

# Northwest Refining Feasibility

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## Northwest Refining Preliminary Feasibility Study

# Northwest Refining Feasibility

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  - Proposed Pipelines
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  - Economics

# Northwest Refining Feasibility

- Market For Refined Products in ND
  - Region Consumption Statistics
    - Dakotas – 132 Mbbbls/Day (2005)
    - Montana – 96 Mbbbls/Day (2005)
  - 117 Mbbbls/Day shortfall between North and South Dakota (2005)
  - Primarily Two Fuels Markets
    1. Jet Fuel – Air Force Bases
    2. Diesel – Agriculture Use Cross Country Trucking and Oil Field Operations

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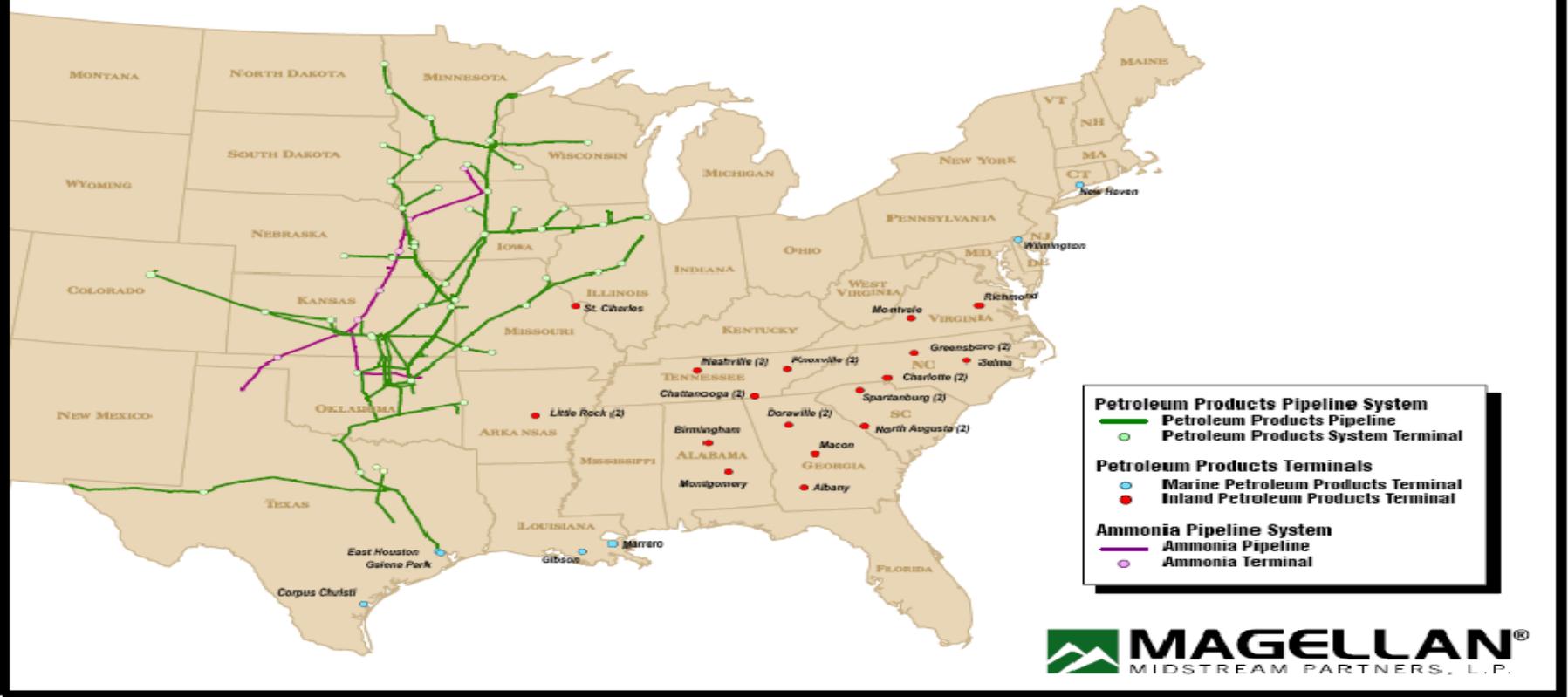
- Market For Refined Products in ND
  - Gasoline minimized
  - LPG possibly transported to market by rail or used as fuel for refinery
  - Region expected to require approximately 1.3 million tons of asphalt by 2011

