Outline

- Company Information
- The CO₂ Pipeline Dilemma
- Carbon Capture and Storage
- Issues and Potential Solutions
Denbury is the largest oil and gas producer in the State of Mississippi.

Primarily as a result of CO2 enhanced oil recovery and Denbury’s efforts, Mississippi’s oil production has reversed its decline and is actually increasing.

Denbury currently operates nine (9) active CO2 enhanced oil recovery projects in Mississippi and is in the process of initiating three (3) new floods during 2008.

Denbury currently injects approximately 475 MMcf (27,500+ tons) of CO2 per day into the nine active floods.

Based on our injection volumes we believe we are the largest injector of CO2 on a daily basis in the U.S.

Denbury currently operates approximately 320 miles of CO2 pipelines and is in the process of constructing an additional 400 miles of CO2 pipelines.

Since 1999, Denbury has produced in excess of 20 MMBbls of oil from CO2 Flooding.
CO₂ Projects - Total Potential Tertiary Oil Reserves \(^{(1)}\)

- **Phase 1**: 82 MMBbls
- **Phase 2**: 77 MMBbls
- **Phase 3**: 41 MMBbls
- **Phase 4**: 31 MMBbls
- **Phase 5**: 36 MMBbls
- **Phase 6**: 26 MMBbls
- **Phase 7**: Hastings Field 50 - 90 MMBbls \(^{(1)}\)
- **Phase 8**: Seabreeze Complex 30 - 40 MMBbls \(^{(1)}\)
- **Faustina Project**: 190 - 225 MMcf/d of CO₂ \(^{(2)}\)

(1) Probable tertiary oil reserves as of 12/31/06 based on 10% to 17% recovery factors. Hastings Field is under contract but not owned.

(2) Projected CO₂ production of petroleum coke to ammonia plant expected to be completed during 2010.
CO₂ Business Model – Projected Net Oil Production

Note: Forecast based on internal management estimates. Actual results may vary.
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Net Daily Production vs. Total CO₂ Injection

- WMU BOPD (Net)
- CO₂ INJECTION MMCPD
- EMU BOPD (Net)

- WMU current production 5200 BOPD
- Temperature Issues
- EMU current production 700 BOPD

Denbury Resources Inc.
US CO₂ Pipelines vs Gasification Projects

"The Dilemma"
Scoping Economics of a 450 Mile CO$_2$ Pipeline**

**30” Pipeline**
- Free Flow Capacity – 650 MMcf/d
- Capacity w/ 1 Pump Station – 880 MMcf/d
- Annual Pump Station Expense (w/o repl. costs or power substation) - $7 MM

**26” Pipeline**
- Free Flow Capacity – 450 MMcf/d
- Capacity w/ 3 Pump Stations – 800 MMcf/d
- Annual Pump Station Expense (w/o repl. costs or power substation) - $19 MM

**24” Pipeline**
- Free Flow Capacity – 370 MMcf/d
- Capacity w/ 5 Pump Stations – 800 MMcf/d
- Annual Pump Station Expense (w/o repl. costs or power substation) - $31 MM

**All Cases Used Pipeline Construction Costs for CO$_2$ Pipelines in Mississippi**
Compression  Capital Costs

**Stated Conditions**
- 15 psig Suction to 2100 psig Discharge
- 3 - 5800 T/d Compressors
- Purchase Cost - $30 MM
- Installation Cost - $30 MM (based on general construction and installation costs)
- Total Cost - $60 MM
- Total Power Requirement – 82.8 MW

**Higher Suction Pressure**
- 50 psig Suction to 2100 psig Discharge
- Purchase Costs - $22.5 MM
- Total Costs - $45 MM
- Total Power Requirement – 45 MW

*CO₂ Capture Pressure is a Major Factor on Costs for CCS*
Total Amortized Cost ($/Mcf)

Amortization Schedule
- 20 and 30 Years
- Solved for Lowest Cost per Mcf Delivered to the EOR Project
- Attempting to Achieve a Utility Type ROR - 30 Year Schedule
- 800 MMcf/d from Day 1
- Two Year Construction Timetable
- Total Capital - $750 M – (24” Pipeline)

Components of Costs – Stated Conditions (15 psig)
- Capital Recovery - $0.475/Mcf
- Operating Costs of Pipeline and Booster Stations - $0.146/Mcf
- Total Costs - $0.621/Mcf
- Excludes Costs of Power to Compress CO₂
- Excludes Cost for CO₂
Carbon Capture and Storage

- **Basic Assumption:** Everyone will be Required to Deal with CO₂ Emissions

- **The Costs of Capture is the same whether the Emitter Chooses to Ultimately Inject into a Pipeline or Inject into Saline Reservoirs.**
  - CO₂ Pipelines Operate at Pressures > 2000 psi
  - Injection Pressures for Saline Reservoir Injection will most likely be > 2000 psi
Carbon Capture and Storage – Geologic Example

- Single Gasification Project Emitting 200 MMcf/d of CO₂
  - 30 Year Life
  - Total CO₂ Emissions – 2.2 Tcf of CO₂

- Denbury’s DRI Ice Field
  - 16,000’ Underground
  - Reservoir Pressure - +/- 11,000 psi
  - Areal Extent - 5,500 acres to spill point (Approx: 9 sq. miles)
  - Average Thickness - 300’
  - Storage Capacity - Approx. – 3 Tcf

Thus, the areal extent of a single plant’s CO₂ emissions will cover a very large area, much greater than the most likely plant site area.

if thickness = 125’, Area would be the size of Manhattan (22+ sq. miles)
if thickness = 60’, Area would be the size of San Francisco (47+ sq miles)
Carbon Capture and Storage

- Enhanced Oil Recovery Operations Can Provide the “Costs” of Transportation, Sequestration and Liability

- Saline Reservoir Injection - All “Costs” for Transportation, Sequestration and Liability will Remain with the Emitter

Therefore;

- Enhanced Oil Recovery is the Lowest Cost Option for Sequestering CO₂ Emissions Today and for the Foreseeable Future
- Provides an Economic Solution for CCS and Provides Additional Quantities of Domestic Oil Production
- The Only CCS Method that Produces an Economic Benefit and Social Benefits
- The Only CCS Method that can be Utilized Now
Issues

- EOR Projects Require Total Delivered CO₂ Costs < $0.50/Mcf at Oil Prices of $30/Bbl to Ensure Its Ability to Continually Take and Sequester the CO₂. Higher Oil Prices will allow CO₂ to be Transported Longer Distances

- CO₂ Located Closer to Existing CO₂ Pipeline Infrastructure will have a Considerable Cost Advantage
  - No Different than Natural Gas Production
  - The Closer Natural Gas is to the User the Higher the Price it Receives (Gulf Coast vs Rockies)
Potential Solutions

- Greenhouse Gas Emissions Credits – “Carbon Value”
  - Estimated 2010 Values - 100% VER @ $3/ton = $0.17/Mcf @$5/ton = $0.285/Mcf

- State or Federal Subsidies to Offset Costs (Capital and Operating)

- Is there the Possibility that CO$_2$ Capture is Valued by the Community Whereby the Sale Price of the Gasification Product Can Be Increased to Cover a Portion of the Costs of CCS?