

**DEPARTMENT OF TRANSPORTATION****Federal Highway Administration****49 CFR Part 395****FHWA Docket No. MC-96-28****RIN 2125-AD93****Hours of Service of Drivers****AGENCY:** Federal Highway Administration (FHWA), DOT.**ACTION:** Advance notice of proposed rulemaking (ANPRM); request for comments.

**SUMMARY:** The FHWA is initiating this rulemaking to revise the FHWA's hours-of-service (HOS) regulations. The FHWA is nearing completion of several research projects and seeks the results of other relevant research to consider in this effort. To assist the FHWA in gathering all pertinent data to make informed decisions based upon scientific evidence, the FHWA requests assistance in locating any other relevant information, including research, operational tests, or pilot regulatory programs conducted anywhere in the world, that may be used by the agency in developing a revised program for the HOS of commercial motor vehicle (CMV) drivers. This action is mandated by the ICC Termination Act of 1995.

**DATES:** Comments to the general ANPRM should be received no later than March 31, 1997. Late comments will be considered to the extent practicable.

**ADDRESSES:** Comments should be sent to: Docket Clerk, Attn: FHWA Docket No. MC-96-28, Federal Highway Administration, Department of Transportation, Room 4232, 400 Seventh Street, SW., Washington, D.C. 20590. Persons who require acknowledgment of the receipt of their comments must enclose a stamped, self-addressed postcard. Comments may be reviewed at the above address from 8:30 a.m. through 3:30 p.m. Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** *For information regarding rulemaking and operational issues:* Mr. David Miller, Office of Motor Carrier Research and Standards, (202) 366-1790; *for information regarding human factors and fatigue research programs:* Ms. Deborah Freund, Office of Motor Carrier Research and Standards, (202) 366-1790; *and for information regarding legal issues:* Mr. Charles Medalen, Office of the Chief Counsel, (202) 366-0834, Federal Highway Administration, Department of Transportation, 400

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**SUPPLEMENTARY INFORMATION:** An electronic copy of this document may be downloaded using a modem and suitable communications software from the Federal Register electronic bulletin board service (telephone: 202-512-1661). Internet users may reach the Federal Register's web page at: [http://www.access.gpo.gov/su\\_docs](http://www.access.gpo.gov/su_docs)

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**I. Purpose of This Rulemaking**

On December 29, 1995, the ICC Termination Act of 1995 (Pub. L. 104-88, 109 Stat. 803, 958) was signed into law. Among other things, section 408 of this Act requires the FHWA to issue an ANPRM addressing the FHWA's current HOS regulations. This requirement is presented in the context of legislation which also requires the FHWA to ensure the development, coordination, and preservation of a transportation system that meets the transportation needs of the United States. Section 13101 of title 49, U.S.C., (109 Stat. 852), in section 103 of the ICC Termination Act, establishes the Transportation Policy for motor carriers, which includes among others:

- (1) Promote safe, adequate, economical, and efficient transportation;
- (2) Encourage sound economic conditions in transportation, including sound economic conditions among carriers;
- (3) Encourage fair wages and working conditions in the transportation industry;
- (4) Oversee transportation by motor carrier, to promote competitive and efficient transportation services in order to—
  - (a) Encourage fair competition, and reasonable rates for transportation by motor carriers of property;
  - (b) Promote efficiency in the motor carrier transportation system and to require fair and expeditious decisions when required;

- (c) Meet the needs of shippers, receivers, passengers, and consumers;
- (d) Allow a variety of quality and price options to meet changing market demands and the diverse requirements of the shipping and traveling public;

- (e) Allow the most productive use of equipment and energy resources;

- (f) Enable efficient and well-managed carriers to earn adequate profits, attract capital, and maintain fair wages and working conditions;

- (g) Provide and maintain service to small communities and small shippers and intrastate bus services;

- (h) Improve and maintain a sound, safe, and competitive privately owned motor carrier system;

- (i) Promote greater participation by minorities in the motor carrier system; and

- (j) Promote intermodal transportation.

The FHWA has much broader responsibilities under the Act than it had in the past. The FHWA's major focus has been, and will continue to be on, motor carrier safety, but now the FHWA must consider the economic vitality and productivity of the motor carrier industry in its economic regulation of motor carriers, drivers, and CMVs.

The FHWA has been considering modifications to its HOS regulations to be more responsive to its goal of reducing highway crashes involving CMVs. Its overall objective has not changed. The provision of the Act concerning an HOS ANPRM is a catalyst to enhance safety while maintaining, or increasing productivity. This process will review the conventional HOS regulations, and variations or exemptions that may be possible based upon scientific data. This process will also initiate an exploration of alternative regulatory approaches and non-regulatory approaches to promote an increased level of highway safety, coupled with improved productivity.

The FHWA believes that there have been changes to many elements of the motor carrier industry that suggest a change in the HOS regulations is necessary. The CMVs of today offer improved ride characteristics and better climate control to enhance driver alertness and comfort. Roads and highways are now built and maintained better than in the 1930's when the HOS regulations were first developed. Shipper/consignee demands and driver pay issues also affect the HOS issue. Improvements in technologies and logistics, including global positioning systems (GPS), satellite communications, in-vehicle cellular communications, and emerging intelligent transportation system (ITS)

and ITS-influenced technologies allow for greater operational flexibility. On the other hand, congestion, truck size, and other factors which increase the burden on drivers have changed substantially, as well. All of these factors, taken together, suggest that a comprehensive review of the HOS rules is appropriate.

In 1992, as a part of the FHWA's Zero-base regulatory review of the motor carrier safety regulations, the FHWA began to re-evaluate the current HOS regulations to respond to changes in the highway environment and the motor carrier industry that operates in it. The FHWA has proposed, in numerous meetings and correspondence, to build a performance-based system of regulations to replace or augment, as appropriate, the current prescriptive-based system. The FHWA's research into driver fatigue and loss of alertness began in the 1970's, was dormant during most of the 1980's, and was renewed and expanded over the last six years.

The FHWA believes this rulemaking will produce two results. In the short term, it will generate proposals for changes to the conventional HOS regulations to make them more responsive to safety, while maintaining or enhancing productivity. In the long term, it should begin a transformation of the HOS regulations into a combination of a new performance-based regulatory scheme which would address driver alertness and fitness for duty. Use of such a performance-based system could be voluntary. Motor carriers not wishing to use such a system would continue to be subject to a modified version of the current, prescriptive system. The short-term changes would reflect the findings of recently completed research that should increase productivity while enhancing operational safety.

A performance-based system of HOS regulations would recognize the use of technology to record and track a driver's level of alertness at intervals each day. The driver's HOS, hours of rest, fatigue-producing extra-curricular activities, and other activities would be recorded by a device. The device would report the level of fatigue at a given time and the amount of additional time that might be worked before rest would be necessary for a particular driver. If adopted by a motor carrier, the FHWA believes this type of system would replace any manual or electronic recordation system that is currently being used to meet the HOS requirements of Part 395. The FHWA is studying four new and different technologies that might be used in a performance-based regulatory scheme. A further discussion of this research study is provided in the research

appendix to this document under the subheading *Driver Work and Rest Needs Study*.

This ANPRM seeks substantive information on research and operational studies in addition to those discussed later in this document or already contained in the public docket. Comments are sought from all interested parties, around the world, that may help the FHWA to formulate both new conventional regulations and a performance-based system that would assist motor carriers in the safe use of their drivers. The FHWA would like to gather research and data to assist the agency in developing a system that ensures that drivers are alert while driving CMVs on public roads.

The FHWA is not proposing specific rules or requirements at this time. This document merely seeks additional information that the FHWA may use to formulate proposals that (1) would minimize crashes and regulatory burdens, (2) are supportable either by data or by the best available professional judgment, (3) are cost-effective, simple to understand, comply with, and (4) are enforceable. The FHWA has an enormous amount of data on this subject already. The research known to exist, presented later in this document, is voluminous. The purpose of this ANPRM is to conduct one last comprehensive worldwide search for any relevant research and information before making specific proposals.

## II. Rulemaking Process

This document is the first in a series of actions to attain the FHWA's HOS goals. As stated previously, it does not propose regulatory changes. It seeks answers to many questions. The FHWA needs specific answers to these questions, and the presentation of supporting information, to ensure that future proposed rulemakings are based upon sound scientific research and factual data. The FHWA does not want to base changes to the rules upon anecdotal information or intuitive opinions.

Based upon public comments to this ANPRM, additional completed research, and research data submitted, the FHWA will formulate specific proposals and publish a notice of proposed rulemaking (NPRM). The NPRM will also provide a comment period for additional public response to specific proposals. Unless modified due to comments on this ANPRM or new information, the FHWA now anticipates that a final rule may be developed and published as early as 1999 for a new prescriptive set of HOS regulations (similar to the 10-hour, 15-hour, etc. rules) and as early as the year

2000 for a performance-based set of regulations.

## III. The History of The FHWA Hours-of-Service Problem

Copies of all historical regulatory documents mentioned below are included in the public docket, number MC-96-28 and will be available for examination at the above given address.

### A. Early Hours-of-Service Problems Identified

The development of the motor carrier industry began shortly after World War I. It had become a serious competitor to the railroads and water carriers prior to the Great Depression of 1929. The motor carrier industry was initially regulated by many of the States, but these regulations were not uniform and universal in their application. The Congress had discussed the issues related to the infant motor carrier industry from 1909 through 1932. See Regulation of Transportation Agencies, S. Doc. No. 152, 73d Cong. 2d Sess. (February 28, 1934).

The Interstate Commerce Commission (ICC), which had been in existence since 1888, recommended Federal regulation of motor carriers as early as 1928. The lack of uniform regulations, or none at all in some States, generated allegations of disturbing abuses and concerns in both the economic and safety arenas. The Federal Coordinator of Transportation, a post created in 1933 by the Emergency Railroad Transportation Act of 1933 (June 16, 1933, Pub. L. 73-68, 48 Stat. 211) to promote transportation development for the Nation, studied the highway transportation situation. In 1934, the Federal Coordinator recommended regulation of motor carrier activities by the Federal Government. The report concluded that motor carriers should be regulated in a way similar to the railroad industry, which had been regulated by the ICC for the previous 50 years. The report recommended regulating the economic, as well as the safety, aspects of the motor carrier industry.

Following this report, the Congress again discussed the regulation of motor carriers and passed the Motor Carrier Act of 1935 (August 9, 1935, Pub. L. 74-255, 49 Stat. 543)(MCA). The MCA was enacted as Part II of the Interstate Commerce Act (49 USC 13101 *et seq.*, Chap. 104, 24 Stat. 379, February 4, 1887, as amended) and placed responsibilities on the ICC to regulate motor carriers in the areas of economic health and safety of operations.

### B. ICC Regulates Hours-of-Service of Drivers

The ICC issued a general set of motor carrier safety regulations in 1937. These first regulations did not include HOS rules. Later, HOS regulations were issued, only to be delayed while additional hearings were held on the issue, which had become controversial within the industry.

