

TOWN OF ERIE OIL AND GAS TABLE TOP WORKSHOP NOVEMBER 18, 2019

OIL AND GAS REGULATIONS, 10/28/2019 DRAFT

Overview of Water Quality Standards

APPLICANT MUST DEMONSTRATE COMPLIANCE WITH WATER QUALITY STANDARDS TO PROTECT PUBLIC HEALTH, SAFETY AND WELFARE, AND THE ENVIRONMENT

WATER QUALITY

The Oil and Gas Operation shall not cause significant degradation of water quality of affected water bodies and water wells. The Operator shall implement the required Water Quality Monitoring and Mitigation Plan to achieve the standard. [Section 10.12.3.I]

1. **Determination of Significant Degradation of Water Quality** [Section 10.12.3.I.1]
Determination of whether the Operation will cause significant degradation to water quality may include, but is not limited to the following considerations:
 - a. Applicable narrative and numeric water quality standards.
 - b. Changes in point and nonpoint source pollution loads.
 - c. Increase in erosion and sediment loads.
 - d. Changes in stream channel or shoreline stability.
 - e. Changes in stormwater runoff flows.
 - f. Changes in quality of ground water.
 - g. Certification. The Operator shall submit annual reports to the LGD certifying compliance with water quality standards, documenting any non-compliance, including its date and duration. A compliance plan is required for all instances of non-compliance.
2. **Water Wells** [Section 10.12.3.I.2]
The Oil and Gas Operation shall not cause water quality or water pressure of any public or private water wells to go below pre-project levels. The Operator shall submit monthly reports to the LGD certifying that the Operation has not caused water quality or pressure of public and private wells to go below pre-project levels, or documenting non-compliance, including the date and duration. A compliance plan is required for all instances of non-compliance.
3. **Water Source Sampling and Testing** [Section 10.12.3.I.3]
Using records of the Colorado Division of Water Resources, Operator shall identify and sample all documented water sources located within one-half (1/2) mile of the projected track of the borehole of a proposed well and within one-half (1/2) mile of the radius of the proposed well pad site. All sampling must be conducted by third-party consultant approved of by the Town. The Operator shall provide all water source test results to the LGD and maintain records of such results. Requirements for sampling include:

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- a. Collection of initial baseline samples and subsequent monitoring samples from all available water sources within one-half (1/2) mile of the well pad site.
- b. Initial collection and testing of baseline samples from available water sources shall occur within twelve (12) months prior to the commencement of drilling a well, or within twelve (12) months prior to the re-stimulation of an existing well for which no samples were collected and tested during the previous twelve (12) months.
- c. Collection and testing of post-stimulation samples from available water sources within the following time frames:
 - i. One sample within six (6) months after completion;
 - ii. One sample between twelve (12) and eighteen (18) months after completion; and
 - iii. One sample between sixty (60) and seventy-two (72) months after completion.
- d. For multi-well pads, monthly collection and testing during active drilling and completion.
- e. Collection of samples from at least one (1) up-gradient and two (2) down-gradient water sources within a one-half (1/2) mile radius of the well pad site. If no such water sources are available, Operator shall collect samples from additional water sources within a radius of up to one mile from the well pad site until samples from a total of at least one (1) up-gradient and two (2) downgradient water sources are collected. Operator shall give priority to the selection of water sources closest to the well pad site.
- f. Operator may rely on existing groundwater sampling data collected from any water source within the radii described above, provided the data was collected within the twelve (12) months preceding the commencement of drilling the well, the data includes measurement of all of the constituents measured in Table 1, and there has been no significant oil and gas activity within a one-mile radius in the time period between the original sampling and the commencement of drilling the well.
- g. Operator shall make reasonable efforts to obtain the consent of the owner of the water source. If the Operator is unable to locate and obtain permission from the surface owner of the water source, the Operator shall advise the LGD that the applicant could not obtain access to the water source from the surface owner.
- h. Testing for the analytes listed in Table 1, and subsequent testing as necessary or appropriate.
- i. Use of standard industry procedures in collecting samples, consistent with the COGCC model Sampling and Analysis Plan.
- j. Reporting the location of the water source using a GPS with sub-meter resolution.

