BMW Group

January 25th 2012

Mr. James Goldstene
Executive Officer
California Air Resources Board
1001 I Street,
Sacramento, California 95814

Re: BMW Comments on the Proposed LEV III and GHG Emission Standards

Dear Mr. Goldstene,

On behalf of BMW AG, BMW of North America, LLC (BMW), BMW appreciates the opportunity to comment on the proposed amendments to the criteria and greenhouse gas regulations (LEV III & GHG). BMW comments and recommendations on the Zero Emission Vehicle (ZEV) and the Clean Fuel Outlet (CFO) regulations are addressed in a separate letter.

In keeping with our corporate commitment to reducing greenhouse gases, BMW commends ARB for listening and collaborating with automakers in their efforts toward developing this complex ISOR covering model years 2017 to 2025. Additionally, we commend both EPA and NHTSA for their collaboration with ARB toward a single national standard that includes their targets. This would also ensure wise financial and resource investments by the auto industry, as well as increased energy security for the nation.

1. General Comments

BMW strongly supports the continuation of a single national program with the EPA/NHTSA MY 2017-2025 rulemaking in order to avoid conflicting and counter-productive regulations. In July, 2011, we submitted a letter of commitment in support of the proposed framework.

To that end, we are very supportive of close cooperation between ARB and federal authorities to develop these standards nationwide. Any action taken in isolation should be avoided; as such an approach may lead to yet another patchwork situation. Therefore, we strongly recommend a single national standard or at least a one to one standard. Continuation of two different standards needs at least the possibility to choose between the standards.
We support fiscal incentives as an additional means to increase the market uptake of more fuel efficient vehicles and improve customer acceptance of fuel saving measures provided they do not distort the development of technology or the market, reward innovation in all market segments equally, and avoid a fragmentation of the US car market.

BMW supports the comments of the Alliance of Automobile Manufacturers addressing the LEVIII and GHG regulation. In addition to those comments, BMW has identified some issues where we have major concerns. The following issues are of particular importance to us.

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2. Comments on GHG

- **Upstream Emissions – Proper Allocation of Responsibilities**

ARB's ISOR proposes the inclusion of upstream emissions in the compliance calculation of standards for automakers which seems to be in contradiction to the federal NPRM. The -standards proposed in the ISOR seem to be very similar to the proposed federal standards, but there are fundamental structural differences in achieving these standards. BMW requests that CARB not only set standards comparable to the federal ones but also incorporate the same fundamental structure for achieving these standards. It is our understanding that a single national standard is built on almost complete harmonization of standards and procedures.

ARB's view is not justified, that within a national context there are expected to be significantly lower shares of electric and fuel cell vehicles than in California and higher national grid GHG emissions, and therefore, any non-zero upstream crediting serves as a lesser relative incentive for BEV and PHEV than the proposed ARB GHG crediting based on California's low-GHG grid. Manufacturers are not able to influence the grid mix and therefore differentiating between CARB States and the others in regard to upstream emissions should be avoided. Every such vehicle needs to be counted as zero upstream emissions. Any crediting above zero is a disincentive.

It is a principal question whether automakers are responsible for inclusion of upstream emissions in their compliance calculations or not, and this question is independent from the emission level of the electricity grid. BMW accepts the responsibility of car makers for the vehicle efficiency by which their products use energy – no matter which fuel or energy source. But manufacturers have no control over the carbon content of electricity generation and cannot be held responsible for energy mix decisions made decades ago.

While it is also acknowledged that the upstream impact of electricity generation needs to be addressed politically at the point of responsibility in order to ensure the credibility of a policy supporting the electrification of road transport, strategic decisions to be taken by car manufacturers for the decades to come should not be burdened by past decisions taken in other sectors: If upstream emissions would be allocated, the comparative advantage of electric vehicles dwindles. Clean Diesel in this case may achieve similar GHG emission reduction results at much lower costs. The attractiveness of electric vehicles for vehicle manufacturers would significantly decrease. Therefore, BMW continues to maintain that electric vehicles, on the merits of their own carbon use, should be counted as zero grams-per-mile vehicles in the greenhouse gas regulations for 2017-2025.

- **Multiplier incentives for electric vehicles**

ARB's ISOR does not include the multiplier incentives for electric vehicles as proposed in the federal NPRM. According to ARB, the proposed ZEV regulation sets sufficient incentives for their market penetration and therefore additional incentives through e.g. multipliers are not needed. This view is not shared by BMW.

Multiplier incentives were part of the proposed framework as announcement by President Obama at the end of July 2011. Depending on automakers strategy and product characteristics, electric

vehicles and/or fuel cell vehicles will play a more or less important role in future standards compliance. Without multiplier incentives, standards compliance may be jeopardized due to the proposed very ambitious GHG standards for model years 2017-2025. The BMW commitment to the GHG rules, which has been shown with the signed letter by our CEO Dr. Reithofer and at the White House event in July 2011, has been clearly linked to a complete adoption of the proposal including all flexibilities, such as MAC credits, zero-gram upstream approach multipliers etc. Our calculation of technical ability under the existing market conditions for achieving these very ambitious goals was completely based on the introduction of these flexibilities.

