STATEMENT OF JOAN CLAYBROOK, ADMINISTRATOR, NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION, BEFORE THE SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND WEATHER, HOUSE SCIENCE AND TECHNOLOGY COMMITTEE, MARCH 20, 1979.

Mr. Chairman and Members of the Subcommittee:

We are pleased to have been asked to appear before this committee to discuss the research and development programs of the National Highway Traffic Safety Administration. With me are Howard Dugoff, Deputy Administrator, and Dr. Rhoads Stephenson, Associate Administrator for Research and Development.

The NHTSA has had an active R&D program in automotive and highway safety for more than a decade. More recently we have added fuel economy and related industrial and economic questions to our research responsibilities. We are proud of our leading role in the automotive and highway research fields. We believe that we have made major contributions and helped to build a strong, independent automotive research capability in the U.S.

Motor vehicle crashes now kill more young people than any disease or other type of accident. They are the leading cause of paraplegia and epilepsy and the sixth leading cause of death in this country. The number of Americans killed each year in highway crashes dwarfs fatalities and injuries in all other transportation modes combined. The cost to the public of highway accidents and casualties is more than 40

billion dollars per year. Motor vehicles also account for nearly one-half of the petroleum consumption in this country. Automotive research thus remains vitally necessary to develop the socially responsible vehicle that can provide us with the personal mobility we have enjoyed in the past.

RESEARCH TOWARD MOTOR VEHICLES FOR THE 1990's

Let me start by telling you how excited we are about Secretary Adams' new initiative in advanced automotive research to support development of motor vehicles for the 1990's and beyond. We are eager to build upon our extensive experience, capability, and long-standing relationships with the automotive industry and research community to help coordinate and develop this vital research endeavor.

Current Federal programs, and industrial planning to design vehicles to meet current Federal regulatory requirements, are generally focused on the near term -- up to about 1985. But the conditions that originally prompted Federal involvement in this field are not likely to disappear over the next decade. On the contrary, fuel shortages, highway injuries and fatalities, and air pollution are likely to become ever more important issues. Thus, we will not be able to rest on our laurels after 1985.

Experimental Vehicle Programs

The NHTSA has a tradition of exploratory research

and development to demonstrate concepts appropriate for the next generation of motor vehicles: those beyond the ones currently being designed or tested for production. In 1968, we initiated the Experimental Safety Vehicle (ESV) program to design and build prototype passenger cars that would achieve levels of safety well beyond those of the cars then in production. The NHTSA contracted to have two six-passenger ESV's built and tested by independent contractors, and GM and FORD each built ESV's at a cost of $1 each to the government.

In addition, a large number of foreign automobile companies were stimulated to construct their own ESV's. Many ideas now appearing in production cars were first developed in the ESV program.

A second generation of experimental vehicles was begun in the mid-1970's under the Research Safety Vehicle (RSV) program. Full working prototypes of these vehicles will shortly be accepted by Secretary Adams. They have been built by Minicars, Inc., and by the Calspan Corporation, and will be tested in the U.S., Europe, and Japan.

The purpose of the RSV Program is to demonstrate the advanced safety features that can be designed into production cars by the mid-1980's, in fuel-efficient, low-emission, practical and economical automobiles. These cars achieve

their advanced performance using designs and materials that are generally available and capable of being mass produced.

The RSV constructed by Calspan Corporation in cooperation with the Chrysler Corporation was derived from a production French Simca, and is designed so that it could be produced in a conventional automobile assembly plant. The steel structure and occupant restraints are designed to provide occupant protection in frontal crashes at up to 45 mph, and in side impacts at up to 40 mph. The front bumper of the RSV is made of soft, energy absorbing plastic materials that will sustain low speed impacts at up to 7 mph without damage. In addition, tests have shown that the front bumper can substantially reduce injuries to pedestrians who are struck at speeds of up to 20 mph.

The Minicars RSV is a car designed virtually from the ground up. And while it is a highly innovative vehicle, it can be manufactured almost totally from materials and components available to manufacturers today. It has a very large interior, excellent visibility, gull wing doors for easy access to front and rear seats, and a Honda stratified charge engine that will produce an estimated 32 miles per gallon with low emissions.

