OIL AND GAS 101 - BASICS

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OIL & GAS 101 - BASICS

The law firm of Lind & Ottenhoff, LLP is special counsel to the Town of Windsor regarding oil and gas matters.

L&O does not represent oil and gas companies.

This presentation is for educational purposes.

Time for questions and discussion will follow the slide presentation.

Mineral Estate & Surface Estate

- The mineral estate may be separated from the surface ownership.
- Surface owner does not have the right to prevent the development of the subsurface mineral estate.
- If an oil & gas lease is silent about surface use, there is an implied right to use the surface to develop the minerals.
- "Reasonable Accommodation Doctrine" - "An operator shall conduct oil and gas operations in a manner that accommodates the surface owner by minimizing intrusion upon and damage to the surface of the land." *CRS.34-60-127.*
- L & O recommends both Oil & Gas Lease and Surface Use Agreements.

What about Surface Owners?

- "Reasonable Accommodation"
  - C.R.S. §34-60-127(1)(a) requires oil and gas operators to conduct operations to accommodate the surface owner by "minimizing intrusion upon and damage to the surface of the land."
  - Select alternative locations for wells, roads, pipelines, production facilities, etc.
  - Mitigate the impacts of oil and gas operations on the surface as technologically sound and economically reasonable
  - This does not prevent an operator for entering and using the surface as is reasonable and necessary for exploring and developing oil and gas production.

Oil & Gas Lease Provisions:

- Granting Clause – defines what rights are granted and defines property.
- Duration Clause – usually includes a "primary term" and "secondary term".
  - Oil & Gas wells "capable of producing in paying quantities".
- Royalty Clause – defines the payment amount and method of calculation.
  - Royalty "free of costs" – may include "marketable" provision for gas.
  - Paying a higher percentage minus "Post-Production Costs".
- Pooling Clause – combining leased lands with adjoining lands to form a "pool" or a "unit".

Oil & Gas Pooling - Voluntary

- Voluntary pooling – the landowner(s) agree to pool their lands and influence the conditions of drilling and operations.
  - Surface Use Agreement – locations of drill sites, roads, pipelines; remediation, etc.
  - Pugh Clause – the lease will end in all non-producing areas when the primary term ends. This means that drilling operations or production in a part of the pooled unit will not preserve the whole lease. Portions of the leased lands that are not held by production are released from the lease.

Oil & Gas Pooling - Compulsory

- Compulsory or Forced-pooling – most states have statutory provisions allowing or compelling landowners to enter into a pooling arrangement.
  - Purpose – protect property owners from loss by production on adjacent lands.
  - Current environment – used by mineral development companies to consolidate both leased and non-participating lands into drilling units.

