Source Water and Regulatory Considerations for Alberta's Carbonate-Hosted Bitumen and Other Unconventional Resources



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Jamie Wills, M.Sc., P.Geol.
Waterline Resources Inc.

Presentation Outline

- Carbonate-based bitumen projects
- Unconventional O&G projects
- Current/emerging regulations
- AER
- The next few years…
- Questions?

- Note: red font = The TAKEAWAY

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Big Picture Stuff

- Approximately 75% of Alberta's oil production is water-assisted (CAPP)
  - Conventional
  - Mining
  - In-situ
  - Unconventional

- It is all about water (based of current technology)

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Part 1
Carbonate-based Bitumen Projects

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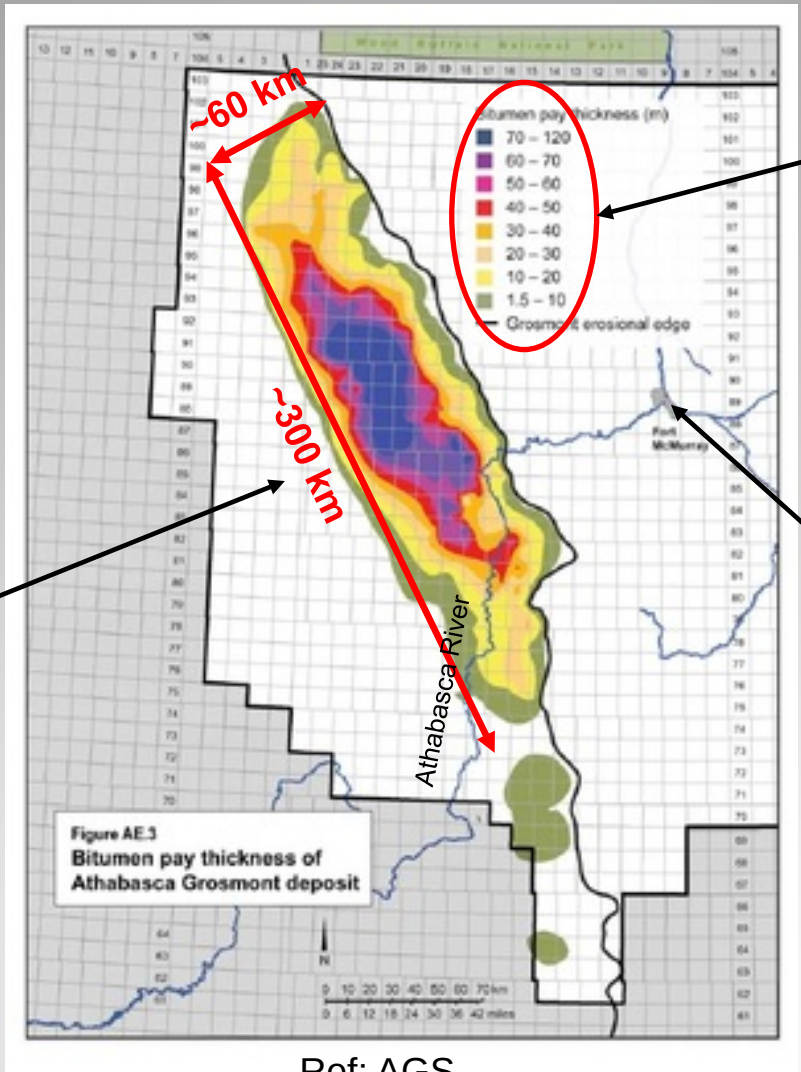
Carbonates = Grosmont Fm



Ref: AGS

Thickness up to 120 m
(~300 billion bbl)

Fort McMurray

Immense Resource
(3-4 x Size of P.E.I.)

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Grosmont Fm = Complex

- Complex
  - Geology
  - Hydrogeology
  - Locally/regionally
- Bitumen-bearing to water-bearing
  - Target reservoir
  - Source water
  - Both

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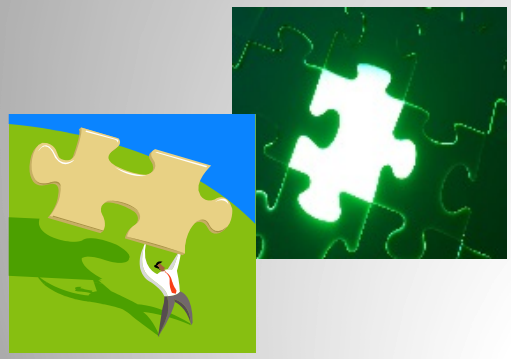
Grosmont Fm - Bitumen Projects Development Status

- Pilot (Shell, Osum, Laricina, Husky, etc.)
- Timing from pilot to commercial
  - "?" years
- Reward
  - Immense to Canadians



