THE ENERGY RESOURCES CONSERVATION BOARD

Workshop on Unconventional Oil & Gas: a Deep Dive
December 5-7, 2011 – Brussels

Regulator's Perspective on Sector Management

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Board Member

AGENDA

- **Alberta regulatory context**
- Regulatory fundamentals
- Regulation life-cycle
- **Basic regulatory requirements**
- Emergency management
- **Adapting regulatory framework for unconventional resources**

THE ALBERTA REGULATORY CONTEXT

Provincial (State) Context

Alberta created in 1905

1930: *Natural Resources Transfer Act*

Each Province owns and regulates its resources

Alberta Government…

- **Sets policy direction**
- **Grants tenure**
- **Sets and collects royalties**

Tenure as opportunity, not a right

Who Regulates Alberta's Energy Industry?

Government of Canada

National policies and standards

- Interprovincial pipelines
  - National Energy Board
- Fisheries and
- Navigable waters
  - Department of Fisheries & Oceans
  - Transport Canada
- Trans-boundry issues
  - Environment Canada
  - Candian Environ-mental Assessment Agency

Oil and Gas Companies

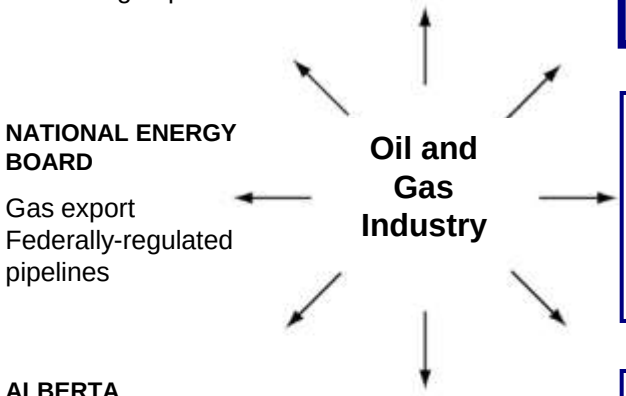
Resource exploration and development

Government of Alberta

Primary resource development jurisdiction

- Resource rights and Crown royalties
  - Alberta Energy
- Environment
  - Alberta Environment
- Public land access
  - Sustainable Resource Development
- Energy developments
  - ERCB

Regulatory Structure: Primary Regulatory Interfaces



PUBLIC

Notice of applications
Information
Directly affected
Public hearings

ALBERTA ENERGY

Energy policy
Mineral rights
Royalty
Pre-drilling exploration

ENERGY RESOURCES CONSERVATION BOARD

Facilities/scheme approvals
Information collection and dissemination
Compliance/inspections
Correlative rights

NATIONAL ENERGY BOARD

Gas export
Federally-regulated pipelines

ALBERTA ENVIRONMENT

Environmental standards and approvals
Environmental impact assessment
Pollution control

ALBERTA HUMAN RESOURCES AND EMPLOYMENT

Occupational health and safety

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY (CEAA)

SUSTAINABLE RESOURCE DEVELOPMENT & SURFACE RIGHTS BOARD

Surface access and rights-of-way on privately owned land

Structure of Alberta oil & Gas Industry Regulation

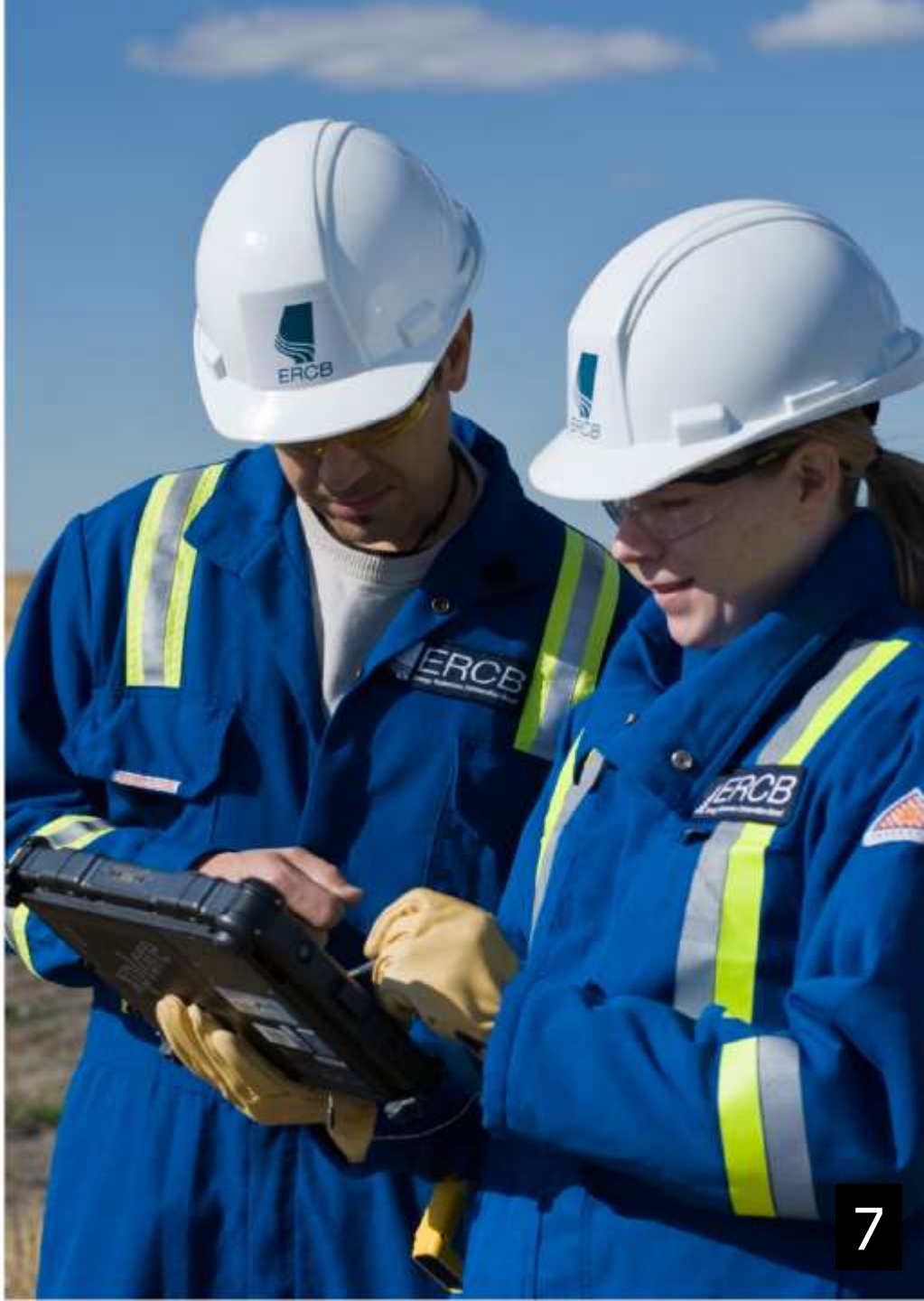
Government
sets policy direction

legislation

Regulators
administer policy

regulations

Industry
develops the resources



Separation of Policy and Regulatory Functions

Department of Energy

- Energy policies
- Mineral tenure
- Setting royalties
- Administering royalties

ERCB

- Authorization of projects
- Compliance
- Closure
- Information
- Advice

The ERCB…

- Arms' Length
- Independent
- Quasi-judicial administrative tribunal
- Creature of statute

