Appendix A – Analysis of Air Quality Impacts

December 2010

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Exhibits

Appendix A. **Analysis of Air Quality Impacts**

A.1. INTRODUCTION

This section provides an analysis of the potential air quality impacts of the four alternatives, including changes in emissions of criteria air pollutants, air toxics, and greenhouse gases (GHGs). These impacts could result from changes in the number of vehicle-miles traveled (VMT) and in vehicle hours idling (VHI) and changes resulting from transportation mode shifts[1] for each alternative.

This air quality analysis is based on total national emissions (in units of metric tons per year) of mobile source emissions of criteria air pollutants, emissions of air toxics, and GHG emissions (carbon dioxide equivalent [CO_2e])[2] for each alternative. This analysis also compares potential emissions for Alternatives 2, 3, and 4 to potential emissions for the No Action Alternative (Alternative 1). Changes in VMT, VHI, and transportation mode shifts will affect overall emissions from commercial motor vehicles (CMVs). Air emissions for the No Action Alternative and the action alternatives (Alternatives 2 through 4) are estimated using emission factors (pollutant emission rates per unit of activity) and projected vehicle activity levels (i.e., VMT and VHI) for each transportation mode the rule would affect. Considering the broad distribution of truck and rail transportation routes throughout the United States, this analysis of air quality impacts is limited to estimating the total nationwide changes in criteria pollutant air emissions, air toxics emissions, and GHG emissions resulting from expected vehicle activity under each alternative.

FMCSA cannot predict the specific locations of any changes in truck and rail routes and operations that would result from the alternatives. The local air quality effects of air pollutant emissions cannot be predicted accurately on a national scale because the effects depend on local conditions. Without knowing the location, topography, time of day, ambient pollutant concentrations, and meteorological conditions (e.g., temperature, sunlight, wind conditions) under which these emissions occur, their potential impacts on air quality are speculative. Therefore, FMCSA used the total nationwide CMV emissions of each pollutant as an indicator of its relative impact.

A.2. AIR QUALITY IMPACT ANALYSIS METHODOLOGY

The methodology FMCSA used consists of estimating total criteria pollutant, air toxics, and GHG emissions for each alternative for three analysis years (2012, 2015, and 2020) related to the following three factors:

[1] The term "mode shift" refers to a change in transportation modes used to move goods, for example, by rail instead of by truck.

[2] CO_2 emissions represent approximately 96.9 percent of GHG emissions from the vehicles affected under the 2010 HOS rule, and other GHG emissions are effectively proportional to CO_2 emissions within the vehicle classes and age (model year) distributions examined here. Thus, CO_2 is a good indicator of overall GHG emissions from trucks and can be used to approximate CO_2e. In this environmental assessment, where estimation of CO_2e emissions is not possible, CO_2 is used.

- Transportation mode shift of freight from long-haul truck to intermodal rail with associated drayage[3] truck operations;
- Change in aggregate annual CMV activity (i.e., VMT and VHI); and
- Change in number of CMV crashes.

Analysis year 2012 represents the first complete calendar year following implementation of the proposed HOS rules. Average emission rates for trucks and locomotives are declining over time due to increasingly restrictive EPA emissions standards. As older, higher emitting vehicles are gradually retired and replaced with newer, lower-emitting ones the average emission rates of the fleet decrease on a per-vehicle basis. Analysis years 2015 and 2020 were included to indicate the effects of these trends in emissions on the alternatives over a short term and a somewhat longer term.

CMV activity for the three analysis years was calculated based on historic VMT and VHI estimated and projected using growth factors. Vehicle travel was estimated at 147.2 billion VMT in 2007, and vehicle idling was estimated at 2,415.36 million VHI in 2006. These data and the methodology for developing the VMT estimates are described in the *2010 Hours-of-Service Rules Regulatory Impact Analysis* (FMCSA 2010). The vehicle idling estimate was derived using the 2002 vehicle idling value of 2,220 million hours and scaling this value by the Bureau of Labor Statistics-reported growth of 8.8 percent of the population of production workers in the long-distance trucking industry (BLS 2008).

Vehicle activity was projected to 2012, to represent the first year of complete implementation of the proposed HOS rules. To generate estimates for 2012 vehicle activity for conditions under the No Action Alternative, an annual growth factor of 2.9 percent was applied to baseline data (described above) until 2010, after which the factor was reduced to 2.0 percent. These factors were derived using Federal Highway Administration (FHWA) projections (FHWA 2002b). Exhibit A-1 summarizes relevant projected operating data for CMV operations for all analysis years.

A.2.1. ***Transportation Mode Shift Emissions***

Under Alternatives 2, 3, and 4 compared to the No Action Alternative, truck driver productivity is projected to decrease due to the requirements for longer or additional rest breaks. As a result, the trucking industry would need to hire more drivers to move the same amount of freight, which is projected to lead to an increase in truck shipping prices (freight rates). For the segment of long-haul trucking that competes with rail, the percentage increase in truck freight rates is determined as a function of increases in total driver compensation caused by in the increase in the number of drivers required. The mode shift from long-haul truck for each alternative is discussed in FMCSA (2010). The potential rate of mode shift from long-haul truck to rail, expressed as the elasticity of the truck mode share of freight with respect to shipping rates, is assumed to remain constant over time at a value of 1.4 (i.e., a 1-percent increase in truck shipping rates results in a 1.4-percent shift of freight to rail). The amount of mode shift from truck to rail is calculated from the change in total long-haul VMT for each alternative compared

[3] Drayage is the transport of shipments between rail yards or other freight terminals and final delivery locations, for either pickup or delivery purposes. This type of truck service is necessary to support intermodal operations.

to the No Action Alternative (Alternative 1). The VMT change is then multiplied by an assumed average payload of 16 tons (DOT 2008) to calculate the total ton-miles shifted to rail.

Exhibit A-1 shows total truck VMT, total change in VMT, and percentage change in VMT for each alternative based on a long-haul operation with an average length of haul of at least 100 miles. Projected values are presented for 2012, 2015, and 2020.

Exhibit A-1. Hours-of-Service Truck Vehicle-miles Traveled Mode-shift Analysis

Scenario	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
2012				
Total truck VMT (millions)	167,030	166,212	166,644	165,209
VMT change compared to No Action Alternative (millions)	–	-818	-386	-1,821
Percent change in VMT	–	-0.49%	-0.23%	-1.09%
Change in rail ton-miles (millions)	–	13,084	6,179	29,130
2015				
Total truck VMT (millions)	177,330	176,462	176,920	175,397
VMT change compared to No Action Alternative (millions)	–	-868	-410	-1,933
Percent change in VMT	–	-0.49%	-0.23%	-1.09%
Change in rail ton-miles (millions)	–	13,891	6,560	30,926
2020				
Total truck VMT (millions)	195,928	194,969	195,475	193,793
VMT change compared to No Action and Alternative 1 (millions)	–	-959	-453	-2,136
Percent change in VMT	–	-0.49%	-0.23%	-1.09%
Change in rail ton-miles (millions)	–	15,348	7,248	34,170

Notes: VMT = vehicle-miles traveled

Emission factors for truck (long-haul and drayage) VMT and VHI will vary over time, as will those for rail locomotives, as emission standards and the vehicle fleet age distribution change. The emissions changes due to transportation mode shifts consist of decreased long-haul trucking emissions (accounted for in the VMT values shown in Exhibit A-1) and increases in two other types of emissions:

- Railroad locomotive emissions; and
- Drayage truck emissions.

The emissions for the mode shift to rail are calculated based on the increase in rail ton-miles of travel (assumed equal to the decrease in truck ton-miles of travel) estimated for each action alternative compared to the No Action Alternative. This value is then divided by an intermodal rail locomotive efficiency of 400 ton-miles per gallon of diesel fuel to determine total fuel consumption (EPA 2009a). Exhibit A-2 shows the rail locomotive emission factors, in grams of pollutant emitted per gallon of diesel fuel consumed, used to calculate rail emissions.

The changes in direct emissions from rail operations for each action alternative compared to the No Action Alternative as a result of mode shift are calculated by multiplying the change in gallons of diesel fuel consumption by the locomotive emission factors shown in Exhibit A-2.

Emission factors for 2012, 2015, and 2020 were developed for drayage trucks and long-haul trucks using the U.S. Environmental Protection Agency's (EPA) Motor Vehicle Emission Simulator (MOVES2010; EPA 2010a). Long-haul CMV emissions were estimated using both

Exhibit A-2. Emission Factors for Rail Locomotives

Pollutant	Grams of Pollutant per Gallon of Fuel		
	2012	2015	2020
CO[a]	26.6	26.6	26.6
NO_x	144	129	99
$PM_{2.5}$[b]	3.98	3.30	2.23
PM_{10}	4.10	3.40	2.30
SO_2[c,d]	0.094	0.094	0.094
VOC[e]	7.5	6.0	3.8
Acetaldehyde	0.188	0.188	0.188
Acrolein	0.026	0.026	0.026
Benzene	0.026	0.026	0.026
1,3-butadiene	0.032	0.032	0.032
Formaldehyde	0.433	0.433	0.433
CO_2[d]	10,084	10,084	10,084

Source: EPA (2009a) for criteria pollutants and carbon dioxide (CO_2); Pechan & Associates (2005) for air toxics.

Notes: Average U.S. factors used for air toxics emission factors. Values not projected for future years. Diesel particulate matter (DPM) emissions assumed equal to PM_{10}.

[a] Carbon monoxide (CO) factors could overestimate emissions because the U.S. Environmental Protection Agency does not project reductions in CO emission standards, despite expected CO emission reductions from particulate matter (PM) and hydrocarbon controls.

[b] $PM_{2.5}$ is assumed to be 97 percent of PM_{10}.

[c] Emission factor for sulfur dioxide (SO_2) assumes ultralow fuel sulfur content of 15 parts per million.

[d] Emission factors of SO_2 and CO_2 are assumed to largely depend on fuel properties rather than engine parameters.

[e] Volatile organic compound (VOC) emissions are assumed equal to 1.053 times hydrocarbon emissions (EPA 2009a).

the combination and single-unit long-haul truck categories. Drayage trucks are necessary to support intermodal operations and are used to transport shipments between rail yards and final delivery or pick-up locations. Drayage truck emissions were estimated using both the combination and single-unit short-haul truck categories. Exhibit A-3 presents that proportion of each vehicle category that was used to estimate emissions from long-haul and drayage trucks. Default national average vehicle fleet characteristics (e.g., age of fleet, distribution of vehicle types) from MOVES were used to develop emission factors for long-haul and drayage truck travel. Drayage truck curb idling rates were derived using vehicle fleet characteristics based on selected counties that contain large ports where large drayage fleets operate. Only combination long-haul trucks are expected to experience extended idle (hoteling).

Exhibits A-4 and A-5 show the mileage and idle emission factors for long-haul and drayage trucks in terms of grams of pollutant per vehicle-mile and grams of pollutant per vehicle idling hour. PM_{10} emission factors reflect exhaust emissions and exclude re-entrained road dust.

Exhibit A-3. Vehicle Category Contribution to Long-haul and Drayage Truck Categories

Category	2012		2015		2020	
	Long-haul	Drayage	Long-haul	Drayage	Long-haul	Drayage
Travel[a]						
Combination	93.6%	58.9%	93.4%	58.5%	93.2%	57.9%
Single-unit	6.4%	41.1%	6.6%	41.5%	6.8%	42.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Idle[b]						
Combination	100.0%	54.3%	100.0%	53.9%	100.0%	53.3%
Single-unit	–	45.7%	–	46.1%	–	46.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: MOVES2010 (EPA 2010a)
[a] Values calculated as a percentage of total truck vehicle-miles traveled (VMT) within each truck category.
[b] Values calculated as a percentage of total truck vehicle hours idling (VHI) within each truck category.

To calculate the number of trips for drayage trucks, FMCSA assumed that the truck trips that shift from truck to rail have an average length of haul of 1,000 miles (FMCSA 2010). The ton-miles carried by rail, as calculated above, are thus divided by 1,000 miles to determine the tons carried, divided by 16 tons to determine the number of truckload shipments, and multiplied by 2 to represent one drayage move at both the origin and destination. The average trip for a drayage truck is assumed to be 40 miles, and 1 hour of loading or unloading (truck curb idle time) is assumed at each trip end (i.e., from origin or destination to a rail yard). Total drayage emissions are calculated by multiplying total drayage mileage and idling hours by appropriate drayage emission factors in grams per mile and grams per hour of pollutant, respectively, as shown in Exhibits A-4 and A-5. Finally, the total emission increases caused by transportation mode shifts are obtained by summing emissions from rail operations and drayage truck operations.

A.2.2. Long-Haul Truck Travel Emissions

The VMT for the No Action Alternative and each action alternative (Alternatives 2 through 4) is multiplied by the long-haul emission factors expressed in grams of pollutant per vehicle-mile to calculate truck mileage-based emissions. Emission factors for VMT are shown in Exhibit A-4.

Exhibit A-4. Long-haul and Drayage Truck Travel Emission Factors

Pollutant	Emission Factor (Grams of Pollutant per Vehicle-mile)					
	2012		2015		2020	
	Long-haul	Drayage	Long-haul	Drayage	Long-haul	Drayage
CO	0.83	0.77	0.57	0.51	0.31	0.27
NO_x	3.48	3.40	2.37	2.21	1.31	1.15
$PM_{2.5}$	0.16	0.15	0.10	0.09	0.05	0.04
PM_{10}	0.16	0.15	0.10	0.09	0.05	0.04
SO_2	0.0057	0.0056	0.0055	0.0054	0.0053	0.0053
VOC	0.15	0.15	0.11	0.10	0.06	0.06
Acetaldehyde	0.0046	0.0044	0.0032	0.0030	0.0019	0.0017
Acrolein	0.0006	0.0005	0.0004	0.0004	0.0002	0.0002

Exhibit A-4. Long-haul and Drayage Truck Travel Emission Factors

Pollutant	Emission Factor (Grams of Pollutant per Vehicle-mile)					
	2012		2015		2020	
	Long-haul	Drayage	Long-haul	Drayage	Long-haul	Drayage
Benzene	0.0017	0.0016	0.0012	0.0011	0.0007	0.0006
1,3-butadiene	0.0010	0.0009	0.0007	0.0006	0.0004	0.0004
Formaldehyde	0.0124	0.0119	0.0088	0.0082	0.0051	0.0045
CO_2e	752.44	748.00	751.78	748.00	750.92	748.00

Source: MOVES2010 (EPA 2010a)
Notes: Diesel particulate matter (DPM) emissions are assumed equal to PM_{10}.

Exhibit A-5. Long-haul and Drayage Truck Idle Emission Factors

Pollutant	Emission Factor (Grams of Pollutant per Vehicle Idling Hour)					
	2012		2015		2020	
	Long-haul	Drayage	Long-haul	Drayage	Long-haul	Drayage
CO	88.68	0.88	88.73	0.59	88.77	0.31
NO_x	236.21	2.44	232.03	1.62	227.92	0.89
$PM_{2.5}$	1.71	0.12	1.20	0.08	0.71	0.03
PM_{10}	1.76	0.13	1.24	0.08	0.73	0.03
SO_2	0.061	0.004	0.061	0.004	0.061	0.003
VOC	55.09	0.007	54.51	0.005	53.94	0.003
Acetaldehyde	1.63	3.42E-05	1.61	2.43E-05	1.59	1.42E-05
Acrolein	0.20	4.16E-06	0.20	2.95E-06	0.19	1.72E-06
Benzene	0.59	1.25E-05	0.59	8.86E-06	0.58	5.17E-06
1,3-butadiene	0.34	7.24E-06	0.34	5.15E-06	0.34	3.01E-06
Formaldehyde	4.42	9.29E-05	4.37	6.60E-05	4.33	3.85E-05
CO_2e	8,977.93	165.46	8,959.96	165.47	8,943.90	165.48

Source: MOVES2010 (EPA 2010a)
Notes: Diesel particulate matter (DPM) emissions are assumed equal to PM_{10}.

