August 22, 2012

James Goldstene
Executive Officer
Air Resources Board of the State of California
1001 I Street
Sacramento, CA 95814

Re: Technical Status and Revisions to Malfunction and Diagnostic System Requirements for Heavy-Duty Engines (HD OBD) and Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II)

Dear Mr. Goldstene:

This letter transmits comments prepared by Allison Transmission, Inc. (ATI) regarding the above-captioned rulemaking.

As a manufacturer of hybrid drive train systems for heavy-duty on-road vehicles, ATI understands the need for and supports the goal of heavy-duty hybrid (HD Hybrid) vehicles that fully comply with ARB's heavy-duty on-board diagnostic (HD OBD) system requirements. This goal is of great interest to ATI since ATI is the world's largest producer of HD Hybrids for transit bus and has been producing hybrid systems since 2003. Over 4800 ATI hybrid city transit bus propulsion systems are now deployed in North America and it is Allison's estimate that these vehicles have saved over 26 million gallons of fuel while traveling an estimated 500 million miles and avoiding the emission of approximately 259,000 metric tons of $CO_2$.

ATI's comment within this letter is to convey that ARB's proposed revisions to the HD (Heavy Duty) OBD regulations that require HD Hybrid compliance by the 2014 model-year do not provide adequate additional lead-time for that goal to be achieved and will likely result in a substantial reduction in the numbers and types of HD Hybrids available in California in the coming years. In order to ensure the continued availability of HD Hybrids in California, ATI urges ARB to harmonize its HD OBD requirements for HD Hybrids with those enacted by the U.S. Environmental Protection Agency (U.S. EPA) that are found at §86.010-18(q) Title 40, Code of Federal Regulations which do not require full OBD compliance for HD Hybrids until the 2016 or 2017 model-year, depending on the initial date that a hybrid system was first offered for sale.

Alignment of ARB and U.S. EPA requirements for HD Hybrids will:

- Provide time needed to address HD Hybrid system effects on HD OBD system performance;
- Provide the time necessary for the HD Hybrid market to evolve rather than driving HD Hybrids from the California market;

- Provide the time needed for collaboration between the HD Hybrid industry, engine manufacturers, vehicle manufacturers, ARB, U.S. EPA and SAE to develop required communication standards, and test and certification protocols for HD Hybrids.

While our detailed justification for this request along with other comments on the proposed revisions to the HD OBD regulations are presented below, we believe that the staff's proposal not to align California HD Hybrid requirements with those of U.S. EPA is fundamentally inconsistent with the staff's proposal for alternative-fueled engines which would be given until the 2018 model-year to comply with HD OBD requirements. We can see no rationale for ARB to provide four years less lead-time to HD Hybrids than is being provided to alternate-fueled engines. Further, alignment of ARB's requirements for HD Hybrids with those of U.S. EPA would still result in an earlier compliance date for HD Hybrids than is being proposed for alternate-fueled engines. In addition, if one of ARB staff's concerns is that funds from the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) not be provided to vehicles that do not comply with ARB's HD OBD requirements, we would urge ARB to align with U.S. EPA HD OBD compliance dates to help ensure continued and growing hybrid availability in the California market but restrict HVIP funding to only those HD Hybrid-equipped vehicles in 2014 and later model-years that are fully OBD compliant.

## Need for More Lead-Time for HD Hybrids and Consistency with U.S. EPA

As ARB currently states on its webpage for the HVIP program[1];

> ***A hybrid-electric vehicle typically uses an electrical motor and a gasoline- or diesel-powered engine, which work in tandem to reduce emissions and fuel consumption. Hybrid vehicle technology reduces criteria pollutant, air toxic, and greenhouse gas emissions – particularly in urban delivery vehicles, refuse trucks, work trucks, buses, and other vehicles with high stop-and-go or idling duty cycles. Hybrid vehicles also provide significant fuel economy benefits and fuel cost savings to the fleet owner and therefore, have the potential to be self-sustaining with some reductions in the upfront vehicle cost. Large scale market penetration of hybrid trucks and buses will help California meet its long term SIP and climate change goals.***

ATI agrees with ARB regarding the importance of HD Hybrids and as noted above supports the goal of HD OBD-compliant HD Hybrids. However, achievement of this goal across the HD Hybrid industry will require more lead-time than the ARB staff is proposing. Staff's decision to oppose harmonization with the U.S. EPA and not to provide the additional two to three years of requested lead-time to comply with HD OBD jeopardizes the near term future of HD Hybrids in California.