The structural shell of this unique experimental car is composed of foam-filled steel sections. In a crash,

the crushing of this foam-filled structure safely dissipates high levels of energy. With its advanced air bag restraints, this car can provide protection in 50-mph frontal crashes into a solid barrier.

This vehicle also has a soft, flexible bumper, hood, and front fenders to reduce the impact forces on a pedestrian hit by the car. The bumpers are not damaged in barrier crashes up to 10 mph. In frontal barrier crashes at up to 20 mph, damage occurs only in an easy-to-change front section, substantially reducing repair costs.

Minicars has also constructed and is testing for the Department a six-passenger Large Research Safety Vehicle (LRSV), using a full-size Chevrolet Impala as a base. However, this car has a unit body, front wheel drive, and a turbocharged, four-cylinder engine with advanced emission controls developed by Volvo. It has advanced air bags to protect occupants in frontal crashes at up to 40 mph; and a soft, plastic front bumper that reduces low speed crash damage and pedestrian injuries.

The LRSV weighs less than 3,000 pounds and is designed to meet or exceed all Federal standards that will apply to 1985 model cars: 27.5 miles per gallon, very low emissions, and a high degree of passive crash protection. It was designed in response to auto company complaints that the fuel

economy program had brought an end to the era of the family car. This vehicle shows that is not true.

General progress in experimental safety vehicle development by the government and the world-wide auto industry will be discussed by world automotive specialists at the Experimental Safety Vehicle Conference in Paris on June 6-8, 1979, which I would like personally to encourage the members of this subcommittee to attend.

OTHER NHTSA RESEARCH PROGRAMS

In addition to the experimental vehicle activities conducted within our Integrated Vehicle Research program, we conduct research in both passenger and heavy duty vehicle safety, in automotive fuel economy, and in highway safety involving non-vehicle factors such as the driver. Our National Center for Statistics and Analysis, the nation's primary highway accident data collection and analysis institution, is a cornerstone of our research and development program. We also operate a vehicle engineering research and test center in Ohio with laboratories and other facilities for testing vehicles, vehicle equipment, and tires.

Our contract research budget request for fiscal year 1980 is $44 million, of which $13 million is for vehicle safety, $8 million fuel economy research, $11 million is for highway safety research and demonstrations, and $12 million is

for the National Center for Statistics and Analysis.

To guide our motor vehicle research, we have just completed a five-year plan that identifies research needs according to priorities in rulemaking that come from analysis of accident data, motor fuel conservation needs, technological potential, and industrial capability. The plan not only helps us to allocate our R&D capabilities efficiently, it also provides the public and the industry with information on our future direction so that they can comment on and plan for changes in Federal requirements well in advance.

Passenger Vehicle Research

Our passenger vehicle research program concentrates on three primary areas of safety: crash avoidance, vehicle structures, and occupant restraints. Crash avoidance research deals primarily with braking and tire performance. Structures research is concerned with the ability of a passenger occupant compartment to maintain its integrity under the severe forces of a crash, and the ability of the remainder of the vehicle -- particularly the front end and the doors -- to absorb crash forces and decelerate the vehicle in a controlled way during a crash. Occupant restraints

include interior padding, safety belts, and air bags, all of which should be designed to prevent or mitigate the injury that can result from the second collision of the occupant with the interior of an automobile in an accident. We have carried out extensive research, development, and testing in occupant restraints. This includes new safety belt system concepts such as air belts, and pre-tensioning and force-limiting devices for belts. The research also includes projects on child restraints, and advanced air bags. In addition to our own acceleration sled facilities in Ohio, we have encouraged the development of a number of independent, private contractors with engineering and crash test facilities, including the Calspan Corporation in New York, Minicars, Inc. in California, Dynamic Sciences in Arizona, and the Highway Safety Research Institute in Michigan.