ERCB Mission/Mandate

to ensure discovery, development and delivery of Alberta's resources…

take place in a manner that is safe, fair, responsible and in the public interest

…economic, efficient and orderly development in the public interest (need, resource conservation, reservoir equity)

taking into consideration environmental, social and economic factors…

<u>Cornerstones of mandate…</u>

Public safety

Environmental protection

Resource conservation

Orderly development

Technically skilled staff

Local field centres

ERCB legislated jurisdiction

Administrative Procedures and Jurisdiction Act

Environmental Protection and Enhancement Act

Energy Resources Conservation Act

- ERCB Rules of Practice
- ERCB Administration Fees Regulation

Coal Conservation Act

- Coal Conservation Regulation
- Agent Exemption Regulation

Gas Resources Preservation Act

- Gas Resources Preservation Regulation

Oil and Gas Conservation Act

- Oil & Gas Conservation Regulation
- Orphan Fund Delegated Admin Regulation

Oil Sands Conservation Act

- Oil Sands Conservation Regulation

Pipeline Act

- Pipeline Regulation

Turner Valley Unit Operations Act

STRONG FOUNDATION: REGULATORY FUNDAMENTALS

Principles of Sound Regulation

- Arms length
- Separation of responsibilities
- Fairness and transparency
- Certainty and clarity of requirements
- Focus on mitigating risks and solving problems
- Technical Competency

Principles of Regulation

Fair, just, open and transparent

- Parties that may be directly and adversely affected have a right to due process
  - Right to notice and to know the case to be met
  - Right to participate in decision (hearing)
  - Right to impartial decision maker and to reasons for decision

Effective and efficient

- Appropriate regulation of risks to prevent harms
- Efficient for Government, industry and public

Principles of Regulation

Continued

Identify and address issues before approval

- Alberta (ERCB) system is “front end loaded”
  - Address rights of directly and adversely affected parties
  - Sound decisions with regulatory certainty
  - Avoids litigation after approvals are issued

How the ERCB Operates

Regulations:
risk-based mitigation

Application Process
Routine / Non-routine
completeness of application

Hearings, Inquiries
industry/public intervenors
costs application

Compliance
field inspection, surveillance,
& enforcement

Emergency Management
mitigation, preparedness,
response, recovery

Liability Management
protection of public purse

Stakeholder Engagement
public, industry, GoA

Data/Information
collection & dissemination

Advice to Government
Alberta & other jurisdictions

Regulatory Approach

- Risk-based
- Identify potential harms
- Mitigate risks
- Spectrum of regulatory options…
  - **Prescriptive**
  - **Outcome-based**
  - **Best practices**
- Clear, appropriate requirements

Prescriptive Regulation

[Traditional, Command & Control, Technology-based, Rules-based, Black Letter Law, Specifications and Design Standards]

- **Traditional means-based approach**
  - mandates use of technology or behaviors
  - regulator identifies and assesses the risk, and mandates the control
- **Advantages**
  - high level of certainty
  - sets clear minimum standard
  - minimizes use of discretion
- **Disadvantages**
  - inflexible; complex rules tend to proliferate
  - difficult and slow to change
  - leads to compliance mentality

Performance-based Regulation

[Results-based, Outcome-based, Goal-based, and General Duty Clauses]

- **Ends-based approach**
  - achievement or avoidance of certain outcomes
  - regulator identifies and assesses risk
  - industry determines control
- **Advantages**
  - provides flexibility
  - promotes innovation
  - cost effective
- **Disadvantages**
  - can be vague and difficult to enforce
  - smaller companies may struggle with best approach
  - difficult to develop clear performance measures

Management-based Regulation

[Process- or System-based regulation, Control of controls, Risk-management requirements, Management systems]

- **Means-based approach**
  - mandates industry to engage in management practices
  - industry identifies, assesses and controls risk
- **Advantages**:
  - Increased flexibility
  - doesn't favour a particular technology
  - incentives to go beyond compliance
- **Disadvantages**
  - tendency to token implementation
  - can be problematic for small/medium enterprises
  - perception of self-regulation

REGULATION LIFE-CYCLE

Regulation Life Cycle

Allocation of resource rights (Energy)

- Leasing of Crown mineral rights

Authorization (ERCB, AENV, SRD, others)

- Project planning and stakeholder consultation
- Applications, Adjudication (hearings) and Approvals

Regulation Life Cycle

Continued

Operational compliance (ERCB, AENV, SRD)

- Monitoring and Data reporting
- Field inspections, investigations and enforcement

Closure

- Suspension and abandonment (ERCB)
- Remediation and Reclamation (AENV, SRD)

ERCB Regulation Life Cycle

Authorization

Application and Approval

- **Routine:** no objections
  - > 90% of facilities applications
  - < three-day turnaround

Non-routine: mandatory technical review and/ or objections

- Detailed expert review
- Appropriate dispute resolution
- Public hearings (11 in 2010)
  - Process provides funding for some interveners

ERCB Regulation Life Cycle

Decision Making

Adjudication/Hearing Function

- Board Members, sitting alone or as part of a hearing panel, make decisions on:
  - Determination of interested parties and interveners that may be directly and adversely affected
  - Pre-hearing matters
  - Hearing and decision
  - Cost awards
  - Appeals/review and variance of ERCB decisions
  - Section 106 Declarations

ERCB Regulation Life Cycle

Compliance and Assurance

Surveillance and Enforcement

- **Field inspections**
  - Nine field centres — community based inspectors
  - Inspections determined on facility risks and compliance history
  - > 25,000 field inspections, audits and desk-top information evaluations conducted in 2009
    - Industry compliance 98.6 per cent in 2009
  - Escalating enforcement consequences

ERCB Regulation Life Cycle

Compliance and Assurance Continued

- **Emergency Response**
  - Review and approve Emergency Response Plans — Emergency response exercises
  - Coordinated GoA response capability
- **Complaints**
  - Track and respond to public complaints

ERCB Regulation
Life Cycle Closure

Suspension and Abandonment

- **Technical requirements**
  - Suspended facilities
  - Well abandonment
- **Abandonment orders**
  - Loss of mineral and/or surface rights
  - Mitigation of environmental, safety and integrity problems

ERCB Regulation Life Cycle Closure

Continued

Liability Management

- **Licensee liability ratio**
  - Security deposits if liabilities > deemed assets
- **Orphan Fund**
  - Provides for abandonment/ reclamation of oil and gas sites from defunct companies
  - Industry levy to fund abandonment and reclamation

ERCB Regulation Life Cycle

Resource Evaluation

Alberta Geological Survey

- Geological evaluations and maps

ERCB

- Reservoir data, production histories
- Reserves, supply and demand reports and forecasts

ERCB Regulation Life Cycle

Advice to Government

Government of Alberta Policy Initiatives

- Resource and industry information
- Technical and regulatory expertise

Public Inquiry Powers

- Address regional or provincial issues
  - Sour gas
  - Gas over bitumen
  - NGL extraction