A.2.3. Long-Haul Truck Idle Emissions

The annual average number of idling hours for each alternative is calculated by multiplying the number of idling hours under the No Action Alternative by the relative percentage change in idling hours for each action alternative as compared to the No Action Alternative.

The idling hours for the No Action Alternative and for Alternatives 2 through 4 and for the percentage changes compared to the No Action Alternative were estimated by constructing typical weekly schedules for drivers working at maximum capacity, estimating the ratio of idling time to driving time, and then adjusting for the percentage of operations that are not at maximum capacity. In these schedules, hours were categorized into time for loading and unloading, driving, layovers on the road, and other breaks. The Regulatory Impact Analysis (FMCSA 2010) contains further detail on these schedules. From these schedules, FMCSA computed the ratio of idling hours to driving hours under the assumption, based on data from Argonne National Laboratory, that tractors idle 70 percent of non-driving hours when they are being loaded or unloaded and during breaks and layovers during the week (ANL 2000). (Weekend layovers were excluded, assuming that the trucks would not be left idling for the days when drivers were not in them.) Using this approach, the ratio of idling hours to driving hours can increase if drivers are required to take longer layovers or more layovers during which they might leave their trucks idling.

Exhibit A-6 shows a summary of the idling hours for the four alternatives. The total idling hours given in Exhibit A-6 are multiplied by the emission factors in grams of pollutant per vehicle-hour as shown in Exhibit A-5 to calculate the total idling emissions.

Exhibit A-6. Total Potential Vehicle-hours Idling in Millions for Alternatives 1 through 4

Year	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
2012	2,821	2,888	2,840	2,992
2015	2,995	3,066	3,016	3,176
2020	3,309	3,388	3,332	3,510

A.2.4. Emissions Resulting from Crashes

To assess the potential emission impacts associated with CMV crashes under each alternative, FMCSA estimated the cost of all CMV crashes, and then divided that cost by the cost per crash to obtain the expected number of crashes. The percent reduction in long-haul crashes was assumed equal to the percent reduction in damages under each alternative. See FMCSA (2010) for further details on this methodology. The total number and relative change in crashes for each alternative for all analysis years are presented in Exhibit A-7. The total number of crashes under each alternative is not projected for future years because, based on FMCSA analysis of recent crash data trends, the total number of crashes for combination trucks is expected to remain generally unchanged from year to year despite expected increases in long-haul truck VMT over time.

Alternatives 2 through 4 show an anticipated decrease in CMV crashes. Emissions are expected to change based on changes in traffic congestion resulting, in turn, from changes in crash frequency. The mid-level congestion-per-crash emission estimates provided in *Environmental Costs of Commercial Motor Vehicle (CMV) Crashes* (Volpe Center 2007) were used to estimate the changes in criteria air pollutant emissions resulting from these congestion changes. The Volpe Center (2007) methodology was used to produce similar emission factors and estimates for air toxics.[4]

Exhibit A-7. Projected Annual Long-haul Crashes

Category	**Alternative 1: No Action**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Total Number of Crashes Per Year	251,553	247,179	248,660	243,270
Change in Crashes from No Action Alternative	–	-4,374	-2,893	-8,283
% Change in Crashes	–	-1.74%	-1.15%	-3.29%

Source: ICF International estimate

[4] The Volpe Center used EPA's MOBILE6 model (EPA 2004) to produce emission factors for criteria air pollutants in units of grams per crash resulting from increased congestion due to CMV crashes (DOT Volpe Center 2007). FMCSA applied this methodology using MOBILE6 to produce similar emission factors for air toxics.

Exhibit A-8 presents the emission factors associated with changes in CMV crashes. The same emission factors were applied to each alternative for each analysis year.

Exhibit A-8. Emission Factors per Long-haul CMV Crash

Pollutant	Grams of Pollutant Per Crash
CO	75,410
NO_x	9,530
$PM_{2.5}$	410
PM_{10}	540
SO_2	1,110
VOC	5,710
Acetaldehyde[a]	0.090
Acrolein[a]	0.008
Benzene[a]	0.536
1,3-butadiene[a]	0.058
DPM[a]	0.136
Formaldehyde[a]	0.187
CO_2	2,418,560

Source: Volpe Center (2007)
[a] Developed by FMCSA with EPA MOBILE6 model using Volpe Center (2007) methodology.

A.3. RESULTS

A.3.1. Transportation Mode Shift Emissions

This section summarizes the changes in emissions for each action alternative that could result from transportation mode shifts and changes in VMT from the No Action Alternative (Alternative 1). Total potential emissions and changes in emissions as compared to the No Action Alternative are included for each alternative in Exhibits A-9 through A-11.

The potential emissions resulting from transportation mode shifts (i.e., increase in emissions from drayage trucks and rail) for each alternative (in metric tons per year) as compared to the No Action Alternative are shown in Exhibit A-9 for 2012, Exhibit A-10 for 2015, and Exhibit A-11 for 2020.

Exhibit A-9. Total Potential Change in Emissions (in metric tons per year) from Mode Shift, 2012

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	923	436	2,054
NO_x	–	4,937	2,331	10,991
$PM_{2.5}$	–	140	66	311
PM_{10}	–	144	68	321
SO_2	–	3	2	8

Exhibit A-9. Total Potential Change in Emissions (in metric tons per year) from Mode Shift, 2012

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
VOC	–	254	120	566
Acetaldehyde	–	6	3	14
Acrolein	–	1	0	2
Benzene	–	1	0	2
1,3-butadiene	–	1	1	2
DPM	–	144	68	321
Formaldehyde	–	15	7	33
CO_2e[a]	–	379,070	179,005	843,927

Note: Values less than 0.5 are rounded to zero.
[a] CO_2-only emissions for rail were summed with CO_2e for drayage truck GHG emissions.

Exhibit A-10. Total Potential Change in Emissions (in metric tons per year) from Mode Shift, 2015

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	961	454	2,140
NO_x	–	4,636	2,189	10,322
$PM_{2.5}$	–	121	57	269
PM_{10}	–	125	59	277
SO_2	–	4	2	8
VOC	–	216	102	480
Acetaldehyde	–	7	3	15
Acrolein	–	1	0	2
Benzene	–	1	0	2
1,3-butadiene	–	1	1	3
DPM	–	125	59	277
Formaldehyde	–	16	7	35
CO_2e[a]	–	402,447	190,044	895,970

Note: Values less than 0.5 are rounded to zero.
[a] CO_2-only emissions for rail were summed with CO_2e for drayage truck GHG emissions.

Exhibit A-11. Total Potential Change in Emissions (in metric tons per year) from Mode Shift, 2020

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	1,043	492	2,321
NO_x	–	3,889	1,836	8,658
$PM_{2.5}$	–	89	42	197
PM_{10}	–	91	43	203
SO_2	–	4	2	9

Exhibit A-11. Total Potential Change in Emissions (in metric tons per year) from Mode Shift, 2020

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
VOC	–	150	71	333
Acetaldehyde	–	7	3	16
Acrolein	–	1	0	2
Benzene	–	1	0	2
1,3-butadiene	–	1	1	3
DPM	–	91	43	203
Formaldehyde	–	17	8	38
CO_2e[a]	–	444,654	209,976	989,937

Note: Values less than 0.5 are rounded to zero.
[a] CO_2-only emissions for rail were summed with CO_2e for drayage truck GHG emissions.

A.3.2. Long-Haul Truck Travel Emissions

The changes in potential emissions from long-haul VMT for each alternative (in metric tons per year) are shown in Exhibits A-12, A-13, and A-14 for years 2012, 2015, and 2020, respectively.

Exhibit A-12. Total Potential Change in Emissions (in metric tons per year) from Long-haul Vehicle Miles Traveled, 2012

Pollutant	**Alternative 1: No Action**	**Alternative 2**	**Alternative 3**	**Alternative 4**
CO	–	-676	-319	-1,506
NO_x	–	-2,849	-1,345	-6,343
$PM_{2.5}$	–	-128	-60	-285
PM_{10}	–	-132	-62	-294
SO_2	–	-5	-2	-10
VOC	–	-126	-60	-281
Acetaldehyde	–	-4	-2	-8
Acrolein	–	0	0	-1
Benzene	–	-1	-1	-3
1,3-butadiene	–	-1	0	-2
DPM	–	-132	-62	-294
Formaldehyde	–	-10	-5	-23
CO_2e	–	-615,330	-290,573	-1,369,914

Note: Values less than 0.5 are rounded to zero.

Exhibit A-13. Total Potential Change in Emissions (in metric tons per year) from Long-haul Vehicle Miles Traveled, 2015

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
	11 hr/No[a]	10 hr/Yes	11 hr/Yes	9 hr/Yes
CO	–	-493	-233	-1,096
NO_x	–	-2,057	-971	-4,579
$PM_{2.5}$	–	-88	-42	-196
PM_{10}	–	-91	-43	-202
SO_2	–	-5	-2	-11
VOC	–	-95	-45	-212
Acetaldehyde	–	-3	-1	-6
Acrolein	–	0	0	-1
Benzene	–	-1	0	-2
1,3-butadiene	–	-1	0	-1
DPM	–	-91	-43	-202
Formaldehyde	–	-8	-4	-17
CO_2e	–	-652,699	-308,219	-1,453,108

Note: Values less than 0.5 are rounded to zero.

Exhibit A-14. Total Potential Change in Emissions (in metric tons per year) from Long-haul Vehicle Miles Traveled, 2020

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	-295	-139	-657
NO_x	–	-1,255	-593	-2,795
$PM_{2.5}$	–	-46	-22	-103
PM_{10}	–	-48	-23	-106
SO_2	–	-5	-2	-11
VOC	–	-61	-29	-135
Acetaldehyde	–	-2	-1	-4
Acrolein	–	0	0	0
Benzene	–	-1	0	-1
1,3-butadiene	–	0	0	-1
DPM	–	-48	-23	-106
Formaldehyde	–	-5	-2	-11
CO_2e	–	-720,331	-340,156	-1,603,678

Note: Values less than 0.5 are rounded to zero.

A.3.3. Long-Haul Truck Idle Emissions

The potential changes in emissions from long-haul truck idling based on VHI for each alternative (in metric tons per year) are presented in Exhibits A-15 for 2012, A-16 for 2015, and A-17 for 2020.

Exhibit A-15. Potential Emissions (in metric tons per year)from Long-haul Vehicle-hours Idling, 2012

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	5,938	1,735	15,167
NO_x	–	15,818	4,622	40,399
$PM_{2.5}$	–	114	33	292
PM_{10}	–	118	34	301
SO_2	–	4	1	10
VOC	–	3,689	1,078	9,423
Acetaldehyde	–	109	32	279
Acrolein	–	13	4	34
Benzene	–	40	12	102
1,3-butadiene	–	23	7	59
DPM	–	118	34	301
Formaldehyde	–	296	87	756
CO_2e	–	601,206	175,684	1,535,528

Exhibit A-16. Potential Emissions (in metric tons per year) from Long-haul Vehicle-hours Idling , 2015

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	6,308	1,843	16,112
NO_x	–	16,496	4,820	42,132
$PM_{2.5}$	–	85	25	218
PM_{10}	–	88	26	225
SO_2	–	4	1	11
VOC	–	3,875	1,132	9,898
Acetaldehyde	–	115	33	293
Acrolein	–	14	4	36
Benzene	–	42	12	107
1,3-butadiene	–	24	7	62
DPM	–	88	26	225
Formaldehyde	–	311	91	794
CO_2e	–	637,003	186,145	1,626,957

Exhibit A-17. Potential Emissions (in metric tons per year) from Long-haul Vehicle-hours Idling, 2020

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	6,973	2,038	17,809
NO_x	–	17,903	5,232	45,726
$PM_{2.5}$	–	56	16	142
PM_{10}	–	57	17	147
SO_2	–	5	1	12
VOC	–	4,237	1,238	10,821
Acetaldehyde	–	125	37	320
Acrolein	–	15	4	39
Benzene	–	46	13	117
1,3-butadiene	–	27	8	68
DPM	–	57	17	147
Formaldehyde	–	340	99	869
CO_2e	–	702,548	205,299	1,794,365

A.3.4. Emissions Resulting from Crashes

Exhibit A-18 presents potential total emissions associated with projected changes in the number of crashes for all alternatives, based on the number of crashes (see Exhibit A-7) and emission factors per crash (see Exhibit A-8).

Exhibit A-18. Potential Emission Changes (in metric tons per year) Resulting from Changes in Long-haul Crash Incidence, 2012 through 2020

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	-329.88	-218.13	-624.65
NO_x	–	-41.69	-27.57	-78.94
$PM_{2.5}$	–	-1.79	-1.19	-3.40
PM_{10}	–	-2.36	-1.56	-4.47
SO_2	–	-4.86	-3.21	-9.19
VOC	–	-24.98	-16.52	-47.30
Acetaldehyde	–	0.000	0.000	-0.001
Acrolein	–	0.000	0.000	0.000
Benzene	–	-0.002	-0.002	-0.004
1,3-butadiene	–	0.000	0.000	0.000
DPM	–	-0.001	0.000	-0.001
Formaldehyde	–	-0.001	-0.001	-0.002
CO_2e[a]	–	-10,580	-6,996	-20,034

Note: Differences less than 0.0005 are rounded to zero.

[a] CO_2-only emissions for crash incidence are assumed to approximate CO_2e.

A.3.5. Total Emissions

The total potential emission change relative to the No Action Alternative as a result of mode shift, VMT, VHI, and CMV crashes for each alternative (in metric tons per year) for the three action alternatives are presented in Exhibits A-19, A-20, and A-21 for 2012, 2015, and 2020 respectively.

Exhibit A-19. Total Potential Emission Changes (in metric tons per year) Relative to the No Action Alternative, 2012

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	5,855	1,634	15,091
NO_x	–	17,864	5,581	44,968
$PM_{2.5}$	–	125	38	315
PM_{10}	–	128	39	324
SO_2	–	-2	-3	-1
VOC	–	3,792	1,122	9,660
Acetaldehyde	–	112	33	285
Acrolein	–	14	4	35
Benzene	–	39	11	101
1,3-butadiene	–	23	7	60
DPM	–	130	40	329
Formaldehyde	–	301	89	767
CO_2e[a]	–	354,366	57,121	989,507

[a] CO_2-only emissions for rail and crashes are summed with CO_2e emissions from long-haul and drayage truck VMT and VHI emissions to approximate CO_2e.

Exhibit A-20. Total Potential Emission Changes (in metric tons per year) Relative to the No Action Alternative, 2015

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	6,447	1,847	16,530
NO_x	–	19,034	6,011	47,797
$PM_{2.5}$	–	116	39	288
PM_{10}	–	120	40	296
SO_2	–	-2	-2	-1
VOC	–	3,970	1,173	10,118
Acetaldehyde	–	118	35	301
Acrolein	–	14	4	37
Benzene	–	42	12	107
1,3-butadiene	–	25	7	63
DPM	–	122	42	300
Formaldehyde	–	319	95	812
CO_2e[a]	–	376,171	60,974	1,049,784

[a] CO_2-only emissions for rail and crashes are summed with CO_2e emissions from long-haul and drayage truck VMT and VHI emissions to approximate CO_2e.

