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ON APRIL 11, 1973, William D. Ruckelshaus, then Administrator of the U.S. Environmental Protection Agency, gave the automobile industry a year's grace in meeting the vehicle emissions standards established by the Clean Air Act of 1970. At the same time, he set "interim" standards, one set for cars sold in California and another for the rest of the country. His intent was to force the automobile industry to use catalytic converters on those vehicles sold in California but not on the others. Although his decision was based in part on recommendations from the automakers who wanted a geographically limited trial of the catalytic converter before going nation-wide, it turns out that no one is satisfied. The car makers claim both sets of standards are too strict, Californians grumble at being used as guinea pigs, environmentalists call it a sell-out to industry—and the citizens of 37 major U.S. cities will have to wait a little longer to get clean air.

The full consequences of this decision are unclear at this writing (early May 1973). The oil and auto companies continue to press Congress to ease the law as well as taking their case to the public with extensive and expensive advertising and speech-making campaigns. Congress is now holding hearings on the Ruckelshaus decision, and EPA has asked the Congress to re-evaluate the Act's statutory standards. Said Ruckelshaus in announcing his decision, "There are issues that I believe Congress should pursue . . . Our assessment of the health risk associated with NOx no longer supports the statutory 90-percent reduction . . . This should be reviewed quickly and, if our analysis is correct, the standard should be changed."

Given the enormous pressure now being exerted on Congress to re-evaluate the provisions of the Clean Air Act, it is certain that it will be amended and probably that it will be weakened. Environmentalists are justifiably concerned. The 1970 Act is a strong law that definitely can bring back clean air in a reasonable time and, as experience is showing, at reasonable cost. The benefits substantially outweigh the costs. The law is implementable. But the problem is resistance from those who have traditionally operated without such restraints. Only very recently has normal business decision-making had to deal with environmental considerations. And industry has not learned to like it.

Historical Perspective

Why must such stringent emission standards be met on such a tight schedule? How did we get into this predicament? The story is this: Two decades ago, when Prof. A. J. Haagen-Smit pinned the blame on automobiles, the car-makers first denied it and then demanded a better definition of the problem. It took time to create air monitoring equipment. Once the car was the accepted culprit, suitable test cycles and test equipment were required. Make changes in the car itself? That took still more time. And so it goes. The years have swept by, but the pollutants have not blown away.

1970 Amendments to the Clean Air Act

The original Clean Air Act was enacted in 1963 and amended in 1967. Positive crankcase ventilation became standard but there were no major breakthroughs. Carbon monoxide levels continued their climb. Exhaust emission controls were required nationally only with 1968 model year passenger cars. In 1970, even while Congressional hearings were being held for an extensive re-write of the Act, Ralph Nader and his staff published Vanishing Air. In it, Nader asserted that Senator Edmund Muskie was "soft" on industry. To prove he wasn't, Muskie pushed forward from 1970 to 1975 the very stringent emissions standards recommended by the Department of Health, Education and Welfare. No one else wanted to look soft, and the ten-year goal became a five-year crash program, focusing everyone's attention entirely on one target—cleaning up the exhaust fumes.

Industry's Attitude

In fact, industry knew how to curb exhaust emissions twenty years ago. Documents available today reveal that they knew of techniques to cut carbon monoxide and hydrocarbons to acceptable levels—but it would make the car more expensive and no car-maker was willing to go it alone. It didn't seem to have sales appeal. Ironically, by today's standards, the cost was negligible—which I'm sure the industry now regrets and which the buying public can hardly be happy about.

Some people called it a conspiracy, and the federal government took the major auto makers to court in 1967. But under the Nixon Administration, this was settled out of court. Industry, while not admitting to conspiracy, agreed to no more "hanky-panky." More recently, the states of California and Washington have sued the automobile industry for joint refusal to reduce vehicle emissions. My agency is a party to that suit and, although I cannot at this time reveal any details, I can say that documentation is available which proves to our satisfaction that industry recognized the problem decades ago, knew how to solve it, and agreed jointly to do nothing. I

The Implications of Present Trends for Air Quality*

by

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call that conspiracy. We shall see what the courts decide.

