

## 1976 Congressional Action on the Clean Air Act: Automobile and Truck Emission Standards

### I. INTRODUCTION

A determination of standards for the control of automobile emissions requires the consideration of a complex network of factors. The following analysis examines the relative benefits and disadvantages created by different legislative proposals. The focus is on economic and health effects and technological feasibility. In addition, special considerations associated with the control of heavy-duty trucks and buses will be discussed.

Vehicle emission standards are only one component of a system of regulations limiting air pollution from various sources. It should be noted that controls of emissions as discussed herein are only one alternative for reducing vehicular pollutants. Other strategies available include attracting mass transit ridership, reducing peak hour transit volumes, and encouraging land use patterns that would decrease average travel distances.<sup>1</sup> Alternatives more closely related to vehicles include increasing costs of automobile use to reduce vehicle miles traveled, eliminating unnecessary pollutants from fuels, controlling evaporation of gasoline from service stations and vehicle gas tanks, and creating differential urban/rural controls whereby strict emission controls would be required only in heavily polluted areas.<sup>2</sup>

Two bills were considered in Congress in 1976 to amend the Clean Air Act by weakening the standards for passenger automobiles and establishing statutory standards for heavy-duty vehicles (over 6000 pounds gross vehicle weight).<sup>3</sup> Both S.3219 and H.R. 10498<sup>4</sup> limit vehicular output of three different pollutants: hydrocarbons, carbon monoxide

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1. 1 R. KRZYCZKOWSKI, *et al.*, JOINT STRATEGIES FOR URBAN TRANSPORTATION, AIR QUALITY AND ENERGY CONSERVATION v (Environmental Protection Agency, Federal Energy Administration, Dept of Transportation, Urban Mass Transit Administration INTERPLAN Rep. No. 7346R, 1974).

2. *Id.* at 5-3.

3. "Heavy duty vehicle means any motor vehicle either designed primarily for transportation of property and rated at more than 6,000 pounds GVW [gross vehicle weight] or designed primarily for transportation of persons and having a capacity of more than 12 persons." 40 C.F.R. § 86.077-2 (1976).

4. S.3219, 94th Cong., 2d Sess. (1976). H.R. 10498, 94th Cong., 2d Sess. (1976).

and oxides of nitrogen.<sup>5</sup> In addition, smoke (particulate) output is controlled for heavy-duty diesel engines. Other pollutants may be controlled at the discretion of the Environmental Protection Agency (EPA) Administrator, who has statutory authority to supervise emission control programs.<sup>6</sup>

## II. LEGISLATIVE HISTORY

It has been more than twenty years since the United States Congress first gave priority to the control of air pollution,<sup>7</sup> and a decade has passed since passage of the first federal automobile emission standards.<sup>8</sup> During this period, automotive pollution control tactics have displayed a pendulum effect. The first legislative action consisted of a weak bill that merely authorized a study of the problem.<sup>9</sup> The second generation of legislation allowed the Department of Health, Education and Welfare to promulgate regulations limiting automobile pollutants, but these standards were set at the level of existing technological feasibility.<sup>10</sup> The primary result of these standards was a codification of existing practices with implementation of a few minor controls.

The third generation legislation brought pollution controls to its apogee in the form of the Clean Air Act of 1970.<sup>11</sup> This bill enacted stringent standards (termed "drastic medicine" by some observers)<sup>12</sup> for cutback of automobile emissions and other sources of pollutants.

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5. Oxides of nitrogen include the sum of nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>) and is abbreviated as NO<sub>x</sub>. 40 C.F.R. § 86.077-2 (1976). Hereinafter, carbon monoxide will be abbreviated as CO and hydrocarbons as HC. It is conventional in automobile emissions literature to express emissions in the shorthand form HC/CO/NO<sub>x</sub> (in that order). Automobile emissions are measured in grams per mile. Thus, an automobile emission standard of .41/3.4/2.0 would be .41 grams per mile of hydrocarbon emissions, 3.4 grams per mile of carbon monoxide and 2.0 grams per mile of oxides of nitrogen.

Heavy-duty vehicle pollutants are expressed in the same shorthand form, except as otherwise noted, but are measured in grams per brake horsepower hour (BHP-hr).

6. National Emission Standards Act (Clean Air Act) § 202(a)(1), 42 U.S.C. § 1857f-1(a)(1) (1970), *as amended* 42 U.S.C.A. § 1857f-1(a)(1) (Supp. 1976).

7. Act of July 14, 1955, Pub. L. No. 84-159, § 2, 69 Stat. 322.

8. Motor Vehicle Air Pollution Control Act of 1965, Pub. L. No. 89-272, 79 Stat. 992.

9. Act of June 8, 1960, Pub. L. No. 86-493, 74 Stat. 162.

10. Act of Dec. 17, 1963, Pub. L. No. 88-206, § 6(a), 77 Stat. 392.

The Secretary shall encourage the continued efforts on the part of the automotive and fuel industries to develop devices and fuels to prevent pollutants from being discharged from the exhaust of automotive vehicles, and to this end shall maintain liaison with automotive vehicle, exhaust control device, and fuel manufacturers. *Id.*

11. Clean Air Act of 1970, Pub. L. No. 91-604, 84 Stat. 1690.

12. *International Harvester v. Ruckelshaus*, 478 F. 2d 615, 623 (D.C. Cir. 1973), *quoting* Senator Muskie, 116 CONG. REC. 32,904 (1970).

Other cases dealing with automobile emissions include *United States v. Automobile Mfrs. Ass'n*, 307 F. Supp. 617 (C.D. Cal. 1969), *aff'd sub nom. City of New York v. United States*, 397 U.S. 248 (1970) (criminal antitrust action against automobile manufacturers for acting in

In recent years, the progress of the crisis-oriented 1970 Act has been reversed with repeated delays of deadlines for meeting emission standards. This slowdown stage in pollution control appears to have been occasioned by such factors as the fuel shortage, an economic slump, and continuing American attachment to large, powerful automobiles.

The automobile emission standards originally set for full implementation in model year 1975 (and 1976 for oxides of nitrogen)<sup>13</sup> have been suspended three times thus far.<sup>14</sup> Each suspension has been for a period of one year, moving the present compliance date to September 30, 1978.<sup>15</sup> Despite Congress' belief in 1970 that technology to meet strict emission standards would be available by 1975, it is now clear that this session of Congress will again postpone these standards until the 1980's.

Preparation for passage of the Clean Air Act Amendments of 1976 began early in 1975.<sup>16</sup> President Ford stated his position in an energy message to Congress in January, 1975, and reaffirmed it in later messages and letters to Congressmen.

I . . . urge the Congress to act quickly on amending the Clean Air Act auto emissions standards that I proposed last June to achieve a balance between objectives for improving air quality, increasing gasoline mileage, and avoiding unnecessary increases in costs to consumers.<sup>17</sup>

The President joined automobile manufacturers in calling for a delay until 1982 on stiffening emission standards.<sup>18</sup> His recommendation for a five-year moratorium on emission standards was embodied in the Dingell-Broyhill (Train) proposal, which will be discussed *infra*.

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coordination to impede development of pollution control technology, ending with consent decree admitting no liability); *In re Multidistrict Vehicle Air Pollution*, 481 F.2d 122 (9th Cir. 1973), remanded 367 F. Supp. 1298 (C.D. Cal. 1973), aff'd 538 F.2d 231 (1976) (action by states and cities based on same antitrust claim as above, holding that no remedy existed in this situation under the Clayton Act §§ 4 and 6, 15 U.S.C. §§ 15 and 26 (1970)).

13. Clean Air Act, 42 U.S.C. § 1857f-1(b)(1)(A) (1970).

14. *Id.* § 1857f-1(b)(1)(B).

15. *Environmental Notes*, 33 CONG. Q. WEEKLY REP. 478 (1975).

The first suspension was granted on Dec. 1, 1973, by EPA Administrator William D. Ruckelshaus, pursuant to 42 U.S.C. § 1857f-1(b)(5) (1970).

The second postponement was by Congressional action. Energy Supply and Environmental Coordination Act of 1974, Pub. L. No. 93-319, § 5, 88 Stat. 246.

An administrative suspension was granted March 5, 1975, by EPA Administrator Russell E. Train. 38 Fed. Reg. 10,317 (1973).

16. Hearings on bills amending the Clean Air Act were held in March of 1975. *Hearings on Titles V and VI of H.R. 2633 and H.R. 2650 Before the Subcomm. on Health and the Environment of the House Comm. on Interstate and Foreign Commerce*, 94th Cong., 1st Sess., ser. 94-25 (1975) [hereinafter cited as *House Hearings*].

17. Message to Congress by President Gerald R. Ford, Feb. 26, 1976, quoted in 34 CONG. Q. WEEKLY REP. 529 (1976).

18. *Congress Faces Hard Choices on Clean Air Act*, 31 CONG. Q. ALMANAC 245 (1975); *Committee Consideration: Clean Air Act Amendments*, 33 CONG. Q. WEEKLY REP. 1511, 1512 (1975).

Work on the House and Senate bills included extensive hearings<sup>19</sup> and mark-up sessions by the Senate Public Works Committee Subcommittee on Environmental Pollution (chaired by Senator Edmund S. Muskie of Maine) and the House Interstate and Foreign Commerce Committee Subcommittee on Health and Environment (chaired by Paul G. Rogers, Florida).<sup>20</sup> House committee members did not report their bill until May 15, 1976, the last day for reporting bills containing appropriations for fiscal year 1977.<sup>21</sup> At the time of this writing, the House had not yet voted on the Clean Air Act Amendments.