Pooling Considerations for Landowners

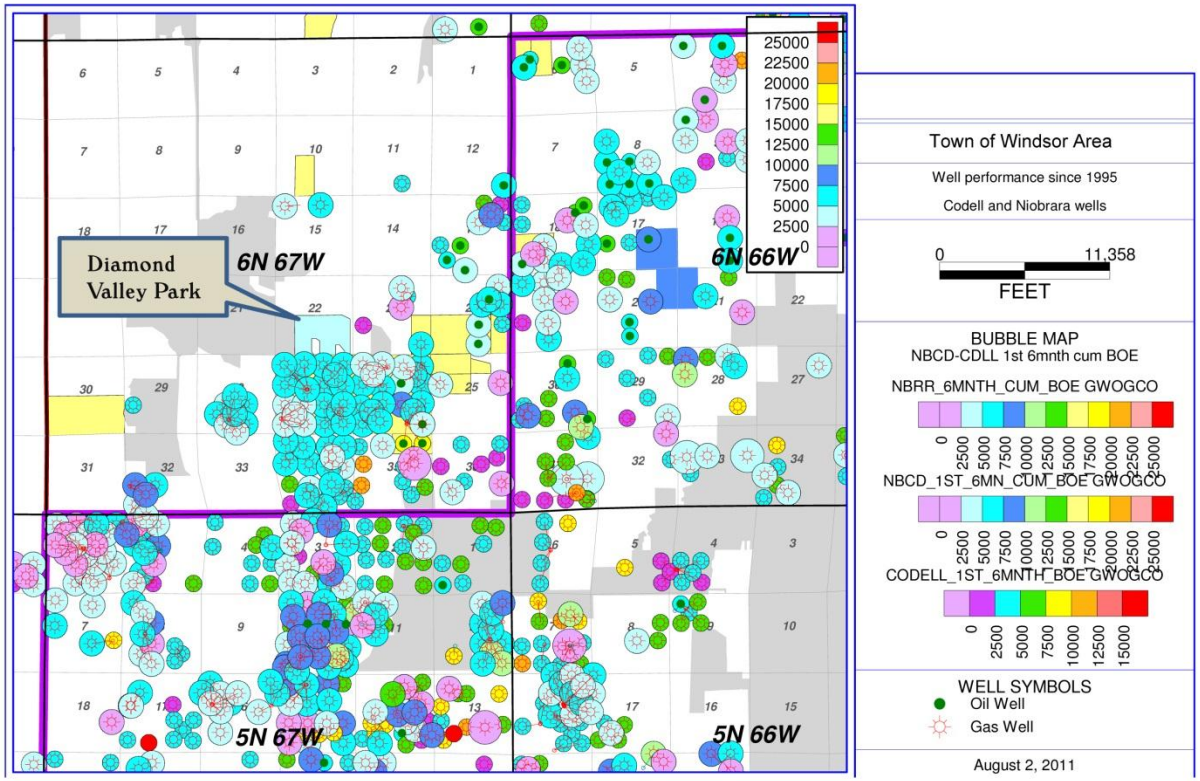
VOLUNTARY POOLING	**FORCED POOLING**
Influence provisions and operations	No direct control, "reasonable use"
Royalties from 12.5% to 20%	Royalty of 12.5% or "PPC" terms
Bonus Payment (thousands per acre)	No Bonus Payment ($0.00 per acre)

Regional Municipalities with O&G Development

Brighton	Brush
Dacono	Frederick
Milliken	Evans
Longmont	Loveland
Wellington	Kersey
Fort Lupton	Firestone