Exhibit A-21. Total Potential Emission Changes (in metric tons per year) Relative to the No Action Alternative, 2020

Pollutant	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	–	7,390	2,172	18,848
NO_x	–	20,495	6,448	51,510
$PM_{2.5}$	–	96	35	233
PM_{10}	–	99	36	239
SO_2	–	-1	-2	1
VOC	–	4,301	1,264	10,972
Acetaldehyde	–	131	39	332
Acrolein	–	16	5	41
Benzene	–	46	14	117
1,3-butadiene	–	27	8	70
DPM	–	101	37	244
Formaldehyde	–	352	105	895
CO_2e[a]	–	416,292	68,122	1,160,590

[a] CO_2-only emissions for rail and crashes are summed with CO_2e emissions from long-haul and drayage truck VMT and VHI emissions to approximate CO_2e.

Exhibits A-19 through A-21 show that emissions of all pollutants (criteria and air toxics) would increase under the action alternatives (Alternative 2 through 4) compared to the No Action Alternative with the exception of SO_2 for Alternatives 2 and 3, which would have very small reductions. The potential increases in all pollutants are due to the expected increase in activity of drayage trucks, rail locomotives, and idling for long-haul trucks associated with Alternatives 2 through 4 compared to the No Action Alternative. Increases in long-haul idling under each action alternative are primarily responsible for potential emission increases of all pollutants. For DPM, $PM_{2.5}$, PM_{10}, and SO_2, increases in locomotive emissions are also a key driver. For SO_2, emission increases from long-haul truck idling and rail transport would approximately balance with emission reductions from long-haul truck VMT and crashes. Because total freight activity is expected to increase between 2010 and 2020, the magnitude of the HOS-related emission changes also would increase between analysis years (i.e., from 2012 to 2015 and from 2015 to 2020). This increase would occur for all pollutants except for PM_{10}, $PM_{2.5}$, and DPM. Emission factors for PM_{10}, $PM_{2.5}$, and DPM are expected to decrease more rapidly than freight activity is expected to increase between 2010 and 2020.

A.3.6. Emissions in National Context

Exhibits A-22 through A-24 show the potential emission change for all alternatives compared to the No Action Alternative (Alternative 1) as a percentage of total highway emission sources nationwide. Exhibits A-25 through A-27 show the potential emission change for all alternatives compared to the No Action Alternative as a percentage of total national emissions from all sources.

Exhibit A-22. Potential Emission Changes Relative to the No Action Alternative, as a Percentage of Total National Emissions from Highway Sources, 2012

Pollutant	Highway Sources[a] (Metric Tons per Year)	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	35,258,642	–	0.02%	0.00%	0.04%
NO_x	4,722,804	–	0.38%	0.12%	0.95%
$PM_{2.5}$	99,790	–	0.12%	0.04%	0.32%
PM_{10}	155,129	–	0.08%	0.02%	0.21%
SO_2	58,060	–	0.00%	0.00%	0.00%
VOC	3,100,757	–	0.12%	0.04%	0.31%
Acetaldehyde	21,563	–	0.52%	0.15%	1.32%
Acrolein	2,278	–	0.60%	0.18%	1.53%
Benzene	129,610	–	0.03%	0.01%	0.08%
1,3-butadiene	15,484	–	0.15%	0.04%	0.39%
DPM	175,232	–	0.07%	0.02%	0.19%
Formaldehyde	48,191	–	0.62%	0.18%	1.59%
CO_2e[b]	1,580,600,000	–	0.02%	0.00%	0.06%

Sources: EPA (2009b) for all criteria air pollutants; EIA (2009) for CO_2e based on total transportation sources; EPA (2008) for air toxics.
Note: Values less than 0.005% are rounded to zero.
[a] Based on 2008 emissions for criteria air pollutants and CO_2, 2005 emissions for air toxics.
[b] CO_2 only.

Exhibit A-23. Potential Emission Changes Relative to the No Action Alternative, as a Percentage of Total National Emissions from Highway Sources, 2015

Pollutant	Highway Sources[a] (Metric Tons Per Year)	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	35,258,642	–	0.02%	0.01%	0.05%
NO_x	4,722,804	–	0.40%	0.13%	1.01%
$PM_{2.5}$	99,790	–	0.12%	0.04%	0.29%
PM_{10}	155,129	–	0.08%	0.03%	0.19%
SO_2	58,060	–	0.00%	0.00%	0.00%
VOC	3,100,757	–	0.13%	0.04%	0.33%
Acetaldehyde	21,563	–	0.55%	0.16%	1.40%
Acrolein	2,278	–	0.64%	0.19%	1.62%
Benzene	129,610	–	0.03%	0.01%	0.08%
1,3-butadiene	15,484	–	0.16%	0.05%	0.41%
DPM	175,232	–	0.07%	0.02%	0.17%
Formaldehyde	48,191	–	0.66%	0.20%	1.69%
CO_2e[b]	1,580,600,000	–	0.02%	0.00%	0.07%

Sources: EPA (2009b) for all criteria air pollutants; EIA (2009) for CO_2e based on total transportation sources; EPA (2008) for air toxics.
Note: Values less than 0.005% are rounded to zero.
[a] Based on 2008 emissions for criteria air pollutants and CO_2, 2005 emissions for air toxics.
[b] CO_2 only.

Exhibit A-24. Potential Emission Changes Relative to the No Action Alternative as a Percentage of Total National Emissions from Highway Sources, 2020

Pollutant	Highway Sources[a] (Metric Tons Per Year)	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	35,258,642	–	0.02%	0.01%	0.05%
NO_x	4,722,804	–	0.43%	0.14%	1.09%
$PM_{2.5}$	99,790	–	0.10%	0.04%	0.23%
PM_{10}	155,129	–	0.06%	0.02%	0.15%
SO_2	58,060	–	0.00%	0.00%	0.00%
VOC	3,100,757	–	0.14%	0.04%	0.35%
Acetaldehyde	21,563	–	0.61%	0.18%	1.54%
Acrolein	2,278	–	0.70%	0.21%	1.78%
Benzene	129,610	–	0.04%	0.01%	0.09%
1,3-butadiene	15,484	–	0.18%	0.05%	0.45%
DPM	175,232	–	0.06%	0.02%	0.14%
Formaldehyde	48,191	–	0.73%	0.22%	1.86%
CO_2e[b]	1,580,600,000	–	0.03%	0.00%	0.07%

Sources: EPA (2009b) for all criteria air pollutants; EIA (2009) for CO_2e based on total transportation sources; EPA (2008) for air toxics.
Note: Values less than 0.005% are rounded to zero.
[a] Based on 2008 emissions for criteria air pollutants and CO_2, 2005 emissions for air toxics
[b] CO_2 only.

Exhibit A-25. Potential Emission Changes Relative to the No Action Alternative as a Percentage of Total National Emissions From All Sources, 2012

Pollutant	All Sources[a] (Metric Tons Per Year)	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	70,474,647	–	0.01%	0.00%	0.02%
NO_x	14,822,491	–	0.12%	0.04%	0.30%
$PM_{2.5}$	4,436,133	–	0.00%	0.00%	0.01%
PM_{10}	13,431,777	–	0.00%	0.00%	0.00%
SO_2	10,368,214	–	0.00%	0.00%	0.00%
VOC	14,448,731	–	0.03%	0.01%	0.07%
Acetaldehyde	65,895	–	0.17%	0.05%	0.43%
Acrolein	27,488	–	0.05%	0.01%	0.13%
Benzene	317,956	–	0.01%	0.00%	0.03%
1,3-butadiene	43,375	–	0.05%	0.02%	0.14%
DPM	19,006,694	–	0.00%	0.00%	0.00%
Formaldehyde	223,260	–	0.13%	0.04%	0.34%
CO_2e[b]	5,814,400,000	–	0.01%	0.00%	0.02%

Sources: EPA (2009b) for all criteria air pollutants; EIA (2009) for CO_2e based on total transportation sources; EPA (2008) for air toxics.
Note: Values less than 0.005% are rounded to zero.
[a] Based on 2008 emissions for criteria air pollutants and CO_2, 2005 emissions for air toxics.
[b] CO_2 only.

Exhibit A-26. Potential Emission Changes Relative to the No Action Alternative, 2015, as a Percentage of Total National Emissions From All Sources

Pollutant	All Sources[a] (Metric Tons Per Year)	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	70,474,647	–	0.01%	0.00%	0.02%
NO_x	14,822,491	–	0.13%	0.04%	0.32%
$PM_{2.5}$	4,436,133	–	0.00%	0.00%	0.01%
PM_{10}	13,431,777	–	0.00%	0.00%	0.00%
SO_2	10,368,214	–	0.00%	0.00%	0.00%
VOC	14,448,731	–	0.03%	0.01%	0.07%
Acetaldehyde	65,895	–	0.18%	0.05%	0.46%
Acrolein	27,488	–	0.05%	0.02%	0.13%
Benzene	317,956	–	0.01%	0.00%	0.03%
1,3-butadiene	43,375	–	0.06%	0.02%	0.15%
DPM	19,006,694	–	0.00%	0.00%	0.00%
Formaldehyde	223,260	–	0.14%	0.04%	0.36%
CO_2e[b]	5,814,400,000	–	0.01%	0.00%	0.02%

Sources: EPA (2009b) for all criteria air pollutants; EIA (2009) for CO_2e based on total transportation sources; EPA (2008) for air toxics.
Note: Values less than 0.005% are rounded to zero.
[a] Based on 2008 emissions for criteria air pollutants and CO_2, 2005 emissions for air toxics.
[b] CO_2 only.

Exhibit A-27. Potential Emission Changes Relative to the No Action Alternative, as a Percentage of Total National Emissions From All Sources, 2020

Pollutant	All Sources[a] (Metric Tons Per Year)	Alternative 1: No Action	Alternative 2	Alternative 3	Alternative 4
CO	70,474,647	–	0.01%	0.00%	0.03%
NO_x	14,822,491	–	0.14%	0.04%	0.35%
$PM_{2.5}$	4,436,133	–	0.00%	0.00%	0.01%
PM_{10}	13,431,777	–	0.00%	0.00%	0.00%
SO_2	10,368,214	–	0.00%	0.00%	0.00%
VOC	14,448,731	–	0.03%	0.01%	0.08%
Acetaldehyde	65,895	–	0.20%	0.06%	0.50%
Acrolein	27,488	–	0.06%	0.02%	0.15%
Benzene	317,956	–	0.01%	0.00%	0.04%
1,3-butadiene	43,375	–	0.06%	0.02%	0.16%
DPM	19,006,694	–	0.00%	0.00%	0.00%
Formaldehyde	223,260	–	0.16%	0.05%	0.40%
CO_2e[b]	5,814,400,000	–	0.01%	0.00%	0.02%

Sources: EPA (2009b) for all criteria air pollutants; EIA (2009) for CO_2e based on total transportation sources; EPA (2008) for air toxics.
Note: Values less than 0.005% are rounded to zero.
[a] Based on 2008 emissions for criteria air pollutants and CO_2, 2005 emissions for air toxics.
[c] CO_2 only.

CO_2 is a GHG that causes climate effects due to its overall concentration in the atmosphere, rather than local conditions near the CO_2 emission sources. Consequently, its impacts are most appropriately evaluated on a national rather than local scale. An appropriate context for evaluating CO_2 emissions associated with the HOS rules is the national GHG emissions inventory. The emission inventory for calendar year 2008, published April 15, 2010 (EPA 2010b), is the latest available. The amount of CO_2 emitted from fossil-fueled transportation sources in the United States in 2008 was 1,785.3 million metric tons. For all fossil-fuel (e.g., coal, petroleum, natural gas) combustion sources, including transportation, the 2008 nationwide emissions were 5,572.8 million metric tons of CO_2. In all, the change in CMV-related GHG emissions represents approximately one-hundredth to one-tenth of one percent of annual total U.S. net GHG emissions, depending on the HOS alternative.

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Appendix B – Public Rest Area/ Commercial Parking Facility Impacts

December 2010

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Exhibits

Appendix B. Public Rest Area/Commercial Parking Facility Impacts

This appendix presents an assessment of the impacts of Alternatives 2, 3, and 4 as compared to the No Action Alternative on the demand for public and non-public parking spaces in each State (except Hawaii). The anticipated changes in the number of trucks operating and the changes in the total demand for parking spaces for each region were estimated using the Federal Motor Carrier Safety Administration (FMCSA) *Hours-of-Service (HOS) Rules Regulatory Impact Analysis* (RIA) results (FMCSA 2010). The results were compared to the Federal Highway Administration's (FHWA 2002) estimates of the existing demand for public and non-public parking spaces. Exhibit B-1 summarizes the HOS RIA results.

Exhibit B-1. Impact of Alternatives on Number of Trucks and Demand for Parking Spaces

Region	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Incremental Change in Number of Trucks	Parking Demand Change (spaces)	Incremental Change in Number of Trucks	Parking Demand Change (spaces)	Incremental Change in Number of Trucks	Parking Demand Change (spaces)	Incremental Change in Number of Trucks	Parking Demand Change (spaces)
Northeast	–	–	7,943	4,468	3,843	2,161	18,192	10,233
Southeast	–	–	7,207	4,054	3,487	1,961	16,506	9,285
Midwest	–	–	7,324	4,120	3,543	1,993	16,775	9,436
South Central	–	–	3,371	1,896	1,631	917	7,720	4,342
Plains/ Rockies	–	–	5,753	3,236	2,783	1,565	13,175	7,411
Far West	–	–	3,957	2,226	1,914	1,077	9,063	5,098
Total	**–**	**–**	**35,554**	**19,999**	**17,201**	**9,675**	**81,431**	**45,805**

List of States in Each Region

Northeast	Southeast	Midwest	South Central	Plains/Rockies	Far West
Connecticut Delaware Maine Maryland Massachusetts New Hampshire New Jersey New York Pennsylvania Rhode Island Vermont	Alabama Florida Georgia Kentucky Mississippi North Carolina South Carolina Tennessee Virginia West Virginia	Illinois Indiana Iowa Michigan Missouri Minnesota Ohio Wisconsin	Arkansas Louisiana Oklahoma Texas	Arizona Colorado Idaho Kansas Montana Nebraska New Mexico North Dakota South Dakota Utah Wyoming	Alaska California Nevada Oregon Washington [Hawaii is not included in FHWA study]

As shown in Exhibit B-1, Alternatives 2, 3, and 4 would result in a slight increase in the demand for truck parking spaces as compared to the No Action Alternative. Mode shift would reduce truck freight demand and thus total VMT. A decrease in total VMT would not necessarily reduce the number of vehicles in operation because Alternatives 2, 3, and 4 would require each driver to drive less as compared to the No Action Alternative. Alternatives 2, 3, and 4 would increase rest time, thereby reducing drivers' productivity. As a result, additional trucks would be required and the industry would need to hire more drivers to meet truck freight demand. With more trucks in operation, and each driver required to take more rest, the demand for parking spaces would increase slightly under Alternatives 2, 3, and 4 as compared to the No Action Alternative. Alternatives 2, 3, and 4 do not contain provisions that would require construction of additional parking facilities.

