The following comments refer to prosed changes in the June 1, 2021, Initial Statement of Reasons, Appendix A, Proposed Regulation Order, §1968.2.

#	Regulatory Reference	Issue	Recommendation
1	**§1968.2:** (e)(15.2.2)(B)(iii)(b), (f)(12.2.4), (g)(6.14.5) **§1971.1**: (g)(3.2.2)(B)(c.)(2.), (e)(11.2.4), (h)(5.9.7)	For all of these phase-ins, the regulations allow manufacturers to use an alternate phase-in but requires 100% in 28MY rather than using the "Alternative Phase-in" definition in section (c). Using unique phase-ins for each requirement in the regulation unnecessarily increases complexity. While this is done in some cases where I&M stations could be confused by phase-ins, this does not appear to be the case.	Use the existing definition of "Alternative phase-in" since there appears to be no reason to have a special phase in for these requirements.
4	**§1968.2**: (g)(6.14) **§1971.1**: (h)(5.9)	Diesel CSERS Trackers	See Attachment 2 – CSERS Diesel Trackers
5	**§1968.2**: (f) Diesel Table 3	LEV-III OBD II Diesel PM Filter Filtering Performance Monitor Threshold	Passenger Cars row: Option 1 should say 2026 - 2028: 17.5, 2029+MY: 10.00 2019+MY Chassis Certified MDVs should say: Up to and including 2028MY: 17.50, 2029+MY: 14.00 ISOR: "the proposed PM threshold of 10.00 mg/mi was set based on the capability of improved PM sensor technology" should add the word "**potential**" before improved because there is no existing commercialized/industrialized improved PM sensor technology... there is a technology company with IP and prototypes but currently no Tier 1 supplier to industrialize - this is a gross over statement by CARB and a downplaying of the challenge to bring this new technology to market
6	**§1968.2**: (f)(1.2.4)(C) **§1971.1**: (e)(5.2.4)	DOC Catalyst Aging, BPU Correlation, with respect to carryover provision	See attachment 3 - BPU Catalyst Aging. We recommend adding "substantially in strategy or architecture" as noted below: *(C) The Executive Officer may waive the requirements for the submittal of the plan and data under sections (f)(1.2.4)(A) and (B) above for a test group if the plan and data have been submitted for a previous model year and the calibrations and hardware of the NMHC catalyst monitor, the engine, and the emission control system for the current model year have not changed substantially in strategy or architecture from the previous model year.*
7	**§1968.2**: (f)(2.2.4)(C) **§1971.1**: (e)(6.2.3)	SCR Catalyst Aging, BPU Correlation, with respect to carryover provision	See attachment 3 - BPU Catalyst Aging. We recommend adding "substantially in strategy or architecture" as noted below: *(C) The Executive Officer may waive the requirements for the submittal of the plan and data under sections (f)(2.2.4)(A) and (B) above for a test group if the plan and data have been submitted for a previous model year and the calibrations and hardware of the NOx*

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			catalyst monitor, the engine, and the emission control system for the current model year have not changed substantially in strategy or architecture from the previous model year.
8	**§1968.2**: (f)(8.2.6) **§1971.1**: (e)(7.2.6)	NOx Adsorber, Catalyst Aging, BPU Correlation, with respect to carryover provision	See attachment 3 - BPU Catalyst Aging. We recommend adding "substantially in strategy or architecture" as noted below. Note that we also recommend moving (f)(8.2.6) to new paragraph (f)(8.2.5)**(C)** like the other sections above. *(C) The Executive Officer may waive the requirements for the submittal of the plan and data under sections (f)(2.2.4)(A) and (B) above for a test group if the plan and data have been submitted for a previous model year and the calibrations and hardware of the NOx adsorber monitor, the engine, and the emission control system for the current model year have not changed substantially in strategy or architecture from the previous model year.*
9	**§1968.2**: (f)(5.2.2)(D)(i)c. **§1971.1**: (e)(9.2.2)	NOx sensor gap	(f)(5.2.2)(D)(i)c. need to add provision from (f)(5.2.2)(D)(i)b. above which states "**(except the data point at the sensor monitor malfunction threshold)**"
10	**§1968.2**: ISOR for NOx sensor gap 1968.2(f)(5.2.2)(D) and 1971.1(e)(9.2.2)	Acknowledgement of relief for dual SCR NOx sensors.	CARB agreed to specify relief for dual SCR NOx sensor 2 & 3 in the ISOR.