Following the adoption of the Clean Air Act of 1970, industry sat on its collective behind for three years crying "Wolf," while foreign auto companies went off and did the job. The reason that General Motors or Ford failed to investigate with greater interest the Diesel or the stratified-charge Wankel engine or any of the other alternatives to the conventional engine is obvious. Industry had everything to gain and little to lose from delaying any action on cleaning up its products. Were Detroit to retool for a new engine type, it would have had to discard millions of dollars of tooling. In addition, they claimed that such action would take a decade, at least, to complete. They would also have had the headache of producing and distributing new parts, training service people to repair the systems, etc. All of which they would like to avoid especially on a crash basis. No one believed that Washington would actually shut-down a company for failing to produce a low-pollution car for model year 1975. A fact that was confirmed by the recent Ruckelshaus decision when he chose not to close down Chrysler which in fact had not demonstrated good faith —a key legal requirement for an extension.

System Costs

It appears that the public cannot possibly win. On the one hand, since Washington has provided a one-year delay, the public must suffer with higher pollution levels in urban areas. And what will industry do during this 12-month grace? They have already said that they will continue to refine the catalytic-type emission control system and at the same time press for a relaxation in emission standards. Detroit has already stated that it has no intention of seriously investigating alternatives such as the Honda Compound Vortex Controlled Combustion engine, the Diesel or the stratified charge (hybrid) Wankel at least for introduction in this decade. Despite the delay, the American public will eventually be "stuck" with the catalyst—the most costly choice available as recently revealed by the National Academy of Sciences in their **Report by the Committee on Motor Vehicle Emissions** (February 12, 1973).

The conscious decision to go with catalysts made by Detroit sometime in the past year may result in an enormous burden to the American public. The Mobil Oil Corporation calls it a **$66 Billion Mistake.** Others call it corporate irresponsibility. Mobil estimated that the cost for full compliance with 1975/76 U.S. Standards would be $100 billion for the decade beginning in 1976. At the same time, they estimated that compliance with California's own 1975 standards (more lenient than the EPA standards) would cost a mere $34 billion during that same period. More recently, the National Academy of Sciences estimated the cost of full compliance, using catalytic controls, at $23.5 billion for the same period and for the same number of vehicles (100 million). And even this enormous cost was questioned by the Academy:

"These casts, in dollars and in depletion of fuel reserves, are so great that they should serve as a national incentive to hasten the development of reliable lower-cost alternatives to the dual-catalyst system as a solution to the problem of emissions control."

The Academy continued by stating that several alternatives (the Honda CVCC and the Wankel) were potentially very much cheaper—costing perhaps only $7.5 billion over the same 10-year period.

Thus while it appears that the U.S. emission standards can be achieved—and at no fuel consumption disadvantage at that—Detroit's insistence upon retaining the conventional spark-ignition re-

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ciprocating internal-combustion engine has back-fired not on Detroit but upon the American consumer. Detroit has produced a solution that is costly (a $66 Billion Mistake), performs poorly, accelerates the consumption of our limited petroleum resources, requires frequent service simply to ensure operation—in short, a totally inadequate solution to a fairly reasonable requirement.

Native American Don't-Know-How

As stated earlier, Detroit sat on its collective behind and said it couldn't be done. They claimed, loudly, that they simply could not produce a car to meet federal emissions requirements. To prove their point they set about demonstrating that not only were catalytic-type controls inadequate, but that alternative power plants (steam, Sterling-cycle, gas turbine, etc.) were even worse. General Motors went to great lengths to demonstrate prototype systems to the press—prototypes so poorly conceived it is hard to believe they weren't intended to fail. These demonstrations were designed to stall any meaningful action; to insure that there was in fact inadequate time to introduce technical solutions that could be introduced into the production cycle on time. So the U.S. Consumer, Detroit and the U.S. Congress find themselves today in exactly that situation—we simply have not got the time to get the low cost solutions into the production process by model year 1975. In my opinion this is wholly the fault of the Detroit auto establishment and the burden for such action falls entirely on their backs. What should be done, however, is another problem.

Implications for the Future

The implications of the activities described above for motor vehicle pollution control and for air pollution control in general are serious. Although on April 9th Richard Nixon extended the Clean Air Act to December 31, thereby protecting the integrity of the present law, that action by no means guarantees strong air pollution legislation thereafter. Activities are already underway to undermine the Act and to weaken any future air quality legislation. The attempt is not only to loosen vehicle emissions standards but to loosen national primary and secondary air quality standards as well. The President's April 18th energy message recommended as much. It is too early to predict the outcome of the pressures currently being exerted on the Congress by EPA, by industry, by the Administration and by politicians. However, a strong consumer backlash—a result, among other things, of Detroit's energetic public relations activities—could be the final straw to break the Act. Meanwhile, environmentalists are rallying citizens to support the Act and to demand even more stringent requirements. Unfortunately, environmentalists are very much the underdogs. They are not as effectively organized as industry, and they cannot afford full-page newspaper ads to communicate the issues. It's David versus Goliath all over again.

