

Project Profile

Project Name:	Gas migration database and statistical analysis on occurrence, attributes and potential causes of gas migration
Project Number:	HS-2018-02
Proponent:	Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia
Funding Envelope:	Health and Safety
Timeframe:	July 1, 2017 to January 31, 2019

Project objectives

The objective of the project is to investigate the likelihood of gas migration at oil and gas wells in Northeast BC through interrogation of existing data held in various databases by the BC Oil and Gas Commission. Potential causes of gas migration will be identified and evaluated based on this existing data. Findings will be used to enhance mitigation and risk management approaches employed by the government, regulator and industry.

Project description

The project will use data collected during drilling of existing energy wells in Northeast BC; including those that exhibited or developed gas migration. The data will be analyzed to develop:

- a) a science-based framework for assessing the likelihood for gas migration in Northeast BC (e.g., occurrence, attributes and potential causes); and
- b) an enhanced understanding of potential causes of gas migration.

Project background

Gas migration refers to the vertical movement of gas outside the well's surface casing. For gas migration to occur, a subsurface source of gas must be present AND a pathway along the wellbore annulus. It is hypothesized that some wells are inherently more susceptible to gas migration than others. The susceptibility of a given well to developing gas migration may be due to a number of factors that could

be related to drilling, cementing and completion, gas properties, geology, presence of intermediate zone gas, or other factors.

Well drilling and completion regulatory requirements are designed to ensure cementing procedures are conducted to seal the wellbore annulus around the surface casing and subsequent casing strings to prevent gas migration. Understanding the factors related to gas migration is fundamental to identifying any enhancements to the regulatory requirements and informing future research needs.

A recent journal publication (Bachu, 2017) provided an analysis of gas migration in Alberta using data from the Alberta Energy Regulator, however, there is no comprehensive publication that examines gas migration at wells in Northeast BC.

Project approach

The project involves:

1. developing a custom database based on a subset of attributes from the BC Oil and Gas Commission's databases (e.g., attributes related to drilling and completion, subsurface fluids, geology, and spatial information); and
2. conducting a comprehensive statistical analysis of the data.

To ensure data context is considered as an integral part of the research, the project will be conducted as a collaborative effort between the University of British Columbia's Fugitive Gas Research Group and the BC Oil and Gas Commission subject matter experts, with input from a technical advisory committee with industry participation.

Project deliverables

The deliverables from this project include the following:

1. A report summarizing the findings of the data analysis and key conclusions regarding understanding the likelihood of gas migration.
2. Database to assist in ongoing management of wells with potential for gas migration.