CALIFORNIA AIR RESOURCES BOARD

Proposed Heavy-Duty Inspection and	)	Agenda Item: 21-13-3
Maintenance (HD I/M) Regulation	)	
	)	Board Hearing: December 9, 2021

COMMENTS OF THE
TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

November 29, 2021

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<u>**Introduction**</u>

On October 15, 2021, the California Air Resources Board ("CARB") published a "Notice of Public Hearing to Consider Proposed Heavy-Duty Inspection and Maintenance Regulation" ("the Proposal").

The Truck and Engine Manufacturers Association ("EMA") is the international trade association that represents the interests of the world's leading manufacturers of internal combustion engines, including heavy-duty engines, and of heavy-duty on-highway vehicles. EMA's members have significant interests in the Proposal, as it will directly impact the products manufactured by EMA members, and will further impact the on-board diagnostic certification and the in-use maintenance of those products.

EMA and its members have actively participated in the various workgroup and workshop meetings held by CARB Staff leading to the development of the proposed heavy-duty inspection and maintenance ("HD I/M") program, and we appreciate the open and collaborative process leading up to the Proposal, and Staff's willingness to address and incorporate stakeholder comments. Notwithstanding EMA's appreciation of the process, we have a number of remaining concerns with the Proposal and its timeline -- and suggested revisions to resolve those concerns -- as detailed in our comments below.

<u>**General Comments on the CARB HD Inspection & Maintenance**</u>
<u>**Initial Statement of Reasons**</u>

Program Design and Timing

California Senate Bill (SB) 210, which directed CARB to develop and implement "a Heavy-Duty Inspection and Maintenance [(HD I/M)] program for nongasoline heavy-duty onroad motor vehicles," requires completion of a pilot program "before adopting and implementing the program." Further, SB 210 requires a "report to the transportation and environmental committees of the Legislature" on a number of elements. (<u>See</u> *§ 44156(a)-(b)*.) CARB's Pilot Report was released in tandem with the Initial Statement of Reasons and Proposed Regulation Order. Thus, any significant issues identified in the pilot program, or in the Report review, are likely not adequately reflected in the Proposal. Staff's recommendations in the Report also indicate a need for more testing and research. In fairness to all stakeholders impacted by the proposed HD I/M

regulations, full consideration should be given to the Report, and a thorough follow-on review should be completed prior to the issuance of a Final Regulation Order. In that regard, there are significant technical issues, as discussed further throughout our comments, that warrant proper consideration, rather than a rushed approach to the rulemaking.

As EMA has previously commented to CARB Staff, there will be very little, if any, time for a full prove-out of the remote onboard diagnostic (OBD) devices that are proposed to be a key element of the HD I/M program. There are many questions and concerns regarding the feasibility, compatibility, and readiness of devices, especially given the short amount of time between planned issuance of the final HD I/M program, device manufacturers' field testing, and the anticipated program implementation. Most importantly, any device that CARB approves for use must not have any impact on heavy-duty vehicle OBD system normal operations and communication. The current timeline will not provide adequate leadtime for device manufacturers and vehicle manufacturers alike to ensure the feasibility and compatibility of the technology, or to protect against any unintended impacts to critical vehicle systems.

In the same vein, in addition to the listing of referenced documents and standards for device requirements, an industry standard or protocol (e.g., SAE, IEEE, etc.) is needed for device communication with vehicles prior to the implementation of the I/M program. EMA has significant concerns that, under the proposed program, devices would not be required to communicate with a specific, _defined_ SAE communication specification, which would enable controllers to be tested and validated to ensure their robustness. The use of third-party devices may create unexpected communication problems that could lead to system failures. We are already aware of situations where this has happened. Further, EMA and its members are concerned that a failure due to third-party devices could be considered tampering if such a device inadvertently impacts emissions or safety controls. Moreover, these concerns are exacerbated with the use of a continuously connected remote OBD (CC-ROBD) tool. Existing controller networks have been validated against the communications to be expected from a generic SAE J1939 service tool, but not against the continuous nature of the devices that would be used for the HD I/M program – especially devices that are not validated to an SAE or other industry standard. A standard, well-defined communication protocol is critical to the success of the program, and to the safety and robustness of the OEM systems on which the devices will be installed.   Further, this communication standard must be established _prior_ to program implementation, not after-the-fact.

