



# North Dakota Refining Capacity Feasibility Study

Energy Development and Transmission Committee

Update March 17<sup>th</sup>, 2010

Kurt Swenson  
Vice President, NW Region

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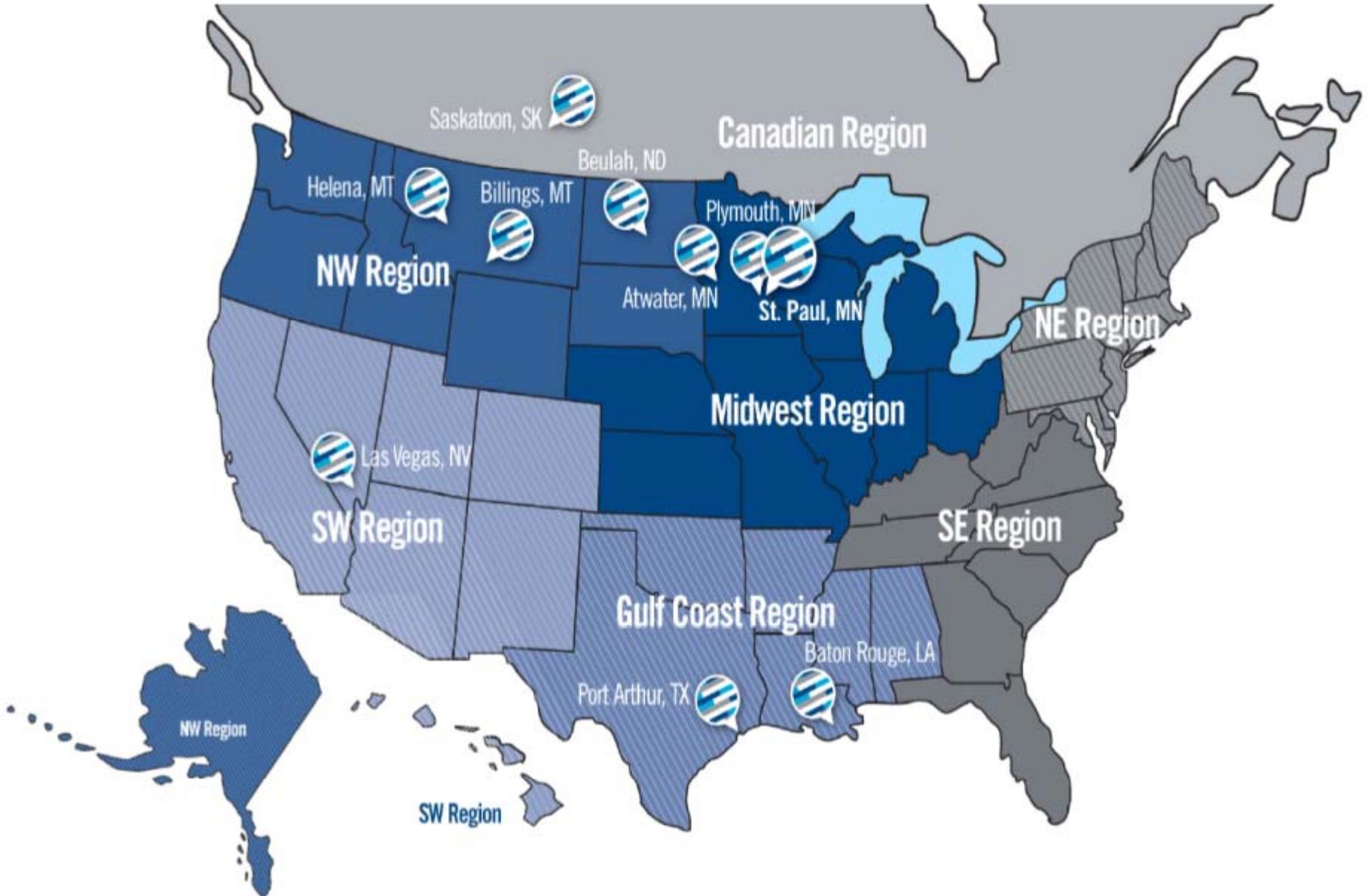
# Company History

