

N-96-01
 II-A-1113

**40 CFR Part 205
 (NH-FRL 1739-7)**

~~Noise Emission Standards: Medium and Heavy Trucks and Truck-Mounted Solid Waste Compactors.~~

AGENCY: U.S. Environmental Protection Agency.

ACTION: Deferral of Effective Dates; Final rule.

SUMMARY: The U.S. Environmental Protection Agency, (EPA) hereby defers the effective date for the 1982 noise emission standard of 80 decibels (dB) for medium and heavy trucks from January 1, 1982, to January 1, 1983. This action is taken in response to petitions for reconsideration of that standard which were submitted by International Harvester Company and Mack Trucks, Incorporated. The purpose of this action is to provide temporary relief to the truck manufacturing industry from expenditures otherwise needed to bring their medium and heavy trucks into compliance with the 1982, 80 dB standard. The basis for this action is the recent downturn in the economic condition of the truck manufacturing industry and an unforeseen increase in

the demand for medium diesel trucks, which are the most costly to quiet.

Because the 76 dB noise emission standard for truck-mounted solid waste compactors is related to the 80 dB level for truck chassis, the effective date for the 76 dB compactor standard is also deferred, from July 1, 1982, to July 1, 1983.

DATES: All medium and heavy trucks manufactured after January 1, 1983, must not emit a noise level (A-weighted) in excess of 80 dB when measured as prescribed in 40 CFR Part 205, Subpart B, Noise Emission Standards for Medium and Heavy Trucks (41 FR 15530).

All truck-mounted solid-waste compactors manufactured after July 1, 1983 must not emit a noise level (A-weighted) in excess of 76 dB when measured as prescribed in 40 CFR Part 205, Subpart F, Noise Emission Standards for Truck-Mounted Solid Waste Compactors (44 FR 50524).

These amendments take effect on (30 days from date of Federal Register publication). EPA will consider any comments on this action, and on whether or not a further deferral of the 80 dB standard for medium and heavy

trucks would be appropriate, which are submitted before 4:30 p.m., April 24, 1981, and will respond to any comments as appropriate.

ADDRESSES: Written comments to the docket should be mailed to: Director, Standards and Regulations Division, Attention: ~~ONAC Docket #1-02 (Medium and Heavy Trucks)~~, ANR-400, U.S. Environmental Protection Agency, Washington, D.C. 20460.

Copies of the International Harvester and Mack Trucks petitions can be obtained from Mr. Charles Mooney, U.S. Environmental Protection Agency, EPA Public Information Center (PM-215), Room 2194D—Waterside Mall, Washington, D.C. 20460. Copies of those documents, related correspondence, and other supporting documents are available for public inspection between the hours of 8:00 a.m. and 4:00 p.m. at the Central Docket Section of the Environmental Protection Agency, West Tower, Gallery 1, 401 M Street, SW., Washington, D.C. 20460. As provided in 40 CFR Part 2, a reasonable fee may be charged for copying services.

FOR FURTHER INFORMATION CONTACT: Dr. Timothy Barry, Project Officer, Standards and Regulations Division, (ANR-400), U.S. Environmental Protection Agency, Washington, D.C. 20460; or phone (202) 557-2710.

SUPPLEMENTARY INFORMATION:

1.0 Introduction

EPA published noise emission regulations for newly manufactured medium and heavy trucks on April 13, 1978 (41 FR 15530). Those regulations require, in part, that vehicles subject to the regulations manufactured after January 1, 1978, meet a not-to-exceed noise level of 83 dB, and that vehicles manufactured after January 1, 1982, meet a not-to-exceed noise level of 80 dB when measured in accordance with a specified test procedure.

On September 2, 1980, International Harvester (IH) submitted a petition for reconsideration of the regulation which proposed that the 1982 medium and heavy truck noise emission standard of 80 dB be withdrawn. IH promised in its initial petition to submit an analysis supporting the issues raised by their petition within 30 days, and to submit an analysis of the community noise impact of the 1982 standard within 60 days. Those documents were forwarded to the Agency on October 2, and November 18, 1980, respectively.

In these submittals, IH contended that the 1982 standard will impose an

unnecessary burden and cannot, under the present conditions, be justified under a cost-benefit analysis. In support of this position, IH argued that circumstances have changed since the publication of the regulations in 1970. Specifically, IH contended that: (1) The Agency justified the 1982 standard based on the fuel savings from quiet fans, which are now being installed solely for their fuel benefit; (2) the growth in demand for medium-duty diesels, the class of vehicle costing the most to quiet, was grossly underestimated by the Agency; (3) the trucking industry is highly sensitive to interest rates, and interest rates are much higher now than projected in 1975; (4) because of inflation, the negative effects of the 1982 standard will be amplified; (5) the cost of the loss in fuel efficiency due to increased weight will be much greater than anticipated due to higher fuel prices; and (6) the Agency did not take into account in the original analysis that some transmissions would require quieting to meet the 1982 standard.

In a November 18, 1980 letter, the Agency asked IH for information to fill in gaps in the data used by IH to support several of its major contentions. On December 16, 1980, EPA staff met with IH staff at their Ft. Wayne, Indiana facility to receive this information. A December 23, 1980 letter with enclosures from IH to EPA summarized the December 18 meeting and provided certain additional information. This letter also raised more specifically the issue of the current depressed truck market and the general economic state of the truck manufacturing industry.

Communications during the summer of 1980 from the Ford Motor Company and the General Motors Corporation requesting a delay in the effective date of the 80 dB standard for medium and heavy trucks also raised the issue of the economic state of the trucking industry.

On November 7, 1980, Mack Trucks, Incorporated (Mack) also submitted a petition for reconsideration of the 1982 medium and heavy truck noise emission regulation. Mack stated that its petition was basically in support of the IH petition, and raised the following concerns: (1) EPA has wrongly identified trucks as the number one surface transportation noise problem; (2) further reductions in truck noise will be masked by unregulated sources at highway speeds, especially tires; (3) the \$400 to \$500 price increase to meet the 80 dB standard may not be justified by the

benefits; (4) sound barriers will impose additional loads on truck cooling systems and lead to reduced preventive maintenance; (5) transmission sound levels may have to be reduced; (6) cost savings from the greater fuel efficiency of clutched fans cannot be ascribed to the noise regulation; (7) some highly customized vehicles may have higher than anticipated noise abatement costs; (8) larger mufflers may encroach on space for cab entrance and egress; and (9) the truck-mounted solid waste compactor noise emission regulation appears inconsistent with the truck noise regulation.

During this period, the Agency also received letters from several States opposing a withdrawal or deferral of the 1982, 80 dB standard, disagreeing with IH's characterization of the benefits as being minimal, and expressing their judgment that the standard is reasonable. Illinois suggested that if the 80 dB standard were withdrawn, it should be withdrawn in a manner that would allow Illinois to adopt an 80 or 75 dB standard. Three States expressed concerns with the Federal preemptive aspect of the existing 83 dB standard.

2.0 Discussion

The Agency has completed its analysis of the petitions submitted by IH and Mack, and the supporting information. The Agency finds that there is insufficient basis with respect to available technology, health and welfare benefits, and compliance costs, for a withdrawal of the 1982, 80 dB standard. The issues raised by IH and Mack in their petitions and EPA's response to those issues are discussed in detail in Section 3.0. However, on the basis of the current economic state of the industry, and the fact that both the industry and EPA did not predict the dramatic growth of medium diesel demand, the type of vehicle bearing the highest cost of compliance, the Agency believes that it is appropriate to defer the 80 dB standard for one year. When the regulation was promulgated, the truck manufacturing industry was on a healthy growth curve and there was adequate evidence that the industry could meet the 80 dB standard in 1982 and subsequent years. At that time, and in the intervening years, the issue of availability of noise abatement technology to meet an 80 dB standard has never been, and is not now, a serious contention by any party. Further, EPA has not found that its original cost estimates for the regulation, when compared in constant dollars, have

changed substantially today. However, the truck manufacturing industry has experienced an economic downturn in terms of total sales and corporate profits which is projected to continue into 1981, and in view of the unanticipated dramatic market shift from gasoline-engined medium trucks to the more costly-to-quiet diesel-engined medium trucks, the one year delay of the 80 dB regulation is expected to immediately provide some relief to the industry's cash-flow problems, which appear to be particularly acute at this time.