B.1. EXISTING PARKING SUPPLY

In June 2002, the Federal Highway Administration (FHWA) published the results of their study of the existing demand for public and non-public parking spaces in *Report to Congress: Study of Adequacy of Parking Facilities*. The study reported FHWA research on parking spaces at public rest areas and commercial truck stops and travel plazas. The FHWA reported an estimated 315,850 parking spaces at public rest areas and commercial truck stops and travel plazas serving interstate highways and other National Highway System routes carrying more than 1,000 trucks per day. Routes carrying fewer than 1,000 trucks per day were not surveyed. Approximately 10 percent of truck parking spaces were in public rest areas and 90 percent were in commercial truck stops and travel plazas. Exhibit B-2 presents an inventory of public and commercial truck parking spaces along interstate and National Highway System routes with greater than 1,000 trucks per day.

Additional research did not identify a more recent study of the existing demand for public and non-public parking spaces that covered all of the continental United States. Therefore, FMCSA used the 2002 FHWA report data for the analyses presented in this environmental assessment.

Exhibit B-2. Commercial Truck Parking Inventory Along Interstate and Other National Highway System Routes Carrying More Than 1,000 Trucks per Day

	Public Rest Areas			Truck Stops and Travel Plazas			Total
State	Number of Facilities	Number of Spaces	Percent of Total	Number of Facilities	Number of Spaces	Percent of Total	Number of Spaces
Alabama	27	712	9%	99	6,902	91%	7,614
Alaska[a]	N/A	457	100%	N/A	N/A	N/A	457
Arizona	38	559	6%	58	8,140	94%	8,699
Arkansas	21	343	4%	108	7,519	96%	7,862
California	88	1,106	13%	122	7,496	87%	8,602
Colorado	31	167	6%	57	2,710	94%	2,877
Connecticut	20	361	23%	12	1,243	77%	1,604
Delaware	1	70	18%	8	324	82%	394
Florida	69	1,709	19%	85	7,339	81%	9,048
Georgia	31	1,162	9%	122	11,475	91%	12,637

Exhibit B-2. Commercial Truck Parking Inventory Along Interstate and Other National Highway System Routes Carrying More Than 1,000 Trucks per Day

	Public Rest Areas			Truck Stops and Travel Plazas			Total
State	Number of Facilities	Number of Spaces	Percent of Total	Number of Facilities	Number of Spaces	Percent of Total	Number of Spaces
Idaho	30	245	11%	25	1,967	89%	2,212
Illinois	54	1,267	12%	122	9,602	88%	10,869
Indiana	52	2,430	14%	119	14,529	86%	16,959
Iowa	38	804	13%	65	5,209	87%	6,013
Kansas	29	455	9%	55	4,383	91%	4,838
Kentucky	44	991	12%	76	7,186	88%	8,177
Louisiana	15	221	2%	115	9,159	98%	9,380
Maine	11	113	8%	16	1,248	92%	1,361
Maryland	11	295	11%	14	2,290	89%	2,585
Massachusetts	17	140	7%	20	1,916	93%	2,056
Michigan	75	1,570	20%	90	6,147	80%	7,717
Minnesota	40	536	11%	58	4,503	89%	5,039
Mississippi	43	428	6%	98	7,003	94%	7,431
Missouri	35	618	5%	140	12,272	95%	12,890
Montana	43	392	11%	39	3,085	89%	3,477
Nebraska	22	263	8%	46	2,835	92%	3,098
Nevada	36	260	5%	31	4,979	95%	5,239
New Hampshire	6	86	11%	13	697	89%	783
New Jersey	19	667	15%	34	3,730	85%	4,397
New Mexico	11	78	1%	49	6,322	99%	6,400
New York	36	1,257	15%	97	6,970	85%	8,227
North Carolina	37	642	8%	102	7,323	92%	7,965
North Dakota	30	260	11%	25	2,039	89%	2,299
Ohio	98	1,402	11%	135	11,474	89%	12,876
Oklahoma	63	767	7%	129	9,632	93%	10,399
Oregon	40	602	10%	52	5,702	90%	6,304
Pennsylvania	65	1,298	8%	134	14,502	92%	15,800
Rhode Island	5	267	39%	3	420	61%	687
South Carolina	49	816	9%	96	8,515	91%	9,331
South Dakota	21	371	22%	30	1,331	78%	1,702
Tennessee	30	767	11%	89	6,419	89%	7,186

Exhibit B-2. Commercial Truck Parking Inventory Along Interstate and Other National Highway System Routes Carrying More Than 1,000 Trucks per Day

State	Public Rest Areas			Truck Stops and Travel Plazas			Total
	Number of Facilities	Number of Spaces	Percent of Total	Number of Facilities	Number of Spaces	Percent of Total	Number of Spaces
Texas	105	654	3%	284	23,525	97%	24,179
Utah	24	238	9%	43	2,488	91%	2,726
Vermont	41	178	28%	63	449	72%	627
Virginia	39	820	10%	13	7,445	90%	8,265
Washington	29	455	15%	39	2,663	85%	3,118
West Virginia	21	506	23%	21	1,717	77%	2,223
Wisconsin	23	652	10%	80	5,971	90%	6,623
Wyoming	58	792	17%	51	3,806	83%	4,598
Total	**1,771**	**31,249**	**10%**	**3,382**	**284,601**	**90%**	**315,850**

[a] Private parking spaces were not inventoried in Alaska. Hawaii is not included in the FHWA study.

To determine the adequacy of the existing parking facilities, FHWA compared the supply of public parking spaces to the demand for public parking spaces, compared the supply of non-public parking spaces to the demand for non-public parking spaces, and compared the total supply to the total demand for each State. (For Alaska parking spaces were not included in the inventory and Hawaii was not included in the study). Public and commercial spaces were evaluated separately because truck drivers use these facilities for different purposes. Public spaces are used for resting. Commercial spaces are used for meals, maintenance, and other purposes. Exhibit B-3 presents the peak-hour demand for public and commercial truck stops and plazas.

Exhibit B-3. Peak-hour Demand for Commercial Vehicle Parking Spaces Along Interstate Highways and Other National Highway System Routes Carrying More Than 1,000 Trucks per Day, 2000

State	Public Rest Area Demand	Commercial Truck Stop Demand	Total Demand	20-Year Forecasted Annual Increase in Parking Demand
Alabama	1,634	5,473	7,107	4.40%
Alaska	25	88	113	1.00%
Arizona	1,052	3,523	4,575	3.20%
Arkansas	1,783	5,968	7,751	2.90%
California	4,539	15,183	19,722	1.90%
Colorado	760	2,546	3,306	3.00%
Connecticut	616	2,060	2,676	1.70%

Exhibit B-3. Peak-hour Demand for Commercial Vehicle Parking Spaces Along Interstate Highways and Other National Highway System Routes Carrying More Than 1,000 Trucks per Day, 2000

State	Public Rest Area Demand	Commercial Truck Stop Demand	Total Demand	20-Year Forecasted Annual Increase in Parking Demand
Delaware	206	694	900	2.40%
Florida	1,694	5,665	7,359	2.80%
Georgia	2,188	7,324	9,512	3.00%
Idaho	734	2,462	3,196	3.00%
Illinois	3,338	11,172	14,510	1.10%
Indiana	4,299	14,400	18,699	3.00%
Iowa	688	2,302	2,990	3.60%
Kansas	566	1,907	2,473	2.70%
Kentucky	2,206	7,380	9,586	2.70%
Louisiana	2,060	6,910	8,970	3.00%
Maine	205	691	896	0.50%
Maryland	592	1,983	2,575	2.00%
Massachusetts	863	2,894	3,757	1.30%
Michigan	1,275	4,262	5,537	2.20%
Minnesota	872	2,925	3,797	2.00%
Mississippi	1,254	4,194	5,448	2.70%
Missouri	2,643	8,841	11,484	2.70%
Montana	462	1,550	2,012	2.60%
Nebraska	251	837	1,088	3.60%
Nevada	682	2,285	2,967	2.00%
New Hampshire	72	243	315	2.20%
New Jersey	457	1,528	1,985	0.60%
New Mexico	1,218	4,083	5,301	2.50%
New York	1,801	6,034	7,835	3.00%
North Carolina	1,270	4,262	5,532	3.00%
North Dakota	188	635	823	3.00%
Ohio	3,301	11,059	14,360	2.90%
Oklahoma	1,078	3,610	4,688	1.80%
Oregon	1,139	3,819	4,958	1.80%
Pennsylvania	2,360	7,903	10,263	3.00%

Exhibit B-3. Peak-hour Demand for Commercial Vehicle Parking Spaces Along Interstate Highways and Other National Highway System Routes Carrying More Than 1,000 Trucks per Day, 2000

State	Public Rest Area Demand	Commercial Truck Stop Demand	Total Demand	20-Year Forecasted Annual Increase in Parking Demand
Rhode Island	167	566	733	1.40%
South Carolina	1,265	4,236	5,501	3.80%
South Dakota	199	666	865	1.70%
Tennessee	1,214	4,073	5,287	4.00%
Texas	8,305	27,797	36,102	2.70%
Utah	391	1,307	1,698	4.30%
Vermont	27	91	118	1.20%
Virginia	1,772	5,932	7,704	1.40%
Washington	815	2,724	3,539	2.10%
West Virginia	468	1,572	2,040	3.00%
Wisconsin	633	2,115	2,748	4.20%
Wyoming	440	1,475	1,915	3.60%
Total	**66,067**	**221,249**	**287,316**	**2.70%**

Each State was classified in the FHWA study as having a surplus (a ratio of demand to supply less than 0.90), sufficient supply (a ratio of demand to supply of 0.90 through 1.10) or shortage (a ratio of demand to supply greater than 1.10) of public parking spaces and of non-public parking spaces. The results showed that 35 States have a shortage of public parking spaces, while only 8 States have a shortage of commercial parking spaces. The comparison of total spaces to total demand showed that 12 States have overall shortages. Exhibit B-4 presents a State-by-State analysis of the adequacy of these existing facilities. The results of the FHWA survey suggest some interchangeability, albeit incomplete, between parking spaces at public rest areas and commercial truck stops and travel plazas. The analysis of the effects of an increase in parking space demand for each alternative assumes that driver preferences with respect to use of public rest areas and commercial parking facilities will remain unchanged from the status quo as of 2003.

Exhibit B-4. Evaluation of Parking Shortages: State-by-State Analysis

	Public Spaces		Commercial Spaces		Total Spaces	
State	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Alabama	2.29	Shortage	0.79	Surplus	0.93	Sufficient
Alaska[b]	0.05	Surplus	N/A	N/A	N/A	N/A
Arizona	1.88	Shortage	0.43	Surplus	0.53	Surplus

Exhibit B-4. Evaluation of Parking Shortages: State-by-State Analysis

State	Public Spaces		Commercial Spaces		Total Spaces	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Arkansas	5.20	Shortage	0.79	Surplus	0.99	Sufficient
California	4.10	Shortage	2.03	Shortage	2.29	Shortage
Colorado	4.55	Shortage	0.94	Sufficient	1.15	Shortage
Connecticut	1.71	Shortage	1.66	Shortage	1.67	Shortage
Delaware	2.94	Shortage	2.14	Shortage	2.28	Shortage
Florida	0.99	Sufficient	0.77	Surplus	0.81	Surplus
Georgia	1.88	Shortage	0.64	Surplus	0.75	Surplus
Idaho	3.00	Shortage	1.25	Shortage	1.44	Shortage
Illinois	2.63	Shortage	1.16	Shortage	1.33	Shortage
Indiana	1.77	Shortage	0.99	Sufficient	1.10	Shortage
Iowa	0.86	Surplus	0.44	Surplus	0.50	Surplus
Kansas	1.24	Shortage	0.44	Surplus	0.51	Surplus
Kentucky	2.23	Shortage	1.03	Sufficient	1.17	Shortage
Louisiana	9.32	Shortage	0.75	Surplus	0.96	Sufficient
Maine	1.81	Shortage	0.55	Surplus	0.66	Surplus
Maryland	2.01	Shortage	0.87	Surplus	1.00	Sufficient
Massachusetts	6.16	Shortage	1.51	Shortage	1.83	Shortage
Michigan	0.81	Surplus	0.69	Surplus	0.72	Surplus
Minnesota	1.63	Shortage	0.65	Surplus	0.75	Surplus
Mississippi	2.93	Shortage	0.60	Surplus	0.73	Surplus
Missouri	4.28	Shortage	0.72	Surplus	0.89	Surplus
Montana	1.18	Shortage	0.50	Surplus	0.58	Surplus
Nebraska	0.95	Sufficient	0.30	Surplus	0.35	Surplus
Nevada	2.62	Shortage	0.46	Surplus	0.57	Surplus
New Hampshire	0.84	Surplus	0.35	Surplus	0.40	Surplus
New Jersey	0.69	Surplus	0.41	Surplus	0.45	Surplus
New Mexico	15.62	Shortage	0.65	Surplus	0.83	Surplus
New York	1.43	Shortage	0.87	Surplus	0.95	Sufficient
North Carolina	1.98	Shortage	0.58	Surplus	0.69	Surplus
North Dakota	0.72	Surplus	0.31	Surplus	0.36	Surplus
Ohio	2.35	Shortage	0.96	Sufficient	1.12	Shortage
Oklahoma	1.41	Shortage	0.37	Surplus	0.45	Surplus

Exhibit B-4. Evaluation of Parking Shortages: State-by-State Analysis

	Public Spaces		Commercial Spaces		Total Spaces	
State	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Oregon	1.89	Shortage	0.67	Surplus	0.79	Surplus
Pennsylvania	1.82	Shortage	0.54	Surplus	0.65	Surplus
Rhode Island	0.63	Surplus	1.35	Shortage	1.07	Sufficient
South Carolina	1.55	Shortage	0.50	Surplus	0.59	Surplus
South Dakota	0.54	Surplus	0.50	Surplus	0.51	Surplus
Tennessee	1.58	Shortage	0.63	Surplus	0.74	Surplus
Texas	12.70	Shortage	1.18	Shortage	1.49	Shortage
Utah	1.64	Shortage	0.53	Surplus	0.62	Surplus
Vermont	0.15	Surplus	0.20	Surplus	0.19	Surplus
Virginia	2.16	Shortage	0.80	Surplus	0.93	Sufficient
Washington	1.79	Shortage	1.02	Sufficient	1.14	Shortage
West Virginia	0.92	Sufficient	0.92	Sufficient	0.92	Sufficient
Wisconsin	0.97	Sufficient	0.35	Surplus	0.41	Surplus
Wyoming	0.56	Surplus	0.39	Surplus	0.42	Surplus

[a] Surplus parking: demand-to-supply ratio is less than 0.9; sufficient parking: demand-to-supply ratio of 0.9 through 1.1; shortage of parking: demand-to-supply ratio of greater than 1.1.

[b] The supply of parking spaces at commercial truck stops and travel plazas was not determined for Alaska. Hawaii is not included in the FHWA study.

B.2. PARKING IMPACT ANALYSIS APPROACH

The anticipated increase in parking demand by region for each alternative, projected from the changes in the number of drivers estimated in the RIA, was disaggregated to assess the impact of Alternatives 2, 3, and 4, as compared to the No Action Alternative, on the demand for public and for non-public parking spaces for each State. First, FMCSA reorganized the State-by-State data from the FHWA Report to Congress according to the regions listed in Exhibit B-1 and calculated the total existing demand for public parking spaces and the total existing demand for non-public parking spaces for each region.