*from Axel Newman Plumbing & Heating Company to Corval Group, Inc.*

- Began in 1921
  - Axel Newman Plumbing and Heating Company Residential & Commercial Mechanical Systems and Services.
- Late 60's / Early 70's
  - Grew into a full service mechanical contractor. Developed Industrial, Mechanical, Service and General Construction Services.
- 1979
  - Integrated all services into NewMech Companies, Inc.
  - Developed Power, Petrochemical and Alt Energy capabilities
- 2009
  - Integrated seven companies with multiple capabilities into Corval Group, Inc. with capabilities in Construction, Fabrication and Solutions

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# Corval Group Regions



## Delivering World Class Construction, Fabrication, and Solutions to Clients

### Partial List - Petrochemical Clients:

- Flint Hills Resources
- Exxon Mobil
- Conoco-Phillips
- Dow Chemical
- Dow Corning
- Shell Motiva
- Valero Refining
- Sunoco
- El Paso Gas
- Petrobras
- Equistar Lyondell
- Kerr McGee / Gulf Marine
- Raytheon
- Shell Explorer
- TransOcean



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# Corval Team Strengths



Total Refinery  
Master Planning Capacity

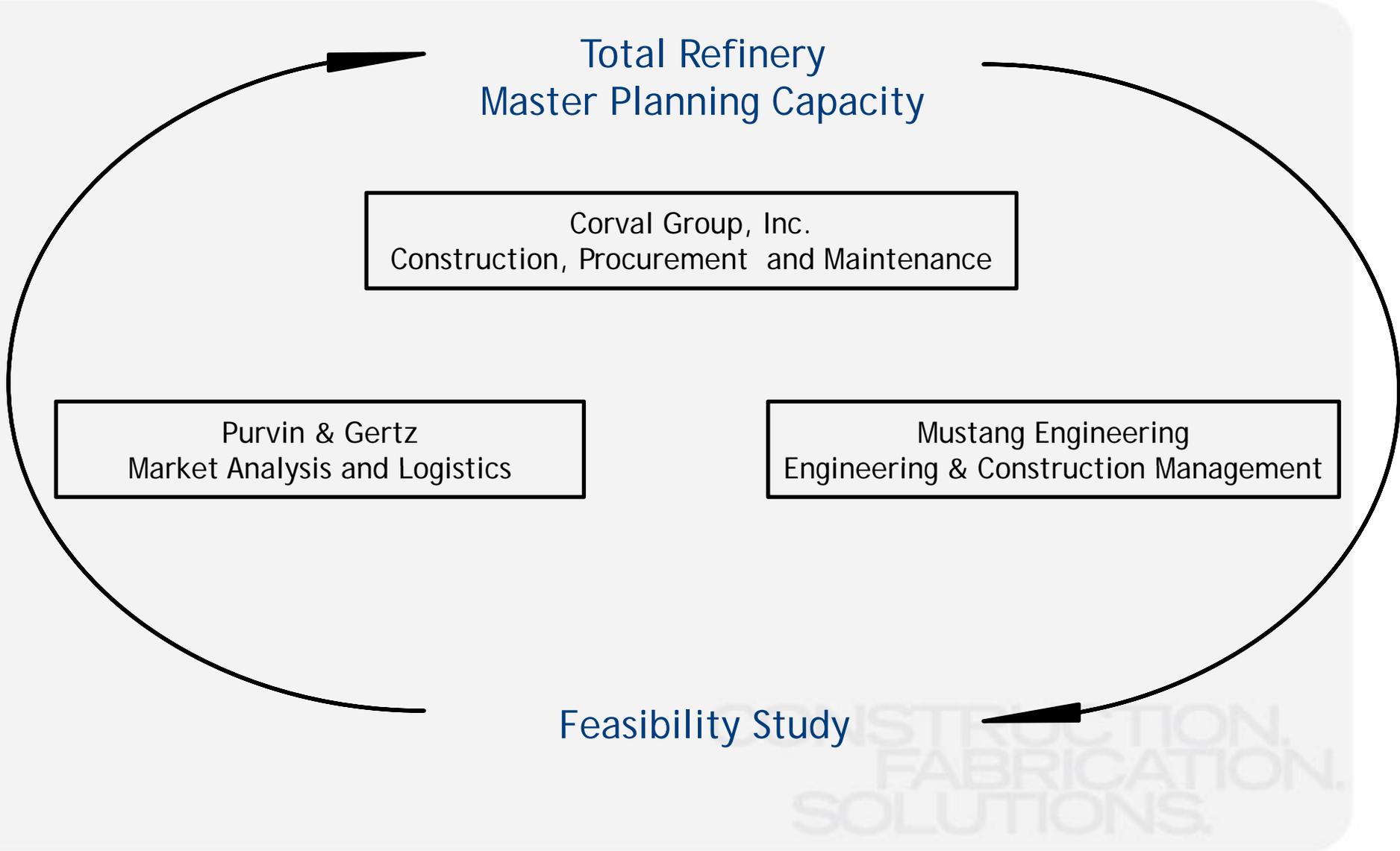
Corval Group, Inc.  
Construction, Procurement and Maintenance