Additionally, with regard to the use of a CC-ROBD device for compliance, while this may provide ease of use for vehicle owners/operators, it raises significant concerns regarding the OBD port itself. Vehicle OBD ports are designed for discrete device connections when needed, rather than a continuous connection at all times. This raises questions regarding durability of the OBD port and the mechanical load on the connecter, given the use of a continuously connected tool. Additionally, depending on the design of a given device, there could be safety concerns with a device continuously connected to the OBD port (_e.g._, clearance, physical location, etc.).

Monitoring

The Proposal indicates that roadside monitoring via CARB's Portable Emissions AcQuisition System (PEAQS) and other roadside emissions monitoring devices (REMDs) will be

utilized to flag "high-emitting" vehicles for further testing and repair. However, there are a number of concerns regarding the potential for the erroneous or "false" flagging of vehicles. There is no instantaneous limit or regulatory standard of emissions. Even in-use emissions are measured as part of an entire drive cycle's work, and it is not unusual or even abnormal to have emissions that exceed this threshold for short intervals of time, such as the moment that a vehicle passes by a remote sensor. Use of an OBD emissions limit of 0.4 g/bhp-hr for flagging such "high emitters" could result in situations where a vehicle is "flagged" when the engine is actually functioning properly (e.g., the engine is running without selective catalytic reduction (SCR) under an approved auxiliary emission control device (AECD), rapid acceleration events, etc.). Stakeholders at the various workshops held during the development of the proposed program noted other situations where a vehicle could be flagged due to the MIL illuminating, but the MIL goes off before the vehicle is taken in for testing/repair. EMA is concerned that erroneous flagging of vehicles could lead to situations where a properly functioning vehicle is required to undergo unnecessary and costly testing. Similarly, a vehicle that travels repeatedly over a fixed route over a given period of time could be flagged multiple times by the same monitor as a high emitter before the owner/operator ever receives a notification.

Further, the accuracy of PEAQS and other REMDs as measurement tools raise significant questions regarding the magnitude of measurement error and variability that can be expected with such measurement methods, since, among other things, those monitors will not measure the dilution ratio at any particular instant, or the work that the vehicle is outputting at the time of the sample. Further studies of REMDs are needed prior to the program start, as there is a significant level of uncertainty that must be accounted for to avoid erroneous flagging of vehicles due to measurement errors. If such "false positives" continue to occur, a vehicle could also be falsely flagged for further inspection by CARB's in-use compliance team – again, where the vehicle is functioning properly and there is no actual emissions-related problem.

The Pilot Report released with the ISOR states "As a follow-up to this pilot, CARB staff are working to implement upgrades to improve the efficacy of REMDs like PEAQS," and "[t]he study highlighted the need to roll out REMD carefully and constantly monitor the outcomes so as to be sure a large number of vehicles are not being directed for further testing without identifiable or repairable emissions-related issues." These statements clearly show that there is a need for more study and refining of the program *before its implementation*. Thus, the concurrent release of a report on the pilot program documenting the need to improve the efficacy of the proposed HD I/M program, and the Proposal of that very same program is patently inappropriate.

Additional work should be done to study the vehicles being flagged by REMDs to determine and better understand the error rate between vehicles flagged and those that have an actual emissions exceedance such that repair is needed. Specifically, that type of pre-implementation study is necessary to determine an appropriate threshold, including an appropriate measurement allowance, that can reliably be used to differentiate improperly flagged vehicles, and ultimately account for the wide range of acceptable in-use emissions rates from vehicles that do not have an emissions-related failure. Thresholds for these screening efforts must be appropriately set, accounting for both measurement accuracy and the likelihood that such screening would actually detect a problem that needs repairing. EMA further recommends that such a pre-implementation study include follow-up testing of the vehicles that trigger PEAQS/REMD

flagging, including actual emissions measurements of the vehicles using industry agreed-upon methods and instruments, to determine if the vehicles have true repair needs, or are merely being flagged due to the nature of the REMD measurement and threshold.

Simply stated, a thorough study of REMDs is needed <u>prior</u> to program implementation to provide program certainty and avoid situations where a significant portion of the vehicle population is erroneously flagged for unnecessary repair. The magnitude of the potential problems of implementing a program based on remote monitoring before fully assessing the capabilities and error rates of REMDs will only be exacerbated by the inclusion in the program of all heavy-duty vehicles traveling in the state of California.

