Agricultural Commodity and Utility Carriers Hours of Service Exemption Analysis

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

May 2010

FOREWORD

The purpose of this study was to assess the safety performance of agricultural commodity and utility service carriers that are exempt from the Federal Motor Carrier Safety Regulations regarding hours of service or record-of-duty-status requirements in comparison to those that are not exempt. The purpose of this report was to document the method, results, and conclusions from this study.

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16. Abstract

The study was conducted in two phases. Phase 1 compares the safety performance of agricultural and non-agricultural carriers for the period 2005 through 2008, and also examines two additional industries: livestock and utility carriers, whose operations were not exempt from Hours Of Service (HOS) regulations prior to the 2005 passage of SAFETEA-LU. The Phase 1 analysis used carrier registration, inspection, and crash data from the Motor Carrier Management Information System (MCMIS). Key findings were that, nationally, agricultural carriers operating within a 100-air-mile radius had lower crash rates per 100 power units than those operating beyond this radius, except for 2008, when there was no difference in the crash rates. Also, agricultural carriers exempt from HOS had higher out of service (OOS) and/or violation rates than non-exempt carriers for regulations pertaining to driver qualifications, vehicle maintenance, and improper loading and securement. For the Phase 2 analysis, inspection data of agricultural commodity and utility carriers was collected during an FMCSA special study of a sample of States. These data included only those inspections occurring during the States' planting and harvesting seasons. Key finding were that agricultural carriers in the survey operating beyond a 100-air-mile radius had a statistically higher driver OOS rate than those driving within a 100-air-mile radius, but those operating within a 100-air-mile radius had a statistically higher vehicle OOS rate. Also, agricultural carriers in the survey that were subject to the HOS requirements had higher crash rates per 100 power units than agricultural carriers that were exempt from the HOS requirements. Both Phase 1 and Phase 2 analyses have data limitations.

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SI* (MODERN METRIC) CONVERSION FACTORS

Table of APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
In	inches	25.4	millimeters	mm
Ft	feet	0.305	meters	m
Yd	yards	0.914	meters	m
Mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yards	0.836	square meters	m^2
Ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME	Note: Volumes greater than 1000 L shall be shown in m^3	
fl oz	fluid ounces	29.57	milliliters	mL
Gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		MASS		
Oz	ounces	28.35	grams	g
Lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE	temperature is in exact degrees	
°F	Fahrenheit	5 × (F-32) ÷ 9 or (F-32) ÷ 1.8	Celsius	°C
		ILLUMINATION		
Fc	foot-candles	10.76	lux	lx
Fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
		Force and Pressure or Stress		
Lbf	poundforce	4.45	Newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

Table of APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
Mm	millimeters	0.039	inches	in
M	meters	3.28	feet	ft
M	meters	1.09	yards	yd
Km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
Ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
G	grams	0.035	ounces	oz
Kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE	temperature is in exact degrees	
°C	Celsius	1.8C + 32	Fahrenheit	°F
		ILLUMINATION		
Lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
		Force & Pressure or Stress		
N	Newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in^2

* SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003, Section 508-accessible version September 2009)

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LIST OF ACRONYMS

Acronym	Definition
BASIC	Behavior Analysis Safety Improvement Category
CDL	commercial driver's license
CMV	commercial motor vehicle
CSA 2010	Comprehensive Safety Analysis 2010
CVSA	Commercial Vehicle Safety Alliance
FMCSA	Federal Motor Carrier Safety Administration
FMCSRs	Federal Motor Carrier Safety Regulations
HOS	hours of service
MCMIS	Motor Carrier Management Information System
MCS-50	Motor Carrier Identification Report
OOS	out of service
PRISM	Performance and Registration Information Systems Management
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

EXECUTIVE SUMMARY

PURPOSE

In recognition of the relatively local and seasonal nature of their operations, certain agricultural commodity carriers are exempt from the Federal Motor Carrier Safety Regulations (FMCSRs) regarding hours of service (HOS) or record-of-duty-status requirements when transporting agricultural commodities and farm supplies during the planting and harvesting seasons as defined by each State. The agriculture exemption, defined in section 4130(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), limits such transportation "to an area within a 100 air mile radius from the source of the commodities or the distribution point for the farm supplies." Similarly, utility service vehicle drivers who operate primarily within the service area of a utility's subscribers or consumers are also exempt from HOS or record-of-duty-status requirements, as defined by section 4132 of SAFETEA-LU. This analysis provides an examination of the safety impact of these HOS exemptions.

The study was conducted in two phases. Phase 1 compares the safety performance of agricultural and non-agricultural carriers for the period 2005 through 2008, and also examines two additional industries: livestock and utility carriers, whose operations were not exempt from HOS regulations prior to the 2005 passage of SAFETEA-LU. The Phase 1 analysis used carrier registration, inspection, and crash data from the Motor Carrier Management Information System (MCMIS). Cargo classification information on the Motor Carrier Identification Report (FMCSA Form MCS-150) in MCMIS was used to identify the carrier's industry group (agricultural, livestock, or utility carrier), and MCS-150 information was used to identify carriers operating within and beyond a 100-air-mile radius (Appendix A). The operating radius information was used to create two agricultural carrier subgroups: agricultural carriers with 100 percent of drivers operating within a 100-air-mile radius, and agricultural carriers with 100 percent of drivers operating beyond a 100-air-mile radius. The analysis used the first subgroup as representative of agricultural carriers exempt from the HOS requirements, and the second subgroup as representative of agricultural carriers not exempt from the HOS requirements.

For the Phase 2 analysis, inspection data of agricultural commodity and utility carriers were collected during an FMCSA special study of a sample of States. These data include only those inspections occurring during the States' planting and harvesting seasons and indicate both the commodity being transported and whether the driver was operating within or beyond the 100-air-mile radius exempt from HOS regulations. The Phase 2 analysis assessed the safety performance of the HOS-exempt agricultural commodity and utility service carriers identified in the survey in comparison with non-HOS-exempt carriers based on their out-of-service (OOS) violation rates and crash rates.

The Phase 1 analysis findings are as follows:

- Nationally, agricultural carriers operating during 2005–2008 within a 100-air-mile radius had lower crash rates per 100 power units than those operating beyond this radius, except for 2008, when there was no difference in the crash rates.