Purvin & Gertz  
Market Analysis and Logistics

Mustang Engineering  
Engineering & Construction Management

Feasibility Study

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## Who is Purvin & Gertz

- Founded in 1947 - in business for over 60 years
- Independent firm owned by active consultants
- Global presence with offices in:
  - Houston, Los Angeles, Calgary, London,  
Singapore, Dubai, Buenos Aires and Moscow
- Consulting staff of Chemical Engineers/MBAs
  - Most join the firm with 10-15 years industry prior experience
  - Average of 22 years experience

A Global Network to Serve Clients Worldwide ...



# Typical Purvin & Gertz Assignments



## MARKET ANALYSIS

## PROJECT-RELATED ASSIGNMENTS

Fundamental Industry Analysis  
Supply/Demand/Trade  
and Pricing

Subscription Services  
• Short-term  
• Long-term

Industry Studies  
• Canadian Oil Sands  
• China Petroleum  
• Russian Trade

Crude/Condensate  
Markets and Pricing

Market Studies for  
Downstream Projects

Refinery Feasibility  
• Configuration  
• Process  
• Economics

Independent Engineer  
• Technical Review  
• Market Study  
• Project Economics

Profit Improvement  
• Commercial Review  
• PIMS LP Analysis  
• Technical/Optimization

Mergers/Acquisitions  
• Asset Valuations  
• Due Diligence



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# Purvin & Gertz

## Representative Recent Project Experience



### *Feasibility Studies*

- Canadian Refinery Development (2006-2009)
- Grassroots Refinery in Western Canada (2008)
- Central America Refinery Development (2005-2007)
- Gulf Coast Refinery Expansion Project Screening (2004)
- Alberta Refinery & Petrochemical Development (2003-2005)
- Refinery Upgrading Assessment (2004)
- Canadian Oil Sands Upgrader Project Review (2002-2003)
- European Grassroots Refinery Project (2002)
- Major Expansion Of Chinese Refinery (2002)
- Licensor Selection (2002)
- Caribbean Refinery Strategy Development (2001)
- Saudi Arabian Refinery Expansion Project (2001)
- Grassroots Projects In India & China (2001)
- Chinese Refining & Power Project Development (1997-2000)
- North American Refinery Upgrade Study (1998)

### *North Dakota Studies*

- Northern Tier Crude Price Analysis (2006)
  - ❖ Independent producer
- Northern Tier Refinery Screening (2006)
  - ❖ Private investment firm
- North Dakota Quality Bank Assistance (2007)
  - ❖ NDPC & NDOGRC

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# Who is Mustang?



- **Founded 1987 in Houston, Texas**
- **Joined Wood Group in 2000**
- **Business focus – Engineering and Project Management, and Construction Services for the petroleum, chemical, pharmaceutical and manufacturing industries worldwide**



**7,000 projects  
for over 350 clients**

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# Mustang in Process Plants



## Services Provided

- Process Design
- Feasibility Studies (Conceptual and Economic)
- Technology Consulting and Evaluation
- Front End Engineering Design Packages (FEED)
- Total Project Management (concept through start-up)
- Engineering / Design
- Procurement
- Inspection and Expediting
- Control / Automation
- Cost Estimates / Scheduling
- Construction Management
- In Plant Services