ERCB Regulation Life Cycle

Advice to Government

Continued

National and International Advice

- Recognized world class regulator
  - Resource regulation
  - Flaring (ERCB work basis for international standard)

Single Regulator Concept

Government policy initiative

REP [regulatory enhancement project]

"efficiency & effectiveness"

Create single entity

for regulation of oil & gas sector

elements currently in several departments…

Alberta Environment & Water, Sustainable Resource Development [crown lands], Municipal Affairs, et al

model new structure on ERCB

STRONG FOUNDATION:
BASIC REGULATORY REQUIREMENTS

Strong Foundation: Regulatory Fundamentals

Comprehensive system of safety, environmental, and technical requirements…

Well design

Casing and cementing

- blowout controls

Well completions

- shallow frac'ing

Pipeline specs & operations

- leak detection and controls

Strong Foundation: Regulatory Fundamentals

Facilities design and operations

- flaring, venting, and emissions

Waste management

- drilling wastes
- production and flow-back water
- oilfield wastes from operations

ERCB Basic Requirements

Dir 008: Surface Casing Depth Requirements

Dir 009: Casing Cementing Requirements

Dir 020: Well Abandonment…

Dir 027: Shallow Fracturing Restricted Operations

Dir 029: Applications and Hearing Process

Dir 031: Guidelines for… Cost Claims

Dir 035: Baseline Water Well Testing…

Dir 038: Noise Control…

Dir 044: Surveillance - Water Production in Wells

Dir 050: Drilling Waste Management…

Dir 051: Injection and Disposal Wells…

Dir 055: Storage Requirements

Dir 056: Energy Development Applications…

Dir 058: Oilfield Waste Management…

Dir 059: Drilling & Completion Data Filing…

etc…

Baseline Data and Monitoring…

- **Regional infrastructure**
  - Cumulative impacts of oil & gas developments projects
  - Land Use Framework [LUF] planning…
    [e.g., LARP - lower Athabasca River plan - etc]
  - URF play-based approach
- **Environment, Air Quality & Water**
  - ERCB field-based mobile monitoring units
  - Industry/Community & Independent organizations
    - Lakeland Industry-Community Association
    - Beaver River Watershed Alliance
    - Wood Buffalo Environmental Association, etc
- **Alberta Environment & Water**
  - All data sources for ambient air quality
  - Website daily reporting

Subsurface wellbore spacing …

- **Conventional oil & gas**

  resource conservation, optimum recovery, equity, etc

  - increased baseline well densities for conventional pools
  - no well density controls for lower quality reservoirs
  - common target areas province-wide for standard DSUs

- **Development Entities**
  - control wells & data

- **Unconventional resource developments**
  - play-focused… vs discrete fields/pools
    [i.e., no subsurface well density controls]

Casing & Cementing…

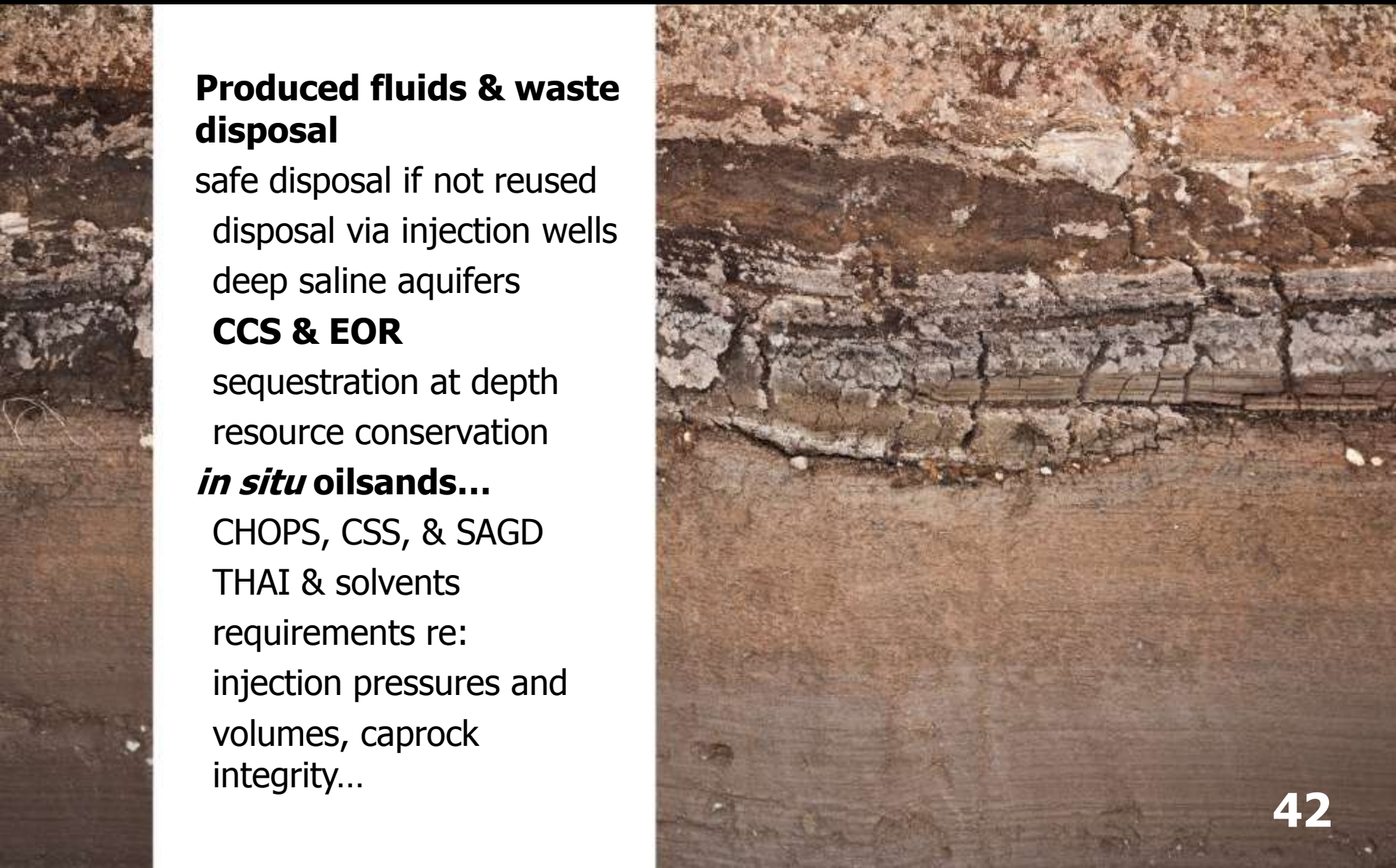
- **Surface casing & conductor pipe**
  - base of ground water protection; wellbore isolation
  - minimum depth requirements
  - minimum casing standards
  - conductor pipe cemented full length
  - surface casing centralized & cemented full length
- **Production, intermediate & liner**
  - design requirements dependant on fluids, temperatures
  - Special cements may be required [foam, thermal…]
  - cement volumes based on hole size + 20%
  - all strings centralized
  - cement flow returns visually monitored
  - cement tops verified by logs
  - liners cemented full length