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Grosmont Fm - Bitumen Projects Regulatory

- Saline groundwater source
  - Existing EOR projects (EIA exempt)
  - Proposed for bitumen projects (EIA required)
- Water Act exempt
  - GW use reported to AER (but not levels)
- Limited calibration data (at present)
  - No point in GW modelling to support EIAs
  - Factor this into EIA completion/review
    - We need to be thinking "outside the box"

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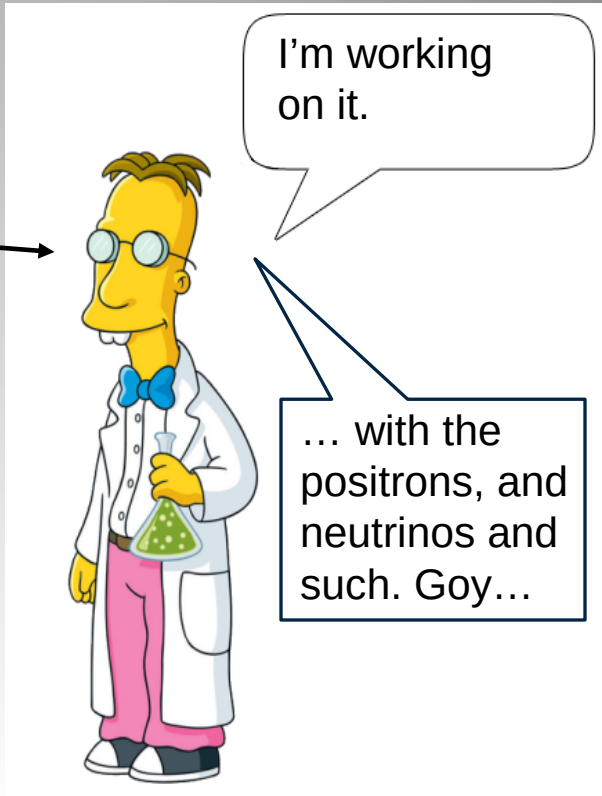
The Future of Carbonates-based Bitumen Projects

- Operational
  - Optimize on existing pilots
  - Implement new projects
- Regulatory (water)
  - Need GW level and pumping data to facilitate management of the resource
  - Improved mgmnt' of resource
  - Shared management



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Part 2
Unconventional Oil & Gas Projects

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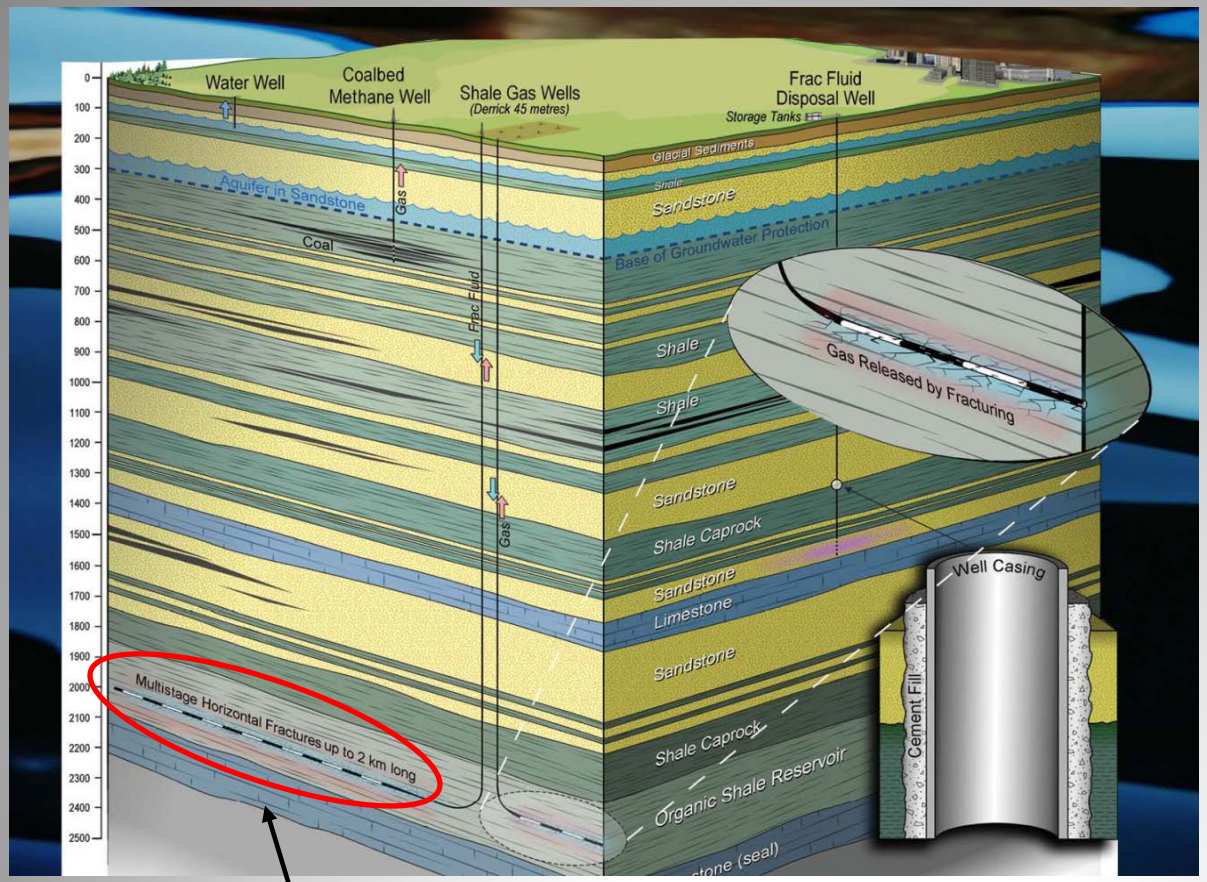
Unconventional Plays



