Well Fluid Analysis – Sampling and Reporting Requirements Guide

VERSION 1.2: December 2023

About the Regulator

The BC Energy Regulator (Regulator) is the single-window regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Regulator's core roles include reviewing and assessing applications for industry activity, consulting with First Nations, ensuring industry complies with provincial legislation and cooperating with partner agencies. The public interest is protected by ensuring public safety, protecting the environment, conserving petroleum resources and ensuring equitable participation in production.

Vision, Mission and Values

Vision

A resilient energy future where B.C.'s energy resource activities are safe, environmentally leading and socially responsible.

Mission

We regulate the life cycle of energy resource activities in B.C., from site planning to restoration, ensuring activities are undertaken in a manner that:

- Protects public safety and the environment
- Supports reconciliation with Indigenous peoples and the transition to low-carbon energy
- Conserves energy resources
- Fosters a sound economy and social well-being

Values

Respect is our commitment to listen, accept and value diverse perspectives.

Integrity is our commitment to the principles of fairness, trust and accountability.

Transparency is our commitment to be open and provide clear information on decisions, operations and actions.

Innovation is our commitment to learn, adapt, act and grow.

Responsiveness is our commitment to listening and timely and meaningful action.

Additional Guidance

As with all Regulator documents, this document does not take the place of applicable legislation. Readers are encouraged to become familiar with the acts and regulations and seek direction from Regulator staff for clarification.

The Regulator publishes both application and operations manuals and guides. The application manual provides guidance to applicants in preparing and applying for permits and the regulatory requirements in the planning and application stages. The operation manual details the reporting, compliance and regulatory obligations of the permit holder. Regulator manuals focus on requirements and processes associated with the Regulator's legislative authorities. Some activities may require additional requirements and approvals from other regulators or create obligations under other statutes. It is the applicant and permit holder's responsibility to know and uphold all legal obligations and responsibilities. For example, Federal Fisheries Act, Transportation Act, Highway Act, Workers Compensation Act and Wildlife Act.

Throughout the document there are references to guides, forms, tables and definitions to assist in creating and submitting all required information. Additional resources include:

- Glossary and acronym listing on the Regulator website.
- Documentation and guidelines on the Regulator website.
- Frequently asked questions on the Regulator website.
- Advisories, bulletins, reports and directives on the Regulator website.
- Regulations and Acts listed on the Regulator website.

In addition, this document may reference some application types and forms to be submitted outside of the Application Management System but made available on the Regulator's website. Application types and forms include:

- Heritage Conservation Act, Section 12
- Road use permits
- Water licences
- Master licence to cut
- Certificate of restoration
- Waste discharge permit
- Experimental scheme application
- Permit extension application

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Manual Revisions

The Regulator is committed to the continuous improvement of its documentation. Revisions to the documentation are highlighted in this section and are posted to the Documentation Section of the Regulator's website. Stakeholders are invited to provide input or feedback on the Regulator's documentation to ServiceDesks@bc-er.ca or submit feedback using the feedback form.

Version Number	Posted Date	Effective Date	Chapter Section	Summary of Revision(s)
1.0	May 8, 2019	June 1, 2019	Various	This is a new document. Users are encouraged to review in full.
1.2	Dec.06, 2023	Dec.06, 2023	Various	Replace BCOGC with BCER; OGAA with ERAA; new logos, references and associations

Chapter 1: Gas Analyses

An initial gas analysis is required for each producing formation within a well, in accordance with Section 67 of the Drilling and Production Regulation (DPR). Any further gas analyses taken throughout the life of the well must also be submitted to the Regulator.

An initial gas sample must be representative of the producing formation. Samples should be taken as close to the wellhead as possible. GPA Midstream Standard 2166-17 provides detailed gas sampling procedures for a variety of test methods.

Samples taken following hydraulic fractures using energizers (such as, but not limited to, N_2 and CO_2) may show elevated levels of the energizer. A subsequent sample, taken at a later date, may be required to ensure the analysis is representative of the natural gas being produced from the producing formation.

1.1 Initial Gas Analysis

A representative natural gas sample from each producing formation in a well must be taken within six months of the initial production date. The corresponding analysis must be submitted to the Regulator within 60 days of sampling or 30 days of analysis, whichever is sooner. The analysis must report the component analyses and physical properties of the natural gas and hydrocarbon liquids.

1.1.2 Hydrocarbon Liquid Analysis

Gas wells which produce condensate are required to submit a hydrocarbon liquid analysis. The analysis must be a liquid analysis, reporting components up to C30. A C7+ extended gas analysis or a C7+ fluid analysis is not equivalent to a hydrocarbon liquid analysis.

Hydrocarbon liquid analysis are used in the primary product determination in Montney formation wells. When the API value of a hydrocarbon liquid sample is below API 46 an oil sample analysis is required. For further information please see the Primary Production Determination for Montney Formation Wells.

A hydrocarbon liquid analysis forms part of the gas analysis submission. A hydrocarbon liquid analysis report cannot be submitted separately.

1.2 Subsequent Gas Analysis

Production gas composition can change over the producing life of a well. Maintaining a complete database of all gas analyses provides valuable information for production modeling.

Any further natural gas sampling and analysis conducted throughout the life of a well must be reported to the Regulator. The analysis submission must report the component analyses and physical properties of the natural gas and hydrocarbon liquids. The submission must be made within 60 days of the sampling or 30 days of analysis completion; whichever is sooner.

