The Drivers and Potential Impact of Environmental Regulation on the Extent and Cost of Shale Gas Production

A Report Prepared on Behalf of the Council of Canadians

For the Ontario Energy Board 2010 Natural Gas Market Review

Lisa Sumi, MSc

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Overview of Presentation:

- Purpose of presentation
- Overview of hydraulic fracturing impacts
- Review of state initiatives related to Marcellus shale gas production
- Review of hydraulic fracturing initiatives that could affect Marcellus shale gas production

Purpose of this presentation:

Why the interest in hydraulic fracturing and the Marcellus shale?

- **Marcellus shale "plays a critical role in the overall supply outlook (ICF, p. 9)**

- **Hydraulic fracturing required to extract natural gas from shales, therefore if regulated, production from the Marcellus shale may be affected**

Overview of hydraulic fracturing impacts:

- Wide range of potential impacts: e.g., air quality, noise, erosion, soil contamination and water quality and quantity

- ICF report lists three particular impacts related to hydraulic fracturing: water requirements, chemical exposures and produced contaminated water management

Water requirements:

- Marcellus shale requires from 1 - 10 million gallons of water / 200 water tanker trips per million gallons

- Costs related to water transportation are significant - access to water is key

Water requirements:

- There are ecological impacts to water withdrawals

- During drought conditions water can be limited - may affect well completion schedules

Chemical exposures:

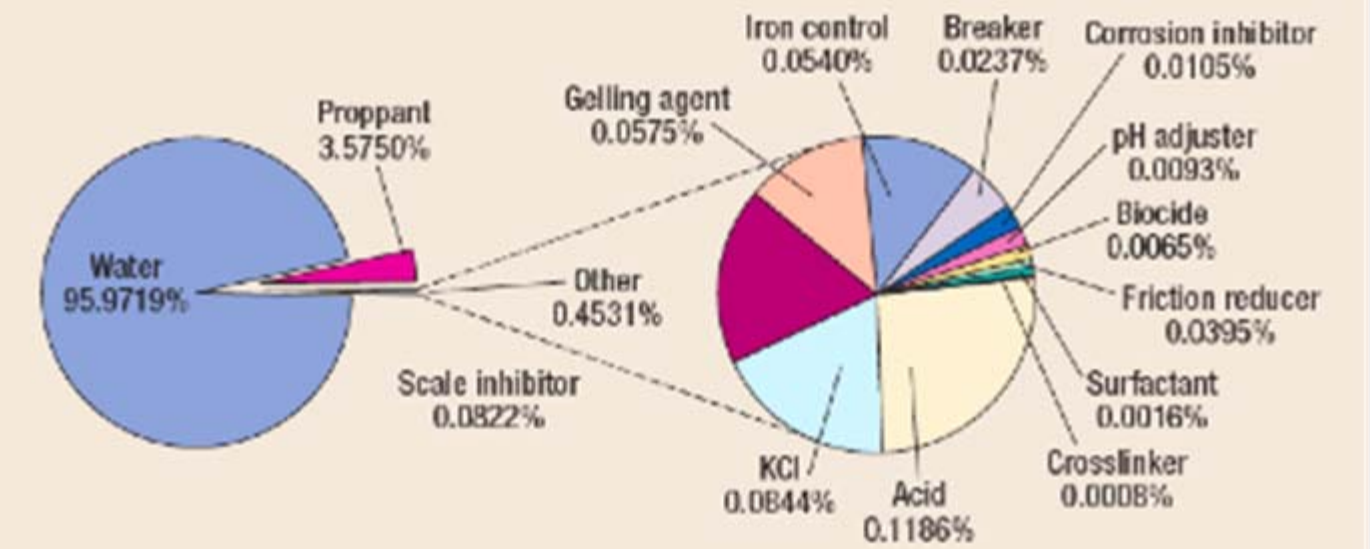

Fig. 2. Volumetric breakdown of a fracture treatment typical of the Marcellus.

- Chemicals are small percentage of hydraulic fracturing fluids, but total use per job is large

Chemical exposures:

- Air emissions from waste impoundments can create air quality concerns

Contaminated water management:

- Two types of wastes: flowback and brines
- Both contain a variety of chemicals at concentrations that can exceed water quality standards
- TDS and salts are extremely high in Marcellus shale flowback and brines

Regulatory Initiatives:

- Marcellus shale formation underlies four states
- States have responded differently in terms of regulation
- Moratorium in New York; Pennsylvania and West Virginia allow drilling

Regulatory Initiatives:

Moratorium in NY

- Current bill would extend moratorium to May, 2011

- API says continued moratorium would produce 2 bcf/day less gas than ICF study

Regulatory Initiatives:

Pennsylvania severance tax

- Most states with oil and gas have severance taxes
- Industry warns that tax would force them to relocate to other states or countries, decreasing gas production

Regulatory Initiatives:

Pennsylvania water discharge standards

- **Number of treatment plants is limited**
- **Disposal wells limited**
- **Reuse/recycle is occurring, but has issues that must be resolved**

Regulatory Initiatives:

Regulation of hydraulic fracturing

- More information available on hydraulic fracturing chemicals, along with more incidents related to fracturing, has intensified public pressure to regulate

Regulatory Initiatives:

Regulation of hydraulic fracturing

- State fracturing fluid disclosure rules: CO, WY
- Federal EPA study and Congressional investigation into hydraulic fracturing
- FRAC Act (would affect all shale development)

Conclusions:

- Regulatory responses to hydraulic fracturing and shale development have been varied and are still in process
- The outcome of some current proposals could reduce the supply of gas from the Marcellus shale

Conclusions:

- If Marcellus gas supply does not grow as anticipated, some gas coming into Ontario may again pass through to the Northeast US

- Other shale gas producing states are facing similar pressure to regulate various aspects of gas shale development, which could also affect outlook for Ontario's natural gas supply

THE END

Credits:

- Fig. 2. Volumetric breakdown of a fracture treatment typical of the Marcellus. (Arthur, D., Bohm, B. and Layne, M. ALL Consulting. 2009. "Considerations for development of Marcellus Shale." *World Oil.)*

- Most photos courtesy of Marcellus-Shale.us

- "No Fracking" photo: workingfamiliesparty.org

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