Ref: Alta. Govnt.

- Tight oil
- Tight gas
- Shale gas
- CBM

Multi-stage fracking (MSF): Packers Plus (Alberta firm)

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Alberta Tight Oil/Gas Estimates

Formation (P50 Value)*	Natural Gas (Tcf)	NGLs (billion bbl)	Oil (billion bbl)
Duvernay	443	11.3	61.7
Muskwa	419	14.8	115.1
Montney	2133	28.9	136.3
Banff/Exshaw**	35	0.1	24.8

*P50 denotes median estimate (ERCB/AGS Oct/12)
** Also referred to as Alberta Bakken
Excludes Nordegg and Wilrich

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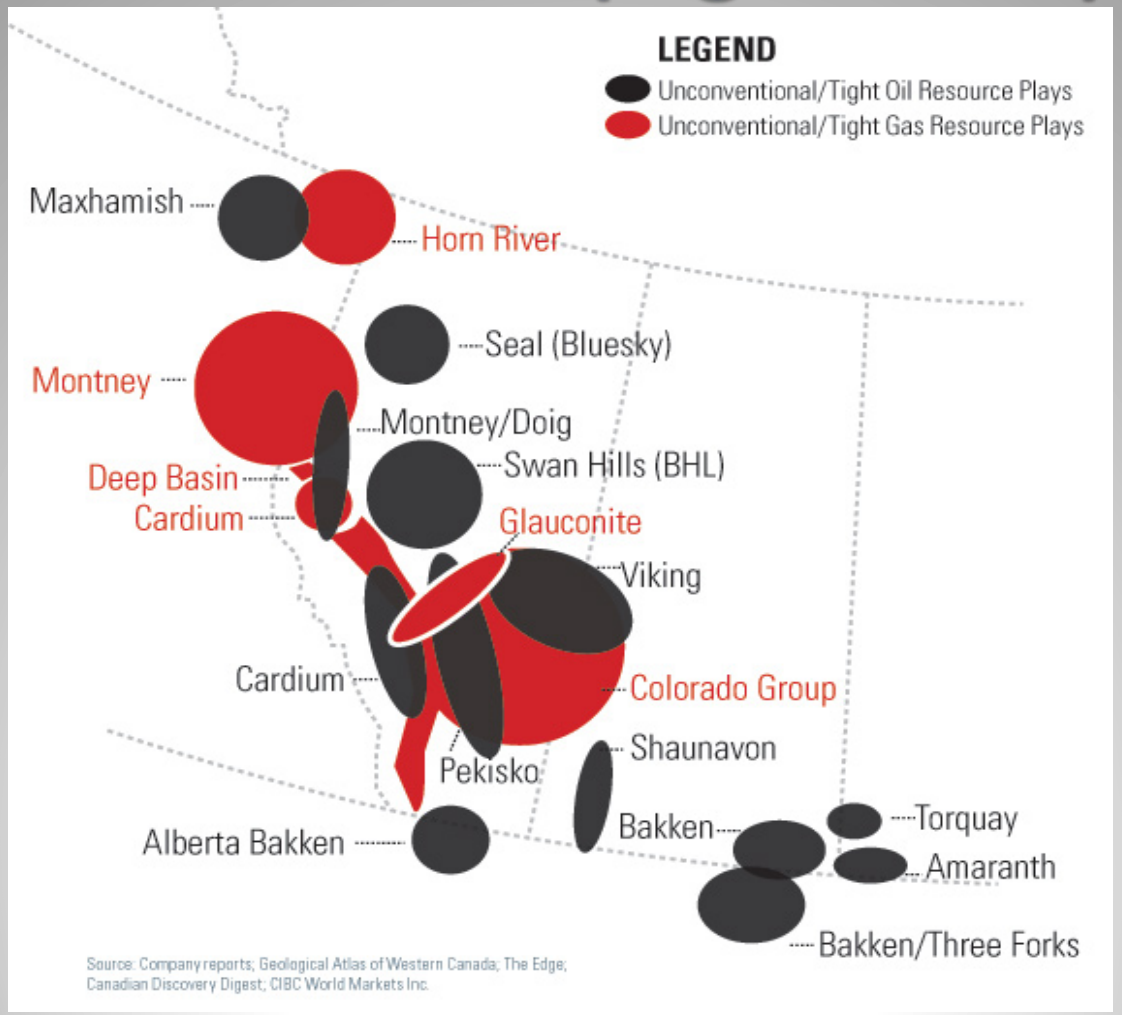
Unconventional (Tight O&G) Plays



