The Cost of **Going Too Far**

Using RMP to Mandate a Chemical Transition Away from Hydrofluoric Acid

There are some who would like to use the Risk Management Program (RMP) regulation to effectively eliminate the use of hydrofluoric acid (HF) at U.S. fuel refineries. Such an extreme step would come with extraordinary costs to consumers, manufacturers and the broader economy.

AFPM

As long as the world needs gasoline, there will be demand for alkylate. Alkylate is a low-emission gasoline blendstock that is also very high in octane. Gasoline with the highest environmental specifications—such as the California Reformulated Gasoline Blendstock for Oxygenate Blending (CARBOB)—requires alkylate.

Alkylate is produced in refinery alkylation units and is the product of a chemical reaction started by a catalyst—primarily hydrofluoric acid (HF) or sulfuric acid. Though other catalyst technologies are in various stages of testing and development, roughly half the alkylate produced in the United States at present is made with HF or modified HF (MHF), which has a vapor suppression additive. The other half is made using sulfuric acid.

The cost to transition away from HF catalyst could approach $1 billion for some refineries.

If refineries designed to use HF alkylation technology were forced to transition to another catalyst, the costs would be substantial and even prohibitive for some. A study looking at a specific Southern California refinery found the cost to replace just its HF unit with a significantly larger sulfuric acid alkylation unit and separate sulfuric acid regeneration unit would approach $1 billion—significantly more than what the facility owner paid to purchase the entire refinery. Alkylation technology cannot be changed in a vacuum. Disrupting this one process would have impacts across a facility, potentially resulting in a range of other costly problems:

More expensive gasoline

A California-focused study looked at the impact of eliminating HF alkylation in Southern California. In just this region, the loss of HF alkylation and resulting loss of overall gasoline production is projected to raise local gasoline prices roughly 25-cents per gallon.

Gasoline and other fuel shortages and higher import dependence

If the United States lost half its alkylation capacity because of RMP rules, there would be no immediate way to make up the difference in alkylate production. Sulfuric acid alkylation units are running at high capacity already and cannot double their output to make up for lost alkylate from HF units. United States gasoline production would be severely curtailed and would have to be replaced by imports. This poses a particular challenge for California-gasoline since very few refineries outside the United States are able to produce CARBOB fuel.

A loss of U.S. alkylation capacity will reduce supplies of gasoline and aviation fuel, leading to higher fuel prices for consumers.

Potential refinery shutdowns and job losses

Replacing an HF unit with an alternative catalyst unit is not a simple proposition for a fuel refinery. HF is a lower volume catalyst, so HF units tend to be much smaller in size than sulfuric acid alkylation units that require significantly more catalyst to produce the same volume of alkylate. The differing unit sizes, required volumes of catalyst and specific needs for catalyst regeneration complicate any possible technology swap. A catalyst overhaul would need to be paired with other modifications throughout a refinery to accommodate the new technology. The cost is considerable and studies have suggested many refineries would not be able to afford the change and would idle their units instead, a potential precursor for facility shutdowns since many would not be viable without operable alkylation units.

Economic impact figures sourced from "Impact of an HF Ban on Southern California Transportation Fuels Supply," Stillwater Associates, LLC, June 23, 2017. "Transportation Fuel Issues: Cost and Economic Viability," California Energy Commission, July 6, 2017.