# Mustang in Process Plants



## Recent Mustang Projects Similar to NDAREC

- Grassroots 400,000 BPD Refinery for Hyperion in South Dakota
  - Front end engineering for 400,000 BPSD grassroots refinery
  - Developed utility balance, plot plan, supplied emissions data for air permitting
  - Conceptualized storage requirements, and rail and truck loading
- Refinery Expansion Project for Confidential Client
  - Updated refinery block flow configuration for major crude slate change requiring addition of new process units
  - Involved evaluation for impacts of crude change to each processing unit and utilities system
  - Determined total installed cost estimate and operating cost for economic evaluation
- Grass Roots 250,000 BPD for Confidential Client
  - Worked with LP modeler to develop refinery configuration
  - Developed conceptual utility arrangements; prepared FEL-2 cost estimate
- Refinery Expansion Project CHS
  - Developed refinery block flow diagram for addition of a new delayed coker to the refinery
  - Involved unit by unit evaluation for changes in operation and product qualities
  - Progressed from initial concept development to detail engineering and construction



# Mustang in Process Plants



## Why Mustang?

- Mustang has significant and recent experience in exactly the same type of project as this NDAREC grassroots refinery.
- FIT FOR PURPOSE ENGINEERING: Mustang executes projects very efficiently utilizing only the resources needed.
- Mustang is responsive and attentive to the sometimes fluid project environment. As the client's needs change, Mustang is agile enough to quickly adapt and keep the project moving.
- Mustang is technology neutral. Mustang can be counted on to deliver an unbiased review of technology choices available when developing a refinery flow scheme.



# ND Refining Capacity Feasibility Study

## Schedule

- Corval Team released to work early January
- Project divided into two phases
  - Phase I complete late April
    - Committee review and “go/no go” decision for Phase II
  - Phase II complete early July pending committee decision

# ND Refining Capacity Feasibility Study

## Phase I Study - 3 key elements

### 1. Marketing Study

- Transportation analysis
- Refined Product pricing (size is key factor)
  - Product displacement (what goes where)

### 2. Crude Oil

- Availability and Pricing forecasts

### 3. Partnerships

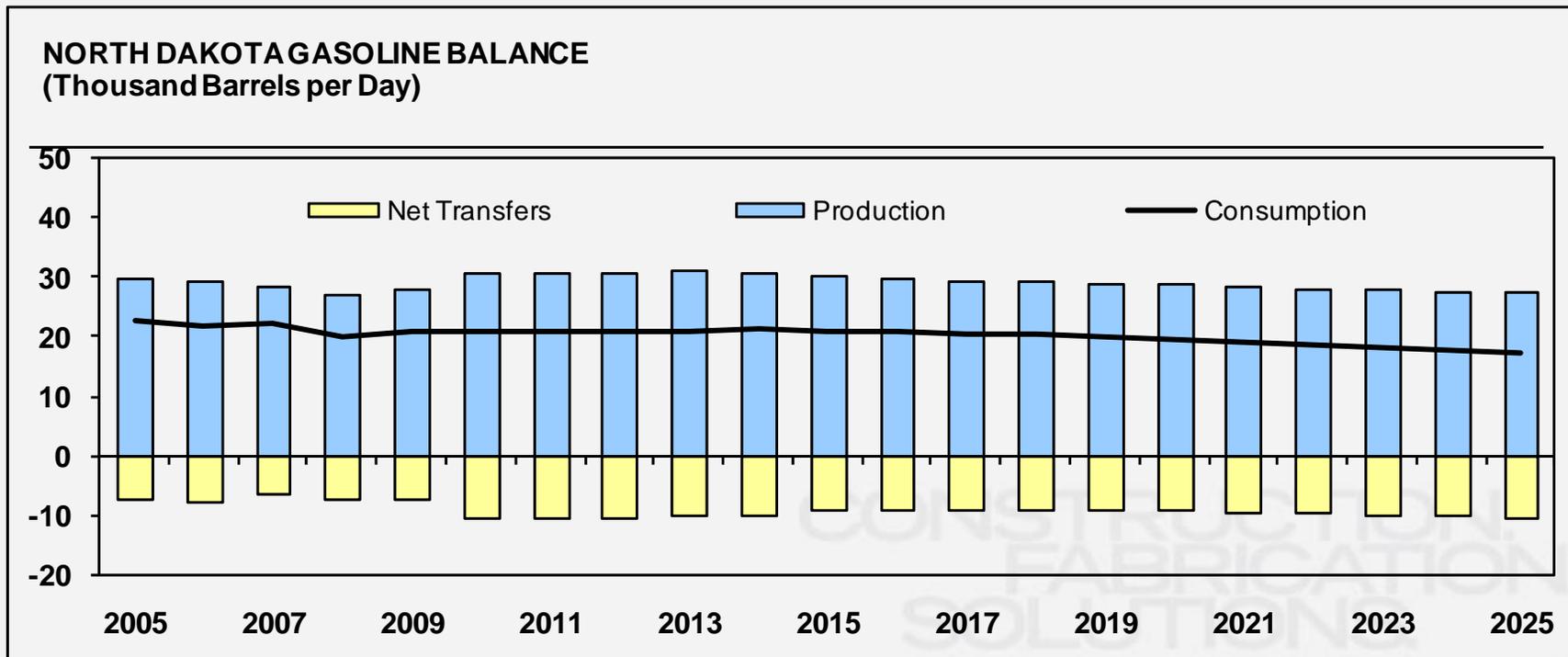
# ND Refining Capacity Feasibility Study