Impact of Concurrent Regulatory Proposals

As also stated in EMA's comments in response to both the "Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments" and the "Proposed Revisions to the On-Board Diagnostic System Requirements and Associated Enforcement Provisions for Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles and Engines, and Heavy-Duty Engines" proposals, the data and validation requirements of the HD I/M program will create duplicative requirements with existing and future OBD data reporting requirements, and thus would result in duplicative and onerous data submissions. EMA strongly recommends streamlining or consolidating the overlapping data submissions to better align the programs, and we welcome the opportunity to discuss with CARB Staff potential options for such consolidation.

Moreover, many provisions referenced in this Proposal, including those specific to ROBD devices and protocols, are currently being amended by CARB's "Proposed Revisions to the On-Board Diagnostic System Requirements and Associated Enforcement Provisions for Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles and Engines, and Heavy-Duty Engines." If this Proposal is intended to determine device protocol (rather than an industry standard, as requested by EMA), stability in the regulations is needed to provide stakeholders (especially device manufacturers) the ability to properly assess this Proposal.

Specific Comments on the HD I/M Proposed Regulation Order

EMA's specific comments on the proposed Heavy-Duty Inspection and Maintenance regulations are set forth below:

- **§2195(a)(3):** The right of entry for shipment certificates is overly broad and needs clarity. EMA recommends the following change:
  (3)   An applicable freight facility, operated by a motor common carrier or private carrier, allowing the operation of vehicles subject to the requirements of this HD I/M Regulation on their property.

- **§2195.1 Definitions – "Compliance certificate":** As EMA has previously noted, the term "compliance certificate" (or simply "certificate") has a very specific meaning in Title 13, and means an *emissions* compliance certificate. Given that, we request that CARB use a

different term for the HD I/M program to avoid potential confusion. Although this term is used in SB 210, the drafters of the legislation likely were not aware of the existing "compliance certificate" definition. As an example, §2196.1(h) states that "CARB may publicly disclose the compliance status of vehicles operating in California;" if that statement is then tied to a "compliance certificate" (as was written in previous drafts of the proposed regulations), it could easily be misconstrued by those unaware of the duplicative terms such that they could incorrectly assume that vehicles without *emissions* compliance certificates are operating in the state. The prospect of vehicles operating "without a compliance certificate" has a very specific meaning, and this could inadvertently cause problems and confusion if another more germane term is not utilized.

- **§2195.1 Definitions – "On-Board Diagnostics (OBD)" and "OBD-equipped vehicle":**
  Clarity is needed in the proposed definition of "On-Board Diagnostics (OBD)" to better tie it to that of "OBD-equipped vehicle." As such, we recommend the following changes:
  "On-Board Diagnostics (OBD) system" means any system certified to meet the requirements of any of the following:
  (#) ~~t~~ Title 13, CCR, section~~s~~ 1968.2.
  (#) Title 13, CCR, section, 1971.1.~~, t~~
  (#) Title 40, Code of Federal Regulations (40 CFR), section 86.010-18.~~, or e~~
  (#) Equivalent requirements to (#) through (#).

- **§2195.1 Definitions – "Provisional compliance certificate":** Prior draft proposed regulatory language defined and used the term "conditional compliance certificate," which EMA also commented to CARB Staff has a specific meaning both in the regulations and in common use. However, the proposed term "provisional compliance certificate" is still problematic. Again, use of the term "compliance certificate" is confusing in and of itself; thus, any modifiers added to that term for provisional or conditional circumstances would still provide the same potential for confusion.

- **§2195.1 Definitions:** To the extent that other definitions in §2195.1 define terms that already exist in other areas of the regulation, we recommend that CARB provide a reference to those chapters, rather than creating new (and potentially conflicting) definitions in proposed new Chapter 3.7.

  §2196.3: Section 2196.3 states what the criteria are for failing a compliance test, and other sections of the proposed regulations refer to "completion of a passing compliance test as specified in section 2196.3;" however, §2196.3 does not <u>affirmatively</u> state criteria for a passing test. Leaving passing criteria up to interpretation, as the section currently does, would create confusion and ambiguity. EMA recommends the addition of a new §2196.3(d), for "Criteria for passing a compliance test."