The data presented by the industry and other information immediately available to EPA support the general economic plight of the industry. Although EPA would have preferred more specific data concerning the immediate cash flow problems of the industry and the extent to which the 1982 standard would contribute to such cash flow problems, there remains inadequate time in which to examine these issues fully and still be in a position to grant necessary relief since purchasing commitments for the 1982 standard are now being made. Since the environmental consequences of granting the relief are mitigated by the fact that the deferral is for one year only, during which time the present 83 dB standard will remain in effect, the Agency concludes that such a short deferral is justified based on the available data.

The Agency does not believe that a longer postponement is appropriate or in the best interests of the public. Trucks are the nation's greatest single source of environmental noise. Traffic noise ranks as the number one noise problem in our urban areas and trucks contribute over half the noise due to traffic. The 80 dB regulation is expected to bring a substantial reduction in impact over the current 83 dB regulation. In addition, the greatest relative benefits are expected to accrue to those citizens who are presently exposed to the highest levels of traffic noise around their homes. Also, without a further reduction below the current 83 dB standard for trucks, reducing the levels of other sources of traffic noise would provide dramatically fewer benefits because of the otherwise masking and dominant effect of truck noise. Thus, the Agency considers the 80 dB regulation for medium and heavy trucks to be a crucial element in bringing about a significant reduction in community noise levels in the U.S.

In addition, in view of the fact that the current 83 dB Federal standard is

preemptive of conflicting State and local noise standards for newly manufactured trucks, that many State and local governments have been and are increasingly becoming active in the control of truck noise, and that several States have recently expressed concern about a deferral of the 80 dB standard, the Agency believes it is in the public interest to limit the length of any period of deferral.

However, recognizing that some parties affected by this action may argue that a one year deferral is either too long or too short, the Agency invites comments from interested parties on this issue, and specifically on whether or not a further deferral of the 80 dB regulation for medium and heavy trucks would be appropriate. Of particular interest to the Agency is information regarding: (1) the impact of any deferral on suppliers of components that would otherwise be used in the manufacture of new trucks to meet the 80 dB level; (2) the impact on State and local jurisdictions of any deferrals; and (3) the impact of the 80 dB regulation on cash-flow and corporate profits in the truck manufacturing and trucking industries.

3.0 Issues and Responses

The following is a summary of the primary issues raised by manufacturers in written submittals to petition the Environmental Protection Agency to defer or withdraw the 1982 regulatory level and the Agency's response to those issues.

3.1 Issue

It has been claimed that the Agency grossly underestimated the growth of the medium diesel market share, the vehicle class that bears the highest cost of compliance per vehicle. Thus, the inflationary impact of the 80 dB regulation will be much greater than originally estimated.

Response

Historical analysis and forecasting indicate that the medium truck market is rapidly becoming dieselized, as claimed. The EPA cost elements (see Appendix) have been updated to 1980 dollars and the economic effects reassessed based on the current fleet growth projection of Data Resources Institute (DRI), which averages 2.1% per year. A nearly identical growth rate (2%) is currently projected by the U.S. Department of Commerce. The Agency's original estimates of incremental quieting costs to meet the 80 dB level are presented in the table below.

Table 3.1.—Comparison of Estimated Quieting Costs, in Millions of Dollars, for Truck Manufacturers To Meet the 80 dB Regulation for the First Three Years Following the Effective Date of the Standard

Year	Original EPA estimates		Revised EPA estimates ¹ (1980 dollars)	1980 manufacturer's estimates (1980 dollars)
	(1975 dollars)	(1980 dollars)		
1982	110.2	187.2	145.0	111.2
1983	113.9	183.5	157.9	120.4
1984	117.8	200.3	165.2	145.0

¹Revised EPA estimates are based on current (Fall 1980) econometric forecasts of aggregate fleet growth prepared by Data Resources Incorporated (Reference 4) and EPA market share projections reflecting current and projected market trends (Appendix, Figure A-3).
²Supplied to EPA by International Harvester Company 12/18/80.

Also presented are the original 1975 estimates updated to 1980 dollars, and further revised to reflect recent changes in market share and the more conservative 1980 estimate of sales trends. A comparison between the original EPA estimates of annual incremental costs to meet the 80 dB level (in 1980 dollars), and the estimates furnished by the claimant show that EPA was conservative; compared to the manufacturer's estimates, there would be a substantial reduction in inflationary effects. When EPA's revised 1980 estimates, which take into account medium truck market shifts and a more conservative sales forecast than used in 1975 (2.1% vs 3.3% per year), are compared with its original estimates (1980 dollars), a reduction of 22.5%, 18.4%, and 17.5% is seen for the years 1982, 1983, and 1984 respectively. On this basis the 80 dB regulation would be considerably less inflationary than EPA originally projected. While there are increased costs associated with the growing dieselization of medium trucks, those costs are, to some degree, counterbalanced by a reduction of costs to manufacturers due to a decline in truck sales. The total cost of the regulation is consequently not as great as originally estimated.

3.2 Issue¹

It has been claimed that EPA underestimated the noise abatement costs required for trucks to comply with the 80 dB regulation.

Response

In the Appendix contained in this notice, EPA has updated the noise abatement costs for medium and heavy trucks. This updating takes into account inflation and real cost increases that have occurred between 1975, when the original costs were determined, and December 1980. Not all truck manufacturers will experience the same abatement costs to comply with the 80

dB regulation. Some trucks are more costly to quiet than others. EPA has determined abatement costs on a per truck basis for each of the four categories considered in our original economic analysis. These costs represent sales-weighted industry averages that take into account abatement costs incurred by individual manufacturers which are then weighted to reflect their respective market shares. The table below summarizes EPA's updated noise abatement estimates and includes estimates supplied to EPA by three major truck manufacturers.

Table 3.2.—1980 Estimate of Noise Abatement Costs per Truck To Comply With 80 dB Regulation

Truck category	EPA	Manufacturer		
		1	2	3
Medium:				
Gasoline	\$307	\$120		
Diesel	578	300		
Heavy:				
Gasoline	209			
Diesel	488	515	\$400-500	\$500

As noted in the issue dealing with the increasing sales of medium diesel trucks, there is a discrepancy between the manner in which EPA and, in particular, one manufacturer classify trucks. EPA uses the weight classifications in common usage by the Department of Transportation, Interstate Commerce Commission and Motor Vehicle Manufacturers Association. EPA believes that differences in the cost data in the above table are partially due to the different truck classification schemes used, and the fact that EPA costs are sales-weighted in contrast to the manufacturer supplied costs. EPA has been unable to resolve these differences and, therefore, the data are not in complete agreement. However, EPA's noise abatement cost estimates are, on the average, higher and, therefore, more conservative than the manufacturers' estimates. EPA, in updating the economic analysis of the regulation, has used the more conservative cost figures and believes that the resulting economic impact projected by EPA overstates the actual cost of the regulation.

3.3 Issue

It has been requested that the 80 dB truck regulation be set aside because the Council on Wage and Price Stability (COWPS) in two statements, May 9, 1975 and July 6, 1975, evaluated the proposed 80 dB regulatory level as lacking economic justification.

Response

Both EPA and COWPS endeavor to determine the economic effects of compliance of a regulation by examining both the costs and potential benefits; therefore, the two assessments are similar in scope and magnitude. However, the benefits evaluation criteria differ substantially. The COWPS examines the cost effectiveness of a regulation purely in economic terms by assigning costs to the technology required to reduce the noise and examining such economic benefits as enhanced fuel economy and improved property values. COWPS does not attempt to place a dollar value on the potential public health and welfare benefits that are expected to occur from noise control, nor do they consider persons removed from impact, except to the extent these benefits are reflected in increased property values. The EPA evaluation considers all manufacturer and user costs related to the regulation. While the potential economic benefits of fuel economy are assessed, principal emphasis is placed on the potential health and welfare benefits to the public. Indeed, these latter benefits are the primary basis for the regulation, as required by the Noise Control Act. These health and welfare benefits are not assigned a dollar value, but rather are examined in terms of reduced adverse impact on people. Therefore, since the primary aim of EPA regulatory actions is to achieve health and welfare benefits, and since COWPS does not evaluate this element, it stands to reason that the COWPS assessment of the 80 dB truck regulation would be less favorable than EPA's assessment.

3.4 Issue

There is a contention that the trucking industry will be placed under a greatly increased burden as current interest rates are considerably greater than EPA predicted in 1975.