Regarding auto emission standards, it appears likely that the nitrogen oxide standards will be loosened—to perhaps 1.0 to 1.5 grams per mile instead of 0.4 grams. This, of course, would make it easy to comply with 1976 carbon monoxide and hydrocarbon standards and still meet such NOx standards.

With the possible exception of Los Angeles, the implications for air quality of the one-year extension for CO and HC and the loosening of NOx standards is really not dramatic. Even the interim standards for 1975 produce most of the impact expected for model year 1975 because of the older, very high-polluting vehicles which are going off the road by attrition. Some urban centers will still experience high carbon monoxide levels well into the next decade at those sites where they allow congestion to occur. This, in turn, implies the need for alternative strategies for urban centers: restricting access by motor vehicles.

Other Problems

Air pollution is not the only problem associated with the automobile. It is barely the tip of the iceberg. The U.S. Environmental Protection Agency estimates the socio-economic cost of vehicular air pollution at $5.8 billion for 1972. Compare that with the cost of highway accidents in the U.S. in 1971 estimated by the U.S. Department of Transportation at $46 billion—almost 8-times the cost of vehicular air pollution. This is the dollar-equated cost for 55,000 fatalities, 8,000 permanent and total disabilities, 250,000 partial disabilities, and 3.5 million personal injuries. Add to this the costs associated with noise, water pollution, congestion, urban decay, blight, and ugliness, wasted non-renewable resources and the incredible misuse of public funds, and we have a social cost associated with motor vehicles of between $75-and-$100 billion annually. It is time that all nations begin to weigh these external costs against the more obvious benefits of the automobile, and in light of this information, make the appropriate decisions to deal with these costs. Perhaps we will find that once fully disclosed, people will choose to accept such costs. I, for one, however, will not.

Who is to blame for this situation and how will it effect the future of the automobile?

In one sense, we are all to blame. We have buried our collective heads and allowed the automobile to dominate us almost totally. Today in the U.S., and to a lesser extent in Europe, the automobile industry is the backbone of our economy. When we wished to stimulate the economy and reduce unemployment, we gave a boost to auto sales by eliminating the auto excise tax. We devalued the dollar to improve the sales of domestic cars in comparison to foreign ones. Whenever the auto industry experiences a major strike, the entire economy has been affected. We are in a very precarious situation—economically dependent upon a major industry that is beginning to destroy the very society it shapes.

We have allowed the car to dominate our lives more than any other national possession in modern history. We have allowed the car to overrun our cities and have actually created cities and suburbs that are totally enslaved to its use. Instead of building our cities for people, we have built them for cars, and as a result, we now experience vast socio-economic and environmental problems. Our urban centers, which have suffered the most at the hand of the automobile, also suffer the greatest levels of vehicular air pollution.

Most of these problems are the result of inadequate long-term planning. Sociologists claim that our culture demands immediate gratification with no apparent interest or concern for past or future history. This absence of long-term goals permeates the planning process. Since the introduction of the automobile, highway planners (in today's more sophisticated jargon, transportation systems planners) have presumed that highway development should precede land development. There is no attempt to structure a region's development in a comprehensive manner—to lay down how an area will be used and to then follow through to insure that the plan is correctly implemented.

Air pollution control, and more particularly vehicular pollution control, is treated on a piecemeal basis. Traditionally, air pollution control officials diagnose a problem, extract it from its own environment, treat it and wait for results. We are continually disappointed when nothing happens; when no improvements occur. We have yet to learn that air pollution is but one of a multitude of urban ills that beset us. And vehicular air pollution is especially sensitive to the inter-relationships of the urban environment. Vehicular pollution control is directly related to how we structure our cities and the role we provide for cars and trucks. It is not unreasonable if we allow cars and trucks to overrun our cities to expect that they will inflict substantial damage, including severe air pollution. When we remove cars from our city centers and alter our freight movement, experience has shown that air quality improves dramatically—we can actually meet national primary air quality standards the very day such action is taken.