- Data from the 23 Performance and Registration Information Systems Management (PRISM) States that enforce MCS-150 updating, however, show that agricultural carriers operating within a 100-air-mile radius had more varied results, with crash rates in 2008 higher than carriers operating beyond a 100-air-mile radius, lower in 2006 and 2007, and nearly the same in 2005.
- Agricultural carriers overall had higher OOS and/or violation rates than non-agricultural carriers for FMCSRs addressing the safe operation of commercial motor vehicles (CMVs), driver qualifications, vehicle maintenance, and cargo loading and securement.
- Agricultural carriers exempt from HOS had higher OOS and/or violation rates than non-exempt agricultural carriers for regulations pertaining to driver qualifications, vehicle maintenance, and improper loading and securement.
- Nationally, utility carriers had higher crash rates after being granted the HOS exemption in SAFETEA-LU. Within the PRISM States, however, both utility and livestock carriers had higher crash rates in the "after" period.

The Phase 2 analysis findings are as follows:

- In the four States participating in the survey (Idaho, Kansas, Maryland, and Michigan), both driver and vehicle OOS rates for agricultural carriers were statistically no different from the corresponding OOS rates for all carriers in the respective States, with the exception of Idaho and Maryland where the agricultural carriers' vehicle OOS rates were higher than average for all carriers in those States.
- When data from the four States were combined, the overall agricultural carrier driver OOS rate was statistically higher than the national driver OOS rate, but the vehicle OOS rate was not.
- None of the surveyed States had utility carrier driver or vehicle OOS rates that statistically differed from their respective State average OOS rates. When the data were aggregated, the utility carrier driver and vehicle OOS rates were not statistically different from the national averages.
- Agricultural carriers in the survey operating beyond a 100-air-mile radius had a statistically higher driver OOS rate than those driving within a 100-air-mile radius, but those operating within a 100-air-mile radius had a statistically higher vehicle OOS rate.
- After removing the HOS-related OOS violations (which the "within 100-air-mile group" were exempted from) from the "beyond 100-air-mile group," there was no longer a statistical difference between the two groups in terms of driver OOS rates.
- Agricultural carriers in the survey that were subject to the HOS requirements had higher crash rates per 100 power units than agricultural carriers that were exempt from the HOS requirements.
- Utility carriers operating within a 100-air-mile radius showed no statistical difference in driver and vehicle OOS rates when compared to those operating beyond a 100-air-mile radius.

Both Phase 1 and Phase 2 have limitations in their analyses of the safety impacts of HOS exemptions. In Phase 1, carrier reported cargo information was used to identify agricultural carriers. Because carriers may select multiple cargo classifications, or no cargo classification, the analysis eliminated such carriers from consideration, resulting in exclusion of more than 25 percent of the carriers in MCMIS. Some of those excluded carriers might have transported agricultural commodities at least occasionally. Additionally, the MCMIS inspection and crash data do not account for whether a carrier's operations occurred during a State's official planting and harvesting season. Therefore, Phase 2 was initiated to analyze the inspection data on agricultural commodity and utility service carriers collected during an FMCSA special study of a sample of States. While the results would not be nationally representative, they were expected to supplement the Phase 1 findings and provide a clearer picture of any potential safety issues. Unfortunately, the number of participating States and the amount of data collected were less than what was called for in the Phase 2 study design, so the statistical analysis of safety impacts was affected. Given the small sample sizes (and large sampling errors associated with such sample sizes), many of the differences between the various groups examined were not found to be statistically significant.

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1. BACKGROUND

In recognition of the relatively local and seasonal nature of their operations, farmers and others in agriculture-related industries are exempt from the Federal Motor Carrier Safety Regulations (FMCSRs) regarding hours of service (HOS) and record-of-duty-status requirements when transporting agricultural commodities and farm supplies within a 100-air-mile radius from the source of the commodities or distribution point for the supplies during the planting and harvesting season determined by each State (see section 395.1(k) of Title 49 of the Code of Federal Regulations). Similarly, utility service vehicle drivers who operate commercial motor vehicles (CMVs) necessary for the delivery of public utility services, including the furnishing of electric, gas, water, sanitary, telephone, and television cable or community antenna service, primarily within the service area of a utility's subscribers or consumers except for any occasional emergency use, are also exempt from HOS and record-of-duty-status requirements (see section 395.1(n) of Title 49 of the Code of Federal Regulations). This analysis provides an examination of the safety impact of these HOS exemptions.

The study was conducted in two phases. Phase 1 compares the safety performance of agricultural and non-agricultural carriers for the period 2005–2008. Carriers and their type of operations were identified based on their registration information in the Motor Carrier Management Information System (MCMIS) census file. Because the HOS exemption is limited to transportation within a 100-air-mile radius, the analysis compares the safety performance of agricultural carriers who reported 100 percent of their drivers operating *within* a 100-air-mile radius (operations are exempt from HOS) to those who reported 100 percent of their drivers operating *beyond* a 100-air-mile radius (operations are non-exempt). Additionally, Phase 1 examines two industries—livestock and utility carriers—whose operations were not exempt from HOS regulations prior to the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). For these carrier groups, the analysis compares crash data for the periods before and after August 2005, when SAFETEA-LU was enacted. Finally, to provide additional validation of the crash analysis, which uses power unit data reported on the Form MCS-150, a separate analysis was performed using data only for carriers domiciled in states participating in the Performance and Registration Information Systems Management (PRISM) program that enforce MCS-150 updating. At the time of this report, the PRISM States that enforce the MCS-150 updating requirement are: Alabama, Arizona, Arkansas, Connecticut, Georgia, Iowa, Kentucky, Louisiana, Maine, Minnesota, Missouri, Nebraska, New Hampshire, New Mexico, North Carolina, Ohio, South Carolina, South Dakota, Tennessee, Utah, Vermont, Washington, and West Virginia. Carriers domiciled in these PRISM States are required to update their MCS-150 annually (Appendix A). As a result, PRISM State data are considered more current and reliable than non-PRISM State data where there are no direct consequences for not updating the data.

A key limitation of the Phase 1 analysis is the use of MCS-150 data to classify a carrier's operations as "agricultural," "non-agricultural," "livestock," or "utility," using commodity information. Because carriers may select multiple cargo classifications, or no cargo classification on the MCS-150, the analysis eliminated such carriers from consideration. This resulted in the exclusion of 25.97 percent of the carriers in MCMIS, some of which were likely to have carried agricultural commodities at least occasionally. Another limitation is the inability to determine whether a carrier's operations occurred during a State's official planting and harvesting season.

