Moving Forward

BC Fracture Fluid Disclosure and www.fracfocus.ca Overview

Stuart Venables, PGeo, Senior Petroleum Geologist
BC Oil and Gas Commission

Thank you, Governor Bentley

Roll Tide, Roll Tide!

2011 National Champions

Hometown:
Ottawa, ON

University:
Wolfville, NS
Acadia U.
B.Sc. (hons)
Geology 1999

Industry:
Calgary, AB
1999-2010

Regulatory:
Victoria, BC
2010 to 2035

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Topics: Moving Forward

BC Fracture Fluid Disclosure

- Timeline
- Regulations

Jurisdictional Comparison

- Canada
- US

Fracfocus.ca

- Relationship with Fracfocus.org

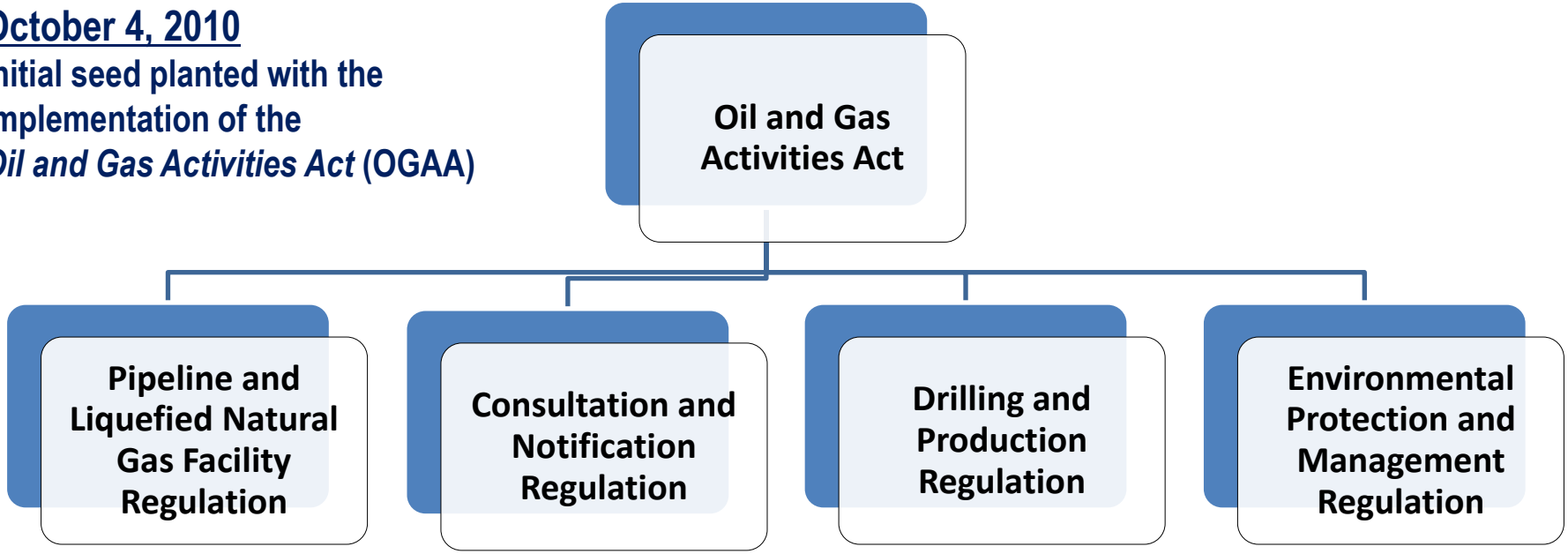
Next Steps

- Fracfocus 2.0
- Forging partnerships

BC Fracture Fluid Disclosure: Timeline

October 4, 2010

Initial seed planted with the implementation of the *Oil and Gas Activities Act* (OGAA)