Phase 2 Study - (Optional) 3 Key elements

1. Economic and Refining Analysis
  - Refinery configuration
  - Product slate
2. Refinery Plot Plan
  - Location and layout
3. Economic Benefits

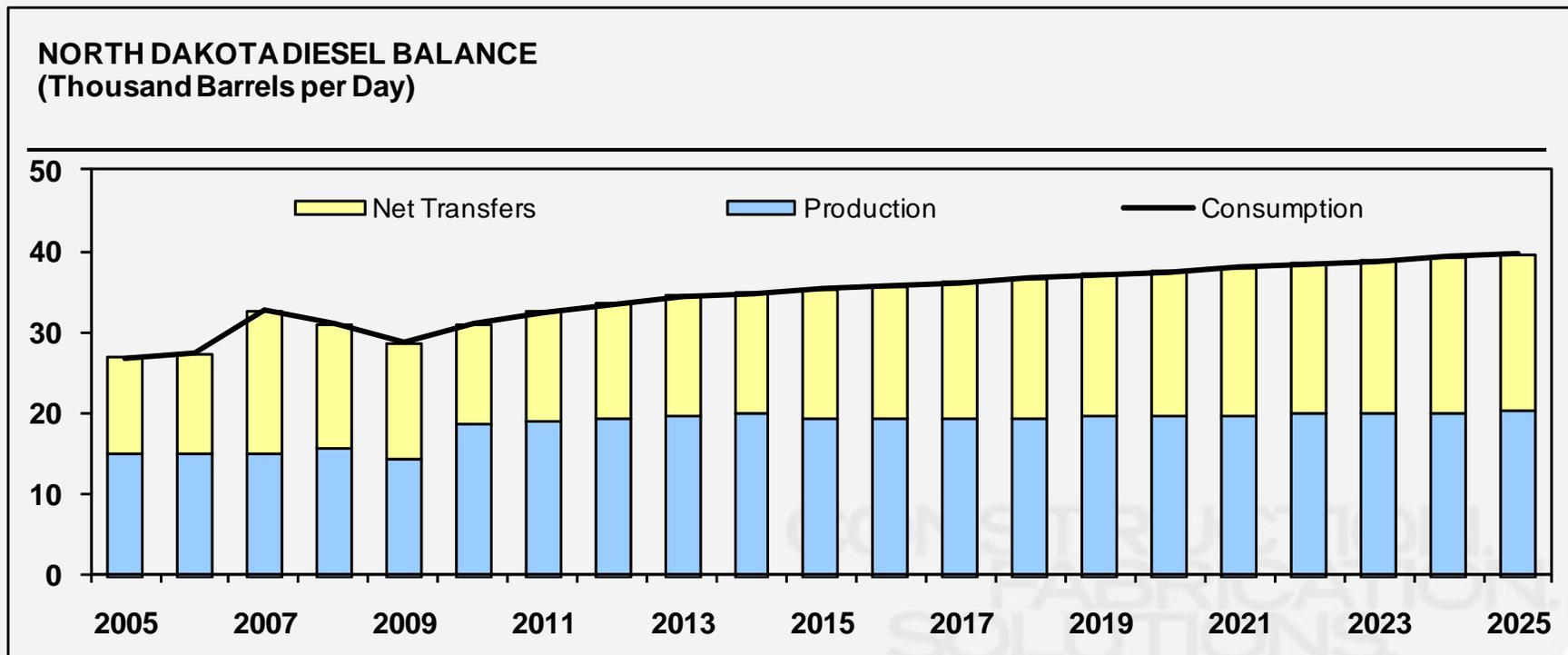
# ND Refining Capacity Feasibility Study

