



Hydraulic Fracture Data – CSV Requirements Guide

VERSION 2.1: October 2020

About the Commission

The BC Oil and Gas Commission (Commission) 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 Commission'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

Safe and responsible energy resource development for British Columbia.

Mission

We provide British Columbia with regulatory excellence in responsible energy resource development by: protecting public safety, safeguarding the environment, and respecting those who are affected.

Values

Safe and responsible energy resource development for British Columbia.

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.

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

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

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



Additional Guidance

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

Throughout the manual 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 Commission website.
- [Documentation and guidelines](#) on the Commission website.
- [Frequently asked questions](#) on the Commission website.
- [Advisories, bulletins, reports and directives](#) on the Commission website.
- [Regulations and Acts](#) listed on the Commission website

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Manual Revisions

The Commission 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 Commission's website. Stakeholders are invited to provide input or feedback on Commission documentation to OGC.Systems@bcogc.ca or submit feedback using the [feedback form](#).

Version Number	Posted Date	Effective Date	Chapter Section	Summary of Revision(s)
1.0	April 11, 2013	June 1, 2013	-	This is a new document provided to guide users through the Commission's processes and procedures associated with hydraulic fracture electronic submissions. Users are encouraged to review the document in full.
	December 6, 2013	January 1, 2014	4.1	Added content to the Hydraulic Fracture Data Submission section.
	April 2, 2015	April 20, 2015	Various	This document has been updated to reflect the implementation of the Commission's eSubmission Portal. Readers are encouraged to review this document in full. Please see INDB 2015-06 and the Commission's BTS webpage for more information.
	July 8, 2015	August 1, 2015	2	Updated description elements to clarify input requirements. Added PERF. Csv file requirements for cemented and uncemented casing hole.
	March 28, 2017	March 29, 2017	1.0	Updated submission guidance. For more information, refer to INDB 2017-07 on the Commission's website.

	June 7, 2017	July 1, 2017	Various	Various edits have been made to this document. Users are encouraged to review in full.
1.6	July 7, 2017	August 1, 2017	Table 1	Changed CO ² to CO ₂ .
2.0	April 9, 2019	April 24, 2019	Various	Allow the addition of CH ₄ as an energizer type. Various edits to the document to address questions frequently asked by operators.
2.1	October 1, 2020	October 1, 2020	Table 1	Changes to the FRAC.csv submission, including: the addition of Frac Start Time; Max Treating Pressure and Instantaneous Shut In Pressure are defined and are now mandatory.

Chapter 1: Introduction

The BC Oil and Gas Commission (Commission) utilizes an online system for reporting hydraulic fracturing data summaries in comma-separated value files (.csv). Timely, comprehensive information on well fracture stimulation operations enhances reporting and communicates field technological improvements. 98 per cent of wells that began production in 2017 in British Columbia were hydraulically fractured. Hydraulic fracture stimulation is a key component to the development of unconventional gas resources.

Hydraulic fracture data is required for each fracture stimulation stage either attempted or concluded in a wellbore completion. Chapter 2 outlines well design types and associated data requirements for both open hole, and cased and cemented sections. Hydraulic fracture data is submitted through [eSubmission](#).

In addition to the .csv file(s), it remains a requirement to submit a complete report of all well completion and workover operations, as per [Section 36](#) of the Drilling and Production Regulation. Well completion and workover reports are to be submitted to the Commission in portable document format (.pdf) via [eSubmission](#). These reports contain additional information necessary to maintain current and accurate records for public dissemination, detailed analysis and report auditing.

Chapter 2: Hydraulic Fracture .csv files

Hydraulic Fracture .csv files refer to two unique data sets; a FRAC record and, if required, a PERF record.

- Hydraulic Fractures are any operations that include pumping water and/or proppant into the zone being stimulated. These operations are reported and submitted in a FRAC .csv file.
- Perforations, in the context of data reporting, are considered any formation access points created by tool in the zone being completed. These operations are reported and submitted in a PERF .csv file.
- All attempted and concluded downhole hydraulic fracture operations must be reported accordingly.
- Diagnostic fracture injection tests are considered a well test and are not required to be included in the .csv file. Please refer to the [Well Testing and Reporting Requirements Guide](#) for DFIT data submission requirements.

