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CO_2 Pipelines

Tim Bradley

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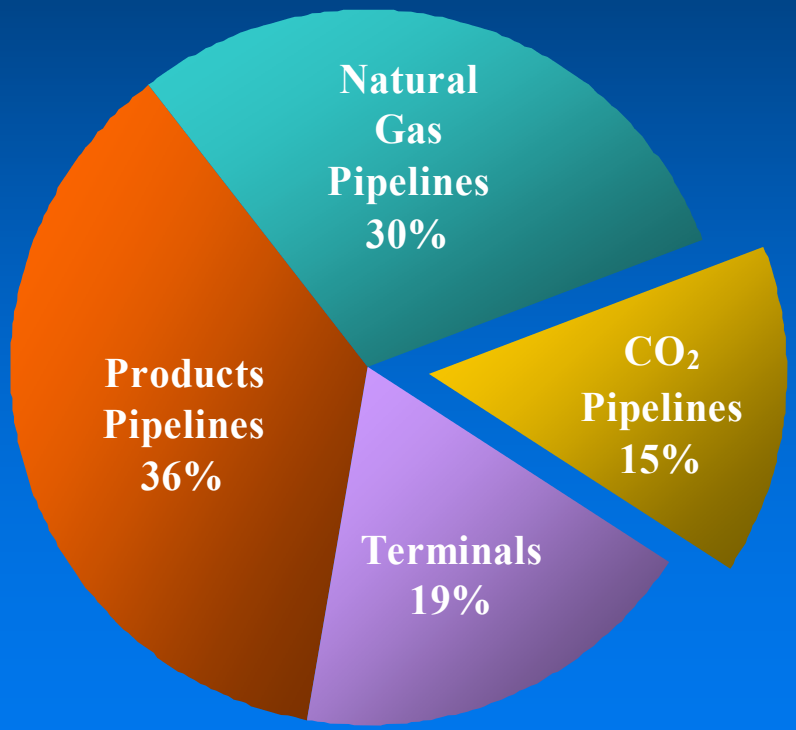
CO_2 In Action

Click here to view

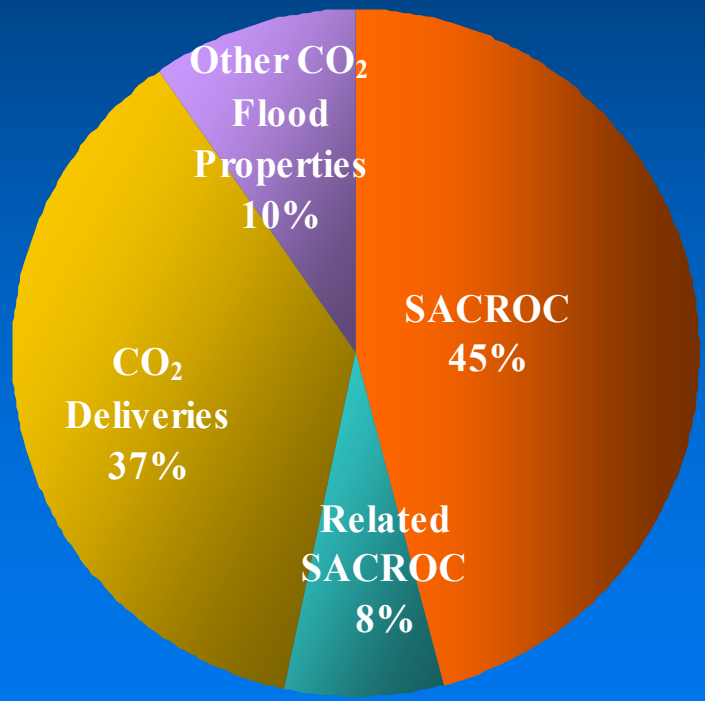
'CO_2 in Action' mpg movie

CO_2 Pipelines Segment Overview (a)

CO_2 Contribution to 2003 KMP Segment DCF



Estimated breakout of CO_2 DCF



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

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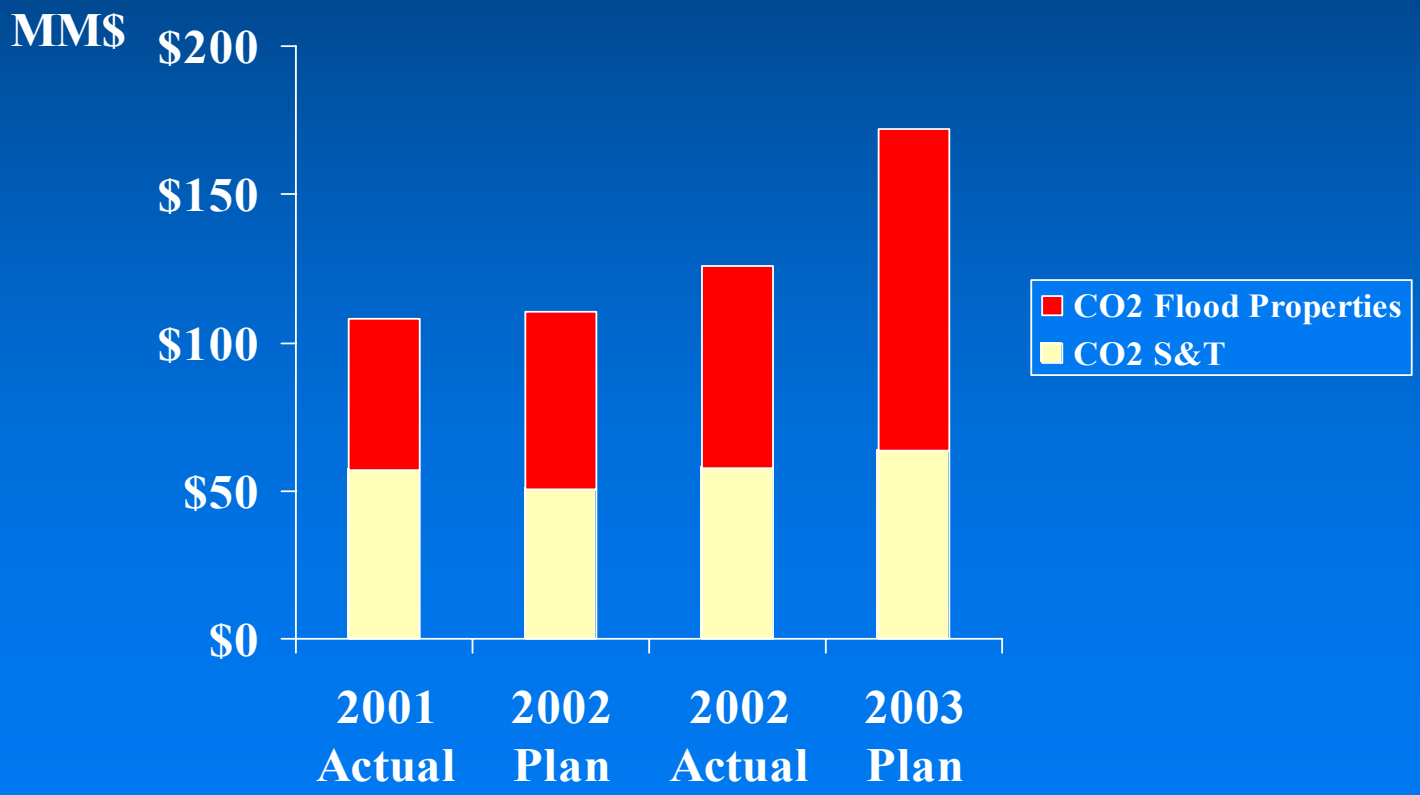
Comparison of 2001, 2002, 2003 – Distributable Cash

- CO_2 Sales and Transportation business remains flat
- CO_2 Flood Development Opportunities are growing