Response

EPA gave careful consideration to the trucking industry's sensitivity to high interest rates in 1975, in the context of possible delays in the granting of rate increases by the Interstate Commerce Commission. To avoid a drain on trucking industry cash resources, EPA stated that rate increases should be allowed to coincide with cost increases, including higher interest payments and capital costs. The U.S. Congress has recently eased the Interstate Commerce Commission's regulatory constraints on rate increases for trucking services. This deregulation of the trucking industry

mitigates the earlier potential problem of delays in rate increase pass-throughs needed to cover costs.

A higher interest rate due to inflationary pressures does not, by itself, pose a burden on an industry, provided that the resulting higher operating costs are passed-through to customers, thereby generating an equal increase in revenue. The increase in the price of trucking services would not necessarily cause a loss of business, since it would only bring the relative cost of trucking in balance with the concurrent increase in costs due to the same inflationary pressures on alternative modes of transportation.

The actual availability of capital at the interest rates being experienced in 1980 cannot be determined based on the information submitted and immediately available to the Agency.

The present economic analysis has de facto corrected for any errors in inflation and discount rates as predicted in 1975 by updating the economic baseline to actual 1980 data. The present growth trends and discount rates are considered reliable for predictions from the present into the future.

3.5 Issue

It was alleged that the 1982 regulation cannot, under the present conditions, be justified under a cost/benefit analysis.

Response

EPA's health and welfare analysis is based on fractional noise impact assessment, e.g., four real persons that are each 25 percent impacted are equivalent to one "level weighted person" (LWP) who is 100 percent impacted.

EPA's original health and welfare estimates indicated an additional reduction in LWP of 2.8 million achieved by the 80 dB regulation over those health and welfare benefits associated with the 83 dB regulation. Attendant with this reduction in LWP, EPA had originally estimated that the average incremental cost to manufacturers to comply with the 80 dB regulation would be \$193.7 million (1980 dollars) averaged over the first three years of the regulation. EPA has reassessed the health and welfare benefits expected from the 80 dB regulation, taking into account growth in the nation's population and the reduced growth rate in the truck fleet. This reassessment indicates a 37% increase in benefits (a reduction in LWP of 4.4 million) over that originally projected by EPA in 1975.

EPA has also reassessed the cost to manufacturers of complying with the 80 dB regulation, taking into account recent

market share trends and econometric projections for truck sales. The Agency's updated estimate of manufacturers' cost to comply averages \$150 million (1980 dollars) over the first three years of the regulation. This represents a 19.5% reduction in EPA's original estimate of the cost to comply with the 80 dB regulation.

Thus, the Agency's recent analyses of health and welfare benefits and compliance costs, indicates that the 80 dB regulation is more cost-effective than originally estimated.

3.6 Issue

It has been alleged that EPA included fuel savings due to the use of clutched fans in its cost benefit analysis, and that such inclusion is inappropriate since these components are being installed voluntarily.

Response

The Agency examined the fan clutch issue in detail during the regulatory development process and examined the cost of the regulation with and without the cost savings due to the greater fuel efficiency of clutched fans. However, the Administrator, in making his decision on the truck regulation, took into consideration the cost of the "worst case" situation, i.e., no fuel saving credit, and determined that the rule was justified based on the potential health and welfare benefits. Therefore, any savings due to fan clutches were not a determining factor in the original regulatory decision.

3.7 Issue

It has been noted that current fuel prices have increased by more than 100% over those used in the EPA's 1975 analysis. The manufacturers argued, therefore, that the cost of fuel efficiency loss due to the added weight of noise abatement components will be much greater than originally forecasted. Projected fuel price increases will continue to compound this situation.

Response

EPA has conducted an updated analysis, using current fuel cost figures based on the industrial products indices for gasoline and diesel fuel. This analysis was carried out to assess any changes in the annual incremental cost of fuel due to the weight of quieting hardware. The following table presents a comparison between the annual incremental costs estimated by EPA in 1975 and 1980.

Table 3.7—Incremental Cost per Year per Truck

	Original estimates	Revised estimates
Medium:		
Gasoline	\$1	\$3
Diesel	0	25
Heavy:		
Gasoline	2	8
Diesel	16	41

These fuel costs are only a small part of the annual overall operating costs. We find this cost acceptable for the resulting reduction in noise.

3.8 Issue

It has been claimed that, with certain drivetrain combinations, transmission covers will be needed to meet the 80 dB regulatory level. Neither the product cost increase associated with the transmission redesign nor the cost of transmission covers was included by EPA in its original analysis. The claim is also made that the addition of transmission covers will increase the servicing costs above those originally projected by EPA.

Response

EPA has determined that widespread changes in transmission design are currently underway by several of the major transmission manufacturers. These changes were not initiated to accommodate the noise regulations. Rather, truck fuel efficiency and performance have dictated transmission redesign, in addition to the derating of engines and changes in axle ratios.

Noise reductions which can be achieved in parallel with this redesign are being incorporated with far less expense than would be the case if dealt with as the sole reason for redesign. The need for a specially designed quieted transmission to meet the 80 dB level is dependent on the noise level of the transmission in combination with other noise generating components of the truck, such as the engine, fan and exhaust. A reduction in noise emission of these other components may well negate the need for quieter transmissions.

EPA investigations indicate that certain drivetrain configurations will need transmission covers to comply with the 80 dB regulation. Using the manufacturer's estimates of the cost of these covers, the capital cost calculations have been updated as detailed in the Appendix. The resultant average increase in unit cost was 0.02% due to the small number of units affected.

Investigations and demonstrations currently underway by the

Environmental Protection Agency indicate that reasonable engineering design of enclosures for oil sumps, engines, and transmissions will result in minimal impact to serviceability.

3.9 Issue

It has been alleged that some medium duty diesel engine lines may not be usable in truck chassis regulated to the 80 dB level in 1982.

Response

EPA is aware that some models of medium duty diesel engines are more difficult to quiet to meet the 80 dB regulation than other models of medium diesels. The industry has been aware of this for a number of years. To quiet the noisier models imposes certain cost and weight penalties not encountered by competing models, thus reducing the attractiveness of the noisier designs. Such models will encounter reduced demand, and some lost sales may result. EPA has received information that alternative uses for these engines are available, for example, in marine applications. Thus, the Agency anticipates that truck-application engine sales losses due to the 80 dB noise regulation will be recovered, at least in part, by alternative applications. Furthermore, the industry has announced that several new and redesigned medium duty diesel engine lines will be introduced for sale in the 1982 timeframe. These engines are being designed to concurrently achieve greater power, less weight, higher fuel economy, reduced air emissions, and less noise.

EPA expects that these new engine lines will substantially offset any lost sales in specific model lines due to potential engine obsolescence resulting from the 80 dB regulation.

3.10 Issue

It has been claimed that the noise treatments, especially sound barriers, needed by some manufacturers to comply with the 80 dB regulation will impose additional loads on truck cooling systems and promote a reduction in truck preventive maintenance.

Response

In the Background Document supporting the truck noise regulation, EPA acknowledged that, for many truck configurations, sound barriers would be necessary to comply with the 80 dB standard and that, for these configurations, additional cooling loads may be imposed. To handle the increased cooling loads, EPA's analysis took into account the incorporation of "off the shelf" components, which included improved fan and fan shroud

designs, as well as more efficient heat transfer radiators. These components were, and are, available for long-haul tractor/semi-trailers, as well as construction trucks. EPA has no reason to believe that the original assessment of the sound barrier requirements and cooling system changes was incorrect. EPA presumed, and continues to presume, that manufacturers will design their cooling systems with the eventual use of their trucks in mind. In so doing, manufacturers would likely incorporate fan, shroud, and radiator designs compatible with the sound barrier treatments applied to the trucks in their product lines.

As to the possible reduction in vehicle preventive maintenance, EPA recognized in the analysis supporting the regulation ("Background Document for Medium and Heavy Truck Noise Emission Regulation" (EPA 550/6-79-008), pages 6-23 through 6-26) that vehicle maintenance cost would be affected, and estimated the yearly cost increment to be \$103 (1975 dollars), which translates to about \$150 in 1980 dollars. EPA presumed that truck operators would protect their substantial investment by incurring the necessary increased maintenance costs, rather than reducing vehicle preventive maintenance. If the preventive maintenance were reduced, the increased cost could be foregone, although in the longer term substantial maintenance and/or operating cost consequences might result.

3.11 Issue

The claim has been made that the 80 dB regulation will result in the elimination of naturally aspirated diesel engines due to the inability of some engines to be turbocharged, and that this elimination will create an economic hardship to the customer by forcing the purchase of a turbocharged engine.

