



Shallow Operations Issues

PTAC Shallow Gas Production Technology Forum

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Principles

- ◆ containment
- ◆ groundwater protection
- ◆ surface impact minimization
- ◆ good engineering practices
 - ◆ shallow operations can be “high risk”



Issue Identification

- ◆ Gas development becoming shallower
- ◆ Closer proximity to water wells
 - ◆ Potential for conflicts with groundwater increase
- ◆ Higher density of wells
 - ◆ Potential for conflicts over surface use increase
- ◆ Increased attention and engineering in shallow operations important



Drilling

- ◆ Use of non-toxic drilling fluids
- ◆ Attention to testing offset water wells
- ◆ Potentially require Alberta Environment preliminary groundwater assessment
 - ◆ produced water < 4000 ppm TDS
 - ◆ shallow wells require pre-planning



Completion & Stimulation

- ◆ Attention to cementing casing to base of groundwater protection
- ◆ Attention to prevent the mixing of water qualities (commingling)
- ◆ Shallow fracture containment within zone
 - ◆ Fracture pressure
 - ◆ Lithology dependencies
- ◆ Best engineering practices for shallow fracs



Re-completion & Abandonment

- ◆ Re-completions
 - ◆ Wellbore (casing & cement) integrity
 - ◆ potential for migration
 - ◆ casing integrity & cement bond logs
- ◆ Abandonment of commingled wells
 - ◆ cement entire perforated interval?



Where do we go from here?

- ◆ Proper engineering & design
- ◆ Industry best practices



Thank you!