CO₂ Pipelines
Tim Bradley
CO₂ In Action

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‘CO₂ in Action’ mpg movie
CO₂ Pipelines Segment Overview (a)

CO₂ Contribution to 2003 KMP Segment DCF

- Natural Gas Pipelines: 30%
- Products Pipelines: 36%
- Terminals: 19%
- CO₂ Pipelines: 15%

Estimated breakout of CO₂ DCF

- SACROC: 45%
- CO₂ Deliveries: 37%
- Other CO₂ Flood Properties: 10%
- Related SACROC: 8%

(a) 2003 budgeted distributable cash flow before allocation of G&A and interest

CO₂ Sales and Transportation business remains flat
CO₂ Flood Development Opportunities are growing
## Kinder Morgan CO₂ Operations

### CO₂ Reserves

<table>
<thead>
<tr>
<th>Company</th>
<th>Ownership</th>
<th>Location</th>
<th>Remaining Deliverability</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>McElmo Dome</td>
<td>45%</td>
<td>SW Colorado</td>
<td>40+ years</td>
<td>KM</td>
</tr>
<tr>
<td>Bravo Dome</td>
<td>11%</td>
<td>NE New Mexico</td>
<td>14 years</td>
<td>Oxy</td>
</tr>
</tbody>
</table>

### Pipelines

<table>
<thead>
<tr>
<th>Company</th>
<th>Ownership</th>
<th>Location</th>
<th>Capacity (MMcf/d)</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortez</td>
<td>50%</td>
<td>McElmo Dome to Denver City</td>
<td>1,050</td>
<td>KM</td>
</tr>
<tr>
<td>Bravo</td>
<td>13%</td>
<td>Bravo Dome to Denver City</td>
<td>375</td>
<td>BP Amoco</td>
</tr>
<tr>
<td>Central Basin</td>
<td>100%</td>
<td>Denver City to McCamey</td>
<td>600</td>
<td>KM</td>
</tr>
<tr>
<td>CRC</td>
<td>90%</td>
<td>McCamey to Snyder</td>
<td>200</td>
<td>KM</td>
</tr>
<tr>
<td>CLPL</td>
<td>100%</td>
<td>Denver City to Snyder</td>
<td>240</td>
<td>KM</td>
</tr>
</tbody>
</table>

### Oil Reserves

<table>
<thead>
<tr>
<th>Company</th>
<th>Ownership</th>
<th>Location</th>
<th>Remaining Life</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>SACROC*</td>
<td>85%</td>
<td>W Texas</td>
<td>20+ years</td>
<td>KM</td>
</tr>
<tr>
<td>Yates*</td>
<td>7.5%</td>
<td>W Texas</td>
<td>30+ years</td>
<td>Marathon</td>
</tr>
</tbody>
</table>

*Including interests in MKM
KM CO₂ Company Mission:

We turn CO₂ into money

Carbon Dioxide → Crude Oil

Results
How CO$_2$ Works

- CO$_2$ mixes with oil much like turpentine cleans paint from a brush
- Inter-phase mass transfer typically yields NGL rich gas production
- Chase water injection helps control mobility and gas recycle
Permian Basin CO₂ Purchases and Oil Production

CO₂ Deliveries - BCFD

Permian Basin Consumption
Cum: 7.3 TCF

McElmo Dome Deliveries
Cum: 3.8 TCF

Oil Production - MBOPD
Cum: 717 MMB

CO₂ Flood Production % of Permian

KM estimates, Oil and Gas Journal
Seventeen oil field operators in the Permian Basin utilize CO₂ in more than 50 projects.

- Oxy
- ExxonMobil
- KM CO₂
- BP
- Other
- ChevTex
- Hess
Permian Basin Market Share

McElmo Dome is the premier source – Market Share continues to grow
Kinder Morgan remains the leading supplier

2002 Deliveries

Total 2002 Supply: 1,110 MMcf/d

Estimates by Kinder Morgan CO₂ Company for 2002 through November based on deliveries made from McElmo Dome and entitled production from other sources.
Kinder Morgan CO₂ Deliveries

SACROC deliveries are an increasing percent of Kinder Morgan CO₂ deliveries

Customer Base 2002 – 398 MMCF/d

Customer Base 2003 – 562 MMCF/d

New projects total 64 MMCF/d (11%)
CO₂ Flooding and MLP Attributes

Investment Characteristics:
- Primarily Hard Assets - Pipelines, Compression Equipment, Wells

Operating Cost Structure:
- Predictable – Driven by fluid handling, purchased power

Revenue Stream:
- CO₂ Floods are typically 20-30 year projects
- Production is usually stable and predictable
- Hedging mitigates price uncertainty
SACROCC Development History

Daily Oil Production 1948-2000

1948 – Discovered. Primary production quickly followed by centerline waterflood for pressure support.