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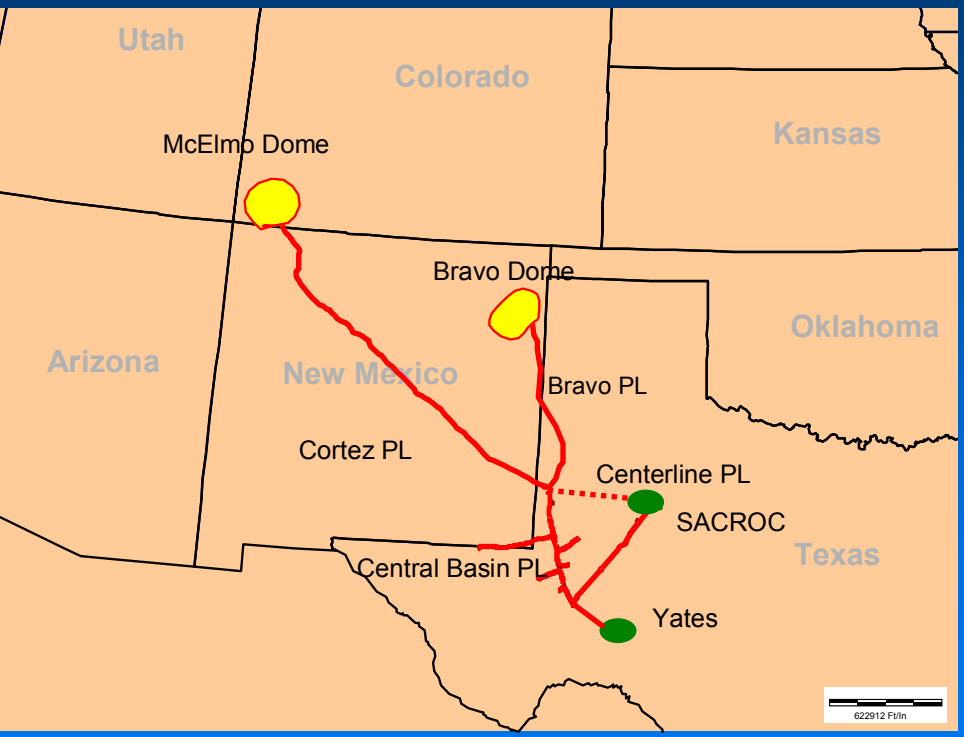
Kinder Morgan CO_2 Operations



CO_2 Reserves	Company Ownership	Location	Remaining Deliverability	Operator
McElmo Dome	45%	SW Colorado	40+ years	KM
Bravo Dome	11%	NE New Mexico	14 years	Oxy

Pipelines	Company Ownership	Location	Capacity (MMcf/d)	Operator
Cortez	50%	McElmo Dome to Denver City	1,050	K M
Bravo	13%	Bravo Dome to Denver City	375	BP Amoco
Central Basin	100%	Denver City to McCamey	600	KM
CRC	90%	McCamey to Snyder	200	KM
CLPL	100%	Denver City to Snyder	240	KM

Oil Reserves	Company Ownership	Location	Remaining Life	Operator
SACROC*	85%	W Texas	20+ years	KM
Yates*	7.5%	W Texas	30+ years	Marathon

*Including interests in MKM

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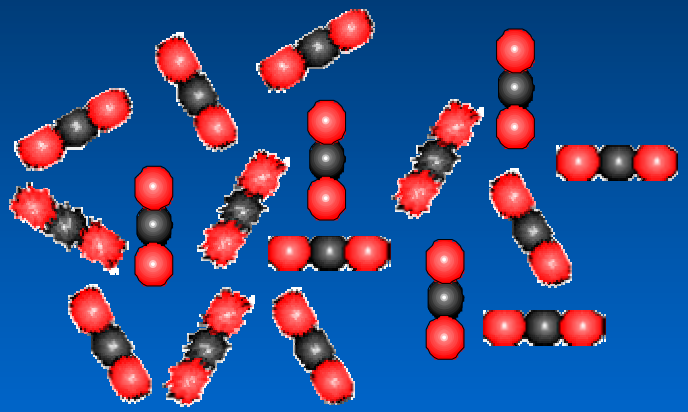
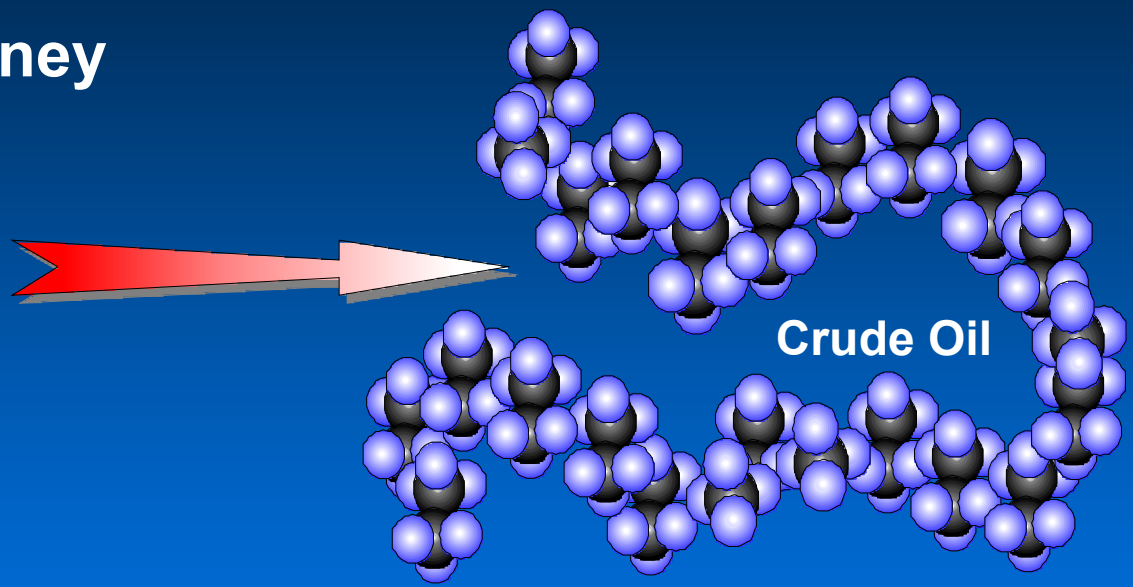
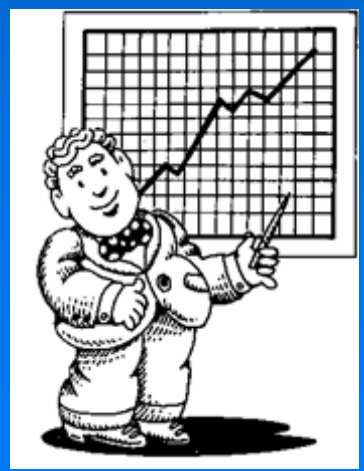
KM CO_2 Company Mission:

We turn CO2 into money



Carbon Dioxide

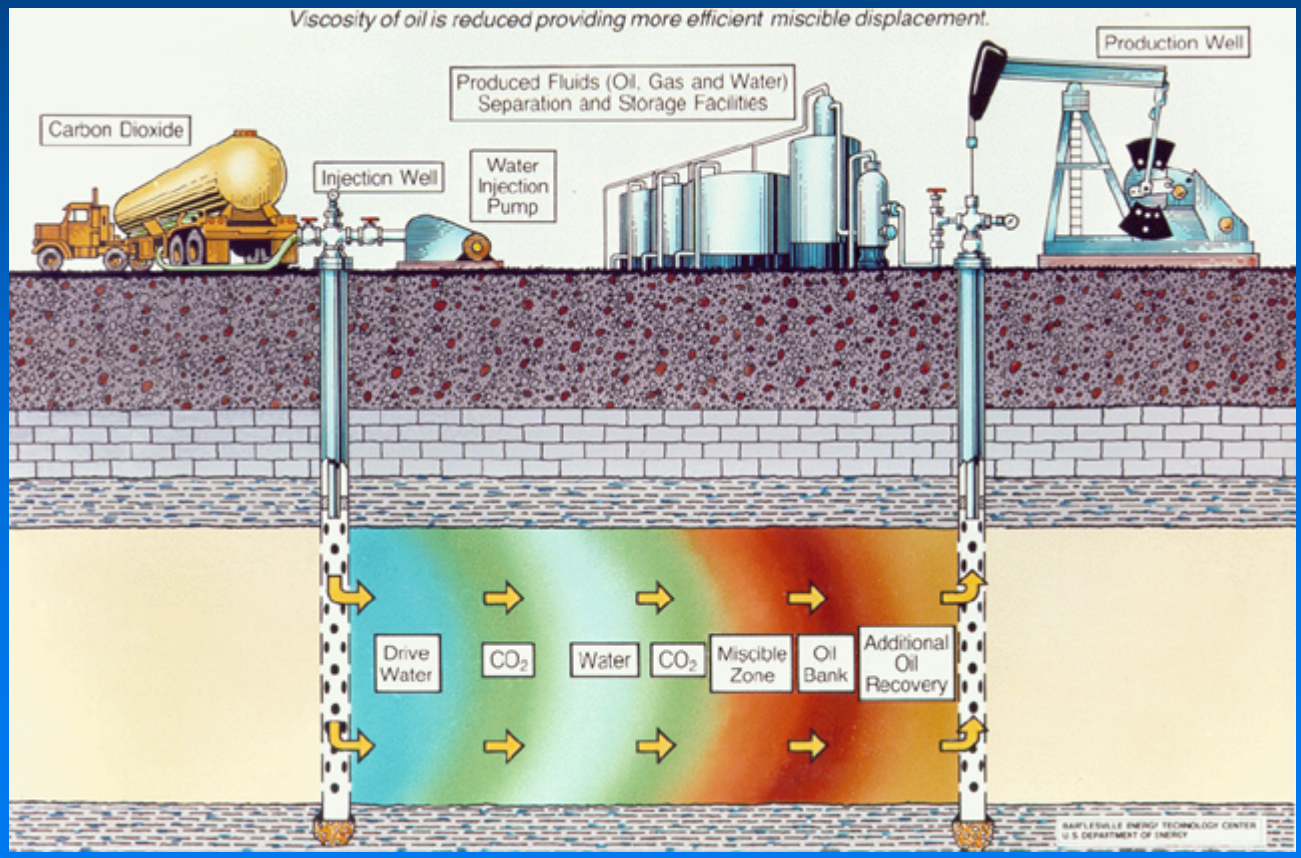




Results

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



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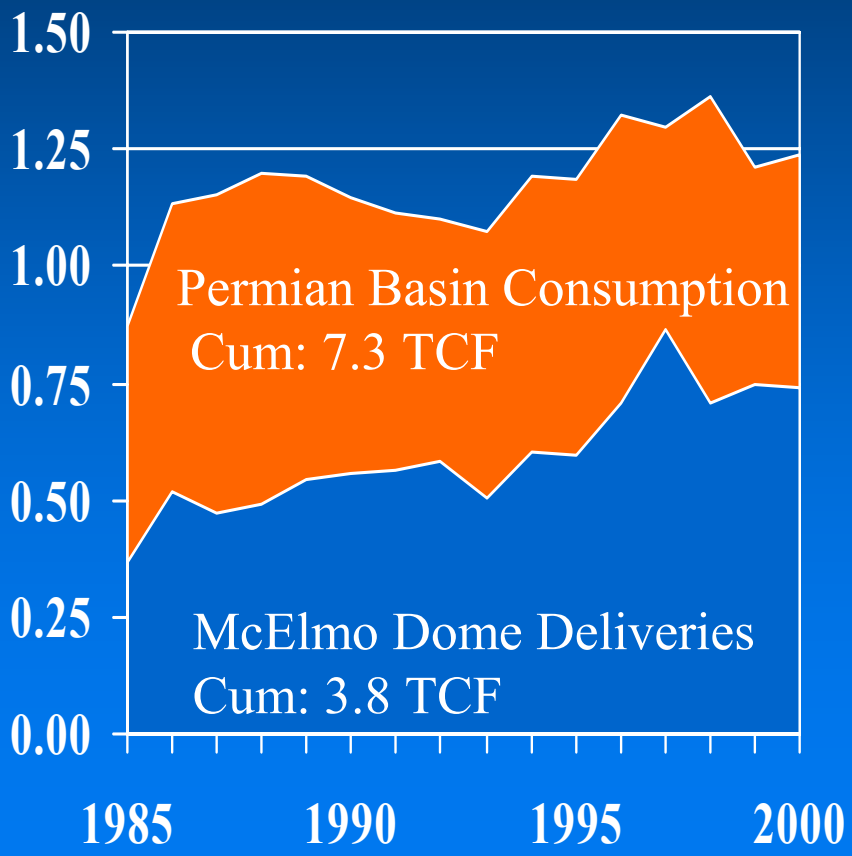
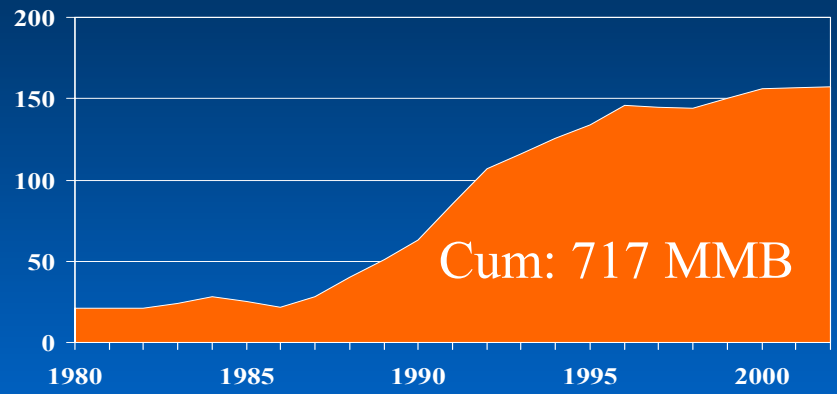
Permian Basin CO_2 Purchases and Oil Production