S. 3219's chief sponsor, Senator Muskie, threatened to substitute another bill if the committee proposal was significantly weakened on the Senate floor. The substitute would contain provisions only for appropriations and for an interim loosening of automobile standards. Action on other portions of the clean air program—e.g; nondegradation, stationary source controls, and transportation controls—would be postponed until the next session of Congress.<sup>22</sup> However, this action proved unnecessary when the Senate passed S. 3219 on August 5, 1976, with no changes in the Public Works Committee stance on vehicle emissions.<sup>23</sup>

Although the party affiliation of Congressmen proved to be an important indicator of their positions on the Clean Air Act, it was not dispositive. President Ford's request for a five-year delay in tightening emission criteria was disregarded by many Republicans.<sup>24</sup> All of the Republicans on the Senate Public Works Committee voted to report S.3219 despite its relatively strong antipollution viewpoint.<sup>25</sup>

Senate roll call votes defeating two amendments offered by Senator Gary Hart of Colorado to shorten deadlines for stringent emission standard compliance showed that 45 percent of Democrats supported them, compared to 18 percent of Republicans. The Senate version of the entire Clean Air Act Amendments was approved by 72 percent of Republicans and 96 percent of Democrats.<sup>26</sup>

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19. *Hearings on Implementation of the Clean Air Act Before the Subcomm. on Environmental Pollution of the Senate Comm. on Public Works*, 94th Cong., 1st Sess., ser. 94-H10, pts. 3 and 4 (1975) [hereinafter cited as Senate Hearings].

20. H.R. REP. NO. 94-1175, 94th Cong., 2d Sess. 22 (1976) [hereinafter cited as HOUSE REPORT]; S. REP. NO. 94-717, 94th Cong., 2d Sess. 10-11 (1976) [hereinafter cited as SENATE REPORT].

21. *Energy, Environment Notes*, 34 CONG. Q. WEEKLY REP. 1190 (1976). The Interstate and Foreign Commerce Committee voted for approval 22 to 13 on March 18, 1976. HOUSE REPORT, *supra* note 22, at 22.

22. 122 CONG. REC. 57452 (daily ed. May 19, 1976) (remarks of Sen. Muskie).

23. Crewdson, *Senate Passes Clean Air Amendments*, 34 CONG. Q. WEEKLY REP. 2107 (1976).

24. 122 CONG. REC. S8475 (daily ed. June 3, 1976) (remarks of Sen. Buckley).

25. SENATE REPORT, *supra* note 20, at 93.

26. 122 CONG. Q. WEEKLY REP. 2172 (1976).

At the time of this writing, figures were not yet available for House action on the Clean Air Act Amendments with the exception of the committee vote to report H.R. 10498. This action received both support and opposition from members of each party.

Due to the Administration's dissatisfaction with the automobile emission cleanup timetable, it has been suggested that a veto might be possible.<sup>27</sup> This appears unlikely because of election-year repercussions and the high percentage of Congress supporting the Clean Air Act Amendments. Additionally, the automobile industry requires almost two years lead time to "tool up" for a particular model year,<sup>28</sup> so 1978 planning is nearly completed with emission levels that would not meet statutory requirements.

The more probable snag for action on the Clean Air Act is adjournment prior to completion of action since substantial conference committee work will be required to synthesize the two versions. In this event, it is likely that legislation resembling Senator Muskie's substitute bill will be passed relaxing automobile emission standards for an interim period until the 1977 Congress can finalize the full Clean Air Amendments.

#### A. PROPOSED STANDARDS FOR LIGHT-DUTY VEHICLE EMISSIONS

The automobile emission control controversy has raged in committees and on the floor as several contrasting amendments (ranging from strong controls to the industry/administration-supported freeze) have been proposed, supported, discussed, analyzed and rejected. Comparison of the relative strengths and weaknesses of these proposals is greatly complicated by the barrage of technical data supporting each one. Amendments at both extremes claimed fuel savings over opposing proposals. Environmentalists claimed marked declines in public health would be brought about by Detroit's proposals, but at the same time the automobile industry's studies found that air quality would improve almost as much under their standards as under the environmentalists.<sup>29</sup> New technology to meet more stringent emission standards, including various types of less-polluting, more economical vehicle engines, was within easy grasp according to environmentalists, but completely unfeasible in the automobile industry's estimation. These proposals facing Congress differed not so much by the reduction in emissions they imposed as by their timetables for implementation. All the proposals contained the same final

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27. *Clean Air Lobbying: Nondeterioration*, 34 CONG. Q. WEEKLY REP. 1033, 1038 (1976).

28. Letter from Roger Strelow, EPA Assistant Administrator for Air and Waste Management, to Rep. Paul Rogers (April 3, 1975) (*printed in House Hearings, supra* note 16, pt. 2, at 1166).

29. 122 CONG. REC. S8551 (daily ed. June 4, 1976) (remarks of Sen. Muskie); 122 CONG. REC. E2798 (daily ed. May 24, 1976) (remarks of Rep. Dingell).

goal for hydrocarbons and carbon monoxide as that in the 1970 Clean Air Act (a 90 percent reduction in these pollutants)<sup>30</sup> but the date for reaching this level varied from 1978 to 1985. The only final standard on which proposals differed was that for nitrogen oxides.

### 1. *Dingell-Broyhill (Train) Amendment*

Representatives John D. Dingell of Michigan and James T. Broyhill of North Carolina sponsored this amendment to H.R. 10498. It was supported by both Environmental Protection Agency (EPA) Administrator Russell Train and the automobile industry.<sup>31</sup> Under the provisions of this amendment standards would remain fixed until 1979, with slightly more stringent interim standards in effect until implementation of the final standards in 1982. The NO<sub>x</sub> level would be set administratively by EPA for the 1982 model year and thereafter.<sup>32</sup> According to its main proponent, Representative Dingell, the advantages of the proposal are that it

permits manufacture of fuel efficient automobiles, phases in stricter air pollution control standards, provides better job security for auto and related industry workers, and reduces air pollution. A major economic impact of my amendment is that it will produce consumer purchase cost savings and maintenance savings far greater than standards contained in H. R. 10498, or other proposals publicly announced to date.<sup>33</sup>

### 2. *Waxman Amendment*

This amendment, sponsored by Representative Henry A. Waxman of California, contains the standards approved by the Health and Environment Subcommittee and later weakened by the Interstate and Foreign Commerce Committee.<sup>34</sup> The final emission standard under this amendment would be implemented in 1980, with a waiver available for NO<sub>x</sub>.<sup>35</sup>

The technical feasibility of this proposal was supported by reference to the California experience:

It requires no more than an extension of the current California standards to all new cars in 1978 and 1979. . . . The fact that the California standards are now being met by 10% of the domestic auto market means that requiring these standards nationwide will not, in our opinion, pose a burden for Detroit.<sup>36</sup>

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30. 42 U.S.C. § 1857f-1(b)(1) (1970).

31. HOUSE REPORT, *supra* note 20, at 47.

32. Staff of Representatives Dingell and Broyhill, Auto Emission Standards and the Clean Air Bill, July 6, 1976; 122 CONG. REC. H4271 (daily ed. May 11, 1976) (remarks of Rep. Dingell).

33. Letter from Representative John D. Dingell to members of Congress, *re* Dingell—Train Auto Emission Standards Amendment to the Clean Air Act Amendments (May 3, 1976).

34. HOUSE REPORT, *supra* note 20, at 475.

35. *Id.*

36. *Id.* at 476.

### 3. *Brodhead Amendment—H. R. 10498*

Representative William M. Brodhead of Michigan presented the amendment that was adopted by the House Committee on Interstate and Foreign Commerce.<sup>37</sup> As a compromise between the Waxman and Dingell proposals, this proposal would freeze current standards for two years (until 1980), at which time the final HC and CO standards would become effective.<sup>38</sup> With the exception of NO<sub>x</sub>, the final standard would not be prefaced by interim standards, thus allowing manufacturers time to experiment with alternate technologies.<sup>39</sup>

### 4. *Hart Amendments*

The most stringent proposal offered to Congress was formulated by Senator Gary Hart of Colorado. His amendments to S. 3219 would have required achievement of statutory HC and CO standards in 1978.<sup>40</sup> Implementation of the 0.4 statutory NO<sub>x</sub> standard would be required in 1982.<sup>41</sup> In other words, this timetable would allow no delays for the automobile industry beyond the latest EPA-granted suspension (with the exception of a three-year delay for NO<sub>x</sub>).

Senator Hart rejected arguments that stiff standards would be economically injurious:

Relaxing clean air [sic] standards is at best an ineffective weapon against inflation and unemployment. Relaxing air quality standards to the detriment of public health and safety misplaces our national priorities. Certainly Congress has at its command more effective tools to deal with national economic problems.<sup>42</sup>

This amendment was defeated by a wide margin on the Senate floor.<sup>43</sup>

### 5. *S. 3219*

The Senate Act, as reported from the Public Works Committee and passed by the Senate, is similar to the Brodhead proposal in eliminating interim standards, but it imposes the statutory guidelines one year earlier than H.R. 10498. It requires that a 1.0 gram per mile NO<sub>x</sub> emission standard be met for 10 percent of a manufacturer's output of new cars for

37. *Id.* at 479.