- **§2196.5(a)(1)(A):** As noted in previous comments to CARB Staff, and above, EMA has serious concerns with the HD I/M program's application of the §1971.1(e)(6.2.1) and (8.2.1) malfunction criteria as the benchmark for a roadside emissions malfunction threshold. Roadside emissions monitoring devices will record a "snapshot" in time, and may not be an accurate measure of an actual malfunction. Sections 1971.1(e)(6.2.1) and

(8.2.1) note that the OBD system shall monitor a malfunction when "the catalyst conversion capability decreases to the point" of causing excess NO_x emissions or "prior to a decrease in the filtering capability," respectively. OBD systems must continuously monitor for malfunctions, and the malfunction criteria of section (e) are designed to detect problems over time, not from an instantaneous snapshot as would be detected by a roadside emissions monitoring system. Further, the OBD regulations at §1971.1(e)(6.3.3) and (8.3.4) allow a manufacturer to request Executive Officer approval to temporarily disable continuous monitoring for technically necessary reasons to "to avoid false passes and false indications of malfunctions." The existing OBD regulations recognize that there may be situations where *continuous* monitoring could result in false indications of a malfunction. From this it follows that the *instantaneous* roadside monitor requirements of proposed §2195.6 could result in many more potential false readings.

- **§2196.8:** The provisions for time extensions due to the unavailability of needed replacement parts are not sufficient for alleviating potential problems. Parts unavailability issues could arise for fleets of any size, not just small fleets. Thus, the stipulation that this provision may only be used by those fleets with "ten or fewer" vehicles is inadequate. This section does not provide any ability for relief in the rare case where the entire industry is affected by a supply issue. A new section (e) should be added to allow for fleets to request a compliance extension request for extreme unforeseen situations that are completely outside an owner's control. As a case in point, the current worldwide semiconductor chip supply shortage is impacting most (if not all) manufacturing industries globally, regardless of business size. In the event of a future widespread component-part shortage such as that one, the regulations as currently drafted would not provide fleets with a mechanism to apply for relief (or CARB Staff with the ability to allow for such relief).

- **§2199.1:** If it is intended that the existing PSIP requirements of §2193 would sunset when the HD I/M program begins, EMA recommends that the proposed regulation order include amendments to §2193 (Appendices A-2.1 and A-2.2) to clearly state that those requirements will be superseded when the I/M program begins. This is important both for public notice, and to ensure that regulated entities are not subject to duplicative (or conflicting) regulations.

Conclusion

EMA appreciates the opportunity to submit comments on the Proposal. We have a number of specific comments and proposed revisions to the proposed I/M program, as detailed above, and in Attachment A. EMA requests that CARB incorporate EMA's comments prior to finalizing the Proposal, and we would welcome the opportunity to answer any questions or further discuss these comments with CARB Staff.

Respectfully Submitted,
TRUCK AND ENGINE
MANUFACTURERS ASSOCIATION

Attachment A.

Specific Comments on Appendix B
Proposed California Standards for Heavy-Duty Remote On-Board Diagnostic Devices

- **Subsection D.1.:** EMA appreciates the addition of language stating that remote OBD (ROBD) devices shall not interfere with a vehicle's normal operation, and linking ROBD devices to requirements in existing SAE protocols. However, we continue to believe that a dedicated industry protocol or standard for communication by ROBD devices is still needed for this program. There are elements of the proposed regulations that show a clear disconnect between what is envisioned for the HD I/M program and what is allowable in existing SAE protocols (e.g., as noted in our previous comments, message data size in Tables 2 and 3, etc.).

- **Subsection E.2.1.4.:** *"The ROBD tool initialization shall be performed prior to requesting diagnostic services from any ECU."*
  EMA previously commented that the following language also be added prior to Subsection E.2.1.4, and we would still recommend this or similar language: "The ROBD tool shall disable CAN communications with the vehicle while the tool is loading or initializing the operating system or application software. This action shall not disable communications on vehicle network segments. Communications shall not be enabled for use by the application until after all POST activity has completed."