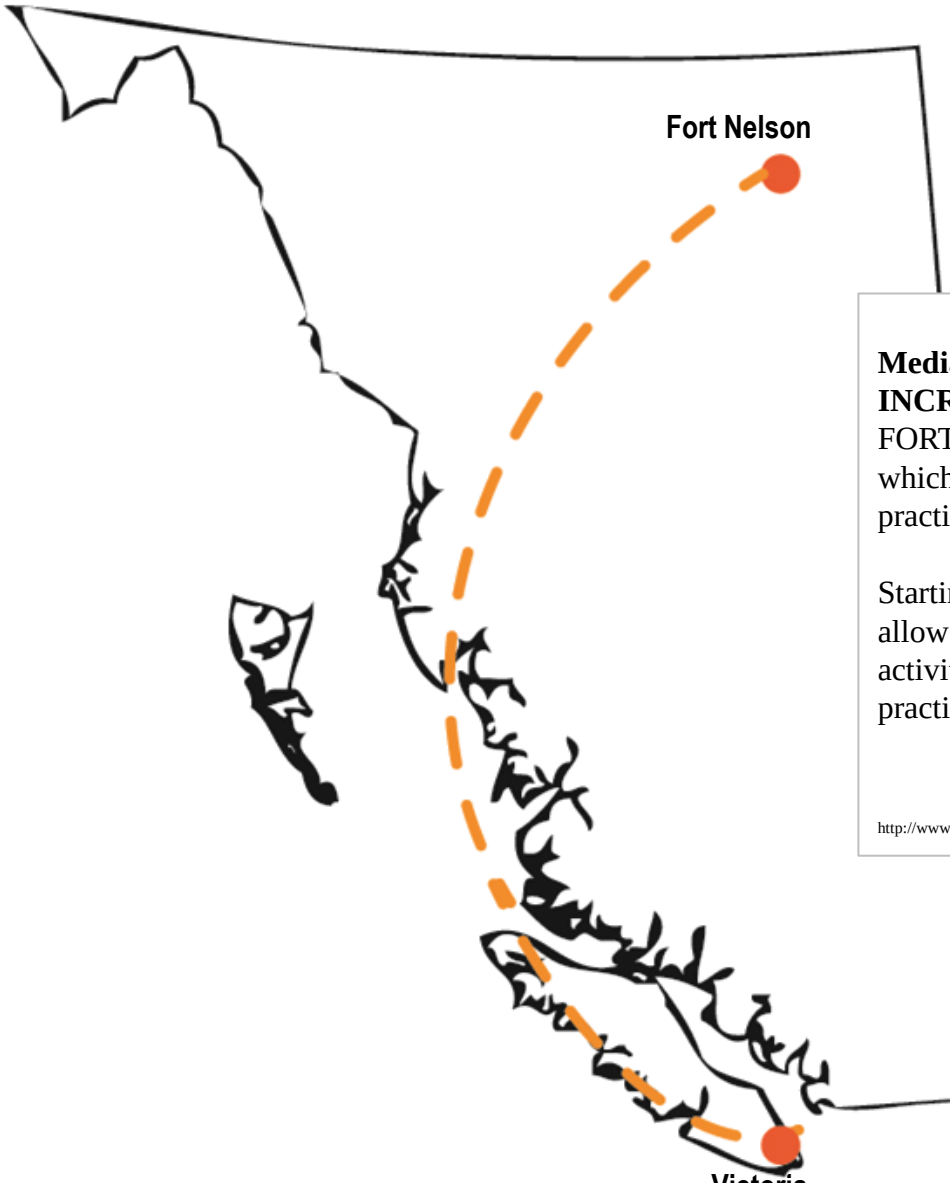


- Drilling and Production Regulation (DPR): Section 37
  - *"A well permit holder must maintain detailed records of the composition of all fracturing fluids that are used in a well for which the well permit holder is responsible"*

Other Regulations:

- Geophysical Exploration Regulations
- Administrative Penalties Regulation
- Fee, Levy and Security Regulation
- Oil and Gas Activities General Regulation
- Prescribed Roads Regulation

September 9, 2011



Media Release:
INCREASED TRANSPARENCY FOR NATURAL GAS SECTOR
FORT NELSON, Sept 9, 2011 – Premier Christy Clark announced a plan which will increase the transparency around hydraulic fracturing practices used in the industry.

Starting in Jan. 2012, an online registry – accessible to everyone – will allow visitors to search for the locations of where hydraulic fracturing activities are taking place, and for detailed information about the practices and additives used during these activities.

http://www.youtube.com/watch?v=vFhS8dJuQnw&feature=player_embedded0

FracFocus
Chemical Disclosure Registry

BC Fracture Fluid Disclosure: Timeline

January 1, 2012

Amendments to DPR:

- *37 (1) A well permit holder must maintain detailed records of the composition of all fracturing fluids that are used in a well for which the well permit holder is responsible, including, but not limited to*
  - *(a) the well authorization number,*
  - *(b) the fracture date,*
  - *(c) an identification of the fluid ingredients and a description of the purpose of each,*
  - *(d) an identification of the ingredient concentration in the additive and in the hydraulic fracturing fluid,*
  - *(e) the chemical abstract service number of each ingredient,*
  - *(f) an identification of the total volume of water injected with the ingredients, and*
  - *(g) the trade name and supplier of each ingredient.*
- *37 (2) A well permit holder must submit to the commission the records referred to in subsection (1) within 30 days after the completion of the well.*

Amendments to General Regulation:

- *17.1 (1)* The following records or reports are not subject to section 15 of this regulation:
  - (a) records or reports submitted to the commission under section 37 of the Drilling and Production Regulation
  - (b) (2) The commission must publish the records and reports referred to in subsection (1) (a) as soon as practicable after receiving those records and reports.

