North Dakota Refining Capacity Feasibility Study
Energy Development and Transmission Committee
Update March 17th, 2010

Kurt Swenson
Vice President, NW Region
Company History

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

• Began in 1921
• 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
Corval Group – 90 Years of Client Satisfaction

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
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 ...

- Calgary
- Houston
- Los Angeles
- London
- Moscow
- Dubai
- Singapore
- Buenos Aires

Corval Group

Purvin & Gertz
Typical Purvin & Gertz Assignments

**MARKET ANALYSIS**

- 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

**PROJECT-RELATED ASSIGNMENTS**

- 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

Fundamental Industry Analysis
Supply/Demand/Trade and Pricing
### 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)
- **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
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
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**
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)

NORTH DAKOTA GASOLINE BALANCE
(Thousand Barrels per Day)

- Net Transfers
- Production
- Consumption

ND Refining Capacity Feasibility Study

Preliminary Diesel Balance (ND)

NORTH DAKOTA DIESEL BALANCE (Thousand Barrels per Day)

- Net Transfers
- Production
- Consumption

FIGURE 7
NORTH DAKOTA PETROLEUM INFRASTRUCTURE

Legend:
- Terminals
- Refineries
- Crude Pipelines
- Product Pipelines
- Rail

Canada
Minnesota
Montana
Fargo
Dickinson
Fryburg
Bismarck
Jamestown
Mandan
South Dakota

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

**CRUDE PRODUCTION AND PIPELINE CAPACITY**

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Cumulative Takeaway Capacity and Local Demand
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
ND Refining Capacity Feasibility Study

Next Steps

Refinery Study Committee Phase I status report
  - March 23rd

Final Phase I Report presented to committee
  - April 23rd

Phase II “go / no go” decision by committee
  - Early May