CO_2 Deliveries - BCFD

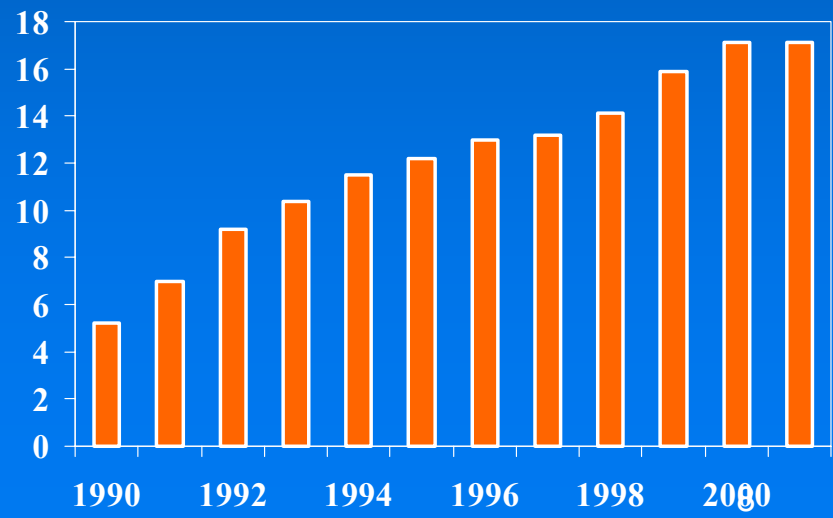


KM estimates, Oil and Gas Journal

Oil Production - MBOPD



CO_2 Flood Production % of Permian



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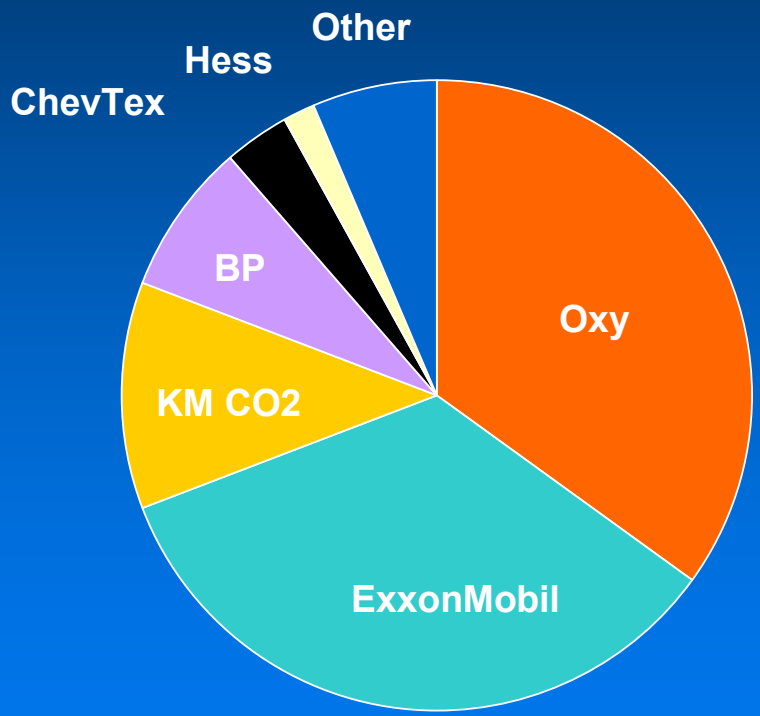
Industry Consumption

Seventeen oil field operators in the Permian Basin utilize CO_2 in more than 50 projects



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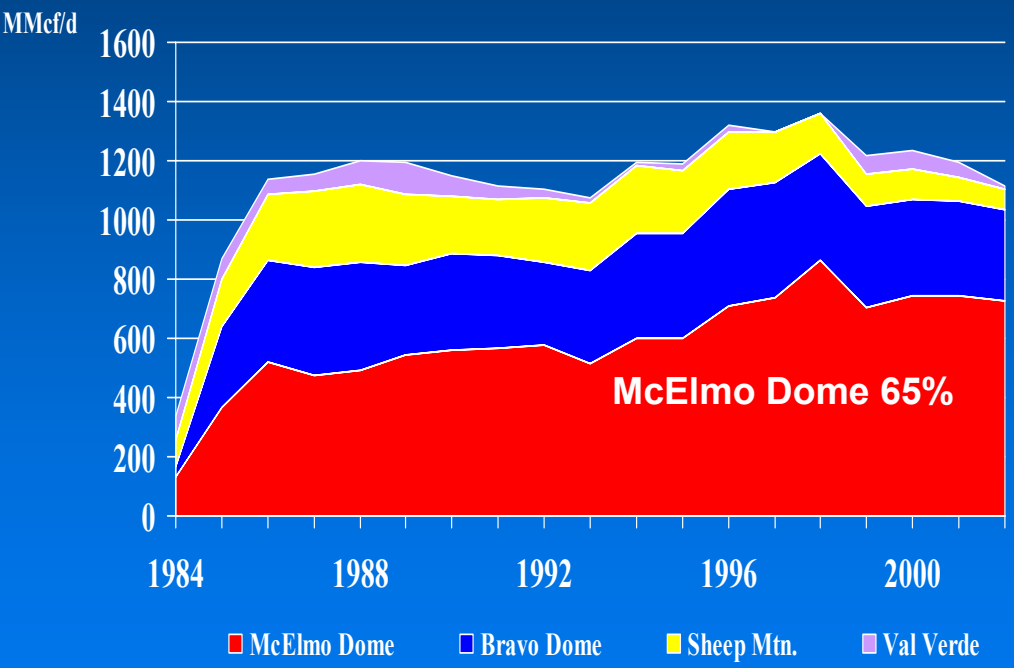
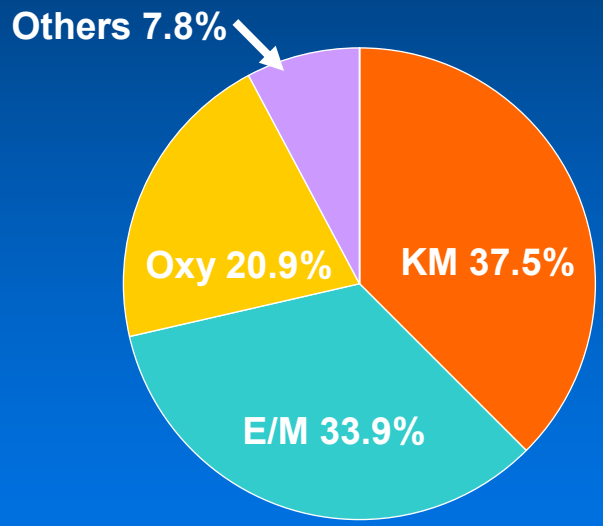
Permian Basin Market Share

McElmo Dome is the premier source – Market Share continues to grow

Kinder Morgan remains the leading supplier



2002 Deliveries



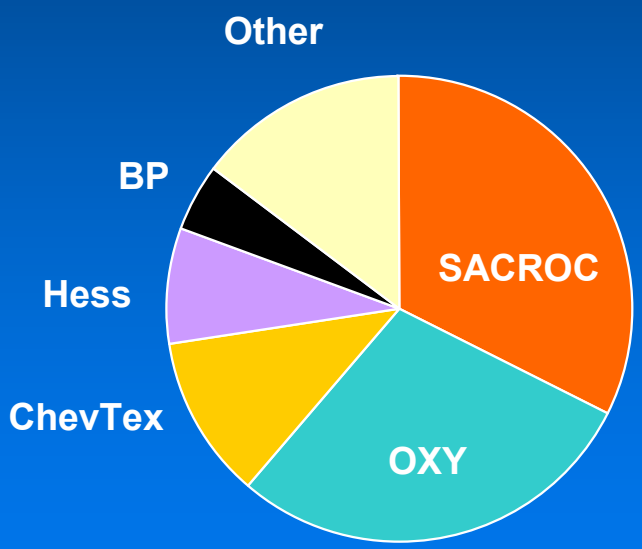
Total 2002 Supply:
1,110 MMcf/d

Estimates by Kinder Morgan CO_2 Company for 2002 through November based on deliveries made from McElmo Dome and entitled production from other sources

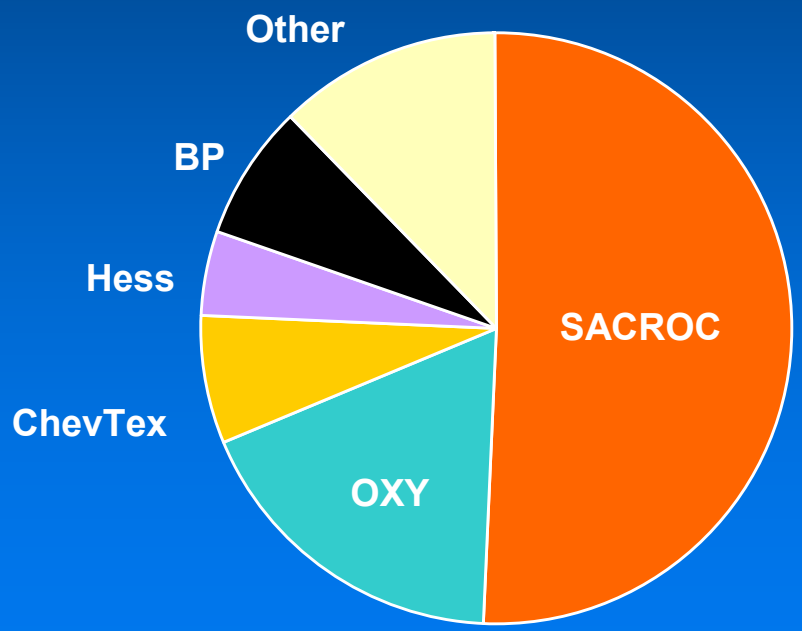
Kinder Morgan CO_2 Deliveries

SACROC deliveries are an increasing percent of Kinder Morgan CO_2 deliveries

Customer Base 2002 – 398 MMCF/d



Customer Base 2003 – 562 MMCF/d



New projects total 64 MMCF/d (11%)