FMCSA apportioned the total projected increase in demand for parking spaces for each alternative for each region to each State in that region based on the existing demand for public and for non-public parking spaces in that State and based on the existing inventory of public and non-public parking spaces in that State. For example, in the Northeast, 88 percent of the existing parking spaces are non-public spaces, and therefore 88 percent of the increase or decrease in parking space demand estimated for the Northeast for each alternative was allocated to non-public parking, and 12 percent was allocated to public parking. Similarly, New York constitutes 24.5 percent of the existing demand for non-public parking spaces in the Northeast, and therefore

24.5 percent of the increase in demand for non-public parking spaces estimated for the Northeast for each alternative was allocated to New York.

Under Alternatives 2, 3, and 4, as compared to the No Action Alternative, parking demand would increase. Therefore, Alternatives 2, 3, and 4 could create shortages of public or non-public spaces in States that have sufficient or surplus parking, or they could exacerbate existing shortages in States that have a shortage of parking. Changes in the adequacy of total parking spaces in States resulting from this rule are discussed in Section B.3. Land area needed to provide additional parking spaces is discussed in Section B.4.

B.3. Adequacy of Total Parking Spaces on a State-by-State Basis

FMCSA also analyzed the HOS RIA results to determine the effects of the alternatives on total parking demand and supply in individual States. Exhibits B-5, B-6, and B-7 illustrate the demand/supply ratio for public parking, non-public parking, and total parking, respectively, for each alternative. Based on the 2002 FHWA report data, 12 States have a shortage of parking spaces, 8 have sufficient parking spaces, and 28 have a surplus. Two States, Alaska and Hawaii, were not considered because there was insufficient information to evaluate the adequacy of their total parking supply.

Because all three action alternatives would result in an increase in parking demand as compared to the No Action Alternative, FMCSA grouped the States into three categories:

1. Category 1 includes those States that have sufficient parking spaces or a current shortage of parking spaces that would experience a shortage of parking spaces under one or more of the action alternatives;

2. Category 2 includes those States that have a current surplus or have a sufficient supply of parking spaces that would be reduced to or remain sufficient under one or more of the action alternatives; and

3. Category 3 includes States that have a current surplus of parking spaces and would continue to have a surplus under all action alternatives.

The results of these categorizations are presented in Exhibit B-8 (for Category 1), Exhibit B-9 (for Category 2), and Exhibit B-10 (for Category 3).

Exhibit B-8 summarizes the parking adequacy of the 15 States that would experience a shortage under one or more of the action alternatives. Exhibit B-9 summarizes the parking adequacy for the 9 States that have an existing surplus of or sufficient supply of parking spaces for which parking would be reduced to, or remain, sufficient under the one or more of the action alternatives. Exhibit B-10 summarizes the parking adequacy for the 24 States that would continue to have a surplus of truck parking under all of the action alternatives. No States with a current surplus are projected to experience shortages under any action alternative. Note that, as discussed above, Alaska and Hawaii are not included in this analysis because data for Alaska are insufficient to conduct the analysis and Hawaii was not included in the FHWA study.

Exhibit B-5. Evaluation of Public Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Alabama	2.29	Shortage	2.36	Shortage	2.33	Shortage	2.45	Shortage
Alaska	0.05	Surplus	0.06	Surplus	0.06	Surplus	0.06	Surplus
Arizona	1.88	Shortage	1.97	Shortage	1.92	Shortage	2.08	Shortage
Arkansas	5.20	Shortage	5.23	Shortage	5.21	Shortage	5.26	Shortage
California	4.10	Shortage	4.26	Shortage	4.18	Shortage	4.46	Shortage
Colorado	4.55	Shortage	4.76	Shortage	4.65	Shortage	5.03	Shortage
Connecticut	1.71	Shortage	1.83	Shortage	1.77	Shortage	2.00	Shortage
Delaware	2.94	Shortage	3.16	Shortage	3.05	Shortage	3.45	Shortage
Florida	0.99	Sufficient	1.02	Sufficient	1.01	Sufficient	1.06	Sufficient
Georgia	1.88	Shortage	1.94	Shortage	1.91	Shortage	2.01	Shortage
Idaho	3.00	Shortage	3.13	Shortage	3.06	Shortage	3.31	Shortage
Illinois	2.63	Shortage	2.71	Shortage	2.67	Shortage	2.81	Shortage
Indiana	1.77	Shortage	1.82	Shortage	1.79	Shortage	1.88	Shortage
Iowa	0.86	Surplus	0.88	Surplus	0.87	Surplus	0.91	Surplus
Kansas	1.24	Shortage	1.30	Shortage	1.27	Shortage	1.37	Shortage
Kentucky	2.23	Shortage	2.29	Shortage	2.26	Shortage	2.37	Shortage
Louisiana	9.32	Shortage	9.37	Shortage	9.35	Shortage	9.44	Shortage
Maine	1.81	Shortage	1.95	Shortage	1.88	Shortage	2.12	Shortage
Maryland	2.01	Shortage	2.16	Shortage	2.08	Shortage	2.35	Shortage
Massachusetts	6.16	Shortage	6.62	Shortage	6.39	Shortage	7.22	Shortage
Michigan	0.81	Surplus	0.84	Surplus	0.82	Surplus	0.86	Surplus
Minnesota	1.63	Shortage	1.67	Shortage	1.65	Shortage	1.73	Shortage
Mississippi	2.93	Shortage	3.01	Shortage	2.97	Shortage	3.12	Shortage
Missouri	4.28	Shortage	4.40	Shortage	4.34	Shortage	4.55	Shortage
Montana	1.18	Shortage	1.23	Shortage	1.20	Shortage	1.30	Shortage
Nebraska	0.95	Sufficient	1.00	Sufficient	0.98	Sufficient	1.05	Sufficient
Nevada	2.62	Shortage	2.72	Shortage	2.67	Shortage	2.85	Shortage
New Hampshire	0.84	Surplus	0.90	Surplus	0.87	Surplus	0.98	Surplus
New Jersey	0.69	Surplus	0.74	Surplus	0.71	Surplus	0.80	Surplus
New Mexico	15.62	Shortage	16.33	Shortage	15.96	Shortage	17.26	Shortage
New York	1.43	Shortage	1.54	Shortage	1.48	Shortage	1.68	Shortage

Exhibit B-5. Evaluation of Public Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
North Carolina	1.98	Shortage	2.04	Shortage	2.01	Shortage	2.11	Shortage
North Dakota	0.72	Surplus	0.76	Surplus	0.74	Surplus	0.80	Surplus
Ohio	2.35	Shortage	2.42	Shortage	2.39	Shortage	2.51	Shortage
Oklahoma	1.41	Shortage	1.41	Shortage	1.41	Shortage	1.42	Shortage
Oregon	1.89	Shortage	1.96	Shortage	1.93	Shortage	2.05	Shortage
Pennsylvania	1.82	Shortage	1.95	Shortage	1.88	Shortage	2.13	Shortage
Rhode Island	0.63	Surplus	0.67	Surplus	0.65	Surplus	0.73	Surplus
South Carolina	1.55	Shortage	1.60	Shortage	1.57	Shortage	1.65	Shortage
South Dakota	0.54	Surplus	0.56	Surplus	0.55	Surplus	0.59	Surplus
Tennessee	1.58	Shortage	1.63	Shortage	1.61	Shortage	1.69	Shortage
Texas	12.70	Shortage	12.77	Shortage	12.73	Shortage	12.86	Shortage
Utah	1.64	Shortage	1.72	Shortage	1.68	Shortage	1.82	Shortage
Vermont	0.15	Surplus	0.16	Surplus	0.16	Surplus	0.18	Surplus
Virginia	2.16	Shortage	2.22	Shortage	2.19	Shortage	2.30	Shortage
Washington	1.79	Shortage	1.86	Shortage	1.82	Shortage	1.95	Shortage
West Virginia	0.92	Sufficient	0.95	Sufficient	0.94	Sufficient	0.99	Sufficient
Wisconsin	0.97	Sufficient	1.00	Sufficient	0.98	Sufficient	1.03	Sufficient
Wyoming	0.56	Surplus	0.58	Surplus	0.57	Surplus	0.61	Surplus

[a] Surplus parking: demand-to-supply ratio is less than 0.9; sufficient parking: demand-to-supply ratio of 0.9 through 1.1; shortage of parking: demand-to-supply ratio of greater than 1.1.

Exhibit B-6. Evaluation of Non-public Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Alabama	0.79	Surplus	0.85	Surplus	0.82	Surplus	0.92	Surplus
Alaska[b]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arizona	0.43	Surplus	0.49	Surplus	0.46	Surplus	0.57	Surplus
Arkansas	0.79	Surplus	0.83	Surplus	0.81	Surplus	0.87	Surplus
California	2.03	Shortage	2.19	Shortage	2.11	Shortage	2.40	Shortage
Colorado	0.94	Sufficient	1.07	Sufficient	1.00	Sufficient	1.24	Surplus

Exhibit B-6. Evaluation of Non-public Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Connecticut	1.66	Shortage	1.92	Shortage	1.78	Shortage	2.26	Shortage
Delaware	2.14	Shortage	2.48	Shortage	2.31	Shortage	2.92	Shortage
Florida	0.77	Surplus	0.83	Surplus	0.80	Surplus	0.90	Surplus
Georgia	0.64	Surplus	0.68	Surplus	0.66	Surplus	0.74	Surplus
Idaho	1.25	Shortage	1.43	Shortage	1.34	Shortage	1.65	Shortage
Illinois	1.16	Shortage	1.24	Shortage	1.20	Shortage	1.33	Shortage
Indiana	0.99	Sufficient	1.05	Sufficient	1.02	Sufficient	1.14	Sufficient
Iowa	0.44	Surplus	0.47	Surplus	0.46	Surplus	0.51	Surplus
Kansas	0.44	Surplus	0.50	Surplus	0.46	Surplus	0.58	Surplus
Kentucky	1.03	Sufficient	1.10	Sufficient	1.06	Sufficient	1.20	Sufficient
Louisiana	0.75	Surplus	0.79	Surplus	0.77	Surplus	0.83	Surplus
Maine	0.55	Surplus	0.64	Surplus	0.60	Surplus	0.75	Surplus
Maryland	0.87	Surplus	1.00	Surplus	0.93	Surplus	1.18	Surplus
Massachusetts	1.51	Shortage	1.75	Shortage	1.63	Shortage	2.06	Shortage
Michigan	0.69	Surplus	0.74	Surplus	0.71	Surplus	0.79	Surplus
Minnesota	0.65	Surplus	0.69	Surplus	0.67	Surplus	0.74	Surplus
Mississippi	0.60	Surplus	0.64	Surplus	0.62	Surplus	0.70	Surplus
Missouri	0.72	Surplus	0.77	Surplus	0.74	Surplus	0.83	Surplus
Montana	0.50	Surplus	0.57	Surplus	0.54	Surplus	0.66	Surplus
Nebraska	0.30	Surplus	0.34	Surplus	0.32	Surplus	0.39	Surplus
Nevada	0.46	Surplus	0.50	Surplus	0.48	Surplus	0.54	Surplus
New Hampshire	0.35	Surplus	0.40	Surplus	0.38	Surplus	0.48	Surplus
New Jersey	0.41	Surplus	0.47	Surplus	0.44	Surplus	0.56	Surplus
New Mexico	0.65	Surplus	0.74	Surplus	0.69	Surplus	0.85	Surplus
New York	0.87	Surplus	1.00	Surplus	0.93	Surplus	1.18	Surplus
North Carolina	0.58	Surplus	0.62	Surplus	0.60	Surplus	0.68	Surplus
North Dakota	0.31	Surplus	0.36	Surplus	0.33	Surplus	0.41	Surplus
Ohio	0.96	Sufficient	1.03	Sufficient	0.99	Sufficient	1.10	Sufficient
Oklahoma	0.37	Surplus	0.39	Surplus	0.38	Surplus	0.41	Surplus
Oregon	0.67	Surplus	0.72	Surplus	0.70	Surplus	0.79	Surplus
Pennsylvania	0.54	Surplus	0.63	Surplus	0.59	Surplus	0.74	Surplus

Exhibit B-6. Evaluation of Non-public Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Rhode Island	1.35	Shortage	1.56	Shortage	1.45	Shortage	1.84	Shortage
South Carolina	0.50	Surplus	0.53	Surplus	0.51	Surplus	0.58	Surplus
South Dakota	0.50	Surplus	0.57	Surplus	0.53	Surplus	0.66	Surplus
Tennessee	0.63	Surplus	0.68	Surplus	0.66	Surplus	0.74	Surplus
Texas	1.18	Shortage	1.23	Shortage	1.21	Shortage	1.29	Shortage
Utah	0.53	Surplus	0.60	Surplus	0.56	Surplus	0.69	Surplus
Vermont	0.20	Surplus	0.23	Surplus	0.22	Surplus	0.28	Surplus
Virginia	0.80	Surplus	0.85	Surplus	0.82	Surplus	0.93	Surplus
Washington	1.02	Sufficient	1.11	Sufficient	1.06	Sufficient	1.21	Sufficient
West Virginia	0.92	Sufficient	0.98	Sufficient	0.95	Sufficient	1.07	Surplus
Wisconsin	0.35	Surplus	0.38	Surplus	0.37	Surplus	0.41	Surplus
Wyoming	0.39	Surplus	0.44	Surplus	0.41	Surplus	0.51	Surplus

[a] Surplus parking: demand-to-supply ratio is less than 0.9; sufficient parking: demand-to-supply ratio of 0.9 through 1.1; shortage of parking: demand-to-supply ratio of greater than 1.1.

[b] The demand/supply ratio for non-public parking was not evaluated for Alaska. Hawaii is not included in the FHWA study.