In August 1937, the Federal Coordinator of Transportation reported that the Bureau of Public Roads (BPR), the predecessor of the Federal and Federally-assisted construction programs of the FHWA, had collected data on the HOS of about 7,000 drivers of for-hire vehicles in 1936. In a hearing before the ICC, the BPR presented a report that noted that, of vehicles using only one driver per vehicle after a period of rest, 23.0 percent of the drivers had worked more than 12 hours, 10.4 percent had worked more than 15 hours, 3.7 percent had worked more than 20 hours, and 1.3 percent had worked in excess of 27 hours. The Federal Coordinator also reported that the States had widely varying HOS rules. The CMV drivers in 34 States were allowed to operate motor vehicles between 7 and 14 continuous hours after a period of rest of between 6 to 12 hours. Additionally, 41 States had allowed between 8 and 16 hours of driving within a 24 hour period of time.

In view of these findings and other evidence submitted at the hearings, the ICC issued regulations on January 4, 1938 (3 FR 7), to limit the HOS of interstate truck drivers engaged in for-hire service. The order of the ICC prescribed, in part, that no driver of a for-hire interstate motor vehicle should be *on duty* longer than 60 hours in any one week or 15 hours in any one day, with a further limitation of 12 hours, *actually at work*, in any one day. These regulations were stayed by the ICC before the July 1, 1938, effective date, and a new set of regulations was

promulgated to become effective three months later. In subsequent proceedings, the ICC considered the advisability of further altering the regulations. Responding to the Federal Coordinator's report, congressional hearings, and public hearings, the ICC adopted regulations establishing maximum hours of driving and on-duty time. The new HOS regulations became effective on March 1, 1939.

These rules required motor carriers, for-hire common and contract, to limit drivers to a total of 10 hours of driving in any period of 24 consecutive hours unless the driver was off duty for 8 consecutive hours immediately following the 10 hours of driving. In addition, drivers were limited to 60 hours on-duty time in any week (168 consecutive hours). For motor carriers that operated vehicles every day of the week, the limit was set at 70 hours in any period of 192 consecutive hours. These rules were extended to private motor carriers of property in October, 1940 and provided exceptions for driver-salesmen who were employed by private motor carriers of property, for farmers of certain agricultural commodities, and for drivers making local deliveries for retail stores or retail catalog goods between December 10 and 25 of each year.

The regulations issued in 1938 and 1939 reflected testimony provided at the ICC hearings, and were not based upon scientific inquiry even though a scientific study was considered at the time. That study is discussed later in this document under the heading "Research into the HOS of Drivers."

On March 29, 1962, in Ex-Parte No. MC-40, Sub No. 1, the ICC issued the "15 hour rule" requiring that no driver be required or permitted to drive more than 2 hours after having been on duty 13 hours following 8 consecutive hours off duty. Also, in this rulemaking, the ICC removed the prohibition that a driver may only drive 10 hours in any 24 hour period and added an exception

to the 60/70 hour rule for oil field related transportation. On February 21, 1963, the ICC amended the 15-hour rule, to state that no driver shall be on duty more than 15 hours following 8 consecutive hours off duty. The ICC, on this date, also amended the 60 hour and 70 hour rules by defining the 7 and 8 day time periods for the calculation of the time period of one week. By these actions, the ICC established the current HOS regulations applicable to most of the motor carrier industry (the 10-hour driving time limit, 15-hour on-duty time limit, and the 60/70 hour on-duty time limit in a 7/8 day period).

### C. Transfer of Hours of Service Regulations to DOT

Serious debate began in the mid-1960's about the establishment of a cabinet level department to administer the transportation safety responsibilities of the Federal Government in all modes. In 1966, the Congress passed the Department of Transportation Act (49 USC 101 *et seq.*) which created the DOT. The DOT Act was effective April 1, 1967. The Congress transferred the ICC's motor carrier safety responsibilities to the DOT, where they were then delegated to the Federal Highway Administrator.

The FHWA published an ANPRM on February 12, 1976 (41 FR 6275). The comments to this ANPRM did not provide sufficient data to determine whether the HOS should be amended. A second ANPRM was issued on May 22, 1978 (43 FR 21905). This second advance notice invited comments on three different plans for limiting driver's HOS. The three proposed plans were identified as plans I, II, and III. Plans I and II were alternative proposals covering single driver operations. Plan III was a proposal that would have been applicable only to sleeper berth operations using two drivers. Some of the major differences between each of the three plans may be seen in Table 1.

TABLE 1.—MAY 22, 1978 ANPRM PROPOSED HOS REVISIONS

Requirement	Plan I—single driver operation	Plan II—single driver operation	Plan III—sleeper berth operation using two drivers
1. Cumulative Limits (Maximum Weekly Hours).	60 hours in 7 consecutive days with 36 hour extended rest period.	60 hours in 7 consecutive days with 36 hour extended rest period.	Not Specified.
2. Duty Tour Limits (Maximum On-Duty Time).	12 hours .....	15 consecutive hours .....	80 consecutive hours.
3. Minimum Off—Duty Time .....	0≤4 hours on duty=8 hours off duty. 4–12 hours on duty=12 hours off duty.	0≤4 hours on duty=8 hours off duty. 4–12 hours on duty=12 hours off duty. 12≤13 hours on duty=14 hours off duty.	0≤2 hours on duty=12 hours off duty. 20≤40 hours on duty=24 hours off duty. 40≤60 hours on duty=36 hours off duty.

TABLE 1.—MAY 22, 1978 ANPRM PROPOSED HOS REVISIONS—Continued

Requirement	Plan I—single driver operation	Plan II—single driver operation	Plan III—sleeper berth operation using two drivers
4. Driving Limitation .....	10 hours or 450 miles .....	13≤14 hours on duty=16 hours off duty. 14≤15 hours on duty=18 hours off duty..	60≤80 hours on duty=48 hours off duty.
5. Driving Relief Periods .....	30 minutes every 2½ hours .....	11 hours or 500 miles .....	Dictated by time spent.
6. Intermittent Duty Status Allowed?.	Yes—But only for meal periods ....	30 minutes every 3 hours .....	30 minutes for each change of duty status.
7. Mandatory Meal Periods? .....	No .....	No .....	No.
8. Special Provisions for Night Driving Assignments?.	Yes—1 hour as off duty .....	Yes—1 hour as on duty time .....	Not Specified.
	No .....	Yes .....	No.

Over 1200 docket comments were submitted in response to the May 22, 1978 ANPRM, and the FHWA held seven public hearings throughout the Nation. The hearings generated 9,000 pages of testimony and submissions. On September 3, 1981 (46 FR 44198), the FHWA terminated the rulemaking based upon the economic impact that the proposed options would have had on motor carrier operations and the Nation's distribution system. The projected costs of each of the FHWA's three major options for revising the HOS regulations were considered to be significantly greater than the proposed benefits. See Booz, Allen, and Hamilton, Inc. *Assessments of the Impacts of Proposed HOS Revisions*, prepared for the Bureau of Motor Carrier Safety (Washington, DC: June 24, 1981). A copy is available in the FHWA docket.

The FHWA published a notice for public comment on January 24, 1980 (45 FR 5781), which, among other things, requested comments on a petition submitted by participants in the White House-established Ad Hoc Working Group on Truck Owner-Operator Problems. The FHWA requested comments on potential safety impacts of expanding the driving time limit to 12 hours in a 24-hour period and the on-duty limit to 96 hours in an 8-day period.

Over 700 docket comments were received. Ninety-four percent of the comments opposed the expanded HOS regulations. On December 15, 1980 (45 FR 82284), the FHWA denied the petition and closed the docket. In this December 15 document, the FHWA published a summary of the findings of three DOT research studies on fatigue, mentioned later in this document, and analyses of 12 other research papers on fatigue. (Copies of the three research reports have been placed in this FHWA docket.)

On October 30, 1987 (52 FR 41718), the FHWA made additional changes to

the HOS regulations. The FHWA amended the 60/70 hour rule to allow a driver to be on-duty, but not driving, after the 60th or 70th hour. In addition, the definition of on-duty time was amended. A final rule addressing declared emergency responses was published on July 30, 1992 (57 FR 33638). This rule allows a total exemption from the Federal Motor Carrier Safety Regulations (FMCSRs). Before a driver returns to normal regulated interstate operations, the FHWA allows a 24-hour restart of the clock similar to the March 29, 1962, oilfield transportation exception. Drivers who provide direct assistance to a declared emergency relief effort and have been on duty for more than 60/70 hours in 7/8 days were allowed to return to driving, in interstate commerce, after a minimum of 24 consecutive hours off duty.

On August 19, 1992 (57 FR 37504), the FHWA proposed changes similar in scope to the 1962 oilfield transportation exception, but that would have been applicable to all motor carriers and drivers subject to the FMCSRs. The FHWA requested comments on eleven issues relating to the proposal. Nearly 68,000 comments were received. Virtually no substantive information was presented in these comments to support a change in the regulations. Except in very general terms, the FHWA received little discussion of potential impacts upon highway safety that could result from increasing the available on-duty hours. The FHWA, therefore, declined to make the proposed changes to the rule, and on February 3, 1993 (58 FR 6937), the FHWA withdrew the proposal and closed the docket.

As mentioned above, the FHWA began a "Zero-base" review of the safety regulations, including the HOS requirements in 1992. This program will reconsider all of the FMCSRs in an effort to determine whether they could be more performance-oriented and less

prescriptive (57 FR 37392; August 18, 1992). The FHWA realizes that such an effort is a multi-stage, multi-year task. The "Zero-base" review is continuing and is projected to be completed in late 1998.

On December 8, 1994 (59 FR 63322), the FHWA invited and received comments on the issue of a waiver of the HOS regulations for those transporting crops and farm supplies. Docket comments were received from over 175 respondents, almost all of which were in support of the waiver concept.

The 1996 Department of Transportation and Related Agencies Appropriations Act (Pub. L. 104–50, 109 Stat. 436) and the National Highway System Designation Act of 1995 (Pub. L. 104–59, 109 Stat. 568)(NHS Act) congressionally mandated a waiver of the HOS regulations for those individuals transporting crops and farm supplies. Section 345 of the NHS Act created four specific exemptions from HOS provisions of the FMCSRs. On April 3, 1996, the FHWA published a final rule exempting specific types of operators and operations from the requirements of 49 CFR Part 395 (61 FR 14677).

The first exemption applies to drivers transporting agricultural commodities or farm supplies during planting and harvesting seasons, if the transportation is limited to the area within a 100 air-mile radius of the source of the commodities or the distribution point for the farm supplies. The FHWA was directed to exempt these drivers from the maximum driving and on-duty time regulations of the FMCSRs.

