



Rejected No More?

By John Harpole

We all have experience with rejection on some level. And in some producing areas of the U.S., ethane production has been treated like a combination of junk mail and political robo-calls—better to reject it and forget about it.

That treatment is about to change thanks to unprecedented, low U.S. ethane prices.

What is ethane?

It's the most prolific of the five gas liquids and accounts for nearly half of every NGL barrel. Pure ethane has a higher heat content, 1,770 Btu per cubic foot (Btu/cf), than methane (1,010 Btu/cf) and should be more valuable. But due to oversupply and lack of demand, ethane is trading at roughly a heating-value equivalent price to methane.

The prolific U.S. shale revolution and its very wet, high-Btu raw natural gas has prompted the expenditure of billions. If recent announcements are any indication, some of that fortune will be spent shipping ethane worldwide.

Some background might be useful: Ethane is "cracked" into ethylene. Cracking heats the ethane up to more than 800 C. The heat separates the molecular bonds, thus creating ethylene, a feedstock for polyethylene, which is then transformed into solvents, urethanes, pharmaceuticals and plastics.

Cracking ethane is not cheap, and at least 10 greenfield cracker plants—at an approximate cost of \$5 billion each—are proposed or under construction across the U.S.

The billion-dollar question facing the burgeoning U.S. chemical industry is whether newly announced plans to export U.S. ethane will negatively impact their economics. Or is there enough ethane to go around?

According to a study of U.S. ethane production undertaken by Lloyd's Register, in 2013 200,000 barrels per day (bbl/d) of ethane were left in the gas stream or "rejected." When ethane is rejected, it is not extracted by natural gas processing plants; it simply remains in the stream of natural gas.

Peter Fasullo, analyst with EnVantage Inc., said U.S. ethane extraction capacity has risen more than 60% during the last eight years, to a 2014 average volume of 1.23 million bbl/d (MMbbl/d).

Fasullo anticipates that by 2020, daily production numbers could be 2.2 MMbbl/d. That explains why ethane prices are at an all-time low, currently trading in the low 20 cents per gallon range as compared to a 90 cents average price per gallon in 2012.

Most world-class ethane crackers are located next to natural gas production. But the growing volume of U.S. ethane production has resulted in a first-of-its-kind export project destined for a foreign cracker.

India's Reliance Industries plans to ship liquefied ethane from the U.S. to its ethane cracker in India. Reliance doesn't have to look

far for an ethane supply due to two joint ventures in the Marcellus Shale, one with Chevron Corp. and the other with Carrizo Oil and Gas Inc.

Enterprise Product Partners LP will construct a 240,000 bbl/d facility—roughly equal to the volume of U.S. ethane currently being rejected—the largest ethane export facility in the world. Located on the Houston Ship Channel, it will assist Reliance in its strides toward vertical integration. That facility is scheduled to be operational by third-quarter 2016. Reliance also placed an order with Samsung Heavy Industries for five very large ethane carriers to be built in South Korea—the first of its type.

Mike Sloan, principal with ICF International, thinks that there is plenty of ethane to go around: "When those

facilities come online, they will reduce the amount of ethane rejection in the market right now, and most of the supply will come from that."

Fortunately for Reliance and Enterprise, exports of liquefied ethane are not regulated by the U.S. Department of Energy (DOE). Only ethane's cousin, natural gas or its liquid form LNG, comes under the DOE's export purview. It is amazing what the market can get done without government interference. ■

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