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CO_2 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:

- CO_2 Floods are typically 20-30 year projects
- Production is usually stable and predictable
- Hedging mitigates price uncertainty

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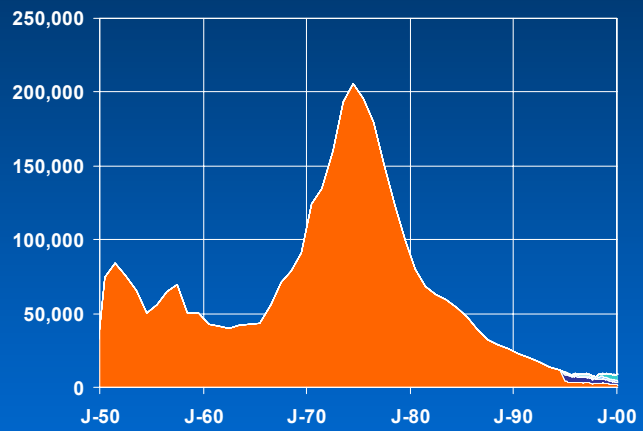
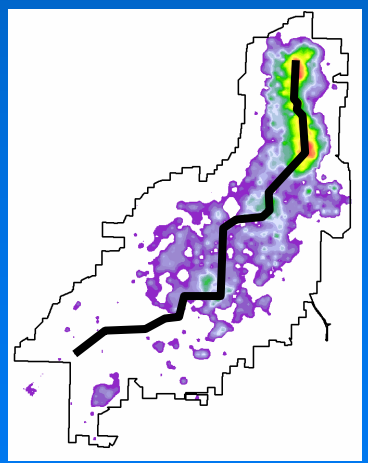
SACROC Development History

Daily Oil Production 1948-2000





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

1972 - CO_2 Injection began
- Small volumes injected; not a concentrated effort

1994 - Pennzoil initiated extensive reservoir study

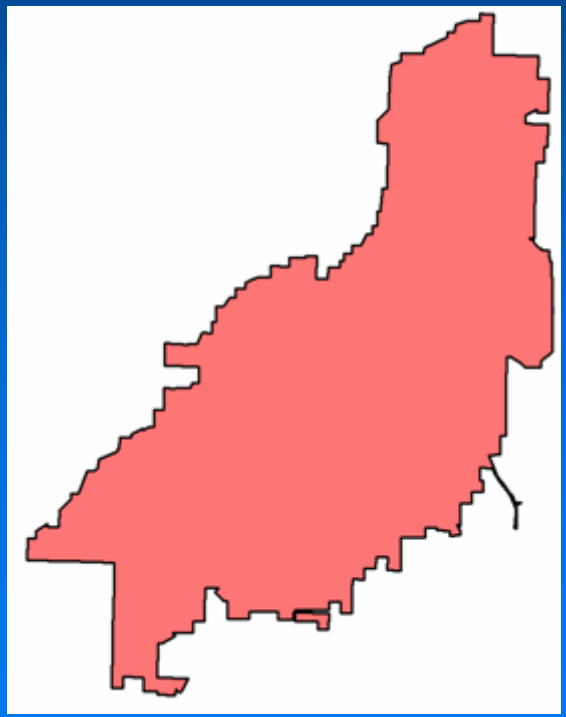
1995 - Turnaround started with Pilot projects
- Centerline project performed relatively well; unconfined
- Cost structure improved

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

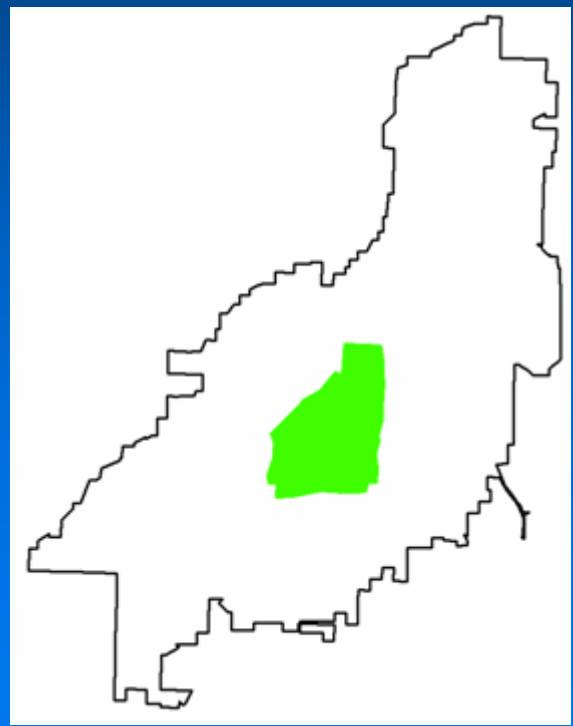
2000 - Kinder Morgan CO_2 restarted development

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



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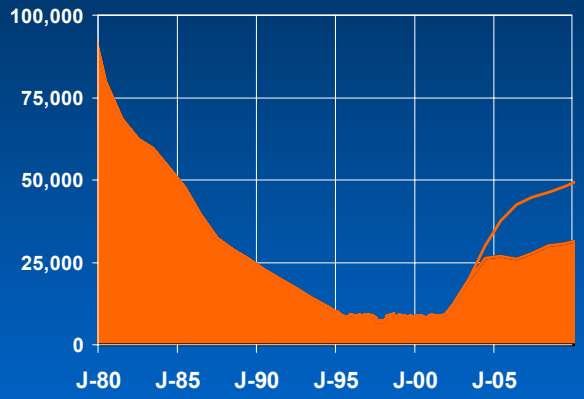
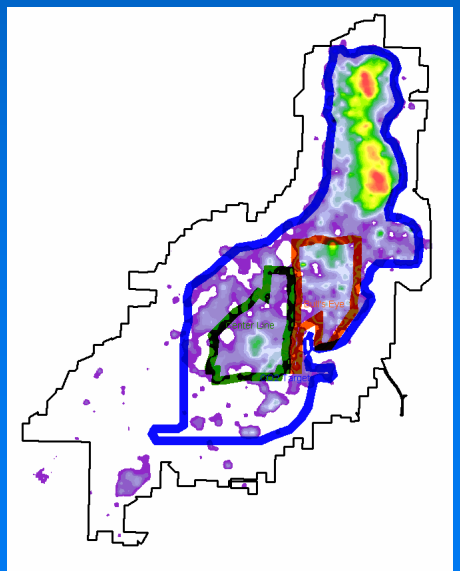
SACROC Long Term Potential

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

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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
     - CO_2 Purchase: Price, recycle availability

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

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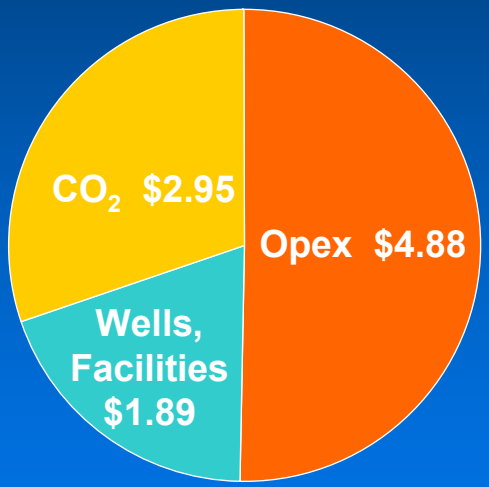
Future SACROC Development Economics