1972 - CO₂ Injection began
- Small volumes injected; not a concentrated effort

1994 - Pennzoil initiated extensive reservoir study

1995 - Turnaround started with Pilot projects
- Centerline project performed relatively well; unconfined
- Cost structure improved

1998 - Devon Purchased Pennzoil, decided to sell
- Development stalled

2000 - Kinder Morgan CO₂ restarted development
SACROC CO$_2$ Flood Projects
Different Approaches, Different Results

Previous Operator’s Project
220 MMCF/d Injection

Kinder Morgan’s Project
220 MMCF/d Injection
SACROC Long Term Potential

Daily Oil Production 1980-2010

Pre-2000 - Cumulative oil production 1.25 Billion barrels, 44.5 % OOIP, Production 8500 BOPD

2002 - Announced CLPL, accelerated development program.
- Average oil production 13,000 BOPD
- Average CO2 injection 220 MMCF/D
- SACROC EBITDA 44.3 MM$ (EOR Operations)

2003 - Anticipate average oil production 20,000 BOPD
- Average CO2 Injection 360 MMCF/D
- SACROC EBITDA expected at 78.6 MM$

2004-2010+- Depending upon pace & extent of development:
Oil Rate may increase to 33 - 50 MBOPD,
EBITDA 120 – 200 MM$/Year
SACROC CO$_2$ Flood Asset Attributes

SACROC Unit has many attractive features:

1. Reservoir thickness reduces well/field facilities investment
2. Prolific reservoir, high permeability accelerates returns
3. Second largest unit in Permian Basin – 2.7 Billion OOIP
4. Field is under-developed relative to its peers
5. Centerline Project has exceeded expectations
6. Infrastructure capacity exists to sustain 30,000 B/D at lower oil prices
What are the Risks:

1. Conventional E&P risks not applicable – source, trap, reservoir, economic size have all been established. Technology/process is mature.

2. Margin Risks:
   - Revenue: Volumes and Price
   - Costs: Capex, Opex, CO₂ Purchases
     - Capex: Drilling/Completion, Facilities
     - Opex: Fluid handling – power, maintenance
     - CO₂ Purchase: Price, recycle availability

3. Execution Risks (post Bullseye project):
   - 60 % of Capex is CO₂ purchase
   - 29 % of Capex is Drilling/Completing wells
   - 11 % of Capex is Facilities/Gas Handling
   - Pace of Development
Future SACROC Development Economics

- Projects are resilient in low price environment

Cost/BOE

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td>$2.95</td>
</tr>
<tr>
<td>Wells, Facilities</td>
<td>$1.89</td>
</tr>
<tr>
<td>Opex</td>
<td>$4.88</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$9.72</strong></td>
</tr>
</tbody>
</table>

Projected IRRs

(CO₂ Cost @ contract price)

- Existing Infrastructure
- Accelerated Case
- CL IV Stepout

Basis: 660 Case, Post Bullseye developments
Volume:

1. Oil Reserves and production expectations are conservative when compared to mature Permian Basin CO2 Floods. Netherland Sewell proved reserves estimate is >98% of our estimate.

2. Production Rate from projects has continued to beat expectations.
Price:

1. Hedging program has locked in >50% of production expected from approved projects in next 5 years at ~ $22 or higher.

2. Conservative hedging policy locks in prices on flat part of forward curve.

(a) Approved projects include Centerline IV, Bullseye I, and Bullseye II or approximately $200 million in total capital.
## Impact of Oil Price/Volume Variance on SACROC 2003 DCF

### Change in Unhedged Oil Price (a)

<table>
<thead>
<tr>
<th>Oil Price:</th>
<th>-2 $/B</th>
<th>-1 $/B</th>
<th>Base</th>
<th>+ 1 $/B</th>
<th>+2 $/B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production + 10%</td>
<td>+8.4 MM$</td>
<td>+10.1 MM$</td>
<td>+11.8 MM$</td>
<td>+13.4 MM$</td>
<td>+15.1 MM$</td>
</tr>
<tr>
<td>Production + 5%</td>
<td>+3.0 MM$</td>
<td>+4.4 MM$</td>
<td>+5.9 MM$</td>
<td>+7.3 MM$</td>
<td>+8.7 MM$</td>
</tr>
<tr>
<td>2003 Plan Approximately 20,000 bbl/d</td>
<td>-2.4 MM$</td>
<td>-1.2 MM$</td>
<td><strong>78.6 MM$</strong></td>
<td>+1.2 MM$</td>
<td>+2.4 MM$</td>
</tr>
<tr>
<td>Production – 5%</td>
<td>-7.8 MM$</td>
<td>-6.9 MM$</td>
<td>-5.9 MM$</td>
<td>-5.0 MM$</td>
<td>-4.0 MM$</td>
</tr>
<tr>
<td>Production – 10%</td>
<td>-13.3 MM$</td>
<td>-12.6 MM$</td>
<td>-11.8 MM$</td>
<td>-11.1 MM$</td>
<td>-10.4 MM$</td>
</tr>
</tbody>
</table>

