American Petroleum Institute

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November 12, 2002

Ms. Linda Bluestein
US Department of Energy
Office of Energy Efficiency and Renewable Energy/
Office of FreedomCAR and Vehicle Technologies
Docket No. EE-RM-02-200, EE-2G
Washington, DC 20585-0121

RE: Consideration by DOE to propose a rulemaking to designate Fischer-Tropsch Diesel (FTD) fuels as Alternative Fuels under Section 301(2) of the Energy Policy Act of 1992 (EPAct)

Dear Ms. Bluestein:

The American Petroleum Institute (API) is pleased to provide comments on the above-referenced consideration by DOE to propose a rulemaking to designate Fischer-Tropsch Diesel (FTD) fuels as alternative fuels under EPAct. API is a national trade association that represents over 400 members that are engaged in all aspects of the petroleum business. Indeed several API members are involved in producing FTD fuels. Consequently, API has a significant interest in issues relating to the referenced DOE undertaking.

API generally supports a DOE proposal to designate non-domestically produced FTD fuels made from natural gas as alternative fuels under section 301(2) of the Energy Policy Act of 1992 (EPAct). In fact, all liquid fuels produced domestically from natural gas already are treated as alternative fuels per the language of Section 122 of the Consolidated Appropriations Act, 2001 (Public Law 106-554, 1(a)(4)). Therefore, the need for DOE to consider additional criteria for designating non-domestically produced FTD derived from natural gas as EPAct alternative fuels is not entirely clear, particularly since doing so could be construed as a possible violation of US obligations under the General Agreement on Trade and Tariffs (GATT) and World Trade Organization (WTO). Nevertheless, the designation of non-domestically produced FTD fuels from natural gas would further the diversification of energy supplies and thereby help the US to accomplish the goals of EPAct.

API understands that the designation of an Alternative Fuel under EPAct requires DOE to consider three criteria. These criteria specify that the candidate fuel: (1) is substantially non-petroleum, (2) yields substantial energy security benefits, and (3) provides substantial environmental benefits. We have concerns about several of the issues that DOE has

raised in considering whether FTD fuels meet these criteria.[1] [2] These concerns are discussed below.

The existing database of information on the emissions effects associated with FTD fuels is not adequate for making quantitative statements.

API concurs with the DOE statement that a 6% reduction in NOx emissions should be considered "substantial" with respect to the EPAct criteria, particularly when considered as a benefit across the entire in-use diesel fleet and when viewed within the context of other fuels-related programs. For instance, EPA's recent approval of the Low Emission Diesel provision of the Texas State Implementation Plan (SIP) was predicated on the assumption that the measure would provide a 6% reduction in NOx emissions that was viewed as very beneficial.

While a 6% reduction may be considered "substantial," it is not supported or validated by the existing database of published FTD emissions test results. In fact, the authors of a study conducted by the National Renewable Energy Laboratory (NREL) readily acknowledge that the only conclusions that can be drawn from the limited available data are that in most tests, NOx and PM emissions are significantly reduced relative to conventional No. 2 diesel.[3] The available test data are simply not sufficiently robust to quantitatively demonstrate a level of NOx reduction from the use of FTD fuels across the in-use diesel fleet as a whole. These data are highly scattered and consist of a total of only 74 tests conducted on several different driving cycles on 24 different engines and vehicles which represent an extremely limited subset of mostly pre-1998 model year technology. In fact, the eight light-duty engines/vehicles in the database developed and analyzed by NREL are over-represented as more than 95% of diesel fuel is consumed by heavy-duty applications in the U.S.

The NREL assessment of the emissions benefits of FTD fuels does not adequately account for the reduced sensitivity of advanced engine/aftertreatment technology to fuel factors other than sulfur

A deficiency of the available studies of fuel factor effects in the published literature is that they fail to account for future trends in vehicle technology and fuels. As the oil industry responds to the federal requirement to produce ultra-low sulfur highway diesel fuel starting in mid-2006, this could cause some shifts in the properties of the baseline diesel fuel – further confounding efforts to estimate the emissions benefits of FTD fuels. Moreover, as noted above, there is almost no information on FTD fuel emissions effects for engines built after 1998, including heavy-duty diesel engines that will be certified to

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[1] 67 FR 57347, September 10, 2002.
[2] L. Bluestein, Department of Energy, *Discussion of Issues Pertinent to Rulemaking to Designate Fischer-Tropsch Diesel Fuel as Alternative Fuel Under Sec. 301(2) of the Energy Policy Act of 1992*, July 2002.
[3] Alleman et al, National Renewable Energy Laboratory, *Assessment of Criteria Pollutant Emissions from Liquid Fuels Derived From Natural Gas*, April 9, 2002.

more stringent emissions standards starting in 2002. These new engines will increasingly dominate the future in-use fleet. And there is evidence that suggests that the emissions response to fuel properties other than sulfur for newer technology heavy-duty engines is much lower than that of older engines.[4] In short, the existing data are simply not adequate to support the quantitative determination of a "substantial" emissions benefit from FTD fuels across the entire current or future in-use fleet of diesel vehicles.

DOE should base the designation of FTD as an alternate fuel on conformity with the specifications of ASTM D-975-02 but should also establish procedures that permit "equivalence" demonstrations if certain of these specifications are not met.