[1] http://www.arb.ca.gov/msprog/aqip/hvip.htm

U.S. EPA and ARB staff, as evidenced by its discussion of HD Hybrids on pages 12 to 16 of the Initial Statement of Reasons (ISOR)[2] have come to the same conclusion with respect to HD Hybrids and HD OBD – which is that the appropriate approach is where *"...one entity takes responsibility to ensure the system as a whole works properly..."* The only thing that differs between the two agencies is the timeframe required for compliance – with U.S. EPA providing three or four additional years of lead-time while ARB staff is proposing only one remaining year of lead time.

There are a number of reasons why the extra lead-time provided by U.S. EPA is necessary. The most significant of these is the difference between the passenger vehicle industry and the HD vehicle industry. In the passenger vehicle market, complete vehicles are produced, emissions certified, and sold, typically in high volumes, by vertically-integrated companies that design and construct the entire vehicle. The HD vehicle market is characterized by a high degree of horizontal manufacturing and HD vehicles are rarely produced in a vertically-integrated setting. The degree and nature of the highly-proliferated, highly-customized HD vehicle industry has no parallel in passenger vehicles. A HD vehicle typically has external sources of major components including the chassis, engine(s), transmission(s), brake system, body, specialized auxiliary equipment and hybrid system components, a HD vehicle may also be a just a "cab chassis" as it leaves the first OE assembler (powertrain, chassis, and cab) before further integration and assembly at a body builder (an upfitter) that will add more equipment and the specialized body for a particular work truck. A second upfitter may also participate before the actual sale to the enduser customer. The thousands of body builders (upfitters) in the industry are typically independent businesses from the first OEM. In summary, multiple independent businesses work in this horizontal HD industry to create what evolves into the final assembly of a work truck to its final configuration according to the purchaser's specialized requirements.

The fact that the HD vehicle industry is not vertically-integrated means that the HD vehicle, the HD engines and HD Hybrid systems are typically produced by different and independent companies. Engine manufacturers have initially designed their engines to comply with HD OBD requirements when used in the high volume non-hybrid vehicles. Engine manufacturers may choose to offer a low volume variant of an engine that is calibrated for use with a particular hybrid system. HD hybrid system manufacturers design their systems to complement the engine duty cycle in order to achieve reduced fuel consumption and lower greenhouse gas emissions as the hybrid system blends in stored energy from the hybrid system's batteries reducing the demands on the engine. A hybrid engine manufacturer and the hybrid system manufacturers must develop, through analysis and empirical test, the data and resources to demonstrate that certified engines continue to meet OBD requirements when used with each of the HD Hybrid systems that vehicle manufacturers may wish to select. This challenge is made even more difficult by the differences in HD systems' calibrations for the many different types of buses and vocational work truck vehicles for which HD hybrid systems may be desired. These differences in calibrations are important because they might impact how readily a certified engine can continue to meet OBD requirements when used in combination with any specific HD hybrid system.

[2] http://www.arb.ca.gov/regact/2012/hdobd12/hdobdiiisor.pdf

While HD engine manufacturers and HD Hybrid system manufacturers have been working to understand the interactions and solve this problem, there are a number of complicating factors that make the additional lead time provided under the U.S. EPA requirements necessary. These include:

1. HD OBD systems are still under development by engine manufacturers, with the first HD OBD requirements for application on some engines having taken effect with the 2010 model year, imposition of some HD OBD requirements for all engines taking effect with the 2013 model year, and full HD OBD compliance not being required until the 2016 model year;

2. HD OBD compliant 2013 model year engines and associated information and data are not yet generally available to HD Hybrid system manufacturers; and

3. The volume of HD Hybrid vehicles being produced is very small.

Although all of these factors are important, the latter is key as it limits the ability of both the HD engine and HD Hybrid system manufacturers to recover the costs associated with HD OBD compliance for HD Hybrids. In order to put the significance of this issue into perspective we would note that external sources have estimated the total U.S. sales of HD Hybrids from 1999 through 2010 (a 12-year period) to be only 11,000 units as compared to sales of almost 2,000,000 light-duty hybrids over that same period.[3]

Our primary concern with the ARB staff's proposal is not its goal of full HD OBD compliance but rather that the lead-time is simply too short for non-vertically integrated HD Hybrid vehicle, HD Hybrid engine, and HD Hybrid system manufacturers.