# Northwest Refining Feasibility

- Current Availability of Refined Products in North Dakota
  - Area Refining Capacity
    - South Dakota – None
    - North Dakota – 60 Mbbls/Day
      - 75% of refined products exported to Minnesota
    - Montana – 183 Mbbls/Day

# Northwest Refining Feasibility

## Asset Portfolio

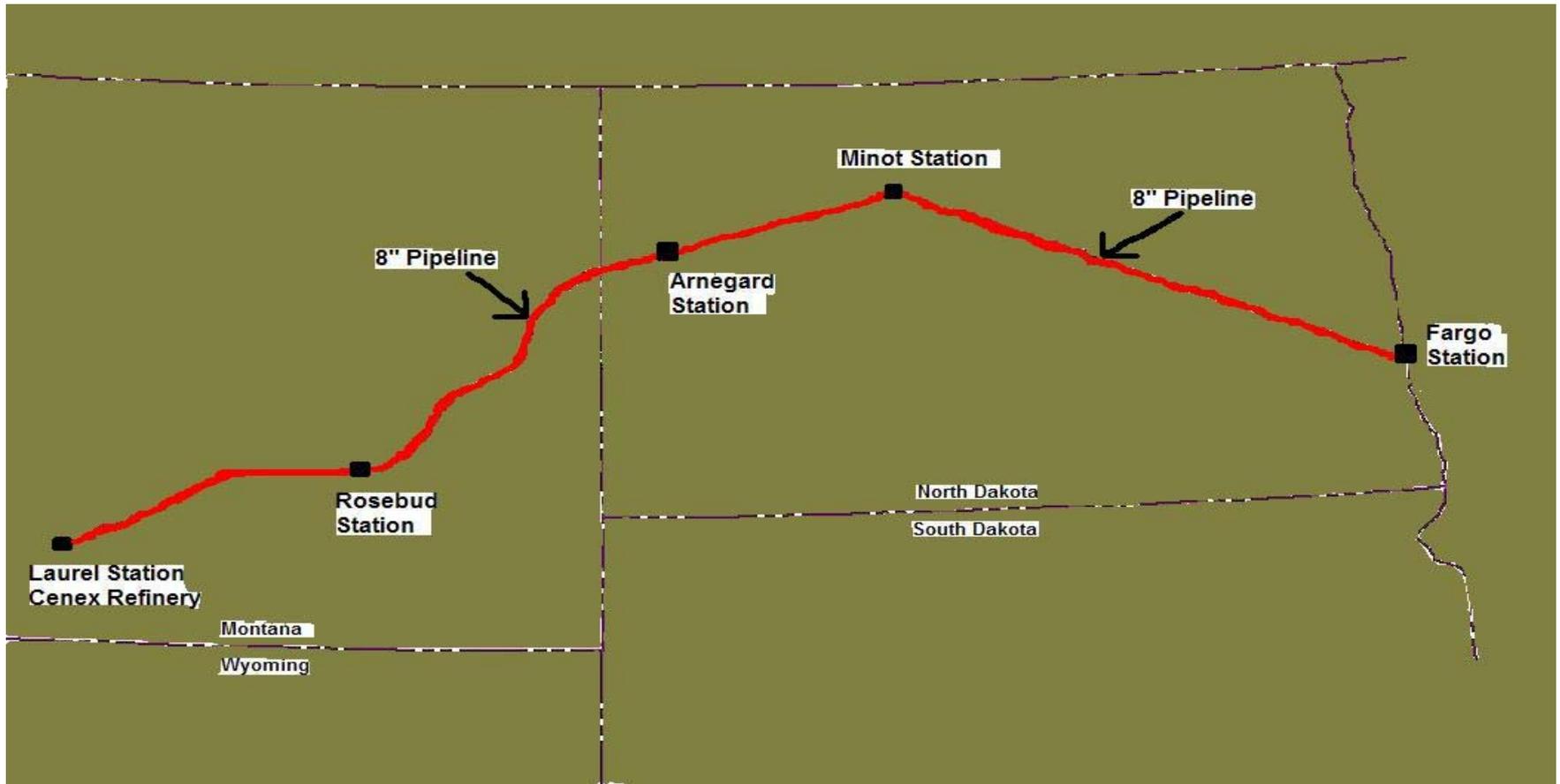


Source <http://www.magellanlp.com/assetmap.asp>

# Northwest Refining Feasibility



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Source <http://www.cenexpipeline.com>

# Northwest Refining Feasibility

- Proposed Pipelines

- Two cases evaluated

- Case 1: 50 Mbbbls/Day

- Two segments recommended

- » First segment – 8” line from refinery west of Williston, ND to a terminal in Minot, ND.

