

ERCB and Groundwater Protection

Water Technologies Symposium 2011

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Outline

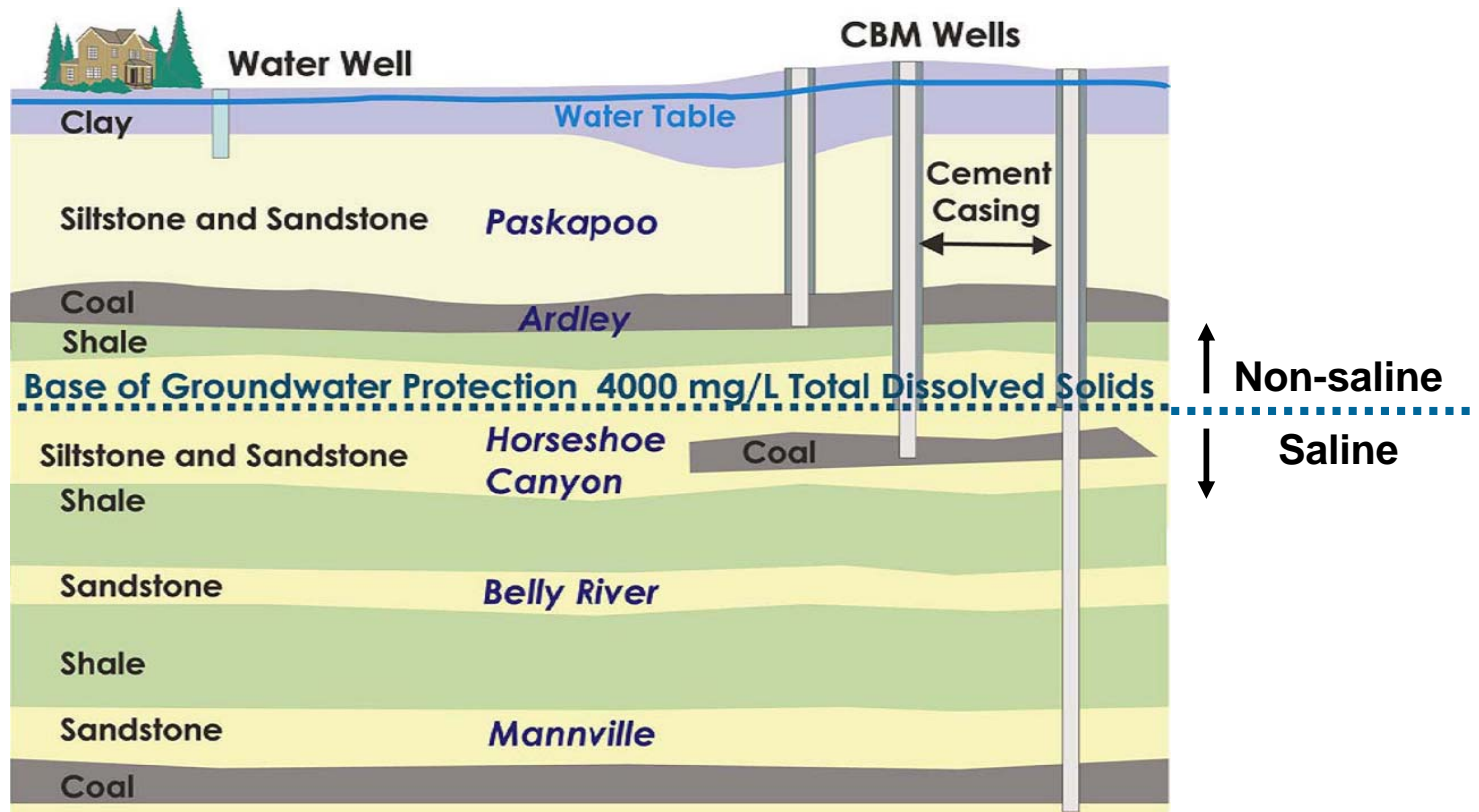
- Groundwater protection at the ERCB
- Base of groundwater protection (BGWP)
- Groundwater protection regulations during:
 - drilling and completion activities
 - production operations
 - abandonment
- Other groundwater-related regulations
- Water well complaints

Groundwater Protection at the ERCB

- Oil and Gas Conservation Act
 - ERCB mandate includes controlling pollution above, at, and below the ground surface in operations over which the Board has jurisdiction (OGCA, Sec.4.f)
- Water Act
 - Defines saline groundwater as having >4,000 milligrams per litre of Total Dissolved Solids (mg/L TDS)

Base of Groundwater Protection - BGWP

- Approximate depth where groundwater changes from non-saline to saline, managed by ERCB
- Enhanced ERCB requirements when working above BGWP