Response

EPA has ascertained that the diesel truck industry has made a wholesale move toward turbocharged engines. Evidence indicates that by 1982 the majority of engines will be turbocharged as a matter of course. This position is supported by the large percentage of turbochargers being installed on diesels today, although they are not required in order to meet the 1978, 83 dB noise standard. One manufacturer indicated that 99.5% of the engines in their chassis are currently turbocharged. The major motivations for turbocharging at this time appear to be customer demand for greater power, fuel economy, and air emissions benefits. In the near future, as truck engines become predominantly

turbocharged. EPA expects the cost ratio of turbocharged to naturally aspirated engines to decrease due to production efficiencies to the point where the cost differential would be offset by attendant savings in fuel. It would be expected that purchasers will increasingly select turbocharged engines, and that this market would continue to increase even absent the EPA regulation. There is no reason, however, for the regulation to eliminate naturally aspirated diesel engines from the market since such engines can meet the regulation requirements at less capital cost than turbocharging, if turbocharging was demanded solely for its less-noisy attributes.

3.12 Issue

It is alleged that manufacturers' difficulties in standardizing side shield placement on highly customized trucks will result in higher than anticipated vehicle costs.

Response

EPA recognizes that some vehicle configurations will be more difficult and costly to quiet than others; however, projected noise abatement cost to meet the 80 dB standard supplied to EPA by several manufacturers presumably include these more costly configurations. Since these noise abatement cost estimates to comply with the 80 dB standard have been found to be in substantial agreement with those projected by EPA, we conclude that while these highly customized vehicles may fall in the upper reaches of each manufacturer's noise abatement cost range, the average costs to meet the 80 dB regulation for manufacturers' overall product lines are not significantly different than those projected by EPA. Whether the problem associated with highly customized vehicles is a unique and serious one deserving of particular attention cannot be determined based on the manufacturers' submissions.

3.13 Issue

It has been alleged that the use of larger mufflers will encroach on the available space for cab entrance and egress.

Response

This issue was not raised by any of the vehicle manufacturers or muffler manufacturers during the development of the proposed regulation or the attendant public comment period, nor was this problem encountered in either the DOT or EPA Quiet Truck Programs. The manufacturer raising this issue indicated that its concern was

speculative. Without detailed technical evidence that such a problem will exist, the seriousness of this alleged problem cannot be ascertained.

3.14 Issue

The question has been posed as to whether trucks are the major source of surface transportation noise as EPA claims, and whether reductions in truck emission levels below the current 83 dB regulation will be masked by unregulated sources, such as tires, at typical highway speeds of 35 mph and above.

Response

EPA has identified trucks as the number one source of surface transportation noise. This finding is based on a careful, detailed analysis by EPA of vehicles operating on the nation's roadway system.

EPA's analysis considered all categories of vehicles involved in surface transportation; their noise emission levels as determined through field studies by both the EPA and the Federal Highway Administration; vehicle operational characteristics, typical traffic conditions, and the distribution of the population relative to the nation's streets and highways. The time phasing of regulated vehicles into the vehicle fleet and the contribution from tire noise under high speed conditions were taken into account. Deviant vehicles (i.e., poorly maintained, jouncing body components, etc.) were explicitly excluded from EPA's analysis. By excluding these deviant vehicles, EPA projections of truck noise health and welfare impacts are conservative.

The EPA analysis of the extent and severity of traffic noise impacts as functions of where they occur (i.e., local roads and streets, collectors, major and minor arterials, freeways, and interstates) shows trucks clearly to be the dominant source of traffic noise impacts. Currently, in excess of 80% of the impacts from traffic noise are from medium and heavy trucks. EPA knows of no studies which contradict its findings or which indicate that trucks will not continue to be the major source, even when the preponderance of medium and heavy trucks meet the 80 dB level.

EPA's analysis clearly distinguished between benefits that accrue to people exposed to urban traffic noise (low speed) where tire noise is only a very minor contributor, and to those exposed to freeway traffic noise (high speed) where tire noise is a significant contributor. This analysis shows that approximately 92% of traffic noise

impacts occur in the urban environment where tire noise is a relatively insignificant contributor.

EPA believes that 95% of the benefits from the 80 dB truck regulation will accrue to those who live in an urban environment. The focus of the medium and heavy truck noise emission regulation is not primarily aimed at the control of vehicles when they are operating in excess of 35 mph. This latter impact is controlled by an existing Federal regulation (40 CFR 202) which specifies maximum high speed (greater than 35 mph) noise levels for vehicles over 10,000 lbs. GVWR operated by carriers in interstate commerce.

3.15 Issue

It has been alleged, based upon the results from a health and welfare computer model developed by Battelle Laboratories:

1. That nine (9) million people, or only 4% of the nation's population will benefit from the 80 dB regulation.

2. This 4% will receive an insignificant and imperceptible daily average benefit of 0.6 dB at the cost of \$3 billion, twenty-six years from now.

3. This analysis represents an ultraconservative estimate in that the EPA's most quoted baseline limit of Ldn greater than 55 dB is a very conservative low end value that includes a built-in margin of 5 dB to 7 dB, below a level of "significant complaint" community reaction.

4. The EPA analysis assumes that the effect of an 80 dB regulation would be immediate, when realistically this is not the case.

5. A 1.0 dB change in level is likely to be the minimum detectable by the human ear and that other studies have noted that as high as a 5 dB change is required before the majority of the population can differentiate a significant change in traffic noise levels, and

6. It makes little sense to go to an 80 dB regulation since most of the benefits will be gained at the 83 dB level.

Response

The contentions rely heavily on results from the roadway traffic noise prediction model developed by Battelle Laboratories. From the description of the Battelle model supplied to EPA by a manufacturer, the EPA and Battelle models appear sufficiently similar so as not to be a major point of contention. However, the manufacturer's and EPA's interpretations of the model's output data are substantially different. Specific responses to each of the issues raised are presented below:

1. The only regulatory benefit from an 80 dB regulation recognized by the

manufacturer is the benefit to people who would be 100 percent removed from any adverse impact due to noise, which is approximately 9 million people. The estimate of 9 million people benefiting from the 80 dB standard represents the difference between the Battelle estimate of 104 million people living in areas with excessive levels of noise with an 83 dB regulation, and the Battelle estimate of 95 million people not 100% removed from impact after an 80 dB regulation. This contention fails to acknowledge that the remaining 95 million persons, although not totally removed from impact, will realize varying levels of reduced impact, and thus would experience a quieter, more livable environment. In fact, those persons who are presently exposed to the highest levels of traffic noise will receive the greatest degree of relief, a fact not acknowledged in the contention. Therefore, the population potentially benefited is considerably greater than the "mere 4 percent" claimed. EPA's method of evaluating benefits has the endorsement of the National Academy of Sciences expert committee on bioacoustics.

The contention also fails to recognize an anticipated growth in the U.S. population and associated increases in traffic volume. Considering both population and traffic growth, EPA estimates that 136 million persons will be adversely impacted to some degree by traffic noise in the year 2001 with trucks regulated to 83 dB.

2. The contention that a benefit of 0.6 dB reduction in average daily noise level cannot be perceived, indicates a confusion of the concept of noise level with that of noise exposure. While noise level differences on the order of 0.6 dB between two successive truck pass-bys may be imperceptible, such differences in average community noise exposure over long periods of time are quantifiable and are quite meaningful in terms of overall community response. Further, the analysis is in error with respect to the time period over which costs will be incurred. The costs of the regulation will not accrue in one lump sum; they will be spread over the entire 20 year period required for total truck fleet turnover to 80 dB vehicles.

3. The analysis is in error in stating that its estimates of benefits are ultraconservative since EPA's identified level of 55 dB to protect public health and welfare includes a built-in margin of 5 to 7 dB below a level of significant community complaint reaction. The EPA identified level was agreed upon by internationally recognized experts as a level below which the U.S. population

would not be at risk from noise exposure. If anything, recent community survey data suggest the identified level of 55 dB may be too high.

4. EPA analysis has never assumed that the "effect" of this regulation would be immediate. The rate of vehicle turnover in the fleet was considered and the full benefits and full costs of the regulations were not expected to accrue until the truck fleet has been fully replaced by quieted trucks in the year 2000.

5. The statements about minimal detectable changes in sound level are valid when considering a single exposure to noise. However, as stated previously, the manufacturer has confused noise level changes with noise exposure changes. Even small changes in noise exposure are significant.

