POTENTIAL DRAFT INNOVATIVE TECHNOLOGY RULEMAKING LANGUAGE
FOR WORKGROUP DISCUSSION PURPOSES ONLY
August 17, 2015 New Engine or Vehicle Certification Work Group Meeting

Note to Public Stakeholders: This draft document provides potential updated concepts and potential staff draft regulatory language for the new engine or vehicle certification element of the Air Resources Board (ARB) possible Innovative Technology Regulation (ITR). This draft document also highlights *(in parenthesis and italics)* areas where additional stakeholder input is desired to help inform the development and formalization of initial draft regulatory language. This document is intended to encourage stakeholder feedback at the August 17, 2015 ITR New Engine or Vehicle Certification Work Group meeting. This potential draft language is incomplete and should not be construed as a regulatory proposal, nor will this replace the public process that any proposed ITR will undergo. Staff also welcomes stakeholder feedback regarding Attachments A, B and C, which are intended to illustrate how the proposed ITR could potentially be implemented for heavy-duty engines meeting California's optional low NOx standard, heavy-duty hybrid engines, and other possible innovative heavy-duty engine technologies, respectively.

Potential Staff Draft Regulatory Language Regarding Possible Tier 1 and Tier 2 Flexibility Provisions

(a) *Certification Flexibility for Early Introduction of Low NOx Engines*

Table 1:
Heavy-Duty Low-NOx Engine Innovative Technology Categories

	Heavy-Duty Engine Certification Standard (g/bhp-hr NOx)		
	0.1	0.05	0.02
Compression-Ignition Engine	√	√	√
Otto Cycle Engine	√	√	√

(1) *Tier 1 Flexibility.* A heavy-duty low-NOx engine family per model year whose Low NOx Engine Tier 1 Certification Flexibility Application has been approved by the Executive Officer shall be eligible for the following flexibility when certified in the applicable model year by ARB.

(A.) *OBD Emission Test Data Sets.* For the purposes of demonstrating compliance with section 1971.1(i)(2.2.3), one engine family per model year that been approved by the Executive Officer for low NOx engine Tier 1 certification flexibility may be excluded from calculation of a manufacturer's total number of engine families for the purposes of this section.

(B.) *Use of "Part 1065"-Certified Cells. Allow use of development test cells or engineering analysis in lieu of requirement to use Part 1065-certified cells for PM and HC OBD/emission evaluation* (*potential draft regulatory language to be determined*)

(C.) *In-Use Monitoring Performance Ratio (IUMPR): IUMPR testing required for all low NOx engines after on the road for one year, but no enforcement based upon the results (i.e., reporting only for greater system understanding). (engine family would potentially be exempt from elements of section 1971.5, potential draft regulatory language to be determined*)

(D.) *Calculation of Deficiencies for Low-NOx Technology Monitoring.* Up to five deficiencies per engine family related to monitoring of a technology needed to meet an engine's low-

NOx emission level, including but not limited to the engine's cold start emission reduction strategy, crankcase ventilation system, SCR catalyst, NOx adsorbers, exhaust gas recirculation, and air/fuel ratio imbalance monitoring, shall be exempt from the specified fines of section 1971.1(k)(3), and these deficiencies shall not be included in the count of deficiencies used in section 1971.1(k)(2) to determine the number of deficiencies subject to fines. *(may need language referencing section 1971.5(A.)(ii.))*

(E.) *Deterioration Factors.* DF's to determine compliance with applicable emission standards may be used in lieu of intermediate or high mileage emission tests. ARB shall provide assigned DFs to manufacturers. If no ARB assigned DFs are available, manufacturers may use the most current United States Environmental Protection Agency (U.S. EPA) assigned DF's, as published by the National Vehicle and Fuel Emissions Laboratory as they existed as of January 1, 2016 and incorporated by reference herein, where applicable or may propose another DF in the absence of a U.S. EPA assigned DF. In proposing a DF, the manufacturer must demonstrate using test data, that the proposed DF is appropriate for use in determining compliance with the applicable emission standards. All such demonstrations must be approved in advance by the Executive Officer. The Executive Officer shall base his or her determination upon all information submitted by a manufacturer and upon good engineering judgment.

Note: A hybrid engine family and driveline combination must utilize a chassis dynamometer or portable emissions measurement system to demonstrate no significant increase in any criteria pollutant relative to an equivalent, non-hybrid base vehicle to be eligible for Tier 2.

(2) *Tier 2 Flexibility.* A low-NOx heavy-duty engine family for which the Low NOx Engine Tier 2 Certification Flexibility Application has been approved by the Executive Officer shall be eligible for the following flexibility when certified in the applicable model year by ARB.

(A.) *OBD Emission Test Data Sets.* One engine family per model year that meets the low-NOx standard and that has received Executive Officer approval for Tier 1 certification flexibility may be excluded from calculation of a manufacturer's total number of engine families for the purposes of section 1971.1(i)(2.2.3).