Erie	Greeley
Johnstown	Eaton
Severance	Fort Morgan

Wells Adjacent to Windsor

Bubble Map and Location for Town of Windsor



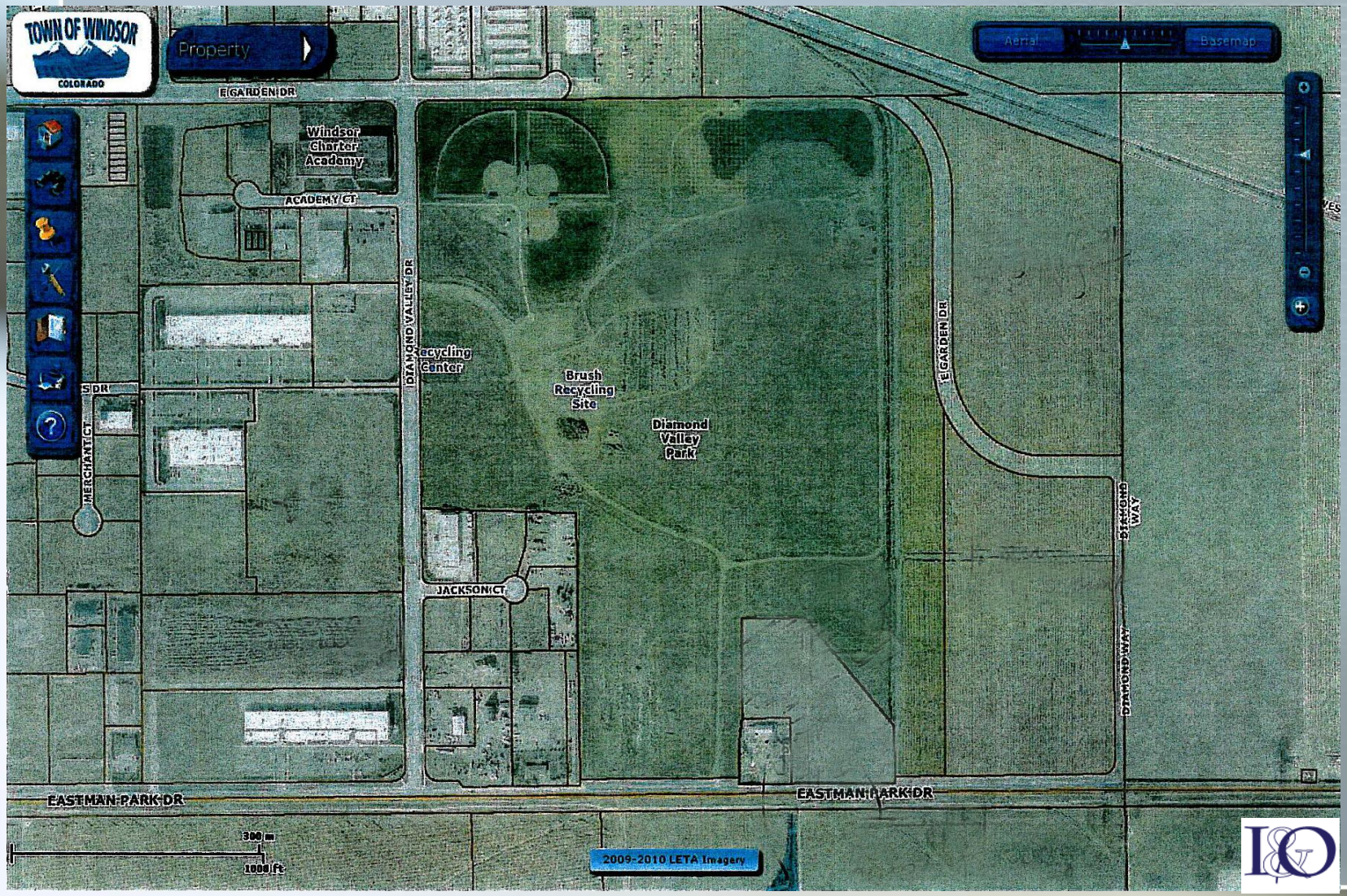
Sample set: 605 wells that have been drilled and completed in the Codell and Niobrara since 1995
NBCD (COMMINGLED Codell and Niobrara production stream and CDLL (Just Codell Stream)
Deviated wells: 197
Vertical wells: 408
BOE is calculated by adding oil in barrels (BBLS) to gas in MCF/6