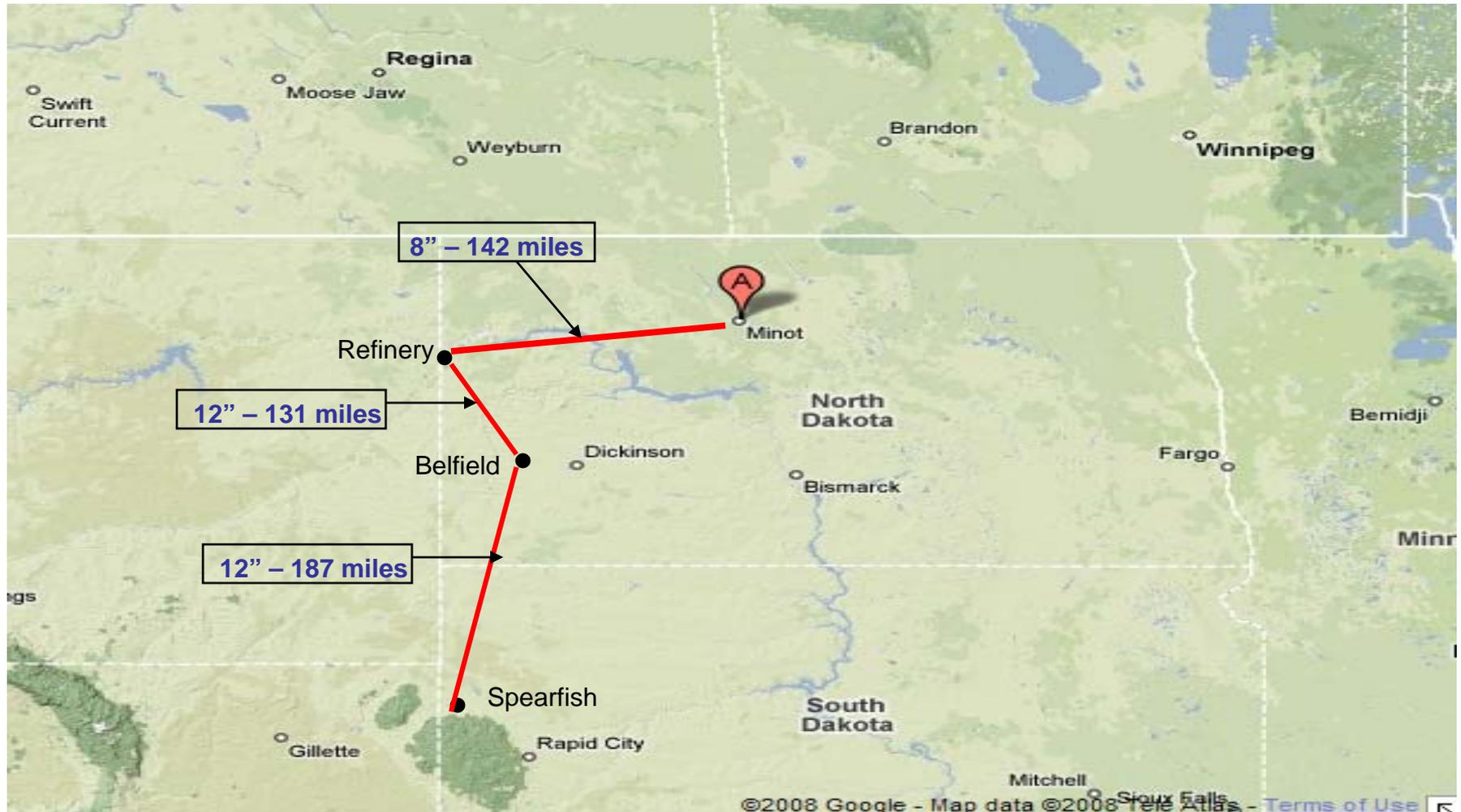
- » Second segment – 12” line from refinery west of Williston, ND to a new terminal in Belfield, ND. I-94