38. *Id.*

39. Crewdson, *supra* note 23, at 2108.

40. *Id.*

41. SENATE REPORT, *supra* note 20, at 58.

42. In his minority view of the committee report, Senator Hart expressed his opposition to S. 3219 as reported from the Public Works Committee: "If the Committee's proposed amendments are adopted, we should remove the word 'clean' from the Clean Air Act. Or at the very least, we should rename the law the Fairly Clean Air Act or Sort-of Clean Air Act." *Minority Views of Senator Hart*, SENATE REPORT, *supra* note 20, at 136.

43. 122 CONG. Q. WEEKLY REP. 2172 (1976).

1979.<sup>44</sup> The method selected for meeting this requirement is apparently at the option of the manufacturer, and could be fulfilled by meeting the requirement for all cars sold in California, or for certain models of cars.

SUMMARY OF AUTOMOBILE EMISSION STANDARDS  
In Grams Per Mile

	HC	CO	NO <sub>x</sub>
Pre-1968 cars (uncontrolled)	8.7	87.0	3.5
1975-76			
Federal	1.5	15.0	2.0
California	.9	9.0	2.0
1977			
Federal	1.5	15.0	2.0
California	.41	9.0	1.5
1978 Statutory	.41	3.4	.4
H.R. 10498			
1977-79	1.5	15.0	2.0
1980	.41	3.4	2.0
1981-82	.41	3.4	.4(1)
1983-84	.41	3.4	.4(2)
1985	.41	3.4	.4
Dingell-Broyhill (Train) Amendment			
1977-79	1.5	15.0	2.0
1980-81	.9	9.0	2.0
1982-1985	.41	3.4	(3)
Waxman Amendment			
1977	1.5	15.0	2.0
1978-79	.9	9.0	2.0
1980-81	1.5	15.0	3.1
1978	.4	3.4	2.0(5)
	.4	3.4	1.0(6)
1979-81	.4	3.4	1.0
1982	.4	3.4	.4
S.3219			
1977-78	1.5	15.0	2.0
1979	.41	3.4	2.0(5)
	.41	3.4	1.0(6)
1980-1985	.41	3.4	1.0

- (1) E.P.A. Administrator may waive NO<sub>x</sub> to 2.0
- (2) E.P.A. Administrator may waive NO<sub>x</sub> to 1.5
- (3) Administratively determined
- (4) Administrator may waive NO<sub>x</sub> to 1.0
- (5) For 90% of manufacturer's new car fleet
- (6) For 10% of manufacturer's new car fleet

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44. SENATE REPORT, *supra* note 20, at 55.



## III. HEAVY-DUTY VEHICLE STANDARDS

Control measures have progressed more slowly on heavy-duty vehicles than light-duty ones. "It has been estimated that under the currently promulgated standards, the Nation's fleet of 23 million trucks would emit as much pollution as 500 million passenger cars."<sup>46</sup>

This reticence might be attributed to the importance of heavy-duty commercial vehicles to the American economy, which causes a hesitancy to interfere with their operation; to the smaller contribution of heavy-duty vehicles to air pollution problems compared with passenger cars;<sup>47</sup> or to the fact that light-duty vehicle standards were imposed by statute while heavy-duty standards were set administratively. Whatever the reason, 1977 federal standards require only a 15 percent reduction in HC plus NO<sub>x</sub> emissions and a 57 percent reduction in CO from uncontrolled levels. This contrasts sharply with the over 80 percent reductions required of light-duty vehicles.<sup>48</sup>

[A] heavy duty truck will emit as much nitrogen oxides as nine automobiles, as much HC as 18 automobiles, and as much CO as 45 automobiles. These ratios indicate that each year, after 1976, trucks and buses will be the source of a larger and larger percentage of total vehicular emissions. At some time between 1980 and 1985, the emissions from heavy-duty vehicles will be more than half of all transportation emissions, unless control regulations are revised.<sup>49</sup>

Since the form of the Clean Air Act Amendments relating to heavy-duty vehicle emissions has not yet been finalized, it was necessary to compile a hypothetical act to illustrate the issues involved and facilitate analysis. This hypothetical bill, set out below is an attempt to compromise the most recent versions of the bill in each house (S.3219 as passed by the Senate, August 8, 1976, and H.R. 10498 as reported from the Interstate and Foreign Commerce Committee May 15, 1976) in light of technological, environmental, economic, and public policy factors discussed in the voluminous literature on automobile emissions.

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45. Compiled from HOUSE REPORT, *supra* note 20, at 194, 195, 475; SENATE REPORT, *supra* note 20, at 57; 122 CONG. REC. H4270 (daily ed. May 11, 1976).

46. HOUSE REPORT, *supra* note 20, at 222.

47. Eighty-four percent of all vehicles miles traveled in the United States can be attributed to light-duty vehicles, compared to ten percent for light-duty trucks and six percent for heavy-duty vehicles. Emission Control Technology Div., Office of Mobile Source Air Pollution Control, EPA, An Examination of Interim Emission Control Strategies for Heavy Duty Vehicles 58 (October, 1975) [hereinafter cited as EPA Interim Strategies].

48. HOUSE REPORT, *supra* note 20, at 221.

49. *Id.*

Emission Standards For Heavy-Duty Vehicles or  
Engines and Certain Other Vehicles or Engines

(Hypothetical portion of the Clean Air Act Amendments of 1976)

SEC. 1(a) Section 202(a) of the Clean Air Act (42 U.S.C. § 1857f-1) is amended by adding the following new paragraph (3):

“(3)(A) The regulations under paragraph (1) of this subsection applicable to emissions of carbon monoxide, hydrocarbons and oxides of nitrogen from classes or categories of heavy-duty vehicles and engines manufactured in model years—

“(i) 1978 through 1980 shall contain standards which require a reduction of emissions of such pollutants established by application of the best available control technology, giving appropriate consideration to the cost of applying such technology within the period of time available to manufacturers, and to noise, energy, and safety factors associated with the application of such technology.

“(ii) 1981 and thereafter shall contain standards which require reductions of at least 65 percent in the case of oxides of nitrogen compared to the baseline model year 1971, and 90 percent in the case of carbon monoxide and hydrocarbons compared to the baseline model year 1970. These reductions shall be based on the average of the actually measured emissions from heavy-duty gasoline-fueled vehicles or engines, or any class or category thereof, manufactured during the appropriate baseline model year.

“(iii) The Administrator may, where appropriate, classify vehicles and engines regulated under this paragraph by size, gross vehicle weight, horsepower, or use patterns.

“(B) At any time after January 1, 1979, the Administrator may, after notice and opportunity for public hearing, promulgate regulations revising any standard prescribed as provided in subparagraph (A)(ii) for any class or category of heavy-duty vehicles or engines. In revising any standard under this subparagraph, the Administrator shall determine the maximum degree of emission reduction which can be achieved by means reasonably expected to be available for production for such period and shall prescribe a revised emission standard in accordance with this determination.

“(C) Action revising any standard for any period may be taken by the Administrator under subparagraph (B) only if—

“(i) he finds that compliance with the emission standards otherwise applicable for such model year cannot be achieved by the technology,

processes, operating methods or other alternatives reasonably expected to be available for production for such model year without increasing cost or decreasing fuel economy to an excessive and unreasonable degree; and

“(ii) the National Academy of Sciences has not, pursuant to its study and investigation under subsection (c) of this section, issued a report substantially contrary to the findings of the Administrator under clause (i).

“(D) A report shall be made to the Congress with respect to any standard revised under subparagraph (B). The report shall contain—

“(i) a summary of the health effects found, or believed to be associated with, the pollutant covered by such standard,

“(ii) an analysis of the cost-effectiveness of other strategies for attaining and maintaining national ambient air quality standards in relation to the cost-effectiveness of the unrevised standard,

“(iii) a summary of the research and development efforts and progress being made by each manufacturer for purposes of meeting the standards promulgated as provided in subparagraph (A)(ii), and

“(iv) specific findings as to the relative costs of compliance, and relative fuel economy, which may be expected to result from the application of such revised standard, in comparison with the unrevised standard.”

(b) Section 202(b)(3) of the Clean Air Act is amended by adding the following new subparagraph at the end thereof:

“(C) The term ‘heavy-duty vehicle’ means a truck, bus, or other vehicle manufactured primarily for use on the public streets, roads, and highways (not including any vehicle operated exclusively on a rail or rails) which has a gross vehicle weight (as determined under regulations promulgated by the Administrator) in excess of six thousand pounds.”

(c) Section 206 of such Act (relating to compliance testing and certification) is amended by adding the following new subsection at the end thereof:

“(f)(1) In the case of any class or category of heavy-duty vehicles or engines or motorcycles to which a standard promulgated under section 202(a) of this Act applies, a certificate of conformity shall be issued to the manufacturer under subsection (a) (except as provided in paragraph (2)) and shall not be suspended or revoked under subsection (b) notwithstanding the failure of such vehicles or engines to meet such standard if such manufacturer pays a nonconformance penalty as provided under regulations promulgated by the Administrator after notice and opportunity for public hearing.

“(2) No certificate of conformity may be issued under paragraph (1) if the degree by which the manufacturer fails to meet any standard promulgated under section 202(a) exceeds the percentage determined by

regulations promulgated by the Administrator to be practicable. Such regulations shall require such testing of vehicles or engines being produced as is necessary to determine the percentage of the classes or categories of vehicles or engines which are not in compliance with the regulations with respect to which a certificate of conformity was issued, and shall be promulgated not later than December 31, 1977.

