Chesapeake – Overview

- One of the largest producers of U.S. natural gas
  - 2010 EOY ~2.6 bcfpd

- Committed to increasing liquids production
  - 59.5 MBPD oil and NGLs – 100% more than EOY 2009!

- Most active driller in U.S. – CHK collects 20% of all daily drilling information generated (25% in areas of interest).
  - 155 operated rigs currently, down from peak of 158 in August 2008
  - 175 operated rigs by EOY 2011 and 200 operated rigs by EOY 2012

- Consistent production growth – 21 consecutive years of sequential production growth
  - Realized a 14% increase in 2010 over 2009

- Best assets in the industry
  - 16.9 tcfe of proved reserves EOY 2010
  - Added 4.8 tcfe of proved reserves through the drillbit in 2010
Chesapeake – Operating Areas

- Frontier and Niobrara
- Cleveland, Tonkawa, Mississippian
- Texas Panhandle Granite Wash
- Colony Granite Wash
- Avalon Shale
- Bone Spring
- Marcellus Shale
- Fayetteville Shale
- Bossier Shale
- Barnett Shale
- Haynesville Shale
- Eagle Ford Shale

Natural Gas Plays
Oil and Liquids Plays
Operating States
Big Oil on the Way to CHK

- Started transition in early 2008
  - Announced discovery of Colony Granite Wash play
  - Disclosed new unconventional oil plays
- Quietly built leasehold positions in unconventional plays that would benefit from advances in drilling and completion technologies
  - CHK has many unique advantages vs. competitors
- 2008-2010: confirmed play concepts work
- Now have ~1.9 mm net acres in 12 plays with ~2.0 bboe of risked unproved resources and 6.8 bboe unrisked unproved resources
- Projecting liquid production mix to increase from 10% in 1Q’10 to 15-20% by YE 2012
- Targeting >100,000 bbls/d of oil and natural gas liquids production by YE 2012
- Continuing to evaluate other play concepts
Eagle Ford Shale Overview

The Eagle Ford Shale is quickly developing into the most profitable of all shale plays

CHK began leasing in August 2009 and has since captured the largest position in the industry with ~625,000 net acres

- Focused leasehold position in oil and wet gas windows and within areas that have optimal mix of permeability and thermal maturity

- Very attractive rates of return
  - Relatively shallow formation results in low drilling and completion costs
  - High value production from oil and wet gas

- Currently have 14 horizontal wells on production

- Currently operating 16 rigs in the play and drilled 50 wells in 2010

- Plan to exit 2012 with ~40 rigs

- New JV with CNOOC

World-class liquids-rich play

- ~3.5 billion boe unrisked unproved resources net to CHK in the Eagle Ford Shale

The Eagle Ford will quickly become a key component of CHK's liquids production
Eagle Ford Shale – JV Summary

- CHK has sold a 33.3% interest in 600,000 net acres in the Eagle Ford Shale to CNOOC International Limited for $2.16 billion or $10,800 per net acre, on a 50/50 cash/carry basis; an additional 25,000 acres to be offered after closing.
- CNOOC will pay $1.08 billion in cash at closing and will pay an additional $1.08 billion by funding 75% of CHK’s share of the drilling and completion expenditures until the $1.08 billion carry obligation has been funded.
  - Closing of the transaction occurred in 4Q ‘10
  - CHK expects to utilize the drilling carry by YE ‘12
- CHK will serve as the operator of the JV and plans to continue acquiring leasehold in the Eagle Ford Shale.
  - CNOOC will have the option to acquire its 33.3% share of the new acreage on mutually attractive terms.
  - CNOOC will also have the option to participate with CHK for a 33.3% interest in the development of midstream infrastructure in the Eagle Ford Shale.
Eagle Ford Shale Industry Activity

 CHK & EOG are the primary players in the oil window
## Eagle Ford Shale – Characteristics