Therefore, a Phase 2 analysis was initiated to supplement the Phase 1 results by analyzing inspection data of agricultural commodity and utility carriers collected during a Federal Motor Carrier Safety Administration (FMCSA) special study of a sample of States (section 4.1). This data includes only those inspections occurring during the States' planting and harvesting seasons and indicates both the commodity being transported and whether the driver was operating within or beyond the 100-air-mile radius exempt from HOS regulations. The objective of Phase 2 was to assess the safety performance of the HOS exempt agricultural commodity and utility service carriers identified in the survey in comparison with non-HOS exempt carriers based on their out of service (OOS) violation rates and crash rates.

2. PHASE 1 METHODOLOGY

2.1 CARRIER COMMODITY GROUPS

This analysis groups motor carriers based on the cargo classifications and driver information on their MCS-150s as of the MCMIS snapshot on June 26, 2009.

MCS-150 Question 24 asks carriers to mark all cargo classifications that describe their operations. Carriers may select more than one classification. Using these cargo classifications, this analysis placed carriers into carrier commodity groups described below. Assumptions were that (1) the cargo classifications as of the date of the MCMIS snapshot accurately represented the carriers' operations over the period studied (2005–2008); and (2) carriers were actually transporting these commodities at the time of a crash or inspection. The carrier commodity groups used in this analysis are shown in Table 1 and are defined as follows:

- *Agricultural Carriers.* The carrier selected at least one of the following agricultural cargo classifications and did not select any other cargo classifications: Logs, Poles, Beams, Lumber; Fresh Produce; Grain, Feed, Hay; Farm Supplies.
- *Livestock Carriers.* The carrier selected the Livestock cargo classification and did not select any other cargo classifications.
- *Utility Carriers.* The carrier selected the Utility cargo classification and did not select any other cargo classifications.
- *Non-Agricultural Carriers.* The carrier did not select any of the four agricultural commodity cargo classifications, the livestock cargo classification, or the utility classification.

Table 1. Carrier Commodity Groups

Carrier Group	Number of Carriers	Share
Agricultural (Only)	44,685	6.06%
Livestock (Only)	6,384	0.87%
Utility (Only)	694	0.09%
Non-Agricultural, Non-Livestock, Non-Utility (Only)	493,717	67.00%
Multiple Cargo Commodities*	172,979	23.47%
No Cargo Commodities*	18,429	2.50%
All Carriers	736,888	100.00%

*Not used in this analysis.

In addition, Question 27 on the MCS-150 asks carriers to identify the number of drivers operating within, and beyond, a 100-air-mile radius. The analysis used this information to partition agricultural carriers in an attempt to further isolate the population of interest (i.e., agricultural carriers with operations that are exempt from HOS regulations because they are within a 100-air-mile radius). Shown in Table 2, the following two agricultural carrier subgroups were used:

- *Agricultural carriers with 100 percent of drivers operating within a 100-air-mile radius*. The carrier indicated that all drivers operate within a 100-air-mile radius.
- *Agricultural carriers with 100 percent of drivers operating beyond a 100-air-mile radius.* The carrier indicated that all drivers operate beyond a 100-air-mile radius.

Table 2. Agricultural Carrier Subgroups

Carrier Subgroup	Number of Carriers	Share
Agricultural carriers with 100 percent of drivers operating within a 100-air-mile radius	18,625	41.68%
Agricultural carriers with 100 percent of drivers operating beyond a 100-air-mile radius	21,071	47.15%
Agricultural carriers with drivers operating both within and beyond a 100-air-mile radius*	4,989	11.16%
All agricultural (only) carriers	44,685	100.00%

*Not used in this analysis.

2.2 CRASH, OOS, AND VIOLATION DATA

The crash, OOS, and violation analysis used crash and inspection data contained in the MCMIS data snapshot for June 26, 2009. For the "before and after" crash comparison, the analysis aggregated the MCMIS data for the 3 years prior to August 2005, when the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 was enacted (August 2002–July 2005) and the 3 years after (August 2005–July 2008).

The crash rate analysis included only those carriers reporting a reasonable number of power units. Specifically, the analysis included only those carriers with at least one power unit, and applied filters to compare driver counts and power unit counts. Carriers were removed if *the number of power units > 10 ×(number of drivers + 1)* or *the number of drivers > 10 × (number of power units + 1)*. In addition, after discovering one carrier with suspect power unit data, the data were examined for additional carriers with unusually high or low driver-to-power unit ratios, unusually high or low crash rates, or unusually large year-to-year changes in power units. No carriers identified from this additional examination had any significant impact on the crash results. (The MCS-150 for the carrier with suspect data showed 17,000 power units and 1,000 drivers. This carrier had no crashes or inspections in MCMIS. Removing this carrier from the analysis resulted in a change in the crash rates for agricultural carriers with 100 percent of drivers operating beyond a 100-mile radius (see section 3 for details on the crash rate results).

Crash rates were calculated using crash data from the MCMIS snapshot and power unit data from SafeStat result files at the end of each calendar year; however, the "before and after" crash rate analysis used power unit data for the end of July 2005 and the end of July 2008.

This analysis calculated the OOS and violation rates by summing up the number of inspections that resulted in the driver or vehicle being placed OOS (or where at least one regulation from the violation category was violated) and dividing by the total number of inspections. The analysis

used data for Inspection Levels 1, 2, 3, and 5. To test for statistical significance of differences in OOS and violation rates, the analysis used a Z-test for comparing proportions.

2.3 BEHAVIOR ANALYSIS AND SAFETY IMPROVEMENT CATEGORIES (BASICS)

In comparing OOS and violation rates, the analysis used Behavior Analysis and Safety Improvement Categories (BASICs) employed by the measurement system developed under the Comprehensive Safety Analysis (CSA) 2010 initiative. This Safety Measurement System uses crash and inspection data to quantify the on-road safety performance of motor carriers and drivers. These categories group violations of the regulations into specific behavioral areas, such as vehicle maintenance, enabling the targeted identification of safety problems. This analysis includes OOS and violation data for the following four BASICs:

- *Unsafe Driving.* Dangerous or careless operation of a CMV. Example violations for this BASIC include speeding, reckless driving, improper lane change, and inattention.
- *Driver Fitness.* Operation of a CMV by a driver who is unfit to operate due to lack of training, experience, or medical qualifications. Violations include failure to have a valid and appropriate commercial driver's license (CDL), and failure to have proper medical documentation.
- *Vehicle Maintenance.* CMV failure due to improper or inadequate maintenance. Violations include brakes, lights, and other mechanical defects, and failure to make required repairs.
- *Improper Loading/Cargo Securement.* Shifting loads, spilled or dropped cargo, and unsafe handling of hazardous materials. Example violations include improper load securement, cargo retention, and hazardous materials handling.