Exhibit B-7. Evaluation of Total Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Alabama	0.93	Sufficient	0.99	Sufficient	0.96	Sufficient	1.07	Sufficient
Alaska[b]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arizona	0.53	Surplus	0.59	Surplus	0.56	Surplus	0.67	Surplus
Arkansas	0.99	Sufficient	1.02	Sufficient	1.00	Sufficient	1.06	Sufficient
California	2.29	Shortage	2.46	Shortage	2.37	Shortage	2.67	Shortage
Colorado	1.15	Shortage	1.29	Shortage	1.22	Shortage	1.46	Shortage
Connecticut	1.67	Shortage	1.90	Shortage	1.78	Shortage	2.20	Shortage
Delaware	2.28	Shortage	2.60	Shortage	2.44	Shortage	3.01	Shortage
Florida	0.81	Surplus	0.86	Surplus	0.84	Surplus	0.93	Sufficient
Georgia	0.75	Surplus	0.80	Surplus	0.78	Surplus	0.86	Surplus
Idaho	1.44	Shortage	1.62	Shortage	1.53	Shortage	1.84	Shortage

Exhibit B-7. Evaluation of Total Parking Demand/Supply Ratio: State-by-State Analysis

	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
State	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Illinois	1.33	Shortage	1.41	Shortage	1.37	Shortage	1.50	Shortage
Indiana	1.10	Shortage	1.16	Shortage	1.13	Shortage	1.24	Shortage
Iowa	0.50	Surplus	0.52	Surplus	0.51	Surplus	0.56	Surplus
Kansas	0.51	Surplus	0.57	Surplus	0.54	Surplus	0.65	Surplus
Kentucky	1.17	Shortage	1.25	Shortage	1.21	Shortage	1.34	Shortage
Louisiana	0.96	Sufficient	0.99	Sufficient	0.97	Sufficient	1.03	Sufficient
Maine	0.66	Surplus	0.75	Surplus	0.70	Surplus	0.87	Surplus
Maryland	1.00	Sufficient	1.13	Shortage	1.06	Sufficient	1.31	Shortage
Massachusetts	1.83	Shortage	2.08	Shortage	1.95	Shortage	2.41	Shortage
Michigan	0.72	Surplus	0.76	Surplus	0.74	Surplus	0.81	Surplus
Minnesota	0.75	Surplus	0.80	Surplus	0.77	Surplus	0.85	Surplus
Mississippi	0.73	Surplus	0.78	Surplus	0.76	Surplus	0.84	Surplus
Missouri	0.89	Surplus	0.94	Sufficient	0.91	Sufficient	1.00	Sufficient
Montana	0.58	Surplus	0.65	Surplus	0.61	Surplus	0.74	Surplus
Nebraska	0.35	Surplus	0.39	Surplus	0.37	Surplus	0.45	Surplus
Nevada	0.57	Surplus	0.61	Surplus	0.59	Surplus	0.66	Surplus
New Hamp.	0.40	Surplus	0.46	Surplus	0.43	Surplus	0.53	Surplus
New Jersey	0.45	Surplus	0.51	Surplus	0.48	Surplus	0.60	Surplus
New Mexico	0.83	Surplus	0.93	Sufficient	0.88	Surplus	1.05	Sufficient
New York	0.95	Sufficient	1.09	Sufficient	1.02	Sufficient	1.26	Shortage
North Carolina	0.69	Surplus	0.74	Surplus	0.72	Surplus	0.79	Surplus
North Dakota	0.36	Surplus	0.40	Surplus	0.38	Surplus	0.46	Surplus
Ohio	1.12	Shortage	1.18	Shortage	1.15	Shortage	1.26	Shortage
Oklahoma	0.45	Surplus	0.47	Surplus	0.46	Surplus	0.48	Surplus
Oregon	0.79	Surplus	0.84	Surplus	0.81	Surplus	0.91	Sufficient
Pennsylvania	0.65	Surplus	0.74	Surplus	0.69	Surplus	0.86	Surplus
Rhode Island	1.07	Sufficient	1.22	Shortage	1.14	Shortage	1.41	Shortage
South Carolina	0.59	Surplus	0.63	Surplus	0.61	Surplus	0.67	Surplus
South Dakota	0.51	Surplus	0.57	Surplus	0.54	Surplus	0.65	Surplus
Tennessee	0.74	Surplus	0.78	Surplus	0.76	Surplus	0.84	Surplus

Exhibit B-7. Evaluation of Total Parking Demand/Supply Ratio: State-by-State Analysis

State	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]	Ratio	Category[a]
Texas	1.49	Shortage	1.54	Shortage	1.52	Shortage	1.61	Shortage
Utah	0.62	Surplus	0.70	Surplus	0.66	Surplus	0.79	Surplus
Vermont	0.19	Surplus	0.21	Surplus	0.20	Surplus	0.25	Surplus
Virginia	0.93	Sufficient	0.99	Sufficient	0.96	Sufficient	1.07	Sufficient
Washington	1.14	Shortage	1.22	Shortage	1.17	Shortage	1.32	Shortage
West Virginia	0.92	Sufficient	0.97	Sufficient	0.95	Sufficient	1.05	Sufficient
Wisconsin	0.41	Surplus	0.44	Surplus	0.43	Surplus	0.47	Surplus
Wyoming	0.42	Surplus	0.47	Surplus	0.44	Surplus	0.53	Surplus

[a] Surplus parking: demand-to-supply ratio is less than 0.9; sufficient parking: demand-to-supply ratio of 0.9 through 1.1; shortage of parking: demand-to-supply ratio of greater than 1.1.

[b] The demand/supply ratio for non-public parking demand/supply ratio was not evaluated for Alaska. Hawaii is not included in the FHWA study.

Exhibit B-8. Parking Adequacy for States Experiencing a Shortage of Truck Parking (Category 1) under One or More Alternatives

	Alternative 1: No Action			Alternative 2				Alternative 3				Alternative 4			
State	Total Existing Spaces	Total Peak-hour Demand	Adequacy Category[a]	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply
California	8,602	19,722	Shortage	21,125	Shortage	1,403	2.46	20,401	Shortage	679	2.37	22,934	Shortage	3,212	2.67
Colorado	2,877	3,306	Shortage	3,699	Shortage	393	1.29	3,496	Shortage	190	1.22	4,205	Shortage	899	1.46
Connecticut	1,604	2,676	Shortage	3,049	Shortage	373	1.90	2,856	Shortage	180	1.78	3,530	Shortage	854	2.20
Delaware	394	900	Shortage	1,026	Shortage	126	2.60	961	Shortage	61	2.44	1,187	Shortage	287	3.01
Idaho	2,212	3,196	Shortage	3,576	Shortage	380	1.62	3,380	Shortage	184	1.53	4,065	Shortage	869	1.84
Illinois	10,869	14,510	Shortage	15,316	Shortage	806	1.41	14,900	Shortage	390	1.37	16,357	Shortage	1,847	1.50
Indiana	16,959	18,699	Shortage	19,738	Shortage	1,039	1.16	19,202	Shortage	503	1.13	21,079	Shortage	2,380	1.24
Kentucky	8,177	9,586	Shortage	10,183	Shortage	597	1.25	9,875	Shortage	289	1.21	10,953	Shortage	1,367	1.34
Maryland	2,585	2,575	Sufficient	2,934	Shortage	359	1.13	2,749	Sufficient	174	1.06	3,397	Shortage	822	1.31
Massachusetts	2,056	3,757	Shortage	4,281	Shortage	524	2.08	4,010	Shortage	253	1.95	4,956	Shortage	1,199	2.41
New York	8,227	7,835	Sufficient	8,927	Sufficient	1,092	1.09	8,363	Sufficient	528	1.02	10,336	Shortage	2,501	1.26
Ohio	12,876	14,360	Shortage	15,158	Shortage	798	1.18	14,746	Shortage	386	1.15	16,188	Shortage	1,828	1.26
Rhode Island	687	733	Sufficient	835	Shortage	102	1.22	782	Shortage	49	1.14	967	Shortage	234	1.41
Texas	24,179	36,102	Shortage	37,292	Shortage	1,190	1.54	36,678	Shortage	576	1.52	38,828	Shortage	2,726	1.61
Washington	3,118	3,539	Shortage	3,791	Shortage	252	1.22	3,661	Shortage	122	1.17	4,115	Shortage	576	1.32

[a] Sufficient parking: demand-to-supply ratio of 0.9 through 1.1; shortage of parking: demand-to-supply ratio of greater than 1.1.

Exhibit B-9. Parking Adequacy for States With a Current Surplus or Sufficient Truck Parking and a Projected Reduction to Sufficient Parking (Category 2) under One or More Alternatives

	Alternative 1: No Action			Alternative 2				Alternative 3				Alternative 4			
State	Total Existing Spaces	Total Peak-hour Demand	Adequacy Category[a]	Total Peak-hour Demand[a]	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply
Alabama	7,614	7,107	Sufficient	7,550	Sufficient	443	0.99	7,321	Sufficient	214	0.96	8,121	Sufficient	1,014	1.07
Arkansas	7,862	7,751	Sufficient	8,007	Sufficient	256	1.02	7,875	Sufficient	124	1.00	8,336	Sufficient	585	1.06
Florida	9,048	7,359	Surplus	7,817	Surplus	458	0.86	7,581	Surplus	222	0.84	8,409	Sufficient	1,050	0.93
Louisiana	9,380	8,970	Sufficient	9,266	Sufficient	296	0.99	9,113	Sufficient	143	0.97	9,648	Sufficient	678	1.03
Missouri	12,890	11,484	Surplus	12,122	Sufficient	638	0.94	11,793	Sufficient	309	0.91	12,946	Sufficient	1,462	1.00
New Mexico	6,400	5,301	Surplus	5,930	Sufficient	629	0.93	5,606	Surplus	305	0.88	6,743	Sufficient	1,442	1.05
Oregon	6,304	4,958	Surplus	5,311	Surplus	353	0.84	5,129	Surplus	171	0.81	5,766	Sufficient	808	0.91
Virginia	8,265	7,704	Sufficient	8,184	Sufficient	480	0.99	7,936	Sufficient	232	0.96	8,803	Sufficient	1,099	1.07
West Virginia	2,223	2,040	Sufficient	2,167	Sufficient	127	0.97	2,102	Sufficient	62	0.95	2,331	Sufficient	291	1.05

[a] Surplus parking: demand-to-supply ratio is less than 0.9; sufficient parking: demand-to-supply ratio of 0.9 through 1.1.

Exhibit B-10. Parking Adequacy for States With a Current Surplus of Truck Parking (Category 3) Under All Alternatives

State	Alternative 1: No Action				Alternative 2				Alternative 3				Alternative 4			
	Total Existing Spaces	Total Peak-hour Demand	Adequacy Category[a]	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply
Alaska	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A	
Arizona	8,699	4,575	Surplus	0.53	5,118	Surplus	543	0.59	4,838	Surplus	263	0.56	5,819	Surplus	1,244	0.67
Georgia	12,637	9,512	Surplus	0.75	10,105	Surplus	593	0.80	9,799	Surplus	287	0.78	10,869	Surplus	1,357	0.86
Hawaii	N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A		N/A	N/A	N/A	
Iowa	6,013	2,990	Surplus	0.50	3,156	Surplus	166	0.52	3,070	Surplus	80	0.51	3,371	Surplus	381	0.56
Kansas	4,838	2,473	Surplus	0.51	2,767	Surplus	294	0.57	2,615	Surplus	142	0.54	3,146	Surplus	673	0.65
Maine	1,361	896	Surplus	0.66	1,021	Surplus	125	0.75	956	Surplus	60	0.70	1,182	Surplus	286	0.87
Michigan	7,717	5,537	Surplus	0.72	5,845	Surplus	308	0.76	5,686	Surplus	149	0.74	6,242	Surplus	705	0.81
Minnesota	5,039	3,797	Surplus	0.75	4,008	Surplus	211	0.80	3,899	Surplus	102	0.77	4,280	Surplus	483	0.85
Mississippi	7,431	5,448	Surplus	0.73	5,787	Surplus	339	0.78	5,612	Surplus	164	0.76	6,225	Surplus	777	0.84
Montana	3,477	2,012	Surplus	0.58	2,251	Surplus	239	0.65	2,128	Surplus	116	0.61	2,559	Surplus	547	0.74
Nebraska	3,098	1,088	Surplus	0.35	1,217	Surplus	129	0.39	1,150	Surplus	62	0.37	1,384	Surplus	296	0.45
Nevada	5,239	2,967	Surplus	0.57	3,178	Surplus	211	0.61	3,069	Surplus	102	0.59	3,450	Surplus	483	0.66
New Hampshire	783	315	Surplus	0.40	359	Surplus	44	0.46	336	Surplus	21	0.43	416	Surplus	101	0.53
New Jersey	4,397	1,985	Surplus	0.45	2,262	Surplus	277	0.51	2,119	Surplus	134	0.48	2,619	Surplus	634	0.60
North Carolina	7,965	5,532	Surplus	0.69	5,877	Surplus	345	0.74	5,699	Surplus	167	0.72	6,321	Surplus	789	0.79
North Dakota	2,299	823	Surplus	0.36	921	Surplus	98	0.40	870	Surplus	47	0.38	1,047	Surplus	224	0.46
Oklahoma	10,399	4,688	Surplus	0.45	4,843	Surplus	155	0.47	4,763	Surplus	75	0.46	5,042	Surplus	354	0.48

Exhibit B-10. Parking Adequacy for States With a Current Surplus of Truck Parking (Category 3) Under All Alternatives

State	Alternative 1: No Action				Alternative 2				Alternative 3				Alternative 4			
	Total Existing Spaces	Total Peak-hour Demand	Adequacy Category[a]	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply	Total Peak-hour Demand	Adequacy Category[a]	Incre-mental Demand	Demand / Supply
Pennsyl-vania	15,800	10,263	Surplus	0.65	11,693	Surplus	1430	0.74	10,955	Surplus	692	0.69	13,539	Surplus	3276	0.86
South Carolina	9,331	5,501	Surplus	0.59	5,844	Surplus	343	0.63	5,667	Surplus	166	0.61	6,286	Surplus	785	0.67
South Dakota	1,702	865	Surplus	0.51	968	Surplus	103	0.57	915	Surplus	50	0.54	1,100	Surplus	235	0.65
Tennessee	7,186	5,287	Surplus	0.74	5,616	Surplus	329	0.78	5,446	Surplus	159	0.76	6,041	Surplus	754	0.84
Utah	2,726	1,698	Surplus	0.62	1,900	Surplus	202	0.70	1,795	Surplus	97	0.66	2,160	Surplus	462	0.79
Vermont	627	118	Surplus	0.19	134	Surplus	16	0.21	126	Surplus	62	0.20	156	Surplus	38	0.25
Wisconsin	6,623	2,748	Surplus	0.41	2,901	Surplus	153	0.44	2,822	Surplus	74	0.43	3,098	Surplus	350	0.47
Wyoming	4,598	1,915	Surplus	0.42	2,142	Surplus	227	0.47	2,025	Surplus	110	0.44	2,436	Surplus	521	0.53

[a] Surplus parking: demand-to-supply ratio is less than 0.9.

B.4. LAND AREA NEEDED TO PROVIDE ADDITIONAL PARKING

FMCSA analyzed the land area that would be needed to satisfy the increased parking demand under Alternatives 2, 3, and 4 as compared to the No Action Alternative. FMCSA assumed that an alternative would not induce construction of additional parking facilities in States where the projected parking supply is either sufficient or in surplus. FMCSA also assumed for the purposes of the land area analysis that States or commercial establishments in States with a shortage of parking spaces would construct additional parking facilities to meet all of the increased demand. This assumption is believed to be conservative (i.e., overstates the effect) because existing shortages are not being addressed in those States that would experience shortages under Alternatives 2, 3, and 4.

Table B-11 summarizes the potential land area that would be needed to satisfy the increased parking demand in the States experiencing a shortage, assuming an average of 18 parking spaces per acre (NATSO, 2001). Under Alternative 2, 458 acres would be required to satisfy the additional parking demand in the 13 States that would experience shortages. Under Alternative 3, 215 acres would be needed to satisfy the additional parking demand in the 13 States that would experience shortages. Under Alternative 4, under which 15 States would experience shortages, 1,200 acres would be needed to satisfy the increased demand.

Exhibit B-11. Number and Acreage of Additional Highway Truck Parking Spaces Needed for Alternatives for States With Existing Shortages of Parking Spaces

	Alternative 1: No Action		Alternative 2		Alternative 3		Alternative 4	
State	Increased Demand (spaces)	Area (acres)	Increased Demand (spaces)	Area (acres)	Increased Demand (spaces)	Area (acres)	Increased Demand (spaces)	Area (acres)
California	–	–	1,403	77.92	679	37.70	3,212	178.46
Colorado	–	–	393	21.81	190	10.55	899	49.94
Connecticut	–	–	373	20.72	180	10.02	854	47.45
Delaware	–	–	126	6.97	61	3.37	287	15.97
Idaho	–	–	380	21.08	184	10.20	869	48.29
Illinois	–	–	806	44.80	390	21.67	1,847	102.61
Indiana	–	–	1,039	57.74	503	27.93	2,380	132.25
Kentucky	–	–	597	33.17	289	16.05	1,367	75.97
Maryland	–	–	359	19.94	–	–	822	45.67
Massachusetts	–	–	524	29.10	253	14.08	1,199	66.64
New York	–	–	–	–	–	–	2,501	138.96
Ohio	–	–	798	44.34	386	21.45	1,828	101.56
Rhode Island	–	–	–	–	49	2.75	234	13.02
Texas	–	–	1,190	66.12	576	31.99	2,726	151.43
Washington	–	–	252	13.98	122	6.76	576	32.02
TOTAL	**–**	**–**	**8,238**	**457.69**	**3,861**	**214.53**	**21,604**	**1,200.24**

B.5. REFERENCES

FHWA (Federal Highway Administration). 2002. Report to Congress: Study of Adequacy of Commercial Truck Parking Facilities – Final Technical Report. Prepared for: FHWA, Turner-Fairbank Highway Research Center, McLean, VA. June.