BC Fracture Fluid Disclosure: Canadian Comparison

BC Disclosure: Sec 37 DPR and Sec. 17.1 General Regulation

- *General well info and data plus ingredient suppliers, purpose, concentrations and Chemical Abstract Services Number (CAS #)*
- *Electronic submission of data*
- *Must be made public by the Commission*

AB Disclosure: Directive 059 – *April 2012*

- *General well info and data plus carrier fluid sourcing, additive name, supplier and purpose and fracturing monitoring being undertaken (e.g. Microseismic)*

PQ Disclosure: Environmental Quality Act (EQA) – *June 2011*

- *EQA Sec 22: Certificate of Authorization required prior to any work to be performed*
- *Regulation under the EQA give specifics: General well info and data plus volume of fluids and the detailed composition and characteristics of the additives used for fracturing and a water management plan*

BC Fracture Fluid Disclosure: US Comparison

Jurisdiction	Disclosure	Effective Date
British Columbia	YES	January 1, 2012
Arkansas	YES	January 15, 2011
Colorado	YES	April 1, 2012
Louisiana	YES, MSDS only	October 20, 2011
Montana	YES	August 26, 2011
New Mexico	YES, MSDS only	February 15, 2012
North Dakota	YES	April 1, 2012
Pennsylvania	YES, MSDS only	February 5, 2011
Texas	YES	February 1, 2012
Wyoming	YES, Pre/Post-Op	October 17, 2010

WWW.FRACFOCUS.ORG

Chemical Disclosure Registry

Home Welcome Publications News & Updates Links

Frac Focus
Chemical Disclosure Registry

HYDRAULIC FRACTURING HOW IT WORKS | GROUNDWATER PROTECTION | CHEMICAL USE | REGULATIONS BY STATE | FIND A WELL BY STATE | FREQUENT QUESTIONS

WELCOME

Welcome to FracFocus, the hydraulic fracturing chemical registry website. This website is a joint project of the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission.

On this site you can search for information about the chemicals used in the hydraulic fracturing of oil and gas wells. You will also find educational materials designed to help you put this information in perspective.

Welcome | Hydraulic Fracturing | Casing & Cement | State R

Looking for information about a *well site near you?*

Groundwater Protection: Priority Number One

collected and prepared for sale to a wide variety

Hydraulic Fracturing
DISCLOSURE

FracFocus
Chemical Disclosure Registry

Company Registration

Use the form below to apply for a new Company account to be used to submit chemical data to the registry.

Note: Upon submission of application for a new Company notice will be sent to the Hydraulic Fracturing Disclosure Administrator for approval.

New Company Registration

Email:

Confirm Email:

First Name:

Last Name:

Address:

City:

State:

Postal Code:

Phone: 555-555-5555

Company:

Find a Well

Map Search | Standard Search

SEARCH OPTIONS

STATE: Texas

COUNTY: Choose a County

WELLS IN COUNTY: Choose a Well Name

OPERATOR: XTO Energy/ExxonMobil

API WELL NUMBER: __-___-_____

WELL NAME:

SEARCH RESET (Note: One search option is required to do a search.)

All FracFocus well site information is voluntarily provided by participating oil and natural gas operators. Wells hydraulically fractured after January 1, 2011 will be added to the database over time.

See the full list of participating production companies.

LATEST WELLS

API Number: 4222736902
Well Name: Long 21-2
Operator: Athlon Energy Operating LLC

API Number: 0423723033
Well Name: C-245A
Operator: Occidental Oil and Gas

API Number: 0423723051
Well Name: C-651A
Operator: Occidental Oil and Gas

API Number: 0423727149

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date	4/24/2012
State:	TX
County:	Howard
API Number:	42-227-36902
Operator Name:	Athlon Energy
Well Name and Number:	Long 21-2
Longitude:	-101.5322112
Latitude:	32.2899555
Long/Lat Projection:	NAD27
Production Type:	Oil
True Vertical Depth (TVD):	9,900
Total Water Volume (gal)*:	1,267,938

