October 10th, 2022

Off-Road Implementation Section  
California Air Resources Board  
P.O. Box 2815, Mail Stop 5B  
Sacramento, CA 95812-2815

RE: Proposed Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation

Dear CARB personnel:

As a California resident I appreciate the opportunity to express my opinions about proposed CARB regulatory statutes. Full disclosure is that I have a minor investment in a small, proposed renewable diesel project but am otherwise not affiliated with any corporation or advocacy group, etc.

I am writing to express my concern over wording in the current legislation that appears to only allow renewable diesel while prohibiting biodiesel blends:

*“The Proposed Amendments would require fleets to use RD99/100 in their off-road vehicles beginning, January 1, 2024”*

I do not see an explanation of why this provision was added but assume a rationale will be provided at the public hearing November 17th. I did read and leave public comments on the “Low Emission Diesel (LED) Study: Biodiesel and Renewable Diesel Emissions in Legacy and New Technology Diesel Engines” and am wondering if the findings of potentially higher NOx emissions in NTDE’s in that study resulted in excluding BD blends in the current mandate. If this is so I would comment that the issue of NOx emissions and BD appear to be quite complex and far from resolved. I also would also comment the results for the “legacy” engine in that study (which is a Tier 3 engine) supported the use of BD blends in reducing emissions. I only mention this because commercially available B20/R80 blends such as REG/Chevron Ultraclean were not tested in that study yet would be excluded from use if the proposed regulatory wording goes into effect. I do not own Chevron stock, nor am affiliated with them in any fashion. As an aside, the BD portion of any blend with RD seems to offer advantages in lubricity over R99/100, but that is not pertinent to emissions aside from potential advantages to engine maintenance and therefore performance over time. For locomotive and marine engine use, should this be explored by CARB in the future, this lubricity issue, as well as a generally accepted reduction in PM emissions for BD and BD blends, should be seen as a potential advantage in those circumstances. I digress. Apologies.

NOx considerations aside, reductions in PM emissions from BD have been reproducibly demonstrated (I am not industry so won’t tag a bunch of references here – sorry), so you may be throwing out a baby with the bath water. The “legacy” off-road engine in the LED study was Tier 3 status. The proposed legislation will prohibit the addition of Tier 3 engines to fleets, but it does not appear there is to be any phase-out of Tier 3 engines in use prior to the 2024 cutoff date for new additions. Therefore, it is reasonable to assume quite a few Tier 3 (and lower until phased out) engines will remain in use well past 2024. The LED study shows clear advantages in reduced PM emissions for the studied “legacy” Tier 3 engine utilizing both RD and the BD/RD blends. NOx emissions were not increased except for the 50/50 blend of RD/BD, and in that case the magnitude of the difference was very small. My assumption here is these findings apply to Tier 0, 1, and 2 engines as well. And likely some Tier 4i engines. I could be wrong, of course, as these were not directly studied.

Returning to the LED study, what struck me most were two things:

1. Statistical significance is NOT equivalent to magnitude of actual emissions. If an experiment is done correctly and statistics properly applied, we can conclude differences in experimental data sets represent actual differences and not sampling error in the data. Great. Does statistical significance between fuels matter? Looking at the raw data, not really. Leading me to:
2. Diesel particle filters and selective catalytic reduction devices are far more important in reducing emissions than the particulars of the combusted fuel.

Under the assumption there will be ongoing use of Tier 4i, 3, and lower engines for some time, biodiesel blends seem to be advantageous in reducing NOx and PM emissions. For Tier 4 Final engines equipped with all the emission-reducing bells and whistles, the actual differences in NOx output are quite small, regardless of statistical significance in the LED study. Therefore, I see no potential benefit in restricting BD/RD blends in this legislation. Perhaps in the future when there exists a preponderance of engines fully equipped with DPF and SCR devices one could argue to phase out BD blends. Given the rapid growth in RD and all the legislative incentive programs and factors at play, it is likely BD will be economically phased out through market forces alone without the need to legislate its disuse in the California off-road marketplace.

Again, thank you for providing a forum through which I can express my viewpoints publicly. In the event I have misread the proposed legislation and in fact no restrictions on BD/RD blend fuels are intended, then my comments are much ado about nothing. In that event I hope a few comments were at least mildly entertaining.

Sincerely,

Joshua Kehoe