



A Screening-Level System for Categorizing Hydraulic Fracturing Fluid Additives According to Potential Health and Environmental Risks

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tagxedo.com


Background ...

- Early 2010, Encana Inc. recognizes mounting public concern over hydraulic fracturing.
- Initiates company-wide “Responsible Products Program” aimed at ensuring that hydraulic fracturing can be performed safely without harm to human health or the environment.
- Intrinsik retained to develop a screening-level assessment system to allow the company to identify “responsible” hydraulic fracturing fluids.
- Early 2012, Intrinsik retained by CAPP to develop Canadian industry-wide version of system.

What the system does ...

- Increases awareness and understanding of the potential risks that can be presented to people and/or the environment from the use of hydraulic fracturing fluids.
- Helps guide decision-making with respect to operating practices and controls that may be needed to reduce any risks identified.

Key features ...

- Operates at a screening level.
- Emphasis on public health and the environment.
- Additive-based ...chemical ingredient-driven.
- Aligns w/CAPP's Hydraulic Fracturing Guiding Principles and Operating Practices. 
- Aligns w/Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Understanding Fracturing Fluid





We **will** support the development of fracturing fluid additives with the least environmental risks.

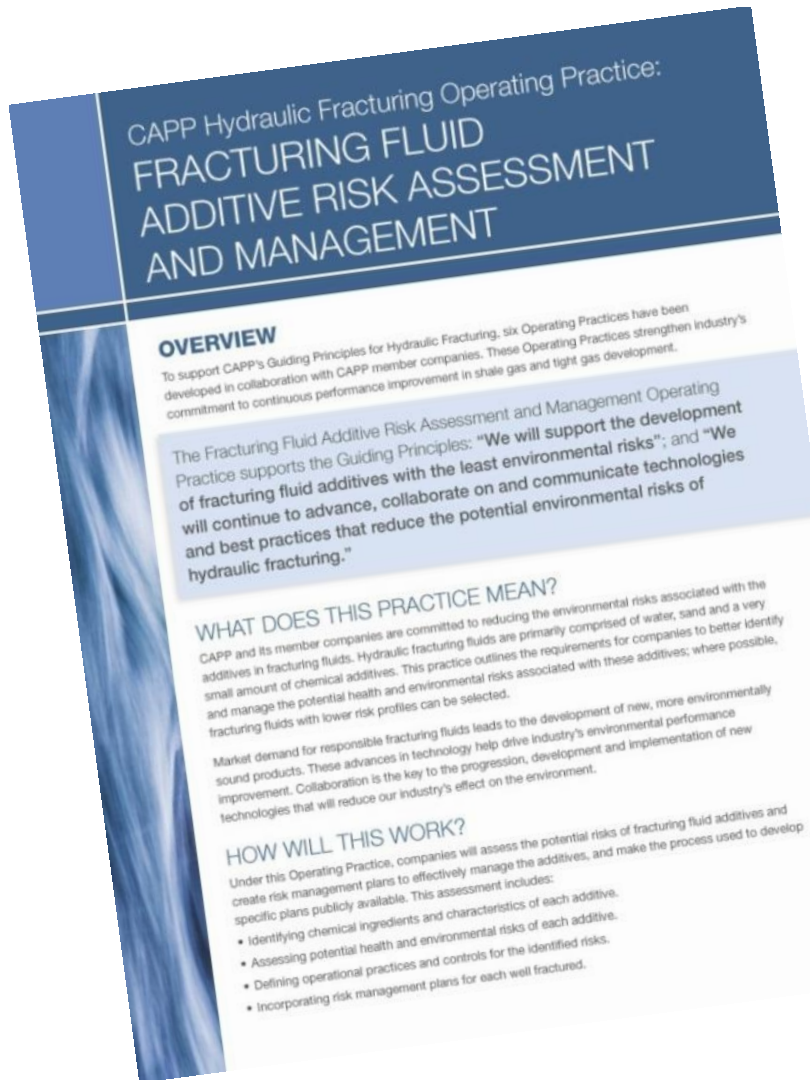
GUIDING PRINCIPLES FOR HYDRAULIC FRACTURING

Canada's shale gas and tight gas industry supports a responsible approach to water management and is committed to continuous performance improvement. Protecting water resources during sourcing, use and handling is a key priority for our industry. We support and abide by all regulations governing hydraulic fracturing operations, water use and water protection. In addition, we commit to following these guiding principles:

- 1 We will safeguard the quality and quantity of regional surface and groundwater resources, through sound wellbore construction practices, sourcing fresh water alternatives where appropriate, and recycling water for reuse as much as practical.
- 2 We will measure and disclose our water use with the goal of continuing to reduce our effect on the environment.
- 3 We will support the development of fracturing fluid additives with the least environmental risks.
- 4 We will support the disclosure of fracturing fluid additives.
- 5 We will continue to advance, collaborate on and communicate technologies and best practices that reduce the potential environmental risks of hydraulic fracturing.

Shale gas and tight gas, for the purpose of these principles, refers to unconventional gas resources from low permeability reservoirs being developed using horizontal wells with multi-stage hydraulic fracturing.

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1. Identify chemical ingredients and characteristics of each additive.
2. Assess potential health and environmental risks of each additive.
3. Define operational practices and controls.
4. Develop and implement risk management plans.

The system ...

Identification of chemical ingredients in the additive



Review of ingredients against screening criteria



Categorization of additive



C
Further Review



B
Controls/practices



A
No Action

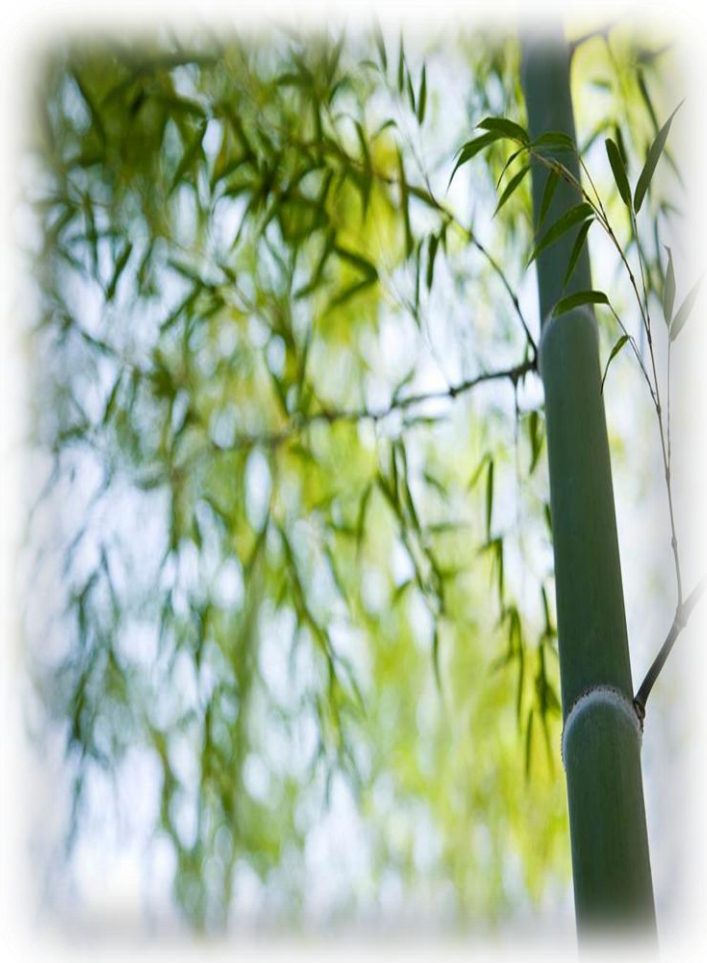
Screening endpoints ...

Public Health



- Carcinogenicity
- Mutagenicity
- Reproductive/
developmental toxicity
- Acute oral toxicity
(humans)
- Chronic oral toxicity

Screening endpoints ...



Environmental

- Acute toxicity to aquatic systems
- Chronic toxicity to aquatic systems
- Acute oral toxicity (wildlife)
- Environmental persistence
- Potential to bio-accumulate

Databases ...

- Developed/maintained by leading scientific/regulatory authorities
- Up-to-date
- Readily accessible
- Easily searchable



Additive Categories ...