This analysis did not include the CSA 2010 Fatigued Driving BASIC, since this category includes HOS-related violations, or the Controlled Substances/Alcohol BASIC, due to the limited number of inspections citing these violations.

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3. PHASE 1 FINDINGS

3.1 CRASH RATES

3.1.1 Agricultural Carriers with All Drivers Operating Within or Beyond a 100-Air-Mile Radius

As shown in Table 3, in 2005 through 2007, agricultural carriers with 100 percent of drivers operating within a 100-air-mile radius had lower crash rates than agricultural carriers with all drivers operating beyond this radius. In 2008, both carrier groups had similar crash rates. However, the results for the PRISM States that enforce MCS-150 updating show that agricultural carriers with all drivers operating within a 100-air-mile radius had a higher crash rate than those carriers with all drivers operating beyond this radius in 2008, a lower crash rate in 2006 and 2007, and nearly the same crash rate in 2005 (Table 4) Because of the requirement for carriers in PRISM States to update their MCS-150 information annually, the data from the PRISM States are considered more current and reliable than the MCS-150 data from non-PRISM States.

Table 3. Crash Rates: Agricultural Carriers with 100 Percent of Drivers Operating Within a 100-Air-Mile Radius and Agricultural Carriers with 100 Percent of Drivers Operating Beyond a 100-Air-Mile Radius

Year	Number of Carriers Within 100-Air-Mile Radius	Number of Power Units Within 100-Air-Mile Radius	Vehicles Involved in a Crash Within 100-Air-Mile Radius	Crash Rate Within 100-Air-Mile Radius	Number of Carriers Beyond 100-Air-Mile Radius	Number of Power Units Beyond 100-Air-Mile Radius	Vehicles Involved in a Crash Beyond 100-Air-Mile Radius	Crash Rate Beyond 100-Air-Mile Radius	Percent Difference for Exempt Carriers
2005	13,327	28,042	506	1.80	16,597	31,782	608	1.91	-6%
2006	14,337	30,218	488	1.62	17,393	33,411	612	1.83	-12%
2007	15,881	33,355	538	1.61	18,790	35,908	724	2.02	-20%
2008	17,569	36,443	569	1.56	19,963	37,970	592	1.56	0%

Source: MCMIS Data Snapshot for June 26, 2009.
Crash rate is the number of crashes per 100 power units.

Table 4. Crash Rates: Agricultural Carriers with 100 Percent of Drivers Operating Within a 100-Air-Mile Radius and Agricultural Carriers with 100 Percent of Drivers Operating Beyond a 100-Air-Mile Radius Domiciled in PRISM States with MCS-150 Updating

Year	Number of Carriers Within 100-Air-Mile Radius	Number of Power Units Within 100-Air-Mile Radius	Vehicles Involved in a Crash Within 100-Air-Mile Radius	Crash Rate Within 100-Air-Mile Radius	Number of Carriers Beyond 100-Air-Mile Radius	Number of Power Units Beyond 100-Air-Mile Radius	Vehicles Involved in a Crash Beyond 100-Air-Mile Radius	Crash Rate Beyond 100-Air-Mile Radius	Percent Difference for Exempt Carriers
2005	6,919	13,692	310	2.26	7,948	14,291	320	2.24	1%
2006	7,426	14,833	272	1.83	8,288	15,031	321	2.14	-14%
2007	8,195	16,226	306	1.89	8,908	16,128	374	2.32	-19%
2008	8,833	17,615	319	1.81	9,443	16,990	273	1.61	13%

Source: MCMIS Data Snapshot for June 26, 2009.
Crash rate is the number of crashes per 100 power units.

3.1.2 "Before and After" Crash Rates for Utility and Livestock Carriers

To assess the impact of the exemption granted to utility and livestock carriers by SAFETEA-LU in August 2005, crash rates for these particular groups were evaluated both prior to and after enactment of the legislation. The "before and after" crash analysis indicates that utility carriers had higher crash rates after being granted the HOS exemption compared to the period prior to the exemption. Livestock carriers had no change in their crash rate in the "after" period, while non-agricultural carriers had a slight decrease in their crash rate (Table 5). However, the crash data for PRISM States that enforce MCS-150 updating show higher crash rates for both utility and livestock carriers in the "after" period (Table 6). In contrast, non-agricultural carriers in these States (which had no change to their HOS requirements during the same period) showed a decrease in their crash rate.

Table 5. Before (August 2002–July 2005) and After (August 2005–July 2008) Crash Rates: Utility/Livestock Carriers and Non-Agricultural Carriers

Carrier Group	"Before" Period: Number of Carriers	"Before" Period: Number of Power Units (July 2005)	"Before" Period: Vehicles Involved in a Crash	"Before" Period: Crash Rate	"After" Period: Number of Carriers	"After" Period: Number of Power Units (July 2008)	"After" Period: Vehicles Involved in a Crash	"After" Period: Crash Rate	Percent Difference in "After" Period
Utility	410	7,871	61	0.26	583	10,400	130	0.42	62%
Livestock	4,336	7,224	532	2.46	5,714	9,151	672	2.45	0%
Non-Ag	334,260	2,356,517	138,094	1.95	426,299	2,965,444	171,576	1.93	-1%

Source: MCMIS Data Snapshot for June 26, 2009.
Crash rates were obtained by aggregating crash data for the 3 years prior to August 2005 and the 3 years after August 2005; power units were multiplied by three to align with the 3 years of crashes.