See the following Sections for further details on creating both FRAC and PERF files.

Prior to creating and loading the FRAC or PERF .csv file, download the [frac template](#) or the [perf template](#).

2.1 FRAC Submission .csv file

2.1.1 File Naming

To facilitate standard identification of submitted data, files must have a file naming convention. Rename the template file using the following naming convention:

WANUM_FRAC_YYYYMMDD_OPTIONAL.csv

- WANUM must be five digits, including leading zeros. This is the Well Permit Number.
- Date entered should be the last frac operation date, not the date of submission.
- Example: 30207_FRAC_2013SEP25_InitialCompletion.csv

2.1.2 Header Information

Box A1 in the .csv file should contain the letters, space and symbol “WA #”

Box B1 in the .csv file should contain the WA Number digits. This number will be compared to the WA Number in the matching Notice of Operation. See Figure 1 for formatting.

Box C1 can contain any well descriptor information, such as well name, UWI or other internal company well identifier. This box is not edited and is for operator use only.

	A	B	C	D	E	F	G	H
1	WA #	24196						
2	FRAC Stage #	Base Fluid	Viscosity/Gel Type	Energizer	Energizer Type	FRAC Date Year (YYYY)	FRAC Date Month (Mon)	FRAC Date Day (DD)
3	1	Fresh Water	Slickwater	Energized	CO2	2011	Jan	16
4	2	Saline water	Linear	Foam	N2	2011	Jan	15
5	3	Oil	Crosslinked	None	CO2/N2	2011	Feb	16
6	4	Acid	None	Energized	None	2011	Feb	16
7	5	CO2	Slickwater	Foam	CO2	2011	Mar	16
8	6	Propane	Linear	None	N2	2011	Mar	16
9	7	Surfactant	Crosslinked	Energized	CO2/N2	2011	Apr	16
10	8	Other	None	Foam	None	2011	Apr	16
11								

Figure 1 Example of a fracture data .csv file displayed in Microsoft Excel

2.1.3 FRAC Template

Complete the information in the .csv file, including the fields listed below, ensuring the following:

- Each interval and/or stimulation attempt is entered into a unique row with a unique stage number:
 - Numerical values are used to begin the stage numbering sequence (i.e. 1, 2, 3).
 - Alpha values are added to the stage number if subsequent treatments or attempts are immediately applied to the same interval (i.e. 1a, 1b, 1c).
- Stage numbers are chronological and reflect the order of operations as they were performed (i.e. Stage #1 = earliest date):
 - Continue consecutively in order of treatment, and
 - Are not sorted by ascending/descending depth.

- Rec Completions or return trips to a previous stage must be assigned new stage numbers corresponding to the current treatment – do not import stage numbers from previous operations.
- Where fracture sleeves and/or ports are used, all stages within the assembly must be reported.
- Where zones are skipped or not completed, report the results as zeros.
- Where isolation tools (i.e. BP) or materials (i.e. diverter) are set between zones, the top of the plug becomes the Plug Back Total Depth (mKB) for the next stage.
- Fields noted as ‘Required’ in Table 1 are mandatory for a successful file upload in the eSubmission Portal. Data for all other fields must be included if collected during operations.
- Number fields cannot exceed those listed in Table 1. Number (3,1) indicates that you can enter up to three (3) digits including one (1) digit as a decimal. Example: 99.9.
- Character fields cannot exceed those listed in Table 1. CHARACTER (30) indicates a user can enter up to 30 characters.
- All edits in Table 1 below must be followed.