6. The argument that it makes little sense to go to an 80 dB truck regulation since most of the benefits would be gained with an 83 dB level, erroneously assumes that no significant benefits would be gained below an 83 dB level. EPA projects that in the year 2001, an 83 dB regulation would reduce impacts by 19.0 percent, while the 80 dB regulation would provide a benefit of approximately 27.3 percent, an additive 8.3 percent reduction. A more stringent limit of, say, 75 dB would yield benefits of about 35 percent. The benefits therefore, of going from an 83 dB to an 80 dB regulation, are significant.

3.16 Issue

The question has been raised as to the compatibility of the medium and heavy truck noise emission regulation with the noise emission regulation for truck-mounted solid waste compactors.

Response

The truck-mounted solid waste compactor (compactor) regulation was developed to be compatible with the existing truck regulation. The noise emission levels established for compactors are predicated, in large part, on the noise emission of the truck chassis. Therefore, the 83 dB and 80 dB truck noise regulations and their attendant effective dates served as the basis for the 79 and 76 dB compactor regulations and their respective effective dates.

The relationship between the different noise emission measurement schemes and levels for the truck and compactor regulations was carefully assessed. Under the truck emission regulation, a truck accelerating to, or away from, a pick-up site is permitted to generate a higher peak noise level than is permitted during compaction. The contention that the regulations are not compatible,

based on a simple comparison of a distance-adjusted peak emission level during acceleration with a stationary compaction cycle level, is erroneous.

To properly compare the truck emission level and compactor level, the peak emission level during acceleration must be converted to an average or equivalent level by properly considering the acceleration noise level as a function of time and distance and then adjusting for the relative duration of acceleration as compared to compaction. When this is done, the comparison becomes 79 dB for the compactor and 78.1 dB for the 83 dB truck, not 79 vs. 89 as contended. For the 76 dB compactor and 80 dB truck, the proper comparison is 76 dB for the compactor and 75.1 dB for the truck. Thus the compactor and truck emission levels are quite compatible, and the compactor regulation is not overly stringent in comparison with the truck regulation.

In response to an assertion that the engine in some vehicles is still a major noise source, even at low speeds, without specific data it is impossible to evaluate this claim. Data from other manufacturers show the expected lower noise levels at lower engine speeds.

As presented in the Regulatory Analysis (Reference 2) for the compactor regulation, the compactor standard is easily met. Recent data indicate that the noise abatement costs for quieted compactors are actually less than the EPA original estimates. EPA has received no data or information which contradicts this analysis.

4.0 Conclusion

Therefore, for the reasons discussed above, the Agency has concluded that the 80 dB standard for medium and heavy trucks should not be withdrawn but should be deferred for one year.

Pursuant to the Administrative Procedure Act (5 U.S.C. 553b), EPA finds that the normal procedure of publishing a notice of proposed rulemaking and receiving public comment before establishing final amendments would be impracticable and contrary to the public interest with respect to this amendment of the truck regulation. The mandatory dates for manufacturers to make ordering commitments to suppliers for production of components for their 1992 trucks are imminent, and would be significantly passed if notice-and-comment procedures were followed. The basic purpose of this action is to allow the industry to defer those costs associated with the 80 dB standard for one year. Any further delay in effecting this deferral would substantially reduce the amount of expenditures that could

otherwise be deferred and would defeat the purpose of this action. However, even though this is a final action by the Agency, the Agency will accept comments from the public on this action until 4:30 p.m. on April 24, 1981.

With respect to amendment of the truck-mounted solid waste compactor regulation, the Agency finds further, that notice-and-comment procedures are unnecessary and contrary to the public interest because compliance with the 76 dB standard of this regulation is predicated upon the availability of truck chassis meeting an 80 dB standard.

EPA has determined that this action is not a "significant" regulation, and therefore, does not require a Regulatory Analysis in accordance with Executive Order 12044.

This amendment is issued under the authority of Section 6 of the Noise Control Act, 42 U.S.C. 4905.

Dated: January 19, 1981.

Douglas M. Costle,
Administrator

§§ 203.52, 203.202 (Amended)

40 CFR Part 203 is amended by removing the word "1982" and inserting, in its place, the word "1983" in paragraph 203.52(a) of Subpart B, and in paragraph 203.202(a) of Subpart F.

(Sec. 6, Pub. L. 92-574, 96 Stat. 1237 (42 U.S.C. 4905))

Editorial Note.—This appendix is printed for information purposes only and will not be reprinted in the CFR.

Appendix to Preamble—Revised Economic Analysis of the Medium and Heavy Truck Noise Emission Regulation

Review of the baseline production and market share trend data submitted by two major truck manufacturers in their petitions to EPA indicated: (1) Significant shifts in truck class purchases, (2) a general decline in total sales and (3) reduced rate of fleet growth since 1976 when the EPA original economic analysis supporting the medium and heavy truck noise emission regulation was completed. Subsequent analysis by EPA of historical truck sales data and available projections for future sales tended to support the petitioners' claims. These changes, which could not have been anticipated in 1976, have been taken into consideration in this revised EPA analysis. Projections of costs, sales, and market shares, have been updated to assess the potential economic effects on the industry. A principal element in this revised analysis is the categorization of trucks.

The industry categorizes trucks by three different schemes. The first of these is to classify a truck according to its intended use or "duty." This is usually a combination of load rating, engine power and torque, and truck configuration (i.e., fixed body, van, etc.). The second scheme is the gross vehicle weight rating or GVWR (Table A-1) which rates a truck purely on the load carrying capacity of the vehicle. The third scheme is a

further division of the GVW Rating into medium trucks as those in GVWR 3-6 and heavy trucks as those in GVWR 7 and 8.

Most truck manufacturers elect to use the medium/heavy split in classifying their vehicles as does the EPA. There is one manufacturer who elects to follow their own scheme. For this reason market share data from this source does not exhibit the same distribution of chassis, engine, and GVW Rating as the majority of the industry.

Market Analysis

Analysis of historical sales and market share data published by the Motor Vehicle Manufacturers Association (MVMA) in their statistical annual reports, show (Figure A-1) that, even in a fluctuating sales market:

- (1) GVWR category 6 is steadily capturing an increasing share of the truck market.
- (2) Taken separately, categories 3, 4, and 5 show similar market share trends and, when combined their market share has generally declined.
- (3) After a 5-year period of sustained growth, the market share of category 6 vehicles appears to dramatically decline between 1979 and 1980.
- (4) For a 10-year period, category 7 represented a fairly constant share of the truck market. Beginning in 1976, however, the market share for category 7 shows a dramatic increase that continued through 1980. This dramatic growth in category 7 is in direct contrast to the decline of the market share of category 6.

The markedly diverse market behavior in 1979 and 1980 of categories 6 and 7 trucks raises questions as to the cause of the apparently inverse growth patterns. A review of the variations on basic medium truck models offered within the medium class indicate a consistent skewing toward those intended for heavy duty use rather than the lighter 3, 4, and 5 categories.

This skewing may be interpreted as an attempt of certain manufacturers to offer purchasers of medium truck chassis higher load-carrying capabilities at costs below the heavy duty truck category. The market share data in Figure A-1 shows that purchasers of category 6 trucks are apparently shifting to those of GVWR 7 and 8 which are basically medium truck chassis with greater horsepower engines and an additional axle to increase their load carrying capability. This shift could be the result of a desire to carry greater payloads to offset increased fuel and capital costs. EPA believes there will be insignificant downgrading of category 6 heavy trucks to category 7 medium trucks due to the normally high initial cost differential between the two categories; marginal needs for increased load carrying capability would not justify the added cost.

From a noise quieting perspective, medium trucks are more costly to quiet than heavy trucks since medium trucks offer less potential for chassis and engine compartment redesign. The "upgrading" of category 6 medium trucks produces in essence a heavy truck but at the higher quieting costs of a medium truck.

Thus, it now seems appropriate to include a percentage of GVWR category 7 trucks in the medium duty category for the purpose of

determining noise quieting costs. For this analysis EPA elected to combine the total market shares of GVWR categories 6 and 7 (Figure A-3). This conservative approach removes the dramatic market fluctuations in the period 1978-1980, as shown in Figure A-1, and more correctly applies the true quieting costs associated with GVWR 7 trucks.

The prediction of future market shares (Figure A-3) was developed from data prepared by Chase Econometrics and supplied to EPA by International Harvester. The dotted lines and circled points on Figure A-3 represent Chase Econometric predictions for future market shares and align very well with the historical trends. The boxed points in Figure A-3 represent EPA's estimate of the market share for the combination of categories 3, 4, and 5. The industry did not provide data for these categories.