BMW believes that any variation to the federal NPRM, such as different counting of upstream emissions or consideration of different flexibilities, is not goal-oriented towards achievement of single national standards.

- **N2O and CH4 provisions**

BMW supports the option to convert measured N2O and CH4 emissions that are above the applicable standards into CO2-equivalent emissions for compliance purposes The calculation of emission debits on this basis allows them to be offset by other GHG reduction measures. While leading to the same overall GHG reduction impact, this option provides flexibility and still gives an incentive to further work on the reduction of N2O and CH4 emissions.

- **Continuing A/C credits approach is supported**

  o From our point of view, adequate availability of R123yf is highly questionable. Therefore, we greatly appreciate CARB's decision regarding the future adoption of this refrigerant. Currently, no one knows when the supply will be adequately established in the market.

  o Credit generation regarding direct (leakage) and indirect (fuel efficiency) emissions is generally supported. Details to be modified from our point of view are listed below. The aim is to ensure best objective methods as well as practicability and fairness.

  o Regarding leakage related credits, we would like CARB to reconsider the so called "HiLeakDisincentives". We feel that it must not be allowed to use any unintended fluid or refrigerant in any A/C system. If someone does so, then it would violate the law. So the effects of illegal refrigerant charge cannot be influenced by the manufacturer. Furthermore, this disincentive provokes discussions to use unintended refrigerants. We do not expect that vehicle manufacturers will shift to higher potential leakage rates when using R1234yf instead of R134a – BMW would definitely not do so and our focus will remain on best quality refrigerant circuit tightness for any given refrigerant.

  o Regarding fuel efficiency credits, we provide the following comments and recommend some specific changes.

    - AC-idle:
      We support the review of AC-idle judgment limits as a function of engine displacement. This supports implementing fuel efficient technologies also in smaller vehicles even

when fuel consumption improvements – which definitely have positive effects during over all typical driving conditions – are not fully visible during small engines idling.

- AC17 test and evaluation:
  - We carried out our own AC17 tests after the NPRM publication.
  - In our opinion, the AC17 test conditions do not reflect typical average or moderately increased air conditioning loads. Especially the solar load is too high. E.g. according to a FAT study the average North American sun load is around 310 W/m² - already taking into account that driving time periods are variable during a day (e.g. less driving at night). We therefore would expect a maximum value of around 350 W/m² to 400 W/m² (instead of 850 W/m²) for AC17 test. Some of the powerful measures to lower all-the-year fuel consumption also can't be evaluated at the currently suggested AC17 test load – e.g. significant reduction of reheat.
  - Reliability of test data is expected to be not better but similar to AC-idle-test.
  - Definition of platforms or carlines could be adopted according to the Alliance proposal.
  - We are also concerned about determining fuel consumption improvements and credit calculations depending on baseline test results. The generation of baseline car results needs to be properly defined. BMW does not have baseline cars – especially focused on 2017 – they have to be designed and built up for this single test. Therefore, we propose to test a baseline car once for each platform – according to the Alliance carline definition – and the use of these baseline results should be allowed during the entire model year 2017 to 2025 timeframe.

- AC17 test procedure
  - During the 30 minute soak, it is quite difficult to control temperature and humidity properly. A wider tolerance range in this phase of the cycle would help. Even more critical for some modern full automatic test benches is the combination of engine off and 4 mph wind speed because this has significant impact on exhaust gas analysis measurement devices.
    We would prefer a soak definition with a wider tolerance range of temperature and especially humidity and a speed definition of maximum 4 mph (instead of exactly 4 mph).
  - Solar load during MAC off phases causes extreme temperature exposure to test drivers. These working conditions are unacceptable and will lead to poor accuracy when trying to meet the given drive cycle requirements. We suggest running MAC off phases without solar load. As MAC is turned off, this has no impact on MAC off fuel consumption.
  - Drive cycle definitions should be fully equal to currently used cycles (e.g. some seconds time shift @ HWFET). This would help to keep accuracy and test quality high and to avoid mistakes.

3. Comments on LEV III

BMW strongly supports one of the primary goals in the LEV III regulation – harmonization of the federal and the California criteria emission program. In accordance with the Alliance of Automobile Manufacturers (Alliance) the following issues are of particular importance:

- Harmonization is needed for ARB and U.S. EPA test procedures, certification processes, phase-in requirements, vehicle standards, fleet averages, and certification fuels in order to establish a common set of vehicle criteria emission standards nationwide.

- Stringent criteria emission requirements for LEV III and Tier 3 require the elimination of non-essential requirements and duplication of efforts (e.g. submission of certification data to the agencies, test procedures for PHEVs).