Frac'ing…

- **Shallow zones...**
  - special requirements re frac'ing at shallow depths
  - adjacent water well testing, sampling and analysis

- **Frac fluids & additives…**
  - strict requirements re storage of fluids at well site to mitigate accidental release
  - authorization of frac pressures
  - concerns re interwell connectivity
  - frac fluid additives disclosure [FracFocus]
  - BC-AB-SK joint venture

Fluid injection & disposal…



Produced fluids & waste disposal

safe disposal if not reused

- disposal via injection wells
- deep saline aquifers

CCS & EOR

- sequestration at depth
- resource conservation

***in situ* oilsands…**

- CHOPS, CSS, & SAGD
- THAI & solvents
- requirements re:
- injection pressures and volumes, caprock integrity…

Compliance assurance…

Surveillance

inspections, audits, response to complaints

Enforcement

commensurate with risk level

Industry-Community

local organizations:
air-shed / watershed monitoring and protection

Reporting

publically on ERCB web-site

Induced seismicity…

- **ERCB [AGS] micro-seismicity project**
  - Province-wide networks [CNSN, ATSN, CRANE]
  - near real-time
  - ERCB/AGS + Univs + Govts
  - AGS-based analysis software [ASIS]
- **Industry area-wide micro-seismic arrays…**
  - collaboration among operators [AB-BC border]
  - play-based approach
- **Individual wells**
  - monitoring of frac'ing during drilling & completion
  - condition of well approval?

Liability management…

Licensee responsible

abandonment, remediation & reclamation

LLR [licensee liability ratio]

security deposits
if liabilities > deemed assets

standardized methodology
allows site-specific assessments

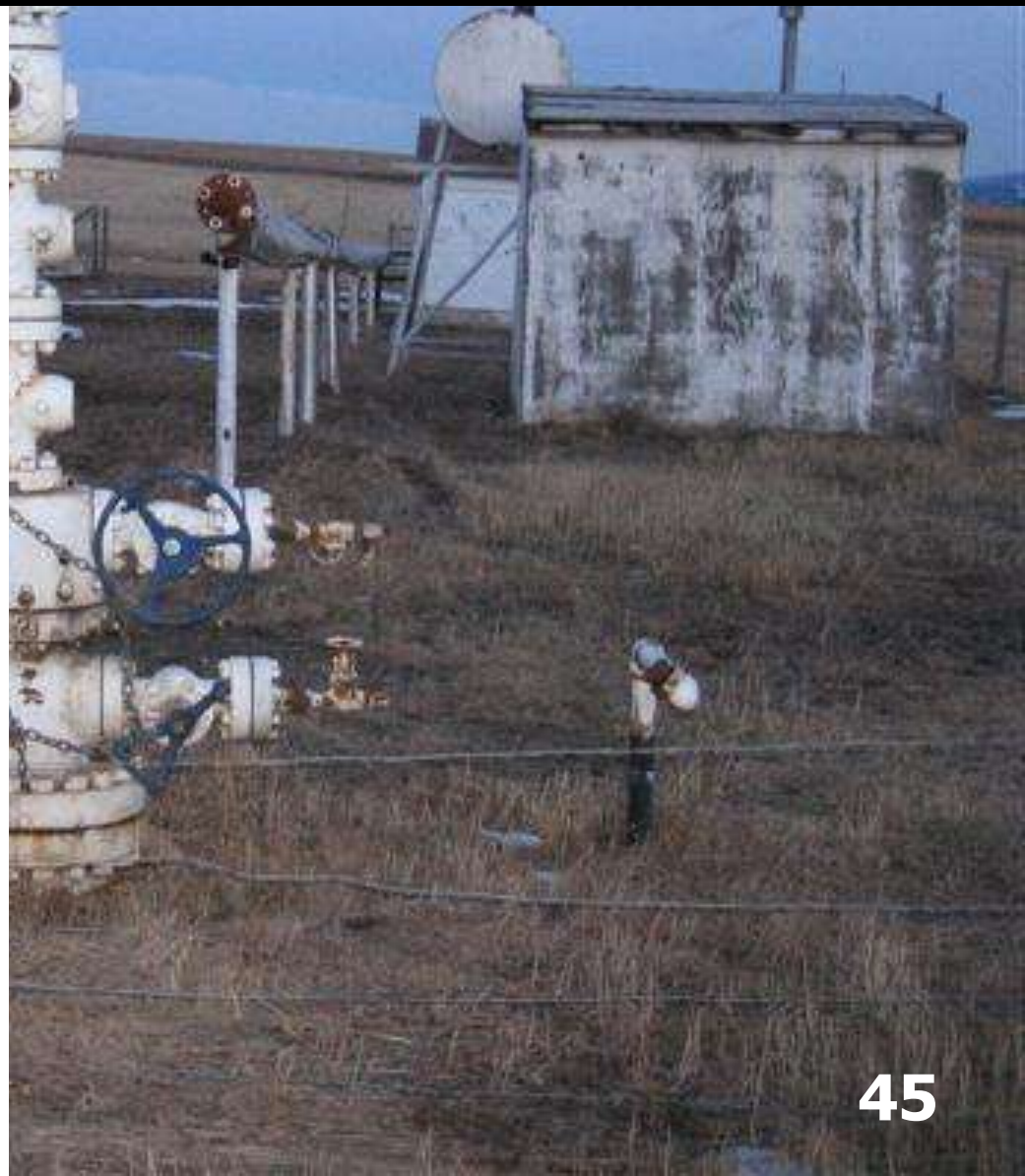
deemed assets =
3x production netback

Orphan Fund

independent body [OWA]

