

program. We developed cost estimates for two such technologies: Linde Iso-Therming and Phillips S-Zorb. The development of cost estimates for these two advanced technologies, as well as conventional hydrotreating, is described in detail in Chapter 7 of the Draft RIA. We request comment on the potential viability and cost savings associated with advanced desulfurization technologies, particularly in the 2010 timeframe.

The total capital cost of new equipment and revamps related to the proposed 2010 sulfur standard would be \$640 million, or \$17 million per refinery

adding or revamping equipment. Total operating costs would be about \$5 million per year for the average refinery. The total refining cost, including the amortized cost of capital, would be 4.4 cents per gallon of new 15 ppm nonroad fuel. This cost is relative to the cost of producing high sulfur fuel today, and includes the cost of meeting the 500 ppm standard beginning in 2007. We request comment on the number of refiners who would need to build new equipment to meet the 15 ppm sulfur cap, the capital cost for this new equipment and the cost of operating this equipment. The average cost of

continuing to meet the 500 ppm standard for locomotive and marine fuel would continue at 2.2 cents per gallon.

The above costs reflect national averages for the fully phased in program for each control step. Some refiners would face lower costs while others would face higher costs. Excluding small refiners because they are able to take advantage of the proposed small refiner provisions, the average refining costs by refining region are shown in the table below. Combined costs are shown for PADDs 1 and 3 because of the large volume of diesel fuel which is shipped from PADD 3 to PADD 1.

TABLE V—A—3.—AVERAGE REFINING COSTS BY REGION (CENTS PER GALLON)

	2007 500 ppm Cap	2010 15 ppm Cap
PADDs 1 and 3	1.4	2.6
PADD 2	2.9	5.7
PADD 4	4.0	8.5
PADD 5	2.6	5.4
Nationwide	2.2	4.4

We request comment on the range of estimated refining costs for the various regions for both the proposed 500 and 15 ppm sulfur caps.

2. Cost of Lubricity Additives

Hydrotreating diesel fuel tends to reduce the natural lubricating quality of diesel fuel, which is necessary for the proper functioning of certain fuel system components. There are a variety of fuel additives which can be used to restore diesel fuel's lubricating quality. These additives are currently used to some extent in highway diesel fuel. We expect that the need for lubricity additives that would result from the proposed 500 ppm sulfur standard for off-highway diesel engine fuel would be similar to that for highway diesel fuel meeting the current 500 ppm sulfur cap standard.²⁷⁵ Industry experience indicates that the vast majority of highway diesel fuel meeting the current 500 ppm sulfur cap does not need lubricity additives. Therefore, we expect that the great majority of off-highway diesel engine fuel meeting the proposed 500 ppm sulfur standard would also not need lubricity additives. In estimating lubricity additive costs for 500 ppm diesel fuel, we assumed that fuel suppliers would use the same additives at the same concentration as we projected would be used in 15 ppm highway diesel fuel. Based on our analysis of this issue for the 2007

highway diesel fuel program, the cost per gallon of the lubricity additive is about 0.2 cent. This level of use is likely conservative, as the amount of lubricity additive needed increases substantially as diesel fuel is desulfurized to lower levels. We also project that only 5 percent of all 500 ppm NRLM diesel fuel would require the use of a lubricity additive. Thus, we project that the cost of additional lubricity additives for the affected 500 ppm NRLM diesel fuel would be 0.01 cent per gallon. See the Draft RIA for more details on the issue of lubricity additives.

We project that all nonroad diesel fuel meeting a 15 ppm cap would require treatment with lubricity additives. Thus, the projected cost would be 0.2 cent per affected gallon of 15 ppm nonroad diesel fuel.

3. Distribution Costs

The proposed fuel program is projected to impact distribution costs in three ways. One, we project that more diesel fuel would have to be distributed under the proposal than without it. This is due to the fact that some of the desulfurization processes reduce the fuel's volumetric energy density during processing. Total energy is not lost during processing, as the total volume of fuel is increased. However, a greater volume of fuel must be consumed in the engine to produce the same amount of power. We assumed that the current cost of distributing diesel fuel of 10 cents per gallon (see Draft RIA for further details) would stay constant (*i.e.*, a 1 percent increase in the amount of

fuel distributed would increase total distribution costs by 1 percent).

We project that desulfurizing diesel fuel to 500 ppm would reduce volumetric energy content by 0.7 percent. This would increase the cost of distributing fuel by 0.07 cent per gallon. We project that desulfurizing diesel fuel to 15 ppm would reduce volumetric energy content by an additional 0.35 percent. This would increase the cost of distributing fuel by an additional 0.04 cent per gallon, or a total cost of 0.11 cent per gallon of affected 15 ppm nonroad diesel fuel.

Two, while this proposal minimizes the segregation of similar fuels, some additional segregation of products in the distribution system would still be required. The proposed allowance that highway and off-highway diesel engine fuel meeting the same sulfur specification can be shipped fungibly until it leaves the terminal obviates the need for additional storage tankage in this segment of the distribution system.²⁷⁶ This proposal would also allow 500 ppm NRLM diesel fuel to be mixed with high-sulfur NRLM diesel fuel once the fuels are dyed to meet IRS requirements. This provision would ease the last part of the distribution of high-sulfur NRLM diesel fuel.

However, we expect that the implementation of the proposed 500 ppm standard for NRLM diesel fuel in 2007 would compel some bulk plants in those parts of the country still

²⁷⁵ Please refer to section IV in today's preamble for additional discussion regarding our projections of the potential impact on fuel lubricity of this proposed rule.

²⁷⁶ Including the refinery, pipeline, marine tanker, and barge segments of the distribution system.