"(3) The regulations referred to in paragraph (1) shall be promulgated by the Administrator not later than December 31, 1977, and shall provide for nonconformance penalties in amounts determined by a formula established by the Administrator. Such penalties under this formula—

"(A) may vary from pollutant to pollutant;

"(B) may vary by class, category, vehicle, or engine;

"(C) shall be based on the extent to which actual emissions of any air pollutant exceed allowable emissions under the standards promulgated under section 202;

"(D) shall create incentives for the development of vehicles or engines which achieve the required degree of emission reduction; and

"(E) shall remove any competitive disadvantage to manufacturers whose engines or vehicles achieve the required degree of emission reduction."

#### A. ANALYSIS OF THE HYPOTHETICAL CONFERENCE BILL

The basic framework of the vehicle emission standards set forth in the Clean Air Act is supplemented by Environmental Protection Agency regulations in 40 C.F.R. Part 86 (1976). The EPA now has power to modify standards in several ways: by suspending the standards (subject to certain restrictions)<sup>50</sup> if the administrator finds that reaching the standards would be unfeasible for a particular model year, by developing and modifying testing procedures,<sup>51</sup> and by setting standards for uncontrolled pollutants.<sup>52</sup> If the proposed amendments are passed, the EPA will gain the additional ability to divide the category of heavy duty vehicles into

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50. 42 U.S.C. § 1857f-1(b)(5)(C) (Supp. 1974) provides:

The Administrator shall grant such suspension only if he determines that (i) such suspension is essential to the public interest or the public health and welfare of the United States, (ii) all good faith efforts have been made to meet the standards established by this subsection, (iii) the applicant has established that effective control technology, processes, operating methods, or other alternatives are not available or have not been available for a sufficient period of time to achieve compliance prior to the effective date of such standards, and (iv) the study and investigation of the National Academy of Sciences conducted pursuant to subsection (c) of this section and other information available to him has not indicated that technology, processes, or other alternatives are available to meet such standards.

51. 42 U.S.C. § 1857f-1(b)(2) (1970).

52. 42 U.S.C. § 1857f-1(a)(1) (1970).

further subcategories based on gross vehicle weight, size, horsepower or use patterns.<sup>53</sup>

Section (3)(A)(i) of the hypothetical bill (dealing with 1978-1980 standards) reflects similar provisions found in both houses. It states that interim emission guidelines will be set administratively at the level of "best available control technology" while taking into account other factors that tend to slow emission clean-up.<sup>54</sup> In May of 1976 the EPA proposed standards for 1979 and later model years for heavy-duty vehicles. It is not clear to what degree the final form of these standards will need to be altered to agree with the current amendments. The standards contemplated by EPA are significantly less stringent than those proposed in either congressional bill, particularly for carbon monoxide. The congressional carbon monoxide standard for model years following 1981 is approximately 9.5 gms/BHP-hr, contrasted with the EPA standard for 1979 of 25 gms/BHP-hr.<sup>55</sup> Some revisions in the EPA regulation thus appear necessary.

The goals for emission reduction for the 1980's are expressed in §(3)(A)(ii) of the hypothetical bill. The foremost difference between the Senate and House versions regarding desirable standards was the timetable for compliance. The Senate called for compliance by 1981 with standards that were slightly stricter than those imposed by the House, but the House would have allowed an additional four years for compliance.<sup>56</sup> Determining a compliance deadline is the most controversial issue of the air pollution debate.

Determination of heavy-duty vehicle emission standards is, in simplified form, a three-step process. First, ambient air quality standards<sup>57</sup> must be set based on health effects of various pollutants, cost, impact on the economy as a whole, energy consumption, regional differences in air quality, and a variety of other factors. Measures to achieve the ambient air quality standards must then be allocated between stationary and mobile source controls by weighing cost-effectiveness, available technology and impact on various industries. Finally, further allocations of emission cut-backs must be made among categories of mobile sources—light-duty vehicles, heavy-duty vehicles, motorcycles, railroad engines, and aircraft,

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53. Hypothetical bill § 1(a), referring to 42 U.S.C. § 1857f-1(3)(A)(iii) (1970); S.3219, 94th Cong., 2d Sess. § 17 (1976); H.R. 10498, 94th Cong., 2d Sess. § 204 (1976).

54. S.3219, 94th Cong., 2d Sess. § 17 (1976); H.R. 10498, 94th Cong., 2d Sess. § 204 (1976).

55. 41 Fed. Reg. 21,292 (1976). Uncontrolled CO emission levels from heavy-duty gasoline trucks were measured at 95 grams per BHP-hr. EPA Interim Strategies, *supra* note 51, at 38.

56. S.3219, 94th Cong., 2d Sess. § 17 (1976); H.R. 10498, 94th Cong., 2d Sess. § 204 (1976).

57. Ambient air standards refer to overall air quality as opposed to emission levels from particular sources.

and subcategories within these main categories. The basis of this allocation is again found in cost-effectiveness and available technology, along with the particular requirements of users of different classes of vehicles and the possibility of reducing vehicle miles traveled.

Of course, this entire process is colored by an overlay of political activity, ranging from response to an environmental crisis to protection of entrenched economic interests. The process must be repeated for each controlled pollutant, with the further complicating factor of synergistic effects of various pollutants.<sup>58</sup>

### 1. Standards for Individual Pollutants

The particular percentages of reductions of heavy-duty vehicle emissions in S. 3219 and H.R. 10498 appear to have been selected by Congress primarily to equalize the burden between light and heavy-duty vehicles, since the reductions are almost identical to those established for light-duty vehicles.<sup>59</sup> The emphasis in past years has been on reducing emission levels of passenger cars and other light-duty vehicles; emissions from Diesel heavy-duty vehicles have been allowed to increase.<sup>60</sup> It should be noted, however, that light and heavy-duty vehicle standards are not directly comparable since light-duty vehicle emissions are measured in grams per mile, while heavy-duty vehicle emissions are expressed in grams per brake horsepower hour (BHP-hr).

In past years, standards for heavy-duty vehicle emissions have allowed a combined total for HC and NO<sub>x</sub> so that manufacturers could exercise more flexibility in their pollution control technology by severely cutting back on one pollutant while allowing greater outputs of the other pollutant. This practice has been questioned by the EPA in its most recent proposal for heavy-duty vehicle standards, which sets forth both a combined standard (10 gms/BHP-hr NO<sub>x</sub> + HC) and a separate standard for hydrocarbons (1.5 gms/BHP-hr).<sup>61</sup>

An EPA report on interim controls discussed the advisability of combining HC and NO<sub>x</sub> standards and noted research indicating that controlling HC is the most effective means of limiting oxidant formation.<sup>62</sup> The EPA's proposal (using both HC and combined standards) has been described as emphasizing control of hydrocarbons but penalizing those

58. 122 CONG. REC. S8554 (daily ed. June 4, 1976); 1 COORDINATING COMM. ON AIR QUALITY STUDIES, NATIONAL ACADEMY OF SCIENCES, NATIONAL ACADEMY OF ENGINEERING, 93D CONG., 2D SESS., AIR QUALITY AND AUTOMOBILE EMISSION CONTROL 18-20 (Comm. Print 1974).

59. H.R. 10498, 94th Cong., 2d Sess. § 204, (1976) specifies that reductions shall be 90% for HC and CO and 65% for NO<sub>x</sub>, while S.3219, 94th Cong., 2d Sess. § 17, (1976) merely states that heavy-duty vehicle standards will be "equivalent" to those for light-duty vehicles.

60. SENATE REPORT, *supra* note 20, at 53.

61. 41 Fed. Reg. 21,292 (1976).

62. EPA Interim Strategies, *supra* note 47, at 21.

manufacturers who have chosen to restrict NO<sub>x</sub> emission at the expense of HC formation.<sup>63</sup>

Two other options were also considered in promulgating regulations: adopting separate standards for HC and NO<sub>x</sub>, and using separate standards plus a combined standard. Both were rejected as being overly severe on all manufacturers who have reached the previous combined standard by cutting back on only one of the pollutants, whereas the EPA proposed standard would adversely affect only the manufacturers who had allowed high levels of HC.<sup>64</sup>

The long-term goal is reduction in both HC and NO<sub>x</sub> standards, so the final standards (as delineated in the hypothetical act) should contain separate requirements. However, for the interim time period (1979-1980), the EPA felt that continuation of the combined standard would create less of an economic hardship for manufacturers who had chosen to comply with previous standards primarily by reducing only one of the constituent pollutants.<sup>65</sup>

Applying the 90 percent/90percent/65 percent reductions to figures previously available, it appears that heavy-duty vehicles will be expected to reach standards of approximately .8/9.4/4.0 grams per brake horsepower hour by 1981.<sup>66</sup> An even stricter reduction requirement, 90 percent for all three pollutants, was proposed in the 1975 House Clean Air bill, but was later discarded.<sup>67</sup> As noted *supra*, the carbon monoxide standard will be particularly difficult to attain since it represents such a severe cutback from previous standards for gasoline-powered engines. However, the carbon monoxide standard is still not as low as measured pollutants from an *uncontrolled* Diesel engine. From the air quality viewpoint, the Diesel engine appears to present distinct advantages over the gasoline engine. Uncontrolled Diesel emissions for each of the three major pollutants are significantly lower than for comparable uncontrolled gasoline engines.<sup>68</sup>

In the past, separate standards have been promulgated for gasoline and Diesel engines. This practice has now been abandoned in order to give extra incentive to a conversion from gasoline engines to Diesel, which would act to cut actual overall heavy-duty vehicle pollutants.<sup>69</sup>

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63. EPA Interim Strategies, *supra* note 47, at 21.

64. *Id.*

65. *Id.* at 23.