- Case 2: 100 Mbbbls/Day

- Three segments recommended

- » Third segment – Line from Belfield, ND to a new terminal in Spearfish, SD. I-90

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- Stranded Crude Supply
  - Traditional ND crudes are heavy sour crudes
    - Not currently being produced and sold
  - Refinery in area would provide an outlet for this oil and encourage greater production of additional oil reserves

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## Location

- Water
- Power
- Rail - BNSF
- Road
- Land
- Zoning

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- Environmental
  - Permitting
  - Byproducts
  - Green
  - Future

# Northwest Refining Feasibility

- Environmental

- Basis: 100 Mbbl/day refinery

- Pollutants can be controlled to less than 250 tons/year (preliminary assessment)
- Control includes use of:
  - Internal floating roofs with double seals on crude and gasoline tanks
  - Heaters and possibly gas turbine designed to burn low sulfur fuels using low or ultra low NOx burners
- Permit for refinery, local distribution and pipeline origination activities only
- Separate air permit application will be prepared for pipeline and terminating operations

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- Refinery Design

- Case 1: Red River C Crude

- Crude currently being produced; Very light and sweet; Minimum capital case; Would be most expensive to modify later to accept other crudes

- Case 2: North Dakota Sour Crude

- Not currently being produced; Requires extensive hydroprocessing; Maximum capital case

- Case 3: Blend Case

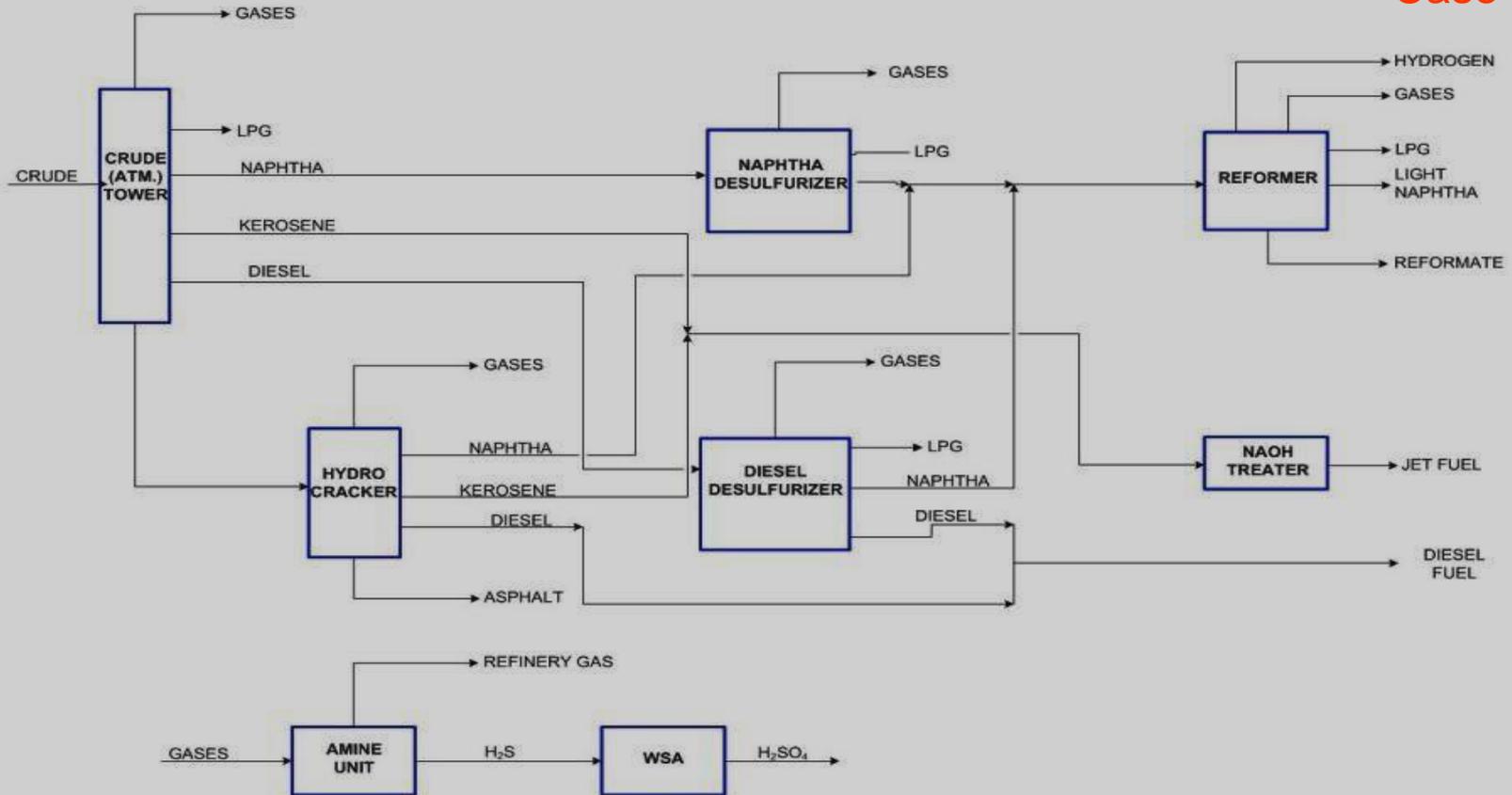
- Blend of heavy sour and light sweet; Produces 15000 bpd of asphaltic resid; No resid hydrocracker