Another aspect of vehicle safety in which we have a major research program is the biomechanics of human trauma. In order to protect vehicle occupants, we must know how they respond to crash forces and how they are injured in collisions. Thus, the agency sponsors work that is at the forefront of biomechanics research. Our projects are directed toward (1) developing anthropomorphic dummies that accurately simulate human responses to crashes (to be used for vehicle development and testing), and (2) determining the limits of

human susceptibility to trauma that typically results from motor vehicle crashes and pedestrian impacts.

Automotive Fuel Economy Research

The fuel economy program requires not only research into the technologies that can be used to improve automotive fuel economy, but also into the industrial capability for adopting these technologies and the consumer responses to cars incorporating new, fuel economy features. For this work, we contract with the Department's Transportation Systems Center and a wide variety of contractors. For example, we have programs to assess potential improvements in engines in cooperation with Volkswagen, Fiat, Chrysler, Riccardo Engineering and Citizens for Clean Air. I am submitting for the Committee a copy of the summary report of the Automotive Fuel Economy Contractor's Coordination Meeting that was held December to show you the scope and nature of research in this field.

The Department of Energy is directed to pursue certain advanced engine types for potential commercialization within five years, and is working particularly on turbine and Stirling engines. Their program of the Department of Energy provides an important complement to our research through its contributions on advanced automotive propulsion systems, and it also complements the long-range basic research which

Secretary Adams' proposed last December in Detroit.

Heavy Duty Vehicle Research

The NHTSA's heavy-duty vehicle research programs define the safety and fuel economy shortcomings of commercial vehicles and develop a technical basis for either rulemaking or voluntary acceptance into industry practice of design, production, and operation of safer and more fuel efficient heavy duty vehicles.

Truck and bus safety is an increasing problem because of the major increases in truck and bus mileage travelled, increasing weight differences between heavy vehicles and passenger cars, and other factors. Near-term NHTSA work is directed toward developing and demonstrating technologies for improving the braking and control capability of heavy duty vehicles, improving the driver's environment (by improving ride quality and by reducing noise and fumes), reducing the vehicle's splash and spray, and reducing the potential for passenger cars to underride the rear of heavy trucks.

Trucks and buses above 10,000 pounds are also major consumers of petroleum, currently using about 7 percent of the nation's total. Our research in this area supports a voluntary program to improve vehicle technology, driving techniques, dispatching, and legal restrictions that increase fuel use in this sector. We have, and are continuing to

develop test and measurement techniques that permit optimum design selections by fleet operators for improved fuel conservation. And this effort has paid off. Through 1977, fuel savings due to the introduction of new, fuel-efficient truck and bus designs are conservatively estimated to total 1.7 billion gallons, with savings of 850 million gallons in 1977 alone.

Highway Safety Research

We are in the midst of a major planning exercise for our highway safety research, development, and demonstration program under Section 403 of the Highway Safety Act. A draft of the plan has been completed and will shortly be discussed with the community of highway safety experts at a meeting sponsored by the Transportation Research Board of the National Academy of Sciences. It will also be published in the Federal Register to solicit comment from the general public.

Our highway safety research directly supports NHTSA programs and provides innovative ideas and opportunities for state and local highway safety program plans that are submitted to the NHTSA as a part of the State and Community Grant programs under Section 402 of the Highway Safety Act.

The priorities that have been tentatively established in our draft 403 plan are in the areas of: speed and other unsafe driving acts, occupant restraint use, misuse of alcohol, pedestrian and bicycle rider performance, driver licensing, motorcycles and mopeds, youth issues, and emergency medical services.

National Center for Statistics and Analysis

A major part of the NHTSA's R&D program has been to develop a comprehensive data system that can identify problems and evaluate the effects of motor vehicle standards and other actions. The initiation of the National Accident Sampling System (NASS) this year at the initial 10 sites was a major milestone. Funding for a second set of 10 teams has been requested in our 1980 Budget. NASS will provide us data for the first time with which to quantify the extent and nature of highway injuries and accidents, on a national, statistical basis. In addition it will provide detailed data to support engineering judgments for rulemaking, and highway safety program decisions, and to evaluate the effect of NHTSA standards.