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- k. Reporting damaged or unsanitary well conditions, adjacent potential pollution sources, odor, water color, sediment, bubbles, and effervescence discovered through field observations.
- l. Providing copies of all test results described above to the LGD, the COGCC, and the water source owners within three (3) months after collecting the samples.
- m. Additional measures to be required if sampling shows water contamination, including:
 - i. If free gas or a dissolved methane concentration level greater than one milligram per liter (mg/l) is detected in a water source, determination of the gas type using gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen).
 - ii. If the test results indicate thermogenic or a mixture of thermogenic and biogenic gas, an action plan to determine the source of the gas.
 - iii. Immediate notification to the LGD, the COGCC, and the owner of the water source if the methane concentration increases by more than five mg/l between sampling periods, or increases to more than ten mg/l.
 - iv. Immediate notification to the LGD, the COGCC and the owner of the water source if BTEX and/or TPH are detected as a result of testing. Such detections may result in required subsequent sampling for additional analytes.
 - v. Further water source sampling in response to complaints from water source owners.
 - vi. Timely production and distribution of test results, well location, and analytical data in electronic deliverable format to the LGD, the COGCC and the water source owners.
- n. All abandoned well assessments and water source testing shall be conducted by the Operator or if requested by a surface owner, by a qualified independent professional consultant approved by the Town at the Operator's expense.

Table 1. Water Quality Analytes	
GENERAL WATER QUALITY	Alkalinity, Conductivity & TDS, Ph, Dissolved Organic Carbon, (or Total Organic Carbon) Bacteria, Hydrogen Sulphide
MAJOR IONS	Bromide, Chloride, Fluoride, Magnesium, Potassium, Sodium, Sulfate, Nitrate + Nitrite as N (total)
METALS	Arsenic, Barium, Boron, Chromium, Copper, Iron, Lead, Manganese, Selenium, Strontium
DISSOLVED GASES AND VOLATILE ORGANIC COMPOUNDS	Methane, Ethane, Propane, BTEX as, Benzene, Toluene, Ethylbenzene, Xylenes, Total Petroleum Hydrocarbons (TPH)
OTHER	Water Level, Stable isotopes of water (Oxygen, Hydrogen, Carbon), Phosphorus

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4. Groundwater Baseline Sampling and Monitoring, Greater Wattenberg Area Wells

[Section 10.12.3.J]

Operator shall provide the LGD with copies of the results of tests performed by Operator on Greater Wattenberg Area wells within the Town limits under COGCC Rule 318A.f.

5. Stormwater [Section 10.12.3.K]

- a. Operation shall be conducted in conformance with the Stormwater Management Plan.
- b. Best Management Practices (BMPs) shall be maintained in effective operating condition and any additional BMPs recommended by a stormwater inspector must be implemented by the Operator as soon as possible.
- c. Results of stormwater inspections required by CDPHE-WQCD shall be provided to the LGD.
- d. Final stabilization measures must be implemented as soon as construction activities cease.
- e. Once the well pad or production facility has reached final stabilization as defined by CDPHE, the well pad or production facility must develop and implement a post construction stormwater program as defined by COGCC Rule 1002.f.

6. Water Supply [Section 10.12.3.L]

- a. The water supply is the least detrimental to the environment among the available sources and adequate to meet the needs of the Oil and Gas Operation.
- b. The water supply is legally and physically available, dependable, and sustainable. Reuse and recycling will be implemented.
- c. The Operation shall not use water from the Town's municipal water supply unless approved by the Board of Trustees.
- d. The Operation shall be conducted in conformance with the Water Supply Plan.

7. Spill Release Response and Reporting [Section 10.12.3.M]

The Operator shall demonstrate the ability to control and contain all spills and releases of exploration and production waste, including produced fluids, immediately upon discovery in conformance with the Spill Release Response and Reporting Plan.

- a. Spills and releases shall be contained, investigated, and cleaned up as soon as possible or immediately in emergency situations.
- b. All employees performing spill clean-up shall be qualified in accordance with applicable state and federal requirements.
- c. Copies of Form 19 Spill Release Report (both initial and Supplemental Report) and Form 23 Loss of Well Control Report shall be submitted to the LGD at the same time they are submitted to the COGCC, including the topographic map showing location of

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the spill and any information relating to initial mitigation, site investigation, and remediation that accompany the report.

- d. Spills and releases outside of containment which exceed one barrel of Exploration and Production Waste or produced fluids shall be reported to the LGD within 24 hours.
- e. Spills and releases of any size which impact or threaten to impact any waters of the state, residences or occupied structures, livestock, or public byways shall be verbally reported to the LGD within twenty-four (24) hours, with a follow-up written notice within 48 hours.
- f. Spills and releases of any size which impact or threaten to impact any water supply area shall be verbally reported to the Colorado Environmental Spill Reporting Hotline at 1-877-518-5608, and to the LGD immediately after discovery.
- g. Spills and releases that impact or threaten to impact a water supply intake shall be reported immediately to the LGD, and to the owner of the intake if the Town is not the owner of the intake.
- h. Spills, chemical spills and releases shall be reported in compliance with applicable state and federal laws. Applicant will provide the LGD with a copy of any self-reporting submissions that applicant provides to any agency.