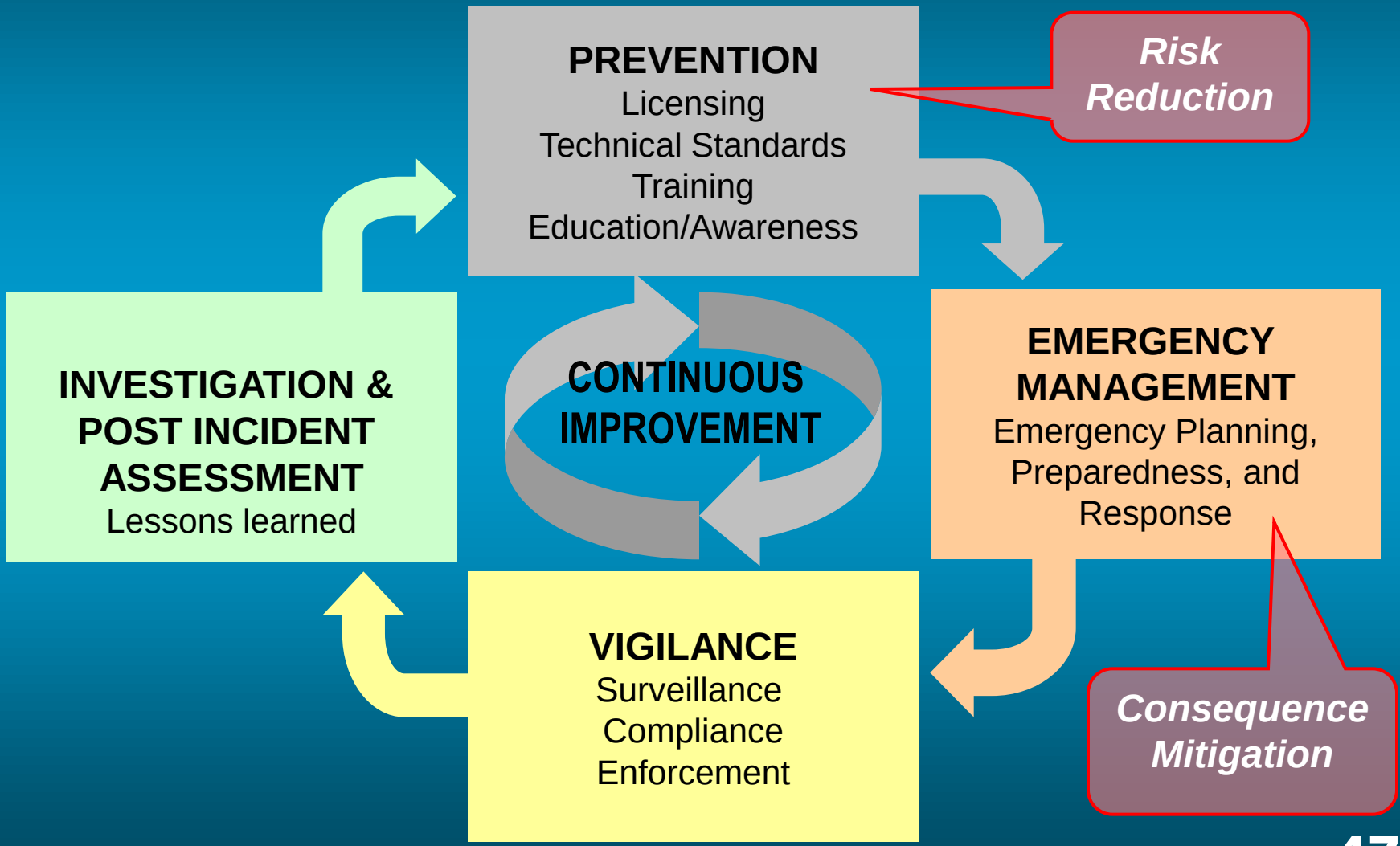
ERCB designates orphan sites
[no viable licensee]