The ARB staff's responses to the issues of the lack of vertical integration, the resulting need for lead-time, and compliance costs are found in the following two paragraphs from the ISOR was:

> ***Fundamentally, an integrated approach needs to be used for engine and hybrid system manufacturers to have a reasonable chance at meeting all of ARB's requirements, including the OBD requirements and tailpipe standards. Modern engine and emission control systems are extremely complex and must balance many competing factors such as durability, performance, emissions, and fuel economy. Engine manufacturers expend significant resources to find a solution that simultaneously meets all of these requirements, so it should come as no surprise that major alterations to the system such as attaching a hybrid system that can turn the engine on and off and change the speeds and loads the engine is routinely operated at can substantially compromise the ability of the engine to continue to meet all of the requirements. Further, an integrated approach has the advantage of likely being able***

[3] Sources: Frost and Sullivan, May 2010 Report, &
http://www.afdc.energy.gov/afdc/data/vehicles.html
http://www.autonews.com/section/datacenter

***to maximize hybrid operation and efficiency, thereby making the system more economically viable for the long term. As such, staff is proposing an extra year of relaxation (the 2013 model year) before hybrid systems are required to be properly integrated and compliant with the OBD regulation.***

***Hybrid manufacturers have indicated that the proposed changes provided above are not enough, indicating that their lack of experience with designing OBD systems makes it difficult to meet the required HD OBD implementation dates. They further indicated that hybrid vehicles comprise less than 1 percent of the heavy-duty market, and that the requirements would impose a huge burden on the hybrid manufacturers. Thus, they proposed delaying HD OBD compliance for heavy-duty hybrid vehicles beyond the 2013 model year. Staff, however, disagrees that more lead time is the appropriate solution. The requirements for hybrids to comply have been clearly identified in the regulation since 2009 and little progress has been made since then, so providing even more lead time is not likely to change the situation. In contrast, requiring manufacturers to begin compliance in the short-term to remain eligible for funding through ARB's hybrid and zero-emission truck and bus voucher incentive project (HVIP) will likely provide sufficient motivation to manufacturers to make real progress. Avoiding further delays incompliance will also better ensure that near-term hybrid vehicles (that are largely subsidized by ARB through the HVIP) actually achieve and maintain benefits over the life of the vehicles.***

From the perspective of a HD Hybrid system manufacturer that is not vertically integrated with an engine manufacturer nor with a chassis manufacturer, it appears that:

1. ARB staff believes that one-year of additional lead time is sufficient to create technical and business systems solutions in a non-vertically-integrated industry to mirror those available in a vertically-integrated industry while solutions of the challenges of designing HD OBD compliant HD hybrids are simultaneously being achieved. These challenges include the standardization of communication protocols as exemplified by the ongoing work of the SAE J1939 Sub-committee on Hybrids; and

2. ARB staff believes that the availability of HVIP funding will sufficiently offset the costs associated with developing HD OBD compliant HD Hybrids within the one year of additional lead time provided.

We do not believe that either of these positions are supported. Regarding ARB staff's position on the reasonableness of one year of additional lead-time being adequate for compliance by non-vertically-integrated HD Hybrid system manufacturers, we respectfully note that it is not supported by any data, analysis or corroborating information. Further, we disagree with the ARB staff's claims regarding the lack of progress made by HD Hybrid system manufacturers since 2009. An example is the well-documented engagement of the HD hybrid industry with the U.S. EPA and SAE in working toward solutions for HD OBD compliance that culminated in an SAE-sponsored workshop in which both U.S. EPA, NHTSA, and ARB staff participated with industry on August 10th, 2012. Further, on a timeline

in parallel with the above-mentioned engagements, ATI (and other hybrid propulsion manufacturers) had appreciated the opportunity to interact with (and provide industry data to) ARB staff on this topic.

ATI also conveys that ARB staff should conduct a proper analysis of Economic Impact (Section V of the ISOR) or Analysis of Alternatives (Section VI of the ISOR), in that it has elected to decline harmonization with U.S. EPA requirements for HD Hybrids without analysis of the impacts' alignment on air quality along with the costs and cost effectiveness of the HD OBD regulation. Those impacts would also provide a negative economic result of unintended consequences such as diminished HD Hybrid availability in California on California entities that operate HD vehicles including Transit Districts, other public agencies, and private businesses. ARB staff appears to take contradictory positions in the ISOR. First, ARB staff states on page 15, with respect to ARB staff's decision not to align with U.S. EPA, that:

> ***Staff also expects that some hybrid system manufacturers may make a business decision to not expend the resources for compliance in 2014, which case they will not be able to offer hybrids for sale in California beyond 2013.***

And then stating in the ISOR, on page 59, that:

> ***It should be noted that one area of difference between the Federal and California requirements involves heavy-duty hybrids. Specifically, the U.S. EPA has exempted hybrids from OBD compliance for the 2014 through 2016 model years while ARB will require compliance. In theory, this could lead to some heavy-duty hybrid vehicles being more expensive in California than in other states during these three years. However, staff's assessment is that this is not likely to happen for two reasons. First, the heavy-duty hybrid vehicle sales volume is extremely low, which would make it virtually impractical for manufacturers to have sufficient resources to offer two different OBD systems (one that complies for the California market and one that does not comply with California hybrid monitoring requirements that would be available for sale in other states). Past history would suggest that these manufacturers will design and build one system nationwide and as such, the cost to purchasers would be the same nationwide.***

