



Alberta Regulations: Wellbore Integrity Issues Driving Regulatory Change

Presented by Theresa Watson

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At the North American Wellbore Integrity Workshop

October 16-17, 2013

Denver, Colorado

Horizontal Well Multistage Fracturing



<http://www.casedhole-solutions.com/capabilities/hydraulic-fracturing-services>

October 6, 2013

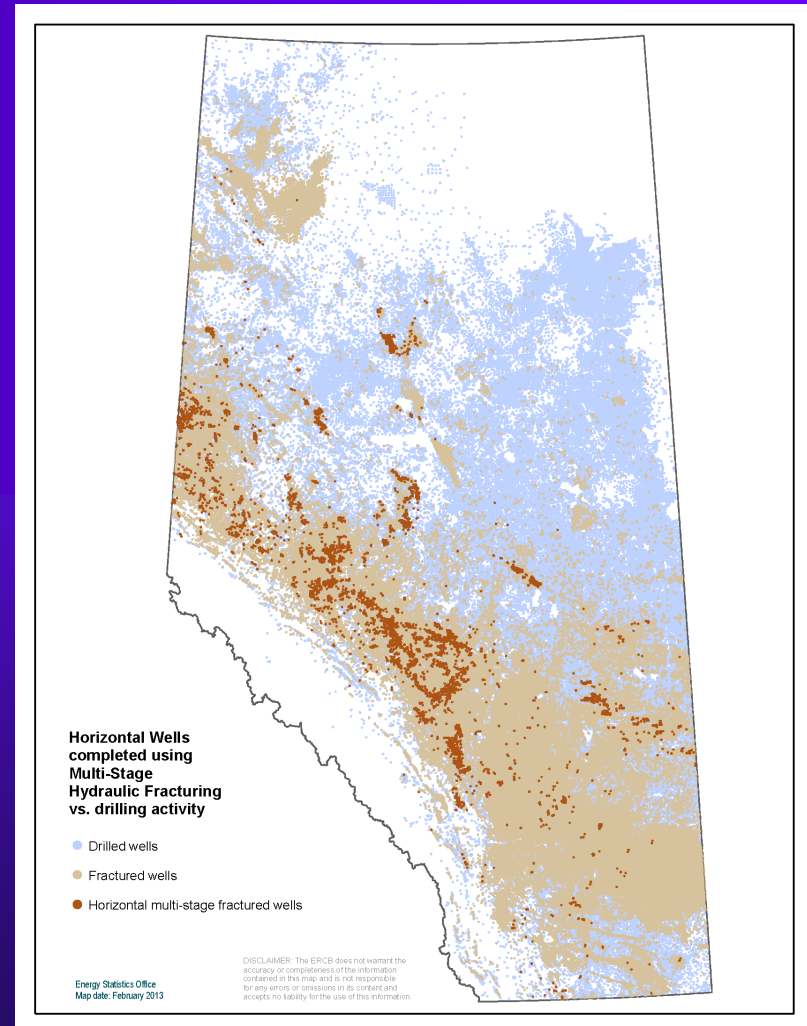


What's the Problem?

- Increasing numbers of horizontal, multi-stage hydraulic fractured wells
- Large numbers of pre-existing wellbores in the province
- Potential to impact assets and groundwater

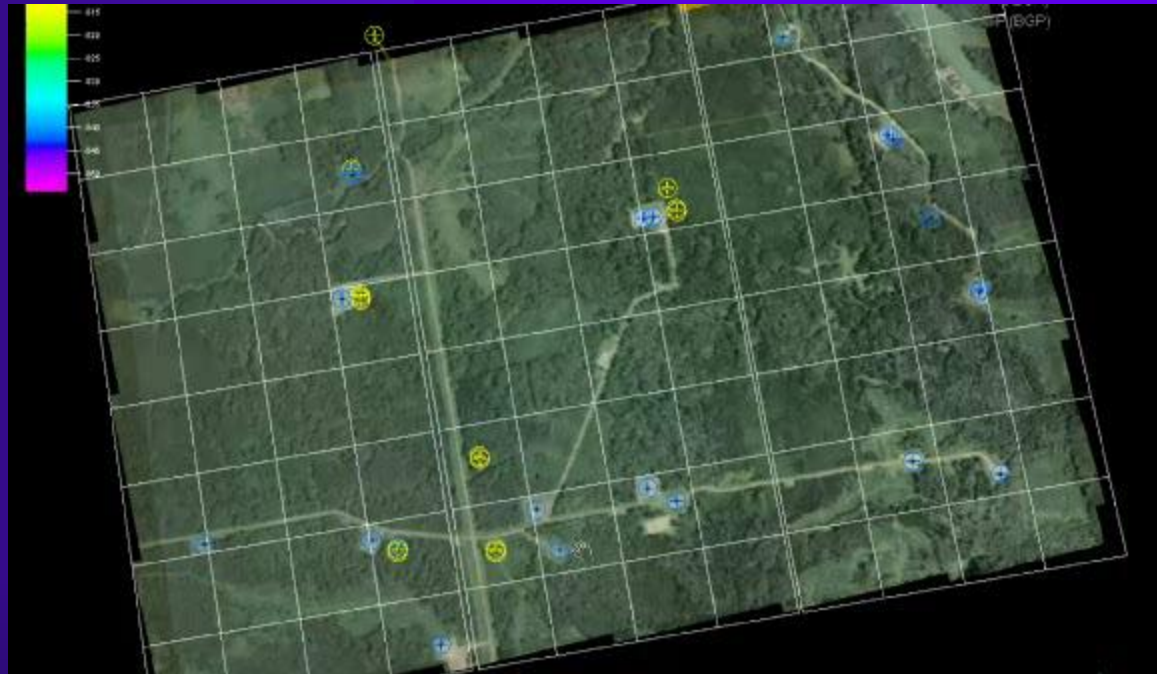
Where's the Proof?