Table 6. Before (August 2002–July 2005) and After (August 2005–July 2008) Crash Rates: Utility/Livestock Carriers and Non-Agricultural Carriers Domiciled in PRISM States with MCS-150 Updating

Carrier Group	"Before" Period: Number of Carriers	"Before" Period: Number of Power Units (July 2005)	"Before" Period: Vehicles Involved in a Crash	"Before" Period: Crash Rate	"After" Period: Number of Carriers	"After" Period: Number of Power Units (July 2008)	"After" Period: Vehicles Involved in a Crash	"After" Period: Crash Rate	Percent Difference in "After" Period
Utility	195	2,832	18	0.21	270	4,764	47	0.33	57%
Livestock	2,028	3,243	262	2.69	2,671	4,081	362	2.96	10%
Non-Ag	126,127	939,118	55,001	1.95	157,481	1,187,733	67,889	1.91	-2%

Source: MCMIS Data Snapshot for June 26, 2009.
Crash rates were obtained by aggregating crash data for the 3 years prior to August 2005 and the 3 years after August 2005; power units were multiplied by three to align with the 3 years of crashes.

3.2 OOS AND VIOLATION RATES

3.2.1 Agricultural and Non-Agricultural Carriers

In the four BASICs considered in this analysis (Unsafe Driving, Driver Fitness, Vehicle Maintenance, and Improper Loading/Cargo Securement—violation categories as defined in section 2), agricultural carriers had higher violation rates that were statistically significant when compared to non-agricultural carriers during the period covered by this analysis (Table 7). For OOS rates, the agricultural carriers also had higher violation rates that were statistically significant when compared to non-agricultural carriers for the Vehicle Maintenance and Improper Loading/Cargo Securement BASICs. The differences in OOS rates for the Unsafe Driving and Driver Fitness BASICs were not statistically significant (Table 8).

Table 7. 2005–2008 Violation Rates: Agricultural and Non-Agricultural Carriers

Violation Category	Ag Inspections	Non-Ag Inspections	Ag Inspections with a Violation	Non-Ag Inspections with a Violation	Ag Violation Rate	Non-Ag Violation Rate	Z-Value
2005 Unsafe Driving	37,072	1,336,266	4,320	138,715	11.65%	10.38%	2.57*
2006 Unsafe Driving	40,051	1,519,387	4,984	162,338	12.44%	10.68%	3.71*
2007 Unsafe Driving	42,736	1,618,573	5,149	165,714	12.05%	10.24%	3.94*
2008 Unsafe Driving	45,941	1,732,273	4,988	164,445	10.86%	9.49%	3.06*
2005 Driver Fitness	37,072	1,336,266	3,580	79,169	9.66%	5.92%	7.45*
2006 Driver Fitness	40,051	1,519,387	4,022	87,281	10.04%	5.74%	8.95*
2007 Driver Fitness	42,736	1,618,573	4,106	102,388	9.61%	6.33%	7.04*
2008 Driver Fitness	45,941	1,732,273	4,470	136,144	9.73%	7.86%	4.16*
2005 Vehicle Maintenance	37,072	1,336,266	19,159	576,062	51.68%	43.11%	23.36*
2006 Vehicle Maintenance	40,051	1,519,387	21,216	673,636	52.97%	44.34%	24.82*
2007 Vehicle Maintenance	42,736	1,618,573	21,841	687,465	51.11%	42.47%	25.14*
2008 Vehicle Maintenance	45,941	1,732,273	23,140	727,835	50.37%	42.02%	25.03*
2005 Improper Loading	37,072	1,336,266	8,541	150,433	23.04%	11.26%	25.45*
2006 Improper Loading	40,051	1,519,387	8,988	160,437	22.44%	10.56%	26.60*
2007 Improper Loading	42,736	1,618,573	9,390	170,531	21.97%	10.54%	26.37*
2008 Improper Loading	45,941	1,732,273	10,114	174,081	22.02%	10.05%	28.61*

Source: MCMIS Data Snapshot for June 26, 2009.
*For two-tail test, a z-value > 1.96 or a z-value < -1.96 indicates significance at a level of α=0.05.

Table 8. 2005–2008 OOS Rates: Agricultural and Non-Agricultural Carriers

OOS Category	Ag Inspections	Non-Ag Inspections	Ag OOS Inspections	Non-Ag OOS Inspections	Ag OOS Rate	Non-Ag OOS Rate	Z-Value
2005 Unsafe Driving	37,072	1,336,266	2	105	0.005%	0.007%	-0.002
2006 Unsafe Driving	40,051	1,519,387	2	93	0.005%	0.006%	-0.001
2007 Unsafe Driving	42,736	1,618,573	3	115	0.007%	0.007%	0.000
2008 Unsafe Driving	45,941	1,732,273	0	88	0.000%	0.005%	0.000
2005 Driver Fitness	37,072	1,336,266	555	16,930	1.50%	1.27%	0.44
2006 Driver Fitness	40,051	1,519,387	654	19,597	1.63%	1.29%	0.68
2007 Driver Fitness	42,736	1,618,573	725	22,132	1.70%	1.37%	0.68
2008 Driver Fitness	45,941	1,732,273	789	24,463	1.72%	1.41%	0.65
2005 Vehicle Maintenance	37,072	1,336,266	6,659	166,359	17.96%	12.45%	11.55*
2006 Vehicle Maintenance	40,051	1,519,387	7,242	187,362	18.08%	12.33%	12.54*
2007 Vehicle Maintenance	42,736	1,618,573	7,327	190,739	17.14%	11.78%	12.01*
2008 Vehicle Maintenance	45,941	1,732,273	7,762	201,393	16.90%	11.63%	12.22*
2005 Improper Loading	37,072	1,336,266	1,943	46,956	5.24%	3.51%	3.37*
2006 Improper Loading	40,051	1,519,387	2,138	50,463	5.34%	3.32%	4.09*
2007 Improper Loading	42,736	1,618,573	2,224	52,532	5.20%	3.25%	4.10*
2008 Improper Loading	45,941	1,732,273	2,298	54,500	5.00%	3.15%	4.03*

Source: MCMIS Data Snapshot for June 26, 2009.
*For two-tail test, a z-value > 1.96 or a z-value < -1.96 indicates significance at a level of α=0.05.

3.2.2 Agricultural Carriers with All Drivers Operating Within or Beyond a 100-Air-Mile Radius

Agricultural carriers operating within a 100-air-mile radius had higher OOS and/or violation rates that were statistically significant when compared with those operating beyond a 100-air-mile radius in some BASICs. As shown in Table 9 and Table 10, these rates are higher for the following violation categories:

- *Driver Fitness.* Violation rate; statistically significant for 2007 and 2008.
- *Vehicle Maintenance.* OOS and violation rate; statistically significant for all years.
- *Improper Loading/Cargo Securement.* Violation rate; statistically significant for all years.