Products from HD Hybrid manufacturers, that are forced to leave the California market by the HD OBD requirements, will not be available in California at any price; and, the arbitrary assumption that all manufacturers will comply with ARB requirements (found in the Economic Impact section) is directly contradicted by the earlier acknowledgement that it is likely that some manufacturers will leave the California market. However, ARB staff has not yet addressed this issue in assessing economic impacts and did not perform an analysis that examines how the HD hybrid market in California will be affected.

Turning to the issue of HVIP funding, while we believe it is unrelated to HD OBD compliance for HD Hybrids, ATI supports restricting the availability of HVIP funding to only fully HD OBD compliant

HD Hybrids if ARB harmonizes its lead-time requirements for HD OBD compliance with those of the U.S. EPA.

## Need for Equitable Treatment of HD Hybrids and Alternate-Fueled Engines

While ARB staff is proposing HD OBD compliance for HD Hybrids beginning with the 2014 model-year, staff is also proposing that alternate-fuel engines continue to be exempt from HD OBD compliance until the 2018 model-year. In proposing extra lead-time for alternate-fuel engines in 2005, ARB staff's rationale[4] was that:

> ***This allowance will reduce the burden on manufacturers of these engines, which are produced in much lower numbers than their gasoline and diesel counterparts and since it is likely that the manufacturers would be required to redevelop a significant portion of the OBD system specifically for alternate-fueled engines (i.e., manufacturers would not be able to use their diesel engine-based OBD systems on alternate-fueled engines because of the vast differences in emission control components). Lastly, the role for alternate fuel engines in the heavy-duty industry is still uncertain and these allowances should provide more time for the market to decide what role these engines will play and in what volumes rather than having manufacturers prematurely elect to discontinue production of these engines partially due to OBD requirements.***

In addition, in the current ISOR, ARB staff states that:

> ***Staff had originally proposed that the compliance date be moved up to the 2016 model year, but feedback from several manufacturers at the workshop indicated bringing their many alternate-fueled engine families into compliance in the 2016 model year would be difficult. As such, they requested a phase-in plan for the 2016 through 2018 model years in lieu of compliance for all engine families in 2016. In subsequent discussions with manufacturers that had multiple engine families, staff determined that, within the small market share of alternate-fueled engines, there could be a significant inequity during the phase-in years between manufacturers that offer many different product offerings and those that have only one or two offerings. To address the initial request for additional lead time and to avoid inequity during the phase-in years, staff revised the HD OBD regulation proposal to require that the HD OBD requirements apply to all alternate-fueled engines starting with the 2018 model year.***

ATI believes that many of the reasons put forth by ARB staff for providing additional lead-time to alternate-fuel engines also apply to HD Hybrids, particularly those regarding the role of the technology in the heavy-duty industry and the fact that HD OBD compliance could lead to discontinued production. Further, the harmonization of ARB requirements with the U.S. EPA requirements for HD

[4] See http://www.arb.ca.gov/regact/hdobd05/isor.pdf

Hybrids would still result in HD OBD compliant HD Hybrids before alternate-fuel engines are required to be HD OBD compliant. Finally, the distinction being made between by ARB staff between HD Hybrids and alternate-fuel engines is not substantiated in that CARB staff has not forwarded a detailed explanation of why alternate-fuel engine compliance is more difficult and requires more lead-time than HD Hybrid compliance.

In summary, Allison Transmission Inc. remains supportive of the goal of HD Hybrid vehicles that fully comply with ARB's HD OBD system requirements. Yet, with the proposed revisions to the HD OBD regulations that require HD Hybrid compliance by the 2014 model-year, this provides insufficient lead-time for that goal to be achieved and will likely result in negative economic impacts in California for the coming years. ATI urges ARB to partner with the U.S. EPA to harmonize its HD OBD requirements for HD Hybrids such that full compliance for HD Hybrids could occur during the 2016 and 2017 model-year for new model products and legacy hybrids, respectively.

In past years and for the future, ATI appreciates the opportunities to work with ARB staff in collaboration with the agencies, industry, end-users, and other stakeholders in successfully meeting the goal while solving the significant business and technical challenges of HD OBD.

Sincerely,

Laurie B. Tuttle

Laurie B. Tuttle
Vice President, Hybrid Programs
Allison Transmission Inc.