The Fatal Accident Reporting System (FARS) has been in place since 1975 and uses State-reported data on all fatal accidents. We are also pilot testing an augmentation of the Consumer Product Safety Commission's National Electronic

Injury Surveillance Systems (NEISS) which collects injury information from hospital emergency rooms. We plan to use these data to support our safety defect investigations, and document otherwise unreported accidents.

These three systems form the foundation for a comprehensive data system. Full implementation of NASS will require about 50 accident investigation teams. We plan to request funds to phase these in between 1980 and 1982. Thus, by 1982 the National Center will be operating systems that will allow us, for the first time, to provide detailed descriptions of the full spectrum of motor vehicle accidents in the United States.

CONCLUSIONS

I would like to close by saying a few words about the NHTSA's mission and our relationship with the automobile industry, the States, and with other Federal agencies.

This agency has two primary functions. We regulate the safety and fuel economy of motor vehicles, and we provide basic support for State highway safety programs. Our research is designed to provide the scientific and technical basis for motor vehicle safety and fuel economy rulemaking, and to provide demonstrated programs for use by State and community governments. Our Integrated Vehicle

Research program allows us to explore beyond the rulemaking of the next few years toward the long-term development of advanced technologies. This program also demonstrates to the public what can be achieved in automotive design and engineering.

Since our programs have important implications for other agencies, and vice versa, we maintain close communication with the Environmental Protection Agency (EPA) on fuel economy and emissions matters, with the Department of Energy (DOE) on their advanced power-plant research and other aspects of automotive fuel conservation, with the Federal Trade Commission (FTC) on matters concerning the industry, and with other agencies. In addition, through our ten regional offices, we have almost daily contact with the States concerning their highway safety problems and programs. It is through these contacts that we disseminate the results of research, development, and demonstration programs that are of interest to the States and local communities.

We have formal interaction with the auto industry, through rulemaking and enforcement proceedings, and informal contact in which we share ideas, research findings, and other information. Despite the adversarial character of some of our formal interactions, we have established effective working relationships with the industry and we share a desire to

improve the technology of motor vehicles toward the goals outlined by Secretary Adams.

We are attempting to implement a research and development program that is well balanced between our short-term needs and our long-term goals. But of necessity, the need to improve safety and fuel economy focuses much of our work on areas of immediate concern. It is a program that is contributing to basic knowledge in automotive engineering, biomechanics, human factors, industrial economics, and our understanding of motor vehicle accidents.

I would be pleased to answer any questions you may have.

STATEMENT OF BROCK ADAMS, SECRETARY OF TRANSPORTATION, BEFORE THE SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND COMMUNICATIONS OF THE HOUSE SCIENCE AND TECHNOLOGY COMMITTEE CONCERNING SURFACE TRANSPORTATION RESEARCH AND DEVELOPMENT PROGRAMS, MARCH 20, 1979

Mr. Chairman and Members of the Subcommittee:

I would like to thank you for the opportunity to appear before this Committee to present an overview of the research and development (R&D) programs of the Department of Transportation. I am accompanied today by Dr. John J. Fearnsides, my Deputy Under Secretary and Chief Scientist at the Department, and Terry Bracy, Assistant Secretary for Governmental and Public Affairs.

As you stated in your letter of invitation, Mr. Chairman, the R&D area is highly dynamic and very important in terms of future impact. It is my belief that the single most important transportation research effort in the foreseeable future will focus on creation of a fundamentally improved automobile, which is the challenge I presented to the automobile manufacturers in Detroit last December.

We need an automobile that responds to the need to reduce our dependence upon foreign petroleum and which is at the same time safer, less polluting, easier to operate and maintain, and generally more "socially responsible" than the cars of today. And we need a basic research program to help get us there. My challenge to the auto manufacturers was focused primarily on the period after 1985, by which time the manufacturers will have complied with the fuel economy and other standards that are now in place for 1985. The auto of

1985 will be safer, more fuel efficient, less polluting, and less susceptible to damage than today's cars. In short, the 1985 car will be a far cry from the cars of, say 10 or 15 years ago.