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
WATER (CLEAN - ACID)	Athlon Energy	Carrier / Base Fluid	Water	7732-18-5	100.00%	91.82448%	
CIA-5	Universal	ACID CORROSION INHIBITORS	METHYL ALCOHOL	67-56-1	40.00%	0.00097%	
			PROPARGYL ALCOHOL	107-19-7	8.00%	0.00019%	
B-4	Universal	BREAKERS AND BREAKER CATALYSTS	Ammonium Persulfate	7727 - 54 - 0	98.00%	0.00374%	
B-6E	Universal	BREAKERS AND BREAKER CATALYSTS	Ammonium Persulfate	7727 - 54 - 0	75.00%	0.00130%	
			Cured Acrylic Resin	Trade Secret	16.00%	0.00028%	
			Talc	14807 - 9	2.00%	0.00003%	
			Silica, Crystalline - Quartz	14808 - 60 - 7	10.00%	0.00017%	
CX-9	Universal	CROSSLINKERS AND DELAYERS	Potassium Metaborate	13709-94-9	30.00%	0.02316%	
			Potassium Hydroxide	1310-58-3	5.00%	0.00386%	
			Ethylene Glycol	107-21-1	10.00%	0.00772%	
			Water	7732-18-5	75.00%	0.05790%	
WFR-3	Universal	FRICTION REDUCERS	Alcohol Ethoxylate Surfactants	Trade Secret	8.00%	0.00076%	
			Cationic Polyacrylamide co polymer	Trade Secret	35.00%	0.00334%	
			Hydrotreated Petroleum Distillate	64742-47-8	30.00%	0.00287%	
			Sodium Chloride	7647-14-5	2.00%	0.00019%	
			Water	7732-18-5	35.00%	0.00334%	
WGA-1A SLR	Universal	GELLING AGENTS FOR WATER	Petroleum Distillates	Trade Secret	60.00%	0.07674%	
			Polysaccharide blend	Trade Secret	60.00%	0.07674%	
I-2L	Universal	IRON CONTROL ADDITIVES	ACETIC ACID	64-19-7	82.00%	0.00222%	
			Water	7732-18-5	20.00%	0.00054%	
NE-1	Universal	NON-EMULSIFIER AND	Methyl Alcohol	67-56-1	15.00%	0.00014%	

WWW.FRACFOCUS.CA

WELCOME

Welcome to the Hydraulic Fracturing and Fracture Fluid Information Site. This website is a project of the BC Oil & Gas Commission and is intended to provide objective information on Hydraulic Fracturing. Fracturing Fluids, Groundwater and Surface water protection and related oil and gas activities in Canada.

LEARN MORE

FAQs

1 / 3

Q. I know there are wells in my area that have been fractured, but when I search for them I get no results. Why?

A. The most likely reasons are that either the wells were fractured before January 1, 2012 or they have not yet been entered into the system. Only wells fractured after Jan. 1st, 2012 will be entered into the system and since the uploading of records began only recently it will take some time before a large number of wells is available. Furthermore, permit holders in B.C. have 30 days from the time their completion operations have finished to submit their records. Please keep checking back as wells are added on a daily basis.

All FAQs »

Groundwater Protection: Priority Number One

Oil and natural gas producers have stringent requirements for how wells must be completed. The genesis of these requirements is water safety.

Casing is the first line of defense used to protect freshwater aquifers.

More About Groundwater Protection »

Canada's first hydraulic fracturing registry now online

British Columbia is the first province in Canada to enforce the public disclosure of ingredients used for hydraulic fracturing.

FracFocus.ca - the registry which provides a transparent accounting of B.C. hydraulic fracturing operations - includes a database of the ingredients used to support natural gas extraction, and extensive content about the regulations and safety procedures governing industry activity.