**Microscopic images from CRTC**

**Lower Eagle Ford**

**Upper Eagle Ford**

- **Depth TVD (feet)**: 5,000 – 11,500
- **Well total depth (feet)**: 10,000 – 17,500
- **Net thickness (feet)**: 140 – 450
- **Total organic content (TOC)**: 3% – 7%
- **Log porosity**: 6% – 9%
- **Permeability (nD)**: 700 – 3000
- **Pressure gradient (psi/foot)**: 0.4 – 0.7
- **Water saturation**: 13% – 25%
- **Average lateral length (feet)**: 5,000 – 8,000
- **Oil-in-place/section (mmbo/section)**: 40 – 70
- **Gas-in-place/section (bcf/section)**: 140 – 150
- **Anticipated recovery factor – oil**: 6% – 10%
- **Anticipated recovery factor – wet gas**: 30% – 40%
- **Average EUR/horizontal well (mboe)**: 595
  - Blend of oil and wet gas

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Eagle Ford Shale has some of the best rock properties of all U.S. shale plays.

Porosity is distributed between intergranular and intrakerogen.
Eagle Ford Shale – Development Plan

- CHK leasehold of ~625,000 net acres
  - ~600,000 net acres initially part of 67/33 JV with CEO
- 4 - 10 wells from single surface pad
- Lateral length: 5000’ - 8000’
- Nominal spacing: 500’ - 660’ between wells
- Targeted EUR
  - 595 mboe (blended oil and wet gas)
- Target Drilling and completion costs of ~$5.5 mm per well
  - Currently ~$6.5 mm per well
- Target Days to drill well (spud to spud): 20-24 days
  - Currently 25 – 30 Days
- Total unrisked unproved resource potential: ~3.5 billion boe
- Average operated rig count:
  - Year-end 2010: 12 rigs
  - Year-end 2011: ~31 rigs
  - Year-end 2012: ~40 rigs

Note: resource potential assumes 80-acre spacing
Initial Planning of a CHK Eagle Ford Well

● **Currently Employ 2 Well Construction Schemes**
  
  – Primary Casing Design
    
    ➢ 9 5/8” (40#/ft, J-55, LT&C) Surface Casing (Inside 12 1/4” Hole)
    ➢ 5 ½” (23#/ft, P-110, CDC) Production Casing (Inside 8 ¾” Hole)
  
  – Alternate Casing Design
    
    ➢ 10 ¾” (45.5#/ft, J-55, BT&C) Surface Casing (Inside 13 ½” Hole)
    ➢ 7 5/8” (29.7#/ft, P-110, LT&C) Int. Casing (Inside 9 7/8” Hole)
    > Can be omitted if not needed
    ➢ 5 ½” (23#/ft, P-110, Ultra SF) Production Casing (Inside 6 ¾” Hole)

● **Well Construction is based on Offset Prod./Well History**
  
  – Austin Chalk Depletion is Primary Driver
  – Olmos Production does not have a large effect

● **Directional Design/Control and Anti-Collision**
  
  – Initially drilling first wells on Pad
  – Pads could hold 4 to 10 wells total
  – Directional Tools are picked up from underneath conductor
Directional Planning

- **Surface Nudges**
  - 0.5 to 1.0 DLS
  - Inclinations of 1 to 5 Degrees

- **Tangent and Curve Sections**
  - Utilize a Build-Hold-Build Design
    - Initial Build 1 to 2 DLS
    - Curve Section 12 DLS
  - Curve Sections are Typically Build/Turn
    - Opposed to S-Shaped Curve
    - More Complex Design and Execution
    - Buckling Reductions
      » Torque and Drag Reductions

- **Lateral Sections**
  - Maximize ROP while maintaining 15 foot vertical window and a 30 foot horizontal window.
Torque and Drag / Hydraulics Modeling

- Utilize Landmark Software Package
  - COMPASS
  - WELLPLAN

- WELLPLAN
  - Torque/Drag Reduction
  - String Design Considerations
    - 5” – 4.5” DP Design
    - Need for Heavyweight and Placement
    - Trips for Shock Sub/Agitator Installation
  - Circumstances Limiting Design Ability
    - Lease Line Conditions and Proximity
    - Maximizing Lateral within Production Unit
  - Verification of Equipment Capabilities
  - Hydraulics Modeling
    - Flowrate Predictions at TD
    - Agitator Losses
    - Dual Size DP advantages.
Drilling Operations by Hole Section