The second exemption relates to drivers who are primarily involved in the transportation of ground water drilling rigs. These rigs include any vehicle, machine, tractor, trailer, semi-trailer, or specialized mobile equipment propelled or drawn by mechanical power and used on highways to

transport water well field operating equipment, including water well drilling and pump service rigs equipped to access ground water. The water drilling rig exception in the NHS Act permits these drivers to "restart the clock," which means that at any point at which the driver is off-duty for 24 or more consecutive hours, the period of 7 or 8 days ends as of the beginning of that off-duty period, and the clock restarts for purposes of computing the 7 or 8 day period when the driver goes on duty again. Thus, this exemption enables the motor carrier to designate the time of day at which the period of 7 or 8 days begins. The definition of "24-hour period" in the NHS Act authorizes the carrier to designate the time of day at which the 24-hour period begins, which may vary between the various terminals from which drivers are dispatched.

The third exemption applies to drivers used primarily in the transportation of construction materials and equipment, which is defined as the transportation of construction and pavement materials, construction equipment, and construction maintenance vehicles. The driver must be en route to or from an "active construction site," which must be at a stage between initial mobilization of equipment and materials to the site, and final completion of the construction project. The construction site must also be within a 50 air-mile radius of the driver's normal work reporting location, and this exemption does not apply to the transportation of hazardous materials in a quantity requiring placarding. This exemption allows these construction drivers to restart the calculation of a 7 or 8 day period under the hours of service regulations in the same fashion as provided in the second exemption.

The fourth and final exemption applies these same provisions to drivers of utility service vehicles. In order to qualify as a utility service vehicle, the vehicle must be operated primarily within the service area of the utility's subscribers. In addition, it must be used in furtherance of the repair, maintenance, or operation of any physical facilities necessary for the delivery of public utility service and must be engaged in any activity necessarily related to the ultimate delivery of public utility services to the consumer, including travel to, from, upon, or between activity sites. The public utility, which includes those delivering electric, gas, water, sanitary sewer, telephone, and television service, need not be the actual owner of the vehicle in question. This exemption

likewise enables utility drivers to restart the calculation of a 7 or 8 day period after the driver has been off duty for at least 24 hours consecutively.

For each of the four exemptions described above, other than the water well drilling exemption, the NHS Act provided the Secretary with the authority to negate or modify the exemption upon a determination, after a rulemaking proceeding, that the exemption is not in the public interest and would have a significant adverse impact on the safety of CMVs. This ANPRM does not serve as the rulemaking to make such a determination to negate or modify the congressionally mandated exemptions. The FHWA is considering such issues in a different rulemaking action to be published in the future.

This ANPRM primarily serves as the first rulemaking document in the "Zero-base" process to ultimately amend or revise the HOS rules. The FHWA envisions the possibility of eventually replacing, in whole or in part, the current set of prescriptive requirements (10-hours driving, 15-hours on-duty, 60/70 hours on duty in 7/8 days) with a set of performance-based requirements. The FHWA has initiated extensive research, some of which is completed, addressing the HOS issue (discussed later in this document) and will compile a record of information that could be applied to the FHWA's future proposal to amend the regulations.

In 1990 and 1995, the National Transportation Safety Board (NTSB) produced reports which sought to address the problem of CMV driver fatigue. The NTSB concluded in its more recent effort that the critical factors in predicting fatigue-related accidents were: (1) Duration of the most recent sleep period; (2) the amount of sleep in the previous 24 hours; and (3) fragmented sleep patterns. Its recommendations to the FHWA included calls for:

(1) Rulemaking to address the regulatory issues identified—

(a) Require sufficient rest provisions to enable drivers to obtain at least 8 continuous hours of sleep after driving for 10 hours or being on duty for 15 hours;

(b) Eliminate the allowance that provides drivers the use of sleeper berth equipment to cumulate 8 hours off-duty time in two separate periods;

(c) Prohibit employers, shippers, receivers, brokers, and drivers from accepting and scheduling shipments which would require the driver to exceed the HOS regulations in order to meet delivery deadlines;

(2) Mandating automatic on-board recording devices to monitor driver activities;

(3) Evaluation of driver compensation issues and their potential effect on HOS violations, accidents or fatigue; and

(4) Development and dissemination of training and materials to inform CMV drivers of the hazards of fatigued operation.

The FHWA continues to work with the Board on the fatigue problem. However, the FHWA believes the information provided from the NTSB's study conducted to date has not yet produced a sufficient range of scientifically valid findings that will allow the FHWA to propose, today, a wholesale revision of current rules governing on- and off-duty driver activities.

In March 1995, the FHWA held a Truck and Bus Summit in Kansas City, Missouri. The FHWA assembled participants who represented every segment of the U.S. motor coach and trucking industries. The number one issue of concern to the participants was driver fatigue.

Accordingly, the FHWA will continue to pursue a number of related studies that will contribute to a better understanding of the implications of fatigue upon highway safety. An approach geared toward driver proficiency will provide a much more viable, long-term solution to ensuring driver alertness. The FHWA's research on fitness-for-duty and work-and-rest cycles, for example, could generate devices and methods to quantitatively assess a driver's readiness and fitness to operate a CMV, based upon the operator's level of physical activity and his or her work and rest cycle history.

At the same time, the FHWA will continue to sponsor task forces, symposia, and working group meetings with domestic and foreign researchers and the scientific, medical, and safety communities to broaden collective knowledge and to facilitate an intelligent approach to resolution of this important issue. The FHWA will pursue efforts, both directly or through cooperative efforts with other safety-spirited organizations, to distribute fatigue-related accident countermeasure pamphlets, educational brochures, and public service announcements. Through these efforts, the FHWA hopes to raise public awareness on the subject and facilitate effective corrective actions.

The organization Parents Against Tired Truckers (PATT) petitioned the FHWA in March, 1996 to adopt an HOS rule that allows up to 12 hours maximum on-duty time and then would require a minimum of 12 hours off-duty

for rest. The PATT states that such a requirement would provide for the safety of CMV operators and the motoring public by promoting "alert drivers based upon the human body's need for rest and naturally occurring circadian rhythms experienced by every human." The petition also recommends that drivers maintain one log book (record of duty status (RODS)) annually. The log book would begin on January 1 and end on December 31, with an allowance for on-board computerized logs. This PATT petition will be incorporated into this rulemaking and will be available for review in the FHWA docket.

#### IV. Research

The first scientific study which addressed the HOS of U.S. commercial drivers was performed in the late 1930's. In the 1970's and the late 1980's, a few research studies were conducted. Many research studies have been and continue to be conducted over the last six years. These studies have advanced the collective understanding of loss of alertness, fatigue, sleep deprivation, and work/rest cycles for many operations that work round-the-clock. Many specific studies have been conducted in relation to CMV operations and have focused upon the desire to change the FHWA's HOS regulations. These studies are voluminous and a summary of each one is contained in the Appendix to this preamble at the end of this document.

#### V. Additional Substantive Data Needed

This ANPRM seeks additional substantive information on research, operational tests, and pilot regulatory programs that have not been discussed in this document or in the "Driver Fatigue and Alertness Study" literature reviews in the FHWA docket. The FHWA urges all interested parties to provide comments to help the agency take initial steps to formulate new conventional regulations and a performance-based system of the HOS requirements. The FHWA would like to gather any research and data that could be used in developing a system that ensures drivers will be alert while driving CMVs on public roads. The FHWA is not proposing specific HOS rules or requirements in this document. The FHWA is simply seeking additional information that may assist us in formulating proposals that would minimize crashes and regulatory burdens and that are cost-effective and simple to understand, comply with, and enforce.

#### VI. Questions

The FHWA needs public comment on the following specific questions. When responding to these questions, the FHWA asks you to identify each question by number and repeat that question in its entirety. Your cooperation will greatly expedite our compilation, review, and analysis of the docket comments. The FHWA would then, based upon research and comments relating to these questions, draft a new set of proposed HOS regulations. For example, the FHWA might keep the concept of the current HOS but simply change the specifics. The FHWA believes many driving performance and sleep/fatigue research findings could be applied directly to specific issues, so it would be possible to assess and compile comments directly relating to each issue. The FHWA believes that a consensus might emerge relating to most, if not all, of the following elements.

##### Research

1. Is there any other HOS-related research that should be considered that the FHWA has not mentioned in this document?

a. What non-CMV HOS-related research should be considered that would be applicable to CMV operation (such as research on airline pilots, railroad engineers, non-transportation-related workers, etc.) and why?

b. Are there additional HOS-related research studies from foreign countries that FHWA should consider?

##### Conventional Hours-of-Service

###### Driving Time (10 hour rule)

2. The FHWA regulations currently allow a driver to continuously drive up to a maximum of 10 hours after having had a minimum of 8 hours off duty. What should be the maximum allowable continuous driving time to enhance safety based upon scientific data? Please provide the scientific data that supports your answer.

###### Total on-Duty Time (15 hour rule)

3. The FHWA regulations currently allow a driver to drive and perform other non-driving duties up to a maximum of 15 hours after having had a minimum of 8 hours off duty. Should the FHWA provide a maximum continuous on-duty time period (driving time and on-duty time) for safety purposes based upon scientific data? Please provide the scientific data that supports your answer.

4. Should non-driving duty time be counted differently from driving time based upon scientific data? (e.g.,

loading, unloading, waiting, administrative time) Why? Please provide the scientific data that supports your answers.

###### Cumulative on-Duty Time (60 and 70 hour rules)

5. The FHWA regulations currently allow a driver to drive and perform other non-driving duties up to a maximum of 60 hours in a 7 day period of time or, up to a maximum of 70 hours in an 8 day period of time, dependent upon how many days a week the motor carrier conducts business. The driver may continue to be on-duty after the 60th or 70th hour; however, the driver is not allowed to drive CMVs. Is there a need or rationale to continue this provision? If so, what should be the maximum cumulative on-duty time and the applicable time period for safety purposes? Should there be two different periods? Please provide research data that supports your answers.

6. As stated previously in this document, Congress legislated 24-hour re-start provisions for certain types of motor carriers in section 345 of the National Highway Systems Designation Act of 1995, Pub. L. 104-59, 109 Stat. 568 (see also 61 FR 14677, April 3, 1996 for implementing regulations), and the FHWA allows 24-hour restarts for certain oilfield operations and certain emergency relief periods. Based upon scientific data, should there be a re-start provision (i.e., a minimum number of continuous hours off-duty to trigger a restart of the cumulative on-duty time period)? Why? Please provide the scientific data that supports your answer.

###### Off-Duty Time

7. The FHWA regulations currently require a driver to have a minimum of 8 consecutive hours off-duty prior to driving for a maximum of 10 hours or being on-duty for a maximum of 15 hours. What should the minimum consecutive off-duty time be for safety based upon scientific data? Please provide the scientific data that supports your answer.

###### Total Circadian Cycle

8. What should be the total daily work/rest cycle based upon scientific data (i.e., the "circadian cycle" implications of questions 2, 3, and 5 for safety purposes)? Please provide the scientific data that supports your answer. [Currently, a daily work-rest cycle of 18 hours is allowed by the FHWA HOS regulations.]

### Split Sleep—General

9. The FHWA regulations currently allow two periods totaling a minimum of 8 hours and the shortest of the two periods must be at least 2 hours in lieu of a consecutive 8 hour period of time. Based upon scientific data, should there be allowances for split-sleep off-duty hours? Please provide the scientific data that supports your answer.