Read more

WWW.FRACFOCUS.CA

Frac Focus
Chemical Disclosure Registry

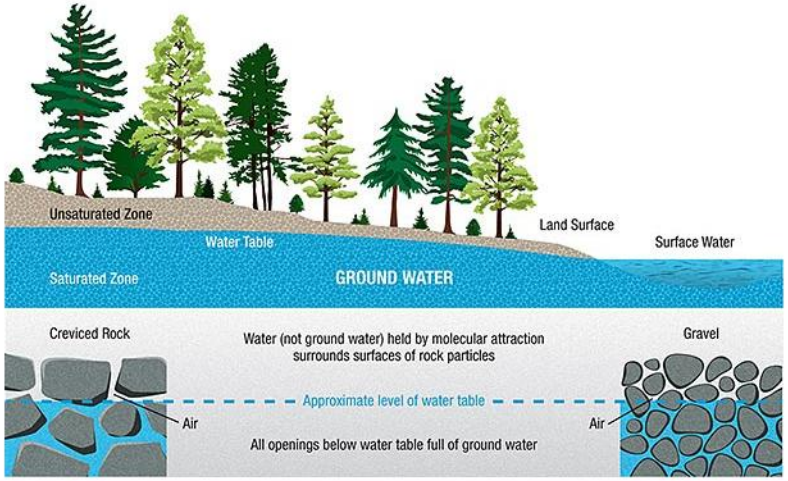
HYDRAULIC FRACTURING THE PROCESS | WATER USAGE & PROTECTION | FIND A WELL IN YOUR AREA | REGULATIONS PROVINCES & TERRITORIES | CHEMICAL USE | FREQUENT QUESTIONS

Hydrologic Cycle, Groundwater, Aquifers and Surface Water

Nearly 9 million Canadians rely on groundwater for domestic use (Source: Statistics Canada), which makes it an essential resource. Geologic strata that contain significant amounts of moveable water are called aquifers. Aquifers can carry fresh, brackish or saline water. Formation or ground water quality is often described by its Total Dissolved Solids (TDS) concentration

The hydrologic cycle describes the natural circulation of water through our atmosphere, surface and subsurface. During the cycle, water undergoes natural transformations. Water will fall from the atmosphere in the form of precipitation and land on the surface. Some of this water will remain on the surface and drain into rivers and lakes, while another portion will soak into the ground or be absorbed by plants and the remainder may evaporate back into the atmosphere again.

Initial water seepage entering the subsurface goes into the unsaturated or vadose zone, which has mix of air and water. Some of this water will be taken up by roots or will coat the soil, but the remainder will continue through to the saturated zone, which is the entire region below the water table, contributing to recharge of localized aquifers.



Water And Hydraulic Fracturing

- Domestic Water Protection
- Groundwater & Aquifers
- Groundwater Terms & Myths
- Water Use, Recycling and Injection
- Drilling and Production

Looking for information about a *well site near you?*

Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

FIND A WELL

You have questions.
WE HAVE ANSWERS.

Find out what you'd like to know about hydraulic fracturing. And if you don't find your answer here, drop us a line using our "Ask a Question" section.

HOW HYDRAULIC FRACTURING WORKS >

Regulations & Contacts

Alberta

Energy Resources Conservation Board

Suite 1000, 250 – 5 Street SW
Calgary, AB
T2P 0R4

Toll Free 1-855-297-8311
Phone: (403) 297-8311
E-mail: inquiries@ercb.ca
Website: www.ercb.ca

About the Energy Resources Conservation Board

Regulations:

AB Legislation
Oil and Gas Conservation Regulations
Oil and Gas Conservation Act
Directive 059

BC Oil & Gas COMMISSION

OIL AND GAS COMMISSION

FracFocus Chemical Disclosure Registry

Applications | Wells | Compliance & Enforcement | Projects & Sites

Home > Wells

Wells

Frac Fluid Reports

- New Frac Fluid Report
- Outstanding Reports
- Find Reports
- Download CSV Template

Additive

Details

Additive

Trade Name: S-2
Supplier: Trican Well Service
Purpose: Surfactant
Comment:

Ingredients

Please use http://ccinfoweb.ccohs.ca/chempendium/search.html to find the correct ingredient name.

Sort Order	CAS #	Ingredient Name	Maximum Additive Concentration (%)	Maximum Fluid Concentration (%)
1	67-63-0	Isopropanol	80.0	0.04048
2	104-76-7	2-Ethylhexanol	13.0	0.00658
3	64742-94-5	Solvent naphtha (petroleum), heavy aromatic	13.0	0.00658
4	68607-28-3	Dimethylcocoamine, bis(chloroethyl) ether, diquaternary ammonium SALT	7.0	0.00354
5	67-56-1	Methanol	1.5	0.00076

Save | Cancel

CSV Upload

Fill in filename (including path), then click Upload.

Uploads are only accepted for files with extensions of .csv

*File Name: WA25773.csv Browse...

Upload

Find A Well

Search Options for British Columbia

British Columbia

Back to Map

BC Regions

Select a Region

Wells

Select a Region first

BC Operators

Select an Operator

Submit

(Note: One search option is required to do a search.)