- Projects are resilient in low price environment

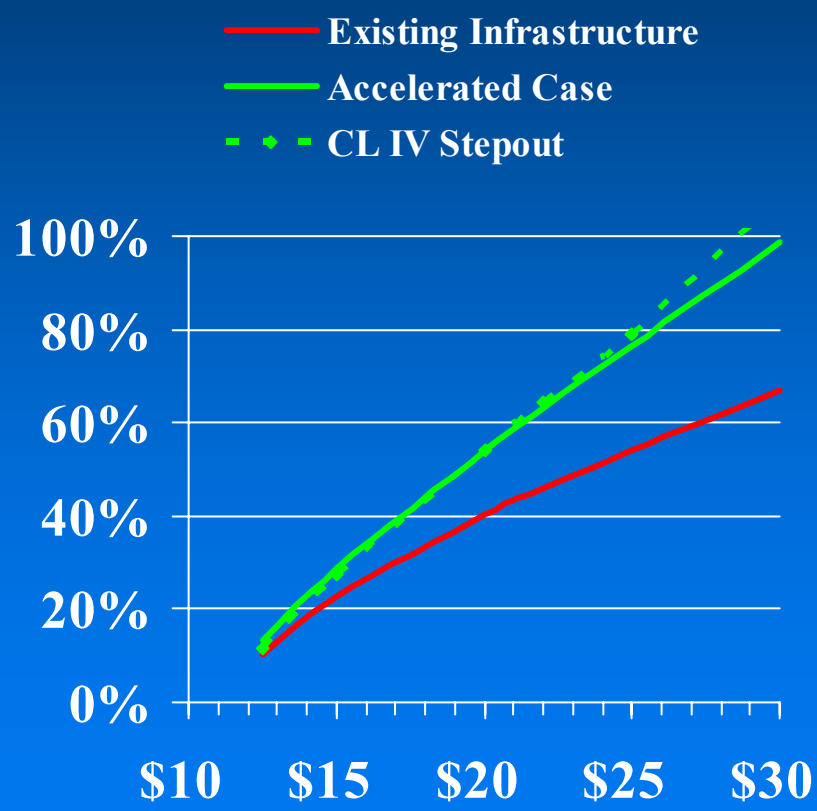
Cost/BOE



Total: $9.72

Projected IRRs

(CO_2 Cost @ contract price)



Basis: 660 Case, Post Bullseye developments

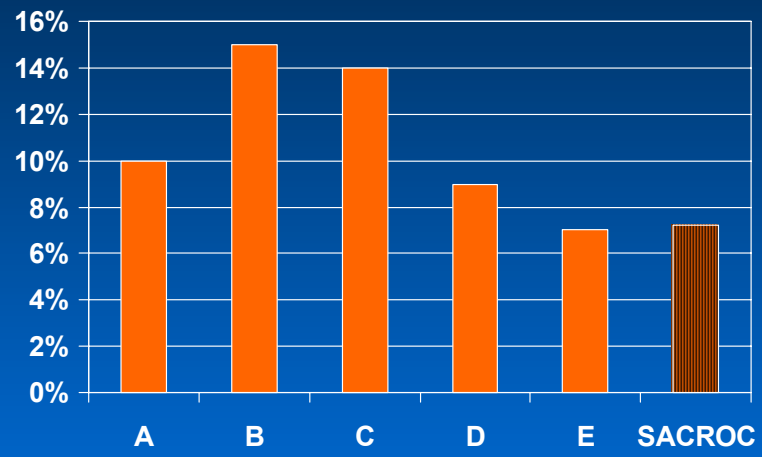
SACROC CO_2 Flood – Revenue Risk Assessment

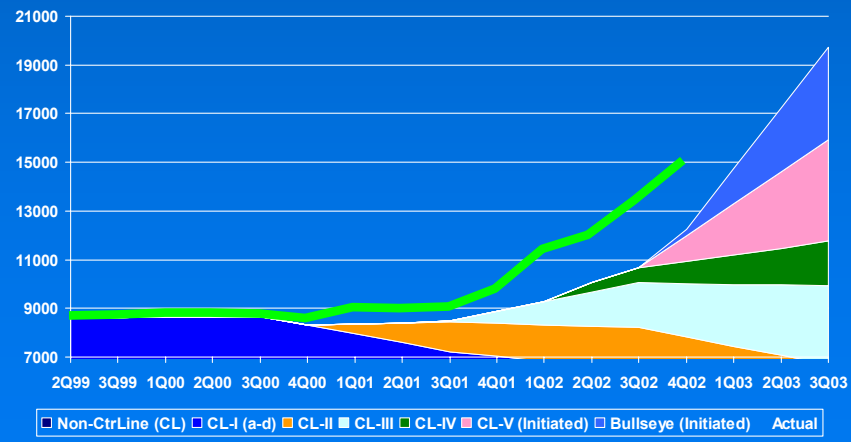
Volume:

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.

Incremental Recovery, % OOIP Ref: Netherland Sewell



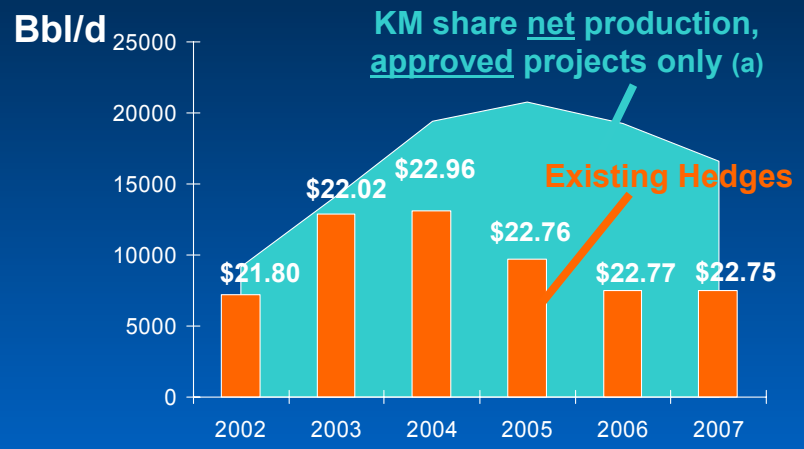


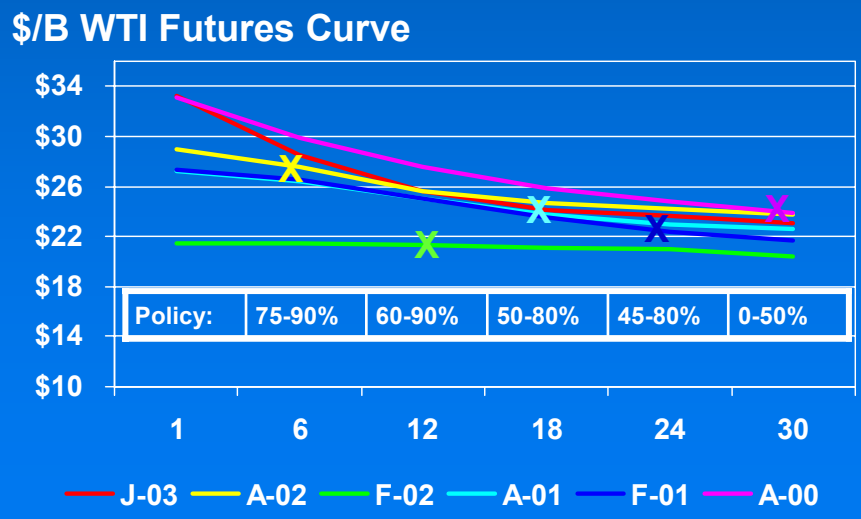
SACROC CO_2 Flood – Revenue Risk Assessment

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)

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

(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.

