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MEMORANDUM

SUBJECT: EPA Response to Comments on the peer review of *Analysis of Evaporative On-Board Diagnostic (OBD) Readiness and DTCs Using I/M Data*

FROM: Constance Hart, Assessment and Standards Division
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THRU: Angela Cullen, Director, Data and Testing Center, Assessment and Standards Division
Office of Transportation and Air Quality, U.S. Environmental Protection Agency

TO: William Charmley, Director, Assessment and Standards Division
Office of Transportation and Air Quality, U.S. Environmental Protection Agency

The three peer reviewers selected by ICF International were Gene Tierney (Opus Inspection/ Systech-ESP), Michael St. Denis, (Revecorp), and Michael McCarthy (California Air Resources Board). EPA would like to extend its appreciation to all three reviewers for their efforts in evaluating this report. The three reviewers brought useful and distinctive views in response to the charge questions.

The peer review process and a summary of the comments can be found in the technical report "Peer Review of Draft Report 'Analysis of Evaporative On-Board Diagnostic (OBD) Readiness and DTCs Using I/M Data'", February 2014, from ICF International. EPA in cooperation with the contractor, Eastern Research Group (ERG), has edited the report which has addressed the Peer Reviewer comments. The responses are described below for each group of comments in this report:

Project Goals

All three reviewers felt that the report did not adequately define the exact purpose of the project. The statement in the Introduction of the report, "The purpose of this Work Assignment (WA) is to perform analysis to better understand evap DTC rates for light-duty vehicles" is vague and does not get to the real purpose of the work. Mr. Tierney felt that there was not a hypothesis or research question raised. Mr. McCarthy felt that there was no suggestion of a current understanding of the work before the analyses were done. He also wanted specific questions or theories laid out. Mr. St. Denis stated that while the conclusions indicate data are used to represent evap DTC rates of the in-use fleet and the IM versus non-IM fleets, this was not made clear in the introduction.

Response:

EPA agreed with the three reviewer comments and has added further clarifications on the project research goals within the report.

Vehicles Included

Mr. McCarthy indicated that "enhanced evap" actually was phased in for the 95-98 MY vehicles in California and 96-99 MY vehicles federally. Mr. St. Denis and Mr. Tierney commented that the report only presents data on vehicles in the condition of being prepared for an I/M inspection and therefore does not represent the expected evap DTC rates of the operating fleet. Mr. St. Denis also noted that in California, vehicles that passed the ASM test were not failed even if they were "not ready". Therefore the not ready rates for California are artificially high and the low evap DTC rates artificially low.

Response:

EPA agrees with Mr. McCarthy's statement on "enhanced evap" phase –in and has added to the report that clarification. EPA agrees with Mr. St Denis and Mr. Tierney's comments that the data only represent the "expected" evap DTC rates of the operating fleet. EPA recognizes that the state data might be low because people might be fixing vehicles before getting their vehicle inspected at an I/M station but also recognizes that it is the only longitudinal data set that EPA could conduct its analysis and provide some insight to trends within the I/M vehicle fleet. EPA recognizes Mr. St Denis's comments that a state might "pass" a vehicle that has a "not ready" evaporative monitor and event can occur. Each state does have unique differences in their I/M test program that could effect their state's vehicle pass/fail rate. To minimize those influences, EPA decided to not conduct its analysis on a vehicle pass/fail rate, or MIL on rate but directly on the evaporative monitor "ready" only and its associated confirmed DTCs. This data is gathered when the vehicle enters the I/M station before any determination by the state on the vehicle's pass/fail status has been made.

States Used

All three reviewers felt that the pretense of not identifying states was done poorly. All felt that the states were easily identifiable by the data presented in Table 1, particularly States A and D. It was not clear in any of the reviewers' minds why this was done. Mr. St. Denis indicated that by hiding the states, it was not clear whether the methods used to process the data were correct.

Response:

EPA recognizes the reviewers were concerned that the states should be identified in this analysis and/or could be identified if a person has a very good understanding of a state I/M program. EPA's main goal was to seek an understanding from different state I/M programs and to determine if a trend could be seen within these different I/M programs and vehicle fleets as these vehicles age. It was not EPA's intent to find fault or to critic an individual state's I/M program and whether the state is identified or not does not effect the report's outcomes.