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What Does it All Mean? (1)

- MSF is a new technology
  - Can use a lot of water
- Unconventional projects exempt from EIA and full-disclosure (at present)
- Public concerned on several fronts

- CAPP developed "7 Guiding Principles"

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What Does it All Mean? (2)

- Upstream O&G + Water Act = AER
- Water use for drilling and fracking:
  - TDLs currently being issued
  - Term licences not being issued
  - Play-based policy in-prep under URF

    "We're going to move out very quickly with a pilot project." (AER CEO Jim Ellis, March, 2014)
  - Location of pilot?
    - See next slide

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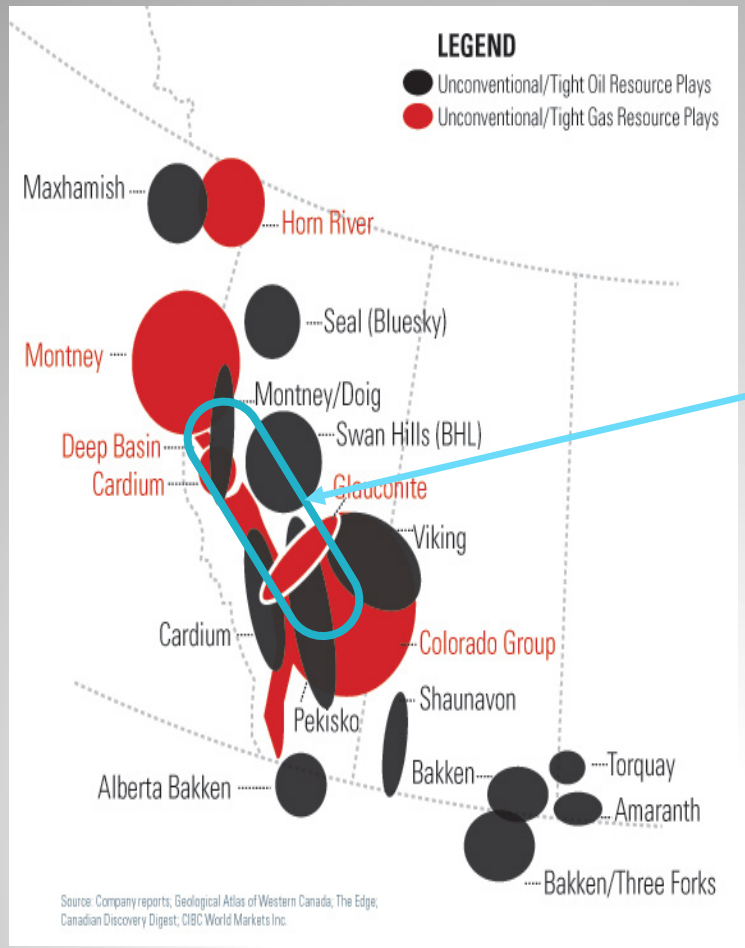
Location of URF Pilot Project (?)



Perhaps "pilot" will be focused in PTAC (2013) Montney & Duvernay Integrated Water Study

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The URF in the Next Few Years

- Under URF, move to play-based regulation
  - Pilot, industry collaboration
  - Smaller development footprint
  - Greater disclosure (development plans)
  - Better manage cumulative effects
    - EIA (or EA) process?
- Term Water Act licences (if OIP met)

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Summary

- **AER** is "in-place", but full roll-out will take time
- **Grosmont bitumen** = immense $ resource
  - Industry investment/experience to "work/solve the problem"
  - Regulatory improvement to better manage saline GW
- **Unconventional resources** = immense $ resource
  - Play-based regulation
  - Industry collaboration
  - Smaller development footprint
  - Greater disclosure (development plans)
  - Better manage cumulative effects
  - EIAs/EAs (?)

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Closure

Thank you

Questions?

jwills@waterlineresources.com