	Well #	Date	Province	Region	Operator	Well Name	Well Type	Latitude	Longitude	Datum
PDF	26296	2011-11-30	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES B- 093-I/094-B-01	Gas	56.143492	-122.02074	NAD83
PDF	26297	2011-12-02	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES B-A093-I/094-B-01	Gas	56.143466	-122.020777	NAD83
PDF	27247	2011-12-02	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES B-B093-I/094-B-01	Gas	56.143441	-122.020811	NAD83
PDF	26597	2011-12-05	British Columbia	Peace River North	EnCana Corporation	ECA HZ KIWIGANA B- 015-D/094-O-07	Undefined	59.154399	-122.561873	NAD83
PDF	26948	2011-12-06	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES A04-33-083-25	Gas	56.140458	-121.535275	NAD83
PDF	25587	2011-12-09	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES 04-33-083-25	Gas	56.140453	-121.535217	NAD83
PDF	26949	2011-12-14	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES B04-33-083-25	Gas	56.140463	-121.535332	NAD83
PDF	26660	2011-12-19	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES A- 100-L/094-A-04	Gas	56.142984	-121.593914	NAD83
PDF	27162	2011-12-19	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES D-A090-L/094-A-04	Gas	56.142931	-121.593982	NAD83
PDF	26950	2011-12-20	British Columbia	Peace River North	Talisman Energy Inc.	TALISMAN HZ ALTARES C04-33-083-25	Undefined	56.140468	-121.535389	NAD83

1 2 3 4 5 6 7 8 9 ... next › last »

How to Read a Fracturing Record

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date:	01/28/2012
Province:	BC
Region:	Sunrise
Well Number:	26678
Operator Name:	Tourmaline Oil Corp.
Well Name:	TOURMALINE ET AL HZ SUNRISE 12-13-080-16
Longitude:	-120.222447
Latitude:	55.560997
Long/Lat Projection:	NAD83
Production Type:	Undefined
True Vertical Depth (TVD):	3,650
Total Water Volume (m3)*:	1,374

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Water	Water	Water	7732-18-5	100.00%	83.92925%	
FR-9	Trican Well Service	Friction Reducer	Petroleum distillate light hydrotreated	64742-47-8	25.00%	0.01585%	
CC-77	Trican Well Service	Clay Control	1,3-Propanediaminium-2-substitued, -hexaalkyl-, di halide		60.00%	0.04020%	HMIRC# 7744
S-2	Trican Well Service	Surfactant	Isopropanol	67-63-0	80.00%	0.04048%	
			2-Ethylhexanol	104-76-7	13.00%	0.00658%	
			Solvent naphtha (petroleum), heavy aromatic	64742-94-5	13.00%	0.00658%	
			Dimethylcocoamine, bis(chloroethyl) ether, diquaternary ammonium SALT	68607-28-3	7.00%	0.00354%	
			Methanol	67-56-1	1.50%	0.00076%	
Busan 94	Trican Well Service	Biocide	2,2-dibromo-3-'nitrilopropionamide	10222-01-2	30.00%	0.00238%	
			Sodium bromide	7647-15-6	4.00%	0.00032%	
			Polyethylene glycol	25322-68-3	60.00%	0.00476%	
			Dibromoacetonitrile	3252-43-5	3.00%	0.00024%	
Frac Sand	Trican Well Service	Proppant	crystalline silica	14808-60-7	100.00%	14.66013%	
Frac Sand - Resin	Trican Well Service	Proppant	Crystalline silica (quartz)	14808-60-7	100.00%	1.22168%	
			may also contain hexamethylenetetramine	100-97-0	10.00%	0.12217%	

Next Steps

Water Sourcing

- ERCB Directive 059
- CAPP Guiding Principle #5 for Hydraulic Fracturing

Mapping Based Search Criteria

- Interactive map showing Hydraulic Fracturing Events

Six Month Review

- Technical team: OGC, CAPP and PSAC
- Pre-lim meeting May 2nd, Technical meeting May 29th

Continuous Industry Training

- First Regulator in Canada – Must work with Permit Holders

On-Going Assessment

- Open Dialogue with ERCB, Fracfocus.org, etc...