### Rest Breaks

10. The FHWA understands that mandatory rest breaks are required in Europe and Australia during a long driving period. The FHWA understands that this was once required under Canadian regulations, also. The FHWA is very interested in receiving comments from foreign motor carriers, drivers, and government officials in Europe, Australia, and other nations in response to this question. Should the FHWA require mandatory rest breaks (suggested number and duration) during a long driving period? Why? Please provide the scientific data that supports your answer.

### Performance-Based Regulations

11. Has our scientific knowledge and data progressed to the point where performance-based regulations are technically feasible and operationally practical? (e.g., fleet management performance, individual driving performance—on-board monitoring, fitness for duty performance monitoring) If so, please cite studies. If not, what research and regulatory actions should be taken now to facilitate an eventual conversion to a primarily performance-based regulatory approach?

### Regulation of Driver Pay

12. Drivers are generally paid by the mile. If they do not have sufficient income, drivers may have to supplement their income by working additional hours outside of the motor carrier industry or violating the HOS regulations. This may compromise the intent of new HOS regulations and may only be mitigated in a performance-based system. In addition, CMV drivers are currently exempt from the overtime provisions of the Fair Labor Standards Act (FLSA, 29 U.S.C. 213(b)(1)). Should new HOS regulations depend upon how a driver is paid? How should such pay issues, (e.g., mileage, hourly, load, or some other measure) be addressed? Should legislation be sought to remove the FLSA exemption based upon scientific data? Why? What data is there to support your answer?

In addition to seeking specific recommendations (and rationales) relating to the questions above, the

FHWA seeks comments on the following issues related to these HOS provisions:

### Compliance Monitoring

13. For prescriptive-based regulations and performance-based regulations, answer each of the following questions separately. How should HOS regulatory compliance be measured or monitored? Who should monitor HOS regulatory compliance? How should HOS regulatory compliance be verified?

14. The FHWA regulations allow on-board monitoring devices to be used in lieu of conventional log books. Should the FHWA require on-board monitoring devices or other electronic methods (e.g., global positioning systems)? If the FHWA required these devices to be used, what would be the costs for small entities to purchase and maintain on-board monitoring devices or other electronic methods? This will help the FHWA determine the impacts upon small entities as is required under the Regulatory Flexibility Act (5 U.S.C. 601–612).

The FHWA also would like to know the answers to the following questions, but does not need these answers to formulate specific proposals for new HOS regulations.

### Conventional Hours-of-Service

#### Driving Time

15. The FHWA regulations currently require all CMV driving time to be recorded. What other motor vehicles (i.e., personal conveyances, automobiles, light duty trucks, small vans) should be included in the definition of driving time to enhance safety and productivity based upon scientific data? Please provide the scientific data that supports your answer.

#### Adverse Driving Conditions

16. The FHWA regulations currently allow 2 extra continuous driving hours if the driver encounters adverse driving conditions. How many, if any, extra continuous driving time hours should be allowed due to adverse driving conditions to enhance safety and productivity based upon scientific data? Please provide the scientific data that supports your answer.

#### Off-Duty Time

17. The FHWA has previously allowed time spent traveling in a CMV (bobtail or fully loaded) from en route terminals to motels and restaurants in the vicinity of the en route terminal to be considered off-duty. (A bobtail CMV is a tractor operating without a trailer.) The FHWA recently rescinded this

interpretation because this practice may produce additional fatigue and reduce available sleep time. Should the FHWA consider time spent traveling in a CMV (bobtail or fully loaded) from en route terminals to motels and restaurants in the vicinity of the en route terminal as driving time or off-duty time for safety purposes? Why? Please provide data that supports your answer.

18. The FHWA has previously allowed time spent traveling in a CMV (fully loaded or empty) from the work reporting/releasing location to the driver's residence to be considered off-duty. The FHWA recently rescinded this interpretation also because this practice may also produce additional fatigue and reduce available sleep time. This is especially true when a driver resides a long distance from the terminal where the driver is released from duty. When dispatched from the driver's residence, the FHWA's previous interpretation required the driver to consider the time as on-duty, driving time. Should the FHWA consider time spent traveling in a CMV (fully loaded or empty) from the work reporting/releasing location to the driver's residence as driving time or off-duty time for safety purposes? Why? Please provide data that supports your answer.

### Total Circadian Cycle

19. Should there be specific clock-time or "circadian trough/peak" provisions for safety purposes? Why? Please provide the scientific data that supports your answer.

20. Should early morning driving time (e.g., 1:00 a.m. to 5:00 a.m.) be more restricted than driving time during normal daylight driving time? Why? Please provide the scientific data that supports your answer.

21. Should there be regulatory relief for late morning or evening driving time (e.g., 8:00 a.m. to noon, or 7:00 p.m. to 11:00 p.m.)? When and why? Please provide the scientific data that supports your answer.

### Split Sleep—General

22. Should the FHWA allow split-sleep periods in facilities other than the sleeper berths to improve driver alertness? Why? Please provide data that supports your answer.

23. Should periods of less than 2 hours in the sleeper berth or other facility count toward the accumulation of a minimum off-duty period? Why? Please provide data that supports your answer.

24. Should the total minimum sleeper berth time change if split periods are used? Why? Please provide data that supports your answer.



25. What is the proportion of drivers who currently split their periods of off-duty time for purposes of rest or sleep? Please provide data that supports your answer.

26. How do drivers most commonly split their rest periods (6/2, 5/3, 4/4)? Please provide data that supports your answer.

27. If split sleep periods are allowed, should there be some minimum for the longer period of time to encourage at least one lengthy period of sleep daily? Why? Please provide data that supports your answer. (e.g., within the current 8 hour rule, there might be a requirement for one period to be at least six hours)

28. Should there be some minimum for the shorter period of time to encourage a minimum amount of rest? Why? Please provide data that supports your answer. (e.g., within the current 8 hour rule, there might be a requirement for one period to be at least three hours)

29. What is the proportion of drivers who utilize sleeping compartments while the CMV is in motion? Please provide data that supports your answer.

#### Split-Sleep Periods on Motor Coaches

30. Should the FHWA allow split-sleep periods for motor coach drivers who sleep in a motor coach passenger seat? Why? Please provide data that supports your answer. [The FHWA currently allows motor coach drivers to sleep or rest in a motor coach seat at certain times.]

31. Should the FHWA allow drivers to use sleeper berths built into the cargo compartment of motor coaches while the vehicle is in motion? Are there safety concerns that should be considered? Please provide data that supports your answer. [The FHWA is considering whether motor coach drivers should be able to sleep or rest in a motor coach cargo compartment at certain times.]

#### Exemptions

32. Should the FHWA allow exemptions, variations, or customizations of any specific provisions (e.g., local/short haul versus long haul, 4,537 to 11,794 kilograms [10,001 to 26,000 pounds] gross vehicle weight rated motor vehicles versus over 11,794 kilograms [26,000 pounds])?

#### Long-Haul Vs. Short-Haul Defined

a. How should the term "long-haul" be defined?

b. How should the term "short-haul" be defined? Should there be other definitions? [regional, local] How should they be determined? Why?

#### Variations by Weight of Vehicle

c. Should the HOS regulations be written in such a way that the weight or size of the CMV is considered? Why? (i.e., 4,537 kilograms (10,000 pounds) to 11,794 kilograms (26,000 pounds) gross vehicle weight rating versus weight ratings over 11,794 kilograms)

#### Variations by Cargo

d. Should the HOS regulations be written in such a way that the type of cargo transported is considered? Why? (i.e., hazardous materials versus non-hazardous materials, passengers (bus) versus freight, for-hire carriage versus private carriage)

e. Should the HOS rules for passenger carrier drivers differ from the HOS rules for other CMV drivers? If yes, why should the HOS rules be unique for passenger carrier drivers and how should they be different? Please provide scientific data that supports your answer.

#### Small Motor Carriers

f. Should the FHWA have special provisions for small business motor carriers? Why? (i.e., to be responsive to the Regulatory Flexibility Act (5 U.S.C. 601–612) requirements, see discussion below in Regulatory Analyses and Notices)

g. How should small business motor carriers be defined?

h. What should those special provisions be (e.g., less paperwork, different HOS limits, different rest periods, partial/total exemption)?

#### Other Segments Defined

i. Should the FHWA try to define any segments of the motor carrier industry? Why?

j. How should the FHWA define segments of the industry?

k. Should the FHWA present a matrix/table, in a subsequent NPRM, for comment?

#### Regulation of Shippers and Consignees

33. What consequences, if any, should be imposed upon a shipper or consignee if a driver violates the HOS requirements due to the actions or demands of the shipper or consignee?

34. How should the loading and unloading of freight, lumping, and engaging in activities other than driving be addressed? Please provide data that supports your answer.

35. How should situations where drivers encounter delays at shippers or consignees be considered in the proposal?

36. Should the FHWA seek legislation from Congress to regulate shippers and consignees to prohibit them from

making demands on a motor carrier and its drivers that would cause a violation of the HOS rules? Why?

#### Cost and Benefit Analyses

37. What are the costs and benefits that would be associated with HOS regulations and performance-based systems (these questions are being asked to help determine the cost-benefit and the paperwork burden associated with any HOS proposal)? Please address these following specific questions:

a. What would be the unit cost for each type of monitoring device? Please provide data that supports your answer.

b. How many hours would be necessary to process, review, and store each type of record? Please provide data that supports your answer.

c. How many records per driver, would be generated? Per motor carrier? Please provide data that supports your answer.

d. How many hours would be necessary to process these records? Please provide data that supports your answer.

e. What would be the unit cost for staff compensation to handle these records? Clerks? Management? Please provide data that supports your answer.

f. What would be the unit cost for staff fringe benefits who handle these records? Please provide data that supports your answer.

g. What are the various types and the average prices of each type of commercial space to collect, inspect, and store these records? Please provide data that supports your answer.

h. What is the unit cost of the non-productive staff time (holidays, vacations, training, breaks, meetings) that should be used? Please provide data that supports your answer.

i. What is the unit cost of staff supervision time (supervisory wages, salary, fringe benefits, staff space, and non-productive time)? Please provide data that supports your answer.

j. What is the type and average price of equipment used? Please provide data that supports your answer.

k. What are the types and average prices of furniture, supplies, and purchased services used? Please provide data that supports your answer.

l. Are there any economies of scale that could be used in the computations? Please provide data that supports your answer.

m. What are the unit costs for general and administrative services? Please provide data that supports your answer.

n. What are the unit costs for organizational overhead? Please provide data that supports your answer.

o. What is the average cost of CMV accidents involving human fatalities?



Please provide data that supports your answer.

p. What is the average cost of CMV accidents involving only bodily injuries, excluding fatalities? Please provide data that supports your answer.

q. What is the average cost of CMV accidents involving only property damage? Please provide data that supports your answer.

r. What is the average cost of lost productivity time for individuals injured in CMV accidents? Please provide data that supports your answer.

s. What other monetary considerations should the FHWA use in the cost and benefit analysis of the revised HOS regulations? Please provide data that supports your answer.