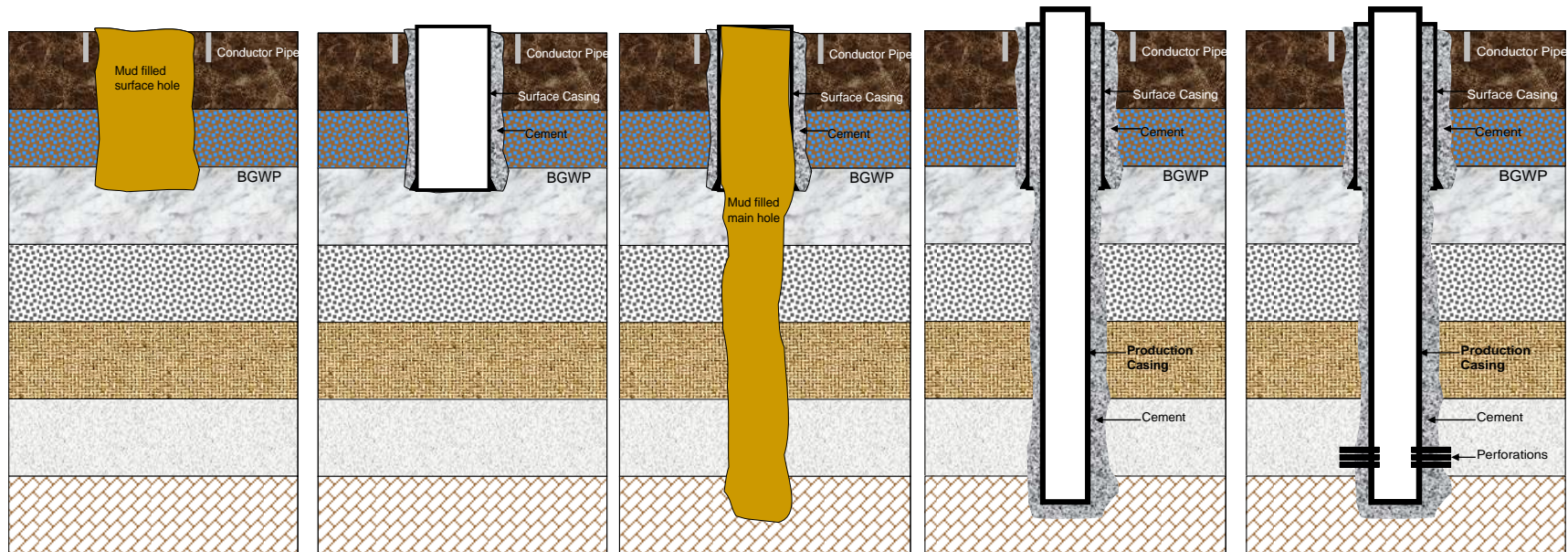
Groundwater Protection in Oil and Gas Operations

- Groundwater Protection Areas include:
 - Drilling / completion
 - Production
 - Abandonment
 - Other

Groundwater Protection During Drilling and Completions



Drilling and Completions continued...



Drill surface
hole

Install and
cement
surface
casing

Drill main /
production
hole

Install and
cement
production
casing

Completions –
perforating,
fracturing

NOT

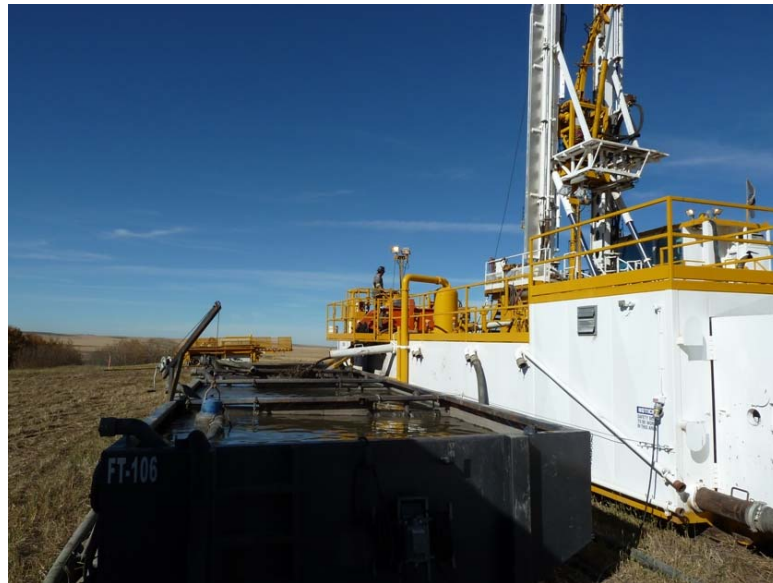
Drilling and Completions continued...