Next Steps

Water Sourcing

- ERCB Directive 059

  Carrier fluid: Type

  Water – (surface water, nonsaline groundwater, saline groundwater, recycled fracturing water, nonoilfield waste water, drinking water, and other oilfield water such as produced water or waste water)

- CAPP Guiding Principle #5 for Hydraulic Fracturing

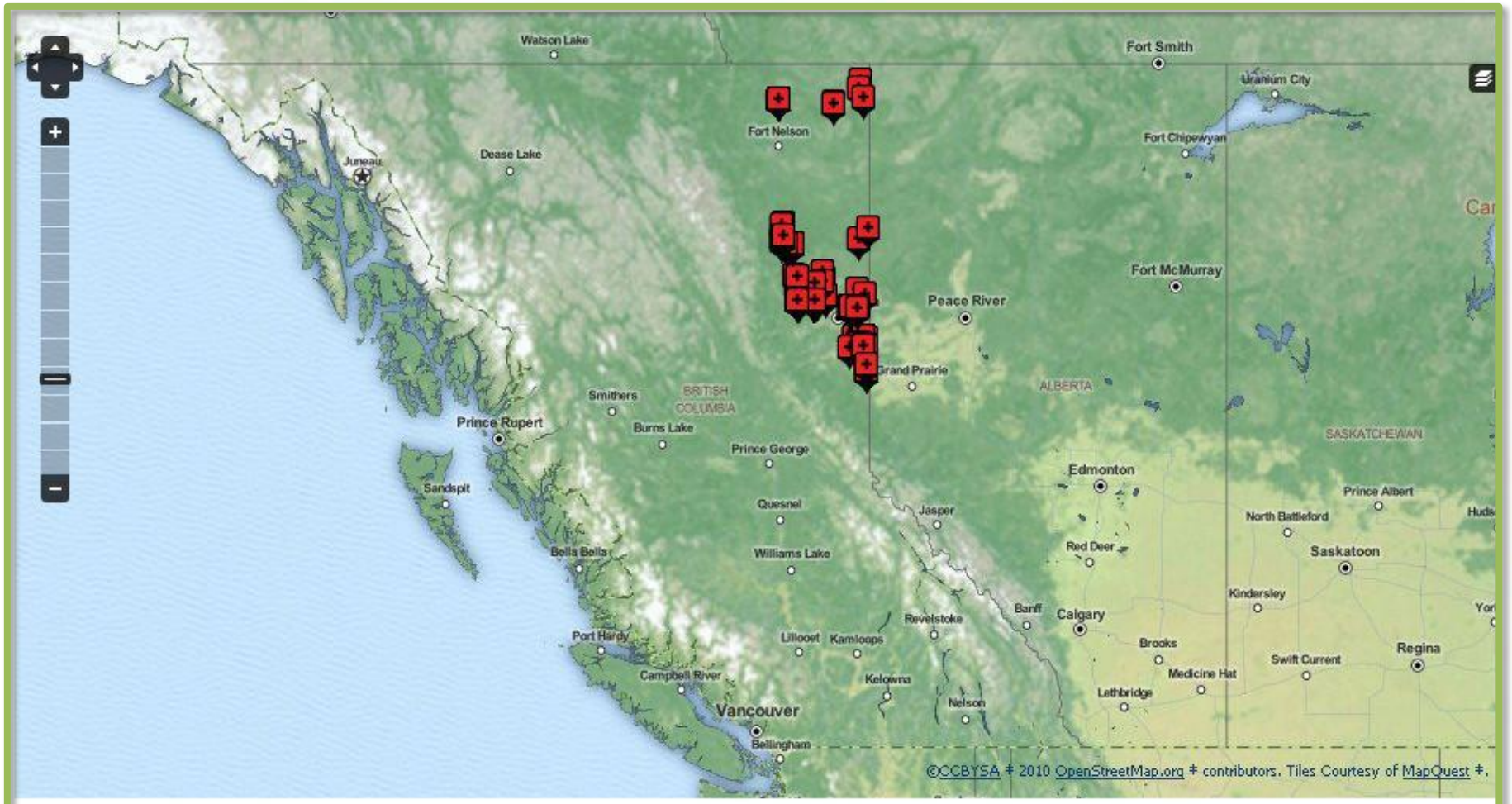
  We will measure and disclose our water use with the goal of continuing to reduce our effect on the environment.

