The Cana Woodford Shale
Devon’s Water Management Strategy

2010 Oklahoma Governor’s Water Conference
Richard Luedecke
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Devon - Who we are

Proved reserves (12/31/09): \approx 2.6\ Billion\ BOE

Current production (Q2 2010): \approx 620\ MBOED

Reserves mix (Q2 2010): 59\%\ natural\ gas 
41\%\ liquids

Reserves/production ratio: \approx 11.5\ years

Enterprise value: \approx $33\ Billion

Among the largest independent natural gas and oil producers in North America
Larger than you might think...
Enterprise Value

US$, Billions

#1 Innovation
Fortune’s Most Admired

Nike
Halliburton
devon
FedEx
Starbucks
Marriott
Southwest Airlines

Source: Enterprise Value as stated on Yahoo! Finance on Oct. 6, 2010.
Daily natural gas production in North America - Q2 2010

Note: Production based on second quarter 2010 reported results.

(1) ExxonMobil Q2 results are proforma for the XTO acquisition.
The shale gas revolution:
Declaring America’s energy independence
North American shale gas
Basins and plays

From 2006 to year-end 2008, resource base rose from 1,321 to 1,836 Tcf (39% increase), and it continues to rise.

Sources: EIA, Potential Gas Committee, Ziff Energy
Devon’s Woodford shale presence

- Net acres: 286,000
- Reserves: 120 million barrels of oil equivalent
- 2010 drilling plans: 155 wells
- 2010 capital investment: $950 million
Technology’s role
Why the revolution

Traps vs. shales

Fracture stimulation 5,000’ - 15,000’ below the surface

Migrating hydrocarbons

Porous and permeable reservoir layer

Frack

Hydrocarbon Trap

Impermeable sealing layer

Shale organic rich source layer
Hydraulic fracturing
Key to the revolution
Groundwater protection
Through proper well construction

Cement
Conductor casing
Aquifer
Cement
Surface casing
Drilling fluid
Intermediate casing
Production casing
Production tubing

2,000 ft.
4,000 ft.
6,000 ft.
8,000 ft.
10,000 ft.
13,500 ft.

Impervious rock layers

In the Cana
Hydraulic fracturing
3-7 day process

• Typical Cana Woodford Shale well can require approximately 6 million gallons of water
  – This represents the equivalent amount of water used for nine Olympic size swimming pools
• Flowback: A portion of the injected water recovered in the first few weeks
• Produced water: Water that is naturally present in the formation; it is recovered over the life of the well
Hydraulic fracturing
Key to the revolution

- Excellent environmental record over decades
- Thoroughly regulated by states
- Continually improving well construction
- Steel and cement protection of aquifers
Water use in the Cana Woodford
Projected water demand
Canadian County - 2010

Canadian County is the most active shale gas play in Oklahoma, with the greatest number of rigs currently operating in the state.

SOURCE: Oklahoma Water Resources Board
Projected water demand
State of Oklahoma - 2010

Irrigation: 40.0%
Oil & Gas Activities: 2.3%
Livestock: 5.1%
Thermoelectric Power: 14%
Self-Supplied Industrial: 4.8%
Self-Supplied Rural Residential: 1.6%
Municipal & Industrial: 32%

SOURCE: Oklahoma Water Resources Board
A shared resource
A shared responsibility

• Alignment with the OWRB Water Plan goals:
  
  – Provide safe and dependable water supply for all Oklahomans while improving the economy and protecting the environment

  – Provide Information so that water providers, policy makers, and water users can make informed decisions concerning the use and management of Oklahoma’s water resources
Water Sustainability Principles

• Devon is committed to the principles of conservation and re-use of water where feasible through the following:

  – Educating and working closely with governmental authorities and members of the public concerning water usage needs and the necessity of water management

  – Identifying usage needs, determining resource availability and monitoring water use

  – Applying conservation practices and identifying opportunities to improve water use efficiency
Water recycling

Barnett Shale
Mobile heated distillation system
Devon and Fountain Quail Water Management

- Approved by the Railroad Commission of Texas in 2005
- Implemented in 2005
- Vaporizes frack flow-back water and condenses it into clean, distilled water
- Remaining concentrated water removed for disposal or utilized for controlling pressures in another well completion as a “kill fluid”
Water recycling results

- 22,500 bbls/day at peak
- 12.9 million barrels processed (542 million gallons)
- 10.1 million barrels of distilled water generated (424 million gallons)
- 100+ wells fracked with recycled water
Water blending strategy

Cana Woodford Shale
Opportunities for water reuse
Efficiency in the Cana Woodford Shale

• Exceptional flowback and produced water quality in the Cana Woodford Shale
  – Very low total dissolved solids (TDS)
  – Flowback water quality is approximately 12,000 TDS
  – Produced water quality is approximately 20,000 TDS
  – Potential exists to reuse these fluids, thus reducing the demand for fresh water

• Current quantities available for reuse:
  – 8,000 barrels per day of produced fluid from 78 wells
Water disposal and water reuse

Saltwater disposal well

Centralized water impoundment for water reuse
Regulatory hurdles
Considerations for reuse

- This opportunity relies on the approval of permits for centralized commercial recycling impoundments
  
  - Enhanced construction and design requirements
    
    - Impoundments are larger than those historically permitted
    - Remain in place thereby exceeding “temporary” thresholds
    - Equipped with redundant leak detection systems
  
- One impoundment currently in permitting phase
Water management strategy

Benefits

- Reduced fresh water use through operational efficiency
- Mitigate potential business risks if water availability becomes constrained
- Potential to reduce truck traffic
- Reduced produced water disposal costs
Thank You.