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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
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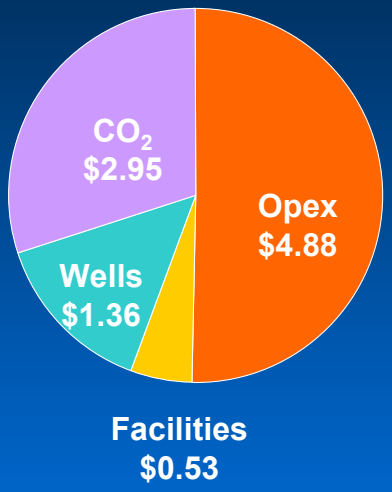
3. **Execution Risks (post Bullseye project):**
   - 60 % of Capex is CO_2 purchase
   - 29 % of Capex is Drilling/Completing wells
   - 11 % of Capex is Facilities/Gas Handling
   - Pace of Development

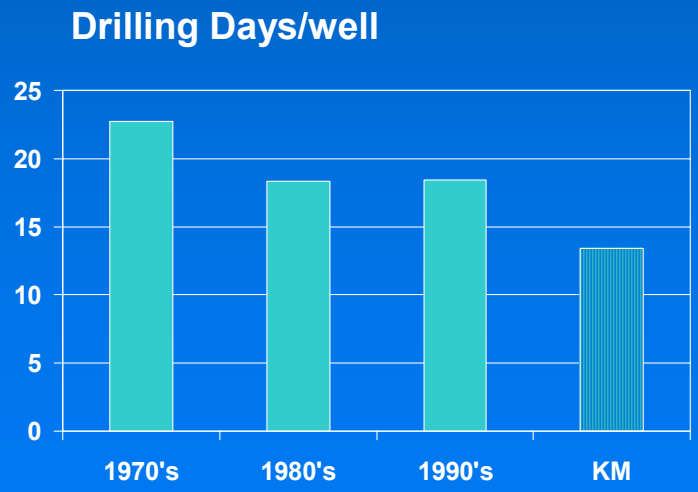
SACROC CO_2 Flood – CAPEX Risk Assessment

1. CO_2 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.





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Drilling Operations







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Facilities Installations









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SACROC CO_2 Flood – Opex Risk Assessment

OPEX:

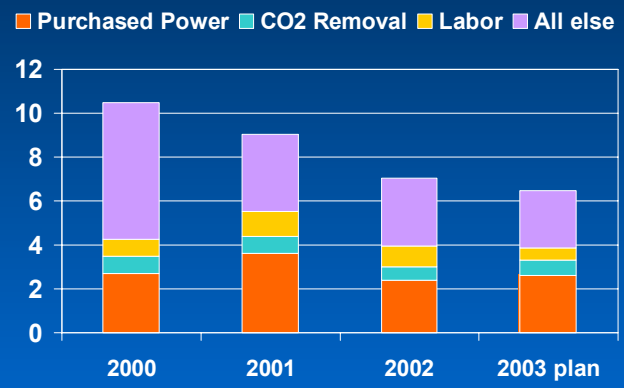
KM as reduced unit cost structure 38% since acquisition.

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

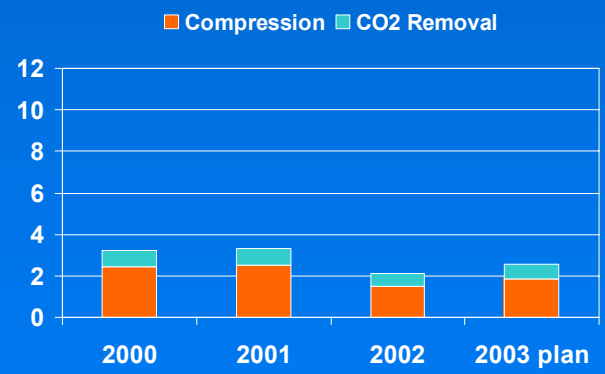
Maintenance Expense unit costs continue to decline, although total expenditures have increased commensurate with activity.

CO_2 Recycle is largest single process expense – fixed contract pricing for CO_2 removal, compression driven by power costs.

OPEX $/BOE



Recycle Expense $/BOE



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SACROC CO_2 Project Highlights

Bullseye Project Announcement

Volumes

Producing 16,800 BOPD

Injecting 220 MMSCF/D CO_2

Development Summary

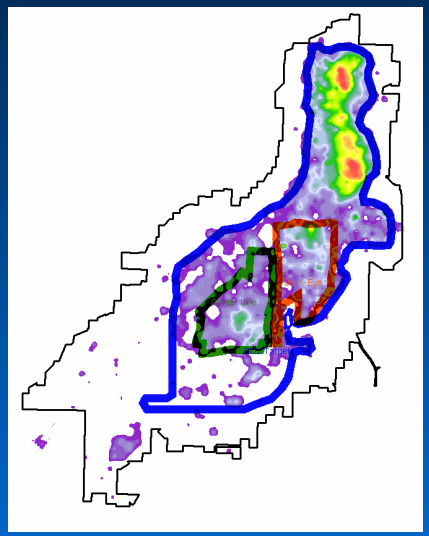
63 Patterns on CO_2 injection (14% of planned)

168 Patterns expected by YE 2003 (37% of planned)

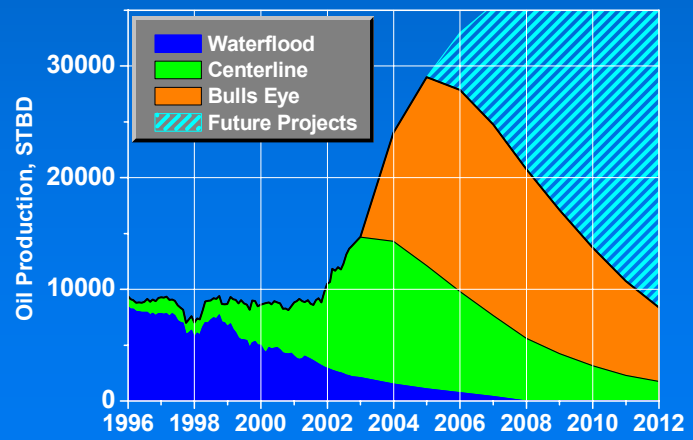
Bullseye Project Summary

- 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)



SACROC PRODUCTION



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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 CO_2 injection process that is efficient in diverse geologic settings.