- Drilling Fluids
- Casing and Cementing
- Fracturing
- Fracturing Fluids



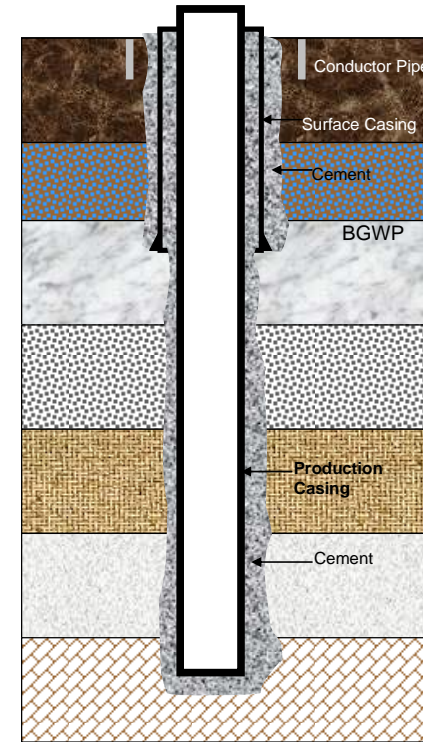
Drilling and Completions continued...

- *Directive 036 - Drilling Blowout Prevention Requirements and Procedures*
 - Section 19.1: “The use of oil-based drilling fluids (or any other potentially toxic drilling additive) is prohibited when drilling above the ‘base of groundwater protection’ depth.”
 - ERCB Report 2009-C: “Risk to Water Wells of Pathogens in Drilling Fluids”



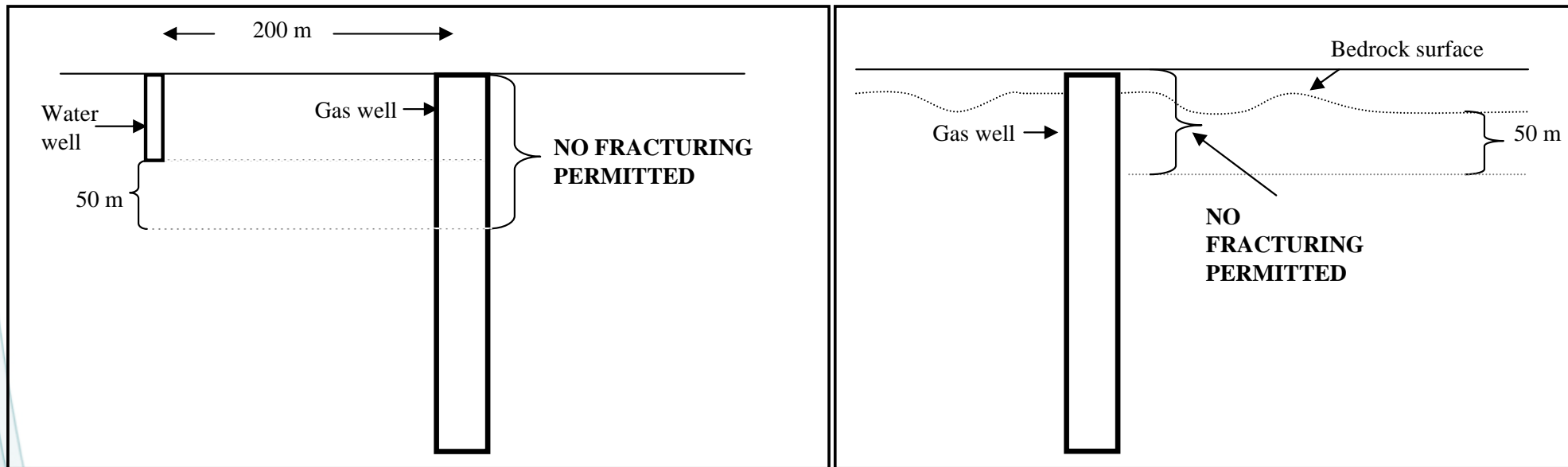
Drilling and Completions continued...

- *Directive 009 - Casing Cementing Minimum Requirements*
 - Surface casing must be cemented to surface, and if it does not extend below BGWP, next casing string must be cemented full-length, to surface
 - If cement not to surface, must notify ERCB for guidance



Drilling and Completions continued...

- *Directive 027 - Shallow Fracturing Operations*
 - Non toxic fluids above the BGWP, must be designed so non-saline aquifers can NOT be impacted
 - Restrictions in proximity to water wells and bedrock surface



Drilling and Completions continued...

