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Director  
Automotive Emissions and  
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October 24, 1984

Mr. Kenneth E. Faith  
Director of Review  
Office of Air and Radiation  
U.S. Environmental Protection Agency  
Washington, D.C. 20460

Dear Mr. Faith:

Pursuant to our October 17, 1984 communication, Ford has completed a preliminary review of portions of the material related to EPA's Notice of Proposed Rulemaking (NPRM) entitled "Gaseous Emission Regulations for 1987 and Later Model Year Light-Duty Vehicles, Light-Duty Trucks and Heavy-Duty Engines; Particulate Emission Regulations for 1987 and Later Model Year Heavy-Duty Diesel Engines" (49 Fed. Reg. 40258). The results of that review, as they pertain to the need for a deferral of the 80dB(A) heavy truck noise emission standards, are provided below and in the attachment.

In our October 12, 1984 meeting, we agreed to review the EPA hardware assumptions which were used to justify the technical feasibility of the "interim" 6.0g/BHP-hr, NOx/0.6g/BHP-hr particulate standards proposed for 1987 model year heavy duty trucks. We believe that the EPA hardware assumptions are consistent with the potential engine revisions discussed in Ford's December 15, 1983 petition for deferral of the 80dB(A) standard. This conclusion is highlighted by the following excerpt from the NPRM (49 FR at 40267):

"Techniques expected to be used include improvements to fuel injection systems, injection timing retard, increased use of turbocharging and aftercooling, minor engine modifications and improvements to engine efficiencies."

In our petition (pages 4 to 7), each of these changes was shown to have a potential effect on vehicle noise. Additionally, the spatial and locational requirements of certain of the components for

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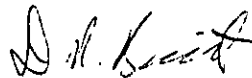
effecting those changes could affect engine packaging, and thus alter noise characteristics or placement of noise abatement hardware. The net effect could be higher or lower noise emissions, dependent upon the specific application.

The attachment to this communication contains an evaluation of the specific sections of the Draft Regulatory Impact Analysis (RIA) which you detailed in our meeting. Once again, there appears to be agreement between the petition, and the information in the RIA -- hardware changes are likely in order to obtain compliance with the proposed 1987 exhaust emission standards. These changes are the type which would be expected to affect vehicle noise.

Based on the foregoing information, we continue to believe that it is appropriate to provide a deferral of the heavy truck 80dB(A) noise standard, to January 1 of the model year to which the "interim", more stringent heavy duty NOx and particulate standards are applicable. (This statement is not intended as a comment on the adequacy of the lead time provided by the proposed NOx/particulate standards.) Such a deferral would avoid the need to engineer the noise abatement hardware twice -- once for the changes associated with the 83 to 80dB(A) reduction and again for the effect on packaging and noise emission characteristics of the changes necessary to meet the proposed NOx exhaust emission standards. Furthermore, without a deferral, an additional, unnecessary cost and burden would be incurred due to complete retesting of the trucks to first assess compliance to 80dB(A) and again one or two years later to assess the effect of changes made to comply with emission requirements.

Since the publication of the NPRM, we have contacted our engine suppliers, and they have reaffirmed the engine modifications necessary to meet more stringent emission standards and their relationship to noise, all as described in the petition.

Please contact me or Mr. D. L. Kulp if you have any questions on this material.



D. E. Buist

Attachment

COMPARISON OF EPA VS. FORD EMISSION CONTROL REQUIREMENTS  
FOR MEETING 6.0 G/BHP NOx/0.6 G/BHP NOx PARTICULATES

<u>EPA Reference</u>	<u>EPA Assumption</u>	<u>Ford Assumption</u>	<u>Noise Assessment*</u>
2-43	Emission control strategies to meet 6.0 g/BHP-hr NOx include optimization of ignition timing, EGR rates and air/fuel ratio calibrations.	Agree. Ford will accomplish this through the application of EFI, PFE and, on some engines, a knock sensor.	Changes to EGR supply may require exhaust system revisions. <u>Effect on noise is dependent on final design and requires retesting for noise.</u>
2-47	Non-catalyst engines will require increased air injection and thermostat as well as vehicle chassis modifications.	Agree. Ford trucks will utilize these strategies coupled with electronic control systems on some engine applications.	Increased air injection, and thermostat modifications may require re-engineering of the exhaust and air intake system. <u>Effect on noise is dependent on final design and requires retesting for noise.</u>
2-62	Absent more stringent emission standards, the application of turbocharging, aftercooling and electronic engine controls would increase.	This may be true. However, our suppliers indicate these changes will be made, in certain instances, coincidentally with the 6.0 gram standard.	Turbocharging generally <u>reduces noise</u> , aftercooling generally <u>increases noise</u> , electronic controls can go either way. <u>Noise testing/evaluation is required.</u>
2-67	The 6.2L DDA & 6.9L IH diesels should already comply with the NOx and particulate standard.	Supplier data on these engines are not available.	Supplier information is not available on these engines.
2-68	Injection timing retard reduces NOx and increases particulate emissions and BSFC.	Agree. Such changes are likely on Ford trucks with certain engine applications.	Injection timing retard reduces engine noise and <u>would necessitate re-engineering of noise hardware and retesting.</u>
2-72	Fuel injection nozzles and combustion chamber modifications are being investigated to reduce particulate emissions.	Agree. Such changes are likely on Ford trucks with certain engine applications.	Combustion chamber modifications will change the noise characteristics of the engine. <u>Noise testing/evaluation is required.</u>
2-72	Full optimization of fuel control will require electronics.	Agree. Such changes are likely on Ford trucks with certain engine applications.	Fuel injection timing changes can increase or reduce engine noise. <u>This possibility would necessitate re-engineering of noise hardware and retesting.</u>
2-73/74	DDA, IH and Caterpillar will use some combination of the above three (variable injection timing, limited use of electronic injection controls and some combustion chamber modifications) techniques to achieve NOx and particulate compliance -- the degree of modification will vary between engines/manufacturers.	Agree, based on supplier information.	The combination of these changes will affect noise emissions. <u>The direction and magnitude of that effect is unknown and requires re-evaluation and testing.</u>

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