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Table 1 FRAC.csv Formats and Business Rules

FRAC Fields	Format	Required.	Max Length	Cell	Description	Edits
WA Num	CHARACTER (5)	YES		B1	Well Permit number - Examples (789, 0789 and 00789 are the same WA), (3456 and 03456 are the same), 24567	Can be up to five digits.
FRAC Stage #	CHARACTER (5)	YES		A3	Frac stage number - can have values such as 1, 2, 3, ...19, 20 or 1A, 5A, 5B, 5C or 1TOE.	Alpha numeric allowed. Cannot be zero.
Base Fluid	CHARACTER(30)	YES		B3	1st of 4 fields defining frac type	List of Values Allowed = Fresh water, Saline water, Oil, Acid, CO ₂ , Propane, Surfactant, Other. See definitions below.
Viscosity/Gel Type	CHARACTER(30)	YES		C3	2nd of 4 fields defining frac type	List of Values Allowed = Slickwater, Linear, Crosslinked, None. See definitions below.
Energizer	CHARACTER(30)	YES		D3	3rd of 4 fields defining frac type	List Of Values Allowed = Energized, Foam, None. See definitions below.
Energizer Type	CHARACTER(30)	YES		E3	4th of 4 fields defining frac type	List of Values Allowed = CO ₂ , N ₂ , CO ₂ /N ₂ , CH ₄ , None. Must be 'None' if Energizer is 'None.' Cannot be 'None' if Energizer is not 'None.'
FRAC Date Year (YYYY)	CHARACTER (4)	YES		F3		Format Allowed = YYYY
FRAC Date Month (Mon)	CHARACTER (3)	YES		G3		Format Allowed = MON
FRAC Date Day (DD)	CHARACTER (2)	YES		H3		Format Allowed = DD All three date components must concatenate into a valid date. Date cannot be in the future.

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FRAC Fields	Format	Required.	Max Length	Cell	Description	Edits
FRAC Start Time (HH:MM:SS)	CHARACTER (8)	YES		I3	The start time of the frac operation	Must be 24 hour clock; HH:MM:SS
Plug Back Total Depth (mKB)	NUMBER(6,1)	YES	99999.9	I3	The depth at which the frac stage is isolated from those below it. For the first stage, this is TD or PBSD in mKB and for subsequent stages this is the location of last bridge plug, sand plug, swell packer, ball seat, etc. below the interval fractured in mKB.	PBSD must be equal to or deeper than the FRAC Base Depth.
FRAC Top Depth (mKB)	NUMBER(7,1)	YES	999999.9	J3		Fracture top depth must be less than fracture base depth.
FRAC Base Depth (mKB)	NUMBER(7,1)	YES	999999.9	K3		
Acid Spearhead Amount (m ³)	NUMBER(4,1)		999.9	L3	Volume of acid in m ³ , blank if none	
Acid Type	CHARACTER(40)			M3	Type of acid used. Example: 15% HCl; blank if none	Acid type must be entered if acid spearhead amount is entered.
Breakdown Pressure (MPa)	NUMBER(5,2)		999.99	N3	Formation break down pressure, in MPa	
Instantaneous Shut-In Pressure (MPa)	NUMBER(5,2)	YES	999.99	O3	Instantaneous Shut-in Pressure in MPa. The pressure at surface when the rate goes to zero – taken as the first deviation off the vertical straight line on shut-in. Report 0.0 for water hammer, slow pump shutdown sand-off etc.	Mandatory, can be zero.

