

Ultra Low Sulfur Diesel

EXECUTIVE SUMMARY

Beginning in the summer of 2006, the U.S. Environmental Protection Agency (EPA) will require a vast majority of the on-road diesel fuel sold in the United States to have a maximum sulfur content of 15 parts per million compared with the current diesel-fuel sulfur-content cap of 500 parts per million.

Under its "Clean Diesel Program" the EPA is aiming to reduce 2.6 million tons per year of nitrogen oxides emissions from diesel exhaust. The agency says that its target to make the change during the next five years - the equivalent of eliminating air pollution from 13 million trucks - is on track. The EPA says that the fuel will be crucial in extending the life of catalytic converters, which are now a pre-requisite in new diesel-fueled vehicles.

Ultra low sulfur diesel is also expected to reduce engine corrosion and extend lubricant life. Benefits that you may not be able to see, but that you're sure to appreciate through potential savings in your vehicle maintenance costs. In addition, the removal of most of the sulfur won't take anything away from the performance; you can expect comparable power and fuel economy, but someone will have to pay the higher costs associated with the new diesel.

However, a number of questions remain concerning the implementation of this program. These questions include: 1) How much ultra-low sulfur diesel will be available to retailers in 2006? 2) How strong will demand be for ultra-low sulfur fuel? 3) What will be the cost associated with this new diesel fuel compared with current fuel? 4) Who is responsible for ensuring the compliance of the new fuel at retail? 5) How much sulfur contamination is expected during the distribution process? 6) Who is liable for damages in the event of a vehicle misfueling? 7) Will distributors have to employ dedicated truck fleets to handle the new product?

HIGHLIGHTS

The EPA requirement that only 80 percent of the diesel fuel in the market in 2006 must comply with the 15 PPM standard forces retailers to make tough decisions about their diesel business by introducing a new diesel-fuel blend into the market, since this new blend is not fungible with current supplies.

With two distinct diesels on the market, retailers will have to decide whether to install an additional storage tank to accommodate a second diesel fuel for a limited time, or to select one fuel over the other.

Every truck model year 2007 and later will require 15 parts per million fuel, and if the higher sulfur content diesel fuel is used, the trucks emissions-control devices will likely be damaged. Also note that the number of 2007 and later model year trucks on the road in the early years of the program will be relatively low.

BACKGROUND

Finalized in December 2000 and reaffirmed by the Bush administration in 2001, EPA regulations require a 97 percent reduction in the sulfur content of on-road diesel fuel to enable 2007 and later-model-year trucks to be fitted with special emissions-control devices, and all on-road diesel fuel must contain not more than 15 ppm by 2010.

Ultra low sulfur diesel [ULSD] is also known as 'cleaner diesel' or 'green diesel' because it contains less than 15 parts per million [ppm] of sulfur. In comparison, conventional diesel can contain up to 500ppm of sulfur. Less sulfur means less sooty black exhaust smoke; as much as 60% less, in fact. Invisible emissions will also be greatly reduced, with carbon monoxide, hydrocarbons and nitrogen oxides soon to be a fraction of their former levels. The benefits achieved should include fewer fine particles in diesel exhaust, which can become lodged in the lungs and cause permanent tissue damage, resulting in improved health especially lung health. Low sulfur diesel exhaust will also reduce the amount of atmospheric haze, acid rain and ozone formation.

In a 2003 precompliance report submitted by the refining industry to the EPA, initial numbers indicate that as much as 96 percent of on-road diesel fuel will comply with the 15 ppm standard in 2006 – far above the regulatory requirement with the anticipated production volume reported to be sufficient to meet on-road diesel demand because EPA believes the refining industry underestimated the volume of imported diesel fuel.

However, the U.S. Energy Information Administration (EIA) predicts that diesel-fuel demand will total 2.916 million barrels per day in 2006, yielding a shortfall of 53,000 barrels or 2.23 million gallons of diesel fuel each day.

According to precompliance reports, refineries and importers currently intend to produce 2.863 million barrels per day of highway diesel fuel, both 15 ppm and 500 ppm. Of this, 2.7 million barrels, or 96 percent, is expected to be 15 ppm. And predictions for subsequent years show a continual increase in the shortfall, rising to 3.91 million gallons per day in 2008 and 8.15 million gallons per day in 2009.

QUESTIONS AND ANSWERS

How will Distribution be Effected?

This drastic reduction in on-road diesel fuel sulfur poses significant production, distribution and marketing challenges for the petroleum industry, forcing retailers to make decisions about their diesel-fuel business.

Complicating the process is the requirement that only 80 percent of the diesel fuel in the market in 2006 must comply with this standard, allowing 20 percent of supplies to contain 500 parts per million sulfur diesel fuel. The on-road rule forces retailers to make some decisions about their diesel business by introducing a new diesel-fuel blend into the market; this new blend is not fungible with current supplies.

How Will Two Distinct Diesel Fuels be Stored?

With two distinct diesels on the market, retailers will have to decide whether to install an additional storage tank to accommodate a second diesel fuel or to select one fuel over the other.

If retailers decide to install an additional tank, they must recognize that the marketing of two fuels is only temporary--500 parts per million diesel fuel is prohibited after 2010. Therefore, retailers would have to find alternative use for the new tank after 2010.

If retailers decide to sell only one type of diesel, they must take into consideration the supply availability for each type of fuel, the cost differential of each fuel and the relative demand for each fuel.

What if the Fuels Get Mixed?

The EPA does not take into consideration sulfur contamination or downgrading of the 15 ppm diesel-fuel supply and every stakeholder in the process acknowledges that refiners will have to produce lower than 15 ppm to accommodate downstream contamination in order to provide 15 ppm at the retail dispenser.

Any contaminated batches must be downgraded to 500 ppm, thus removing a volume of ultra-low-sulfur product in the system.

Will Current Diesel Fuel Damage 2007 Model Trucks?

Yes, it is important to note that every truck model year 2007 and later will require 15 parts per million fuel, and if the higher sulfur content diesel fuel is used, the trucks emissions-control devices will likely be damaged. It is also interesting to note that the number of 2007 and later model year trucks on the road in the early years of the program is likely to be relatively low.

The EPA provided for a phase-in of the rule because not all vehicles on the market will require this ultra-low sulfur diesel and not all refiners will be able to produce ultra-low sulfur diesel by June 2006. The regulatory deadline for those retailers deciding to sell the 15 parts per million diesel fuel is September 1, 2006. The terminal deadline is July 15, 2006.

What About Farmers and Other Non-Highway Diesel Use?

The non-road rule requires diesel engines, beginning with model year 2008, to use advanced exhaust emission-control devices that are anticipated to reduce PM emissions by 95 percent and NOx emissions by 90 percent. The sulfur content in non-road diesel fuel will be reduced from 3,000 parts per million to 15 parts per million--a 99 percent reduction--phased in beginning in 2007 and completed by 2010. EPA estimates this new fuel will virtually eliminate SOx emissions from non-road diesel engines.

The non-road rule represents an effort by the agency, supported by the petroleum industry, to coordinate its implementation with that of the on-road rule. By coordinating implementation of these two rules, the EPA avoids introducing yet another grade into the market.

SOURCES

National Association of Convenience Stores (NACS)
Petroleum Marketers Association of America (PMAA)
Environmental Protection Agency (EPA)
John Hill, Utah Petroleum Marketers and Retailers (UPMRA)