

Project Profile

Project Name:	Hydraulic Fracturing Fluid Greenness Assessment
Project Number:	EI-2017-01
Proponent:	School of Engineering, University of British Columbia, Okanagan Campus
Funding Envelope:	Environmental Impacts
Timeframe:	October 15, 2016 – October 15 , 2017

Project objectives

The objectives of this project are as follows:

1. Compare and discuss the underlying concepts using in HyFFGAS and Intrinsik hydraulic fracturing fluid greenness assessment.
2. Develop a meta-language of common terms used in the evaluation of hydraulic fracturing fluid toxicity.
3. Evaluate a representative sample of hydraulic fracturing additives using the HyFFGAS method and Intrinsik method and compare the results.
4. Develop a common hydraulic fracturing fluid greenness assessment method to be used and establish baseline industry performance.

Project description

The proposed project will combine HyFFGAS and Intrinsik methods into a single greenness assessment method for hydraulic fracturing fluids. The new method will utilize existing chemical hazard descriptions as well as quantitative structure-activity relationship (QSAR) models to fill data gaps, if necessary. As such, the project requires intensive data collection. This work will be carried out by UBC researchers with the support and direction of the BC Oil and Gas Commission and the Canadian Association of Petroleum Producers.

Project background

The proposed project represents a continuation, expansion and implementation of collaborative research work completed during 2014. Approximately one year ago UBC Okanagan completed a BCOGC funded project entitled “Assessment of Green Additives and Chemical Compounds for Hydraulic Fracturing: A Critical Review”. The project presented a creative approach to solving the problem of assessing the greenness of a hydraulic fracturing fluid. Through the review of existing hydraulic fracturing fluid assessment systems employed by the oil and gas industry, a Hydraulic Fracturing Fluid Greenness Assessment System (HyFFGAS) was developed. The system derives greenness scores from the

inherent hazard profile of additive and fracturing fluid chemical ingredients based upon the Global Harmonized System for Classification and Labeling of Chemicals (GHS). Beta testing of the system revealed promising and informative results; however, further work is required to validate and implement the evaluation framework.

Screening-level assessment system was also developed for hydraulic fracturing fluid additives by Intrinsik, an environmental and health sciences consulting firm. Intrinsik's human and environmental health hazard based classification system categorizes additives into three classes reflective of their potential to cause adverse public or environmental health impacts. The assessment system is chemical ingredient driven, which scores ingredients against several human health and environmental health endpoints, including carcinogenicity, mutagenicity, bioaccumulation potential and toxicity, among others. Chemical hazard information for scoring purposes is gathered from several readily accessible chemical classification databases.

Project deliverables

The deliverables from this project include the following:

1. Final report describing the hydraulic fracturing fluid greenness assessment method and baseline industry performance.