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FRAC Fields	Format	Required.	Max Length	Cell	Description	Edits
Max Treating Pressure (MPa)	NUMBER(5,2)	YES	999.99	P3	Maximum Treating Pressure in MPa. The highest pressure incurred during the frac pumping operations.	Mandatory.
Avg Treating Pressure (MPa)	NUMBER(5,2)		999.99	Q3	Average Treating Pressure in MPa	Average treating pressure must be less than maximum treating pressure.
Avg Rate (m ³ /min)	NUMBER(3,1)		99.9	R3	Average Treating Rate in m ³ /min	
FRAC Gradient (kPa/m)	NUMBER(7,2)		99999.99	S3	Fracture Gradient - expected calculation method for industry is (ISIP(kPa) + Hydrostatic Head (kPa))/ Depth (m)	
Total Fluid Pumped (m ³)	NUMBER(6,1)		99999.9	T3	Total Fluid Pumped into formation in m ³ for the frac stage, including acid and additives (not including CO ₂ volumes)	
Total CO ₂ Pumped (m ³)	NUMBER(4,1)		999.9	U3		Must be Null or 0 if Energizer Type is 'None.' Cannot be blank if Energizer Type is not 'None.'
Total N ₂ Pumped (scm)	NUMBER(7,1)		999999.9	V3		Must be Null or 0 if Energizer Type is 'None.' Cannot be blank if Energizer Type is not 'None.'
Total CH ₄ Pumped (e ³ m ³)	NUMBER(7,1)		999999.9	W3		Must be Null or 0 if Energizer Type is 'None.' Cannot be blank if Energizer Type is not 'None.'
Radioactive Tracer Used (Y/N)	CHARACTER (1)			X3		List of Values Allowed = Y, N
Radioactive Tracer Element Isotope	CHARACTER(40)			Y3	Element isotope, blank if none	If Flag above = Y, then Radioactive Tracer Element Isotope must be entered
Chemical Tracer Used (Y/N)	CHARACTER (1)			Z3		List of Values Allowed = Y, N
Chemical Tracer Name	CHARACTER(40)			AA3	Chemical used, blank if none	If Flag above = Y, then Chemical Tracer Type must be entered

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FRAC Fields	Format	Required.	Max Length	Cell	Description	Edits
Proppant Type 1	CHARACTER(40)	YES		AB3	Proppant type. If proppant was not used, enter None in this field.	Enter at least one proppant type and amounts. If the fracture was conducted without proppant, enter “None” with 0t pumped and placed. Proppant type examples are 100 mesh, 50/140, 40/70, 20/40, 20/40 SB Prime etc.
Proppant Type 1 Pumped (t)	NUMBER(5,2)	YES	999.99	AC3	Tonnes of proppant pumped for proppant type 1. If proppant was not used, enter 0 in this field.	
Proppant Type 1 Placed (t)	NUMBER(5,2)	YES	999.99	AD3	Tonnes of proppant placed for proppant type 1. If proppant was not used, enter 0 in this field.	
Proppant Type 2	CHARACTER(40)			AE3	Proppant type	If proppant type 2 field is entered then proppant type 2 pumped and proppant type 2 placed must be entered.
Proppant Type 2 Pumped (t)	NUMBER(5,2)		999.99	AF3	Tonnes of proppant pumped for proppant type 2	
Proppant Type 2 Placed (t)	NUMBER(5,2)		999.99	AG3	Tonnes of proppant placed for proppant type 2	
Proppant Type 3	CHARACTER(40)			AH3	Proppant type	If proppant type 3 field is entered then proppant type 3 pumped and proppant type 3 placed must be entered.
Proppant Type 3 Pumped (t)	NUMBER(5,2)		999.99	AI3	Tonnes of proppant pumped for proppant type 3.	
Proppant Type 3 Placed (t)	NUMBER(5,2)		999.99	AJ3	Tonnes of proppant placed for proppant type 3.	
Proppant Type 4	CHARACTER(40)			AK3	Proppant type	If proppant type 4 field is entered proppant type 4 pumped and proppant type 4 placed must be entered.
Proppant Type 4 Pumped (t)	NUMBER(5,2)		999.99	AL3	Tonnes of proppant pumped for proppant type 4.	
Proppant Type 4 Placed (t)	NUMBER(5,2)		999.99	AM3	Tonnes of proppant placed for proppant type 4.	

Base Fluid:

- Fresh Water is up to 4,000 ppm.
- Saline Water is > 4,000 ppm.

Viscosity/Gel Type:

- Slickwater is water containing friction reducing chemicals with a low viscosity.
- Linear contains polymer (guar, guar derivatives or synthetic polymers (HPG, CMHPG, HEC)) added to the base fluid to increase viscosity.
- Cross-linked contains cross-linkers (borate ion) to join together overlapping linear polymer strands to increase viscosity of the base fluid.

Energizer:

- Energized is less than 52 per cent N₂, CO₂, CO₂/N₂ or CH₄ added.
- Foam is greater than 52 per cent N₂, CO₂, CO₂/N₂ or CH₄ added.