11	**§1968.2**: (f)(1.2.3)(B) **§1971.1**: (e)(5.2.3)(B)	DOC Feedgas generation	Update 1971.1 to include DOC feedgas generation to align with 1968.2
12	1968.2(f)(1.2.3)(B) and 1971.1(e)(5.2.3)(B) ISOR & 1968.2(f)(9.2.4)(B) and 1971.1(e)(8.2.4)(B) ISOR		ISOR should replace "complete deterioration" with "net zero feedgas" (what's coming into versus coming out of).
13	**§1968.2**: (f)(9.2.4)(B) **§1971.1**: (e)(8.2.4)(B)	DPF Feedgas generation	Update 1971.1 to include DOC feedgas generation to align with 1968.2
14	**§1968.2**: (j)(3.2.2)(A) through (C) **§1971.1**: (l)(3.2.4)(A)	PVET (j)(3) data submission along with typical IUMPR spreadsheet	1. Comment: (J)(3.2.2)(B) specifies #MSC 06-23 but MSC 06-23 does not include the additional data for (d)(5.7)+D20, (g)(4.1) through (g)(4.9), and (g)(6) 2. Comment: > 300 denominator will make an already challenging assignment virtually impossible. Supplemental Monitor Activity Ratio (SMAR) will provide a vast amount of additional data that was not previously available to CARB. Thus, we propose continuing discussions with ARB Staff.
15	**§1968.2**: (j)(3.2.3)(C)	alternate identifier in place of providing full VIN	The intent of the proposed regulatory change is to allow manufacturers to draw data from a potentially larger group of vehicles when collecting in use rate data electronically. As the VIN is considered personally identifiable information, the current regulation allows for data collection only from customers who have opted into the highest level of information sharing. The proposed requirement that the manufacture retain information that matches the VIN to the alternate identifier would still only allow for data collection from customers who opt into the highest level of information sharing. Allowing manufacturers to use an alternate identifier that is vehicle specific but cannot be matched to the original VIN (such as a "VIN hash" derived from applying an irreversible

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			mathematical operation to the VIN), would allow for data collection from a wider number of California vehicles while still ensuring that no vehicles are included more than once in the data set. The proposal should be revised to still allow for manufacturers to use an alternate vehicle identifier but to also oblige them to collect additional VIN-inclusive data upon request of the executive officer if needed for specific investigations or to better understand issues identified in the submitted data set (bimodal distribution, significant numbers of vehicles with zero or non-compliant in-use rates, etc.). This allowance should also be extended to 1971.1 (l)(3) PVE data requirements, although it should be noted that manufacturer collection of this standardized data may become moot if it is also collected from vehicle operators as part of upcoming Heavy Duty Inspection & Maintenance requirements. We recommend deleting this, and adding to 3.2.3, "If issues are identified, the EO may require collection of additional data which may include VIN."
16	**§1968.2**: (h)(6.4.1)		This has been previously discussed, and is discussed further in Attachment 5, but industry does not agree that MIL-on DTCs should be reported as AECDs. ISOR language, "When the United States Environmental Protection Agency (U.S. EPA) and CARB review AECDs for compliance, the approval criteria generally used include the determination that the AECD activation is limited to only the conditions necessary and the modulation of the emission control system is limited to the minimum necessary to achieve the stated purpose. Additionally, CARB staff has discovered that many manufacturers have not readily disclosed or justified the default actions as an AECD within the application for emissions certification. As a result, CARB staff is proposing to amend the language of this subsection to ensure that retesting to show compliance with the requirements is limited to default strategies that are AECDs listed in the application for emissions certification." This sentence is misleading - the US EPA review of AECDs has not ever included MIL on DTCs, the difference between AECDs and MIL on default actions is the very clear and visible indication to the driver and I/M that there is a FAULT present on the vehicle.
17	**§1968.2**: (j)(2.3.1)(B)(ii)	Requirements to test 400 "diagnostics" not tested per previous paragraph.	(j)(2.3.1)(B)(ii) requires, "400 diagnostics that are not described in section (j)(2.3.1)(B)(i) above. The manufacturer shall select the diagnostics at random, and the diagnostics may not include diagnostics that are exempted from testing in accordance with section (j)(2.3.6)." Does the term "Diagnostic" mean "DTC?"