66. Based on figures *id.* at 40.

67. SUBCOMM. ON HEALTH AND THE ENVIRONMENT, COMM. ON INTERSTATE AND FOREIGN COMMERCE, 94TH CONG., 1ST SESS., CLEAN AIR ACT AMENDMENTS OF 1975—SUMMARY OF THE BILL 11 (Comm. Print 1975).

68. EPA Interim Strategies, *supra* note 47, at 40.

69. SENATE REPORT, *supra* note 20 at 54. HOUSE REPORT, *supra* note 20, at 224 n. 15.

## 2. Noncompliance Penalty

Section (c) of the hypothetical bill follows H.R. 10498 in allowing manufacturers an opportunity to avoid complying with stringent emission standards by payment of a nonconformance penalty. This is a unique treatment of the problem of noncompliance—considerably more realistic than delegating to the Administrator only the illusory options of granting a total waiver or enjoining production of noncomplying vehicles.<sup>70</sup> This provision is interesting in that it highlights a point of controversy among environmentalists: do controls operate more effectively through imposition of legal sanctions or through economic incentives? The hypothetical bill attempts to synthesize these two alternatives.

Of course, a vital factor in the effectiveness of this technique is the setting of penalties. The guidelines enumerated in §1(b)(C)(3) of the hypothetical bill require that the manufacturer's penalty at least exceed the costs expended by competitors in complying and not foreclose the possibility that a voluntary discontinuance of production of noncomplying vehicles would be a less costly alternative.

Another motivation for setting heavy-duty vehicle emission standards at the point specified by Congress is to "force technology." The prevalent theory is that manufacturers will be motivated to strive for advances in emission control technology only if the standards are set beyond the level achievable with existing technology. This technology-forcing motivation was readily admitted by Congress. The House Committee on Interstate and Foreign Commerce made a statement often expressed in the congressional discussion of emission levels:

In providing for these levels, the Committee did not conclude that they were certainly technologically feasible. Rather, the Committee determined that these were reasonable target levels for manufacturers at which to aim research and development efforts for 1985 production.<sup>71</sup>

The concept of technology-forcing as a legitimate tool of environmental legislation has been affirmed recently by the United States Supreme Court.<sup>72</sup> The obvious problem, of course, is attempting to predict the rate at which technology will become available. As an "escape hatch," the hypothetical bill incorporates a provision allowing the EPA Administrator to revise standards if compliance is not feasible or would be too costly in terms of cost or fuel economy.<sup>73</sup> As an additional deterrent to manufacturers seeking to relax standards, the bill provides that the National Academy

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70. *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 636 (D.C. Cir. 1973).

71. HOUSE REPORT, *supra* note 20, at 224.

72. *Union Electric Co. v. Environmental Protection Agency*, 96 S. Ct. 2518 (June 25, 1976) (dealing with ambient air quality standards).

73. Hypothetical bill § 1(a), referring to 42 U.S.C. § 1857f-1(a)(3)(B) (1970).



of Sciences must not be in opposition to a loosening of standards. Thus the bill attempts to force manufacturers into a good-faith effort to comply.

#### IV. AIR QUALITY AND HEALTH EFFECTS

Although emission standards for new vehicles have been reduced by over eighty percent,<sup>74</sup> this has not been reflected in a concomitant improvement in either air quality or emissions from vehicles in operation. Automotive emissions were reduced by approximately twenty-five percent in 1975 over baseline year 1972, and will be reduced an expected forty-five percent in 1977.<sup>75</sup>

Air quality improvements from vehicular emission reductions consistently lag behind new car standards because of two factors:

##### (1) *Failure to reduce vehicle miles traveled.*

The cutback in emissions per vehicle is partially offset by the growing number of automobiles on the road each year.<sup>76</sup> Despite slowdowns in new car sales, the total number of passenger cars registered in 1975 was 2.4 million more than in 1974, and the number of trucks increased by 1.3 million.<sup>77</sup> It has been predicted that "the historical growth of the vehicle population and the increasing trend in annual mileage per vehicle lead to a projected increase in automotive emissions sometime after 1985."<sup>78</sup>

##### (2) *Vehicle age mix.*

Even if the vehicle emission standards were permanently frozen at their present levels, air quality would continue to improve for several years as new vehicles replaced older pre-controlled vehicles.<sup>79</sup> This replacement process has two major ramifications. First, economic conditions causing automobile sales to decline have negative effects on the environment if it is assumed that the total number of vehicles in use will remain relatively constant. Second, and more importantly, adding overly expensive emission-control equipment to automobiles may have the contrapositive effect of degrading ambient air quality. If consumers are dissuaded from purchasing new automobiles because of higher prices, higher fuel

74. *Senate Hearings, supra* note 16, pt. 4, at 1340 (statement of EPA Administrator Russell Train).

75. J. HOROWITZ & S. KURTZ, *TRANSPORTATION CONTROLS TO REDUCE AUTOMOBILE USE AND IMPROVE AIR QUALITY IN CITIES*, EPA OFFICE OF AIR AND WASTE MANAGEMENT 8 (1974).

76. Domenici, *The Clean Air Act Amendments of 1976: Balancing the Imponderables*, NOTRE DAME J. LEGIS. (1976).

77. MOTOR VEHICLE MANUFACTURERS ASSOCIATION, *MOTOR VEHICLE FACTS AND FIGURES* 29 (1976).

78. J. HOROWITZ & S. KURTZ, *supra* note 75, at 8. This projection was made prior to the granting of the last two suspensions.

79. 122 CONG. REC. E2798 (daily ed. May 24, 1976).

consumption, or diminished performance, older cars will remain on the road for a longer time, creating an adverse environmental effect.<sup>80</sup>

As will be described in the economic impact section, *infra*, price increases due to emission control technology are relatively small when compared with increases for optional accessories or inflation, but the replacement process effects of emission control alternatives should be the subject of further investigation.

The ultimate effect on the public health of a given pollution control technology can be difficult to predict, due to the varying mix of advantages and disadvantages of the different methods. For example, catalysts are especially effective in meeting strict emission reduction standards for some pollutants, but they also produce an unusually large amount of sulfates, the danger of which has not yet been fully assessed.<sup>81</sup>

For the most part, health effects are dependent upon ambient emission levels. It is difficult to separate health problems caused by mobile sources from those created by stationary sources. A few basic differences are apparent, though; for example, carbon monoxide from vehicles in urban areas is more directly harmful to human health than identical pollutants from factories and power plants because vehicle pollutants are emitted at street level where they are not easily dispersed.

Significant health effects of air pollution have been confirmed by numerous studies. The results of a few of these studies will suffice to illustrate the seriousness of the health hazard posed by automotive pollutants:

(1) Four thousand deaths per year and four million illness-restricted days per year may result from automobile emissions, according to the Coordinating Committee on Air Quality Studies report to the Senate Public Works Committee. This is approximately .25% of the total U.S. health hazard.<sup>83</sup>

(2) Specifically, pollutants have been linked to heart problems, respiratory disease, hypertension, and cancer. "[T]here is growing evidence that nitrogen oxides may combine with other substances in urban air to form deadly, cancer-causing nitrosamines."<sup>84</sup>

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80. *International Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 634 (D.C. Cir. 1973).

An analogous occurrence has been described by the Motor Vehicle Manufacturers Association, which attributed a 43% decline in sales of Diesel vehicles over 33,000 pounds (1974 to 1975) to the recession and "buyer resistance to Federal Motor Vehicle Safety Standard 121 (Air Brakes) which dramatically increased prices." MOTOR VEHICLE MANUFACTURERS ASSOCIATION, *supra* note 83, at 17.

81. *House Hearings*, *supra* note 16, pt. 1 at 48 (Testimony of EPA Administrator Train).

82. J. HOROWITZ & S. KURTZ, *supra* note 75, at 9.

83. COORDINATING COMM. ON AIR QUALITY STUDIES, *supra* note 58, at 12.

84. HOUSE REPORT, *supra* note 22, at 197.

(3) "[T]he Department of Health, Education and Welfare estimated in 1970 that automotive air pollution cost the Federal Government \$1.9 billion in lost income taxes due to premature death, \$0.2 billion in disability payments and \$0.1 billion in lost production."<sup>85</sup>

(4) A study of New York metropolitan policemen on patrol car duty found that they exhibited abnormally high levels of carbon monoxide and lead in their blood and a high incidence of high blood pressure, breathing problems, and abnormal heart action.<sup>86</sup>

(5) Health effects become more pronounced when the effect on particularly susceptible groups, including children, the elderly, and those with respiratory and cardiac problems, is studied separately.<sup>87</sup> For example, it has been estimated that a standard of 3.1 grams per mile of NO<sub>x</sub> will cause 200 to 245% more days of illness in children than the statutory standard.<sup>88</sup>

In general, studies of health effects of air pollution have concluded that there is no "threshold" level of pollutants above which public health is harmed and below which air quality is "safe".<sup>89</sup> Ideally, standards should be set by determining a level at which no serious health effects have been observed, and then allowing a safety margin to overcome presently unknown effects and synergistic reactions. The actual process of setting air quality standards involves other considerations—unquantifiable health and environmental benefits must be balanced against more readily quantifiable fuel consumption and technological costs.

#### V. FUEL CONSUMPTION

The correlation between fuel consumption and pollution control is one of the strongest arguments that has been used against enactment of strict emission standards. Although demonstrably strong in the past, that correlation has recently been questioned.