- Case 4: Blend Case – HC

- Same as Case 3 except utilizes resid hydrocracker

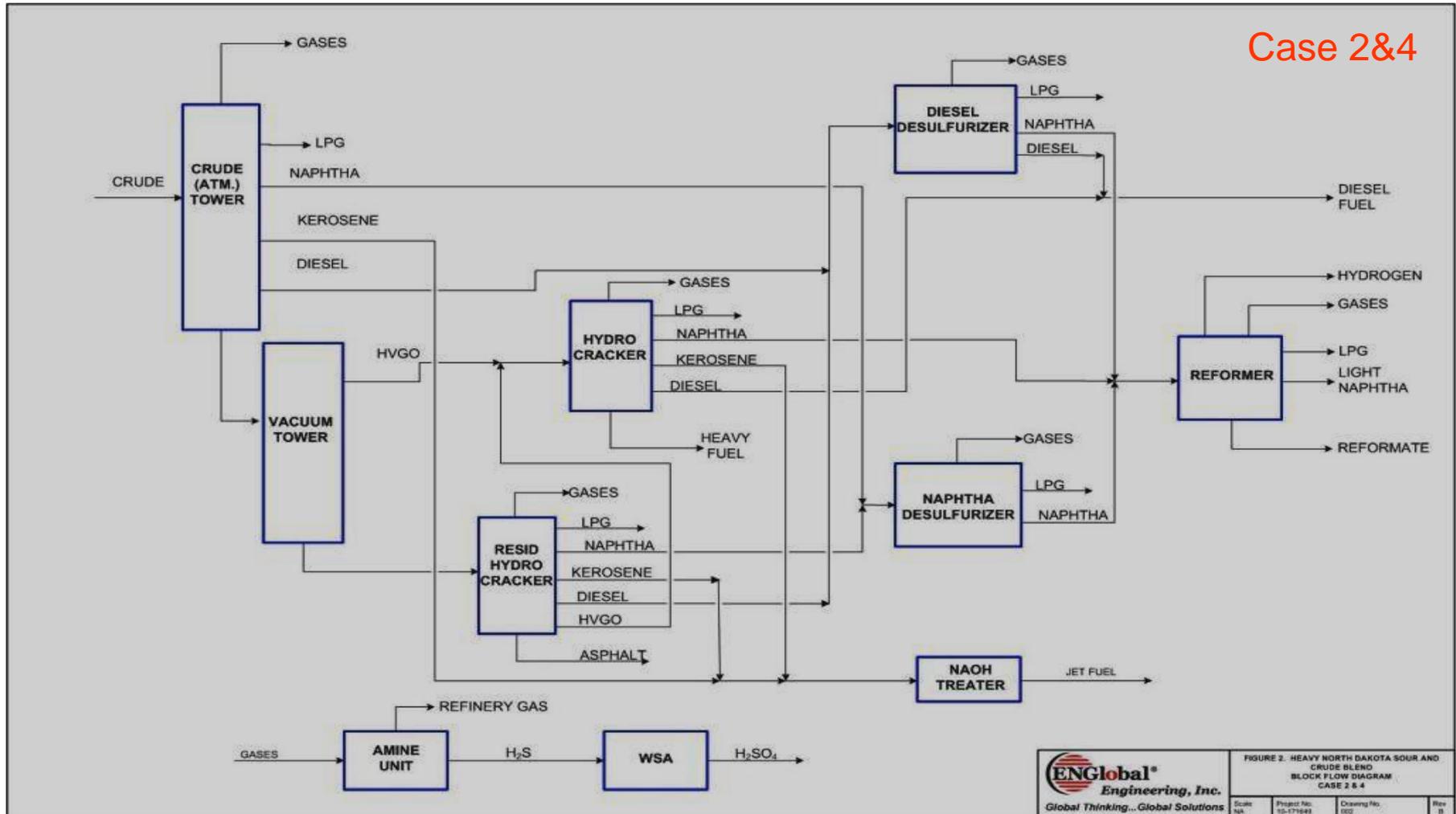
# Northwest Refining Feasibility

Case 1



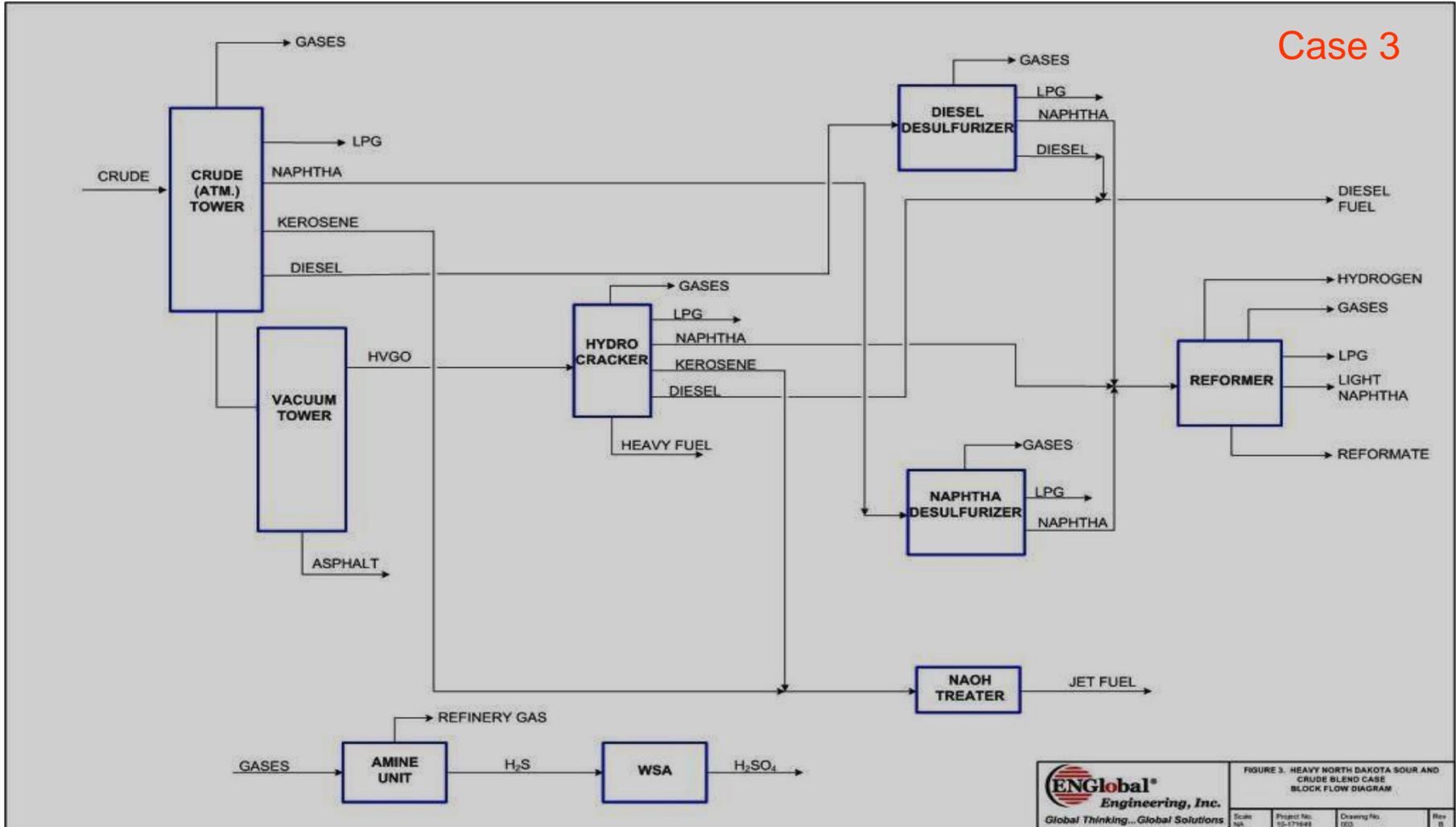
# Northwest Refining Feasibility

Case 2&4



# Northwest Refining Feasibility

Case 3



# Northwest Refining Feasibility

- Capital ISBL Cost

– Case 1 (Red River Crude):	\$436MM
– Case 2 (ND Sour Crude):	\$920MM
– Case 3 (Blended Crude):	\$438MM
– Case 4 (Blended with Resid Hydrocracker):	\$751MM
– Flex Case	
• Without Hydrocracker	\$497MM
• With Hydrocracker	\$956MM

# Northwest Refining Feasibility

- Capital ISBL Cost

- Flex Case

- All units sized to 100 Mbbls/day
- Resid Hydrocracker not initially provided
- Enables either light sweet or heavy sour crudes to be run as available
- Avoids big expenditure until enough heavy sour crude becomes available in future to make it economically viable

# Northwest Refining Feasibility

- Total Project Cost
  - ISBL capital costs converted to project capital costs by adding 100% of ISBL for OSBL