18	**§1968.2**: (g)(3.4.1)(A)	The OBD II system **may** respond to **physical Service $14** (i.e., clear/reset emission-related diagnostic information) request messages from a scan tool.	It is not fully clear, whether "**may**" means it is optional or mandatory to respond to **physical Service $14** (i.e., clear/reset emission-related diagnostic information) request messages from a scan tool? For clarity, we recommend revising this to read, "**At the manufacturer's discretion,** the

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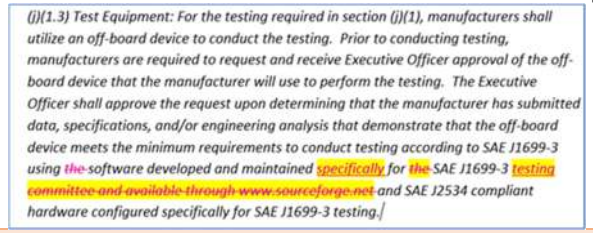
			OBD II system may respond to physical Service $14 (i.e., clear/reset emission-related diagnostic information) request messages from a scan tool."
19	**§1968.2**: (g)(4.1.2)(B)	(xii) Gasoline A/C System Component: section (e)(12.2.1) (xxx) Diesel A/C System Component: section (f)(14.2.1)	CCR 1968.2 45-day notice requires readiness status for A/C System Component but in SAE J1979-DA (04-2021) there is NO Readiness Group Identifier (RGID) defined for A/C System Component and Service$22 F501 does also NOT provide a bit for Readiness A/C System Component.
20	App E	Data reporting requirement for OTA should be 75 days per 1968.2(g)(8.1.1)	App E has a 60-day requirement instead of the (g)(8.1.1) 75-day requirement.
21	**§1968.2**: ISOR Page 58	References (g)(6.6.3), which doesn't exist.	On Page 58 of the ISOR, CARB references modification to 1968.2(g)(6.6.3) however, no such section is included in the proposed regulations in Appendix A. This segment should be in relation to the new requirements set in (g)(6.14) and state the information needs to be available via Generic Scan tool but think that should be clarified by, for example, adding something like, "(g)(6.6.3) For each parameter specified in section in section (6.14.2), the parameters shall be made available to a generic scan tool in accordance with the SAE J1979 or SAE J1979-2 specifications, whichever is applicable."
22	**§1968.2**: (j)(1.3) SAE J1699 Software	Change to SAE J1699-3 and -5 software from Sourceforge	SAE J1699-3 software will no longer be maintained on sourceforge. Instead, it will be on the Auto Innovators website. The current version will cost an annual license fee, but older versions will be available at no cost. This section could be updated to read,  *(j)(1.3) Test Equipment: For the testing required in section (j)(1), manufacturers shall utilize an off-board device to conduct the testing. Prior to conducting testing, manufacturers are required to request and receive Executive Officer approval of the off-board device that the manufacturer will use to perform the testing. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data, specifications, and/or engineering analysis that demonstrate that the off-board device meets the minimum requirements to conduct testing according to SAE J1699-3 using ~~the~~ software developed and maintained specifically for ~~the~~ SAE J1699-3 testing ~~committee and available through www.sourceforge.net~~ and SAE J2534 compliant hardware configured specifically for SAE J1699-3 testing.*
23	**Existing** (e)(11.1.3) and (f)(12.1.2) **§1971.1**: (e)(11.1.2) and (f)(4.1.2)	CSERS: different diagnostics to distinguish faults	Recommendation for regulation clarity: manufacturers can use "similar conditions" OR unique DTCs to cover "different diagnostics" Note: OR not AND
24	**§1968.2**: (e)(11.2.3)(A)(i)	CSERS Constant threshold	Industry remains concerned about false failures of a constant threshold. Individual companies have held one-on-one discussions with CARB staff about this.