(B.) IUMPR: *IUMPR testing required for all low NOx engines after on the road for one year, but no enforcement based upon the results (i.e., reporting only for greater system understanding). (engine family would potentially be exempt from elements of section 1971.5, potential draft regulatory language to be determined)*

(C.) *Calculation of Deficiencies for Low-NOx Technology Monitoring.* Up to three deficiencies per engine family related to monitoring of a technology needed to meet an engines low-NOx emission level shall be exempt from the specified fines of section 1971.1(k)(3) and these deficiencies shall not be included in the count of deficiencies used in section 1971.1(k)(2) to determine the number of deficiencies subject to fines. *(may need additional language referencing section 1971.5(A.)(ii.))*

(b) Certification Flexibility for Early Introduction of Hybrid Heavy-Duty Engines

Table 2: Innovative Hybrid Technology Categories and Associated Maximum California Demonstration Sales Volume per Manufacturer[1]

	Hybrid with No/Low Zero-Emission Operation	Hybrid with Significant All-Electric Range (AER)[2]
Vocational Truck or Bus Engine	100	200
Urban Bus Engine (>33,000 lbs)	50	100
Class 8 Tractor Engine (>55,000 lbs)	50	100

1 – Demonstration volumes are cumulative and not per model year.
2 – Vehicle must be capable of a minimum of thirty-five miles zero-emission range. Class 8 Tractors over 55,000 lbs GVWR capable of a minimum twenty mile zero-emission range that also offer hybrid propulsion may also be eligible.

(1) *Tier 1 Flexibility.* A manufacturer whose Hybrid Engine Tier 1 Certification Flexibility Application for a hybrid engine family has been approved by the Executive Officer may certify the engine family with ARB utilizing the applicable Tier 1 flexibility provisions in this section, but shall not exceed the Demonstration Volume identified in Table 2 for the applicable technology category.

(A.) A hybrid heavy-duty engine family for which a Hybrid Engine Tier 1Certification Flexibility Application has been approved by the Executive Officer shall meet requirements of section 1971 rather than section 1971.1 (title 13, CCR).

(B.) An engine family for which a Hybrid Engine Tier 1Certification Flexibility Application has been approved by the Executive Officer may use DF's to determine compliance with applicable emission standards in lieu of intermediate or high mileage emission tests during certification. ARB shall provide assigned DFs to manufacturers. If no ARB assigned DFs are available, manufacturers may use the most current United States Environmental Protection Agency (U.S. EPA) assigned DF's, as published by the National Vehicle and Fuel Emissions Laboratory as they existed as of January 1, 2016, and incorporated by reference herein, where applicable or may propose another DF in the absence of a U.S. EPA assigned DF. In proposing a DF, the manufacturer must demonstrate using test data that the proposed DF is appropriate for use in determining compliance with the applicable emission standards. All such demonstrations must be approved in advance by the Executive Officer. The Executive Officer shall base his or her determination upon all information submitted by a manufacturer and upon good engineering judgment.

(2) *Tier 2 Flexibility.* A manufacturer whose Hybrid Engine Tier 2 Certification Flexibility Application for a hybrid engine family has been approved by the Executive Officer may certify the engine family with ARB utilizing the Tier 2 flexibility provisions in this section.

(A.) Basic OBD (i.e., circuit and functionality checks) required, may light separate MIL and use proprietary scan tools (*potential draft regulatory language to be determined*)

(B.) Demonstrate that OBD readiness can be achieved to ensure compatibility with Smog Check or other heavy-duty vehicle inspection and maintenance programs (*potential draft regulatory language to be determined*)

(C.) *OBD Emission Test Data Sets.* For the purposes of demonstrating compliance with section 1971.1(i)(2.2.3), one engine family per model year that been approved by the Executive Officer for low NOx engine Tier 1 certification flexibility may be excluded from calculation of a manufacturer's total number of engine families for the purposes of this section.

(D.) *IUMPR.* IUMPR testing required for all low NOx engines after on the road for one year, but no enforcement based upon the results (i.e., reporting only for greater system understanding). *(engine family would potentially be exempt from elements of section 1971.5, potential draft regulatory language to be determined)*

(E.) An engine family for which a Hybrid Engine Tier 2 Certification Flexibility Application has been approved by the Executive Officer may use DF's to determine compliance with applicable emission standards in lieu of intermediate or high mileage emission tests during certification. ARB shall provide assigned DFs to manufacturers. If no ARB assigned DFs are available, manufacturers may use the most current United States Environmental Protection Agency (U.S. EPA) assigned DF's, as published by the National Vehicle and Fuel Emissions Laboratory as they existed as of January 1, 2016 and incorporated by reference herein, where applicable or may propose another DF in the absence of a U.S. EPA assigned DF. In proposing a DF, the manufacturer must demonstrate using test data, that the proposed DF is appropriate for use in determining compliance with the applicable emission standards. All such demonstrations must be approved in advance by the Executive Officer. The Executive Officer shall base his or her determination upon all information submitted by a manufacturer and upon good engineering judgment.

(c.) Certification Flexibility for Early Introduction of Hybrid Medium-Duty Vehicles

ARB staff encourages stakeholder comments regarding continued inclusion of hybrid Class 2b or 3 medium-duty hybrid vehicles in the potential ITR. Staff has received no stakeholder feedback regarding a specific need for certification or OBD flexibility to encourage early deployment of newly manufactured medium-duty hybrid vehicles. The potential ITR would continue to address development of ARB approval protocols for medium-duty vehicle hybrid conversion systems.

(d.) ITR Technology Diversity Element

ARB staff welcomes stakeholder feedback regarding potential ITR Technology Diversity Provision concepts identified in Attachment C.