But we will not be able to rest on our laurels in 1985. It is with this in mind that I posed this challenge to the automobile manufacturers. To help in meeting the challenge, I proposed a national program of basic automobile research, involving all interested persons in the public and private sectors. This effort would produce a pool of basic research technologies which would be available to all auto manufacturers for further individual development and commercialization. The future direction of this program is not fully developed because many aspects still need to be worked out--technical content, institutional arrangements, and resource needs. However, we are actively pursuing this.

I am undertaking this effort with the active support and coordination of several other Federal agencies, in order to take advantage of all the available expertise within the Government and in order to avoid any overlap of Government programs. I would expect that this research will be performed not by the Government, but by the many people everywhere who have something to contribute--automobile manufacturers, private research laboratories, universities, and others. With this broad base of participation in a widespread program of basic research that is nationally coordinated, I would hope to produce a pool of technological options available to industry for future production. In developing this program of basic research, I have attempted to

structure it in a way that maximizes competitive efforts and allows the marketplace to have its greatest impact.

Again Mr. Chairman, the primary goal of my proposed national program of coordinated basic automobile research is to provide the technical knowledge that will allow the production of automobiles that will use substantially less fuel than today's cars, or that will use a fuel that does not come primarily from foreign sources. The main point that underlies all of this is that, if we wish to maintain the freedom of personal mobility we presently enjoy, we must begin now because fundamental changes in automotive technology require lead times of many years.

I would now like to briefly address the management of R&D in the Department and hopefully provide some insight into my philosophy of providing future transportation options.

Too often in the past we found ourselves locked into positions to pursue a single course of development. There had not been an adequate process available which would provide an early look, at the top policy level, at major programs.

We have taken steps to correct this problem by tying together the Department's systems acquisition process (TSARC) with the implementation of OMB Circular A-109. This circular addresses the acquisition of major systems by the Federal Government and emphasis is placed on competition and innovation in the solution of real problems. You know of my interest in competition from my remarks on the automobile of the future--an interest I am sure we all share.

We also emphasize the exploration of alternative solutions during the early phases of the development and acquisition process. While this effort adds some expense during the R&D phase, it minimizes the costly changes of approach or specification during implementation, when changes are many times more costly than in early stages. Also, we emphasize innovative ideas from the U.S. private sector as opposed to relying on single approaches developed within the Government.

As an example of this management approach, I would like to describe our interaction with UMTA and their Advanced Group Rapid Transit (AGRT) program. The ultimate purpose of the GRT program is the evaluation and verification of a new technology capable of providing transit sevice in urban areas in the post-1985 period. This program will provide an alternative to the automobile in center city areas, thereby reducing traffic congestion and improving personal mobility.

The original design of the AGRT program focused on the narrowing down of technological alternatives rather quickly. Working with UMTA, we decided that this approach would result in a single contractor with a single design. This not only violates the basic intent of R&D, which is to provide options for an uncertain future, but also puts all of the potential for U.S. suppliers for this future system in one source. This is not the best way either to assure competition for price and innovation among U.S. suppliers, but also puts the U.S. at a competitive disadvantage with foreign suppliers who are pursuing various options. So, using functional or performance specifications as opposed to design specifications has the additional advantage

of attracting competition. The Research Safety Vehicle is one example where we have seen good results from competition at the concept stage. It is my belief that competition will remain the keystone of a viable and innovative supplier industry.

Lastly, I also note that one aspect of our review considers long run cost impacts for the transportation system as a whole. Estimates of cost impacts are critical in the decision process of selecting between improvements to existing systems versus the introduction of new transportation systems. While this is not always an "either-or" question, the decision elements should be clearly stated and understood. The need for this type of review of R&D efforts is particularly important in that most transportation systems are capital intensitive, and decisions made today will have long lasting effects tending to foreclose the utilization of innovations as they become available.

This concludes my prepared statement, Mr. Chairman. Further specifics on the progress of the research and development programs of the Department will be discussed in later testimony by officials of RSPA, NHTSA, FHWA, UMTA, and FRA. Now, Dr. Fearnsides, Mr. Bracy and I will be happy to answer any questions you or other members of the Subcommittee may have.

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