#### IX. Rulemaking Analyses and Notices

All comments received before the close of business on the comment closing date indicated above will be considered and will be available for examination in FHWA Docket MC-96-28 at the above address. Comments received after the comment closing date will be filed in FHWA Docket MC-96-28 and will be considered to the extent practicable, but the FHWA may issue an NPRM at any time after the close of the comment period. In addition to late comments, the FHWA will also continue to file, in the docket, relevant information that becomes available after the comment closing date, and interested persons should continue to examine the docket for new material.

#### *Executive Order 12866 (Regulatory Planning and Review) and DOT Regulatory Policies and Procedures*

The FHWA has determined that this document may contain a significant regulatory action under Executive Order 12866. It is a significant regulatory action under the Department of Transportation's regulatory policies and procedures because this action has substantial public interest. In addition to the substantial public interest, the HOS regulations impose the largest paperwork burden on the FHWA's regulated industry. Any significant change to the HOS requirements, or their recordation requirements, will also have a significant impact upon the paperwork burden estimates.

The FHWA does not know what direction this rulemaking will take or what the economic impacts of any proposals will be in the future. The FHWA does not expect that this rulemaking will be inconsistent with any other agency actions or materially alter the budgetary impact of any entitlements, grants, user fees, or loan programs. Evaluation of the costs of this

rulemaking action cannot be determined at this time.

#### *Regulatory Flexibility Act*

To meet the requirements of the Regulatory Flexibility Act (5 U.S.C. 601-612), the FHWA has evaluated the effects of this rule on small entities and has preliminarily determined that this regulatory action will have a significant economic impact on a substantial number of small entities.

Although this document does not include any specific proposal at this time, the FHWA believes this action will lead to a proposed rule that will have a significant economic impact on a substantial number of small motor carriers. The FHWA requests small entities to comment on the questions asked in this advance notice (specifically the questions with respect to the costs and benefits of compliance and question 17 above), so that the FHWA may accurately determine the economic impacts any proposal will have on the small entities.

#### *Executive Order 12612 (Federalism Assessment)*

This action has been analyzed using the principles and criteria contained in Executive Order 12612, and it has been preliminarily determined that this proposal may have sufficient federalism implications to warrant the preparation of a federalism assessment.

Although there are no proposals in this document, any future proposals are expected to preempt State laws and regulations with respect to the HOS of interstate motor carriers and their drivers. These changes, if adopted, would limit the policy making discretion of the States. The additional costs or burdens that the FHWA would impose upon the States because of this action would be generated from the requirement that the States incorporate these future proposed changes into their safety regulations for interstate operations. The FHWA does not expect this action would infringe upon the State's ability to discharge traditional State governmental functions because interstate commerce, which is the subject of these regulations regarding interstate operations, has traditionally been governed by Federal laws. The FHWA expects that it would require, as a condition of the Motor Carrier Safety Assistance Program (MCSAP), the States to adopt these regulations for intrastate safety once they are promulgated.

In compliance with the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, 109 Stat. 48), the FHWA will ask State and local governments to comment upon any proposals made to amend the

HOS regulations and the effects the changes will have upon the various State and local governments.

#### *Executive Order 12372 (Intergovernmental Review)*

Catalog of Federal Domestic Assistance Program Number 20.217, Motor Carrier Safety. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities do not apply to this program.

#### *Paperwork Reduction Act*

Under the OMB regulations, 5 CFR 1320, *Controlling Paperwork Burdens on the Public* (1995), the FHWA will be required to estimate the burden new regulations impose to generate, maintain, retain, disclose, or provide information to or for the FHWA. The FHWA believes that this rulemaking action will result in changes that would substantially reduce the collection of information requirements that are currently approved.

On January 25, 1994, the OMB approved the information collection request for driver's time cards under 49 CFR 395.1(e). It was assigned OMB control number 2125-0196. The information collection request estimates that the annual cost to the public is \$110,733,330. This is based upon 11,073,333 hours burden for alternative time records (motor carriers usually and customarily utilize time cards or time sheets for this purpose). See Table 2 for a summary of this information collection.

On February 23, 1995, the OMB approved the information collection request for driver's records of duty status under 49 CFR 395.8. The OMB assigned control number 2125-0016. This information collection request estimates an annual cost to the public of \$399,798,455. The estimate includes an annual time burden of 11,720,681 hours for records of duty status and supporting documents. See Table 2 for a summary of this information collection.

#### *Background of Past OMB Approvals*

*OMB Number:* 2125-0016.

*Title:* Driver's Record of Duty Status (RODS).

*Background:* Title 49 U.S.C. 31502 allows the Secretary of Transportation to promulgate regulations which establish maximum hours of service of employees of motor carriers. The Secretary has adopted regulations that require information to be recorded in a specified manner, but no specific form is required. The FHWA regulations allow motor carriers to make electronic

records produced through the use of automatic on-board recording devices, in lieu of making paper records. The FHWA estimates that these automatic on-board recording devices substantially reduce, by as much as 90 percent, the time involved in preparing, filing, and storing paper. The FHWA believes that the use of automatic on-board recorders continues to be uncommon and is not likely to grow significantly based upon the current regulations.

The RODS must be maintained with all supporting documents for a period of six months from the date of the RODS.

The FHWA believes the record keeping requirements are necessary for motor carriers and drivers to properly monitor their compliance with the HOS regulations. It is also necessary for Federal, State, and local officials who are charged with monitoring and enforcing the HOS regulations. The HOS regulations are allowed by statute to promote the safe operation of CMVs, and the FHWA believes this record keeping requirement is not unnecessarily duplicative of information that would otherwise be reasonably accessible to the FHWA.

Based upon improved data collection, the FHWA's 1996 data indicates there are 2,084,000 drivers and 390,000 motor carriers in interstate commerce that would be subject to the HOS regulations. The FHWA's data indicates

that 70 percent of CMV drivers operate farther than 100 air-miles from their normal work reporting location and 30 percent are eligible to use the 100 air-mile radius exception in § 395.1(e).

*Recordkeepers:* Approximately 1,452,000 CMV drivers.

*Average Burden per Response:* 2 minutes for driver's to prepare the daily record of duty status; 15 seconds per record for motor carriers to audit each record of duty status; and 5 seconds per record to file records of duty status and all supporting documents.

*Collection of Information Frequency:* RODS: Every day of the year. Two or more days off duty may be kept on one record. Supporting documents: Every day of work.

#### *Time Records*

*OMB Number:* 2125-0196.

*Title:* Time Records.

*Background:* Title 49 U.S.C. 31502 allows the Secretary of Transportation to promulgate regulations which establish maximum hours of service of employees of motor carriers. The Secretary has adopted regulations that require information to be recorded in a specified manner, but no specific form is required. The regulations allow motor carriers to make electronic time records, in lieu of making paper time records.

*Recordkeepers:* 632,000 CMV drivers or their motor carriers.

*Average Burden per Response:* 2 minutes per time card per day.

*Collection of Information Frequency:* Every day of work.

#### *National Environmental Policy Act*

The agency has analyzed this action for the purposes of the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and has determined that this action will not affect the quality of the environment.

#### *Regulation Identification Number*

A regulation identification number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross reference this action with the Unified Agenda.

#### *List of Subjects in 49 CFR Part 395*

Global positioning systems, Highway safety, Highways and roads, Intelligent Transportation Systems, Motor carriers, Motor vehicle safety, Reporting and recordkeeping requirements.

Issued on: October 29, 1996.

Rodney E. Slater,

*Federal Highway Administrator.*

TABLE 2.—ESTIMATED ANNUAL RECORDKEEPING BURDEN (CURRENTLY APPROVED)

OMB control No.	Section	No. of recordkeepers	Annual frequency per recordkeeping	Total annual records	Hours per recordkeeper	Total hours
2125-0016—Expires Feb. 28, 1998 .....	395.8 & 395.15	1,864,587	200	372,917,400	0.0333	14,799,033
2125-0196—Expires Mar. 31, 1997 .....	395.1(e) .....	1,100,000	302	332,200,000	0.0333	11,073,333

#### Appendix to Preamble for FHWA Docket No. MC-96-28 RIN 2125-AD

##### A. Research Into the HOS of Drivers

Copies of all research reports mentioned below are included in the FHWA docket, number MC-96-28, and will be available for examination. In addition to comments and research reports received in response to this notice, the FHWA will also continue to file in the docket other research reports that become available after the publication of this document. Interested persons should continue to examine the docket for new material.

##### *Prior Research*

The first scientific study which addressed the HOS of U.S. commercial drivers was performed in the late 1930's. On April 25, 1938, the ICC requested the United States Public Health Service (USPHS) to conduct an investigation into the problem of fatigue and HOS of drivers of commercial motor vehicles operating in interstate commerce. See *Fatigue*

*and Hours of Service of Interstate Truck Drivers*, U.S. Public Health Service, Washington, D.C., Public Health Bulletin No. 265, 1941. The USPHS found that "it would \* \* \* appear that a reasonable limitation of the HOS would, at the very least, reduce the number of drivers on the road with very low functional efficiency. This, it might reasonably be inferred, would act in the interest of highway safety." Although the ICC indicated the need for further study, no further study was undertaken by USPHS or the ICC.

In the 1970's, the FHWA and its sister agency, the National Highway Traffic Safety Administration (NHTSA), conducted three studies which investigated driver performance and fatigue. They are reported in:

1. William Harris, et al. Human Factors Research, Inc., "A Study of the Relationships Among Fatigue, HOS, and Safety of Operations of Truck and Bus Drivers," (Springfield, VA, National Technical Information Service, 1972, (PB-213 963)).

The general findings of the study indicated that driver performance deteriorates, driver alertness (as reflected in psychophysiological arousal) diminishes, rest breaks become less effective, and accident probability increases, all within the 1972 10-hour daily limitation on driving time. The study also concluded that the situation would likely remain as long as drivers are rewarded economically in direct proportion to the amount of time spent on the highway.

2. Mackie, R.R., O'Hanlon, J.P., and McCauley M., Human Factors Research, Inc. "A Study of Heat, Noise, and Vibration in Relation to Driver Performance and Physiological Status," December 1974. This study measured the stressful effects of heat, noise, and vibration on the physiological status, feelings of alertness and fatigue, and actual driving performance of automobile and truck drivers under realistic conditions. The research found that heat and humidity between 80 and 85 degrees Fahrenheit WetBulb-Globe-Temperature (WBGT) index had somewhat adverse, but less dramatic,

effects on driver physiology and level of arousal for professional truck drivers than nonprofessional drivers. The WBGT is an index reflecting the combined effects of air temperature, air velocity, and relative humidity. The study's findings also indicated that the levels of fatigue and central nervous system arousal experienced by drivers were not systematically different for the different noise-vibration condition encountered.