(a) Currently, Kinder Morgan has hedged approximately 90% of its share of 2003 planned production at $22/bbl. Base case assumes a price of $25/bbl on 10% unhedged piece and any excess production.
SACROC CO$_2$ Flood –
So…Where’s the Beef?

What are the Risks:

1. Conventional E&P risks not applicable – source, trap, reservoir, economic size have all been established. Technology/process is mature.

2. Margin Risks:
   - Revenue: Volumes and Price
   - Costs: Capex, Opex, CO$_2$ Purchases
     - Capex: Drilling/Completion, Facilities
     - Opex: Fluid handling – power, maintenance
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3. Execution Risks (post Bullseye project):
   - 60 % of Capex is CO$_2$ purchase
   - 29 % of Capex is Drilling/Completing wells
   - 11 % of Capex is Facilities/Gas Handling
   - Pace of Development
1. CO₂ purchase costs comprise 60% of future capital investment – at market prices.

2. Drilling and well workover costs comprise 29% of future investment. KM drilling performance has improved relative to predecessors – down >27%.

3. Future Facilities costs are dominated by increasing capacity of compression and gas handling facilities.
Drilling Operations
Facilities Installations
SACROC CO$_2$ Flood – Opex Risk Assessment

OPEX:

KM as reduced unit cost structure 38% since acquisition.

Purchased Power is largest single component and is driven by volumes. Hydrocarbon production serves as a natural hedge.

Maintenance Expense unit costs continue to decline, although total expenditures have increased commensurate with activity.

CO$_2$ Recycle is largest single process expense – fixed contract pricing for CO$_2$ removal, compression driven by power costs.
SACROC CO₂ Project Highlights
Bullseye Project Announcement

Volumes
- Producing 16,800 BOPD
- Injecting 220 MMSCF/D CO₂

Development Summary
- 63 Patterns on CO₂ injection (14% of planned)
- 168 Patterns expected by YE 2003 (37% of planned)

Bullseye Project Summary
- 95 Patterns, $137 MM total
  - $52 MM new project (Bullseye II)
  - $85 MM included in April 2002 announcement
- Production expected to approach 30,000 B/D
- 25.9% IRR at $22 flat (hedged prices)*

*(economics fully burdened by compression, CO2 removal facilities which will be used in future projects)
Development Pace

Observation: The faster we go, the higher net present value becomes, however this must be balanced with higher execution risk.

Two Key Issues:

We must execute drilling operations and facilities installations on time, at the same time.

We must install and operate a CO₂ injection process that is efficient in diverse geologic settings.
North Platform reservoir is substantially thicker and more prolific than the Centerline area. Bullseye project may give early clues to optimize Platform region development.
3-D Seismic data reveals portions of Platform area should behave similar to Centerline projects; other portions are much more prolific and may require a different project design.
SACROC CO₂ Project

Pace Development Alternatives

Current Status

Producing ~16,000 BOPD
Injecting ~220 MMscf/D CO₂
3,586 Acres (thru CL-V)

Development Options (#3 is preferred option)

1. Limited Platform, Current Capacities
   - 165 MMBOE, ~18,100 Acres, 580 MM$*
2. Full Field, Current Capacities
   - 255 MMBOE, ~20,200 Acres, 790 MM$*
3. Full Field, Accelerated Development
   - 255 MMBOE, ~20,200 Acres, 820 MM$*

*2003 forward capital required including capitalized CO₂

Further work:

- Reservoir Modeling of Platform
- Surveillance of Recent Bullseye Project
2002 Achievements, 2003 Goals

2002

Significantly exceeded plan
- Volumes ahead, costs on, price hurt more than helped

Secured significant cost improvements
- SACROC unit costs down
- Assumed Snyder Plant operations

2003

SACROC Development program

Pursue strategic fit acquisitions, continue aggressive CO2 Marketing

Continue Hedging program
Domestic oil reserve replacement costs are increasing

- CO₂ flooding provides an attractive cost structure and a proven track record to add new reserves

Kinder Morgan will leverage infrastructure in Permian Basin

- Lowest cost supply
- Largest reserves
- Innovative deals for producers
- Use CO₂ to sell, trade, acquire, and maintain leadership in emerging U.S. CO₂ market