FMCSA (Federal Motor Carrier Safety Administration). 2010. 2010 Hours of Service Rules Regulatory Impact Analysis.

NATSO (National Association of Truck Stop Owners). 2001. Truck Parking Solutions. Available on-line at:
http://www.natso.com/for_members/government_downloads/truckparking_solutions2001.doc

Appendix C – Statement of Energy Effects for FMCSA Hours of Service Proposed Rule

December 2010

Appendix C. Statement of Energy Effects for FMCSA Hours of Service Proposed Rule

Executive Order 13211 of May 18, 2001, requires preparation of a Statement of Energy Effects in certain circumstances. The Statement is intended to provide additional information to decision-makers and discussants on the potential effects of certain regulatory actions on energy supply, distribution, or use. The Statement is required for rules determined to be a "significant energy action," defined as those "likely to have a significant adverse effect on the supply, distribution, or use of energy" or that are "designated by the Administrator of the Office of Information and Regulatory Affairs (OIRA) [at the Office of Management and Budget (OMB)] as a significant energy action.[1]"

The Federal Motor Carrier Safety Administration's (FMCSA) proposed rule (Alternatives 2 or 3 in this environmental assessment) would limit drivers to 10 or 11 hours of driving time (rather than the current 11 hours) within a period of 14 consecutive hours from the start of the duty tour, between periods of at least 10 hours off duty. The driving window would routinely be 14 hours, but could be extended to 16 hours twice a week. Duty time in the driving window would be limited to 13 hours. Drivers would be allowed to be on duty for 7 consecutive hours without a break; after 7 hours, drivers would not be allowed to drive unless they had taken an off-duty period of at least a half hour in the previous 7 hours. A period of 34 hours off duty (a "restart break") resets the count of hours. The current 34-hour restart provision would be retained, subject to two limits: (1) the restart break must include two periods between midnight and 6 a.m., and (2) a driver may begin another 34-hour off duty period no sooner than 168 hours after the beginning of the previously designated restart. The driver must designate whether any period of 34 hours off duty is to be considered a restart. The sleeper berth exemption would not be altered, but would be affected by the other provisions. The definition of "on duty" would be revised to allow some time spent in or on the truck to be logged as off duty. The proposed rule would provide flexibility for drivers to take breaks when needed while limiting the hours worked to reduce fatigue and the health impacts associated with long hours.

This proposed rule appears to satisfy the criteria for classification as a "significant energy action" based on supplemental guidance from OMB. Specifically, Alternative 2, Alternative 3, and Alternative 4 under consideration might result in changes in the demand for diesel fuel that exceed the 4,000 barrels-per-day threshold and could have a minor impact on U.S. diesel fuel prices.[2] No other energy criteria appear to be affected by the action alternatives. FMCSA is submitting this Statement of Energy Effects based on this determination, although OIRA has not formally designated the issuance of the Final Rule as a "significant energy action" at this time.

FMCSA has submitted a 2010 Hours-of-Service Regulatory Impact Analysis (RIA) and this environmental assessment, which address Alternative 1 (No Action), Alternative 2, Alternative 3, and Alternative 4. The results of these analyses provided for summary-level data on the change in diesel fuel consumption between the No Action Alternative and Alternatives 2, 3, and

1 This determination of "significant" is different than a determination under NEPA of significance to perform mitigation or additional analysis.

2 This represents a combination of criterion #6 and, subsequently, #2 in the OMB guidance.

4. FMCSA considered the No Action Alternative and Alternatives 2, 3, and 4 in conducting its analysis (summarized in the RIA and the environmental assessment), which satisfies the requirement that the Statement of Energy Effects examine "reasonable alternatives."

The findings presented below are based on the outcomes of the RIA associated with the 2010 HOS rulemaking alternatives and on this environmental assessment analysis. These two analyses considered vehicle-miles traveled (VMT) and vehicle hours idling (VHI) by combination and single-unit long-haul trucks, change in VMT and VHI of drayage trucks, and change in ton-miles of freight transported by rail locomotives as a result of anticipated shifts in freight transport from truck to rail in response to changes in the prices of trucking activity caused by the rule.

Fuel consumption was calculated for long-haul trucks and drayage trucks, while traveling and idling, using the U.S. Environmental Protection Agency's Motor Vehicle Emission Simulator (MOVES2010) model. The MOVES model outputs the energy usage per mile traveled (or hour idled). This output was converted to calculate the fuel consumption per mile traveled (or hour idled) using the energy density of diesel fuel.

The MOVES model independently models combination and single-unit long-haul truck types. To calculate average energy consumption for long-haul trucks (combination and single-unit vehicles), energy consumption for combination and single-unit vehicles was weighted relative to the fraction of total miles traveled (and fraction of total hours idled) by each vehicle type in the MOVES model run. The same was done to calculate short-haul (drayage) truck emission factors.

Exhibit C-1 shows the anticipated direct impacts of Alternatives 1, 2, 3, and 4 on the demand for diesel fuel in gallons, barrels of diesel fuel, and million British thermal units (MMBtu) of energy, as estimated by this environmental assessment. The demand is based on the estimated changes in VMT and VHI that would result from implementation of Alternatives 2, 3, or 4, as compared to the No Action Alternative, and the fuel consumption rate for long-haul trucks and drayage trucks while traveling or idling, and for rail locomotives. Exhibit C-1 also shows the change in energy consumption for Alternatives 2, 3, and 4 based on 2007 data, relative to Alternative 1.

Exhibit C-1. Change in Annual Transportation Diesel Fuel Consumption by Hours-of-Service Alternative

Energy Consumption Impacts	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4
Actual Energy Consumption				
Energy Consumption, Diesel Fuel, Gallons	28,426,919,629	28,387,646,027	28,399,596,037	28,355,468,209
Energy Consumption, Diesel Fuel, Barrels	676,831,420	675,896,334	676,180,858	675,130,195
Energy Consumption, MMBtu	3,951,341,828	3,945,882,798	3,947,543,849	3,941,410,081
Change in Energy Consumption Compared to No Action Alternative				
Energy Consumption, Diesel Fuel, Gallons	–	-39,273,603	-27,323,592	-71,451,421

Exhibit C-1. Change in Annual Transportation Diesel Fuel Consumption by Hours-of-Service Alternative

Energy Consumption Impacts	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4
Energy Consumption, Diesel Fuel, Barrels	–	-935,086	-650,562	-1,701,224
Energy Consumption, MMBtu	–	-5,459,031	-3,797,979	-9,931,747
Average Percent Change in Energy Consumption	–	-0.14%	-0.10%	-0.25%

Notes: MMBtu = million British thermal units

The changes in the demand for diesel fuel relative to the No Action Alternative could have an impact on fuel prices. Any change in price is expected to be relatively minor, however, given the change in demand for diesel fuel at the national level that is not analyzed in this Statement of Energy Effects. The analysis assumed that the price elasticity of diesel fuel demand is relatively small.

Appendix D – Exposure to Diesel Exhaust

December 2010

Appendix D. **Exposure to Diesel Exhaust**

The Environmental Protection Agency's (EPA) *Health Assessment Document for Diesel Engine Exhaust* (2002) concluded that "long-term (i.e., chronic) inhalation exposure is likely to pose a lung cancer hazard to humans, as well as damage to the lung in other ways depending on exposure" [EPA (2002), Abstract, p. ii].

Diesel particulate matter (DPM) is a mixture of hundreds of gases and particles, the composition of which varies with the type of engine generating the emissions, the engine operating conditions, and the fuel formulation. Some of the components of DPM are known carcinogens (e.g., benzene) and others are mutagenic or toxic. Particles from diesel engines, which comprise about 6 percent of the total ambient particulate matter having an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), are highly respirable, and can reach the deep lung. EPA has not formally declared DPM to be a carcinogen, however, for several reasons discussed below.

Dose-response curves are the classic means of measuring exposure effects. A curve is typically established in a laboratory. Very high doses are administered over a relatively short period, and the physiological response is measured. A dose-response curve is assumed to be a straight line, which can be extended to the lower exposures typical of ambient conditions outside the laboratory. If the physiological response decreases disproportionately when exposure is reduced, that is, the dose-response curve is not a straight line, the curve will overstate the effect of ambient exposure by some unknown amount. In such cases, long-term population studies might be an alternative, provided long-term exposure could be established.

Attempts to establish a dose-response curve for DPM have not produced clear-cut results. In animal studies, rats develop lung tumors after lifetime inhalation of DPM at exposures vastly higher than any ambient condition, but these cancers appear to be at least partially the result of particle overload, which prevents lung clearance and causes chronic inflammation and subsequent lung disease. Chronic inhalation studies in mice show equivocal results, and hamsters do not develop cancer [Bunn et al. (2002), p. S126; EPA (2002), pg. 7-139]. EPA therefore concluded that "the rat lung tumor response is not considered relevant to an evaluation of the potential for a human environmental exposure-related hazard" [EPA (2002), p. 7-139]. EPA further noted that "[t]he gaseous phase of DPM (filtered exhaust without particulate fraction) was found not to be carcinogenic in rats, mice, or hamsters" [*Id*.].

Although EPA has declared DPM to be a "probable human carcinogen," based in part on a review of 22 epidemiologic studies of workers exposed to DPM in various occupations, EPA also noted that "increased lung cancer relative risks generally range from 1.2 to 1.5, although a few studies show relative risks as high as 2.6. Statistically significant increases in pooled relative risk estimates (1.33 to 1.47) from two independent meta-analyses further support a positive relationship between DPM exposure and lung cancer in a variety of diesel emissions (DE)-exposed occupations. The generally small increase in lung cancer relative risk (less than 2) observed in the epidemiologic studies and meta-analyses tends to weaken the evidence of causality. When a relative risk is less than 2, if confounding factors (e.g., smoking, asbestos exposure) are having an effect on the observed risk increases, they could be enough to account for the increased risk" [EPA (2002), pp. 7-138 and 7-139]. Overall, the evidence is not sufficient for DPM to be considered a proven human carcinogen because of exposure uncertainties (lack of historical exposure data for workers exposed to diesel exhaust) and an inability to reach a full and direct accounting for all possible confounders [*Id.*, pp. 7-138 and 7-139].

The actual cancer risk involved in operating a diesel-engine truck depends on the degree and duration of exposure to diesel exhaust, and especially to smaller particulate matter ($PM_{2.5}$). Information on the real-world DPM exposure of truck drivers is limited by many uncertainties. Because trucks are in motion much of the time, the exposure levels of various highway, municipal, and regional environments must be collected and combined to obtain an accurate measure of exposure. Truck idling time at terminals, in traffic jams, or while drivers are using a sleeper berth presumably generates higher exposure than does highway driving, but estimating the possible combinations of conditions for a large population of drivers is difficult. Furthermore, because of the long latency period of most cancers, the extent of the risk to truck drivers depends on the length of their exposure. In turn, factors that have existed for several decades influenced this risk: engine design, formulation of diesel fuel, prevalence of smoking among driver populations, total particulate levels from all sources, and other factors. In most cases, data on these factors are less available for previous decades than are comparable data on these factors today. Nor can one project previous (assumed) conditions forward or current conditions backward; the state of scientific knowledge about DPM exposure levels and health effects has changed drastically over the past few decades and continues to evolve rapidly. Average emission rates of DPM from vehicles are declining as older, higher emitting vehicles are retired and replaced with newer, lower emitting ones. As a result, the most recent EPA diesel engine emissions standards apply to an increasing proportion of the national vehicle fleet. Also, given EPA initiatives to reduce truck idling and Federal financing available for idle-reduction programs, the Federal Motor Carrier Safety Administration (FMCSA) expects additional reductions in the future in exposure of commercial motor vehicle (CMV) drivers to diesel exhaust.

A potential exposure effect of a feature of confirming via final rule certain provisions of the hours-of-service (HOS) regulations readopted in the 2007 interim final rule and retained in the 2010 proposed rule is useful to examine; specifically, the availability of additional driving and on-duty hours through the use of the 34-hour restart break provision. The restart break would include two periods between midnight and 6 a.m., and a driver would begin another 34-hour off-duty period no sooner than 168 hours after the beginning of the previously designated restart. To examine the effect on driver work hours, FMCSA compared an earlier survey of drivers operating under the pre-2003 rule (451 respondents) with a 2005 survey (489 respondents). In 2000, a 7-day workweek consisted of, on average (driving and on-duty time), 7 approximately 9.2-hour days [Campbell and Belzer (2000), pg. 104]. In 2005, the average driver worked 8.7 hours per day. In the 2010 HOS rule, this daily on-duty hour average was multiplied by 7 days to arrive at average weekly on-duty hours (driving and on-duty time) of just over 60 hours [FMCSA Field HOS Survey (2005)].

At the annual meeting of the Transportation Research Board in Washington, D.C. in January 2005, Schneider National, a large motor carrier, provided a distribution of the weekly (8-day period) on-duty hours for its drivers (available in the docket for the 2007 rule). The data show that Schneider's employee drivers averaged 62 hours on duty per 8-day period and its leased drivers averaged 65 hours on duty per 8-day period. In addition, J.B. Hunt, another large motor carrier, in comments submitted for the Notice of Proposed Rulemaking, reviewed the work records of 80 randomly selected over-the-road drivers for a 30-day period. J.B. Hunt found that 74 percent of its drivers used the 34-hour restart at least once during the 30-day period. On average, J.B. Hunt's drivers accumulated 62.25 hours on duty per 8-day period. These data, although not representative of the industry overall, provide some indication of the hours worked as a result of the 2003 rule.

FMCSA identified and reviewed four studies that address the issue of hours of work and duration of DPM exposure in transportation workers. A large case-control study in Germany found significant associations between lung cancer and employment as a professional driver. The risk reached statistical significance for exposures longer than 30 years [Brüske-Hohlfeld et al. (1999), p. 405]. An exposure response analysis and risk assessment of lung cancer and DPM found a 1- to 2-percent increased lifetime risk of lung cancer above a background risk of 5 percent among workers in the trucking industry, based on historical extrapolation of elemental carbon levels [Steenland et al. (1998), p. 220]. A large case-control study of bus and tramway drivers in Copenhagen found a negative association between lung cancer and increased years of employment [Soll-Johanning et al. (2003), p. 25]. Finally, a meta-analysis of 29 studies addressing occupational exposure to DPM and lung cancer showed, of the 23 studies meeting the inclusion criteria, 21 observed relative risk estimates greater than 1 (probability of a CMV driver developing lung cancer divided by the probability of the control group developing lung cancer). All studies that quantified exposure noted a positive duration response [Bhatia et al. (1998), p. 84].