funding by industry levy

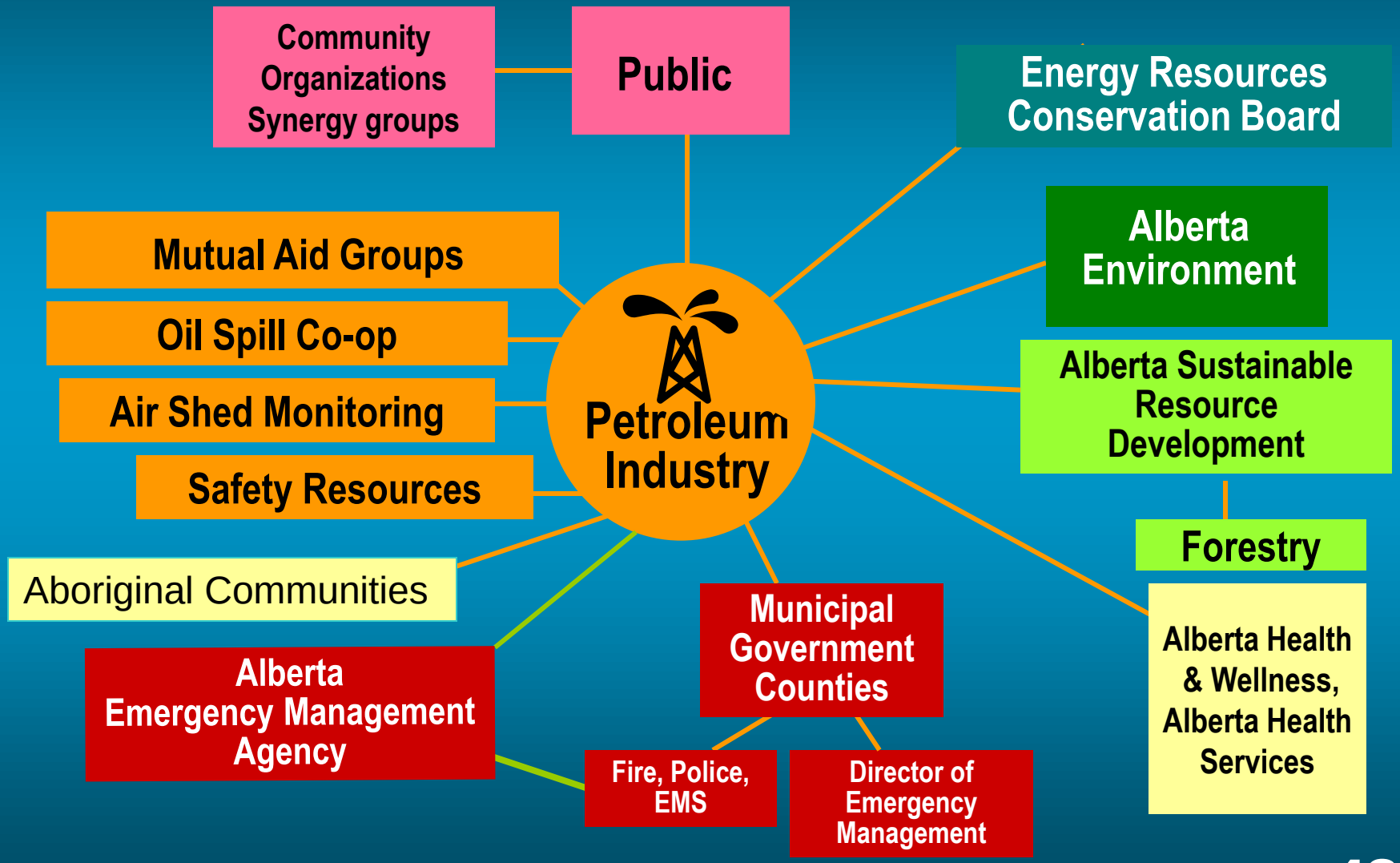


EMERGENCY MANAGEMENT

ERCB Emergency Management System



Oil & Gas Industry Incident Response



Inter-agency Response

ERCB

Alberta Environment

AEMA – Alberta Emergency Management Agency

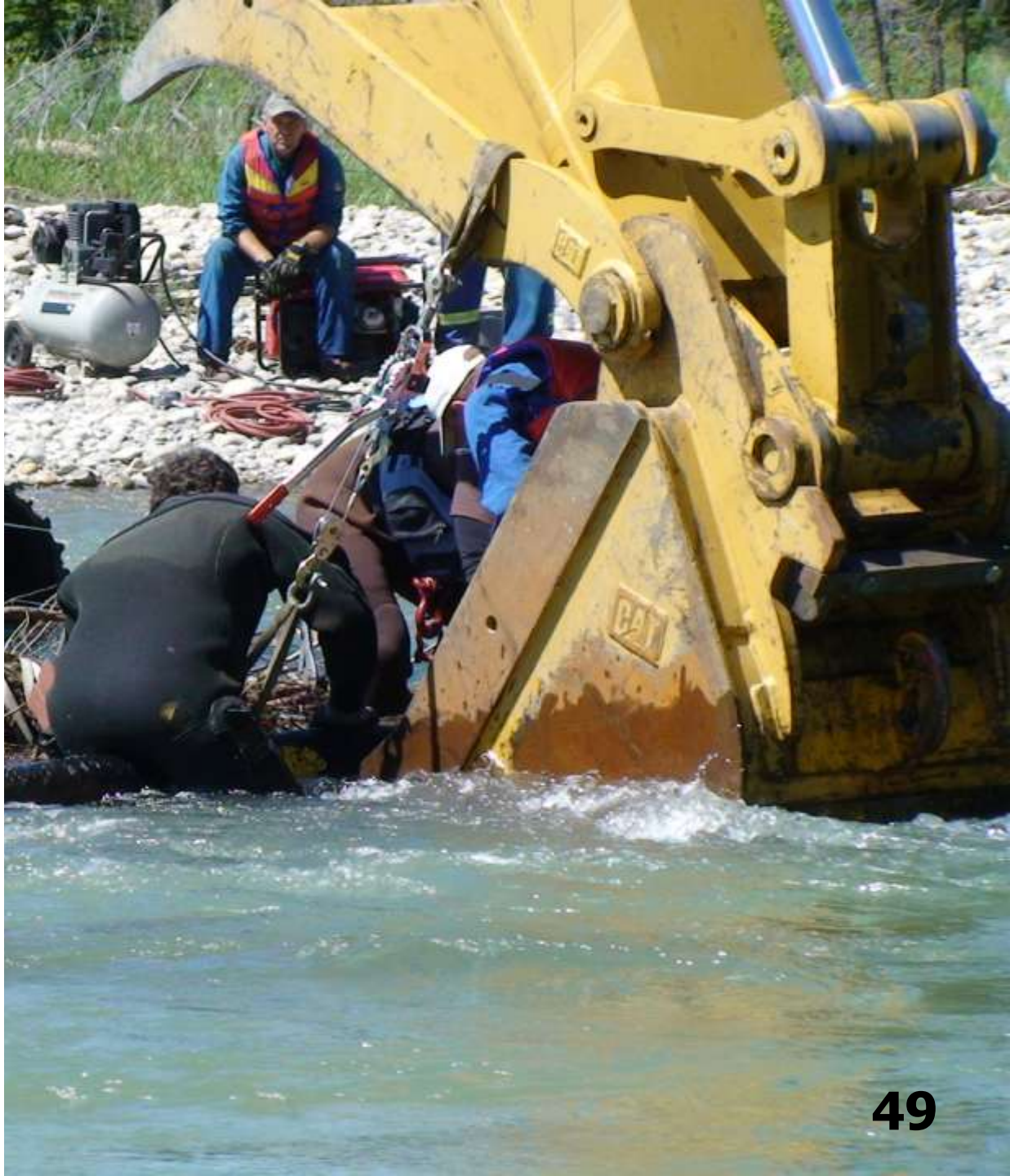
SRD - Sustainable Resource Development

Alberta Health Services

Local Health Region

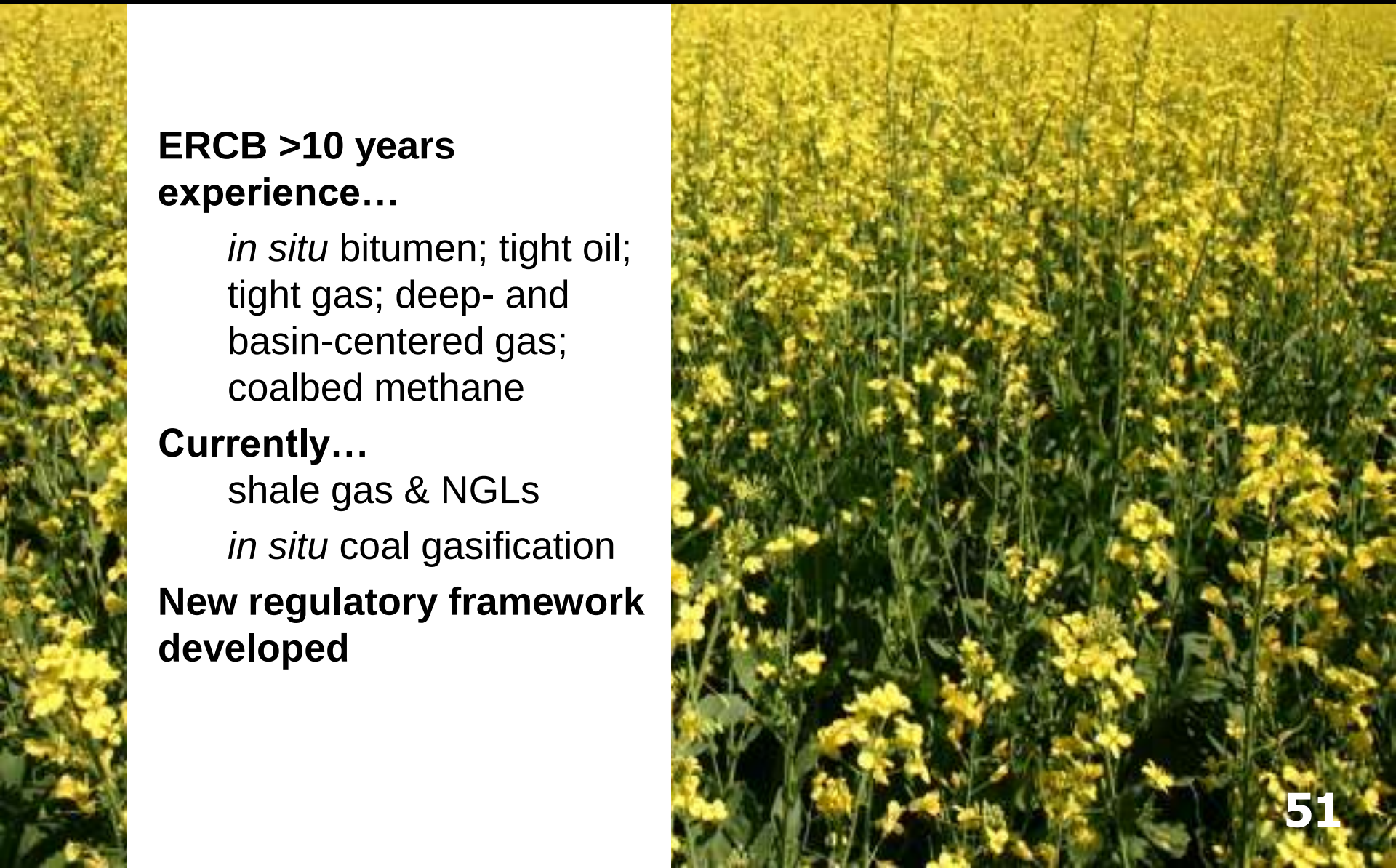
Dept Fisheries & Oceans

Coast Guard



ADAPTING REGULATIONS FOR UNCONVENTIONAL RESOURCES

Regulating Unconventional Resources…



ERCB >10 years experience…

- *in situ* bitumen; tight oil; tight gas; deep- and basin-centered gas; coalbed methane