The specifications in ASTM D-975-02 establish standards governing such factors as the driveability and safety performance of No. 2 diesel fuels in compression-ignition engines. FTD fuels should conform to the same ASTM standards established for petroleum-derived No. 2 diesel fuels. However, there may be instances wherein a certain FTD fuel exceeds one or another of the ASTM D-975-02 specifications yet provides the same emission benefits as one that demonstrates full ASTM conformance. DOE should not preclude such a fuel from alternate fuel designation as long as the manufacturer submits the requisite data to demonstrate both emissions equivalence and compliance with those specifications influencing safe handling, storage, driveability, etc. This type of procedure is used, for example, by the California Air Resources Board (CARB) to allow California diesel fuel suppliers to certify that candidate alternative diesel formulations provide equivalent emission reductions to those of a designated reference fuel.[5] With respect to FTD alternate fuel designation, the burden would be for a manufacturer to show equivalence to an existing FTD fuel or to show a benefit relative to some standard diesel blend based on testing procedures promulgated by DOE regulation.

DOE should not condition the designation of FTD as an alternate fuel on specific limits for selected fuel properties.

The authors of the NREL report attempt to compensate for the paucity of FTD emissions data by suggesting that limits on the values of key FTD fuel properties will result in the achievement of emissions benefits comparable to those obtained with similarly modified conventional diesel fuels. They extrapolate from emissions studies performed with conventional diesel fuel to assert that NOx emission reductions in the range of 6-20% may be obtained from Fischer-Tropsch diesel fuels "based on the cumulative effects from decreasing aromatic content to below 10% and increasing cetane number over 74..." There are several problems with this approach:

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[4] R. Lee et al, *Fuel Quality Impact on Heavy Duty Diesel Emissions: A Literature Review*, Society of Automotive Engineers, Paper No. 982649, October 1998.

[5] California Air Resources Board, *The California Diesel Fuel Regulations*, Title 13, California Code of Regulations, Section 2282(g).

1. As noted above, the existing database on FTD fuels is too sparse to support either (a) the quantification of emissions effects from changes in individual (or combinations of) fuel properties or (b) the validation of emissions effects based on extrapolations outside of the range of typical petroleum-derived No. 2 diesel fuel properties. Moreover, many of the test programs reported in the literature do not present detailed properties of both the FTD test fuel and the base diesel fuel used for comparison, thus further complicating attempts to correlate emissions reductions with specific fuel parameters.

2. There are no models of diesel fuel property effects in existence today that are adequate for extrapolating the impacts of changes in the individual properties of conventional diesel fuel much less those characteristic of FTD. The draft model of diesel fuel property effects recently issued by the Environmental Protection Agency (EPA) has significant technical limitations because the presence of a high degree of multicollinearity among fuel properties in the underlying database imparts large statistical uncertainty to the emissions impacts predicted by this tool.[6]

3. Setting limits on the properties of FTD fuels based on the presumption that emissions effects can be linearly extrapolated outside of the ranges of fuel properties of typical petroleum-derived No. 2 diesel adds both a layer of assumption and a level of complexity to the process of designating alternate fuels that does not appear to be justified.

4. As noted previously, the small potential emissions reductions from the imposition of limits on non-sulfur fuel properties will be reduced even further when improved aftertreatment technology begins to penetrate the in-use fleet and ultra-low sulfur diesel is introduced.

Additional Sources of Data on FTD Fuels Used in Late Model Diesel Engines

The NREL report cites data collected as part of the Ad-Hoc CIDI/diesel fuel test program (Reference No. 13 on p. 37 of the NREL report). DOE also should include the most recent information presented by this program at the October 2002 Society of Automotive Engineers (SAE) Powertrain & Fluid Systems Conference and Exhibition, and published in SAE Technical Paper No. 2002-2884, *Impact of Engine Operating Conditions on Low-NOx Emissions in a Light-Duty CIDI Engine Using Advanced Fuels.*

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[6] See letter from Ed Murphy, API, to Margo Oge, EPA, October 30, 2001 re: Comments on the July 2001 EPA Staff Discussion Document entitled: *Strategies and Issues in Correlating Diesel Fuel Properties with Emissions*

DOE Should Also Designate Blends of FTD and Conventional Petroleum-Based Diesel Fuels as Alternative Fuels Under EPAct

Data in the literature suggest that blends of conventional diesel fuel containing FTD as low as 20 % by volume can provide significant emissions benefits in some engines while greatly increasing the effective availability of the fuel (by five-fold for a 20% blend). Furthermore, the use of FTD/conventional diesel blends would mitigate concerns raised by some regarding the negative impacts of neat FTD fuels on some older vehicle engines in the fleet that employ engine fuel seals made of nitrile rubber material. Finally, the US Congress has established precedent for the use of blended material by adopting a special statutory provision allowing limited use of 20 volume % biodiesel blends for partial EPAct compliance. Given these considerations, API believes that DOE should expand the alternative fuels designation to include blends of conventional diesel fuel containing FTD as lows as 20 % by volume.

In closing, I would like to reiterate that API generally supports a DOE proposal to designate non-domestically produced FTD fuels made from natural gas as alternative fuels under section 301(2) of the Energy Policy Act of 1992 (EPAct).

Thank you for the opportunity to convey API's views on DOE's consideration to designate FTD fuels as alternative fuels under EPAct. Please do not hesitate to contact me if you have any questions concerning our comments.

Sincerely,

David H. Lax