25	**§1968.2**: (d)(2.2.7)(B) **§1971.1**: (d)(2.2.1)(D)(ii)	Freeze Frame Requirements for J1979-2	Suggest revise "second frame" wording to "most recent frame" to avoid confusion and more closely align with J1979-2
26	**§1968.2**: (d)(5.1.3)/(5.1.4) **§1971.1**: (d)(5.1.3)/(5.1.4)	J1979-2 IUMPR Reporting	General Denominator and Ignition Cycle Counter reporting is required. Need discussion in J1979 meeting, should we report a short length of F808/F80B parameters with only these two items
27	**§1968.2**: (g)(4.2.2)(F) **§1971.1**: (h)(4.2.4)	J1979-2 Data Stream	Need a reference to add data stream item for "(iv) OBDonUDS Protocol Identification" (aka PID F810)
28	**§1968.2**:	Evap System Sealing	Is 4.2.2(F)(iii) just intended to require support of the service $31 Routine response, or is an additional PID being requested? (Does not exist in J1979-DA)

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29	**§1968.2**: (g)(4.4.6)(D)(ii)	Module Reprogramming Code Clear	Language should be modified to indicate for "J1979 Implementations", as for J1979-2, CCM readiness will no longer show always ready (similar to coordinated code clear)
30	**§1968.2**: (g)(4.8.2)(B)	VIN Reprogramming Code Clear	Like Item 29 above, should this now be for "J1979 Implementations only"
31	**§1968.2**: (g)(3.4.2)	General alignment of ARB regulations and SAE J1979	See Attachment 4 - Additional Items related to SAE J1979
32	**§1968.2**: (j)(3.2.2)(A) through (C) **§1971.1**: (l)(3.2.4)(A)	PVET (j)(3) data submission along with typical IUMPR spreadsheet	Regarding additional data submission requirement to include (g)(4.1) through (g)(4.5) and (g)(6). It is not clear what data we should provide under (g)(4.2) Data stream, which shows current powertrain data (e.g., engine speed, throttle position, vehicle speed, etc.).
33	**§1968.2**: (15.2.2)(B)(iii)	Engine stall monitor (Idle stop)	There is currently no exemption from the monitoring requirement for idle stop equipped vehicles that may intentionally shut down the engine to 0 rpm.
34	**§1968.2**: (g)(4.5.1)	Specifies display of test results in J1979-2 service $19 subfunction $06	The regulation specifies service $19 subfunction $06 regulation, it should say AND service $22 (or refer to the specification)
35	**§1968.2**: (g)(6.12.3)(F)	Chassis cert MD vehicles, NOx Tracking Bin 15 = 0 at all times	The regulation does not specify when this change takes effect. The NOx tracking requirements in (g)(6.12.1) start in 2022MY, but this is a change and 2022MY is already complete/certified.
36	**§1968.2**: (g)(6.12.4)	Negative concentrations reported by Nox sensor must be set to 0 when calculating Nox mass data	Discussed at length in SAE J3349 Sensor Accuracy taskforce; the ultimate concern from industry is that exclusion of negative NOx sensor concentrations can have a significant impact on accuracy of cumulative NOx emissions for ultra-low NOx emissions systems (MY24+).
37	**§1968.2**: ISOR Page 41	Demonstration to be exempt from the cold start catalyst heating monitor requirements	"Vehicles and engines that utilize both electrically heated catalysts and accelerated catalyst heating based on engine operating conditions would be expected to monitor the electrically heated catalyst per the existing monitoring requirements for electrically heated catalysts and would not be expected to disable the electrical heating for the exemption demonstration." This statement has good foresight to envision a possible case where both engine operation control to significantly accelerate the heating of the catalyst (CSERS) and electrically heated catalyst (EHC) are used. It should be put directly into regulation. (proposed changes to draft language in **red**) (e)(11.2.3)(C) Vehicles are exempt from the Cold Start Catalyst Heating monitoring requirements in section (e)(11.2.3)(A) if: (i) Disabling the CSERS would not cause the vehicle to exceed the full useful life emission standards through the demonstration of a cold start FTP test cycle with the CSERS fully disabled (i.e., with the system configured to the fully warmed-up values as if the vehicle was shut off after the engine coolant and/or block temperature achieve the targeted regulated temperature for at least 2 minutes and immediately restarted within 60 seconds), or