Anti-pollution measures were the major cause of a 13 to 20 percent fuel economy loss between 1967 and 1974, but 1975 and 1976 witnessed a return to better gas mileage. EPA tests showed that 1975 models increased gas mileage by an average of 13.5 percent over 1974 cars,<sup>90</sup>

85. *Id.* at 208.

86. Schmack, *Data Link Adverse Health Effects to Air Pollution*, New York Times, Feb. 27, 1976. Study by E. J. Felderman, M.D. *reprinted in* 122 CONG. REC. H1587 (daily ed. March 3, 1976).

87. COORDINATING COMM. ON AIR QUALITY STUDIES, *supra* note 58, at 41.

88. HOUSE REPORT, *supra* note 20, at 212. For further statistics on health effects of emissions, see Department of Transportation, EPA, Federal Energy Administration, *Analysis of Some Effects of Several Specified Alternative Automobile Emission Control Schedules*, *reprinted at* 122 CONG. REC. H3482 (daily ed. April 27, 1976).

89. COORDINATING COMM. ON AIR QUALITY STUDIES, *supra* note 58, at 17.

90. *Id.* R. KRZYCZKOWSKI, *supra* note 1, at 5-3.

increasing to 26.6 percent for 1976 models.<sup>91</sup>

The true energy impact of pollution control is a question that *should* be answered through scientific investigation, rather than through legal or political determinations. The contradictions presented in existing scientific analyses, however, return the question to the political arena. Therefore, to describe the political controversy fully it is necessary to summarize the divergent scientific findings.

It should be noted that presentations supporting the fuel consumption/emission control correlation are usually stated in terms of fuel penalties caused by adjustments and devices altering the classic Otto internal combustion engine.<sup>92</sup>

Representative Dingell, in comparing his proposed standards to stricter ones, commented:

Brodhead, or the Committee bill, results in a 5 percent reduction in fuel economy for model year 1980 cars relative to Dingell-Train. A 5 percent reduction corresponds to 2.46 billion gallons of added gasoline consumption over the ten-year lifetime of the model year 1980 auto fleet; this amounts to 16,000 barrels per day.<sup>93</sup>

A study conducted by DuPont found that meeting the statutory emission standards<sup>94</sup> would cause a 20 per cent fuel economy loss compared to 1975 models, while maintaining existing standards<sup>95</sup> would allow manufacturers more freedom for technological innovation.<sup>96</sup>

Presentations attempting to prove that fuel economy need not be harmed by air quality controls tend to rely on the utilization of new technology rather than on modifications of the Otto engine. An interesting point is that "1976 cars are the most fuel efficient since 1957 and the uncontrolled emission days. In some cases, methods used to reduce emissions has [sic] also improved fuel economy."<sup>97</sup>

Relative fuel consumption depends upon several factors: vehicle weight, type of engine, and perfection of that type of technology. Emission controls are not directly related to fuel consumption:

91. HOUSE REPORT, *supra* note 20, at 201.

92. Reitze and Reitze, *Law—Engines for the Future*, ENVIRONMENT (1976), *reprinted in* 122 CONG. REC. H4915 (daily ed. May 25, 1976).

93. 122 CONG. REC. H4270 (daily ed. May 11, 1976) (remarks of Rep. Dingell). The source of Representative Dingell's information was the Department of Transportation study, *supra* note 88. It should be noted that this study found no fuel consumption differences between the Dingell-Broyhill (Train) and Brodhead standards for model years 1976-1979 and 1982-1984.

94. .4/3.4/.4 grams per mile.

95. 1.5/15.0/3.1 grams per mile.

96. E.I. du Pont de Nemours & Co., Inc., Vehicle Design Options for Reducing Gasoline Consumption, in *House Hearings*, pt. 2, 1132, 1133.

97. Vol. 83 No. 12 Dec. 1975, Austin, Michael & Service, *Fuel Economy Trends*, AUTOMOTIVE ENGINEERING 12, 29 (1975), *quoted in* HOUSE REPORT at 201.

There is no inherent relationship between exhaust emission standards and fuel economy. Delaying or relaxing standards cannot guarantee that gains in fuel economy will be made. . . .<sup>98</sup>

The EPA and Federal Energy Administration (FEA) joined in a technical analysis which concluded that fuel economy improvements mandated by 1985<sup>99</sup> will be achieved "almost totally by non-emission control related changes such as weight reduction, model mix shifts, driveline improvements and the use of diesel engines."<sup>100</sup> This study found that there would be no fuel penalty for meeting the statutory emission standard, provided enough time were allowed for development. Implementation in 1980 would cause a fuel economy loss of 10 to 15 percent, and reaching statutory standards by 1978 would cause a 15 to 20 percent fuel economy loss compared to 1976 cars.<sup>101</sup> On the other hand, another FEA study concluded that gas mileage improvements could be made while meeting these standards.<sup>102</sup> Thus it appears that it is not the standard per se that harms gas mileage, but rather the technology utilized in achieving that standard.

The United States consumes about 6.3 million barrels of gasoline per day. Approximately 25 percent of this amount is used by commercial vehicles.<sup>103</sup> Thus it is appropriate to illustrate the differences in fuel consumption that can be caused by various technologies with the example of heavy-duty vehicles. Diesel engines currently attain 25 percent better mileage than gasoline-powered engines, yet emit fewer pollutants.<sup>104</sup> It is anticipated that the difference in fuel costs and other maintenance costs may militate toward usage of Diesel engines. Since Diesels are already within proposed emission standards, no fuel penalties for Diesels will result by implementation of these standards.

For heavy-duty gasoline engines, EPA expects no fuel penalty for implementation of their proposed 1979 standards.<sup>105</sup>

98. EPA, AUTOMOBILE EMISSION CONTROL (December, 1974), *quoted by* Representative Waxman, 122 CONG. REC. E2887 (daily ed. May 26, 1976).

99. The Energy Policy and Conservation Act of 1975, Pub. L. No. 94-163, §301, 89 Stat. 871. set fuel economy standards for all manufacturers at 20.0 miles per gallon in 1980 and 27.5 miles per gallon in 1985.

100. Federal Energy Administration and EPA, Joint Technical Paper (Feb. 20, 1976), *quoted in* HOUSE REPORT, *supra* note 20, at 197.

101. EPA, Progress in the Implementation of Motor Vehicle Emission Standards Through June, 1975, 26 (1976).

102. Federal Energy Administration, Potential New Car Fuel Economy (October, 1974), in *House Hearings, supra* note 16, 183, 188.

103. E.I. du Pont de Nemours & Co., Inc., *supra* note 96, at 1133.

104. EPA Interim Strategies, *supra* note 47, at 23 and 63.

105. Proposed 1979 standards are 1.5/25/10(HC<sub>x</sub>+NO<sub>x</sub>) grams per BHP-hr. 41 Fed. Reg. 21292 (1976); EPA Interim Strategies *supra* note 47, at 39-41.

In fact, based on recent light duty vehicle performance, it is expected that a recovery of any existing fuel penalty will be possible if catalyst technology is applied to gasoline engines.<sup>106</sup>

FEA has projected that average fuel economy for heavy-duty vehicles may improve 18 percent by 1980.<sup>107</sup> These administrative estimates differ sharply from estimates presented by some vehicle manufacturers to the California Air Resources Board in 1973, which stated that fuel penalties for a standard similar to the 1979 Federal standard<sup>108</sup> could reach 40 percent.<sup>109</sup>

To date no studies have been made assessing the fuel economy impacts of the heavy-duty vehicle standards contemplated in Congress for 1981 and beyond. This area is one that should be investigated immediately because these standards are significantly more stringent than their predecessors.

#### VI. ECONOMIC IMPACT OF VEHICULAR EMISSION LIMITATIONS

Economic impact of vehicular emission controls may be manifested in three ways:

First, the cost to purchasers may be raised by devices (such as catalysts) added to vehicles to limit pollution and by increased fuel consumption.

Secondly, a slowdown in the purchase of new vehicles could occur because of the increased price, resulting in economic injury to the automobile industry, and reverberating through the economy as a whole.

Thirdly, the increased cost of transporting goods by truck because of higher capital costs of heavy-duty vehicles and higher fuel consumption could have consequential effects on the trucking industry.

On balance, the evidence discussed *infra* shows that the economic impacts of vehicular controls are minimal, and that the net economic impact of pollution control, including both stationary and mobile sources, is positive.

106. EPA Interim Strategies, *supra* note 47, at 41.

107. Federal Energy Administration, Potential for Motor Vehicle Fuel Economy Improvement—Report to Congress (Oct. 24, 1975), in *House Hearings*, *supra* note 16, pt. 1, 189, 194.

108. 5 grams per BHP-hr. (HC, NO<sub>x</sub>)/25 grams per BHP-hr. CO.

109. EPA Interim Strategies, *supra* note 47, at 31. The EPA concluded that these figures were suspect:

The gross overestimations of fuel penalty by Chrysler, Ford, IH [International Harvester] . . . clearly represent a lack of development effort by these manufacturers. Furthermore, the panel concludes that the large fuel consumption 'penalties' quoted by some manufacturers are more the result of questionable data chosen to try to influence CARB'S [California Air Resources Board's] decision on their standards than they are estimates representative of good faith efforts to achieve the emission levels required with minimum or no BSFC [brake specific fuel consumption] penalty.

## A. INCREASED VEHICULAR COST

For the majority of private passenger automobiles, emission controls will be achieved by modification of presently utilized engine designs rather than by widespread conversion to advanced designs. Thus it should be comparatively easy to compute the extra cost that will be added to the price of each new car to compensate for emission controls. Despite this seeming ease of computation, estimates by proponents of various viewpoints have differed considerably.

