The Ultimate Low-Down on Ultra-Low Sulfur Diesel

After years of palaver, planning, and (hopefully!) preparation, ultra-low sulfur diesel (ULSD) is on its way. Most refiners are required to ship highway diesel fuel with a sulfur content of no more than 15 parts per million (ppm), beginning on June 1. That’s a 97% reduction from the previous standard of 500 ppm.

Terminals will have until September 1 and retailers will have until October 15 to complete their transitions to ULSD. But they will be subject to penalties if they miss those deadlines, and it takes time to purge the higher-sulfur fuel from pipelines, storage tanks, and pumps. Therefore, many truckstops are already selling ULSD, and many more will do so in the coming weeks. The U.S. Environmental Protection Agency (EPA) maintains a map on its website that shows where ULSD is currently available, at www.epa.gov/otaq/retrofit/fuelsmap.htm.

All trucks can use ULSD. Beginning with the 2007 model year, trucks are designed to run on ULSD. The combination of new engines, aftertreatment, and ULSD should dramatically cut truck emissions.

Costs

Like most things, such benefits come at a cost. In this case, there are two or even three costs for contractors who operate diesel-powered heavy-duty trucks. First, the fuel itself is likely to be more expensive because refiners will be trying to pass on their extra capital and operating costs. To get so much sulfur out of crude oil, refiners have added billions of dollars worth of new equipment, which also uses more energy to operate.

In a report issued in April, the federal Energy Information Administration (EIA) wrote, “This conversion to ULSD is possibly the most difficult fuel specification transition the refining industry has had to make so far. The transition will result in increased production costs and distribution complexity. Specific average production cost increases are highly uncertain, with typical estimates of at least five cents per gallon. But during the transition period, diesel prices may be driven more by short-term supply/demand balances than by average production cost economics.”

In other words, it’s too early to know how much fuel prices will go up, and there are likely to be even more week-to-week and state-to-state variations than had been the case.

The second impact is likely to be smaller but is also unknown at this time. The limited experience with ULSD indicates that it produces slightly lower fuel economy than 500-ppm diesel. In a long question-and-answer document on its diesel fuel website, EPA wrote, “In most cases [the reduced fuel efficiency] should be imperceptible—since the change still falls within the range of normal variations in diesel fuel….There is also expected to be a slight improvement in the cetane number of the diesel fuel”.

The third, and most uncertain, effect is whether there will be transition problems for truck operators, refiners, distributors, or retailers. When the sulfur standard for highway diesel was lowered from 3000 ppm to 500 ppm in October 2003, a few trucks with a particular engine model reported damage to o-ring seals, apparently because the lower-sulfur fuel had less lubricity. ULSD is expected to include additives to maintain sufficient lubricity, but there may be change-over problems.

Old trucks

Operators of existing trucks should not need to take any special precautions or steps. EPA wrote, “Generally, ULSD will be beneficial to engine operation and durability” for older as well as new equipment.

Pre-2007 trucks will still be allowed to fuel with 500-ppm fuel if they can find it, although distributors and truckstops may elect to handle only ULSD to simplify operations and avoid accidental mixing. EPA will inspect samples from fuel pump stands and tanks to make sure fuel labeled as ULSD meets the 15-ppm standard. Furthermore, beginning December 1, 2010, all motor vehicle diesel fuel must be 15 ppm or less.
New trucks

Operators of model year 2007 and later trucks, as well as trucks that have been retrofitted to reduce emissions, will have to make sure they use only ULSD. All pumps are to be labeled clearly as to what type of fuel they contain. Using 500-ppm fuel will cause operating problems and could void the warranty on an engine or aftertreatment. EPA wrote, “If a new truck is misfueled once, it will have significantly higher [particulate matter] emissions during operation on that fuel, but there should not be any significant long-term emissions or engine durability concerns as long as the vehicle is then fueled with the proper fuel. Constant misfueling would damage the aftertreatment/emission controls on these newer vehicles.”

Additives

New-model truck operators will also have to be careful about additives they put into fuel, especially kerosene, to make sure they are not introducing more sulfur. Most kerosene today has up to 500 ppm of sulfur, although EPA wrote last fall, “we are currently aware that at least two refiners plan on manufacturing 15 ppm #1 diesel fuel for wintertime blending purposes.”

Biodiesel, unlike kerosene or diesel fuel, is naturally sulfur-free. That makes it likely that more distributors and retailers will sell fuel blended with biodiesel. The prevalence of biodiesel will depend on what raw materials are available locally to make it and what the costs of diesel and biodiesel are, including any taxes or tax breaks.

Hold or trade?

A strong economy has kept demand for both new and used trucks high. In addition, many companies have been ordering 2006 model year trucks in the belief that they will be cheaper to buy and operate, and perhaps more trouble-free, than the 2007 trucks with their relatively untested engines and emissions controls. Those concerns have added to the demand for good used trucks and have left truck makers worried that demand will be soft in 2007.

The combination of high trade-in value and possible incentives to buy a 2007 model may make next year a more affordable time than most to buy a new truck. Keep an ear cocked for reports on pricing, performance, and reliability of the new crop of trucks over the next year. You might find ULSD also stands for “unusually large sales discounts.”