Category	Basis	Recommended Action(s)
A	None of the additive's ingredients "triggers" any of the screening criteria. No obvious potential for additive to cause significant impacts to public health and/or the environment.	None



Additive Categories ...

Category	Basis	Recommended Action(s)
B	<p>One or more of the environmental screening criteria triggered.</p> <p>Additive is potentially capable of causing adverse environmental impacts.</p>	<p>Determine appropriate operational practices and controls to be implemented to reduce identified risks.</p>

Additive Categories ...

Category	Basis	Recommended Action(s)
C 	<p>One or more of the public health screening criteria triggered.</p> <p>Additive is potentially capable of causing adverse impacts on public health.</p> <p>One or more of the environmental screening criteria also may be triggered.</p>	<p>Further review to determine measures needed to manage potential risks to public health as well as any potential environmental risks.</p>

Data Availability Index ...

- Indication of extent of availability of information on an additive's ingredients in databases searched as part of screening process.
- Four (4) levels:



Experience to date ...

- More than 1,700 additives classified ... capturing more than 500 ingredients
 - 5% assigned to Category C
 - 40-45% assigned Category B
 - Balance Category A
- Tool has proven to be rapid, flexible, reliable.



Awareness ...

- E & P Companies

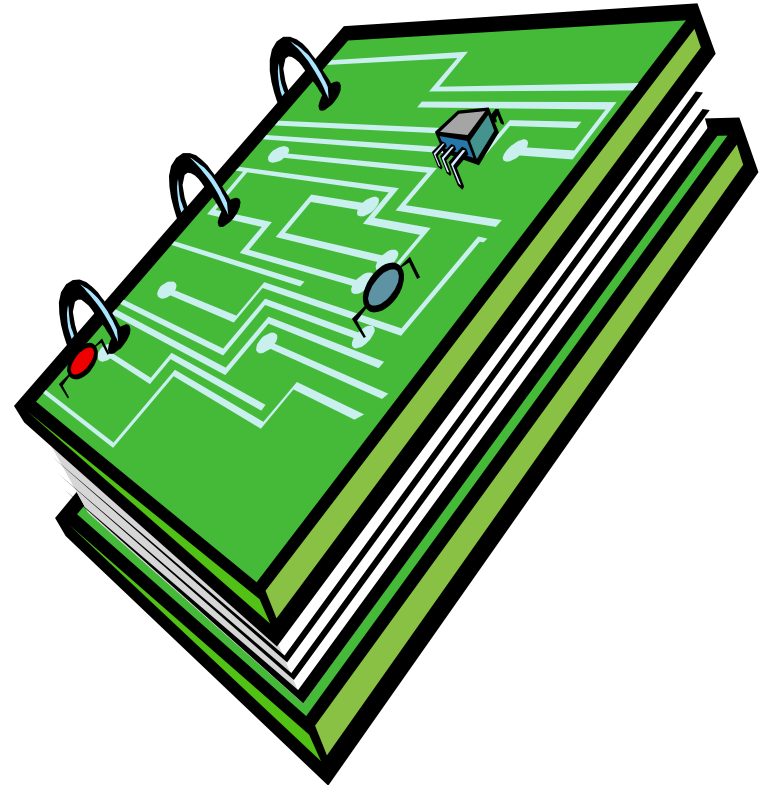
- e.g., Encana, Shell Canada, ConocoPhillips Canada, Progress Energy, AXPAC, CSUR, PTAC

- Regulatory agencies


- e.g., IOGCC, ERCB, Alberta Health, BC OGC, New West Partnership, NB Dep't of Health, NB Dep't of Environment, Health Canada, Environment Canada

Next Steps ...

- User Guide
 - Now being written
 - Nearing completion
 - Delivery to CAPP by month end
 - Launch details TBD.
- Independent peer review



Summary ...

- System provides simple, rapid yet reliable means to categorize additives according to their potential health and environmental risks.
- Aligns with CAPP HF Guiding Principles and Operating Practices. 
- Proven ... already well-tested.
- Captures input received from a number of different audiences.
- Soon to be ready for industry-wide launch.