  Additionally, the proposed language regarding J1939 device communication with vehicles does not fully describe in detail how to accomplish device initialization. More specifically, an initialization failure provision should be added. EMA recommends the following language:
  2.1.4. The ROBD device initialization shall be performed prior to requesting diagnostic services from any ECU. Failure to complete any of the steps in 2.1.4.1-3 shall be defined as an initialization failure.
    2.1.4.1. Address claim: The ROBD device shall meet address claim and dynamic addressing requirements in SAE J1939-81. The ROBD device shall only claim address 249 or address 250.

- **Subsection E.2.2.3 (for SAE J1979 devices):** *"The ROBD device shall meet the standardized communication requirements for scan devices as illustrated in SAE J1699-2;"* and E.2.3.3 (for 1979-2 devices): *"The ROBD device shall meet the standardized communication requirements for scan devices as illustrated in SAE J1699-2 or later version, whichever is applicable for vehicles using SAE J1979-2."*
  The previous drafts of Appendix B included the following language, "The ROBD tool shall meet the standardized communication requirements as illustrated in SAE J1939-84." EMA previously commented that this requirement was not directly actionable, as content in SAE J1939-84 intends to test a vehicle and is not a reference standard for "tools" (it specifies a reference tool for engines installed in vehicles). This language is no longer included in Subsection E.2., however, we would recommend that CARB include SAE J1939-84 in the list of references in Subsection C, as it has practical information that will aid implementors. The same concept applies to J1699-3 & -5, as the specifications lie in ISO 15765-4.

- **Subsection E.2.5.:** *"In the case of failed initialization (i.e., vehicle not responding to the ROBD tool within the required duration), the ROBD tool shall repeat the initialization sequence, up to three times."*
  Does CARB intend to mean initialization as establishing vehicle network speed, or establishing whether the vehicle is subject to HD I/M (via receipt of the (DM5) message containing the OBD compliance value? Does this apply to each data item collected, or just the process to identify the vehicle as relevant; if it is just the process, under what circumstances should the ROBD tool fail data collection in progress? EMA also recommends that the provisions of E.2.5 and 2.6 be expanded for foreign vehicles.

- **Subsection E.2.6.2.:** *"The ROBD device shall submit a "Vehicle not HD OBD/OBD II compliant" message to the CARB electronic reporting system."*
  What is the desired list of relevant OBD_Compliance values?

- **Subsection E.4.1.2., Table 2:** *"CAN Bus data formatting requirements for the J1979 or J1979-2, as applicable, ROBD device"*

ECU Address	The hexadecimal address of the	String (15)

The proposed provision for a 15-bit string is improved however, EMA still questions the omission of a tool address, see examples below.

> *1234567890ABCDEFG,J1979,23000, ABC Company, ABC0000001,1.20.1005,1234567890,23,*
> *2024-06-25 12:23:4567 Timestamp, Message Type, ECU Address, Data Message*
> *2024-06-25 12:23:4570,REQ,,07 DF 01 00*
> *2024-06-25 12:23:4588,RSP,E8,07 E8 41 00 BF BE A8 93*
> *2024-06-25 12:23:4592,RSP,EC,07 EC 41 00 98 18 80 11*
> *2024-06-25 12:23:4623,REQ,,07 DF 01 01*
> *2024-06-25 12:23:4712,RSP,E8,07 E8 41 01 00 07 65 00*
> *2024-06-25 12:23:4800,REQ,,07 DF 01 20*
> *2024-06-25 12:23:4811,RSP,EC,07 EC 41 20 80 01 80 01*
> *2024-06-25 12:23:4823,RSP,E8,07 E8 41 20 A0 07 B1 19*
>
> ***ECU addresses missing from 29-bit examples … use last (LSB) byte for ECU addresses.***
> *VIN,SAE Protocol,Odometer,Device Name,Device Serial Number,Device Firmware Number,Firmware Verification Number,Record ID, Data Collection Date and Time 1234567890ABCDEFG,J1979,23000,ABC Company, ABC0000001,1.20.1005,1234567890,23,*
> *2024-06-25 12:23:4567 Timestamp,Message Type,ECU Address,Data Message*
> *2024-06-25 12:23:4570,REQ,,18 DB 33 F1 01 00*
> *2024-06-25 12:23:4588,RSP,18DAF159,18 DA F1 59 41 00 BF BE A8 93*
> *2024-06-25 12:23:4592,RSP,18DAF15A,18 DA F1 5A 41 00 98 18 80 11*
> *2024-06-25 12:23:4623,REQ,,18 DB 33 F1 01 01*
> *2024-06-25 12:23:4712,RSP,18DAF159,18 DA F1 59 41 01 00 07 65 00*
> *2024-06-25 12:23:4800,REQ,,18 DB 33 F1 01 20*
> *2024-06-25 12:23:4811,RSP,18DAF15A,18 DA F1 5A 41 20 80 01 80 01*
> *2024-06-25 12:23:4823,RSP,18DAF159,18 DA F1 59 41 20 A0 07 B1 19*

