Platt’s 4th Annual Midstream Development & Management Conference

South Texas Eagle Ford Shale & Olmos Tight Gas Sand
RESOURCE FULL

Market Forces and Drivers
U.S. Oil Production Increased at the Highest Sustained Rate in Over Two Decades

U.S. Crude Oil Production in Million Barrels per Month: 1920 to 2011

First Sustained Increase Since The Mid-1980s

Source: U.S. Energy Information Administration
U.S. Liquids Consumption Is Increasing But Remains Below 2007 Levels

United States Consumption of Petroleum & Liquids (Million Barrels per Day)

Source: U.S. Energy Information Administration
Brent Futures Prices Have Diverged from NYMEX Prices

Near-Month Futures
Crude Oil Prices in $ per Barrel

Spread Between Brent and NYMEX in $ per Barrel

Spread Reaches Long-Term High of Over $15 in February

Sources: Bloomberg and Platts (Weekly Data Through mid-April 2011)
Bottlenecks at Cushing Help Explain the Spread Between WTI and Other Oil Prices

Weekly Cushing, Oklahoma, Ending Stocks in Million Barrels*
(April 9, 2004, Through April 15, 2011)

* Excludes U.S. Strategic Petroleum Reserve
Source: U.S. Energy Information Administration
Natural Gas Prices Hover Below 2003 Levels

U.S. Monthly Average Natural Gas Wellhead Price
(Nominal Dollars per Thousand Cubic Feet)

Source: U.S. Energy Information Administration
Natural Gas Production Hits 35-Year High

Production topped 60 Bcf per day in late 2010

Source: U.S. Energy Information Administration
U.S. Shale Gas Production Has Increased Over 1500% Since 2000

Annual U.S. Shale Gas Production in Trillion Cubic Feet

Source: U.S. Energy Information Administration (Newell and Lippman Consulting / 2010 Estimated)
U.S. Natural Gas Supplies Will Increasingly Depend Upon Natural Gas Shales

Source: U.S. Energy Information Administration
Consumption Growth Is Expected to Come from the Industrial and Electricity Sectors

U.S. Natural Gas Consumption in Trillion Cubic Feet

Source: U.S. Energy Information Administration
Spread Between Drilling for Oil vs. Natural Gas
Closed in Early 2011

Drilling Rigs Running By Week
In the United States, 1987-2011

Percent of Total Drilling Rigs Running
In the United States, 1987-2011

Source: Baker Hughes Inc.
Horizontal Drilling Reaches All-time High & Represents 57% of Rigs Running

Drilling Rigs Running By Week
In the United States, 1991-2011

Percent of Total Drilling Rigs Running
in the United States, 1991-2011

Source: Baker Hughes Inc.
Eagle Ford Shale Overview
Eagle Ford Resource Play Overview

- Excellent Thickness
- High Kerogen and Total Organic Carbon Content
- High Porosity
- High Carbonate Content
- Low Clay Content
- Dry Gas to Gas / Condensate to Oil Thermal Windows
- Strong IP’s and EUR’s