## Preliminary Gasoline Balance (ND)



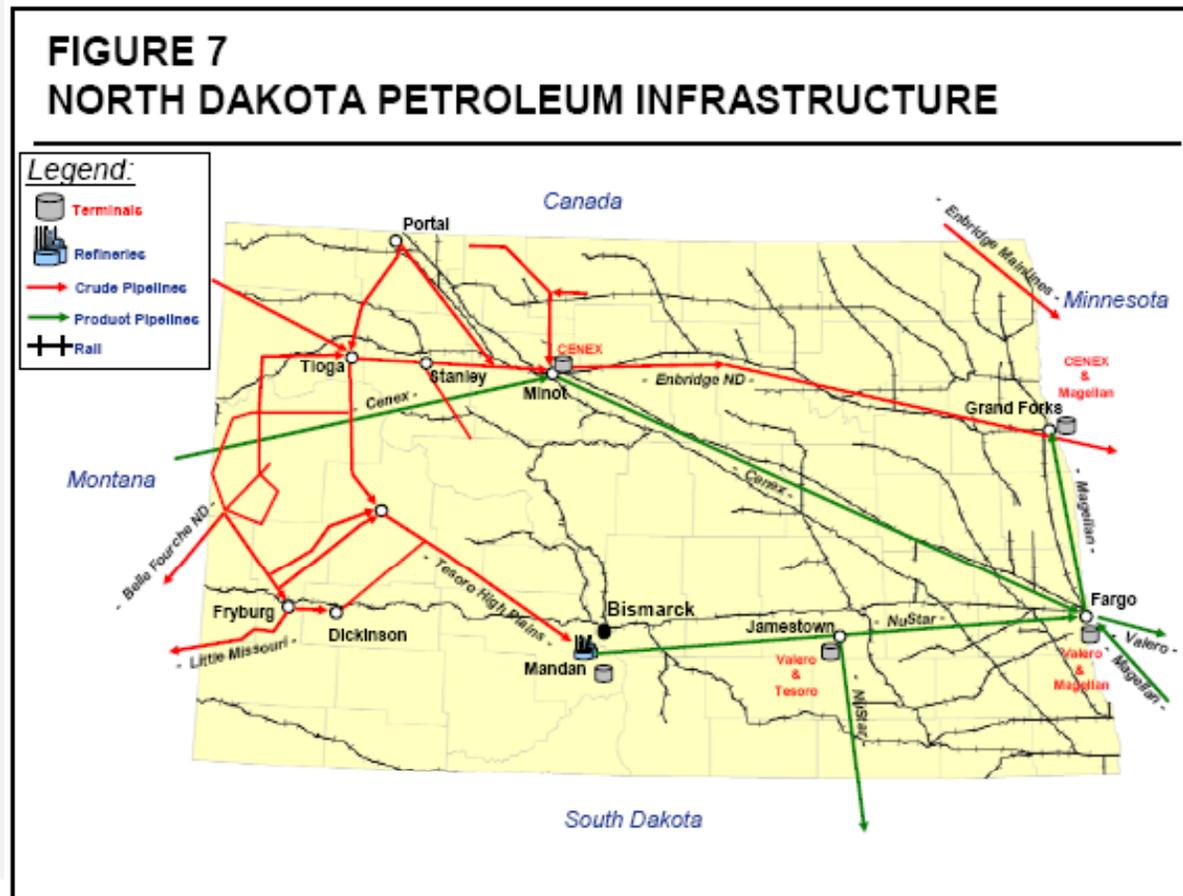
# ND Refining Capacity Feasibility Study