Pending DTCs

Mr. McCarthy points out that no state program collects pending code data because they are provided via Mode $07 of SAE J1979. States only collect Mode $03. Mr. McCarthy felt it unwise to

include cases of DTCs present but no MIL command because they don't necessarily indicate that the vehicle had a problem at the time of inspection. Mr. St. Denis indicated that pending DTCs could just be false positives.

Response:

Mr. McCarthy is correct that states only collect Mode$03 (confirmed) codes and EPA will correct and clarify that in report. Mr. McCarthy felt it was unwise to include cases of DTCs present but no MIL command "on" because they don't necessarily indicate a problem at the time of inspection. EPA agrees with Mr. McCarthy's statement, but felt to get a better understanding of what has happened to the vehicle in the near term as it pertains to potential evaporative emissions, and has kept them in. EPA did not filter the data by excluding MIL command "on" and "off" because there has been some recorded problems with some vehicle manufacturers' makes and models with known confirmed codes not triggering the MIL command "on." EPA took the approach to focus on the evaporative monitor being in the "ready" mode and taking those confirmed codes to conduct its analysis. These confirmed codes represent known encountered events that are both present and historic (an event that occurred in a previous drive cycle(s) or period and have not been cleared by the powertrain control module yet). EPA believes using Mr. McCarthy's method could have been more speculative to the report's outcomes.

Non-IM State

Mr. St. Denis indicated that State D, if Colorado, is not equivalent to a state without an I/M program. Colorado has a gas cap test and the testing provides advisory OBDII results. In addition, Colorado has an evap repair consumer assistance program which would lead to more repairs than a non-I/M state.

Response:

EPA agrees with Mr. St Denis that there are differences between each state's I/M program and it was one of the reasons that EPA included a variety of states and conducted specific analysis to understand the degree of those influences.

Not Ready Evap Monitors

Mr. Tierney indicates that the report does not explain why evap monitor unreadiness increases with age. He feels a hypothesis should be raised and tested. Mr. St. Denis indicated there is no justification to state that older vehicles could have a higher non-ready state. This could be a result of motorists disconnecting their batteries prior to an inspection to clear out potential DTCs or the result of a battery being disconnected during repair. Mr. McCarthy feels that the national percentage of evap not ready for initial inspection is not the same as what was found in IM programs.

Response:

EPA agrees with Mr. Tierney and included in the report additional explanations as to why the evaporative monitor "unreadiness" increases with vehicle age. EPA agrees also with Mr. St. Denis that a possible hypothesis that would increase this evaporative monitor "unreadiness" could be associated with a vehicle's battery being disconnected during a repair or before an inspection but there is no direct evidence within a state I/M data files or program to prove that theory. EPA has proposed within this

report to investigate the possible reasons in future research efforts if the proper vehicle data becomes available.

Statistical Significance

Mr. Tierney felt that the report did not provide any statistical information on the number of vehicles in any of the cohorts. In addition, there was no discussion of statistical significance of the differences or similarities found. Mr. St. Denis thought there should be more analysis of different makes and models to see the difference in not ready and DTC rates. He noted that different environmental conditions can cause significant differences in evap emissions and cause the systems to function differently.

Response:

EPA understood that while the state I/M programs are very good programs for reducing emissions there is a limit to how much information can be gathered on a single vehicle test day either annually or biannually. EPA was able to establish a general evaporative trend line associated with a vehicle age within a state I/M fleet by reviewing factors that could contribute to different results. EPA designed its data analyses to limit and separate these factors to gain some understanding to those differences and similarities (i.e. state I/M program data gathering differences, environmental conditions and vehicle maintenance).

General

All three reviewers had many general comments correcting statements throughout the report. More details can be found in the three full reviews in Appendices C through E of the peer review report.

Response:

EPA has reviewed the general comments and has accepted most of them. EPA has added to the report further clarifications as noted by the three reviewers.