- **Surface Hole**
  - Directional Plan/Control
    - Nudge to Prevent Surface Anti Collision Issues
    - Helps reduce Inclinations in Tangent Section
  - Equipment Considerations
    - High Torque/Low Speed Motors
    - PDC Bits - 6 or 7 Blade, 16 MM Cutters
      - DBR’s on More Aggressive Bits observed
  - Surface Casing Setting Depths
    - 1,300’ to 4,800’ (100’ to 150’ into Midway Shale)
    - McMullen County is only exception
  - Drilling Fluids - LSND / Spud Muds
    - Gumbo Shales present in Certain Areas
    - 500’ to 1,500’ Deep
    - Control Drill with Fresh Water
      - Drilling Detergents and SAPP
Drilling Operations by Hole Section

- **Tangent Hole**
  - FIT 14 ppg to 16 ppg
  - Directional Plan
    - Build Up to Hold Inclination for Directional Plan to KOP
      - Rotate Out 100’ to 200’
      - This will put High Side Wall Forces in Open Hole Section
      - Casing Wear kept to minimum
  - Equipment Considerations
    - High Torque / Low Speed Motor
    - PDC Bits – 5 Blade 19 MM and 22 MM Cutters
      - Have not seen DBR Issues
  - Drilling Fluids - 80/20 OBM (10.0 ppg to 10.5 ppg)
    - Midway Shale Inhibition
    - HTHP 6 to 8
    - Solids Control Equipment Important
    - Occasional Manageable Losses from Olmos
Drilling Operations by Hole Section

● Curve Section

  - Directional Plan
    - Build and Turn on 12 DLS total
    - Important to not get behind in Turn
    - Advantages for Buckling
      - Torque/Drag Reduction
      - More Complex than S Shaped Curves

  - Equipment Considerations
    - High Torque / Low Speed Motors
    - PDC Bits – 5 Blade 13 MM Cutters
      - Directional Control
      - Short Gauge / Flat Cone Profile

  - Drilling Fluids - 80/20 OBM (10.0 ppg to 13.8 ppg)
    - HTHP 4 to 6
    - Solids Control Equipment Important
    - Possible Severe Losses in Austin Chalk
Drilling Operations by Hole Section

● Lateral Section
  – Directional Plan
    - All Target Changes kept to 1 to 2 DLS, if possible
    - Important to Drill inside Target Box – Do not paint line
  – Equipment Considerations
    - High Torque / Med Speed Motors
    - PDC Bits – 6 Blade 19 MM Cutters
      » Directional Control
      » Longer Gauge / Deeper Cone Profile
    - Use of Agitators
      » 5,000’ to 5,500’ Cut Off Point
      » Lateral Lengths are 6,500’ to 7,000’ Average
  – Drilling Fluids - 80/20 OBM (10.0 ppg to 13.8 ppg)
    - HTHP 4 to 6
    - Solids Control Equipment Important
    - 6 RPM Reading Important – Hole Cleaning
    - Clean Up Cycles – 100+ RPM
CHK Exploring New Methods in STX

- **Austin Chalk Depletion / Lost Circulation Issues**
  - Use of Water Based Mud
  - Managed Pressure / Under Balanced Drilling
    - Employed for Infield Drilling
    - Need to Identify Pads that have Issue
    - Training
  - Use of EM Directional Tools
    - Handle Larger Amounts of Loss Circulation Material
    - Faster Survey Time – Increased Efficiency

- **RSS Technology**
  - Long laterals where Sliding for Target Changes and Directional Control very difficult
    - Compare to use of Agitators
  - Currently trying RSS without Motors
    - Benefits gained from Motor Introduction.

- **Directional Drilling Tangent and Curve with One BHA**
Drilling Performance

South Texas District
Eagle Ford Drilling Program

FPD
Super. Mov. Avg. (FPD)
Drilling Performance

South Texas District
Eagle Ford Drilling Program

Drill Days
5 per. Mov. Avg. (Drill Days)
Drilling Performance

South Texas District
Eagle Ford Drilling Program

% NPT

5 per. Mov. Avg. (% NPT)
Conclusion / Questions