August 8, 2015

VIA ELECTRONIC POSTING

California Air Resources Board 1001 I Street Sacramento, CA 95814

Subject: Comments on Governor’s Symposium “Rethinking Transportation in California”

Thanks to the Governor’s Office for organizing the Five Pillars Symposium, including “Rethinking Transportation in California,” to address California’s 2030 Climate Change Commitments. We appreciate the opportunity to submit comments and would like to call your attention to biosynthetic motor oil and lubricant technology with great promise to reduce petroleum consumption and GHG emissions.

We commend the Governor for proposing an ambitious state goal to reduce petroleum use in cars and trucks by up to 50% within the next 15 years. In order to meet that goal, the state will need to support public policies to ensure new technologies have a place in the market. New technologies for synthetic and biosynthetic motor oils and industrial lubricants will help meet the Governor’s goal to reduce petroleum use in cars and trucks and will provide significant reductions in GHG emissions in the transportation and waste sectors.

There are generally only two categories of options available to reduce transportation GHG emissions. Either decarbonize the fuel and lubricants, or reduce their consumption. Many decarbonized fuel technologies and fuel reduction strategies will take decades to be phased in, as existing vehicle fleets are converted to newer vehicles equipped with the new technologies. Current lubricant technologies exist today as fully certified drop-in alternatives, able to work in the surviving vehicle stock, that both decarbonize the lubricant and reduce fuel consumption.

Petroleum used in transportation fuels comes from the same barrel of crude, and goes into the same vehicles, as the petroleum used in automotive lubricants and motor oils. Significant GHG reductions can be achieved by tying lubricants with fuels in transportation GHG reduction strategies. Extrapolation from studies done elsewhere suggest those reductions could be as much as 5,780,000 tonnes in California annually.

California has taken significant steps and led the nation in policies to reduce GHG emissions in the transportation sector through clean car standards, low-carbon fuels, land use planning policies, and including fuels in the cap and trade program. We must continue this national and international leadership by capitalizing on the opportunities for both cost savings and GHG reductions from the use of renewable and synthetic lubricant technologies.

Multiple California companies have developed renewable lube oil feedstock from algae, tallow and other renewable sources, as well as industry-certified motor oil products that offer significant technical and environmental performance benefits over conventional petroleum derived products.

A recent Life Cycle Analysis of a biosynthetic base oil shows a nearly 80% reduction in GHG emissions compared with similar petroleum based synthetic oils,[[1]](#footnote-1) with technical performance qualities similar to or superior than other synthetic lubricants. From an environmental and public health perspective, used motor oil formulated with this renewable oil biodegrades 79.8% in 28 days, is not bio-accumulative to marine organisms, and is considered practically non-toxic by the U.S. EPA.

The ARB’s 2008 Scoping Plan acknowledged the potential to reduce engine load via lower friction oil[[2]](#footnote-2) as a component of vehicle efficiency measures. Lower friction translates to better fuel economy, a goal of lubricant development for decades. Synthetic lubricants are widely recognized to improve fuel economy, and independent testing shows biosynthetic motor oils achieve over a 3% fuel economy gain relative to the industry reference (conventional) oils.

Biosynthetic oils are made with a base stock of uniformly sized molecules, resulting in less evaporation and less thickening of the oil, which allows for extended oil drain intervals with minimal loss in fuel economy.

Conventional oils, including re-refined oils, are high viscosity (thick) oils that create drag in the movement of engine parts, called “parasitic load”. Rather than burning fuel only to move a vehicle, the higher the viscosity of the lubricant, the more fuel is required to overcome the oils resistance to flow, thus placing additional load on the engine and driving up fuel consumption.

Waste oil remains the largest-single waste stream generated in California,[[3]](#footnote-3) and while source reduction continues to top the waste management hierarchy[[4]](#footnote-4), motor oils and lubricants formulated with biosynthetic base oils can be recycled and re-refined along with petroleum products. Unfortunately, there is a strong profit motive for recyclers to maintain the level of waste oil generated in the state, causing some industry participants to vigorously oppose any new technologies or policy efforts that eliminate that waste.