Senator Muskie stated that the S.3219 standard would add \$175 to \$218 to the price of a new 1982 car, while the less stringent Dingell-Train standard would add an almost identical \$175 to \$216. He estimated that the lifetime cost difference between the two sets of standards would be approximately \$100.<sup>110</sup>

On the other hand, EPA determined that the lifetime cost of S.3219 would be \$217 to \$369 higher than the Dingell-Train standards.<sup>111</sup> Henry Ford II stated that emission reductions for models beyond 1978 would cost \$750 per car.<sup>112</sup> Another estimate places pollution control cost for 1980 cars at \$350 in equipment costs plus \$50 to \$75 additional fuel and maintenance costs per year.<sup>113</sup>

The year-to-year change in the base price of new automobiles has increased from .57 percent to 10.19 percent during the last decade, but additional safety and anti-pollution equipment is not the primary reason for these increases. Instead, the blame can be placed on inflation and the greater use of convenience and power options.<sup>114</sup>

The wholesale price index for passenger cars rose to 134 in April of 1976, compared to a 1967 base of 100, but this rise was not as great as that of most goods. The overall consumer price index rose to 168 during this period.<sup>115</sup>

Maintenance and fuel costs of pollution control equipment, as well as initial equipment costs, are affected by the type of technology utilized, and not merely by the emission standards selected. This phenomenon is best illustrated by a National Academy of Sciences study which compared sticker price, fuel, and maintenance costs for vehicles achieving S.3219

110. 122 CONG. REC. S8552 (daily ed. June 4, 1976).

111. Dep't. of Transportation, et al., *supra* note 88, at H3484.

112. R. KRZCZKOWSKI, *supra* note 1, at 5-3.

113. White, *The Auto Pollution Muddle*, 32 PUBLIC INTEREST 97, reprinted in 122 CONG. REC. S9317, S9320 (daily ed. June 15, 1976).

114. Biniek, *The Economics of Auto Emission Controls: An Historical Overview*, Congressional Research Service study, reprinted in 122 CONG. REC. E3083, E3084 (daily ed. June 3, 1976).

115. National Academy of Sciences, Comm. on Motor Vehicle Emissions Report (November, 1974) summarized at SENATE REPORT, *supra* note 20, at 59.

standards for 1980 utilizing different control techniques. The most expensive would add a lifetime total cost of \$575 to the 1970 base price, while a Diesel engine was forecast to be more economical than the 1970 gasoline-powered model by \$234.<sup>116</sup> The Diesel engine would yield a vastly different cost configuration than alterations in present engines: the initial equipment cost would be higher, but would be counteracted by significant savings on fuel and maintenance.<sup>117</sup>

Accessories add significantly to the price of new cars. The average consumer adds \$800 to the price of his automobile by purchasing optional accessories.<sup>118</sup>

Thus, any decrease in sales of new cars due to higher prices would not be attributable solely to emission control devices, although their effect might be larger than that discernible from their percentage as a component of cost increase. For example, present emission control devices have caused decreases in engine power that might dissuade buyers from purchasing new cars.

Disagreement as to the fuel economy implications of different standards and the technologies used to achieve them also influences the outcome of lifetime vehicle cost computations. Regarding these costs, the Senate Public Works Committee concluded, "The costs of emission control are real, but they are reasonable in relation to the public benefits achieved."<sup>119</sup>

#### B. EFFECTS ON THE AUTOMOBILE INDUSTRY AND THE NATIONAL ECONOMY

Imposition of strict automobile pollution control has been predicted to lead to serious economic consequences. Projected consumer cost increases and shifting target emission levels would, according to some observers, lead to "[h]igher inflation rates, [r]educed purchasing power, [r]educed consumption of new cars, [g]reater unemployment in the auto industry, [g]reater unemployment in related supplier industries (steel, rubber, glass, etc.), [and a] [r]eturn to the recessionary spiral."<sup>120</sup>

It is not contested that the automobile industry suffered from a severe decline in sales during the early 1970's, brought on by the recessionary conditions prevalent throughout the economy and by oil shortages. The

116. *Id.*

117. Dep't of Transportation, et al., *supra* note 88, at H3486.

118. *Most GM Prices Top \$4,000*, Los Angeles Times, Aug. 28, 1974, § III, at 11, quoted in Biniek, *supra* note 114, at E3084.

119. SENATE REPORT *supra* note 20 at 60.

120. *Dissenting Views of Representatives John D. Dingell, James Broyhill, Fred Rooney, Clarence Brown, John Murphy, John McCollister, W.S. (Bill) Stuckey, Jr., James Collins, and Robert Kreuger*, [hereinafter cited as *Dissenting Views of Dingell*] HOUSE REPORT 415, 416.



issue in dispute is the stability of the present recovery of the industry. Statements by congressmen from opposite sides of the automobile emission controversy illustrate these divergent viewpoints. Senator Muskie commented:

Dark projections of permanent industry depression were vastly overstated. Suggestions that the domestic auto industry would suffer permanent retrenchment have been replaced by new statistics indicating that an upturn has occurred. . . . Industry sales as of December, 1975 were up 30 percent over those of a year earlier. . . .

The dire statistics presented by industry spokesmen as a basis for relaxing emission requirements have also undergone a metamorphosis. Long-term layoffs of auto workers were down to about 65,000 industrywide in January, 1976, compared to 275,000 in February, 1975. . . .<sup>121</sup>

On the other hand, the viewpoint of those who oppose emission standards as harmful to the economy was stated by Representative Dingell:

Only recently has there been evidence of a trend toward reducing the rate of unemployment, but this could be reversed if energy penalties and high consumer costs produce further inflation, with consequent reduction in purchasing power. The [House Interstate and Foreign Commerce] Committee bill and Waxman amendment are capable of providing just such a disruptive influence.<sup>122</sup>

Another way of approaching this controversy is to examine the air pollution control effort as a whole. When stationary source control is included in the economic analysis, the economic impact of pollution control appears more positive, although mobile source controls may be more cost-effective for certain pollutants. A study by the Council on Environmental Quality revealed that 1.1 million workers are employed in the pollution control industry.<sup>123</sup> According to Council on Environmental Quality Chairman Russel W. Peterson, the report "provides a forceful rebuttal to the thesis that we must choose either a healthy economy or a healthy environment. On the contrary, it suggests economic health and environmental health are interrelated."<sup>124</sup>

121. 122 CONG. REC. S12488 (daily ed. July 26, 1976) (remarks of Sen. Muskie).

122. *Dissenting Views of Dingell*, *supra* note 120 at 418.

The United Automobile Workers expressed a similar view:

There is a trade-off between short-range increases in fuel efficiency and decreases in emission standard requirements for new cars. Unless that trade-off is allowed for in setting the standards, we will have severe disruption in production and marketing activities of the domestic auto industry, and that will hamper the nation's ability to reduce the current high level of unemployment and the human suffering which it causes. United Automobile Workers, Position Paper on Federal Standards for Auto Emissions and Fuel Efficiency (March 6, 1976), in Senate Hearings, pt. 3, at 300.

123. J. Leung & J. Klein, Council on Environmental Quality, study, *reported in* 122 CONG. REC. H314 (daily ed. Jan. 26, 1976).

124. *Id.*

The scales weighing the costs of automobile emission clean-up may be tipped by another means, namely, including the externalities of vehicular pollutants in the analysis. The National Academy of Sciences estimated the health and other benefits from automobile emission controls at 2.5 to 10 billion dollars per year.<sup>125</sup>

### C. EFFECTS ON THE TRUCKING INDUSTRY

The reaction of motor carriers to emission control has quite often been negative. The Highway Users Federation stated, "Greatly increased truck costs would constitute an added burden on an industry which already feels itself threatened by proposed economic deregulation."<sup>126</sup>

However, EPA studied the costs that would arise from control of heavy-duty vehicles and found that they were insignificant. To implement standards as stringent as 1.5/15/9 grams per BHP-hr., gasoline-powered trucks would probably need to be equipped with a catalyist. The initial cost would be \$165 amortized over a 160,000 mile useful life of the vehicle (a cost of .1¢ per mile), but in addition there would be a fuel savings of eighty-seven dollars per year.<sup>127</sup>

For a Diesel engine, the initial cost would be approximately \$300 to meet these standards. This would amortize to .07¢ per mile over an average 436,000 mile useful life.<sup>128</sup> There is not expected to be a fuel penalty for this level of control.

These figures must be evaluated in light of the average cost of operating a heavy-duty vehicle—usually over one dollar per mile.<sup>129</sup> It should be noted that the controls evaluated by EPA are considerably weaker than those that would be required under the current congressional proposals. This is another area that merits some investigation prior to final enactment of statutory standards.

#### COST PER HEAVY-DUTY ENGINE OVER 1974 BASE TO MEET POSSIBLE EMISSION STANDARDS<sup>130</sup>

	Diesel Engine	Gasoline Engine
HC/CO/NO <sub>x</sub> *		
3/30/9	\$100	\$ 75
1.5/25/9	\$300	\$110
1.5/15/9	\$300	\$165

\* Grams per brake horsepower hour.

125. HOUSE REPORT at 208.

126. *From Issues to Answers*, HIGHWAY USERS QUARTERLY 2, 11. (Spring, 1976).

127. EPA Interim Strategies, *supra* note 47, at 64. The fuel savings of \$87 assumes a gasoline cost of 50¢ per gallon. The savings would be \$130 if the price of gasoline was 75¢ per gallon.

128. *Id.*

129. *Id.*

130. *Id.* at 41.