Comparison of U.S. Shales

<table>
<thead>
<tr>
<th>GAS SHALE BASIN</th>
<th>BARNETT</th>
<th>FAYETTEVILLE</th>
<th>HAYNESVILLE</th>
<th>WOODFORD</th>
<th>EAGLE FORD</th>
<th>SWIFT EAGLE FORD</th>
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</thead>
<tbody>
<tr>
<td>Depth, ft.</td>
<td>6,500-8,500</td>
<td>1,000-7,000</td>
<td>10,500-13,500</td>
<td>6,000-11,000</td>
<td>2,500-15,000</td>
<td>8,000-13,000</td>
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<tr>
<td>Net Thickness, ft.</td>
<td>100-600</td>
<td>20-200</td>
<td>200-300</td>
<td>120-220</td>
<td>150-350</td>
<td>100-450</td>
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<tr>
<td>Total Organic Carbon, %</td>
<td>4.5</td>
<td>4-9.8</td>
<td>0.5-4</td>
<td>1-14</td>
<td>2-6</td>
<td>3-7</td>
</tr>
<tr>
<td>Total Porosity, %</td>
<td>4-5</td>
<td>2-8</td>
<td>8-9</td>
<td>3-9</td>
<td>6-14</td>
<td>6-17</td>
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<tr>
<td>Gas Content, scf/ton</td>
<td>300-350</td>
<td>60-220</td>
<td>100-330</td>
<td>200-300</td>
<td>200-220</td>
<td>200-230</td>
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<tr>
<td>Quartz, %</td>
<td>48</td>
<td>35</td>
<td>28</td>
<td>45</td>
<td>15</td>
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<tr>
<td>Clay, %</td>
<td>21</td>
<td>38</td>
<td>39</td>
<td>22</td>
<td>18</td>
<td>18</td>
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<tr>
<td>Carbonate, %</td>
<td>8</td>
<td>12</td>
<td>14</td>
<td>5</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Kerogen, %</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<tr>
<td>IP, MMcfd</td>
<td>1-9</td>
<td>2-7</td>
<td>15-24</td>
<td>2.5-12</td>
<td>5-17</td>
<td>6-14</td>
</tr>
<tr>
<td>EUR, Bcf/well</td>
<td>2-5</td>
<td>2-2.5</td>
<td>4-5-8.5</td>
<td>2.7-3.4</td>
<td>4-7</td>
<td>4-7</td>
</tr>
</tbody>
</table>

Sources: DOE, Core Lab, NuTech, AAPG, Atlas Energy, SM Energy, Range, Petrohawk
Industry Activity Focus Areas

Graphics are for presentation purposes only
Eagle Ford & Olmos
Evaluation, Appraisal and Development Process
Building The Resource Factory™

- Evaluation & Data Capture
- Calibration
- Re-Calibration
- Appraisal & Efficiency Capture
- Development & Optimization Capture
- Manufacturing & Commercial Capture
Building The Resource Factory™

- Evaluation & Data Capture
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- Development & Optimization Capture
Evaluation & Data Capture Phase

**Sub-Surface Modeling**
- 2D Seismic mapping
- X Sections/petrophysics
- Micro-seismic data
- Volumetric calculations
- Exploration & appraisal site selection

**Drilling & Formation Evaluation**
- Pilot holes, logs, cores & petrophysics
- Lateral landing & geo-steering techniques
- Wellbore integrity
- Identify technology applications

**Completion & Production**
- Baseline lateral lengths, frac stages, spacing, horsepower requirements and recipe
- Flow back measurement, fluid characteristics & history matching to pre-drill models
- Identify technology applications
- Utilize HSE plans & regulatory processes

**Infrastructure & Marketing**
- Source water (drill or haul), flow lines, processing and inter-connects
- Interruptible transportation and sales
Net Acres: ~ 20,000
Potential Locations: 250
Resource Potential: 61 - 92 MMBoe (un-risked)

Graphics are for presentation purposes only & do not depict all land, geologic & engineering information
Building The Resource Factory™

- Evaluation & Data Capture
- Calibration
- Re-Calibration
- Appraisal & Efficiency Capture
- Manufacturing & Commercial Capture
- Development & Optimization Capture

SM
# Appraisal & Efficiency Capture Phase

## Sub-surface Modeling
- Incorporate well data & trade data into geologic model
- Preliminary fault mapping
- Refined volumetrics & sensitivity analysis
- Conceptual simulation modeling
- Preliminary economic modeling

## Drilling & Formation Evaluation
- Contractor & equipment alliances
- Batch drilling
- Work efficiencies – casing design, bit selection, rotary steerable techniques
- Limited logging, swc’s, improved geosteering

## Completions and Production
- Adjust lateral lengths, frac stages, spacing, horsepower, recipe & compare to baseline
- Contractor & equipment alliances
- Integrate frac/drill schedules
- Production logging, history matching, phase behavior & calibration to IP/EUR models