2.2 PERF Submission .csv file

2.2.1 Cemented Cased Hole

A PERF .csv file is required for all cemented cased holes. The records within the PERF .csv file are to include all gun perforations, tubing conveyed perforations, abrasive jet cuts, burst ports, frac ports and frac sleeves that are cemented into place. For fracture stages that have multiple frac sleeves opened by a single ball drop, the location of each frac sleeve is recorded as a net interval for the stage.

2.2.2 Open Hole and Uncemented Cased Hole

A PERF .csv file is only required for open hole and uncemented cased hole completions where gun perforations, tubing conveyed perforations, and/or abrasive jet cuts were used. When perforation systems were used in one or more stages, **both** a FRAC .csv file and a PERF .csv file are required. The perforation .csv file is to contain only the stages where perforation systems were applied.

EXAMPLE:

A completion operation including the hydraulic fracture of 25 stages, where perforations were made in only last three stages would have a hydraulic fracture data submissions comprised of:

- A FRAC .csv file with stages 1 to 25, and
- A PERF .csv file with stages 23 to 25.

In eSubmission, to allow a PERF .csv upload for Open Hole operations with perforations, enter 'No' at 'Frac Submission for Open Hole Completion?' Please see the eSubmission User Guide for further information.

2.2.3 File Naming

To facilitate standard identification of submitted data, files must have a file naming convention. Rename the template file using the following naming convention:

WANUM_PERF_YYYYMMDD_OPTIONAL.csv

- WANUM must be five digits, including leading zeros. This is the Well Permit Number.

- Date entered should be the last perf date, not the date of submission.
- Example: 30207_PERF_2013SEP25_InitialCompletion.csv.

2.2.4 Header Information

Box A1 in the .csv file should contain the letters, space and symbol “WA #”

Box B1 in the .csv file should contain the WA Number digits. This number will be compared to the WA Number in the matching Notice of Operation. See Figure 2 below for formatting.

Box C1 can contain any well description information, such as well name, Unique Well Identifier (UWI) or other internal company well identifier. This box is not edited and is for operator use only.

	A	B	C	D	E	F
1	WA #	00400				
2	Perf Stage #	Perf Date Year (YYYY)	Perf Date Month (Mon)	Perf Date Day (DD)	Perf Gross Interval Top Depth	Perf Gross Interval Base Depth
3	1	2011	Feb	16	567	914
4	2	2011	Feb	16	985	1054
5	3	2011	Feb	16	985	1054
6						
7						

Figure 2 Example of a perforation .csv file displayed in Microsoft Excel

2.2.5 PERF Template

Complete the information in the .csv file, including the fields listed below, ensuring the following:

- Each gross perforation interval or attempt is entered into a unique row with a unique stage number, with any net perforation top and base depths entered into the Perf Net Interval # Depth fields.
 - Gross interval = total zone length between isolation points.
 - Net intervals = each set of perforations made within the zone (i.e. multiple shots)
 - Numerical values are used to begin the stage numbering sequence (i.e. 1, 2, 3).
 - Alpha values are added to the stage number if subsequent perforations or ‘re-perfs’ are immediately applied to the same interval (i.e. 1a, 1b, 1c).

- Stage numbers are chronological and reflect the order of operations as they were performed (i.e. Stage #1 = earliest date);
 - Continue consecutively in the order they were performed, and
 - Are not sorted by ascending/descending depth.
- PERF stages attempted must have the Comment field completed with further details (i.e. not all shots fired, dropped gun).
- PERF stages skipped during plug and perf programs do not need to be reported.
- Rec Completions must use stage numbers corresponding to the current work – do not import stage numbers from previous operations.
- Where cemented sleeves and/or ports are used, all stages within the assembly must be reported.
- Required fields are those which are mandatory for a successful file upload in the eSubmission Portal. Data for all other fields must be included if collected during operations.
- Number fields cannot exceed those in Table 2. Number (3,1) indicates that you can enter up to three (3) digits including one (1) digit as a decimal. Example: 99.9.
- Character fields cannot exceed those listed in Table 2. CHARACTER (30) indicates a user can enter up to 30 characters.
- All edits in the Table 2 below must be followed.