Californians purchase more than 150 million gallons of motor oil each year and generate more than 90 million gallons of used motor oil every year.[[5]](#footnote-5) The 60 million gallon difference is oil that is burned in the combustion chamber or dripped onto streets and parking lots. At a time when water is such an important issue, it is important to note that over 40% of pollution in America’s waterways is from used motor oil.[[6]](#footnote-6)

Of the approximately 90 million gallons that are collectable, an estimated 14-16 million gallons are illegally dumped. Stated another way, roughly half of the motor oil sold in the State of California directly enters the environment every year, finding its way into our rivers, streams, and lakes, degrading our drinking water supplies, and adding to storm water and coastal pollution.

The other half of the used motor oil is collected and recycled. The most common method to recycle used motor oil is by burning it for energy recovery. The potential zinc, cadmium, copper and lead emissions from used oil-derived fuels from California are on the order of emissions from all of California’s major stationary sources combined.[[7]](#footnote-7) Because the combustion of untreated used oil as fuel occurs primarily outside of California, the impacts may not be directly damaging to California. However, California’s global environmental footprint can be significantly decreased.

The vast majority of used motor oil collected in California is shipped out of state and burned as fuel, with the balance being re-refined into base oil used to formulate “conventional” motor oils that lack the fuel economy benefits and source reduction opportunities offered by synthetics or biosynthetics. Many regulatory entities have given a strong preference to the use of re-refined products, but evidence against that position is mounting.

The U.S. Department of Energy reported in 2006 that in [a] European Commission document the priority to re-refining has been removed. It notes that "Recent analysis, using the life-cycle approach, has shown that the priority given to regeneration of waste oils over use as a fuel is not justified by any clear environmental advantage.”[[8]](#footnote-8)

A State of California study[[9]](#footnote-9) says re-refining used motor oil does not reduce the GHG emissions or global warming when compared to burning the used oil as fuel. It is also noteworthy that re-refining used oil changes the pollutants released, and that according to the UCSB Final Report, re-refining increases the potential for human cancers.

“However, the re-refined base oil currently constitutes only 2.5% of California's base oil production capacity and 0.3% of U.S. capacity. Hence, re-refining is considered to not affect the overall lubricating oil market.”[[10]](#footnote-10)

The State has long recognized the economic benefits, as well as the performance and environmental benefits of synthetic lubricants and by extension biosynthetic lubricants.

“Fleet managers can further extend oil change intervals by using higher quality oil and by using oil analysis. Routine oil analysis indicates that many current synthetic oils effectively protect engines from wear with oil change intervals at 15,000 miles.” [[11]](#footnote-11)

“The original drain interval of 5,000 miles compared to 15,000 miles for extended drain intervals offsets the increased crude oil equivalent energy cost to manufacture the synthetic oils. The net economic savings will be increased further from three additional factors: labor savings for skipped oil changes, reduced engine wear, and higher vehicle availability in the field.”[[12]](#footnote-12) We would add that by using around one-third as much lubricant, disposal costs will be similarly reduced.

“The long term savings associated with their use and extended oil drain intervals will ultimately save the State money and help reduce the State’s dependence on petroleum.”[[13]](#footnote-13)

“The DGS, in conjunction with the State Mobile Equipment Council, will recommend changes to the State preventative maintenance policy and incorporate extended oil change intervals—thus decreasing the petroleum consumption in the State fleet. This is a cost savings solution.”[[14]](#footnote-14)

While lower-quality conventional and re-refined motor oil can cost less per quart, the synthetic and biosynthetic oils can run for substantially longer intervals. A recent market survey found synthetic products guaranteed for 15,000 miles by major oil companies for retail sale at $5.34 per quart. The wholesale price of the lowest quality motor oil available is over $2.50 per quart. The synthetic oil cost twice as much but lasts three times as long – resulting in significant cost savings. And as these, more fuel efficient oils, are more widely adopted their price will come down even further relative to the alternatives.