Currently…

- shale gas & NGLs
- *in situ* coal gasification

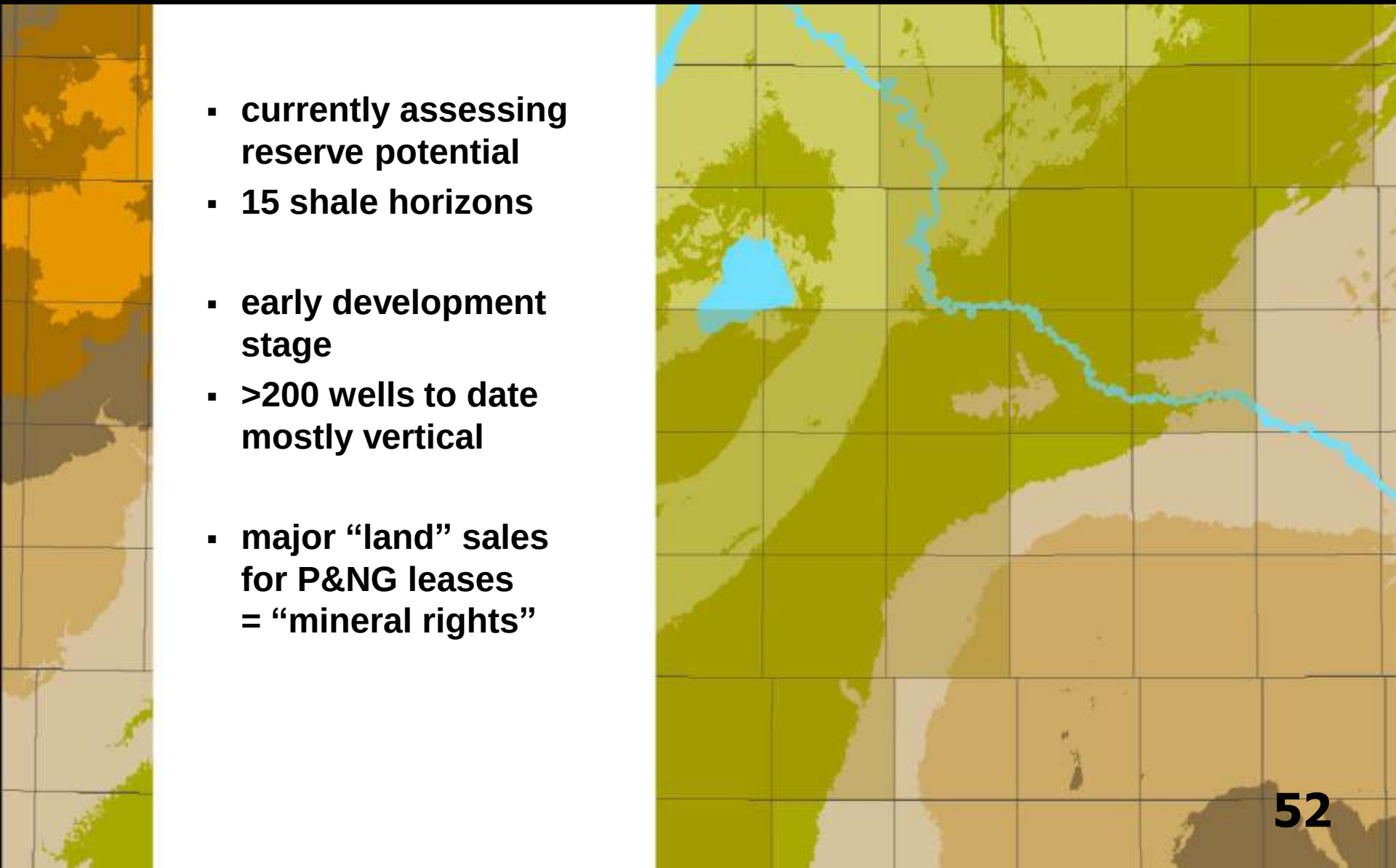
New regulatory framework developed

Shale Gas in Alberta…

- currently assessing reserve potential
- 15 shale horizons

- early development stage
- >200 wells to date mostly vertical

- major “land” sales for P&NG leases = “mineral rights”



Changes Driving Concerns…

- **Societal...**
  - population growth/density
  - urban encroachment / *urbs in rure*
  - surface & ground-water protection and use

- **Type of Resource Development…**
  - depleting conventional oil & gas
  - emergence of unconventional resources
  - ***technology*** advances, improved economics
  - ***"play"*** areas… vs discrete fields/pools
  - ***"light industrial sites"…*** vs individual wells

[cont'd]…

- **Nature of Industry…**
  - companies created/driven by Financial sector
  - five-year exit strategies
  - less community involvement

- **Stakeholder expectations…**
  - **Industry**: regulations relevant to new realities
  - **Govt**: streamlined approach - *the Alberta Advantage*
  - **Public**: increased societal/environmental concerns; desire to participate in development planning

Who are the Stakeholders?

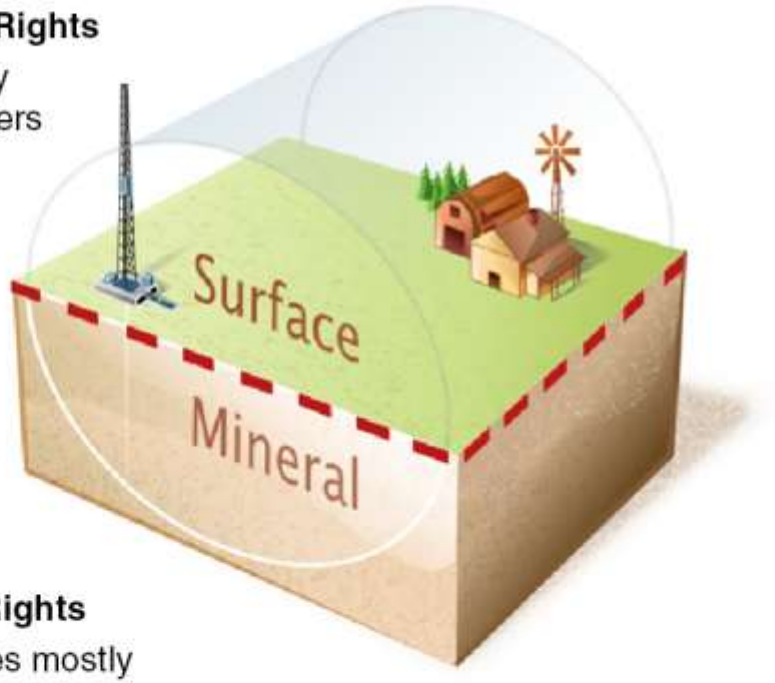
- **Provincial Government**
  - revenues: royalties, lease payments
- **All Albertans**
  - lower taxes
- **Municipal & Rural Governments**
  - revenue: tax base
- **Landowners**
  - gamut of *quality of life* issues
- **Oil & Gas Industry**
  - mineral rights, profits