Alternative Approaches to Vehicle Pollution Control

Air pollution control officials in the U.S. are beginning to learn that vehicle emission control is no panacea. Not only are current controls on new cars disappointingly ineffective (New York City has not yet experienced the reductions in carbon monoxide suggested by auto industry claims), but the engines must be tuned frequently for any clean-air effects to be maintained. A car-owner backlash has developed as cars have become hard to start and expensive to feed. The cars with catalytic converters are even more suspect; they will require at least annual emission inspection besides. So control officials are seeking other ways.

A reduction in the use of the private car certainly will yield positive results. Vehicle emissions are directly proportional to vehicle miles traveled. The obvious alternative is to get people to use public transportation—buses and rail-rapid transit. But rail-rapid transit will only work in densely settled cities. This is also true to a lesser extent of bus service. The route served must carry reasonably high traffic. Yet most new cities in the U.S. can't even adopt bus systems effectively—they are simply too spread out. The newer parts of town were designed and built with the automobile's mobility very much in mind.

The use of public transit in place of private cars has been cited as a pollution control strategy for 37 major U.S. cities. Yet most of these cities are unsuited to the requirements for public transit—they do not contain dense urban subcenters linked by densely traveled corridors. Most of these cities are spread out and therefore auto-dependent. Thus we come to the conclusion that even public transit is inadequate in most cases.

The only lasting long-term solution is restructuring our existing cities to separate people from cars and to make public transit viable. New towns yet to be described and defined could be made up of communities (neighborhoods) forming urban activity centers. Some for work, some for shopping, some for living in, some for playing in, some for being entertained in. They would be connected one to another with high-speed, high-quality public transit—transit that is

free to the user and truly a community service. Within any one urban center, the major mode of transportation would be walking, and perhaps bicycling. Urban centers should be of a size to allow you to walk from any one end to the other in less than 15 minutes. Tiny electric vehicles, similar to golf carts, could be used by the infirm. Automobiles of the sort we know today would be excluded entirely. The automobile could instead be relegated to its more logical role of providing mobility in rural areas and in low density developments. And for pleasure —the activity for which it was originally conceived. We would no longer be enslaved to one mode of transportation. We would no longer suffer the burden we currently bear because of our auto-dependence. Such a utopian view of the future suggests a major reapportioning of our limited energy and dollar resources. The cost of moving goods and people can be reduced and in time we will find hundreds of billions of dollars available for more socially productive investments.

CONCLUSION

To be successful, future actions regarding the vehicular pollution problem must be treated comprehensively. We have learned that we cannot simply take the source of pollution—the automobile—and minimize the emissions from it and expect to solve our problems entirely. A comprehensive approach to the vehicular pollution problem would have revealed other less costly, more permanent long-term solutions—compromises to today's very costly attempts to apply band-aid solutions to our auto-related problems. In my opinion, a comprehensive approach, had it been applied in the United States ten years ago, would have yielded a solution combining less stringent vehicle emissions standards than applicable for 1976 model cars with widespread vehicle restraints in central business districts. Instead we are getting very stringent emissions standards nationally and finding that even they are inadequate for the very serious vehicular pollution levels experienced in many American cities today. The U.S. experience in this regard certainly offers a powerful insight to other nations that have held back on adopting the U.S. vehicle emissions standards. Perhaps, as appears to be the case with most European nations, the approach should be to restrict vehicle operation, build car-free new towns, and provide extensive alternatives to the automobile and the truck in urban areas. Although such action must be studied further, I think that combined with emission standards similar to the current U.S. interim standards for 1975 model year cars, most urban areas will achieve acceptible levels of carbon monoxide within five years. One note of caution. I do not by any means want to give the impression that the U.S. national primary and secondary air quality standards are too stringent. Quite the contrary! There is sufficient medical evidence to indicate that present U.S. standards are the maximum levels that people should be made to endure in what is considered a healthy air environment. I endorse them and recommend that all nations of the world adopt them as their goals.

In our attempts to treat auto-related air pollution, we have ignored many of the more pernicious effects of the automobile. Highway accidents which kill and maim millions of victims each year, water pollution, noise, congestion, urban blight, decay and ugliness, wasted nonrenewable resources, and the economic burdens inflicted on a nation that cannot survive without the automobile—all of these must be added to a growing list of evils associated with our use of motor vehicles. Once this total picture of the insult of the automobile has been recognized by society, one cannot help but believe that then, indeed, changes will occur.