Dielectrication of the truck fleet, shown in Figure A-4, was estimated from historical data obtained from MVMA (3) and a combination of industry and government forecasts for the future. (4) EPA's Mobile Source Air Programs Office estimated (5) full conversion to diesel engines in GVWR category 6 by 1984 and 20 percent diesel penetration for categories 3, 4, and 5 by 1990. Commercial Car Journal (6) claims that GVWR category 6 will be 90 percent diesel by 1990. Using this latter estimate for both categories 6 and 7, and the EPA Air Programs estimates for categories 3, 4, 5, and 8, straight line projections from current (1980) diesel penetration to 1990 were made. Beyond 1990 diesel penetration was assumed to hold constant.

To estimate the future growth of the total medium and heavy truck market, EPA consulted MVMA, the Engine Manufacturers Association (EMA), the Truck Manufacturers Association (TMA), Federal Highway Administration (FHWA), National Highway Traffic Safety Administration (NHTSA), Office of the Secretary of Transportation, Transportation Systems Center (DOT/TSC), the Department of Commerce Bureau of Industrial Economics (BIE), Office of Management and Budget (OMB), and the President's Automobile Industry Council. Of these sources, only BIE and TSC were prepared to provide growth forecasts. The BIE projection is a short term projection to the mid-1980's. TSC provided long-term projections made by Data Resources Incorporated (DRI). The DRI forecasts are generated by a national econometric model that incorporates both trend analysis and business cycle considerations. The DRI forecasts were made in the Fall of 1980 and therefore include data reflecting current economic conditions and the present state of the trucking industry. EPA has used the DRI projections because they appear to represent the best available forecasts.

Cost Comparison

A comparison of the estimated costs associated with the 80 dB regulation (given that the 83 dB regulation is already in place) is presented below. Tables A-2 thru A-4 present EPA's estimates of unit base prices, incremental noise abatement costs and operating costs. The 1975 estimates are from the Background Document supporting the

regulation. The 1980 estimates are based on the latest economic indices supplied by the Bureau of Labor Statistics.

Table A-2 shows a 70 percent increase over 1975 estimates of the sales-weighted unit price of an unregulated truck, i.e., cost increases due to factors other than 83 dB and 80 dB quieting requirements.

Table A-3 shows a comparable 70 percent increase in the 1975 estimated costs to reduce the noise level from 83 to 80 dB. Potential added cost increases due to the possible need for transmission covers, not considered in EPA's 1975 analysis, range from zero for heavy gas to less than 3 percent for medium gas trucks.

Table A-4 compares estimates of annual fuel and maintenance costs. The increases in fuel costs over that estimated in 1975 range from 150 percent for heavy gas to 200 percent for medium gas, based on average fuel costs of \$1.59 per gallon for gas and \$1.23 per gallon for diesel. The maintenance costs have also risen between 40 and 40 percent from those estimated in 1975.

The above increases in estimated costs, with the exception of transmission cover costs, do not represent any technology requirements different from those originally anticipated for the 80 dB regulation.

Comparative Economic Analysis

In order to assess the change in potential economic impact between 1975 and 1980, due to changing costs, shifts in market shares, and changes in general sales trends, a comparative analysis was carried out between: (1) The original 1975 EPA analysis, (2) the original EPA analysis adjusted for 1980 costs as listed in Table A-3, (3) a revised EPA estimate which incorporates 1980 cost elements, including transmission covers, plus the most recent and complete (DRI) predictions of fleet growth, shifts in market share, and dieselization projections, and (4) cost estimates submitted to EPA by International Harvester Company (12/16/80).

The sales forecasts for the EPA analyses are presented in Figures A-5, A-6, and A-7.

Comparison of Figures A-5 and A-6 illustrates the effects of increased dieselization between 1975 and 1980, and market shifts, all other factors being equal.

A comparison of Figures A-6 and A-7 illustrates the dramatic change in predicted aggregate growth rates for each vehicle category. The substantial reduction in anticipated fleet growth, compared to EPA's 1975 estimates, results in substantial reductions in present estimates of aggregate annual costs that manufacturers would incur in quieting their trucks to comply with the 80 dB regulation.

Summary

The results of the comparative analyses are presented in Table A-5 in terms of costs to meet the 80 dB regulation for the first three years following the effective date of the regulation.

The manufacturer's estimate of cost in 1980 dollars is substantially less than EPA's original cost estimate updated to 1980 dollars. Furthermore, comparing the Agency's revised

1980 estimates with its original estimates in 1980 dollars, reductions of 22.5%, 10.4%, and 17.5% are seen for the years 1982, 1983, and 1984 respectively. On this basis, the 80 dB regulation would be considerably less costly than originally projected by EPA.

References

- (1) "Background Document for Medium and Heavy Truck Noise Emission Regulations", USEPA, Washington, D.C., March 1975.
- (2) "Regulatory Analysis of the Noise Emission Regulations for Truck-Mounted Solid Waste Compactors", USEPA, Washington, D.C., August 1979.
- (3) "MVMA Motor Vehicle Facts and Figures '80", Motor Vehicle Manufacturers Association of the United States, Inc., Detroit, Michigan.
- (4) "Data Resources Long-Term Review", Data Resources Incorporated, Fall 1980.
- (5) "Regulatory Analysis and Environmental Impact of Final Emission Regulations for 1984 and Later Model Year Heavy Duty Engines", USEPA, Washington, D.C., December 1978.
- (6) "On What's Available in Mid-Range Diesel Trucks", pp. 74-87, Commercial Car Journal, Chilton Publications, January 1980.

Table A-1.—Comparison of Gross Vehicle Weight Rating and Truck Categorization Schemes

Gross vehicle weight rating, in pounds	Truck category	Industry classification
10,001 to 14,000	3	Medium
14,001 to 18,000	4	Medium
18,001 to 24,000	5	Medium
24,001 to 33,000	6	Medium
33,001 to 44,000	7	Heavy
Over 44,000	8	Heavy

Table A-2.—Sales-Weighted Unit Base Prices for Trucks (Unregulated)

Truck category	1975	1980 ¹	Percent change ¹
Medium gas	\$7,070	\$12,018	+70
Medium diesel	8,916	13,157	+70
Heavy gas	14,058	23,81	+70
Heavy diesel	21,021	32,73	+70

¹ Bureau of Labor Statistics (BLS): Producer Price Index (PPI), 1975 104.1, 1980 201.0.

Table A-3.—Comparison of Estimated Incremental Noise Abatement Costs to Meet 80 dB Regulation From Current 83 dB Regulation by Truck Category

Truck category	EPA 1975 excluding transmission covers	1980 ¹ excluding transmission covers	1980 ² including transmission covers
Medium gas	\$170	\$29	\$307
Medium diesel	513	872	876
Heavy gas	158	209	208
Heavy diesel	282	479	487

¹ BLS: PPI 1975 104.1, 1980 201.0.
² Sales-weighted costs based on data submitted to EPA by International Harvester Company (12/16/80).

Table A-4.—Comparison of Estimated Increases in Operating Costs in Going From Current 83 dB to 80 dB Regulation

Truck category	Increased average annual fuel costs at 80 dB		Increased average annual maintenance costs at 80 dB	
	1975	1980 ¹	1975	1980 ²
Medium gas	\$1	\$1	\$23	\$24
Medium diesel	9	23	98	139
Heavy gas	2	5	45	56
Heavy diesel	15	41	103	150

¹ BLS: Industrial Products Index Gas 1975 220.0, 1980 295.4, Diesel 1975 248.0, 1980 351.1.
² BLS: Wage Price Index 1975 101.2, 1980 203.0.

Table A-5.—Comparison of Estimated Quiet-ting Costs, in Millions of Dollars, for Truck Manufacturers To Meet the 80 dB Regulation for the First 3 Years Following the Effective Date of the Regulation

Year	Original EPA estimate (1975 dollars)	Original EPA estimate (1980 dollars)	Revised EPA estimate (1980 dollars)	1980 Manufacturer's estimate (1980 dollars)
1982	110.2	157.2	145.0	111.2
1983	112.9	153.5	157.9	123.4
1984	117.9	200.0	188.2	145.0

¹ Revised EPA estimates are based on current (Fall 1980) economic forecasts of aggregate fleet growth prepared by Data Resources Incorporated (Scenario 4) and EPA market share projections reflecting current and projected market trends (Appendix Figure A-7).
² Supplied to EPA by International Harvester Company 12/16/80.