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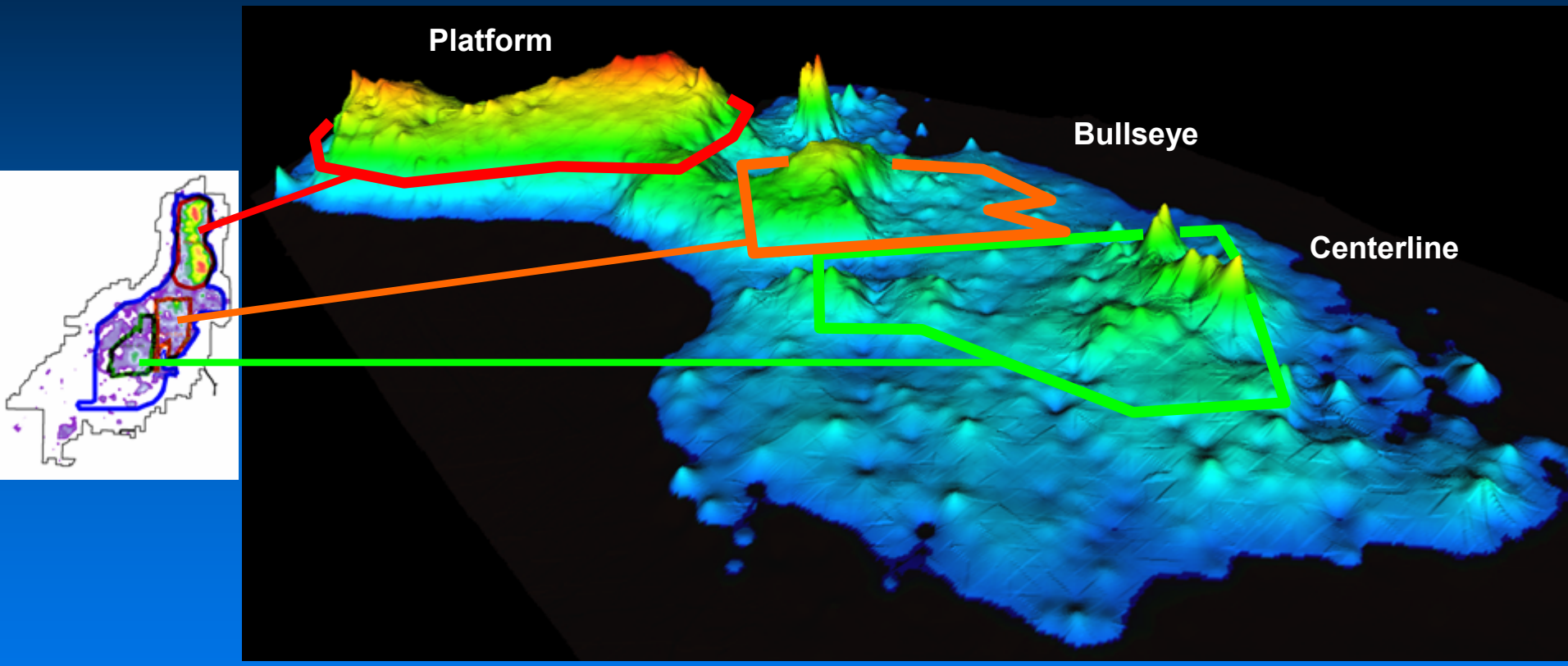
Development Pace – Reservoir Variability



North Platform reservoir is substantially thicker and more prolific than the Centerline area. Bullseye project may give early clues to optimize Platform region development.

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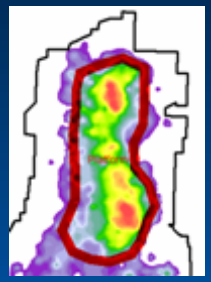
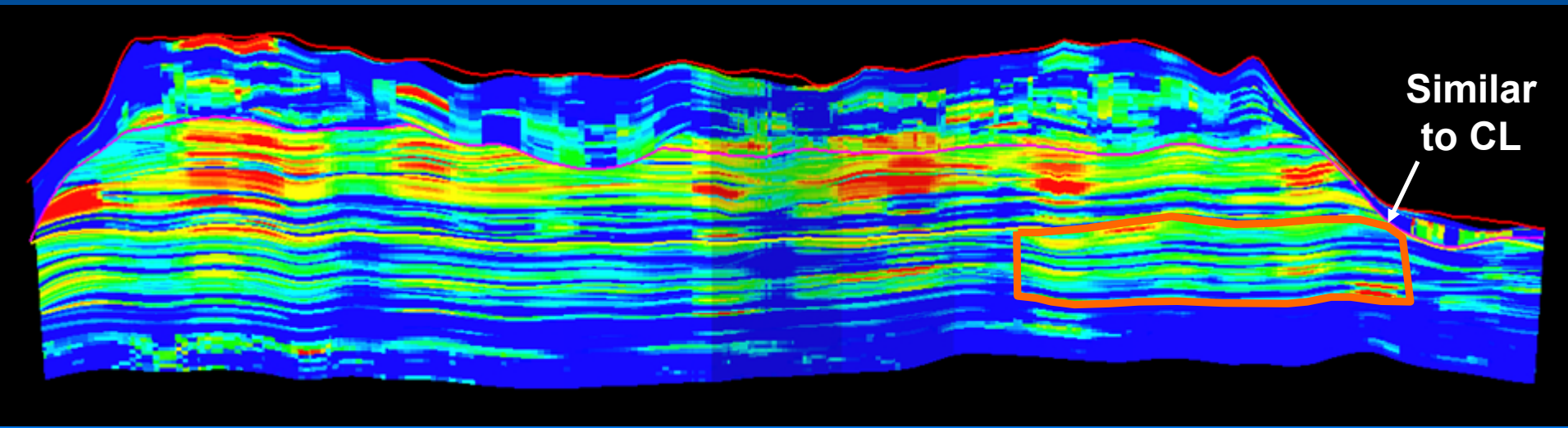
Development Pace – N. Platform





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 CO_2 Project

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Pace Development Alternatives

Current Status

- Producing ~16,000 BOPD
- Injecting ~220 MMscf/D CO_2
- 3,586 Acres (thru CL-V)

Development Options (#3 is preferred option)

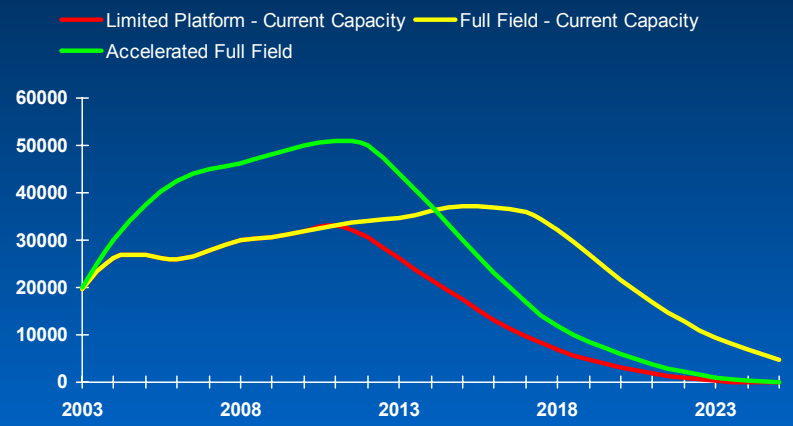
1. Limited Platform, Current Capacities
   - 165 MMBOE, ~18,100 Acres, 580 MM$*
2. Full Field, Current Capacities
   - 255 MMBOE, ~20,200 Acres, 790 MM$*
3. Full Field, Accelerated Development
   - 255 MMBOE, ~20,200 Acres, 820 MM$*

*2003 forward capital required including capitalized CO2

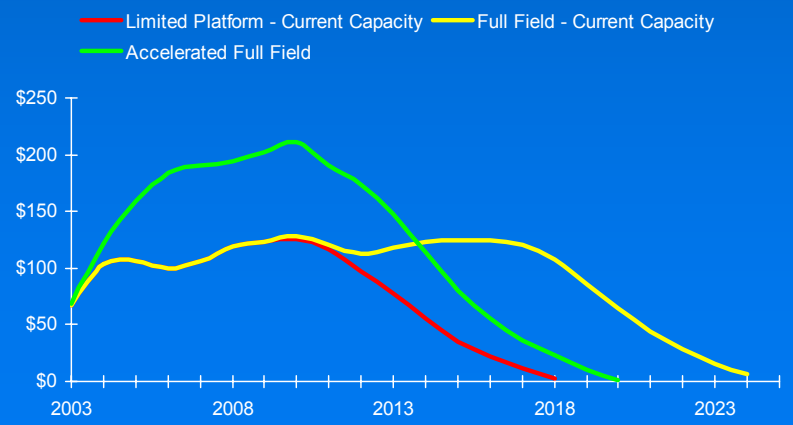
Further work:

- Reservoir Modeling of Platform
- Surveillance of Recent Bullseye Project

Oil Production, B/D



DCF, MM$/Yr - Oil Price $20/B



KINDER MORGAN

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

KINDER MORGAN

Long-Term Outlook / Goals

Domestic oil reserve replacement costs are increasing

- **CO_2 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 CO_2 to sell, trade, acquire, and maintain leadership in emerging U.S. CO_2 market**