State law requires state agencies to develop and implement a plan to improve the overall state fleet’s use of alternative fuels, synthetic lubricants, and fuel-efficient vehicles by reducing or displacing the consumption of petroleum products and to report their progress annually (AB 236, Lieu, Chapter 593, Statutes of 2007).[[15]](#footnote-15) State Management Memo MM 12-06 acknowledges that synthetic motor oil and lubricants can help reduce the fleet’s petroleum consumption and protect the environment.[[16]](#footnote-16) However, thus far, the state has not reported on the state fleet’s use of synthetic motor oils.

The benefits of synthetic motor oils include longer intervals between oil changes, the reduced consumption of lubricating oil over the life of the vehicle, the reduction in GHG emissions, and overall cost savings. Biosynthetic blends of motor oil would have the added benefit of further reduced GHG emissions and reduced water pollution. These technologies will help the state fleet meet the requirements of AB 236, while also helping meet the Governor’s goal to reduce petroleum use in cars and trucks by 50%.

Several federal programs and policies acknowledge the multiple benefits of these technologies: The U.S. EPA’s “Environmentally Acceptable Lubricants[[17]](#footnote-17)” standard is currently applied to ocean vessels as a way to reduce ocean pollution. That standard was put in place to prevent some 16 million gallons of petroleum pollution. Twenty times that much motor oil enters the oceans each year from stormwater runoff.

The U.S. EPA’s SmartWay Transport Partnership extolls: *“Synthetic lubricants in the engine crankcase, rear axle, and transmission can improve fuel economy by about 3 percent, saving nearly 485 gallons of fuel and eliminating 5 metric tons of greenhouse emissions for a typical combination truck each year.” [[18]](#footnote-18)*

The U. S. Department of Agriculture’s BioPreferred Program sets a procurement standard for federal agencies and federal contractors for the purchase of bio-based products, including a minimum 25% bio-content for motor oils.[[19]](#footnote-19)

Current state legislation, SB 778 (Allen), would require all automotive oil sold in California to meet a 10,000 mile drain interval standard by 2018.[[20]](#footnote-20) Quality standards for motor oil will reduce petroleum consumption, protect engines, reduce pollution, improve gas mileage, and save money for consumers and public agencies.

A legal opinion by the U.S. EPA clarifies that formulations of bio-based oils mixed with convention oils fits the definition of used oil and may be managed as used oil.[[21]](#footnote-21) AB 628 (Bloom) proposes to clarify state law relating to the management of used oil, thus removing any legal confusion and barriers to expanding environmentally preferred and superior performing lubricants in the California market.[[22]](#footnote-22)

In conclusion, we recommend the State take the following actions to help meet the Governor’s petroleum reduction goal:

* Acknowledge synthetic and biosynthetic motor oils and industrial lubricants as presenting an opportunity for petroleum and GHG emission reductions in the transportation and waste sectors.
* Include synthetic and biosynthetic lubricating oils that reduce petroleum use under current fuels policies, standards, research programs and incentives.
* Support public policies such as SB 778 (Allen) to set a minimum drain interval standard for motor oil sold in California and AB 628 (Bloom), which will remove a barrier for market participation.
* Adopt a minimum drain interval standard for motor oil used by the state fleet of vehicles in order for the State to lead by example and reduce petroleum use and GHG emissions.
* Adopt policies to encourage the use of biosynthetic lubricants in the industrial market, which could reduce pollution around ports and rail yards.
* Create a standard modeled after U.S. EPA’s EAL standard for application in motor vehicles, vessels, and industrial equipment.

Thank you again for the opportunity to comment on this important effort.