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Figure A-1 Historical Truck Market Share by GVWR
- Obtained from MVMA (Source: Reference 3)

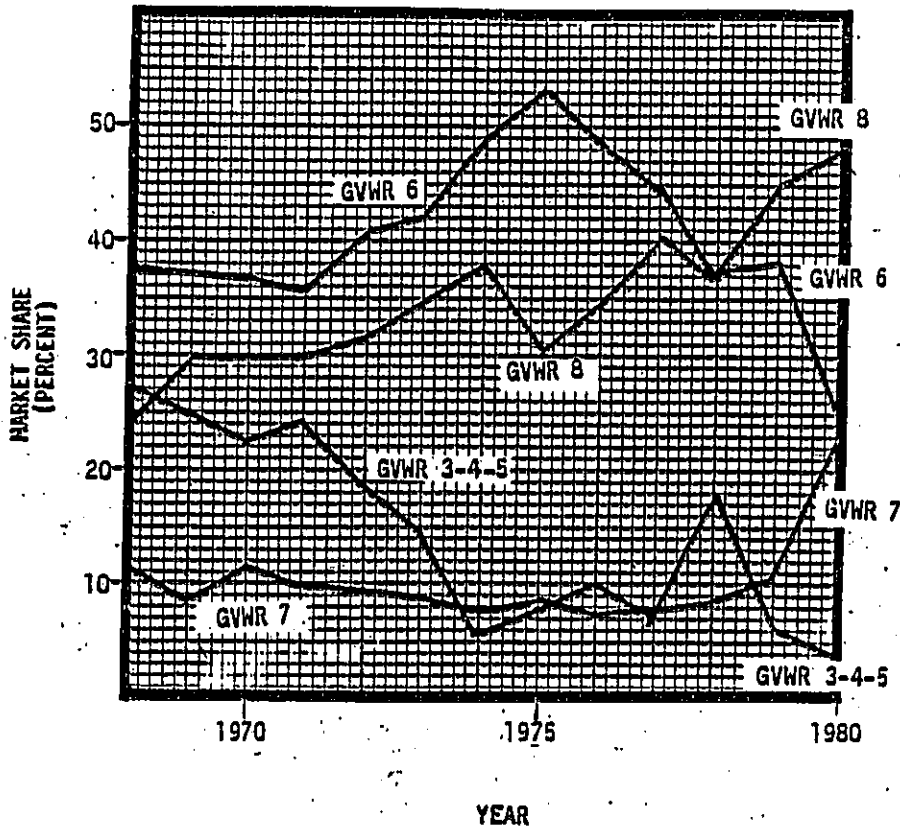
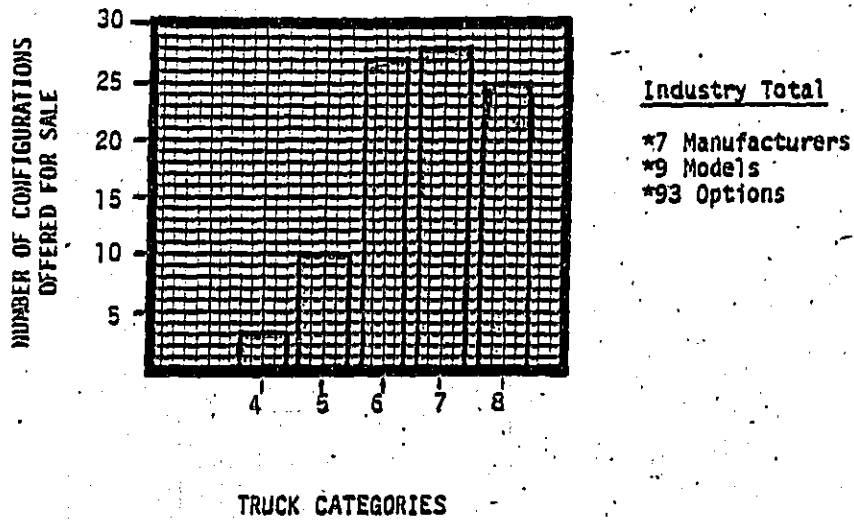
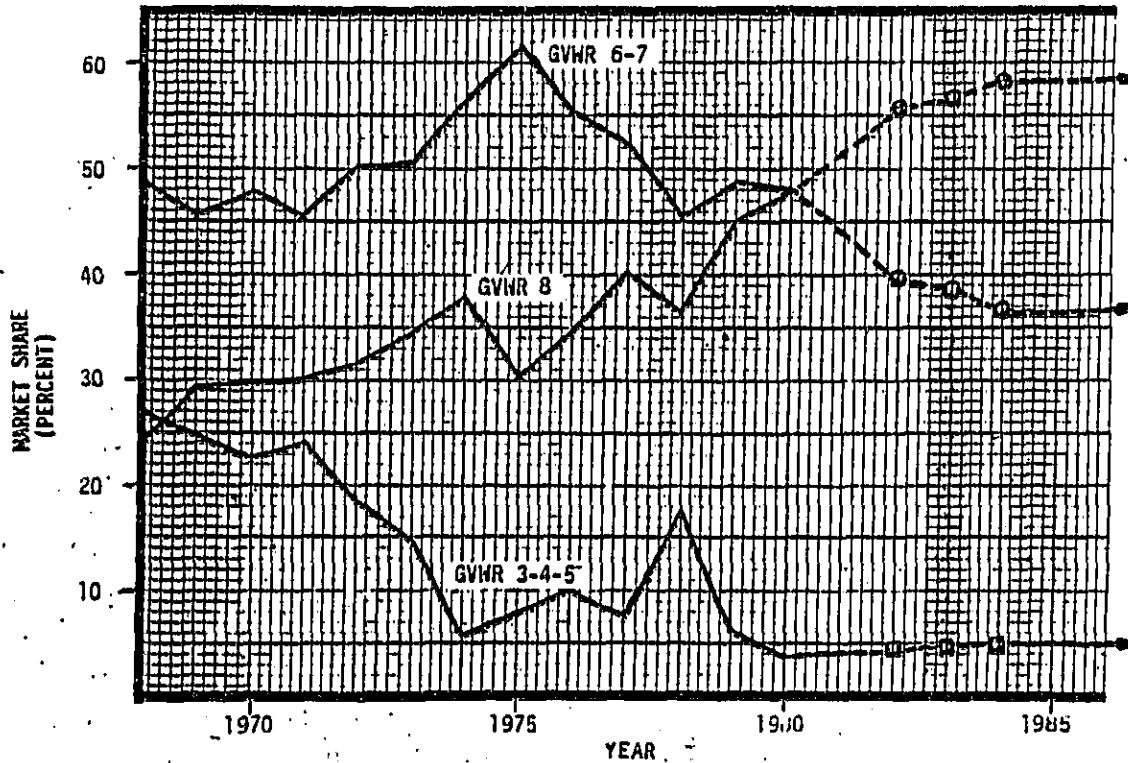


Figure A-2 Distribution of "Medium Truck" Configurations by GVW Rating Option (Source: Commercial Car Journal, 11/19/80)



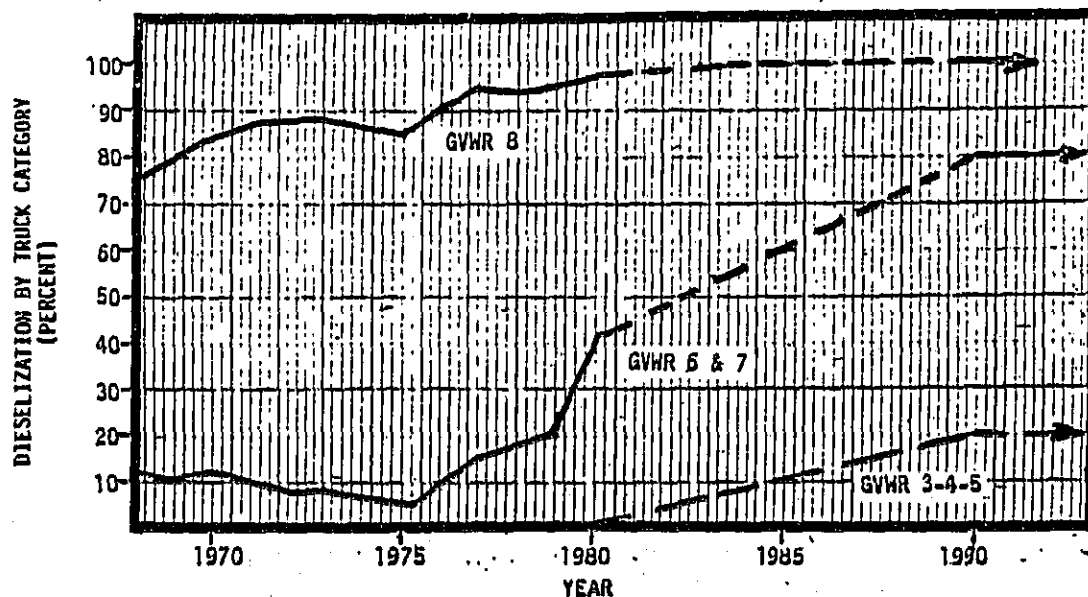
Note: The load carrying capability of a medium truck dictates its category classification

Figure A-3 Realigned Market Shares by Truck Category



Note: Predictions for years beyond 1980 in Categories 6, 7, and 8 are based on data provided to EPA by International Harvester Company. Predictions beyond 1980 for categories 3, 4, and 5 are based on EPA's market share estimate of 5% for these combined categories.

