Question 41: Have the panel members considered 15% ethanol (E15) gasoline blending?

KOONTZ (HollyFrontier)

My first slide shows a little background. The EPA administers the Renewable Fuel Standard program that has volume requirements for renewable fuels. They established these volume requirements under the Energy Independence and Security Act of 2007. The EPA tracks compliance with the Renewable Identification Number (RIN) system, and they assigned a RIN to each gallon of renewable fuel.

HollyFrontier satisfies much of its requirement for conventional biofuel, which is essentially corn ethanol, by blending E10 gasoline at many of its terminals. Most of HollyFrontier's gasoline is sold via pipeline to terminals owned by others; therefore, we are not able to supply our full mandated volume. HollyFrontier does purchase RINs from others. The decision to purchase ethanol to blend or the RINs is based on the economics of the cost of the RINs.

Ethanol blending for the refiner does have a significant impact on two critical gasoline properties: namely, octane and RVP. The hydrocarbon blend stock used for 90% of the E10product, which HollyFrontier calls sub-grade, has an octane rating of about 84. After blending with the 10% ethanol, the resulting octane is the regular 87. So being a refinery that adjusts total octane with its reformer severity, this allows us to run a lower severity, which is especially beneficial to those refineries with semi-regen reformers that operate at relatively high pressures and relatively low liquid volume product yield.

RVP is the other critical property affected by blending. When ethanol is blended with naphtha at a low concentration, the RVP of the gasoline is increased. Pure ethanol does have a low RVP; but when it is

blended with hydrocarbon, it behaves more like a light hydrocarbon and actually raises the RVP. For example, with E10 for naphtha having an RVP of 9, the resultantE10 product has an RVP of about 10. So, to encourage ethanol blending, in 1990, the U.S. Congress passed a waiver known as the “One-Pound Waiver” which allows E10 gasoline to be sold at one psi (pound per square inch) higher than that normally required.

For the refinery, E15 would allow lower octane severity reformer operation, which would be beneficial. However, the EPA regulation implementing the “One-Pound Waiver” specifically references gasoline containing between 9% and 10% ethanol. The EPA has refused to extend this One Pounder Waiver to E15. Therefore, marketing E15 requires a sub-grade blendstock that has an RVP approximately 1 psi lower than normal gasoline sub-grade blendstock used for E10.

In addition, since January 2011, E15 has been permitted for use in light-duty motor vehicles manufactured after 2001. It was not approved to be used in small gasoline engines or other vehicles built before that due to concerns of material incompatibilities and corrosion. Furthermore, I have seen several places where current automobile manufacturers will not honor their warranties if the person used E15, even if the vehicle was manufactured after 2001. Also, the EPA requires that in order to sell E15 gasoline, a Misfuelling Mitigation Plan must be in place to prevent consumers from using the product in an unapproved engine. Today, there are very few retailers who have chosen to go through the additional trouble in order to sell the E15.
In conclusion, due to the absence of the “One-Pound Waiver” and the legal risk of corrosion or voiding the warranties of customers’ cars, HollyFrontier has chosen not to produce or blend E15.

SUBHASH SINGHAL (Kuwait National Petroleum Company)

Does the 15% have to do with the oxygen in the ethanol and other oxygenate like MTBE, or it is just because of the RVP limitations and other issues that you explained? From safety point of view, is there oxygen contained in the old oxygenate like ethanol? Is that one of the criteria for limiting the blending

from 15% or 10%? Does this have to do with the oxygen attached even though it is oxygenate?

KOONTZ (HollyFrontier)

My understanding, from reading, is that the E15 decision is not really based on logic. I think it was more of a U.S. Congress action. I do not really understand why they have not extended the “One-Pound Waiver” to E15. I do not think it is based on science.

KOONTZ (HollyFrontier Corporation)

The Environmental Protection Agency (EPA) administers the Renewable Fuel Standard (RFS) program with volume requirements for several categories of renewable fuels. EPA establishes the volume requirements for each category based on EISA (Energy Independence and Security Act of 2007) legislated volumes and fuel availability. EPA tracks compliance through the Renewable Identification Number (RIN) system, which assigns a RIN to each gallon of renewable fuel.
HollyFrontier satisfies much of its requirement for Conventional Biofuel (essentially corn ethanol) usage within RFS by selling E10 (10% ethanol) at many of its terminals. Most of HFs’ gasoline is sold via pipeline to terminals owned by others; therefore, to fully satisfy its mandated volume, HF purchases RINs from others. The decision to purchase ethanol from others and blend to E10 or to purchase RINs from others is based on economics.

Ethanol blending has a significant impact on two critical gasoline properties controlled by the refiner: octane and RVP. The hydrocarbon blendstock used for 90% of the E10 product (termed sub-grade by HF) has an octane rating of ~84. After blending with 10% ethanol (octane ~114) the resultant E10 octane is “regular” 87. For a refinery that normally adjusts reformer severity to satisfy the total gasoline pool octane, producing sub-grade allows for lower reformer severity and higher liquid yield. This improved yield is more pronounced for a semi-regeneration reformer that operates at relatively high pressure.

RVP is the other critical gasoline property affected by ethanol blending. When ethanol is blended with naphtha at low concentration, the RVP of the gasoline is increased. Even though pure ethanol has a low RVP [about 2 psia (pounds per square inch absolute)] due to O-H bonding, it behaves more like a hydrocarbon with a molecular weight of 46 when mixed with naphtha at low concentration. If ethanol is blended to 10% with 84 octane naphtha having an RVP of 9, the resultant E10 gasoline has an RVP of ~10. In order to encourage ethanol blending, the U.S. Congress passed the One-Pound Waiver in 1990 allowing E10 gasoline RVP to be 1 psi higher than that normally required by the EPA (One-Pound Waiver).

E15 would allow a refiner to produce an even lower octane sub-grade to blend with the ethanol and the RVP effect would be similar. However, the EPA regulation implementing the One-Pound Waiver specifically references gasoline containing between 9% and 10% ethanol. The EPA has refused to extend the one-pound waiver to E15. Therefore, to market E15 requires a sub-grade blendstock having

an RVP over 1 psi lower than that required for E10.

Since January 2011, E15 has been permitted for use in light-duty motor vehicles manufactured after 2001. However, it is not approved for use in small engines and older vehicles due to concerns with material incompatibilities and corrosion. Furthermore, several automobile manufacturers will not honor their warranties if E15 gasoline was used in the vehicle (even for those manufactured after 2001). The EPA requires that in order to sell E15 gasoline, a Misfueling Mitigation Plan must be in place to prevent consumers from using the product in an unapproved engine. There are very few retailers who have chosen to get approval to sell E15.

Due to the absence of the One-Pound Waiver for RVP, the significant legal risk in selling a controversial product, and the minimal market demand HF has decided that it would be unwise to enter the E15 market at this time.

Print as PDF:

Tags

Aromatics

Blending

Corrosion

Octane

Year

2012