29-bit addresses in 15765-4 only use physically addressed responses. 18 DB 33 F1 is defined as the global (OBD only) request. Both 29-bit schemes provide a tool address, 15765-4 uses F1h; SAE J1939 allows F9h and FAh. Why omit the tool addresses when it is often included in test

logs? (There appears to be an example missing for 29-bit CAN IDs that will use TA and SA fields.)

- **Subsection E.4.1.2., Table 2:** *"CAN Bus data formatting requirements for the J1979 or J1979-2, as applicable, ROBD device"*

Message	The data portion of the CAN message sent to or	String

Previous drafts of the regulatory text specified a 50-byte limit, which has now been removed (as it was too small). Is there a length limit for the intended CSV reference? A more practical limit of 255 bytes is recommended.

- **Subsections E.5.4.1. and E.5.4.2.:** *"The ROBD device shall have enough internal storage capacity to store, at minimum, 15 encrypted data files that have not been submitted due to unavailable internet connection. The encrypted collected OBD data shall be retained for at least seven days following a successful submission to the electronic reporting system."*
As currently drafted, the Proposal does not provide an encryption method for stored data, and could create an issue with personal identifiable information (PII).

- **Subsection E.6.1 (Table 4):** Concerns still exist regarding the timing of the HD I/M program's implementation, specifically with respect to ROBD device demonstration. As noted in Table 4, ROBD devices are required to collect specific OBD data listed in §1971.1(h). However, there are model year 2024 requirements (e.g., §1971.1(h)(5.8)) that will not be available for certification testing until 2023. Additionally, many of the provisions referenced in Table 4 are currently being amended by the proposed OBD regulation changes. Additional time should be allowed for stability in the regulations prior to device manufacturer development of ROBD tools. As it stands, the implementation schedule envisioned by CARB essentially would require the development of ROBD tools prior to the HD I/M regulations being finalized and adopted. Further, as we have previously cautioned, the planned schedule would leave very little time for device prove-out.

Specific Comments on Proposed Table 4

Table 4 was reproduced below to show minor editorial changes, and as a convenience for readers. Specific comments are noted both in and following the Table 4 line items.

Table 4. Specifications of the OBD data required to be collected by a ROBD device

Item	Data Type	Corresponding Section in CARB HD OBD Regulation (CCR Title 13, Section 1971.1)	Relevant Diagnostic Message(s) in SAE J1939 OBD Protocol	Relevant Diagnostic Message(s) in SAE J1979 OBD Protocol	Relevant Diagnostic Message(s) in SAE J1979-2 OBD Protocol	Comments
1	Readiness status of all OBD monitors listed in sections (e) and (g)	(h)(4.1)	DM5, DM21, DM26	Mode $01 PID $01	Service $22 DID $F501	
2	All data stream parameters	(h)(4.2.2) & (h)(4.2.3)	See SAE J1939DA for PGNs and SPN PGN 40960 (DM34) SPNs 4127 thru 4132	Mode $01, see SAE J1979DA for PIDs	Service $22, see SAE J1979DA for $F400 - $F5FF DIDs	
3	Freeze frame data	(h)(4.3)	DM24, DM25	Mode $02	Service $19 $04 DTCMREC DTC Snapshot Record Number = $00 (first occurrence) or $F0 (latest occurrence)	
4	Fault codes including active, pending, and permanent	(h)(4.4)	DM1, DM6, DM12, DM23, DM28, DM29	Modes $03, $07, $0A	Service $19 $42 $33 $08 $02, Service $19 $42 $33 $04 $02, Service $19 $55 $33	The J1939 ROBD tool shall also be capable of collecting the previously active fault codes. The union of fault codes returned by DM12 and DM23 meet the J1979 definition for confirmed fault codes.
5	Monitoring support status and test result	(h)(4.5)	DM24, DM30	Mode $06	Service $19 $06 DTCMREC $92	Use DM7 with a Test ID value of 247 and Failure Mode Indicator of 31 to obtain test results (DM30 responses) for SPs listed in DM24.
6	Software calibration ID (Cal-ID)	(h)(4.6) (h)(4.7)	DM19	Mode $09 InfoType $04	Service $22 InfoType $F804	
7	Calibration Verification Number (CVN)	(h)(4.6) (h)(4.7)	DM19	Mode $09 InfoType $06	Service $22 InfoType $F806	