- Particulate Matter (PM) Standards:

  o Technical feasibility of reaching the stringent SFTP single PM standard (10 mg/mile for PCs, 20 mg/mile for LDTs) do not appear to be achievable for all vehicles equipped with new technologies necessary to meet the GHG requirements.
  o More flexibility in meeting the SFTP PM standard is essential for future development and leads to the following recommendation for the PM standard:
  PM = 25 mg/mile for PCs and LDTs or 10 mg/mile composite as an alternative.

  o Within the framework of a harmonized phase-in during 2017-2021, BMW believes it is possible to meet the FTP PM Standard 3 mg/mile, even though additional resources are needed to meet the new requirements with new test procedures and new facilities.
  However, the proposed MY 2025 FTP PM Standard of 1 mg/mile is considered impossible to achieve with the currently established as well as the under development measurement procedures. BMW recommends to eliminate the 2025 FTP PM Standard 1mg/mile from the regulations and to plan a review of the PM standards with ARB, U.S. EPA, and the industry. The review process should evaluate correlation and variability of new test procedures and facility requirements, consistency and repeatability of measuring PM at low levels (≤3 mg/mile), as well as an evaluation of alternative particulate test methods.

In addition to above mentioned comments on harmonization and PM standard, BMW recommends specific amendments on Appendix A, see attached.

BMW is committed to working constructively with ARB on this matter. If you should have any questions please contact me or Dr. Azita Khalili at (805) 271-7314.

Sincerely,

Thomas C. Baloga
Vice President, Engineering – US

cc: Mary Nichols
Tom Cackette
Bob Cross
Steve Albu
Paul Hughes

Enclosure

Proposed LEV III and GHG Emission Standards,
BMW COMMENTS ON PROPOSED REGULATION ORDER

- **Section § 1961 (b) (1) (B), page A-22**: Table c shows the applicable emission standards to be used in the fleet average equations. According to ARB's Manufacturers Advisory Conversation on rounding of the equation, the results of the equation lead to different values for 2004 through 2014 model year vehicles certified to the optional 150,000 mile "LEV II" standards (e.g. ULEV for PCs and LDTs is 0.03 instead of 0.034). Please ensure the regulatory text does not retroactively change for manufacturers who have planned their vehicle certification in MY 2004 through 2014 based on ARB's Manufacturers Advisory Conversation.

- **Section § 1961.2 (a) (7), page A-42**: BMW recommends to introduce a pooling provision for SFTP like it is already proposed for FTP in California, the District of Columbia, and all states that have adopted California's criteria pollutant emission standards (see page A-54).

- **Appendix D, Test Procedure, page E-2** " 1.1.1. LEV II Exhaust Standards. The following LEV II standards are the maximum exhaust emissions for the intermediate and full useful life from new 2004 through 2019 model year LEVs, ULEVs, and SULEVs, including fuel-flexible, bi-fuel and dual fuel vehicles when operating on the gaseous or alcohol fuel they are designed to use, except that for the 2015 through 2019 model years, SULEV exhaust standards shall only apply to vehicles that receive partial zero-emission vehicle credits according to the criteria set forth in section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles"

In the ZEV Standards and Test Procedures it is required that from MY 2015 all PZEV and TZEV must fulfill LEV III SULEV 30(20) and LEV III Evap. So the intention of the above limitation is unclear. BMW recommends to adjust the regulation language to ensure PZEVs certified under LEV II regulation may be carried over without limitation until MY 2017 and LEV III SULEVs certifications be allowed without limitations starting with model year 2014.

- Harmonizing of different phase-in requirements: depending on product line up, the different phase-in requirements for PM, FTP, SFTP and EVAP standards can lead to a number of model variants and unreasonably high burden for variants near end of model cycle. BMW recommends to allow an alternative harmonized phase in for different standards as follows:

Phase-in	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
PM	10%	20%	40%	70%	100%	
FTP	10%	20%	40%	100%[i]		
SFTP	10%	20%	40%	70%	100%[ii]	
EVAP		60%	60%	80%	80%	100%
Harmonized Phase-in	**10%**	**20%**	**40%**	**70%**	**100%**	

- In addition to one single harmonized phase-in requirement for all criteria PM, FTP, SFTP, and EVAP), manufacturers should get more flexibility for aligning their model plans with the phase-in requirements by allowing an alternative phase-in with variation in the individual years if the same overall phase-in requirement 2017 to 2021 is achieved.

- **Appendix D, Test Procedure, page F-1** " §86.1823 Durability demonstration procedures for exhaust emissions. ... 4.3 SFTP. These procedures are not applicable to vehicles certified to the SFTP standards set forth in section E.1.2.2."

BMW understands DF's estimated through FTP Cycle may be applied to the LEV III US06 and SC03 emissions as well, in line with Tier 2 SFTP standards.

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[i] **Section § 1961.(a)(1), page A-15** *"(1) "LEV II" Exhaust Standards. The following standards are represent the maximum exhaust emissions for the intermediate and full useful life from new 2004 through 2019 ..."*

[ii] **§ 1960.1.(r)** *"4000-Mile Supplemental FTP Emission Standards. ... The SFTP exhaust emission levels from new 2001 through 2020 and subsequent model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class certifying to the LEV II exhaust emission standards in section 1961,"* According to the Test Procedure page E-8 LEV II SFTP Standards could only be applied through MY 2018: *"1.2.1 4,000-mile SFTP Exhaust Emission Standards for Light- and Medium-Duty Vehicles. The following standards represent the maximum SFTP exhaust emissions at 4,000 miles for 2015 through 2018 model year passenger cars, and ..."*