: recommended adding to the list.
-radium isotopes (226Ra and 228Ra) because these may be present in elevated concentrations in deep groundwater and the 5pCi/L drinking water standard. Found in other black organic-rich shales.
-strontium isotopes 87Sr/86Sr have been elevated in deep groundwater and could be used to distinguish more brackish groundwater.
-Also, we found elevated dissolved metals: -strontium, lithium naturally occurring in wells.
-Nitrate would be important to establish background agricultural conditions and with the 10 mg/L drinking water standard; not sure it would be influenced by drilling/gas well production activities.
-Zinc/lead – may want to add these to establish any existing steel casing effects on background groundwater quality.
-Dissolved methane would be a signature for groundwater discharge.

of all oil or gas wells at a well pad. The subsequent analytical results shall include pH, specific conductance, total dissolved solids (TDS), alkalinity, calcium, chloride, magnesium, fluoride, sodium, sulfate, arsenic, barium, chromium, iron, selenium, benzene, toluene, ethyl benzene, xylenes (BTEX), diesel range organics (DRO), gasoline range organics (GRO), total petroleum hydrocarbons (TPH), and polycyclic aromatic hydrocarbons (PAH) (including benzo(a)pyrene), boron, bromide, manganese, trihalomethanes, nitrate, strontium, lithium, lead, zinc, isotopic radium (^{226}Ra and ^{228}Ra), isotopic strontium (^{87}Sr and ^{86}Sr), and dissolved methane.

(i) The second series of subsequent testing, of all surface water tested during the initial baseline procedure, shall occur between 18 and 24 months following the completion of all oil or gas wells at the well pad. If the results from the first series of subsequent sampling and testing, listed in Paragraph (h) of this Rule, did not exceed the permissible concentrations outlined in 15A NCAC 02B .0200 then the operator may sample and test for pH, specific conductance, and total dissolved solids (TDS). If there is an increase in the concentration or the occurrence of pH, specific conductance, total dissolved solids (TDS), and dissolved methane, the operator shall test for all parameters outlined in Paragraph (h).

(j) If a concentration of dissolved methane is found to be greater than 1.0 milligram per liter (mg/l) in a water sample, then an operator shall conduct a gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen – ^{12}C, ^{13}C, ^{1}H and ^{2}H) to determine the gas type.

(k) The operator shall notify the Department immediately if BTEX compounds, TPH, or PAH are detected in a surface water sample exceeding the permissible concentrations outlined in 15 NCAC 02B .0200.

15A NCAC 05H .0XX5 AIR QUALITY TESTING

(a) All operators conducting oil and gas exploration, drilling, completion, workover or stimulation of a well shall conduct source testing in accordance with 15A NCAC 02D .2600 if required in a permit issued under 15A NCAC 02Q or as requested by the Director of the Division of Air Quality to determine the compliance status of the source.

15A NCAC 05H .0XX6 REPORTING OF TEST RESULTS

(a) An operator electing to preserve its defenses pursuant to §113-423(f) shall provide a written copy of all analytical results to the Department within 10 business days of receipt of the results. The report describing the results of the sampling and testing must be sealed by either a Licensed Geologist or Professional Engineer and contain the following information:

(1) The surveyed location of the water supply, name, address, and telephone number of the surface landowner or owner of the water supply.

(2) The date of the test, the name of the certified laboratory, and the name of the person who conducted the analytical testing.

(3) A description of where and how the sample was collected and the name of the person who collected the sample.

(4) Field observations to include odor, water color, sediment, bubbles, & effervescence.

Comment [RC12]: DWQ: recommend adding to list. Trihalomethanes are formed by combination of bromide with dissolved organic material is bromide is discharged to surface waters.

Comment [RC13]: USGS: recommended adding to the list.
-radium isotopes (226Ra and 228Ra) because these may be present in elevated concentrations in deep groundwater and the 5pCi/L drinking water standard. Found in other black organic-rich shales.
-strontium isotopes 87Sr/86Sr have been elevated in deep groundwater and could be used to distinguish more brackish groundwater.
-Also, we found elevated dissolved metals: -strontium, lithium naturally occurring in wells.
-Nitrate would be important to establish background agricultural conditions and with the 10 mg/L drinking water standard; not sure it would be influenced by drilling/gas well production activities.
-Zinc/lead – may want to add these to establish any existing steel casing effects on background groundwater quality.
-Dissolved methane would be a signature for groundwater discharge.

Comment [RC14]: USGS: recommended adding to the list.
-Dissolved methane would be a signature for groundwater discharge.

(5) A description of the type and age, if known, of the water supply, and treatment, if any.
(6) The name of the operator, name and number of the oil or gas well, API number of the oil or gas well.
(7) A complete packet of all laboratory analysis results.

(b) All operators shall keep records of air pollution emissions and reports covering their discharge into the outdoor atmosphere of the state pursuant to 15A NCAC 02D .0600. All operators shall report source testing results in accordance with 15A NCAC 02D .2600 if required in a permit issued under 15A NCAC 02Q or as requested by the Director of the Division of Air Quality to determine the compliance status of the source.

15A NCAC 05H .0XX8 RECORD KEEPING AND REPORTING

(a) The Department shall maintain baseline and subsequent testing analytical results and reports, which will be available to the public through the Department's website.

Comment [RC15]: Jennifer Everett recommended posting the results on the Department's website.