Figure 1

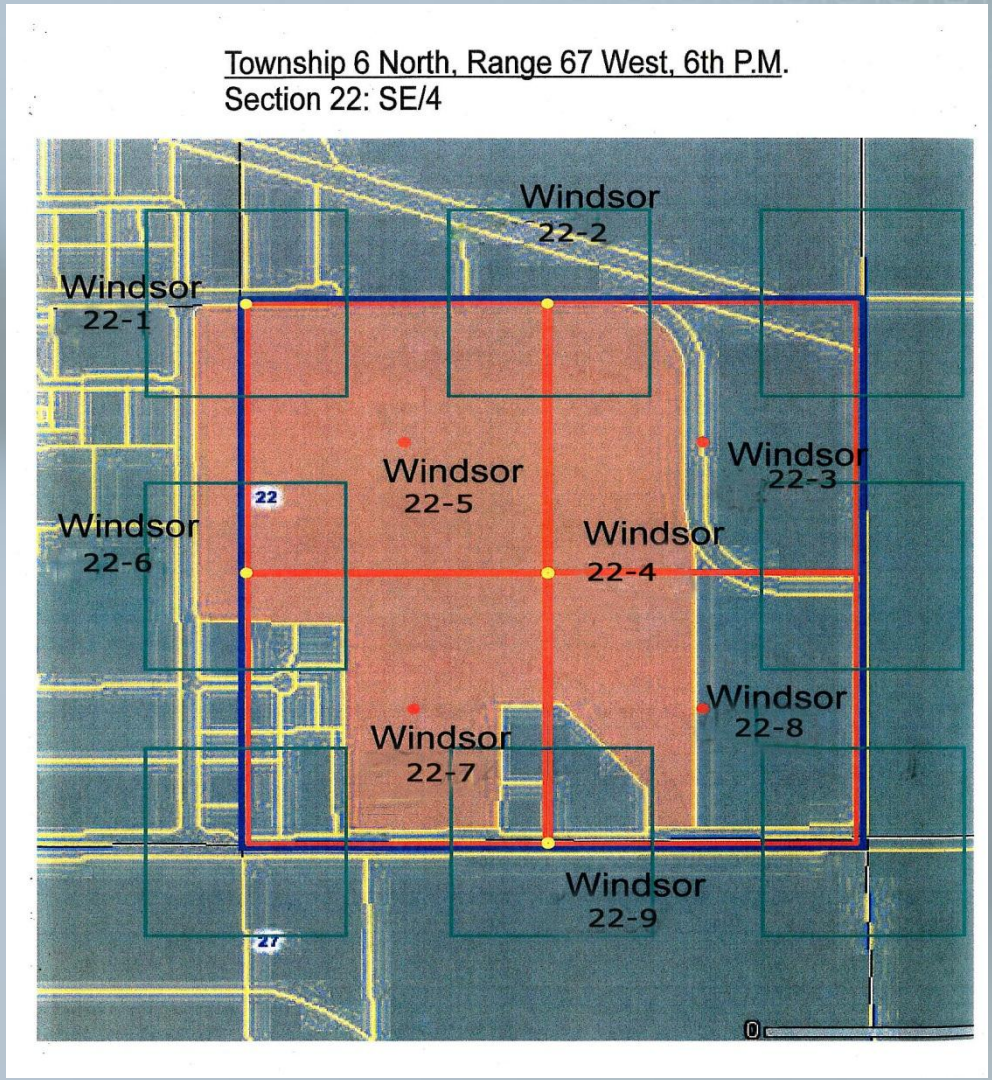
Vertical Drilling

Directional Drilling

Diamond Park Aerial



Example Well Placement



Colorado Oil and Gas Conservation Commission

Under the Oil and Gas Conservation Act, the Commission's mission is:

> To foster the responsible, balanced development, production, and utilization of oil and gas in a manner consistent with protection of public health, safety, and welfare, including protection of the environment and wildlife resources.

C.R.S. 34-60-102(1)(a)(I)

Colorado's Process for Permitting Oil and Gas Wells: Form 2

- Anyone seeking to drill a natural gas or oil well in Colorado must submit a Form 2, **Application for Permit to Drill** ("APD"), under COGCC Rule 303.a.
- The APD includes information on
  - the well location
  - formations and spacing
  - and drilling plans and procedures, including the casing, cementing, and blowout preventer
- This information is reviewed by engineers and permit technicians at the COGCC, and additional conditions are imposed where necessary to protect public health and the environment.

Colorado's Process for Permitting Oil and Gas Wells: Form 2A

- Applicants must also submit a Form 2A, **Oil and Gas Location Assessment**, for the well pad and certain related facilities under Rule 303.b.
- The Location Assessment contains information about the location, including information about
  - the equipment to be used
  - nearby improvements
  - surface and ground water
  - access roads
  - current and future land uses
  - and soils
- This information is reviewed by environmental professionals at the COGCC, and conditions of approval can be imposed where necessary to protect public health and the environment.

Colorado's Process for Permitting Oil and Gas Wells: Public Notice Rule (Rule 305)

- All Location Assessments and associated APDs are subject to public notice and at least 20 days of public comment under Rule 305.
- Special notice is provided to the local government, the surface owner, and, across most of the state, the owners of surface property within 500 feet.

What about Surface Owners?

- COGCC Rule 305 Requires:
  - Notice of Intent to Drill – 305e
    - 30 days before starting
  - Notice of Subsequent Operations – 305e(4)
  - Notice of Final Reclamation – 305e(6)
  - Waiver of Notice Requirement – 305e(7)

Colorado's Process for Permitting Oil and Gas Wells: Consultation (Rule 306)

- Operators are also required to consult with the surface owner and the local government in locating certain facilities under Rule 306.
- If a proposed well pad is located in an important wildlife habitat, then the COGCC will consult with the Colorado Division of Wildlife.
- If the operator seeks a variance from certain environmental regulations or the local government requests, then the COGCC will consult with the Colorado Department of Public Health and Environment.

What about Surface Owners?

- COGCC Rule 306 Requires:
  - Operator must consult in "good faith" with surface owner
- "Good Faith Consultation":
  - "…Such good faith consultation shall allow the surface owner or appointed agent the opportunity to provide comments to the operator regarding preferences for the timing of oil and gas operations and preferred locations for wells and associate facilities."