Table 9. 2005–2008 OOS Rates: Agricultural Carriers with All Drivers Operating Within a 100-air-mile Radius and Agricultural Carriers with All Drivers Operating Beyond a 100--air-mile Radius

OOS Category	Ag < 100-Air-Mile Radius Inspections	Ag >100-Air-Mile Radius Inspections	Ag < 100-Air-Mile Radius OOS Inspections	Ag >100-Air-Mile Radius OOS Inspections	Ag < 100-Air-Mile Radius OOS Rate	Ag > 100-Air-Mile Radius OOS Rate	Z-Value
2005 Unsafe Driving	13,444	18,320	0	1	0.000%	0.005%	0.00
2006 Unsafe Driving	15,101	19,472	1	1	0.007%	0.005%	0.00
2007 Unsafe Driving	15,989	20,928	2	0	0.013%	0.000%	0.00
2008 Unsafe Driving	17,220	22,502	0	0	0.000%	0.000%	0.00
2005 Driver Fitness	13,444	18,320	183	273	1.36%	1.49%	-0.11
2006 Driver Fitness	15,101	19,472	235	309	1.56%	1.59%	-0.03
2007 Driver Fitness	15,989	20,928	259	348	1.62%	1.66%	-0.04
2008 Driver Fitness	17,220	22,502	271	399	1.57%	1.77%	-0.20
2005 Vehicle Maintenance	13,444	18,320	2,765	3,078	20.57%	16.80%	3.68*
2006 Vehicle Maintenance	15,101	19,472	3,149	3,273	20.85%	16.81%	4.15*
2007 Vehicle Maintenance	15,989	20,928	3,121	3,364	19.52%	16.07%	3.62*
2008 Vehicle Maintenance	17,220	22,502	3,303	3,635	19.18%	16.15%	3.30*
2005 Improper Loading	13,444	18,320	758	931	5.64%	5.08%	0.50
2006 Improper Loading	15,101	19,472	939	966	6.22%	4.96%	1.19
2007 Improper Loading	15,989	20,928	973	957	6.09%	4.57%	1.48
2008 Improper Loading	17,220	22,502	1,033	1,022	6.00%	4.54%	1.48

Source: MCMIS Data Snapshot for June 26, 2009.

*For two-tail test, a z-value > 1.96 or a z-value < -1.96 indicates significance at a level of α=0.05.

Table 10. 2005–2008 Violation Rates: Agricultural Carriers with All Drivers Operating Within a 100-Air-Mile Radius and Agricultural Carriers with All Drivers Operating Beyond a 100-Air-Mile Radius

Violation Category	Ag < 100-Air-Mile Radius Inspections	Ag >100-Air-Mile Radius Inspections	Ag < 100-Air-Mile Radius Inspections with a Violation	Ag > 100-Air-Mile Radius Inspections with a Violation	Ag < 100-Air-Mile Radius Violation Rate	Ag > 100-Air-Mile Radius Violation Rate	Z-Value
2005 Unsafe Driving	13,444	18,320	1,435	2,232	10.67%	12.18%	-1.41
2006 Unsafe Driving	15,101	19,472	1,750	2,505	11.59%	12.86%	-1.26
2007 Unsafe Driving	15,989	20,928	1,771	2,538	11.08%	12.13%	-1.06
2008 Unsafe Driving	17,220	22,502	1,679	2,525	9.75%	11.22%	-1.53
2005 Driver Fitness	13,444	18,320	1,445	1,652	10.75%	9.02%	1.61
2006 Driver Fitness	15,101	19,472	1,647	1,833	10.91%	9.41%	1.45
2007 Driver Fitness	15,989	20,928	1,746	1,814	10.92%	8.67%	2.26*
2008 Driver Fitness	17,220	22,502	1,977	1,937	11.48%	8.61%	2.99*
2005 Vehicle Maintenance	13,444	18,320	7,504	9,158	55.82%	49.99%	7.51*
2006 Vehicle Maintenance	15,101	19,472	8,587	9,987	56.86%	51.29%	7.62*
2007 Vehicle Maintenance	15,989	20,928	8,848	10,373	55.34%	49.57%	8.00*
2008 Vehicle Maintenance	17,220	22,502	9,483	10,875	55.07%	48.33%	9.62*
2005 Improper Loading	13,444	18,320	3,662	3,987	27.24%	21.76%	5.56*
2006 Improper Loading	15,101	19,472	4,111	3,981	27.22%	20.44%	7.18*
2007 Improper Loading	15,989	20,928	4,264	4,103	26.67%	19.61%	7.69*
2008 Improper Loading	17,220	22,502	4,612	4,471	26.78%	19.87%	7.82*

Source: MCMIS Data Snapshot for June 26, 2009.

* For two-tail test, a z-value > 1.96 or a z-value < -1.96 indicates significance at a level of α=0.05

4. PHASE 1 CONCLUSIONS

The Phase 1 analysis of the safety of agricultural and utility carriers and the impact of the HOS exemption yields the following conclusions:

- Nationally, agricultural carriers with 100 percent of drivers operating within a 100-air-mile radius had lower crash rates than those with all drivers operating beyond this radius, except for 2008, when there was no difference in the crash rates. However, data for PRISM States that enforce MCS-150 updating show that agricultural carriers with all drivers operating within a 100-air-mile radius had more varied results, with crash rates higher than carriers with all drivers operating beyond a 100-air-mile radius in 2008, lower in 2006 and 2007, and nearly the same in 2005.
- Nationally, utility carriers had higher crash rates after being granted the HOS exemption in SAFETEA-LU. Within the PRISM States, however, both utility and livestock carriers had higher crash rates in the "after" period.
- Agricultural carriers overall had higher OOS and/or violation rates than non-agricultural carriers for FMCSA regulations addressing the safe operation of CMVs, driver qualifications, vehicle maintenance, and cargo loading and securement.
- Agricultural carriers exempt from HOS (those with all drivers operating within a 100-air-mile radius) had higher OOS and/or violation rates than non-exempt agricultural carriers (those with all drivers operating beyond a 100-air-mile radius) for regulations addressing driver qualifications, vehicle maintenance, and improper loading and securement.