3. Mackie, Robert R., and Miller, James C., Human Factors Research, Inc., "Effects of HOS Regularity of Schedules, and Cargo Loading on Truck and Bus Driver Fatigue," (Springfield, VA, National Technical Information Service, 1978 (PB-290-957)). The study's findings indicated 18 main points, including that: (a) Some cumulative fatigue occurs during 6 consecutive days of relay operations, but time of day strongly affects how much will be seen; (b) participation in moderately heavy cargo loading to the extent engaged in by many relay truck drivers increases the severity of fatigue associated with irregular schedules; (c) sleeper driver fatigue, physiological state, and performance are strongly affected by time of day; (d) bus drivers operating on irregular schedules suffer greater subjective fatigue and physiological stress than drivers on a regular schedule; and (e) the major problem posed by irregular operations is that the driver must at some time drive during those hours of the night when circadian depressions in psychophysiological arousal are substantial.

The U.S. Army Research Institute for the Behavioral and Social Sciences' "Prolonged Heavy Vehicle Driving Performance: Effects of Unpredictable Shift Onset and Duration and Convoy Versus Independent Driving Conditions" (September 1983, Technical Report 585) found that the effects of prolonged driving depend in part on *when* that prolonged driving takes place, rather than simply on the prolonged driving's actual *duration*. This was an empirical, field experiment that used twelve Army truck drivers in experimental trucks in a continuous convoy on four consecutive days on a pre-selected 300-mile route. The report notes that feelings of fatigue, overall, did not show dramatic change over time, although a trend was noticed in the pattern of performance deterioration toward the end of the late shift for drowsiness, exhaustion, and awareness-daydreaming-hallucinations. The conclusion was that it is the timing, and not the duration of the late shift, that makes driving more fatiguing.

In 1985, the American Automobile Association's (AAA) Foundation for Traffic Safety in "A Report on the Determination and Evaluation of the Role of Fatigue in Heavy Truck Accidents," examined about 250 accident reports of heavy truck accidents in six Western States. The study looked specifically at the driver's pre-accident activities and attempted to determine whether fatigue was a primary or probable cause of the accident. The study concluded that fatigue was the probable or primary cause of 41% of those heavy truck accidents.

In 1987, the Congressional Office of Technology Assessment's (OTA) report, "Gearing Up For Safety," concluded that

aggressive Federal research programs addressing fatigue and sleep issues and determining their role in truck accidents should be top priorities. The report also concluded that the FHWA should reexamine the HOS regulations, and develop revised standards based upon current knowledge.

This same OTA report noted that in the Insurance Institute for Highway Safety's "Sleeper Berth Use as Risk Factor for Tractor-Trailer Driver Fatality," evaluated the association of sleeper berth use in two periods and tractor-trailer driver fatalities. The study found that sleeper berth use increased the risk of fatality more than twofold. Night driving was also found to significantly increase the risk of truck driver fatality.

In February 1988, the Insurance Institute for Highway Safety in "Tractor-Trailer Driver Fatality: The Role of Nonconsecutive Rest In A Sleeper Berth," revised its earlier study of the association of sleeper berth use and tractor-trailer driver fatalities. The revised study found that sleeper berth use increased the risk of fatality more than threefold, not twofold as originally reported to Congress' OTA.

In June 1988, the Australia Transport and Communications' (ATC) Federal Office of Road Safety in "Driver Fatigue: Concepts, Measurement and Crash Countermeasures" (Report No. CR 72) reviewed the concepts and theories directly related to fatigue, the measurement of fatigue, and factors contributing to the onset and development of fatigue. Also reviewed was the degree to which fatigue is associated with road crashes, countermeasures having potential for offsetting the degrading effects of fatigue on safety, and an identification of research issues having promise for reducing the role of fatigue in crashes.

On November 29-30, 1988, the FHWA sponsored a symposium on truck and bus driver fatigue. Researchers in the area of fatigue and data collection attended, along with motor carrier participants. The primary purpose of this symposium was to identify research that was needed in the area of driver fatigue.

The DOT, in "Transportation-Related Sleep Research" (March 1989), reported to the Congress about the Department's actions in researching sleep and its effects on transportation safety. The report gave special emphasis to the efforts of NHTSA and FHWA related to the truck and bus industries. The discussion included the FHWA-sponsored symposium, past commercial driver fatigue- and alertness-related research, and future research to be undertaken.

The Institut National de Recherche sur les Transportes et Leur Securite's (INRETS) report, "Working Conditions of Drivers in Road Transport," (October 1989, ACTES INRETS No. 23) presented twelve research discussion abstracts written by various researchers from Canada, France, Germany, Ireland, Sweden, Netherlands, and the United Kingdom at a conference in France on June 3 and 4, 1988. Topics included "Sleepiness at Work: Measurement and Regulation," "Reviewing Fatigue and Driving," "Disposition of Waiting Time and the Waiting Behaviour of Truck-drivers,"

"Working Hours of European International Truck-Drivers," "Know-how in the Management of Working-Time and Safety," "Medical Survey of French Truck-Drivers: a Cross-sectional Study of the Most Frequent Pathologies," "Problem-Study of the Work of Heavy-goods Drivers in Quebec: Work Accomplished and Future Prospects," and "Regulations in Seven E.E.C. Countries Concerning Work Duration of Long Distance Lorry Drivers."

The NTSB published a study in February 1990, of 182 fatal-to-the-CMV-driver heavy truck accidents in eight States resulting in 207 fatalities. The NTSB's accident investigations considered the presence of fatigue, alcohol and other drugs, and medical factors involved in these accidents. Fatigue was implicated as a causal factor in 31 percent of these accidents.

The ATC's "NSW (New South Wales) Heavy Vehicle Crash Study Final Technical Report" (August 1990, Report No. CR 92 (FORS), CR 5/90 (RSB)) concluded that "heavy vehicle driver fatigue is clearly an important issue \* \* \* in at least 14 percent of (Australian) heavy vehicle crashes." The report indicated that the regulations should recognize that there are factors other than just the period of time at the wheel of the heavy vehicle that are important.

The FHWA's "HOS Study: Report to Congress" in November 1990, reported on the FHWA's progress in addressing driver fatigue. The report summarized prior research, discussed factors that had been identified with the onset of driver fatigue, and described the FHWA's current research efforts.

The Insurance Institute for Highway Safety's "Who Violates Work Hour Rules: A Survey of Tractor-Trailer Drivers" (January 1992) surveyed long-haul tractor-trailer drivers to estimate what proportion of drivers report that they regularly violate the HOS rules and to identify the drivers most likely to commit HOS violations. The survey found that almost three-fourths of the drivers responding to the survey violated the HOS rules. About two-thirds of the drivers reported that they routinely drive or work more than the allowable weekly maximum. The survey found that the primary impetus for violating the HOS rules appeared to be economic factors, including tight delivery schedules and very low driver earnings per mile rates (less than 30 cents per mile). The study reported many other driver, job, and vehicle characteristics significantly associated with the HOS violator.

The ATC's "Strategies to Combat Fatigue in the Long Distance Road Transport Industry, Stage 1: The Industry Perspective" (May 1992, Report No. CR 108) reported on an effort to gather information about the strategies that would be effective and practical in reducing driver fatigue. The study involved international authorities in the area of fatigue, major employer and employee organizations in Australia, and a questionnaire-based survey of drivers across Australia. The results of the study indicated that shorter trips and greater flexibility in organizing the trip, reducing driving in the early hours of the morning, improving roads, easing schedules, and improving loading and

unloading were all factors that were either related to lower levels of fatigue in drivers or were favored by them as ways of managing their fatigue.

The Upper Great Plains Transportation Institute's "Evaluation of the Impact of Changes in the Hours of Service Regulations on Efficiency, Drivers and Safety" (October 1992) surveyed the opinions of five large for-hire motor carriers and their drivers concerning the FHWA's 1992 proposed change to the HOS regulations. The study distributed 3,500 survey forms to these five motor carriers which, in turn, distributed the forms to their drivers. The study received 754 surveys. The study concluded that "[d]rivers, carriers, and society in general would appear to experience positive net gains from a change in the cumulative HOS rules from the current 70-in-8 day rule to a 24-hour restart provision." The study report clearly indicated that the survey was "in no way meant to be represented as a random sample."

The ATC's "Strategies to Combat Fatigue in the Long Distance Road Transport Industry. The Bus and Coach Perspective" (June 1993, Report No. CR 122) is a continuation of the May 1992 report discussed above. This report focuses upon bus and motor coach drivers (the previous report discussed only truck drivers). It also reported that bus and motor coach drivers typically report fatigue before the tenth hour of work, and most commonly in the early hours of the morning.

The Murdoch University Institute for Research into Safety and Transport's "Driver Impairment Fatigue and Driving Simulation: Conference Programme and Proceedings" (September 16-17, 1993, ISBN: 1 86308 014 7) reported on twenty five research projects that were presented at this 1993 conference. The twenty five research papers are included in the docket.

The Society of Automotive Engineers, Inc.'s "Changing Trucking to Match A Changing Work Force" (November 1993, SP-979) included papers on fatigue and sleep deprivation, as well as labor force trends and an overall review of changes that should take place. In "Driver Fatigue and Long Distance Truck Drivers: Implications for Trucking Operations," the author, James C. Miller of Miller Ergonomics, discusses scheduling of over-the-road, commercial trucking operations. He suggests that drivers who have work shifts that end just before dawn, should have their work-rest cycle altered to allow more time to rest during the 24 hours leading up to the end of the work shift. This additional period of time to rest could then be split between additional time for cumulative sleep and the introduction of time for a nap. In Merrill M. Mitler's report on "Sleep Deprivation and Its Consequences for Performance," he recommends five things. His recommendations include: (a) Recognition that present day risks due to fatigue-related human error necessitate accurate cost accounting of human error accidents and effective approaches to risk management; (b) round-the-clock work schedules must be biologically compatible with human sleep requirements; (c) drivers who transport the public or dangerous materials should be tested regularly for their

ability to stay awake on the job; (d) people with sleep pathology such as obstructive sleep apnea and narcolepsy must be identified and treated; and (e) the Federal government must take the lead in formulating new hiring and scheduling guidelines that do not place workers at jobs and on schedules for which they are biologically unsuited.

The University of Tennessee's "Driver-Related Factors Involved with Truck Accidents" (January 1994, STC Project No. 23385-019) study found that fatigue was not specified as a contributing factor in accident reports, but that truck drivers reported that fatigue was a major crash cause.

The ATC's "Strategies to Combat Fatigue in the Long Distance Road Transport Industry. Stage 2: Evaluation of Alternative Work Practices" (September 1994, Report No. CR 144) found that a 12 hour trip was fatiguing for drivers, irrespective of schedule. In particular, driving to a flexible schedule, where rest was taken on a "needs" basis rather than according to the breaks specified in current (Australian) regulations, was found not to be different than driving performance in driver-subjective outcomes. It also did not appear to make a difference whether the trip was "staged" or driven by a single driver. In addition, staged trip drivers were more fatigued at the beginning of the staged trip, compared to the other two trips that they undertook, and remained so at the end of these trips. The study concludes that the effects of accumulated or chronic fatigue may overshadow the effects of acute or short-term fatigue, at least within a 12 hour trip.