    Rule 306(2)

Colorado's Process for Permitting Oil and Gas Wells: Approval

- After staff review and any consultation and public comment, Location Assessments and APDs are approved by the COGCC Director.
- The COGCC may attach technically feasible and economically practicable conditions of approval under Rule 305, and the COGCC often does so to protect public health and the environment.
- Applicants must also provide financial assurance to the State under Rule 304 and the 700 Series of Rules.
- After drilling and completion of the well, additional reporting requirements apply under Rules 308A, 308B, and 309.

What is Fracing?

- Hydraulic fracturing is the process of creating small cracks, or fractures, in underground geological formations to allow oil or natural gas to flow into the wellbore and thereby increase production.
- In Colorado, the target formation is often more than 7,000 feet below the ground surface and more than 5,000 feet below any drinking water aquifers.

What is Hydraulic Fracturing?

- To fracture the formation, special fracturing fluids are injected down the well bore and into the formation. These fluids typically consist of water, sand, and chemical additives.
- The pressure created by injecting the fluid opens the fractures. Sand is carried into the fractures by the fluid and keeps the fractures open to increase the flow of oil or natural gas to the well bore.
- The chemicals serve a variety of purposes, including increasing viscosity, reducing friction, controlling bacteria, and decreasing corrosion.
- Following the treatment, much of the fracturing fluid flows back up the well bore and is collected at the surface in tanks or lined pits.

What Materials are Used in Fracing?

- About 99.5% of the fracing fluid is water and sand.
- Other typical ingredients include friction reducers, gelling agents and biocides. In Colorado, a type of salt called potassium chloride (KCl) is a common additive and can constitute 2% to 4% of the fracing fluid.

Why is Hydraulic Fracturing Necessary in Colorado?

- Fracture treatment of oil and gas wells in Colorado began in the 1970s and has evolved since then because most of the hydrocarbon-bearing formations in Colorado are dense: they have low porosity and permeability.

- Without fracturing them, these formations would not produce enough quantities of hydrocarbons.

How is Groundwater Protected?

- The COGCC requires all wells to be constructed with a cemented surface and steel casing to isolate and protect fresh water aquifers.
- Surface casing must extend 50 feet below the base of the freshwater aquifer to seal it off from any possible migration of fluids associated with oil and gas development.
- The production casing cement is required to be verified by a specialized well survey (cement bond log) on all wells.
- After it is determined that the well is capable of producing oil or natural gas, a tubing string is set to provide an added layer of separation between the oil or natural gas stream and freshwater aquifer.
- The multiple layers of steel and cement used to construct an oil or natural gas well, when properly installed, provide several layers of protection to prevent the contamination of freshwater zones.

Ground Water Protection

- Properly drilled, completed, operated, and P&A to ensure and maintain isolation of productive zones from GW & SW.
- Properly stored, treated, reused/recycled, transported, and disposed of wastes.
- Properly installed and maintained associated equipment & E&P waste management facilities.
- Rapid response to and thorough remediation of impacts from spills and releases.

COGCC - Inspections

- Fifteen Inspectors in Colorado
- Over 17,000 inspections in 2010
- Most are unannounced

Complaint Response

- Response within 24 to 48 hours
- Water testing and analysis: Collect samples from water wells, soil or other media for field and laboratory analyses
- Collect samples of gas, oil, condensate, produced water, flow back, or other wastes from nearby oil and gas wells
- Compare analytical results to background and water regional water quality
- Compare stable isotopic signatures and composition of gas samples to determine source
- Reports

Sources and Resources

- **Sources for this Presentation include:**
  - Colorado Oil & Gas Conservation Commission, "COGCC Presentation on Hydraulic Fracturing", (05/2011).
  - Colorado Oil & Gas Conservation Commission, "Frequently Asked Questions About Hydraulic Fracturing".
  - "Oil and Gas Law Short Course" by Rocky Mountain Mineral Law Foundation, Institute for Energy Law of the Center for American and International Law, and Energy & Mineral Law Foundation.
  - "Oil and Gas Law in a Nutshell" by John S. Lowe. West Nutshell Series.

- **For more information on Gas and Oil Production, visit**:
  - http://cogcc.state.co.us/
  - http://www.api.org/
  - http: //www.coga.org/index.php
  - http://westernenergyalliance.org/