

**Northwest Refining, Inc. Preliminary Engineering Feasibility Study**  
**Contract No. G-014-027**

This is a project submitted by Northwest Refining, Inc. Total cost of the project is \$80,000 with \$40,000 provided from the Oil and Gas Research Fund. The purpose of this preliminary feasibility engineering study is to explore all of the factors involved in the development, construction, and operation of a 50,000 bbl/day oil refinery in the Williston area. The duration of this project is 4 months. In approving the funding for this project, the Industrial Commission accepted the recommendation of the Oil and Gas Research Council and included the following conditions:

That the preliminary feasibility engineering study include product logistics such as an assessment of the market for refined products in the region and an analysis of available product transportation infrastructure and costs of construction of pipeline infrastructure; a crude oil supply forecast over the anticipated operating life of the refinery; review of all the permitting processes including an analysis of emissions availability under the State's air emissions law; a timeline for the construction of a refinery; and cost estimates of different sized refineries

These conditions were agreed to and a contract has been executed with Northwest Refining, Inc. *The final report is to be released September 30, 2008.*

January 10, 2008

Three status reports have been received regarding this project. To date the following has been completed:

- Preliminary site evaluation was conducted by ENGlobal;
- Crude assays were obtained and a crude blend slate has been created composed of 31% Bakken, 29% Madison and 40% Red River B. A lab in Houston has been selected to perform tests on the chosen crude slate;
- A preliminary proposed process unit scheme has been developed;
- A preliminary block flow diagram has been developed for the preliminary proposed process unit scheme;
- Contacts have been made with pipeline companies in North Dakota and in surrounding states to determine what pipeline availability will be around 2010;
- If no pipeline availability is determined, then ENGlobal will provide an estimate to construct a new pipeline using a cost/mile for the region;
- It has been indicated that there is an adequate large local market for jet fuel but not for the gasoline and diesel products from a 50,000 bbl/day refinery;
- A market study is being expanded to determine if a 100,000 bbl/day refinery can be supported with increased marketing infrastructure.

October 3, 2008

The final report has been received. The following one-page summary was provided by Northwest Refining's consultant ENGlobal:

Product Logistics Assessment of Refined Product Markets

According to the U.S. Energy Information Administration, North and South Dakota consumed 131,531 bpd of petroleum products in 2005. Montana consumed 95,819 bbl per day in 2005.

South Dakota has no oil refinery. Montana has refining capacity, as of January 1<sup>st</sup> of 2007 of 182,500 bpd. Tesoro operates a 58,000 bpd refinery in Mandan, North Dakota. According to Tesoro, 75% of their refined products are exported into Minnesota. Montana also exports refined products to regional markets. In the Dakotas, there is a short fall of 117,031 bpd of petroleum products from existing facilities based on 2005 statistics.

Diesel fuel is used extensively in drilling operations, agriculture, and trucking throughout the region. There are 5 Air Force bases within trucking distance from the proposed site. Therefore, the refinery will be designed to maximize diesel and jet fuel.

Gasoline will be produced, but not maximized, as the market for gasoline is less attractive than diesel and jet fuel. LPG could be sold or used in a supplementary, in-plant fuel, producing power for consumption and or sale. The Dakotas and Montana are estimated to require 1.3 million tons of asphalt in 2011, three times the refinery's production capacity.

#### Product Transportation

A 100,000 bpd refinery could supply local and major markets. Trucks can access local markets with 100 miles. Building pipelines to Minot, Belfield, and Spearfish is necessary to access major markets in the Dakotas. These will serve trucking, population centers, and air force bases.

The total pipeline and terminal cost (including land acquisition) for a 50,000 bpd refinery is \$135,635,758  $\pm$ 30%; for a 100,000 bpd refinery is \$232,670,087  $\pm$ 30%. Estimated cost of a 100,000 bbl refinery is \$1.5 billion.

#### Crude Oil Supply Forecast

Traditional North Dakota crude oils are heavy sour crudes that are generally stranded, so they are not currently being produced and sold. A refinery in the area would enable markets to access this oil, and would encourage greater production of additional oil reserves.

Presently, North Dakota is producing 145,000 bpd of crude oil and Montana is producing 90,000 bpd. The Elm Coulee field in Montana is producing 52,000 bpd from the Bakken formation, 25 miles from the proposed refinery. A local refinery will provide a market for heavy crudes and provide an incentive to produce light crudes; providing a viable market outlet.

#### Review of Permitting Process

It is strongly recommended that, in order to reduce financial and marketing risks, the refinery start at 100,000 bpd. Emissions at this level are adequate to obtain essential construction permits.

Air and wastewater discharge permits will be applied for under EPA Title V through the North Dakota Department of Health. This source will not require a PSD review because all emissions will be below 250 tons/year with controls and the refinery is in an attainment area. Once the construction permit is obtained, applications will be made for many other permits which are required such as storm water NPDES and operation permits.

The time from issuance of the construction permit(s) and financing to completed refinery construction could be as long as 5 years. This estimated schedule includes preliminary

engineering, the normal procurement cycle, the arrival of long delivery items which alone could take 42 months from the start of detailed engineering, plus another 3 to 6 months for construction.

Posted on this website is the final report, a PowerPoint presentation given by Gary Reeves of EnGlobal at an Oil and Gas Research Council meeting held on October 3, 2008 and a recording of the discussion held at the Oil and Gas Research Council meeting. You are encouraged to listen to the Council meeting while viewing the PowerPoint presentation.