The NTSB's January 1995 publication, "Factors That Affect Fatigue in Heavy Truck Accidents," PB95-917001, NTSB/SS-95/01, examined factors believed to influence driver fatigue. Since the study was not meant to be a study of the incidence of fatigue, the NTSB specifically selected truck accidents that were likely to include fatigue-related accidents, such as single-vehicle accidents that occurred at night. Based upon its review of 107 accidents, using a multivariate statistical analysis (a multiple discriminant analysis), the NTSB found the most important factors in predicting a fatigue-related accident in its sample to be the duration of the driver's last sleep period, the total hours of sleep obtained during the 24 hours prior to the accident, and split sleep patterns.

The FHWA has also placed in the docket a paper entitled "Management of Fatigue in the Road Transport Industry" which was distributed by the Second International Conference on Fatigue in Transportation at Fremantle, Western Australia (February 1996). The discussion paper states that "over the final two days of the conference, delegates discussed the characteristics of fatigued drivers and what steps could be taken to measure and limit fatigue by Government, the transport industry, and the community who are both drivers and clients of the transport industry." The paper provides recommendations at the conclusion of the discussion of each item.

The ATC's "Strategies to Combat Fatigue in the Long Distance Road Transport Industry. Stage 2: Evaluation of Two-up Operations"

(December 1995, Report No. CR 158) suggests that the best strategy to manage fatigue on very long trips may be the judicious use of effective night rest in combination with two-up driving. The study used a regular pre-selected route. The route typically took 100 hours to complete and was a total distance of 4,500 kilometers. The route traversed remote zones. The report concludes that the most effective improvements in managing fatigue must take into account the overall work practices, including activities in the past week, activities before driving begins as well as the way in which the trip is structured.

#### *Current FHWA Research in Relation to Fatigue and Alertness*

##### *Driver Fatigue and Alertness Study*

The FHWA's motor carrier research and technology program has undertaken research into driver fatigue and loss of alertness. The program incorporates and integrates physiological, psychological, and performance testing technologies. The research began in earnest in 1989, with the award of the baseline "Driver Fatigue and Alertness Study" to the Essex Corporation, Goleta, California, and a companion study of physiological measures of alertness awarded to the Trucking Research Institute (TRI) of the American Trucking Associations Foundation in 1990. For over six years, this massive piece of research has encompassed one of the most technologically and logistically complex field research activities concerning CMV drivers ever conducted—in either the U.S. or the world. This significant piece of research forms the basis for many of the following human factor studies examining driver fatigue and alertness that will be conducted by the FHWA in the years to come.

The FHWA's commercial driver fatigue and alertness effort is being coordinated with the NHTSA and with other DOT operating administrations that support related research on operator alertness, especially the Federal Aviation Administration (FAA) and the Federal Railroad Administration. At the same time, ongoing interaction with the various motor carrier industry associations and drivers' groups continues. These include the TRI, the National Private Truck Council's Private Fleet Management Institute (PFMI), the Owner-Operators Independent Drivers' Association (OOIDA), the Independent Truck Driver's Association, the International Brotherhood of Teamsters, Transport Canada, the Private Motor Truck Council of Canada, and the Canadian Trucking Association.

In 1996, the FHWA will conclude the multi-year, baseline study of Driver Fatigue and Alertness. It has been accomplished with the significant cooperation of five research contractors, two governments (U.S. and Canada), two industry associations, three participating motor carriers, and 80 professional drivers and their management and labor representatives. The overall intent of this research has been to:

1. Provide a technically sound basis for evaluating the current HOS requirements for CMV operators; and
2. Identify potentially effective countermeasures for reducing fatigue and increasing driver alertness.

Through the efforts of these various participants and the combined scientific expertise they offer, the "Driver Fatigue and Alertness Study" has obtained information on a broad range of interrelated items involving the driver/vehicle environment, such as:

1. Driver performance and vehicle operating parameters;
2. Objective and subjective measures of driver psychological and physiological state; and
3. The vehicle operating environment (e.g., cab temperature and air quality).

The TRI has participated with the FHWA in providing assistance to help collect, review, and analyze physiological data from the same driver test subjects. Additionally, the TRI, Transport Canada, and the Canadian Trucking Research Institute have provided financial and on-site assistance to the project.

During the test phase, data were collected through driver field testing for four different driving and operating conditions. A set of field experiments, designed to replicate a range of carrier operations, performed under real world conditions, were undertaken:

1. A "baseline" U.S. operation, consisting of a regular daytime schedule of 10 hours of driving;
2. An "operational" U.S. schedule, which saw driving start and end at different times of the day and night. This schedule was chosen to permit the assessment of a varying schedule set to maximize distance traveled, and yet adhere to the 10-hour driving limit and 8-hour off-duty requirement now in effect;
3. A 13-hour daytime driving schedule operated in Canada which, while longer than the U.S. regulations currently allow, is permitted in certain Canadian provinces. The FHWA was interested in learning if this extended schedule may promote increased driver alertness by keeping the driver's work and rest cycles closer to a 24-hour circadian time table; and
4. A 13-hour nighttime driving schedule, again undertaken in Canada, to ascertain if extended nighttime driving, while on a regular schedule, had adverse effects upon driver performance.

Concurrent with this study, the FHWA undertook, in early 1995, a survey of 500 drivers to assess current use, and to determine potential application of safe, legal, and effective fatigue-reducing and alertness-enhancing countermeasures.

The study was the most comprehensive "operational" study ever performed and benefitted from unprecedented international partnerships among governments, industry, and research communities. The study has already demonstrated that these partnerships are needed to develop solutions to the fatigue and alertness problem.

The FHWA anticipates that a final report of the "Driver Fatigue and Alertness Study" will be made available to the public this autumn. A copy of the final report will be placed in the public docket when it is completed.

At congressional direction, in 1991, 1992, and 1993, the FHWA has undertaken a series of additional studies associated with driver fatigue. These research efforts are:

1. Longer Combination Vehicle Driver Fatigue and Stress Study;
2. Driver Work and Rest Needs Study;
3. Interstate Rest Area Availability Study;
4. Obstructive Sleep Apnea Study;
5. Commercial Driver Fitness-for-Duty Testing Study; and
6. Performance of Older Commercial Drivers Study.

#### *Longer Combination Vehicle Driver Fatigue and Stress Study*

Section 4007 of the Intermodal Surface Transportation Efficiency Act (ISTEA), Pub. L. 102-240, 105 Stat. 1914, directed the Department to perform a study on the possible effect of multiple-trailer combination vehicle (MTCV) operations on driver stress and fatigue. Working together with the Battelle Human Affairs Research Center and the Oregon Trucking Association, the FHWA and the NHTSA directed this 24-driver, 2,700 mile study that used specially equipped and loaded single and triple-trailer combination vehicles under controlled experimental conditions. Typical operating conditions were encountered and standard operating practices were followed. Tractors were equipped with video and digital equipment to gather data on the drivers' performance during the study.

Test drivers answered standardized questionnaires concerning their perception of stress and fatigue during the driving day. In addition, measurements were taken of the drivers' physiological responses, mental processes associated with driving safety and performance, and driving performance. Of the nineteen measures used in the study, only two produced statistically significant results. These were a measure of perceived workload, and a measure of steering wheel reversals. Interestingly, only the drivers' *subjective perception* of increased workload while driving MTCV's suggested that such operations might result in increased driver stress and fatigue.

This study indicated that the most important contributing factor in predicting stress or fatigue is the driver. Tolerance of potentially fatiguing conditions varies a great deal among professional truck drivers. The study also has shown that, although the number of trailers attached to the tractor may influence a drivers' *subjective* estimate of his or her fatigue, the related *objective* measures of performance and physiological condition registered very little, if any, difference. It appears that vehicle variations alone are not significant predictors of driver fatigue and stress under these conditions (e.g., drivers, daytime driving, 12 consecutive hours off-duty).

#### *Driver Work and Rest Needs Study*

This study is designed to assess the work and rest needs of CMV drivers. Working with the Walter Reed Army Institute of Research, the FAA, and the National Institutes of Health (NIH), the FHWA seeks to determine driver performance and physiological and subjective states after varying amounts of sleep. This study is using four new and different technologies to develop a means by which alertness-related performance can be measured and driver proficiency predicted

(i.e., performance-based technology). This study is projected to be completed in late 1997. The study will also attempt to determine how much off-duty time is required to ensure a driver obtains enough sleep to be sufficiently rejuvenated to safely operate a CMV.

#### *Interstate Rest Area Availability Study*

The TRI and its subcontractors studied the adequacy of truck parking at public rest areas on the Dwight D. Eisenhower Interstate Highway System and private truck stops adjacent to those highways. States were surveyed about parking capacity and restrictions at public rest areas. The research also observed truckers' usage of public and private stops along Interstate Route 81, interviewed CMV drivers, and surveyed motor carriers and private truck stop operators about the perceived need for, and availability of, Interstate CMV parking. Based partly upon this information, assessments of utilization and demand for public and private parking spaces for CMVs were also undertaken. A final report on the study's findings was completed in May 1996.

#### *Obstructive Sleep Apnea Study*

Working with the TRI and the University of Pennsylvania Hospital, the FHWA is responding to congressional direction to examine the problem of obstructive sleep apnea among CMV operators. The overall goals of the study are to:

1. Obtain a more precise estimate of obstructive sleep apnea based upon CMV operators' responses to a questionnaire regarding the prevalence of sleep apnea in a sample of CMV drivers who may be at high risk because of the disorder; and
2. Estimate the level of sleep apnea (i.e., identify a threshold of apneatic episodes during sleep) at which the CMV drivers may be operating while impaired.

First identified in the 1960's, obstructive sleep apnea has been recognized as a major health problem, affecting millions of Americans. The prevalence of obstructive sleep apnea among CMV drivers may be greater than the four percent estimated in the general male population. Truck driving is largely a sedentary occupation and, therefore, conducive to obesity. Obesity, along with age and high blood pressure, is associated with an increased risk of obstructive sleep apnea.

Because obstructive sleep apnea is a disorder characterized by breathing cessations, it interrupts restful sleep. The quality of sleep is greatly diminished due to frequent awakenings. Identified as a leading cause of excessive daytime sleepiness, obstructive sleep apnea has been found to greatly increase the potential for accidents among sufferers. Thus, it poses a potentially significant risk to drivers of CMVs and, in turn, the motoring public.

To obtain an accurate estimate of the prevalence of obstructive sleep apnea among the CMV driver population, the University of Pennsylvania Hospital first conducted a pilot test to validate a questionnaire using 200 truck drivers drawn from the TRI's list of operators. Results of that pilot test, obtained in January 1995, demonstrated the feasibility of such a sampling effort in obtaining

information about apneatic conditions from the CMV driving population. During 1996, a full-scale sample will be undertaken, with results provided on the prevalence of obstructive sleep apnea among the CMV driving population.