Water Sources

Surface Water	• Freshwater • Lakes, streams, rivers • Dugouts	65%	↓
Shallow Groundwater (0-200m)	• Unconfined or confined aquifers • Variable water quality, but often fresh	10%	↓
Deep Groundwater (>800m)	• Disconnected from surface water • Often saline • Can require treatment	10%	↑
Flowback Fluid Other	• Saline • Variable quality • Can require treatment	15%	↑

Next Steps

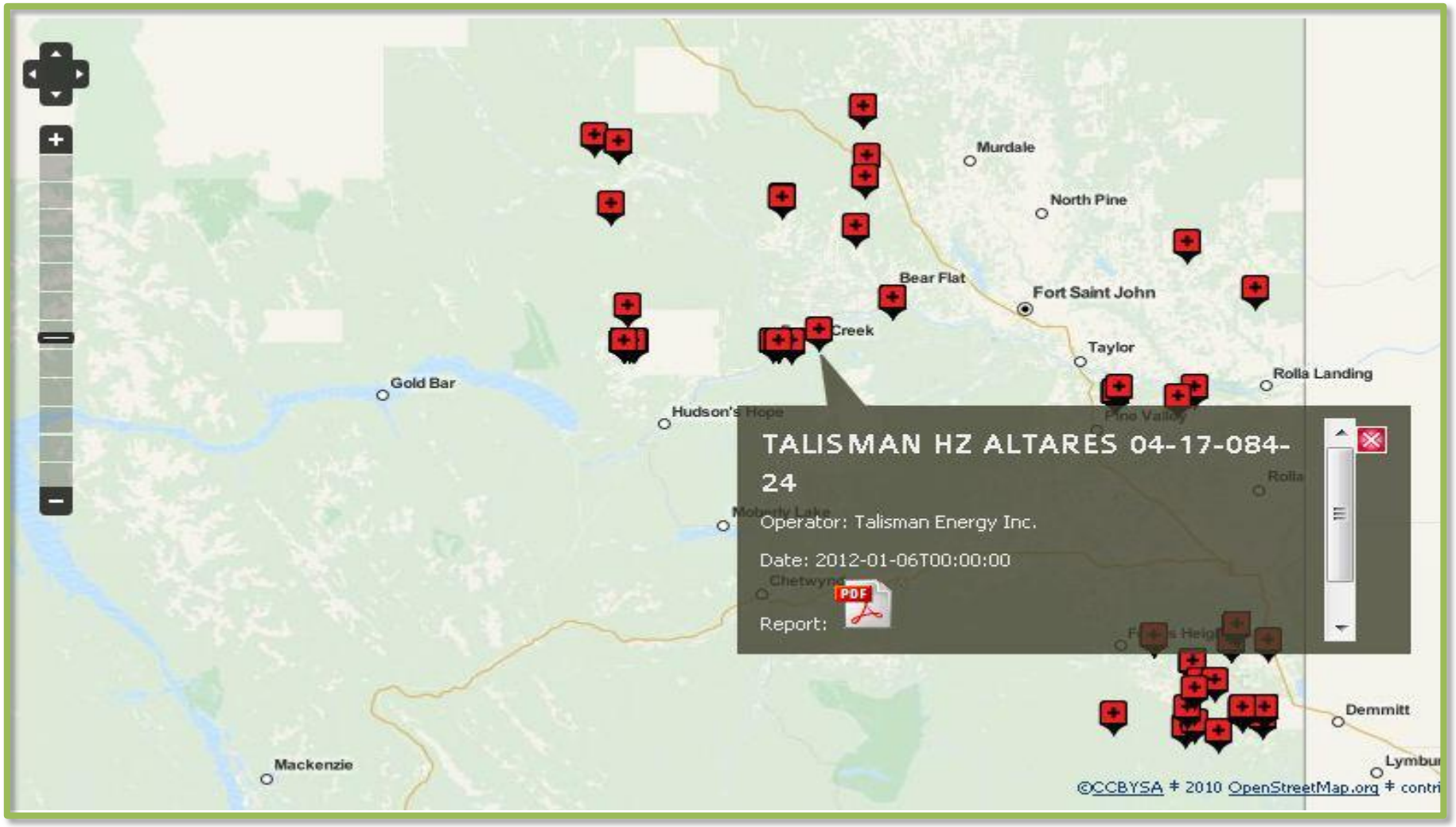
Mapping Based Search Criteria



‡ - When you click links marked with the ‡ symbol, you will leave the FracFocus website and go to websites that are not controlled by or affiliated with this site.

Next Steps

Mapping Based Search Criteria



Next Steps

Six Month Review

- Technical team:
  - OGC, CAPP and PSAC
- Purpose:
  - Continuously improve public disclosure
  - Review and move to implement best methods
- Learn:
  - Multi-jurisdictional operators
  - Direct feedback from the Operational Level

Next Steps

Continuous Industry Training

- Update user manual regularly
- Individual and group training, as required

On-Going Assessment

- Talk to all jurisdictions
  - Sharing information
  - Co-ordination of approach
- Expand Fracture Fluid Disclosure and Fracfocus.ca
  - National Registry – NA Standard

Questions?

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