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5. PHASE 2 METHODOLOGY

5.1 CARRIER ROADSIDE INSPECTION DATA

FMCSA, with the assistance of the Commercial Vehicle Safety Alliance (CVSA), arranged to capture information during roadside inspections from July through November 2008 in several States that expressed interest in participating in a special survey. The usual inspection data collected at the roadside were supplemented with additional information that was entered in the Special Study fields in the Aspen data reporting system for transmittal to MCMIS. The following questions were asked during the roadside inspections:

Question 1: (to be entered into Aspen Special Study Field #1): At the time of inspection, please specify the type of operation in which the driver/vehicle are involved:

- Private operation, intRAstate commerce = 1.
- Private operation, intERstate commerce = 2.
- For-hire operation, intRAstate commerce = 3.
- For-hire operation, intERstate commerce = 4.
- Unknown = 9.

Question 2: (to be entered into Aspen Special Study Field #2): Please specify the type of commodity being transported at the time of the inspection:

- Logs = 1.
- Fresh Produce = 2.
- Grain, Feed, or Hay = 3.
- Farm Supplies = 4.
- Livestock = 5.
- Other commodity = 6.
- No commodity (i.e., empty load or bobtail) = 7.
- Utility Service Vehicle = 8.
- Unknown = 9.

Question 3: (to be entered into Aspen Special Study Field #3): If the vehicle being inspected is a Utility Service Vehicle (Response = 8 in Question 2), please specify the type of utility service industry this vehicle was operated by:

- Electrical & Gas Utility = 1.
- Cable Television Utility = 2.
- Telecommunications Utility = 3.
- Other Utility = 4.
- Unknown = 9.
- Not Applicable = 0.

Question 4: (to be entered into Aspen Special Study Field #4): If the response to Question 2 is "No Commodity (i.e., empty load or bobtail) = 7", please specify which of the following was the ***last*** commodity carried by this vehicle:

- Logs = 1.
- Fresh Produce = 2.
- Grain, Feed, Hay = 3.
- Farm Supplies = 4.
- Livestock = 5.
- Other commodity = 6.
- Utility Service Vehicle = 8.
- Unknown = 9.
- Not Applicable = 0.

Question 5: (to be entered into Aspen Special Study Field #5): Is the intended or actual distance of the current trip more than 100-air-miles from the point of origin?

- Yes = 1.
- No = 2.
- Unknown = 9.

As a result, currently operating agricultural and utility carriers could be specifically identified during the Phase 2 data analysis. Also, based on the response to Question 5, agricultural carriers reporting a current trip distance of 100-air-miles or less from the point of origin were considered representative in terms of performance of agricultural carrier exempt from the HOS requirements; those reporting a distance greater than 100-air-miles were considered representative of agricultural carriers not exempt from the HOS requirements. Although the FMCSRs do not specify a radius of operations for utility service carriers to differentiate exempt from non-exempt status, they do exempt only those utility carriers operating primarily within the

service area of a utility's subscribers or consumers except for any occasional emergency use. Therefore, the 100-air-mile radius was used to estimate the number of utility carriers operating within their service area from those operating outside their service area.

The survey data collected included information from four States (Idaho, Kansas, Maryland, and Michigan). These four were among the six States (Arizona, Idaho, Kansas, Kentucky, Maryland, and Michigan) that had originally agreed to participate in the data collection effort during roadside inspections. The Phase 2 study design was a stratified random sample with each of the six participating States representing a stratum. The planned total sample size for the study was allocated proportionately to the six States based on the historical proportion of inspections performed in each of the six States annually. Agricultural commodity and utility service carriers were identified at the roadside jurisdictions for inclusion in the study. The sample of inspections desired for statistical analysis from the two study groups, and the achieved number of driver/vehicle inspections from agricultural and utility carriers, are presented in Table 11.

Unfortunately, the number of participating States and the amount of data collected were less than what was called for in the Phase 2 study design (compare Target Number and Achieved columns in Table 11), so the statistical analysis of safety impacts was affected. Given the small sample sizes (and the large sampling errors associated with such sample sizes), many of the differences between the various groups examined were not found to be statistically significant. Additionally, it is apparent from Table 11 that an overwhelming percentage of the total agricultural carrier driver and vehicle inspections, nearly 90 percent, was recorded in Kansas. Thus, any analysis of combined totals from all States will be highly influenced by the data from Kansas.

Table 11. Target Number of Inspections of Agricultural Commodity and Utility Service Carriers, Phase 2 Study

Survey States	Target Number of Agricultural Carrier Inspections	Target Number of Utility Carrier Inspections	Achieved Agricultural Carrier Inspections	Achieved Utility Carrier Inspections
Arizona	500	625	0	0
Idaho	100	125	38	5
Kansas	500	275	575	46
Kentucky	525	575	0	0
Maryland	450	475	64	35
Michigan	425	425	90	8
Total Samples	2,500	2,500	667	94

Source: Special Study Survey Data

Because those carriers reporting a current trip distance of 100-air-miles or less from the point of origin were considered representative in terms of performance of agricultural and utility carriers exempt from the HOS requirements, any inspections for this group with an HOS violation were removed from the analysis file.

5.2 OOS VIOLATION ANALYSIS

The Phase 2 analysis involved a series of comparisons of driver and vehicle OOS rates for the surveyed carriers in each State with the calendar year 2008 OOS rates for all carriers within that state, and of the OOS rates for the four States combined with the national OOS rates. The analysis used data for Inspection Levels 1, 2, 3, and 5. Comparisons were also made between OOS rates for carriers operating within a 100-air-mile radius and those operating beyond a 100-air-mile radius, first with all violations included from the inspection records of the carriers operating beyond a 100-air-mile radius and then with HOS violations removed. This was done to determine if any difference between the two groups was solely a result of the HOS requirements.

5.3 CRASH ANALYSIS

As was done in Phase 1, a comparison was made of crash rates in 2007 and 2008 of the agricultural commodity carriers in the survey that were operating within a 100-air-mile radius to those operating beyond a 100-air-mile radius, using MCS-150 data to classify carriers. The U.S. Department of Transportation Number from each inspection report was used to match the carriers with their respective MCMIS registration data and crash records. The registration data were used to identify 611 distinct agricultural carriers that had counts in the carriers' driver count table.

Each carrier was categorized according to its driving distance reported on its MCS-150 Form in the MCMIS census file. Two groups were created:

- Carriers that exclusively drive within 100-air-miles and are therefore exempt from the HOS requirements.
- Carriers that exclusively drive beyond 100-air-miles and are therefore subject to the HOS requirements.