#### *Commercial Driver Fitness-for-Duty Testing Study*

At congressional direction, the FHWA also has sought to identify and test technologies, both in-terminal and in-vehicle, that will detect and identify a driver who is not fit for duty. An initial study, begun by the TRI and its partner Systems Technology, Inc. (STI) in 1993, undertook an evaluation of the accuracy and reliability of four fitness-for-duty performance tests. The research evaluated the testing devices to determine their effectiveness at motor carriers' terminals, and also sought to determine if miniaturized versions of the equipment could be successfully used in-cab, to test drivers away from their home terminal.

Data were collected on drivers' test results, driver and motor carrier management acceptance of the tasks, the effects of terminal and in-cab environments on the hardware, and system reliability and maintainability. The conclusion of this initial study was that in-cab testing was feasible. The findings of the study also recommended that, for a motor carrier's program to work effectively, testing had to be made mandatory, and the motor carrier had to permit drivers failing the test to stop driving and take a rest without penalty.

In early 1995, the FHWA entered into a second phase of fitness-for-duty testing, also with the TRI and STI. More frequent monitoring of driver alertness was instituted. Using a second-generation version of in-vehicle testing equipment employed in the first generation's effort, the TRI and its subcontractor also added a lane tracking device to monitor the driver's fitness-for-duty. Under the proposed study design, a driver using this device must first establish a "baseline" of performance that documented his or her own ability to keep a vehicle in its lane. If a deviation from the baseline is detected, the driver would be alerted. If the deviation continues, both the driver and the motor carrier would be notified. The test driver then would be required to stop the vehicle at the nearest safe location and take a five minute test. Depending upon the test results, the driver would either be permitted to continue driving or be required to sleep, or nap, before continuing to drive.

The NHTSA is focusing on continuous monitoring of drivers in its research on commercial driver fitness-for-duty testing. The ultimate goal is to produce a practical vehicle-based driver alertness monitor for use in heavy vehicles. The technologies employed include systems to evaluate the driver's steering and lane tracking performance, and his or her psychophysiological condition (principally eye activity). A contemporary and complementary fitness-for-duty study to the FHWA's research, the Carnegie-Mellon Research Institute is conducting the NHTSA's research. This research will use several equipment prototypes mounted in

two CMVs. This work is based upon previous driving simulator studies at the Virginia Polytechnic Institute and State University. It will produce a recommended specification for heavy vehicle driver alertness monitors, including both detection algorithms and appropriate driver warning devices.

#### *Performance of Older Commercial Drivers Study*

In 1993, the Congress directed the FHWA to undertake research to determine the influence of age on CMV drivers' performance. Again relying on the services of the TRI and subcontractors, the study investigated 15 human perceptual, cognitive, and psychomotor abilities. Age, by itself, was not found to be a significant predictor of driving performance. Nevertheless, older CMV drivers (defined in this study as 50 years or older) are more likely to demonstrate age-related perceptual, cognitive, and psychomotor impairments which directly influence driving performance. However, their performance was improved after they had taken training.

#### *B. Future FHWA Research Envisioned*

A number of new research projects are planned for 1996 and beyond that will evaluate driver performance and needs. A number of these will be undertaken in response to congressional recommendation and direction. Topics include:

- a. Assessment of Technological Interventions;
- b. Impact of Loading and Unloading Commercial Vehicles on Driver Fatigue and Alertness;
- c. Drivers Engaged in Local/Short Haul Operations;
- d. Sleeper Berth Use and Fatigue;
- e. Shipper and Consignee Involvement in Driver HOS Violations;
- f. Scheduling Practices;
- g. Driver Proficiency and Wellness; and
- h. Crash Investigation Project.

#### *Assessment of Technological Interventions*

In 1996, the FHWA, in cooperation with the TRI, will begin an assessment of the most promising technological interventions and other countermeasures identified in the Driver Fatigue and Alertness Study and other research. Individual interventions and countermeasures will be field-tested and evaluated in terms of their feasibility and cost-effectiveness. Also with the TRI, the FHWA will develop, evaluate, and disseminate educational and training programs targeted at CMV drivers, dispatchers, risk managers, and shippers. Current knowledge about fatigue and effective countermeasures, including ways CMV drivers can recognize impending drowsiness, will be explained.

#### *Impact of Loading and Unloading Commercial Vehicles on Driver Fatigue and Alertness*

In 1978, Human Factors Research, Incorporated (now Essex Corporation) conducted a study for the NHTSA which included a limited assessment of the influence of driver fatigue on cargo loading and unloading. Using a simulated loading task, the study sought to determine if cargo

loading either enhanced or reduced the CMV driver's alertness. The results indicated mixed effects on the driver's subjective feelings, physiological status, and performance. It appeared to researchers that performing the loading task had "some beneficial activating effects that persisted for much of the driving stint, especially during late night/early morning trips." Yet, the final report also found "considerably greater incidence of 'critical incidents' involving sleepiness or lack of attention for drivers who engaged in moderate work."

The limited 1978 assessment left unresolved the issue of whether substantial periods of loading and unloading a CMV would introduce or exacerbate fatigue to such an extent that driving would be impacted. The FHWA has for many years desired to further assess the effects of this simulated loading task, in particular on long-distance, over-the-road operators engaged in interstate commerce. The FHWA has deferred action on this important effort in order to first complete the multi-year "Driver Fatigue and Alertness Study" and, thus, be able to employ driver assessment technologies validated in that study in the evaluation of the impact of loading and unloading. In 1996, in response to congressional direction, the FHWA is initiating a study of this frequent work requirement.

As currently proposed, the study will be undertaken in two phases. The first phase, carried out in cooperation with the TRI and the PFMI, will undertake a critical literature review which: (1) Concentrates on the effects of physical activity on alertness, fatigue, and performance; (2) identifies critical variables for field study; and (3) identifies appropriate measures and measurement technology. The FHWA believes it is important to understand, from the motor carrier industry perspective, what actual physical requirements are being imposed on drivers by representative types of cargo being transported. Once these activities are completed, a second phase of study will assess the actual physical demands imposed in performing loading and unloading tasks by examining an appropriate industry segment and its work schedule. This second phase will include the collection of on-the-road measurements of driver alertness, fatigue, and performance. The second phase will provide a report that analyzes the relationship between the loading/unloading requirement and fatigue.

#### *Drivers Engaged in Local/Short-Haul Operations*

The local/short-haul operations segment of the motor carrier industry engages in work practices which distinguish it from the long-haul, over-the-road interstate operation. Chiefly, these practices are characterized by pick-up and delivery activities which result in the vehicle operator engaging in non-driving activities (e.g., package pick-up and delivery) which consume a significant portion of the driver's work day. This type of CMV driving was originally intended to be included in the baseline "Driver Fatigue and Alertness Study" begun in 1989. It had to be postponed due to financial constraints and the need to focus resources on the significant data analysis activity required by the over-

the-road portion of the study. In fiscal year 1996, in response to congressional direction, the FHWA plans to award a contract for a study focusing on driver fatigue in local/short-haul operations. The planned study will employ both direct observation (i.e., instrumented vehicle studies) and driver interviews and focus groups. These will help to determine the role played by fatigue and related factors in driver errors and incidents involving local/short-haul truck operations. In addition, the study will: (1) Analyze crash statistics involving driver fatigue and related factors as principal or contributing causes of local/short-haul commercial vehicle crashes; and (2) investigate a sample of crashes to obtain more in-depth crash causation data. The study will also compare local/short-haul to long-haul operations in terms of driver fatigue, associated safety concerns, and the overall safety picture.

#### *Sleeper Berth Fatigue*

In its limited 1978 study, Human Factors Research, Incorporated, assessed the impact of sleeper berth use. That study indicated that CMV drivers who rely upon sleeper berths for rest demonstrated performance effects of sleep degradation, such as lower scores on hand-eye coordination tests and a higher incidence of lane drifting and drowsiness. The FHWA intends to award a study, in 1996, that will assess the impact of sleeper berth use upon the level of driver alertness. The study would assess the quality of rest achieved while the vehicle is both stationary and in motion. Because sleeper berth users tend to operate on irregular schedules, the FHWA would like to include in the research an evaluation of the effects of irregular schedules and sleeper berth use.

#### *Shipper and Consignee Involvement in Driver HOS Violations*

The Senate Report to the 1996 Department of Transportation and Related Agencies Appropriations Act called upon the FHWA to "sign a contract before November 1, 1995, to conduct research to determine the scope,

nature, and extent of shipper involvement in noncompliance with the safety regulations" (S. Rep. No. 126, 104th Cong., 1st Sess. 97 (1995)). This year, the FHWA has undertaken both contractual and in-house tasks to satisfy this requirement. The FHWA has engaged Calspan Corporation to undertake a series of focus group sessions and in-depth interviews. This undertaking will generate qualitative data about the state of shipper (and consignee) demands on the motor carrier industry and its drivers. Concurrent with this effort, the FHWA will seek to identify and analyze existing data that may help define the scope of the problem, pinpoint factors that appear to be related to driver violations of the HOS regulations, and eliminate others which do not appear to be correlated. Subsequent tasks still remain to be determined, with their selection and design to be linked, in part, to initial findings. The FHWA may decide to test specific segments of the motor carrier industry where evidence indicates, for example, that time-sensitive deliveries are the norm and pressure from shippers and consignees may tend to be greater than the norm.

The FHWA envisions that this study will indicate some important safety issues, and is prepared to work with the Congress and various industry groups toward their resolution. Such resolution might involve a determination of effective enforcement and educational activities that would help to reduce any misunderstanding about the critical need for driver compliance with the HOS rules.

#### *Scheduling Practices*

Concurrent with the shipper study, the FHWA, in 1996, will also begin surveying a variety of CMV drivers, motor carriers, and shippers to determine the prevalence of various shipping and scheduling practices, associated driving schedules, and possible effects of fatigue. This work will be undertaken in cooperation with the TRI and the PFMI. A proposed outcome of this

research would be a symposium of recognized experts in shift work, traffic management, trucking operations, and trucking safety, convened to review the survey findings and make appropriate recommendations for safer operations.

#### *Driver Proficiency and Wellness*

As the current decade draws to a close, the FHWA plans to expand its efforts on behalf of the CMV driver beyond the traditional areas of fatigue detection and prevention. The demand for fast, efficient passenger and cargo delivery is placing increasing pressures upon drivers. This is resulting not only in immediate performance decrement, but also long-term stress. Consequently, our efforts to counteract fatigue and stress must not only continue but be expanded to promote the creation of positive models of driver wellness and proficiency. At this stage, the FHWA believes that non-regulatory approaches being developed by the National Motor Carrier Advisory Committee's Subcommittee on Drivers, the PFMI, and the OOIDA, such as education, could be the key to the success of this effort. Such wellness education might address such lifestyle issues as nutrition, exercise, and, of course, sleep.

#### *Crash Investigation Project*

This project, planned to begin in 1996, will compile a database of in-depth crash investigation reports from the various States and other sources in order to determine the contributing factors, causes, fault, or reasons for truck and bus crashes. This CMV crash causation study is intended to employ a comprehensive classification of crash causes (including drowsiness/fatigue as well as other forms of driver inattention) and a broad, representative sample of CMV crashes. The FHWA regards these as critical methodological elements in any valid study of CMV crash causation.

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