1.3 Submission of Gas Analyses

A gas analysis is submitted as a GAN in eSubmission. Each GAN submission is comprised of one PDF file and one PAS file and must follow the naming conventions outlined in the Well Data Submission Requirements Manual.

The PDF file must report the component analysis and physical properties of the sample. Where a hydrocarbon liquid analysis was conducted, the gas analysis report and the hydrocarbon liquid analysis report must be merged into a single PDF for submission.

The PAS file component must follow the standards outlined in the Check hyperlink

Where a hydrocarbon liquid analysis has been completed the information must be included in the GAN PAS file. This information is captured in the Condensate/Liquid Analysis and the Data Table – Condensate/Liquid Analysis sections of the PAS file.

For further information on eSubmission please see the eSubmission User Guide.

1.4 Disposal Well Gas Analysis

Acid gas disposal wells must have a disposal fluid sample taken and analyzed at least twice a year. The analyses must be submitted against the disposal well, even when taken at a compressor outlet. The analyses must be submitted within 60 days of the sample date or 30 days of the analysis date; whichever is sooner.

For further information please see the Acid Gas Disposal Well Summary Document.

Chapter 2: Oil Analyses

An initial oil analysis is required for each producing formation within a well, in accordance with Section 62 of the DPR. Any further oil sampling and analyses taken throughout the life of the well must also be submitted to the Regulator.

2.1 Initial Oil Analysis

A representative crude oil sample from each oil producing formation in a well must be taken within six months of the initial production date. The corresponding analysis must be submitted to the Regulator within 60 days of the sampling or 30 days of the analysis, whichever is sooner. The analysis must report the component analyses and physical properties of the natural gas and hydrocarbon liquids.

2.2 Subsequent Oil Analysis

Any further representative oil samples taken and analyzed throughout the life of a well must be submitted to the Regulator within 30 days of the analysis date.

2.3 Submission of Oil Analyses

An oil analysis is submitted as an OAN in eSubmission. Each OAN submission is comprised of one PDF file and one PAS file and must follow the naming conventions outlined in the Well Data Submission Requirements Manual.

The PDF file must report the component analysis and physical properties of the sample. The PAS file component must follow the standards outlined in the Pressure ASCII Standard (PAS) – Reference Guide.

For further information on eSubmission please see the eSubmission User Guide.

Chapter 3: Water Analyses

A water analysis is required for each zone in a well that produces enough water to allow sampling, in accordance with Section 71 of the DPR. This includes formation water associated with gas or oil production, water source well production, and hydraulic fracture flowback. Any further water sampling and analyses taken throughout the life of the well must also be submitted to the Regulator.

3.1 Initial Water Analysis

An initial water analysis should be taken within six months from any zone producing sufficient water to permit sampling. The corresponding analysis must be submitted to the Regulator within 60 days of the sampling or 30 days of the analysis, whichever is sooner. The analysis must report the mineral and ion content of the sample.

For the purpose of Section 71 of the DPR water from the zone is not restricted to representative formation water but also includes any water that is introduced into the zone (i.e. hydraulic fracturing fluid or load fluid). Analyzed samples of produced water provide valuable data on the qualities of flowback fluid, which may be held in storage, recycled for the purpose of hydraulic fracturing or sent to water disposal injection wells.

3.2 Subsequent Water Analysis

Any further representative water samples taken and analyzed throughout the life of a well must be submitted to the Regulator within 60 days of the sample date or 30 days of the analysis date, whichever is sooner.

In wells that have been hydraulically fractured, produced water properties may vary with formation retention time. The Regulator encourages well permit holders to take multiple water samples from the same well over the production life. These samples provide insight on effects to formation mineralogy and potential impacts to production, and inter-well communication.

3.3 Disposal Well Water Analysis

An analysis of the water in the disposal formation and an analysis representing typical disposal water must be provided as part of the application for Deep Well Disposal of Produced Water and/or Non-Hazardous Waste. The analysis performed on the disposal formation sample must be submitted as a WAN in eSubmission against the disposal well.

The Regulator encourages the operators of deep well water disposal wells to sample and analyze disposal fluids. A water analysis conducted in conjunction with a reservoir pressure test can increase confidence in calculations associated with determining the reservoir pressure by determining water density.

Multiple water samples taken throughout the life of a disposal well provide insight on effects to formation mineralogy, precipitate in formation, wellbore and sandface scale maintenance and potential impacts to injection performance.

All water analysis conducted must be submitted against the corresponding disposal well within 60 days of the sample date or 30 days of the analysis date; whichever is sooner.

3.4 Submission of Water Analyses

A water analysis is submitted as a WAN document type in eSubmission. Each WAN submission is comprised of one PDF file and one PAS file and must follow the naming conventions outlined in the Well Data Submission Requirements Manual.

The PDF file must report the mineral and ion content of the sample. The PAS file must follow the standards outlined in the Pressure ASCII Standard (PAS) – Reference Guide.

For further information on eSubmission please see the eSubmission User Guide.

Chapter 4: Analyses Exemptions

The requirement to conduct initial gas, oil, and water analyses may be exempted under Sections 4(1)(x), 4(1)(u), and 4(1)(y) of the DPR, respectively.. Well permit holders should submit requests for exemption to the Supervisor, Reservoir Engineering. Requests for exemption from initial sampling requirements must include robust rationale for the exemption. Exemptions granted from initial sampling will generally require additional sampling later in the life of the well.