Sincerely,

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1. “Life Cycle Analysis of Greenhouse Gas Emissions from Biosynthetic Base Oil (BBO) compared to Poly-Alpha Olefin (PAO) base Oil” By Dustin Mulvaney, Ph.D., EcoShift Consulting February 3, 2014 <http://biosynthetic.com/wp-content/uploads/Biosynthetic-Technologies-GHG-LCA-Report-Feb-3-20142.pdf> [↑](#footnote-ref-1)
2. “CLIMATE CHANGE SCOPING PLAN a framework for change” December 2008 Pursuant to AB 32, Page 51

   <http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf> [↑](#footnote-ref-2)
3. “ California Hazardous Waste Source Reduction Requirement - How it Works", Nabil H. Yacoub, Ph.D., Cal/EPA-Department of Toxic Substances Control, 2/4/2010 CUPA Conference [↑](#footnote-ref-3)
4. Public Resource Code Section 40051

   <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=40001-41000&file=40050-40063> [↑](#footnote-ref-4)
5. California Department of General Services Environmentally Preferable Purchasing Program's Best Practices Manual, 2005

   <http://www.calrecycle.ca.gov/epp/Resources/BPM.pdf> [↑](#footnote-ref-5)
6. State of California, Department of Health Services, Toxic Substances Control Program. *The No Waste Anthology.* Department of Health Services, Office of Public Government Liaison – Education and Information Unit, 400 P Street, P.O. Box 942732, Sacramento, CA 94234-7320 [↑](#footnote-ref-6)
7. State of California, Department of Health Services, Toxic Substances Control Program. The No Waste Anthology. Department of Health Services, Office of Public Government Liaison – Education and Information Unit, 400 P Street, P.O. Box 942732, Sacramento, CA 94234-7320 [↑](#footnote-ref-7)
8. The U.S. Department of Energy - Office of Fossil Energy Used Oil Re-Refining Study to Address Energy Policy Act of 2005 Section 1838 July 2006

   <http://fossil.energy.gov/epact/used_oil_report.pdf)> [↑](#footnote-ref-8)
9. "Critical Review of Used Oil Life Cycle Analysis." (2013): 13 Mar. 2014

   <http://www.calrecycle.ca.gov/publications/Documents/1468/20131468.pdf> [↑](#footnote-ref-9)
10. “Environmental Assessment of Used Oil Management Methods”, Vol. 38 No. 2, 2004 Environmental Science & Technology, Bob Boughton at DTSC [↑](#footnote-ref-10)
11. California Action Plan for Reducing or displacing the Consumption of Petroleum Products by the State Fleet and First Annual Progress Report, Page 20, April 2010

    <http://www.documents.dgs.ca.gov/ofa/AB236Report2010.pdf> [↑](#footnote-ref-11)
12. ibid, Page 22 [↑](#footnote-ref-12)
13. Ibid, Page 23 [↑](#footnote-ref-13)
14. California Action Plan for Reducing or displacing the Consumption of Petroleum Products by the State Fleet and First Annual Progress Report, Page 21, April 2010

    <http://www.documents.dgs.ca.gov/ofa/AB236Report2010.pdf> [↑](#footnote-ref-14)
15. Public Resource Code Section 25722.8

    <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=25001-26000&file=25722-25723> [↑](#footnote-ref-15)
16. <http://www.documents.dgs.ca.gov/osp/sam/mmemos/MM12_06.pdf> [↑](#footnote-ref-16)
17. Environmentally Acceptable Lubricants” EPA 800-R-11-002 November 2011 [↑](#footnote-ref-17)
18. http://www.epa.gov/smartway/forpartners/documents/trucks/techsheets-truck/420f12076.pdf [↑](#footnote-ref-18)
19. <http://www.biopreferred.gov/BioPreferred/faces/pages/ProductCategories.xhtml> [↑](#footnote-ref-19)
20. <http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB778> [↑](#footnote-ref-20)
21. <http://yosemite.epa.gov/osw/rcra.nsf/0c994248c239947e85256d090071175f/7E088E554C48980785257E5900714F93/$file/14849.pdf> [↑](#footnote-ref-21)
22. <http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB628> [↑](#footnote-ref-22)