8. Use of Steel-Rim Berms [Section 10.12.3.N]

The Oil and Gas Operation shall use steel rim berms or some other state of the art technology that has the capacity to contain 150% of the largest storage tank.

9. Vehicle and Equipment Fueling and Maintenance [Section 10.12.3.O]

Routine field maintenance of vehicles or mobile machinery shall not be performed within five hundred (500) feet of any water body. All fueling must occur over impervious material.

10. Fuel Storage Areas [Section 10.12.3.P]

The Oil and Gas Operation includes measures to contain fuel in fuel storage areas to prevent release to any water body. Inventory management or leak detection plans may be required.

11. Waste Water Management [Section 10.12.3.Q]

Operation will be conducted in conformance with the Waste Water Management Plan.

- a. All fluids will be contained and there will be no discharge of fluids.
- b. Waste will be stored in tanks, transported by tanker trucks and/or pipelines, and disposed of at licensed disposal or recycling sites.
- c. Land treatment of oil impacted or contaminated drill cuttings within the Town limits is prohibited.
- d. Disposal of waste water within the Town limits is prohibited.

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12. Use of Underground Waste Water Injection Wells Prohibited [Section 10.12.3.R]

Class II underground waste water injection wells within the Town limits are prohibited.

13. Disposal of Hydraulic Fracturing Fluid [Section 10.12.3.S]

The Operator shall demonstrate the ability to and shall dispose of all hydraulic fracturing fluids in accordance with the Chemicals and Hydraulic Fracturing Fluids Disposal and Reporting Plan.

14. Hazardous Materials [Section 10.12.3.T]

- a. The Oil and Gas Operation includes measures to contain all hazardous materials in storage areas to prevent release to any water body. Inventory management and leak detection systems are required.
- b. Full disclosure, consistent with COGCC requirements, including material safety data sheets of all hazardous materials that will be transported on any public or private roadway within the Town for the Oil and Gas Operation, shall be provided to the LGD. This information will be treated as confidential and will be shared with other emergency response personnel only on an as needed basis.
- c. Flammable Material. The area twenty-five (25) feet around anything flammable shall be kept free of dry grass or weeds, conform to COGCC safety standards and applicable fire code.

15. Chemical Disclosure and Storage [Section 10.12.3.U]

Prior to bringing hydraulic fracturing chemicals onto the property, the Operator shall make available to the Town, in table format, the name, Chemical Abstracts Service (CAS) number, storage, containment and disposal method for such chemicals to be used on the well site, which the Town may make available to the public as public records. Fracturing chemicals shall be uploaded onto the FracFocus website within sixty (60) days of the completion of fracturing operations. The Operator shall not permanently store fracturing chemicals, flowback from hydraulic fracturing, or produced water in the Town limits. Operator shall remove all hydraulic fracturing chemicals at a well site within thirty (30) days following the completing of hydraulic fracturing at that well site.

The following chemicals will not be added to the hydraulic fracturing fluids used at the well sites:

Ingredient Name	CAS#
Benzene	71-43-2
Lead	7439-92-1
Mercury	7439-97-6
Arsenic	740-38-2
Cadmium	7440-43-9
Chromium	7440-47-3
Ethyl benzene	100-41-4
Xylenesf	1330-20-7
1,3,5-trimethylbenzene	108-67-8

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Ingredient Name	CAS#
1,4-dioxane	123-91-1
1-butanol	71-36-3
2-butoxyethanol	111-76-2
N,N-dimethylformamide	68-12-2
2-ethylhexanol	104-76-7
2-mercaptoethanol	60-24-2
benzene, 1,1'-oxybis-, tetrapropylene derivatives, sulfonated, sodium salts (BOTS)	119345-04-9
butyl glycidyl ether	8/6/2426
polysorbate 80	9005-65-6
quaternary ammonium compounds, dicoco alkyldimethyl, chlorides (QAC)	61789-77-3
bis hexamethylene triamine penta methylene phosphonic acid (BMPA)	35657-77-3
diethylenetriamine penta (methylene-phosphonic acid)(DMPA)	15827-60-8
FD&C blue no. 1	3844-45-9
Tetrakis(triethanolaminate) zirconium(IV) (TTZ)	101033-44-7

16. Emergency Response [Section 10.12.3.V]

The Oil and Gas Operation shall be conducted in accordance with the Emergency Response Plan.

17. Grading, Drainage, and Erosion Control [Section 10.12.3.AA]

The Oil and Gas Operation shall be conducted in accordance with the Grading, Drainage, and Erosion Control Plan.