## Preliminary Diesel Balance (ND)



# ND Refining Capacity Feasibility Study

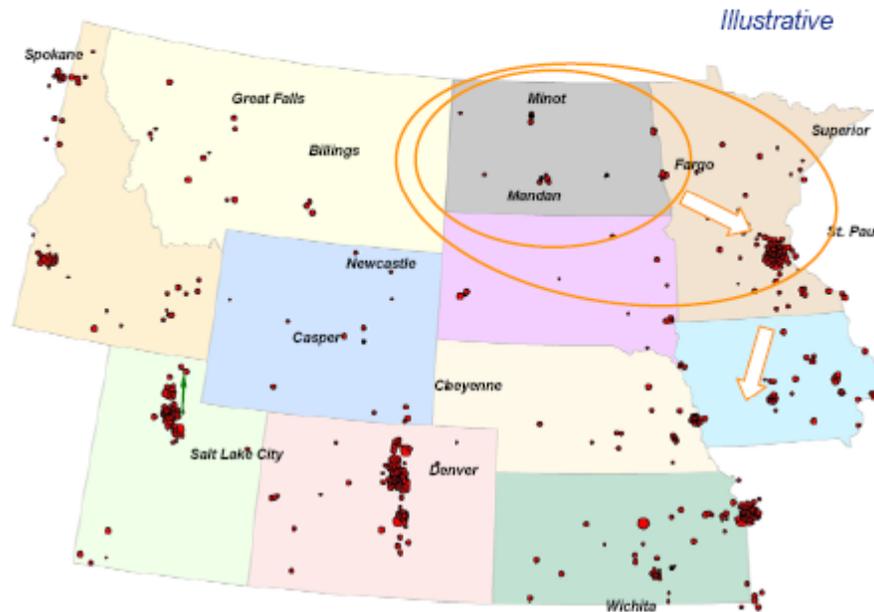
## Preliminary Transportation Infrastructure



# ND Refining Capacity Feasibility Study

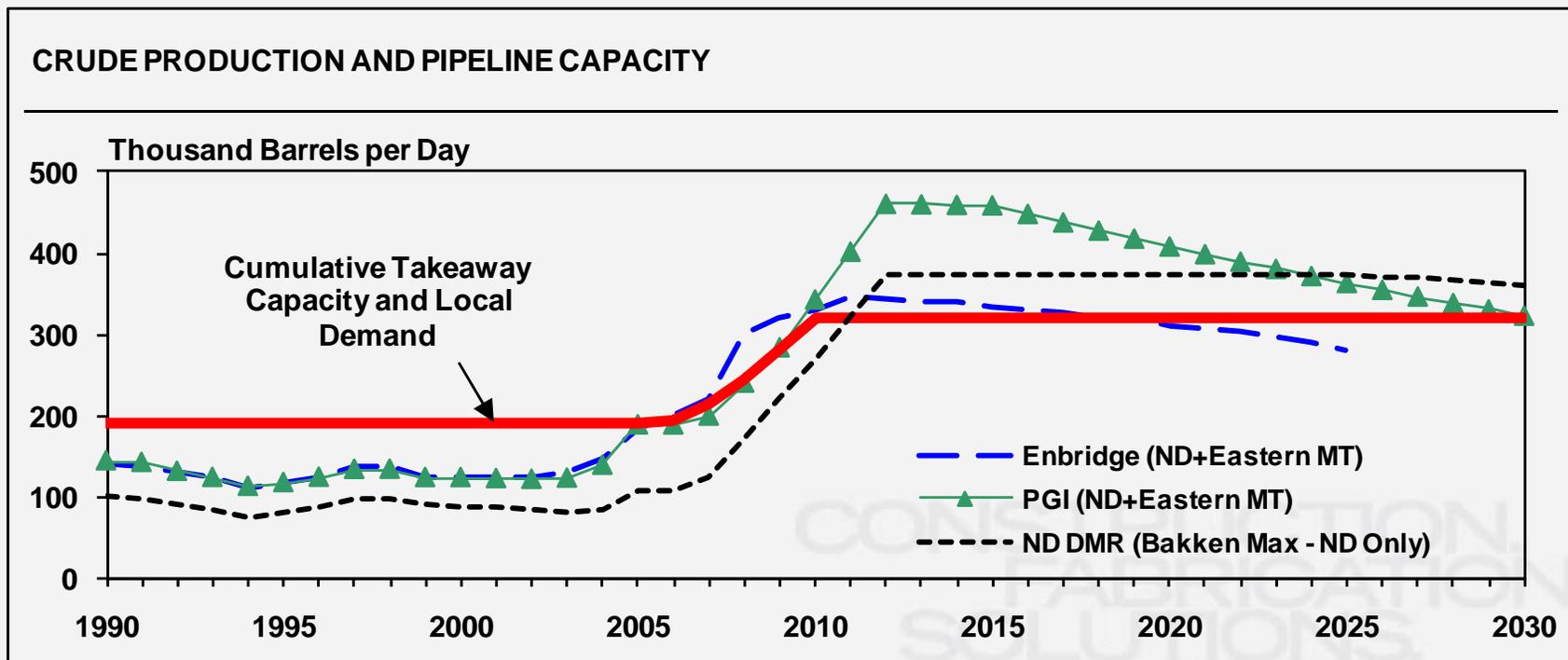
## Preliminary Refined Product Balance Impact