Purpose of Energy Regulation

Rights of Parties —Two Types of Rights in America

Surface Rights

Owned by Landowners



Mineral Rights

Companies mostly lease from Government of Alberta

ERCB as a Regulator must consider rights of both parties

Industry/Landowner potential conflicts…

Surface impacts

- preservation of way of life
- proliferation of facilities, traffic, noise, dust, land use conflicts
- setbacks, property values, legacy issues…

Environmental protection

- groundwater protection, shallow production, water use…
- health & safety, wildlife, plant species etc

Corporate behaviour and performance

- community consultation, plans for area development, industry's compliance record…

New technology

- Horizontal drilling, multi-stage frac'ing, chemicals, steam, solvents, in situ combustion, water management and use…

Desired Regulatory Outcomes

- Sustainable levels of non-saline water use
- Non-saline water: maintain quality of surface- and groundwater
- Waste management: conserve resources, minimize waste
- Air quality: no unacceptable effects
- Optimum recovery of resources
- Maximum gas conservation
- Resource owners' equitable opportunity for share of production
- Planned/coordinated development
- Minimization of regional impacts and cumulative effects
- Public safety protected
- Information available for decision making

How to Manage the Situation?

Effective industry-community consultation

Early & continuing involvement

Nature, scope, scale and duration of activities

Appropriate corporate citizenship/behaviour

Maintain
"social license to operate"

Modified Regulatory Framework

- **Build on risk-based, play-focused concept**
- **Address identified high level risks**
- **Development plan for ‘play’ area**
- **Benefits gain at ‘play’ scale** [4 key elements]
  - Water Management
  - Surface Infrastructure
  - Sub-surface Reservoir Management
  - Stakeholder Engagement

Why Play-focused?

Alberta Watersheds

Regional Issues

require regional solutions

- **Water Management and Protection** (Risk 1)
- **Development Planning and Cumulative Effects** (Risk 3)

Local Issues

- **High-Pressure Hydraulic Fracturing** (Risk 2)

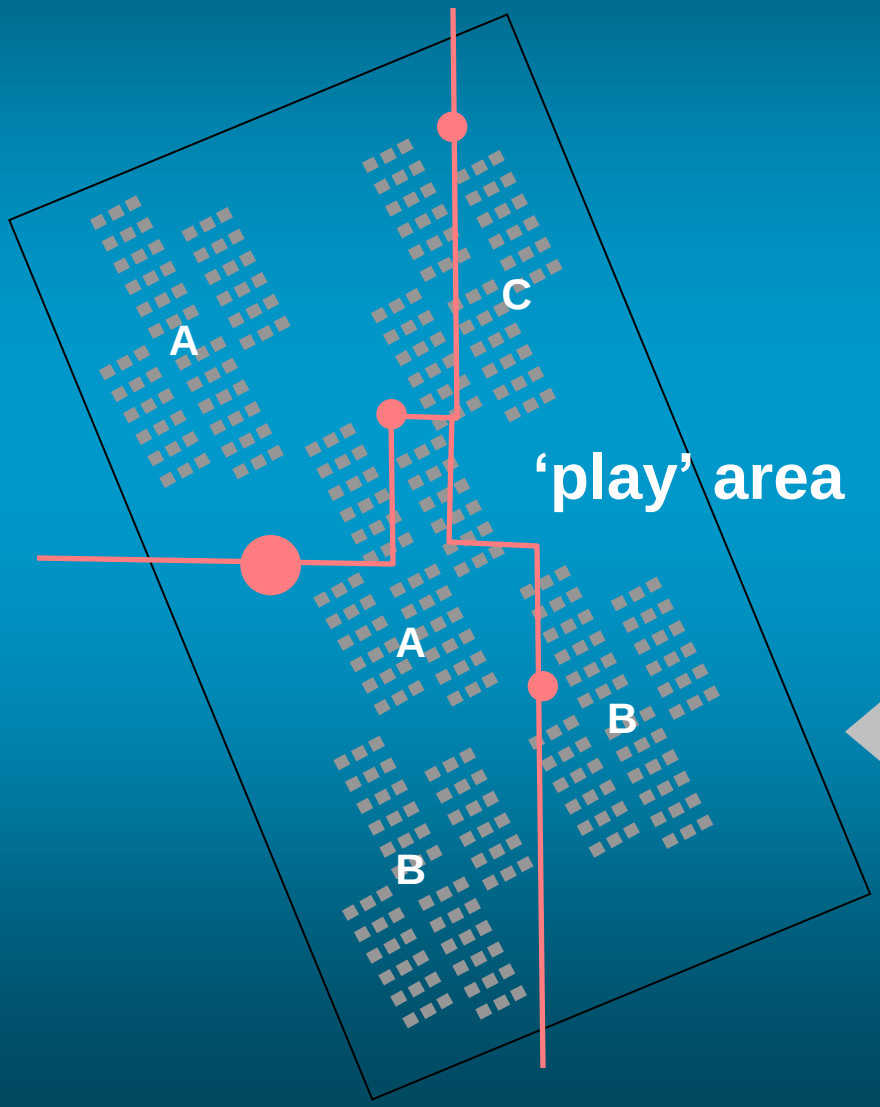
How does it work?

- **Existing entity-based requirements**
  - Foundation, enhanced/relaxed
- ***New* - Pad Approval – consolidates approvals**
- ***New* - Project Plan Application**
  - addresses 4 key areas, operator specific
- ***New* - Play Development Plan**
  - all operators collectively address all 4 areas

Unconventional Resources Regulatory Framework…

Existing	New
Well/Pool (entity) focus	**Regional (play) focus**
Reactive	Proactive
Individual operator performance	Combined operator performance
Single entity license approvals	**Pad / Project Approvals**
Activity authorizations	**Play/Project Planning** - Water Management - Surface Infrastructure - Sub-surface Reservoir Management - Stakeholder Engagement **Monitoring & Outcome Assurance**
Prescriptive regulation	**Outcomes focus**
Data by well / pool	Data by pad / project / play
Management of pools	**Management by plays**

Play-focused Regulation



‘play’ area

project

well pad

individual wells


MGV


TRICAN
TRICAN
TRICAN


Surge Tanks
Diesel
Electrical
Wireline Units
Well Test
Equipment
Command
Centre
Frac Sand
Frac Pumps
Coiled Tubing
Wellheads
Frac Line

Piceance Basin Producing Shale Gas Pad

Summary highlights…

Development scale different

Outcomes established up front

Regulatory focus; regional scale development – ‘play’

Fulsome development planning - 4 key areas

Collaboration among industry operators

Performance-based regulation - where appropriate

Away from front-end loaded authorization process…

… to planning, audit, and performance monitoring

Approvals at higher levels

Community involvement/awareness early

AGENDA

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- Regulatory fundamentals
- Regulation life-cycle
- **Basic regulatory requirements**
- Emergency management
- **Adapting regulatory framework for unconventional resources**

ENERGY RESOURCES CONSERVATION BOARD

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