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			(ii) The vehicle does not use increased air, increased fuel flow, and/or combustion efficiency degradation to accelerate aftertreatment heating to reduce cold start emissions (e.g., catalyst is only electrically-heated). **(D) For purposes of meeting the requirements for exemption demonstration in section (e)(11.2.3)(C) (i) above, vehicles and engines that utilize both electrically heated catalysts monitored per the monitoring requirements for electrically heated catalysts in section (e)(2) and accelerated catalyst heating based on engine operating conditions would not be expected to disable the electrical heating for the exemption demonstration.**
38	**1968.2**: (d)(4.3.2)(N), and existing (d)(4.3.2)(E)(ii)	The updated regulations covering CSERS include both system level monitors and feature/component monitors. Moreover, these are covered by IUMPR. There are some disconnects in the numerators and denominators that should be updated to prevent inaccurate IUMPRs.	1. The updated regulatory text in (d)(4.3.2)(N) should add feature/component in sections (e)(11.2.4) and (f)(12.2.3) as shown here: *(N) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator for the cold start emission reduction strategy catalyst warm-up monitor (section (f)(12.2.2)) and the feature/component monitors (sections (e)(11.2.4) and (f)(12.2.3)) shall be incremented if and only if the CSERS cold start criteria (as defined in section (c)) have been met.* 2. Additionally, the denominator for gasoline CSERS warm-up monitor should only be incremented if the CSERS criteria is met AND there is a 10 second idle during the first 30 seconds after engine start. Thus, we recommend adding a new paragraph (O) as follows: *(O) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator for the cold start emission reduction strategy catalyst warm-up monitor (section (e)(11.2.3)) shall be incremented if and only if the CSERS cold start criteria (as defined in section (c)) have been met and idle operation during the first 30 seconds after engine start is 10 seconds or more.* Finally, the existing CSERS reference in (d)(4.3.2)(E)(ii) should be updated to point to the correct section of the regulation, as follows: (ii) Cold Start Emission Reduction Strategy (sections (e)(11**.2.2**) and (f)(12**.2.1**))
39	**1968.2**: (e)(15.2.2)(B)	The proposed language for the stall monitor is ambiguous about whether fuel level information must be considered for the stall monitor enablement. We understood from previous discussions with CARB that it is ok to disable the stall monitor at low fuel levels.	To clarify that fuel level does not have to be monitored for enablement, we recommend revising this section as follows: *(iii) For 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles without manual transmissions (i.e., any transmission that relies on the vehicle operator to independently control clutch engagement/disengagement and gear selection), an engine stall occurs (where an "engine stall" refers to a drop in the engine revolutions-per-minute (rpm) to zero rpm) within 20 seconds after engine start at the*

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			beginning of a driving cycle ~~when fuel level is 15 percent or more of the nominal capacity of the fuel tank~~. *a. Manufacturers are required to store different fault codes for stalls detected while the CSERS cold start criteria (as defined in section (c)) are met and stalls detected while the CSERS cold start criteria are not met.* *b. The manufacturer may use an alternate phase-in schedule as defined in section (c) in lieu of the required phase-in schedule for the engine stall monitor in section (e)(15.2.2)(B)(iii) if the alternate phase-in schedule provides for equivalent compliance volume as defined in section (c) with the exception that 100 percent of 2028 and subsequent model year vehicles shall comply with the requirements.* *c. No monitoring is required when fuel level is 15 percent or more of the nominal capacity of the fuel tank.*
40	**NA**	SAE J1979-2 DTC Severity and DTC Class	SAE J1979-2 says "which DTC classes are applicable for a specific market, is a function of the market regulation." We understand from SAE that US will have class #1 definition, but we could not find anything in 45day language. We need to know which class should be required in US OBD.
41	**(g)(4.3.2)(B)**	(g)(4.3) Freeze Frame (4.3.2) For vehicles using SAE J1979-2 Regulation citation in (B) looks incorrect: "...(g)(4.3.3)." should be "...(g)(4.3.2)(C)"?	"(B) "Freeze frame" conditions must include the fault code which caused the data to be stored and all of the signals required in section (g)(4.2.1)(A) except number of stored confirmed fault codes, OBD requirements to which the engine is certified, MIL status, and absolute throttle position in accordance with ~~(g)(4.3.3)~~ (g)(4.3.2)(C)."