Figure A-4 Dieselization of Trucks by Truck Category



Note: Data prior to, and including 1980, are based on historical information provided by MVMA (Reference 3). Beyond 1980, GVWR 8 and GVWR 3-4-5 represent EPA estimates; GVWR 6 & 7 represent CCJ projections (Reference 6).

Figure A-5 EPA 1975 Truck Production Forecast
(Source: Reference 1)

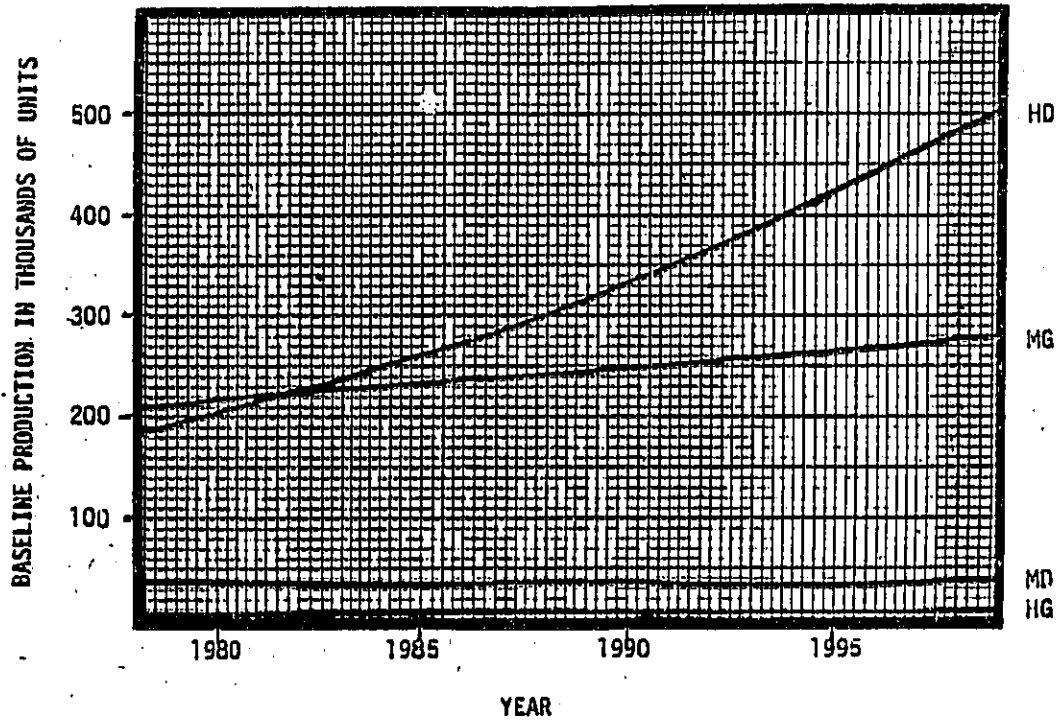


Figure A-6 Truck Production Forecast Utilizing Updated Market Share Projections and 1975 EPA Aggregate Growth Projections

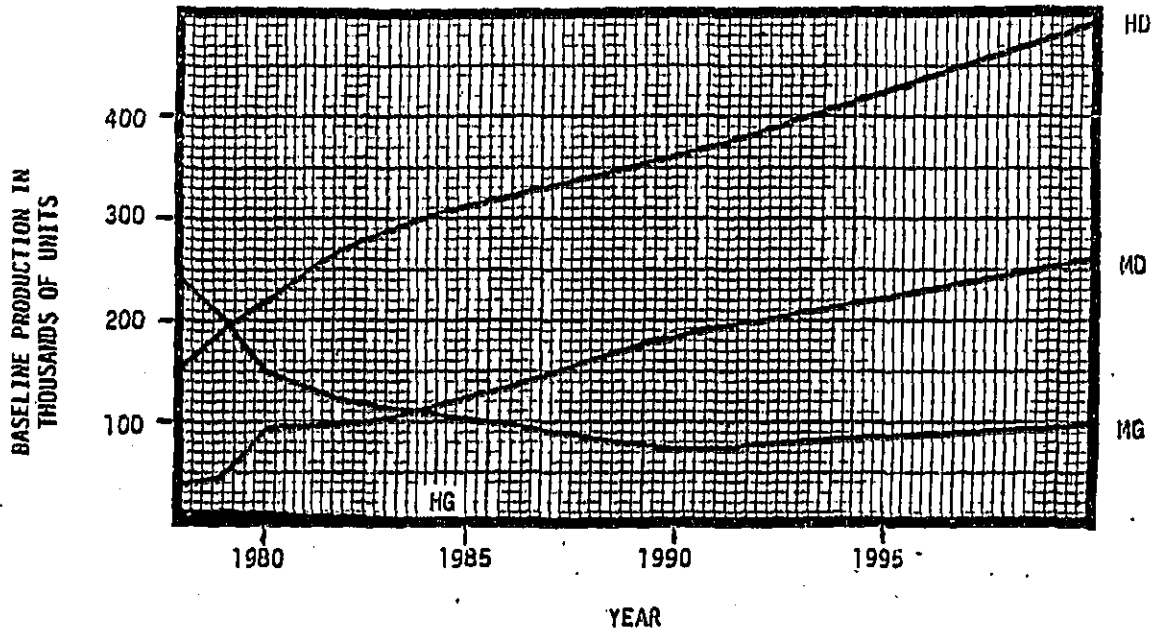
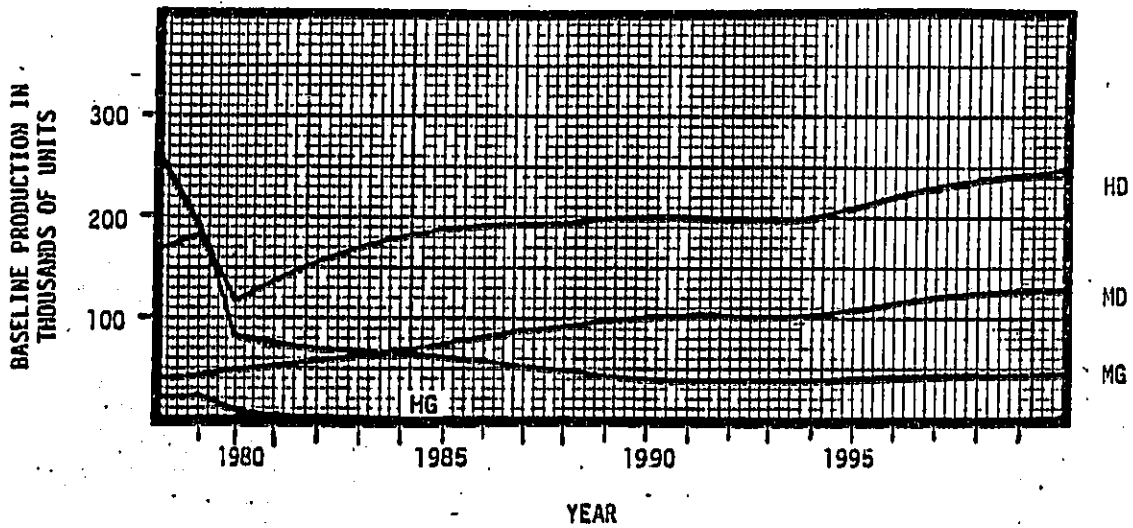


Figure A-7 Truck Production Forecast Utilizing EPA/Chase Econometrics Updated Market Share Projections and DRI Aggregate Growth Projection



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