- Blue: all wells drilled in Alberta since 1955
- Light orange: all wells fractured
- Dark orange: all horizontal wells stimulated by multistage hydraulic fracturing



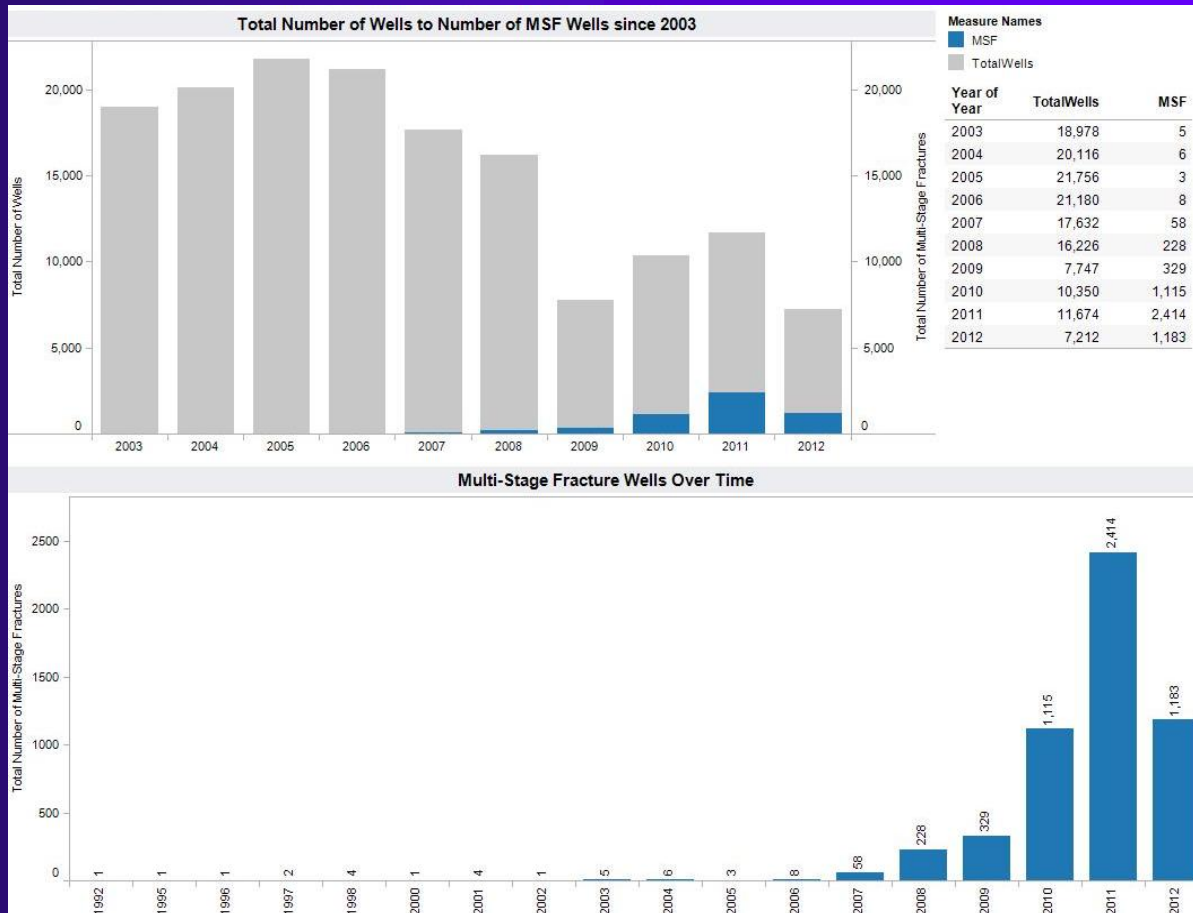
Watson, Theresa, Presented at University of Calgary, Schulich School of Engineering Alumni 2013 Distinguished Speakers Panel, March 14, 2013.