**FIGURE 8  
REFINED PRODUCT BALANCE IMPACT**



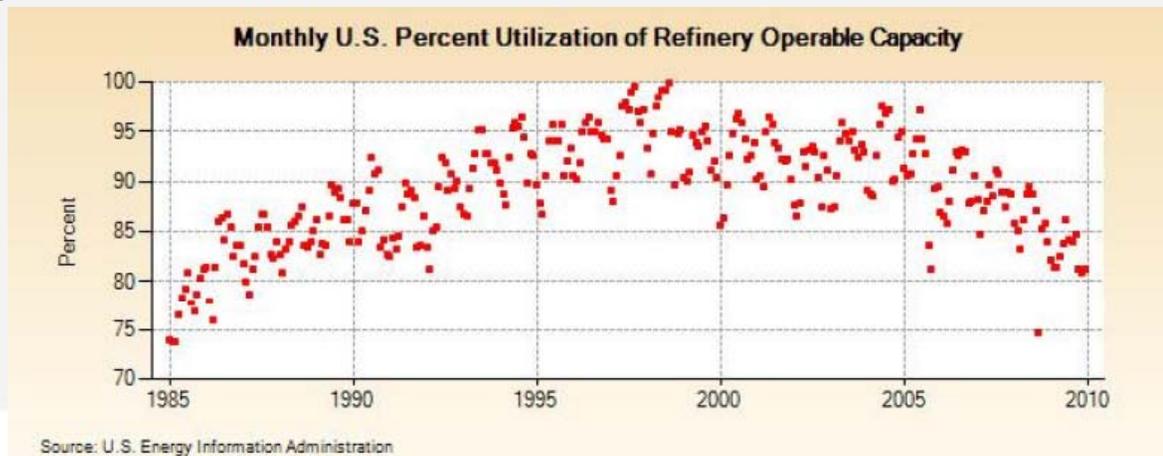
# ND Refining Capacity Feasibility Study

## Preliminary Crude Supply vs Pipeline Capacity



# Refining Outlook - United States

- Margins have deteriorated due to world economy and falling prices
  - Imports have effect
  - Announced closures / idling
  - Majority of refining capacity increase has been in Asia and Middle East
- Refinery utilization



# Refining Outlook - United States

## Capital Spending

- Primarily focused on environmental projects and consent decrees
- Ultra Low Sulfur Diesel spending is completing
- Next round of environmental focus is Benzene reduction
- Future spending focused on pending regulations (off-road diesel sulfur spec, ozone standards, particulates)

## Support Infrastructure

- Terminal expansions and pipeline projects are extensive
- Not all proposed projects will proceed

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# ND Refining Capacity Feasibility Study

## Next Steps

Refinery Study Committee Phase I status report

- March 23<sup>rd</sup>

Final Phase I Report presented to committee

- April 23<sup>rd</sup>

Phase II “go / no go” decision by committee

- Early May



Questions?

Thank You

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