    - Excludes pipeline cost, 3,000,000 barrels of tankage, and a 20% contingency
  - Estimates are probably high (next slide)

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**Table 4**  
**Northwest Refining**  
**Total Project Costs**  
**in Millions of Dollars**

			Case 1	Case 2	Case 3	Case 4
ISBL			436	920	438	751
OSBL	@ 100% of ISBL		436	920	438	751
Tankage	@ \$18/bbl		54	54	54	54
Pipeline			233	233	233	233
<b>Total Project Capital</b>			<b>\$1,159</b>	<b>\$2,127</b>	<b>\$1,163</b>	<b>\$1,789</b>

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- Economics

- Cost of Red River Crude taken as price of WTI at Cushing, OK
- Cost of ND Heavy Sour Crude taken at \$10/bbl below price of WTI at Cushing.
- Product pricing taken as price in Los Angeles
- Exceptions
  - LPG - \$7.00/MM BTU
    - Assumes no market for LPG
  - Asphaltic resid valued as fuel oil
  - Resid from Hydrocracker valued as gas oil

# Northwest Refining Feasibility

- Economics

- Payouts

- Case 1 (Red River Crude): 1.4 yrs
    - Case 2 (ND Heavy Sour Crude): 2.1 yrs
    - Case 3 (Blend): 1.6 yrs
    - Case 4 (Blend with hydrocracker): 2.2 yrs
    - Flexible Case:
      - Without hydrocracker 1.4 yrs
      - With hydrocracker 3.7 yrs

# Northwest Refining Feasibility

- Economics

- Other factors that may affect economics

- Crude oil price:

- Red River Crude priced much higher

- ND Heavy Sour Crude priced lower than \$10/bbl discount from WTI Product Prices:

- Assumed prices at Los Angeles for products

- Capital Estimate:

- OSBL estimate for Residual Hydrocracker cases probably high

- Operating Costs:

- Estimated cost (\$1.70/bbl) for average refinery was assumed

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## Conclusion

- Market
- Raw Material
- Economics
- Logistics
- Site
- Proceed

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Thank You

Questions?

Gary Reeves, P.E.  
Manager of Process Engineering  
654 N Sam Houston Parkway E Suite 400  
Houston, Texas 77060  
281-878-1063  
[gary.reeves@englobal.com](mailto:gary.reeves@englobal.com)  
[www.ENGglobal.com](http://www.ENGglobal.com)