Several studies have shown an association between truck driving and bladder cancer. FMCSA reviewed three studies that addressed the association between duration of exposure to DPM and bladder cancer. A population-based case-control study in New Hampshire found a positive association between bladder cancer and tractor-trailer driving and a positive trend with duration of employment [Colt et al. (2004), p. 759]. A large study in Finland found increased standard incidence ratios for six types of cancer in truck drivers. Cumulative exposure to DPM was negatively associated with all cancers, except ovarian cancer in women with high cumulative exposure [Guo et al. 2004, p. 286]. A meta-analysis of 29 studies on bladder cancer and truck driving found an overall significant association between "high" exposure to DPM and bladder cancer, as well as a dose-response trend. The authors concluded that DPM exposure could result in bladder cancer, but the effects of misclassification, publication bias, and confounding variables could not be fully taken into account [Boffetta & Silverman (2001), p. 125].

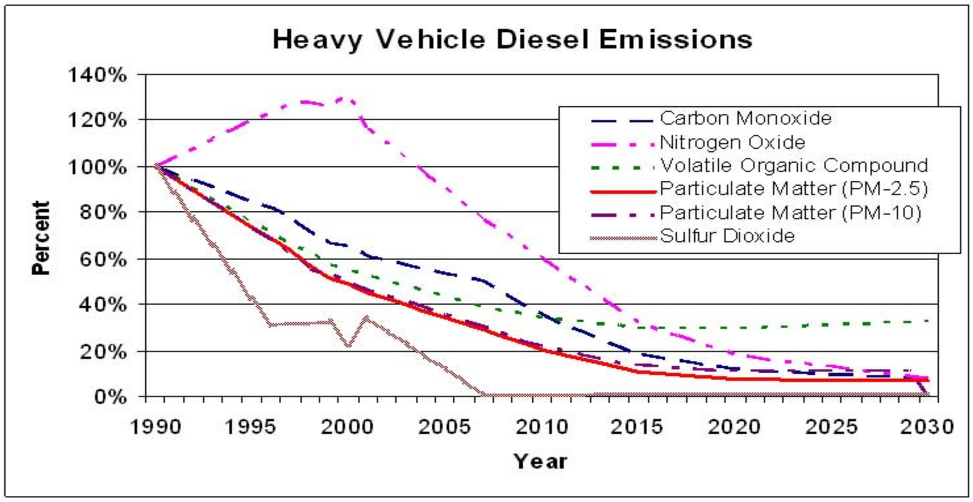
The World Health Organization and the U.S. Department of Health and Human Services' National Toxicology Program consider DPM a "probable" carcinogen because of the number of studies showing an association. Because of the complexity of proving a definitive link between DPM and cancer, no organization, other than the California EPA, has classified DPM as a known carcinogen [Garshick et al. (2003), p. 17]. Study results have a great degree of uncertainty due to study design and exposure assumptions, measurement issues, and synergistic effects of various pollutants, among other variables [Bailey et al. (2003), p. 92]. Excluding rats, animal studies are overall negative with regard to lung tumor formation following DPM exposure. In rats, lifetime inhalation exposure to many different particle types produces lung tumors. These exposures are characterized as "lung overload;" however, numerous analyses point to a lack of relevance of data from lung-overloaded rats to human risk calculations, particularly at environmental or ambient levels [Bunn et al. (2002), p. S122]. As noted earlier, EPA's risk assessment on DPM based on long-term (chronic) exposure concludes that DPM is “likely to be carcinogenic to humans by inhalation.” Studies show a causal relationship between exposure to DPM and lung cancer, but EPA has not concluded that DPM is a human carcinogen and cannot develop a quantitative dose-response cancer risk. The rat inhalation studies underpinning these findings resulted from overloading DPM and are unrealistic exposure scenarios for humans [Ris (2003), p. 35].

The acute (short-term) effects of DPM to determine safe exposure levels are not currently known [Ris (2003), p. 35]. Also, insufficient human test data are available to conduct a definitive risk assessment on the chronic long-term respiratory effects of diesel exhaust. Tests on animals, however, suggest chronic respiratory problems exist [Ris (2003), p. 35]. Cleaner burning diesel fuel standards (2006) combined with cleaner diesel engine technologies from more stringent emission standards (2007) were projected to generate a net reduction in pollutant emissions, despite growth in diesel use [Sawyer (2003), p. 39].

EPA models project on a national basis the amount of emissions or pollutants expected annually from all mobile sources. These projections are based on estimates of vehicle-miles traveled and new vehicles entering and old vehicles leaving the inventory, and they reflect changes in vehicle emissions standards. The models project the emissions for the following pollutants: carbon monoxide, oxides of nitrogen, volatile organic compounds, particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), particulate matter less than 10 microns in diameter (PM_{10}), and sulfur dioxide. In addition, air toxics from on-road sources are also available from EPA’s National Emission Inventory (NEI), including acetaldehyde, acrolein, benzene, 1,3-butadiene, DPM, and formaldehyde. EPA estimates show that vehicle emissions from all mobile sources have declined significantly from 1990 to 2005 (average 35% reduction in emissions) and are projected to decline further until 2030 (average 55% reduction in emissions). DPM from heavy vehicles represents about 23 percent of all emissions from mobile sources. DPM from heavy vehicles has also declined from 1990 to 2005 (average 55% reduction in emissions) and is projected to decline further until 2030 (average 88% reduction in emissions). Exhibit D-1 shows the projections of heavy-vehicle diesel emissions from the on-the-road fleet by pollutant from 1990 to 2030. Mobile-source emission inventories were directly modeled for 2001, 2007, 2010, 2015, 2020, and 2030. Emissions for other years were obtained by linear interpolation.

If diesel or all engine emissions are in fact carcinogenic (not yet proven), then the risk of developing cancer is a function of both the amount of DPM being inhaled and the cumulative exposure to DPM over time. Based on EPA emission projections of lower emissions from on-the-road heavy vehicles, continued reduction in health impacts can be expected.

Chronic (long-term) exposure to DPM might cause cancer. The exposure/dose required, however, is currently unknown due to the extreme difficulty in measuring and modeling exposure. EPA has noted great “uncertainty regarding whether the health hazards identified from previous studies using emissions from older engines can be applied to present-day environmental emissions and related exposures, as some physical and chemical characteristics of the emissions from certain sources have changed over time. Available data are not sufficient to provide definitive answers to this question because changes in DPM composition over time cannot be confidently quantified, and the relationship between the DPM components and the mode(s) of action for DPM toxicity is unclear” [Ris (2003), p. 35].



Source of Data: EPA National Mobile Inventory Model

Exhibit D-1. Heavy-vehicle diesel emissions.

Garshick's effort to quantify lung cancer risk in the trucking industry through an epidemiological study using some 72,000 subjects [Garshick et al. (2002), p. 115] might address some of these uncertainties. At this time, however, according to EPA, the National Institute for Occupational Safety and Health, the Centers for Disease Control and Prevention, and the National Institute of Health, evidence to declare DPM a carcinogen is insufficient. Nonetheless, EPA's finding that DPM is a probable carcinogen is a cause for concern. EPA therefore adopted new diesel engine performance requirements and by 2007 required refiners to produce low-sulfur fuel [66 FR 5002, January 18, 2001]. EPA's previous and forthcoming regulatory changes lead to a projection of dramatically lower DPM through 2030, which would greatly reduce any health effects of DPM exposure.

Still, the question remains whether the 2010 HOS proposed rule, regarding exposure to diesel emissions, ensures that "the operation of commercial motor vehicles does not have a deleterious effect on the physical condition" of CMV drivers [49 U.S.C. 31136(a)(4)]. FMCSA has concluded there is no evidence such operation has a deleterious effect. By drawing this conclusion, FMCSA does not meant to deny the possibility that DPM could have some impact on the health of truck drivers. The Agency, however, cannot prudently address a problem without data on its extent and severity. The data on exposure to DPM are notoriously deficient. As Garshick and colleagues noted, "[t]he ideal marker of DPM exposure would be a single marker that would be inexpensive, easy to measure, and clearly linked to the source of diesel emissions. However, the reality is that DPM is a complex mixture, and in many real-life scenarios it may not be the only important source of exposure to the individual particles and gases that constitute DE [diesel exhaust]. In addition, the mechanism of the health effects and specific causal agents are uncertain. The best diesel exposure marker is likely to be more complex and involve the measurements of molecular organic tracers and elemental carbon. The nature of the exposure assessment and marker chosen may also depend on mechanism of health effect postulated, and may include measurement of exhaust gases (such as ozone and nitrogen oxide) in the setting of nonmalignant respiratory diseases. Although current literature identifies DPM as a health hazard, insight into a dose-response relationship is limited by factors related to both cohort selection and exposure assessment. The development of an exposure model in the existing DPM epidemiologic literature is hindered by a lack of exposure measurements upon which an exposure model can be developed, uncertainty regarding the best measurement or marker(s) indicative of exposure, and uncertainty regarding historical exposures" [Garshick et al. (2003), p. 21].

One of the best works to date on diesel exhaust, lung cancer, and truck driving is a series of studies by Steenland and his colleagues published between 1990 and 1998. The abstract of the 1998 study (Steenland et al. 1998) concludes that, "[r]egardless of assumptions about past exposure, all analyses resulted in significant positive trends in lung cancer risk with increasing cumulative exposure. A male truck driver exposed to 5 micrograms/m^3 of elemental carbon (a typical exposure in 1990, approximately five times urban background levels) would have a lifetime excess risk of lung cancer of 1-2 percent above a background risk of 5 percent." The difference between 1 percent and 2 percent is obviously quite large, but the absence of a dose-response curve for DPM and uncertainties in the exposure data make greater precision impossible.

In 1999, however, the Health Effects Institute (HEI), a non-profit corporation chartered in 1980 to assess the health effects of pollutants generated by motor vehicles and other sources, and supported jointly by EPA and industry, found significant flaws even in the 1998 Steenland study. As summarized by Bunn and colleagues [Bunn et al. (2002), p. S127], HEI found that the Steenland study "quite likely suffers from an inadequate latency period, making it completely unsuitable for reaching any qualitative or quantitative conclusions about the link between DPM exposure and lung cancer." Furthermore, the workers in the study were exposed to an inseparable mix of gasoline and diesel fumes. "Indeed, during the 1960s (the critical years of the Steenland study from a latency perspective), diesel fuel represented only 4–7 percent of the total fuel sales (cars and trucks). Moreover, in the 1960s, gasoline-fueled vehicles had no after-treatment, so that emissions from gasoline-fueled vehicles likely would have been comparable to those from diesel vehicles" (*Id*).

A January 2010 study by HEI concluded that the exposure zone for vehicle emissions on a major roadway extends from 300 meters to 500 meters from the roadway. The study found suggestive but not conclusive evidence to support a causal relationship between exposure to traffic-related air pollution and several adverse health effects, including total and cardiovascular mortality (HEI 2010, p. 10).

Given the uncertain effects of exposure to diesel exhaust, FMCSA could not include this factor in any cost/benefit analysis for any regulatory change the Agency might wish to consider. Some changes are beyond FMCSA's authority. EPA has exclusive authority to set emission standards for new trucks, and the National Highway Traffic Safety Administration has comparable jurisdiction over equipment standards for new vehicles. FMCSA retains a degree of authority to order the retrofitting of safety equipment to vehicles already in service [see 49 CFR 1.73(g)], but what CMV equipment, if any, could be installed on the current fleet to reduce the driver's exposure to diesel exhaust is unclear. A driver's ability to open one or both side windows could defeat any air-cleaning technology that might be added to the tractor, and all drivers spend time outside the vehicle at terminals, truck stops, and other locations where exposure to DPM is unavoidable.

Another possible means of reducing drivers’ DPM exposure would be to curtail driving and on-duty time, or even to limit a driver’s career to a certain number of years, all in the interest of improved health. As indicated above, however, there is no dose-response curve for DPM and the Agency could not be sure that a given reduction in hours of driving or years of service would produce a clear benefit. Forced retirement after a certain number of years on the job is especially problematic. Nothing in the legislative history of 49 U.S.C. 31136(a)(4) indicates that Congress wanted FMCSA to protect the health of drivers by limiting their livelihood.

One of the benefits of the 2003 HOS rule was that it limited driver duty periods to 14 consecutive hours per day with no extensions for intervening off-duty periods. Under the pre-2003 rule, drivers were allowed a 15-hour duty period but could extend their maximum duty period indefinitely by taking off-duty time during their workday. This option perpetuated the problem of excessive waiting time for pick up and delivery of freight at shippers and receivers, because the drivers were expected to place themselves in off-duty status while waiting. A 1999 study of dry freight truckload carriers by the Truckload Carriers Association revealed that drivers spent nearly 7 hours waiting for each freight shipment that they picked up and delivered.

The 14-hour provision of the 2003 rule gave motor carriers greater leverage to insist that shippers and receivers reduce waiting time. At the 2005 Annual Meeting of the Transportation Research Board in January 2005, in Washington D.C., several large carriers stated that, as a result of the 14-hour rule, they were increasingly charging detention fees when shippers and receivers cause delays. Because of the 14-hour provision, shippers and receivers have had to improve the efficiency and productivity of their loading docks. Many drivers have commented that waiting time has been significantly reduced. Reduced waiting time has a positive impact on drivers. First, less waiting time reduces the total duty period for the driver and reduces unproductive and often uncompensated time. Second, Steenland et al. (1990) cited loading docks as having high levels of DPM. Thus, reduced waiting time reduces driver exposure to DPM and could have beneficial effects on driver health.

Diesel emissions have been falling steadily since the early 1990s and are projected to continue to decline for many years to come (see Exhibit D-1). To whatever unknown extent DPM might cause lung cancer, EPA’s long-range regulatory program is expected to reduce that risk. Three recent developments could accelerate that downward trend. The first is the cost of diesel fuel, which makes idling more expensive. The second is the spread of local regulations that limit CMV engine idling time. The third is the proliferation of truck-stop services available to drivers that eliminate idling by providing hot or cold air for the sleeper berth, cable TV, and Internet access through an attachment to the side window of the tractor. The expected reduction in engine idling in the next few years should amplify the human health and environmental benefits of EPA’s regulations. FMCSA has thus concluded that, although DPM probably entails some risk to drivers, adoption of the 2010 proposed rule neither causes nor exacerbates that risk.

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Appendix E – Public Notice

December 2010

APPENDIX E

PUBLIC NOTICE – ALL INTERESTED PARTIES

FMCSA'S ENVIRONMENTAL ASSESSMENT

THE 2010 DRAFT HOURS-OF-SERVICE (HOS) OF DRIVERS RULE

Docket No. FMCSA-2004-19608
RIN 2126-AB26

The FMCSA's environmental assessment (EA) was prepared in accordance with FMCSA's NEPA Implementing Procedures and Policy for Considering Environmental Impacts (FMCSA Order 5601.1) and complies with the National Environmental Policy Act of 1969 (P.L. 91-190) and the Council of Environmental Quality Regulations dated 28 November 1978 (40 CFR parts 1500-1508).

This environmental assessment serves as a concise public document to briefly provide sufficient evidence and analysis for determining the need to prepare an environmental impact statement or a finding of no significant impact (FONSI).

This environmental assessment concisely describes the action, the need for the action, the alternatives, and the environmental impacts of the action and alternatives. This environmental assessment also contains a comparative analysis of the preferred alternatives, and a list of the agencies and persons consulted during the EA preparation.

Date Michael M. Johnsen, Environmental Protection Specialist

Date Larry Minor, Associate Administrator, Office of Policy and Development

In reaching my decision/recommendation on the FMCSA's action, I have considered the information contained in this EA on the potential for environmental impacts.

Date Anne S. Ferro, Administrator for FMCSA