## VII. TECHNOLOGICAL FEASIBILITY

Do manufacturers presently possess the capability to meet automobile and heavy-duty vehicle emission standards? If so, how soon will utilization of this technology become feasible?

The first question can be answered affirmatively, based on the fact that vehicles meeting Clean Air Act standards are already being produced and sold on a large scale. A vehicle that is accomplishing so-called impossibilities is the 1977 Volvo equipped with a three-way catalyst system. The 1977 Volvo received considerable attention from Congress when it was certified by the California Air Resources Board at .2/2.8/.17, well below the statutory standard of .41/3.4/.4.<sup>131</sup> Particularly controversial was the fact that it accomplished this fact while improving gas mileage by ten percent over the preceding year.<sup>132</sup> It should also be noted that this car displays an exceptionally low NO<sub>x</sub> level: "Most dramatically, the Volvos certified to date have halved the statutory 0.4 NO<sub>x</sub> standard—a standard which the industry said could not be met for several years and which, under the Dingell amendment, is effectively repealed altogether."<sup>133</sup>

Projected timetables for feasible implementation of new technology differ widely. Automobile manufacturers contend it will be several years before large-scale production can take place, particularly if more radical changes from the traditional engine are contemplated. However, other estimates have placed the technology for meeting emission standards within production range by 1977-78.

EPA's March 5, 1975, decision to suspend the 1977 standards was based on the need to study sulfate emissions from catalytic converters prior to implementation of standards which would almost certainly require their use.<sup>134</sup> EPA Administrator Train stated that the suspension application would have been denied except for the sulfate problem,<sup>135</sup> and further commented: "I thus find that the catalyst technology exists and could be applied to meet the statutory HC and CO emission levels on a very large proportion of automobiles by 1977."<sup>136</sup>

131. Letter from Tom Quinn, chairman of the California Air Resources Board, to Senator Gary Hart (May 26, 1976), *reprinted at* 122 CONG. REC. S8400 (daily ed. June 3, 1976).

132. 122 CONG. REC. E3193 (June 9, 1976) (remarks of Rep. Waxman). The measured gasoline mileage for these cars was 21.6 miles per gallon. *Id.* at E3195.

133. *Id.* at E3193.

134. EPA Administrator Train commented, "The decision on my part was driven . . . by the sulfate issue." *House Hearings, supra* note 18, at 42.

135. The 1977 Volvo three-way catalyst appears to have overcome this problem. 122 CONG. REC. E3195 (daily ed. June 9, 1976).

The House Interstate and Foreign Commerce Committee concluded, "The potential threat of sulfuric acid mist from catalytic converters was grossly overestimated. Since this potential risk was the sole basis for Administrator Train's proposed five-year moratorium on new car emission standards, there is no longer any basis for Congress to adopt Administrator Train's proposed delay." HOUSE REPORT, *supra* note 20, at 215.

136. EPA, *In re Applications for Suspension of 1977 Motor Vehicle Exhaust Emission Standards* 8 (1975), in *Senate Hearings, supra* note 21, at 1397, 1405.

Another assessment of technological feasibility was made by the National Academy of Sciences, and again the conclusion was that emissions could be reduced feasibly to statutory levels in the 1970's.

Emission standards for HC and CO (.41 and 3.4 gm/mi) for the 1978 and subsequent model year light-duty vehicles should be maintained at the current statutory levels. Attaining these levels by 1978 is both feasible and worthwhile.<sup>137</sup>

Furthermore, the National Academy of Sciences concluded that these standards could be met in 1977 with gas mileage equal to or better than 1970 cars.<sup>138</sup>

Although both of these conclusions were framed in terms of meeting the standards with the use of catalysts, a variety of alternative technologies are available. These include types of engines that might, in the long run, be preferable for fuel economy and emissions reduction, but involve significantly higher costs and extensive re-tooling for manufacturers, such as the Diesel, Stirling, and stratified-charge engines.<sup>139</sup>

In the case of heavy-duty vehicles, the technological feasibility of the standards proposed by Congress has not yet been determined. In assessing available technology for meeting interim standards for hydrocarbons, the EPA found that fuel injection and crankcase emission controls would be the most feasible alternatives for reducing Diesel emissions. For gasoline, the preferred alternatives were oxidation catalysts, air injection, and improved air/fuel management.<sup>140</sup>

For carbon monoxide, no controls are necessary for Diesels to meet interim standards since uncontrolled Diesel CO levels are so low. CO controls for gasoline engines are substantially the same as for HC control.<sup>141</sup>

The devices available for cutting NO<sub>x</sub> emissions from Diesels include modifications in the shape of the combustion chamber with such colorful names as the "swirl chamber," "poker head," and "squish lip." However, changes in combustion chamber shape would entail more industry opposition, a longer lead time, and higher fuel consumption than other types of control technologies, so the EPA instead recommended improved injection systems and exhaust gas recirculation.<sup>142</sup> The latter is also preferred for gasoline-powered heavy-duty vehicles.<sup>143</sup>

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137. Comm. on Environmental Decision-making, National Research Council, National Academy of Sciences, National Academy of Engineering, Report of the Conference on Air Quality and Automobile Emissions 1 (May 5, 1975), in *Senate Hearings*, *supra* note 16, at 1463, 1467.

138. *Id.* at 7, *Senate Hearings*, *supra* note 16, at 1473.

139. *Reitze & Reitze*, *supra* note 92.

140. EPA Interim Strategies, *supra* note 51, at 25-26.

141. *Id.* at 26.

142. *Id.* at 27.

143. *Id.* at 28.

Smoke limitations on Diesel trucks, as set by the proposed interim regulations, were considered not to require any additional control devices, since standards were set at the current level of control to prevent sacrifice of smoke control for control of other pollutants.<sup>144</sup>

#### CONCLUSION

##### A. LIGHT-DUTY VEHICLES

If one considers the evidence on the environmental, technological, economic, and fuel consumption factors, substantial extension of the deadline for achieving the final statutory standards does not appear to be justified. An appropriate compromise between the opposing viewpoints would be to set the final compliance deadlines for HC and CO standards for the 1980 model year, and with NO<sub>x</sub> deadlines set for 1982.

As discussed above, studies have found that technology is presently available for meeting the standards mandated in the 1970 Clean Air Act, and these standards are in fact being achieved by some vehicles today. Despite the automobile industry's contentions that suitable technology will not be available for mass production before 1982, EPA originally found that technology was available for the 1975 model year. If the best available pollution control devices are utilized, fuel and cost penalties for achievement of these standards by 1980 need not be excessive. There may in fact be some positive fuel consumption results from antipollution technology, depending on the methods utilized.

In the long run, the most beneficial and efficient means of achieving pollution control will probably be the development of alternative engines. Funding should be made available to encourage a bold step in this direction.

The foremost argument against delaying implementation of the final standards is that it negates the technology-forcing aspects of the Clean Air Act. Standards should remain stringent to serve as ideal goals. For those manufacturers who cannot achieve these performance levels, a noncompliance penalty like that found in the hypothetical heavy-duty emissions bill *supra* would be appropriate. Thus manufacturers who succeed in cutting emissions would be rewarded. The situation now yields a reverse effect; a manufacturer who achieves the standards is penalized when the deadlines are postponed because other manufacturers can offer larger and more powerful vehicles at lower cost.

The Clean Air Act § 202(b)(5)(C)<sup>145</sup> sets forth the criteria that must be met for the EPA Administrator to grant an extension of the deadline for

144. *Id.*

145. 42 U.S.C. § 1857f-1(b)(5)(c) (Supp. 1974).

vehicle manufacturers to meet pollutant standards. Among these criteria is a requirement that manufacturers have made "good faith efforts" to comply with the standards.<sup>146</sup> In 1975, EPA studied the automobile industry's compliance efforts and found, "[t]he efforts of some auto manufacturers directed toward the 1978 statutory emission standards have dramatically decreased during the past year [1974]."<sup>147</sup> EPA analyzed its observations as suggesting that "a maximum effort was not made by the automobile industry to meet the 1978 emission standards. . . ."<sup>148</sup>

It does not appear that the automobile industry has increased its research and development efforts in the last year. Even though manufacturers may not have shown good-faith efforts sufficient to qualify them for a one-year administrative delay, Congress is on the verge of granting them a considerably longer delay while simultaneously relaxing the goals to be met. This action is inconsistent with the original character of the Clean Air Act. It transforms a progressive, technology-forcing act into a weak endorsement of current industry practices.

#### B. HEAVY-DUTY VEHICLES

Adoption of heavy-duty vehicle standards similar to those set forth in the hypothetical bill *supra* would constitute significant progress in reducing the amount of pollutants from heavy-duty vehicles. The primary effect of heavy-duty emission standards in conjunction with rising costs of fuel will probably be a shift toward Diesel-powered engines. The environmental benefits of this type of shift would be substantial. The non-compliance penalty clause may allow many manufacturers to delay compliance, but it gives continuing economic incentives for progress. These standards represent a step forward in environmental preservation, in contrast to the delays manifest in light-duty vehicle standards.

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146. *Id.* § 1857f-1(b)(5)(c)(ii). See note 50 *supra*.

147. EPA, A Review and Analysis of the Good Faith of the Automobile Industry in Attempting to Comply with the Statutory 0.4 NO<sub>x</sub> Standard 1-2 (1975), reprinted in *Senate Hearings, supra* note 16, pt. 3, 684, 689.

148. *Id.* at 1-3, *Senate Hearings, supra* note 16, pt. 3, at 690.