8	VIN	(h)(4.8)	PGN: 65260 SPN: 237	Mode $09 InfoType $02	Service $22 InfoType $F802	
9	Engine serial number	(h)(4.8)	PGN: 65269 SPN: 588	Mode $09 InfoType $0D	Service $22 InfoType $F80D	
10	ECU name	(h)(4.9)	PGN: 60928 SPN:2848	Mode $09 InfoType $0A	Service $22 InfoType $F80A	
11	Monitor in-use performance ratio	(h)(5.1)	DM20	Mode $09 InfoType $0B	Service $19 $06 DTCMREC $91	
12	Engine run time tracking data	(h)(5.2)	See SAE J1979DA for PGNs and SPNs	Mode $01, see SAE J1979DA for PIDs	Service $22, see SAE J1979DA for DIDs	
13	NOx emissions tracking data*	(h)(5.3)	PGNs: 64258 thru 64279	Mode $09 InfoTypes $61 - $76	Service $22 InfoTypes $F861 - $F876	
14	GHG tracking data**	(h)(5.4) thru (h)(5.6)	PGNs: 64252 thru 64257	Mode $09 InfoTypes $41 - $49, $50 - $5B	Service $22 InfoTypes $F841 - $F849, $F850 - $F85B	
15	PM filter regeneration event data	(h)(5.8)	See SAE J1939DA for PGNs and SPNs	Mode $01 PID $8B	Service $22 DID $F48B	
16	Readiness status of each monitor within a readiness group	(h)(4.12)	N/A	N/A	Service $19 $56 $33 RGID	Data available for every OBD monitor tied to a readiness group

* For all OBD systems in 2022 and subsequent MY diesel engines required by CARB to support NOx emissions tracking data
** For all OBD systems in 2022 and subsequent MY diesel engines required by CARB to support GHG emissions tracking data

- Item 1:

| 1 | Readiness status of all OBD monitors listed in sections (e) and (g) of the heavy-duty OBD Regulation | (h)(4.1) | DM5, DM21, DM26 | Mode $01 PID $01 | Service $22 DID $F501 | |

This should only apply to DM5 completion bits for supported monitors and not DM26 monitor enabled bits. Current Trip Monitoring Status in DM26 is not relevant to IM decision. Enabled bits will create nuisance reports. Changes in DM26 enabled and completion bit states are not relevant in the seven-day collection schedule. In five minutes of engine operation, it is often observed that a plurality of monitors will be incomplete for this trip especially after cold starts. Hence, evaluation of monitor changes for SAE J1939 equipped vehicles should be restricted to the DM5 monitor support completion status which is the HD equivalent of PID $01. Additionally, DM21 may be better placed in Item 2.

    Bytes: 1-2 Distance traveled while MIL is activated
    Bytes: 3-4 Distance since diagnostic trouble codes cleared
    Bytes: 5-6 Minutes run by engine while MIL is activated
    Bytes: 7-8 Time since diagnostic trouble codes cleared

- Item 2:

| 2 | All data stream parameters | (h)(4.2.2) and (h)(4.2.3) | See SAE J1939DA for PGNs and SPN PGN 40960 (DM34) SPNs 4127 thru 4132 | Mode $01, see SAE J1979DA for PIDs | Service $22, see SAE J1979DA for $F400 - $F5FF DIDs | |

EMA previously recommended the addition of a reference to DM34 (which would add NTE status), but this was not included in proposed Table 4. As noted in line edits to the table, above, we recommend the addition of the text "PGN 40960 (DM34) SPNs 4127 thru 4132."

