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## **Question 42: What options are available to produce on-spec jet fuel from high total acid number (TAN) sources? What impacts these choices?**

**PIZZINI** (Phillips 66)

Regarding the conventional hydrotreating, I do not think high TAN would be an issue; but if you try to caustic-treat high TAN material, you will end up with what amounts to be the equivalent of lye soap. So anywhere you want oil and water separation to take place, the soap components may cause rag layers and carryover. We have to employ periodic waterwashes of solid bed processes or sufficient purge and makeup water to prevent the buildup of the soaps before they cause separation issues.

**KOONTZ** (HollyFrontier)

Four out of five HollyFrontier refineries treat the kerosene fraction in a hydrotreater, so the TAN of the crude does not matter. The fifth, our Tulsa refinery, does utilize the Merox process to produce jet fuel. However, the crude to this unit is relatively sweet. The kerosene fraction averages 0.002 mg (milligram) of KOH per gram of kerosene and has ranged as high as 0.06; but at these low TANs, they have not experienced problems.

**NATHAN KEEN** (Merichem Company)

The naphthenic acids that produce stable emulsions, to which this discussion refers, tend to concentrate up in the jet fuel and diesel cuts. Merichem has developed the NAPFINING™ HiTAN technology that treats the kerosene and diesel fractions. Merichem considers any jet fuel or kerosene feed with 0.1 TAN or above as high TAN. To date, Merichem has customers who have successfully processed jet fuel fractions above 1.0 TAN in commercial units without getting the uncontrollable rag layers to which you are referring.

**KOONTZ** (HollyFrontier Corporation)

HollyFrontier processes crude primarily from Texas, Canada and the Mid-Continent. Of these, certain heavy and synthetic crudes from Canada have the highest TANs. Four of the five HF refineries utilize hydrotreating to desulfurize the kerosene fraction and have not noted a significant jet/kero (kerosene) impact from processing these high TAN crudes. The HF Tulsa refinery utilizes the Merox process to produce jet fuel. The crude input to this refinery is relatively sweet. The kerosene fraction averages ~0.002 mg KOH/g kerosene, but has ranged as high as 0.060 mg KOH/g kerosene. At these low TANs,

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they have not experienced problems maintaining acceptable jet quality.

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