42	**1968.2:** (f)(9.2.1) & (d)(3.2.1)(C)	Manufacturers assessed PM Filter IUMPR deficiencies for 2022MY diesel products, whereas the proposed regulation provides relief starting in 2022MY.	**To give full effect these regulatory provisions, CARB should credit manufacturer deficiency fine payment accounts for any fines paid for deficiencies assessed during the 2022-2025MY, when the proposed regulations provide temporary relief.**
43	**1968.2**: (f)(9.2.1) & (d)(3.2.1)(C), (f)(1.2.4), (f)(2.2.4), (f)(8.2.5), (f)(5.2.2)	ISOR and Appendix F Economic Analysis Support Grossly Underestimates Regulatory Cost Impact to Manufacturers	Here are three specific examples of CARB's underestimated cost assessment, however CARB's underestimation is not limited to these examples. (f)(9.2.1) & (f)(3.2.1): PM filter and PM filter filtering performance in-use monitor performance ratio. The cost impact of implementing new technology PM sensor (electrostatic), which are not yet commercially available, is grossly underestimated. The electrostatic sensor technology is still under development by a technology company, but no sensor supplier has opted to commercialize the sensor. The USCAR PM sensor task force projects USCAR members will need to invest nearly $1Million just to further develop the sensor technology to make it attractive enough to a sensor supplier for commercialization. (Note: many sensor suppliers have abandoned diesel internal combustion engine technology development since the industry is shifting toward ZEVs.) This upfront technology and supplier development cost has not been represented at all in the Economic Analysis. For the hardware cost of the sensor, CARB estimates the sensor will cost $200/vehicle but then cites an at volume reduction to $125/vehicle. However,

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			without commercially available sensors, the sensor cost and the at volume reduction is unobtainable Additional considerations should be given to whether multiple sensor suppliers choose to commercialize the technology or not. If only one supplier commercializes the sensor, the piece cost will be driven higher through lack of competition. AAI questions the source of CARB's estimate that 25% of the diesel volume will use the electrostatic sensor technology, considering at least one manufacturer expects 100% of its diesel volume will need to implement the new electrostatic PM sensor to meet regulatory requirements. Additionally, the cost to develop a new monitoring algorithm is not adequately represented. In Table F-1 in Appendix F, CARB estimates algorithm development at $4,613, whereas one manufacturer estimates $165,781 (for 2153 hours of development using CARB's hourly rate of $77 for software developers*) which is 35 times higher than CARB's estimate. For calibration development, CARB estimates $814, whereas one manufacturer estimates calibration/development/validation of a new monitor to be $118,530 for 2634 hours of development*-- 145 times higher than CARB's estimation (using CARB's $45/hour for calibrator). Sensor suppliers, in cooperation with industry, are also working to develop an advanced resistive sensor. Similar discussion and analysis exist for the advanced resistive sensor technology. Furthermore, CARB's cost analysis does not include discussion of the optical sensor technology, although costs to develop this technology are expected to be very similar to the electrostatic sensor (with the difference being the existence of at least one sensor supplier for commercialization). Although CARB provided some short-term relief for PM filter IUMPR, the increased stringency after the relief is thoroughly underestimated. (f)(1.2.4), (f)(2.2.4), and (f)(8.2.5): The cost of diesel catalyst/adsorber malfunction criteria determination requirements are also underestimated. One manufacturer estimated the total cost to obtain and test 5 high-mileage and 5 field returned catalysts as $750,000 per engine. This estimate includes approximately 50 hours of labor and emissions testing per catalyst. Considering 5 high-mileage and 5 field returned catalysts are to be tested in addition to the BPU *per catalyst type*, approximately 1000 hours are required for test preparation and testing. Additional costs are incurred for field part replacement, shipping, and reactor testing to generate required data for the correlation. If multiple catalysts are used and diagnosed independently, this cost will increase. CARB grossly underestimated manufacturer costs total testing cost of $880, since emissions testing on chassis dynamometers can be more than $1000/hr. (f)(5.2.2): The cost of Diesel NOx sensor monitor data has been estimated by CARB to be $1,043, again this is underestimated. Manufacturers have estimated 23 engineering hours for testing per SCR catalyst on a single application. Using CARB's $45/hour rate* for calibration engineers that equates to $1725, underestimated by 40%. Further, the cost analysis does not comprehend more advanced diesel aftertreatment architectures which implement multiple SCRs on one application.

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			*CARB's estimate of $45/hour for a calibrator and $77/hour for a software developer is not aligned with manufacturer pay scale practice, the pay scale doesn't differentiate software developer versus calibration engineer. $77/hour is aligned with industry's cost estimates that were submitted to CARB prior to the 45-day package.