- Item 3:

| 3 | Freeze frame data | (h)(4.3) | DM24, DM25 | Mode $02 | Service $19 $04 DTCMREC DTC Snapshot Record Number = $00 (first occurrence) or $F0 (latest occurrence) | |

EMA requests the addition of DM24 for Item 3. Freeze frame data is not relevant to a pass/fall IM decision, in 2024 there will be 10 freeze frames in the J1979-2 response, as the proposed resolution to current single freeze frame priority scheme. Freeze frame responses already exceed 50 bytes as the plurality of manufacturers provide more than the minimum list of data, and many heavy-duty manufacturers send multiple freeze frames in a single DM25 response. The DM25 data cannot be interpreted without the record layout in DM24, which is hundreds of bytes long now.

- Item 4:

| 4 | Fault codes including active, pending, and permanent | (h)(4.4) | DM1, DM6, DM12, DM23, DM28, DM29 | Modes $03, $07, $0A | Service $19 $42 $33 $08 $02, Service $19 $42 $33 $04 $02, Service $19 $55 $33 | The J1939 ROBD tool shall also be capable of collecting the previously active fault codes. The union of fault codes returned by DM12 and DM23 meet the J1979 definition for confirmed fault codes. |

EMA recommends the deletion of DM1 from Item 4, it is not cited in the regulations, and includes non-emissions related faults which are not relevant to I/M pass/fail decisions. Testing for DM1 (in SAE J1939-84) is only relevant for MI status – which is also contained (and tested) in DM6, DM12, DM23, and DM28. DM23 is the list previously active fault codes – the comment to provide previously active fault codes via J1939 is superfluous. The union of DTCs returned by DM12 and DM23 is the equivalent of Mode $07 faults. For commercial vehicles there is value in knowing which DTCs are driving the MIL, to prioritize repair efforts. (This is the reason Mode$07 DTCs were bifurcated in SAE J1939-73.) Tests for DM1 in SAE J1939-84 are intended to ensure HD OBD engines were backwards compatible with old service tools, but DM1 should not play a role in HD I/M.

Additionally, whereas DM23 provides previously active fault codes, and is included in Item 4, the proposed statement in the Comments field ("The J1939 ROBD device shall also be capable of collecting the previously active fault codes.") is ineffectual. A more informative comment, which could explain the potential perception of an extra entry in the J1939 column, could state: "The union of fault codes returned by DM12 and DM23 meet the J1979 definition for confirmed fault codes."

- Item 5:

5	Monitoring support status and test results	(h)(4.5)	DM24, DM30	Mode $06	Service $19 $06 DTCMREC $92	Use DM7 with a Test ID value of 247 and Failure Mode Indicator of 31 to obtain test results (DM30 responses) for SPs listed in DM24.

DM24 tells tools which J1939DA SPs are supported with DM30 test results using DM7 requests, and DM7 is not included. We suggest the addition of the following in the Comments field: "Use DM7 with a Test ID value of 247 and Failure Mode Indicator of 31 to obtain test results (DM30 responses) for SPs listed in DM24." Only Test ID 247 is guaranteed to return results.

- Item 9:

9	Engine serial number	(h)(4.8)	PGN: 65269 SPN: 588	Mode $09 InfoType $0D	Service $22 InfoType $F80D	

EMA notes that DM56 was cited in previous draft versions of Table 4, but has been omitted in this Proposal. What is the reasoning behind this, as future engines must also support DM56?

- Item 15:

| 15 | PM filter regeneration event data | (h)(5.8) | See SAE J1939DA for PGNs and SPNs | Mode $01 PID $8B | Service $22 DID $F48B | |

Item 15 references Section 1971.1(h)(5.8), however this is a model year 2024 requirement that will not be available for vendor certification testing until at least calendar year 2023:

> *(5.8)* **For all 2024** *and subsequent model year diesel engines, manufacturers shall implement software algorithms to track and report in a standardized format the following parameters:*
>
> *(5.8.1) Engine odometer reading (or chassis odometer reading if engine odometer is not available) at the beginning and end of the last 3 PM filter regeneration events; and*
>
> *(5.8.2) Lifetime counter of PM filter regeneration events.*
>
> *(5.8.3) Each number in section (h)(5.8) shall be reset to zero only when a non-volatile memory reset occurs (e.g., reprogramming event). Numbers may not be reset to zero under any other circumstances including when a scan tool (generic or enhanced) command to clear fault codes or reset KAM is received.*