Where's the Proof



Kim.Thomas, **Overview of Interwellbore Communication Incidents: An ERCB Perspective.** Presented at the Canadian Society of Unconventional Resources 14th Annual Conference October 3-4, 2012, Calgary Alberta

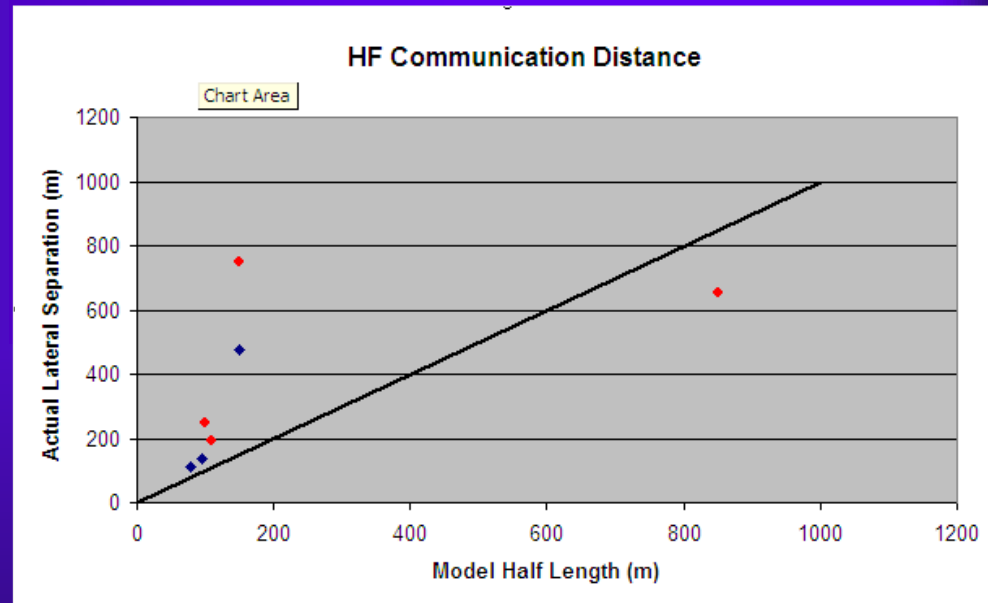
Where's the Proof



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Where's the Proof

- Distance between wellbores:
 - Closest 30 m
 - Furthest 2400 m
 - Mean 355 m
 - Median 250 m
- Most are infill wells
- Impacted wells can be down-dip or up-dip of the originating well



Kim.Thomas, **Overview of Interwellbore Communication Incidents: An ERCB Perspective**. Presented at the Canadian Society of Unconventional Resources 14th Annual Conference October 3-4, 2012, Calgary Alberta

Where's the Proof?

- 20 reported incidents since 2009
 - 18 incidents: fracture stimulation communicating to a producing well
 - 2 incidents: fracture stimulation to a drilling well
- 55% of the incidents had no spills, equipment damage, or long-term adverse effects on production



Photos Courtesy ERCB



More Photos



Photos Courtesy ERCB



What's the Solution?

- Directive 83
 - In depth risk assessment conducted by the ERCB
 - Communication of issue and regulatory objective
 - Development of requirements to protect against each risk



What's the Solution?

- Well integrity of fractured well
 - Preference for dual barrier systems
 - Increased requirements for single barrier systems
- Inter-wellbore Communication
 - Determination of area of influence (AOI)
 - Risk assessment for wells within the AOI
 - Mitigation plan



What's the Solution

- Non-saline aquifer protection
 - Risk assessment required when fracturing within 100 m of non-saline aquifer
 - Mitigation plan
- Water well protection
 - Offset distances both vertically and horizontally
- Fracturing in proximity to bedrock
 - No fracturing within 100 m of surface except with nitrogen

Legacy of Abandoned Wells



Courtesy ERCB (AER)



What's the Problem?

- Urban encroachment on old abandoned oil fields
- Public safety concerns about leaking wells and gas accumulations in basements
- Numbers of impacts growing
- No permanent indicator of abandoned wells either on the land or on title

Where's the Proof?



Courtesy Doull Site Inc



Courtesy Doull Site Inc



Courtesy ERCB (AER)



Courtesy Doull Site Inc



What's the Solution?

- Directive 79: Surface Development in Proximity to Abandoned Wells
 - Requires a 5 metre setback from an abandoned well
 - Requires developers to check for abandoned wells and contact licensees to make development plans
 - Liability remains with licensee
 - Requires abandoned wells to be tested for gas migration
 - Risk assessment and ongoing testing



Other Regulatory Responses

- Change in abandoned well capping requirements (D20)
- Changes in surface casing requirements (D8)
- Discussion and research ongoing to determine a level of acceptable leakage
- Field research investigating surface measureable gas leakage of abandoned wells.
- Ongoing changes in abandonment requirements
- Limits on in-situ oil sands development due to pre-existing wellbores in the steam AOI.
- Changes to wellbore construction requirements for injection wells (D51)

In-situ bitumen to surface due to wellbore integrity issues with abandoned well in proximity to the project



http://www.huffingtonpost.ca/2013/09/24/cnrl-oil-leak-environmental-protection-order_n_3983340.html retrieved October 8, 2013.

The Skeletons are Coming Out of the Closet!



<http://cryofworship.com/wp-content/uploads/2012/10/skeleton-in-the-closet.jpg>

Retrieved October 6, 2013