- *Directive 035 - Baseline Water Well Testing (BWWT) Requirement for Coalbed Methane Wells Completed Above the Base of Groundwater Protection (BGWP)*
 - Operationalizes AENV baseline water well testing standard
 - Company must offer to test all water wells within 600m of proposed CBM well; if none, must offer to test closest within 800m
 - BWWT results must be sent to AENV and landowner
 - “If a landowner/occupant perceives a change in water well quantity or quality after CBM development, then the CBM developers must retest the water well.” AENV Standard, 2006

Groundwater Protection During Production



Groundwater Protection During Production

- *Directive 044 - Requirements for the Surveillance, Sampling, and Analysis of Water Production in Oil and Gas Wells Completed Above the Base of Groundwater Protection (BGWP)*
 - Effective for all wells producing 5m³/month water or more
 - Water produced (>5m³/mo) from above the BGP must be measured, analysed and reported
 - Ensure no cross-flow of water between completion intervals
 - Ensure no non-saline water production from coal without authorization from AENV



Groundwater Protection During Abandonment



Groundwater Protection During Abandonment

- *Directive 020 - Well Abandonment Guide*
 - All oil and gas zones must be isolated
 - All non-saline groundwater zones above the BGWP must be isolated, for wells drilled prior to current GWP requirements



Other Groundwater Protection Related Regulations

- Fluid Handling and Spills
- Pipelines
- Waste Disposal



Other Regulations continued...

Fluid handling and Spills

- *Directive 036 - Drilling Blowout Prevention Requirements and Procedures*
 - All fluids used or generated must be properly contained;
 - “The licensee is responsible for the immediate containment and cleanup of all unrefined (oil, salt water, etc.) and refined (diesel, gasoline, mud additives, etc.) fluid spills on or off lease.”;
 - Any unrefined spill off lease, or any unrefined spill over 2m³ on lease must be reported to ERCB field centre immediately and landowner must be advised.

Other Regulations continued...

Fluid handling and Spills

- *Directive 055 - Storage Requirements for the Upstream Petroleum Industry*
 - Outlines requirements to prevent leaks
 - Leaks must be investigated, impacted soil must be remediated



Other Regulations continued...

Fluid handling and Spills

- *IL 98-1 - Release Notification Requirements*
 - All spills/releases must be reported to ERCB if:
 - >2 m³ on lease or any off-lease release
 - any release from a pipeline
 - any release that is causing or has caused an adverse effect (no matter what size, on- or off-lease)
 - ERCB ensures spills are contained, free hydrocarbon product is recovered. Further remediation dealt with by AENV.

Other Regulations continued...

Pipelines

- *Directive 066 - Requirements and Procedures for Pipelines*
 - Pipelines must have corrosion and cathodic protection
 - Overpressure protection requirements
 - Yearly review of maintenance program
 - Shutdown required for pressure loss situations
 - Pipeline failures must be reported immediately



Other Regulations continued...

Waste Disposal

- *Directive 050 - Drilling Waste Management*
 - Sets out requirements for proper handling of drilling waste
- *Directive 051 - Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements*
 - Most produced water and other fluids are deep-well injected (below BGWP)
 - Must inject through tubing (more protection for groundwater)
 - Require annual test to prove well integrity

Other Regulations continued...

Waste Disposal

- Directive 058 - Oilfield Waste Management Requirements for Upstream Petroleum Industry
 - Sets out responsibilities for proper handling of oilfield waste
 - oilfield waste management facilities:
 - applications must contain environmental site assessment info. Level of detail is dependant on 'type of facility'
 - most types of facilities require groundwater monitoring



Other Regulations continued...

Other groundwater protection requirements:

- No fluid may be stored in flare pits
- New flare pits not allowed since 1996
- Existing pits must be removed if found to contain hydrocarbons, produced water, or any other contaminant (e.g., chemicals)

Water Well Complaints

- If a water well owner/user notices a change in quantity or quality of water from their well, report it to AENV (1-800-222-6514)
- AENV initiates review of water well, may request ERCB support to provide specific information on energy wells and industry activity in vicinity
- If AENV determines there could be energy industry link, ERCB takes a major role in the continuing investigation and works directly with landowners, industry and AENV
- Impacts to water wells from the oil and gas industry are rare. Most water well issues are found to be related to drilling and/or maintenance of the water well.



Resources for the Public

- ERCB Website: www.ercb.ca
- ERCB Calgary Head Office: 403.297-8311
- 9 local field centres – 24 hr Emergency Service
- EnviroServices helpline: (403) 297-8330 or enviroservices@ercb.ca

Thank you

Questions?