## Infrastructure and Marketing
- Develop water handling system – WSW’s, flow lines and pits
- Layout common flow lines, processing/treatment facilities & inter-connects
- Evaluate longer-term market options/costs/differentials
- Prepare full-scale facilities/capacity analysis & sensitivities
South Texas: ~119,000 Total Net Acres

- Eagle Ford Oil
  ~24,000 Acres
  20%

- Eagle Ford High GOR Oil
  ~20,000 Acres
  17%

- Eagle Ford Dry Gas
  ~35,000 Acres
  29%

- Olmos Rich Gas Condensate
  ~40,000 Acres
  34%

Numbers not exact due to rounding
Approximate Reserve Component by Model

Eagle Ford Oil (20% of Acreage)
- Oil: 77%
- Dry Gas: 16%
- NGL: 7%

Eagle Ford High GOR Oil (17% of acreage)
- Oil: 48%
- Dry Gas: 35%
- NGL: 17%

Olmos Rich Gas / Condensate (34% of Acreage)
- Oil: 8%
- Dry Gas: 30%
- NGL: 63%

Eagle Ford Dry Gas (29% of acreage)
- Oil: 100%
Building The Resource Factory℠

- Evaluation & Data Capture
- Calibration
- Re-Calibration
- Appraisal & Efficiency Capture
- Manufacturing & Commercial Capture
- Development & Optimization Capture
Development & Optimization Capture Phase

**Sub-surface Modeling**
- Acquire 3D Seismic
- Prepare integrated 3D geological/reservoir model & update with well data
- Develop reservoir simulation model & optimize
- Develop full scale economic models

**Drilling & Evaluation**
- Work rig efficiencies, optimized pad drilling, capture lessons-learned & time/cost efficiencies
- Enhanced SCM – contractor alliances, yards, offices
- Selected logs & cores for calibration to 3D Model

**Completions & Production**
- Lessons-learned captured for optimized well lengths, orientations, stages, etc.
- Production logging & history matching calibrated to 3D models
- Optimize well counts, patterns & spacing tied to simulation
- Develop full scale operating & regulatory plans

**Infrastructure & Marketing**
- Optimize common water management system, facilities/flow lines
- Capacity commitments/tariffs for transportation systems & markets
- Implement hedging strategies
- Fine tune field infrastructure and capacity layouts, costs, schedules
Critical Midstream Development Issues for Eagle Ford Producers
Rich Gas Infrastructure

- Several midstream players have added or are adding new pipe and/or processing capacity
  - Enterprise, Kinder Morgan, Copano, Southcross - to name a few
  - Midstream players are seeking guaranteed revenue streams and long-term arrangements to fund their capital commitments
Rich Gas Infrastructure (Cont.)

- Producers perspective/issues
  - Capacity requirements must be developed with accuracy
    - Confidence in production projections
    - Predictability of production mix – rich vs. lean, CO₂, H₂S
    - Execution risks – rigs, services, results
  - Timing of mid-stream projects vs. resource development is critical
    - Project in-service precedes resource readiness
      - Capacity ramp-up
      - More conservative capacity commitment
    - Project in-service follows resource readiness
      - Potential curtailment
      - Impact on pace of drilling and/or fracking
  - Confidence / willingness to enter into long-term capacity commitments (5 years and longer) – firm vs. interruptible
Oil and Condensate Infrastructure

- Timing is key!

- Most Eagle Ford producers have announced their focus on the liquids-rich segment of the Eagle Ford
  - Creates further pressure on existing infrastructure and trucking resources

- Multiple mid-stream projects have been announced, several others are under discussion, with planned in-service dates in 2012 and 2013

- In the mean time, numerous trucking challenges will continue –
  - Availability
  - Wait time at load stations
  - Long distance hauls out of area
Platt’s 4th Annual Midstream Development & Management Conference