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Table 2 PERF.csv Formats and Business Rules

Perf Fields	Format	Required.	Max Length	Cell	Description	Edits
WA Num	CHARACTER (5)	YES		B1	Well permit number.	Can be up to 5 digits. Examples (789, 0789 and 00789 are the same WA), (3456 and 03456 are the same), 24567
Perf Stage #	CHARACTER (5)	YES		A3	Perf Stage number - can have values such as 1,2,3...19, 20. 5A, 5B, 5C should be used when re-perfs are used to complete a stage, or 1TOE to open toe port in cased well completion.	Alpha numeric allowed. Cannot be zero. Examples 1, 1A, 2, 3, 3A, 3B, 3C, 4, 20.
Perf Date Year (YYYY)	CHARACTER (4)	YES		B3		Format Allowed = YYYY
Perf Date Month (Mon)	CHARACTER (4)	YES		C3		Format Allowed = MON
Perf Date Day (DD)	CHARACTER (2)	YES		D3		Format Allowed = DD
						All 3 date components must concatenate into a valid date. Date cannot be in the future.
Perf Gross Interval Top Depth	NUMBER (7,1)	YES	999999.9	E3		Gross interval top depth must be less than gross interval base depth.
Perf Gross Interval Base Depth	NUMBER (7,1)	YES	999999.9	F3		
Charge Size	NUMBER (3,1)		99.9	G3	Example # of grams (such as 23)	Charge size, charge type, shots per meter and degree of phasing - must enter all or none.
Charge Type	CHARACTER (40)			H3	Examples SDP, DP, GH, BH, Connex,etc	
Shots per Meter	NUMBER (2,0)		99	I3	Number of shots per meter - such as 8, 10, 14, 20	

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Perf Fields	Format	Required.	Max Length	Cell	Description	Edits
Degree of Phasing	NUMBER (3,0)		999	J3		Value from 0 to 360 degrees.
Perf Comments	CHARACTER (200)			K3	Result of perf – Examples: 2 guns fired, All shots fired, Misfired and re-shot, opened Toe Port, burst disc, Port in casing, open frac sleeve, etc	
Perf Net Interval #1 Top Depth	NUMBER (7,1)		999999.9	L3		If there are multiple Perf Net Intervals, provide all Net intervals that comprise the Perf Gross interval. Net interval top depth cannot be less than gross interval top depth.
Perf Net Interval #1 Base Depth	NUMBER (7,1)		999999.9	M3		Net interval base depth cannot be greater than gross interval base depth.
Perf Net Interval #2 Top Depth	NUMBER (7,1)		999999.9	N3		Net interval top depth cannot be less than gross interval top depth.
Perf Net Interval #2 Base Depth	NUMBER (7,1)		999999.9	O3		Net interval base depth cannot be greater than gross interval base depth.
Perf Net Interval #100 Top Depth	NUMBER (7,1)		999999.9			You can have up to 100 Net Intervals in the .csv file.
Perf Net Interval #100 Base Depth	NUMBER (7,1)		999999.9			

3.0 Error Messages

When .csv files are uploaded through [eSubmission](#), the data items in the .csv file are subjected to quality assurance checks to verify all required data items are populated and within an acceptable range of values. If the data is incorrect, the file will not load and the user will get an error message.

The error message provides a brief explanation of any errors.

The user must open their .csv file, fix the incorrect data and upload the file again. If there are any additional errors, the user will continue to get an error alert until all errors are fixed. Ensuring data follows the edits outlined in Table 1 and Table 2 will resolve the errors.

For questions regarding error messages or to request the deletion or amendment of a previously submitted .csv file, please email the Reservoir Engineering Department at reservoir@bcogc.ca.

4.0 Additional Information

Fracture and perforation .csv files are submitted to the Commission through [eSubmission](#). Please refer to the eSubmission Portal User Guide for additional information on how to submit hydraulic fracture .csv files.

For additional information on Well Data Submission Requirements please refer to the [Well Data Submission Requirements Manual](#).