Carriers that have drivers driving within and beyond a 100-air-mile radius were eliminated. These two groups were determined by using the carrier's driver count table, which was obtained from the MCMIS data file. A crash rate per 100 power units was calculated for each of these two groups based on crash data for the years 2007 and 2008. When calculating the crash rates, a few carriers were excluded because the driver to power unit ratio (or power unit to driver ratio) was greater than 50, too high to be considered reasonable. Also, any carrier whose power unit count was found to be greater than 500, and therefore too large to be considered accurate, was also removed. Power unit counts from the December SafeStat run for the year 2007 and 2008 were used as the denominator to calculate the crash rates. Crashes in 2007 and 2008, as recorded in the May 22, 2009, MCMIS snapshot, were used as the numerator for calculating the crash rates.

The crash analysis was conducted to determine if there was a difference in the overall crash rates of the agricultural carriers in the data collection that operated within a 100-air-mile radius compared to the agricultural carriers that operated beyond a 100-air-mile radius. It is recognized that this analysis, by using all crashes in which the carriers were involved in 2007 and 2008, and relying on the MCMIS registration data to identify carriers that operated exclusively within or beyond a 100-air-mile radius, resulted in some of the same limitations as in Phase 1. This

includes the analysis of crashes by agricultural carriers that occurred outside their States' planting and harvesting seasons, crashes occurring beyond a 100-air-mile radius but attributed to a carrier in the group identified as operating within a 100-air-mile radius (and vice versa), and crashes involving the transport of other than agricultural commodities or farm supplies.

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6. PHASE 2 FINDINGS

6.1 OOS RATES

6.1.1 Agricultural Carriers

Because the OOS rates for all carriers in each of the four States participating in Phase 2 may differ significantly from similar rates calculated at the national level, the Phase 2 analysis began by comparing each survey State's agricultural carrier OOS rates to the rates for all carriers in that State. Driver and vehicle OOS rates were calculated for each State for the agricultural commodity carriers identified in the survey. These rates were compared to their respective State's 2008 overall driver and vehicle OOS rates to determine if the agricultural carriers' inspection results differed from other carriers. As shown in Table 12, based on the Phase 2 survey, agricultural carriers inspected in Maryland and Idaho had vehicle OOS rates that were statistically higher than their State average vehicle OOS rate. Kansas and Michigan had vehicle OOS rates that were not statistically different from their State averages. None of the States had agricultural carrier driver OOS rates that statistically differed from the State average driver OOS rate.

Table 12. Driver Inspections (Levels 1, 2, and 3) and Vehicle Inspections (Levels 1, 2, and 5) with Driver/Vehicle OOS Rate of Agricultural Commodity Carriers in Four Survey States

State (Driver/Vehicle OOS Rate for all carriers in state)	Agricultural Carrier Driver Inspections	Agricultural Carrier Driver OOS Violations (Driver OOS Rate)	Agricultural Carrier Vehicle Inspections	Agricultural Carrier Vehicle OOS Violations (Vehicle OOS Rate)
Idaho (10.7%/29.3%)	25	1 (4.0%)	38	18 (47.4%)* Z=2.264
Kansas (8.8%/17.9%)	575	49 (8.5%)	390	67 (17.2%)
Maryland (7.3%/19.7%)	64	7 (10.9%)	63	19 (30.2%)* Z=1.926
Michigan (6.1%/19.0%)	90	6 (6.7%)	43	10 (23.3%)
Total (2008 National Driver/Vehicle OOS Rates: 6.4%/22.3%)	754	63 (8.4%)* Z=2.150	534	114 (21.4%)

Source: Special Study Survey Data and MCMIS Data Snapshot for December 18, 2009.
Note: Asterisk denotes rate is statistically significant compared to the state or national rate using a one-tailed test at a level of α=0.05

The data from the four States were then aggregated and driver and vehicle OOS rates were calculated. These rates were compared to the 2008 national rates for all carriers of 6.4 percent driver OOS rate and 22.3 percent vehicle OOS rate. The agricultural carriers in the survey had a vehicle OOS rate (21.4 percent) that was not statistically different from the national average.

However, the agricultural carriers had a driver OOS rate (8.4 percent) that was statistically higher than the national average of 6.4 percent. It should be noted that Kansas, which accounted for about 75 percent of both the Phase 2 survey driver and vehicle inspections, highly influenced the aggregated State data comparison to the national OOS rates. For example, although the recorded driver OOS rates for Kansas, Maryland and Michigan were all higher than the national rate of 6.4 percent, only Kansas had a statistically significant difference between its rate and the national rate. Similarly, although Idaho and Maryland had statistically significant vehicle OOS rates that were higher than their State rates and the national rate of 22.3 percent, and Michigan's recorded rate was higher than the national rate but not statistically significant, Kansas had a statistically significant vehicle OOS rate that was lower than the national rate and thus resulted in an aggregated rate lower than the national rate that was statistically significant.

6.1.2 Utility Carriers

Driver and vehicle OOS rates were calculated for each State for the utility service carriers identified in the survey (see Table 13). These rates were compared to their respective State's 2008 overall driver and vehicle OOS rates to determine if the utility carriers' inspection results differed from other carriers in the State. None of the States had driver or vehicle OOS rates that statistically from their respective State average driver and vehicle OOS rates. Also, the driver and vehicle OOS rates for the aggregated data of the four States were not statistically different from the national rates. Although some of the OOS rates in Table 13 are lower or higher than the national rates, the small number of utility carrier inspections affected the precision levels obtained for the survey estimates, resulting in statistical power limitations.

Table 13. Driver Inspections (Levels 1, 2, and 3) and Vehicle Inspections (Levels 1, 2, and 5) with Driver/Vehicle OOS Rate of Utility Service Carriers in Four Survey States

State (Driver/Vehicle OOS Rate for all carriers in State)	Utility Carriers with Driver Inspections	Utility Carriers with Driver OOS Violations (Driver OOS Rate)	Utility Carriers with Vehicle Inspections	Utility Carriers with Vehicle OOS Violations (Vehicle OOS Rate)
Idaho (10.7%/29.3%)	5	0 (0.0%)	5	2 (40.0%)
Kansas (8.8%/17.9%)	46	4 (8.7%)	43	9 (20.9%)
Maryland (7.3%/19.7%)	35	0 (0.0%)	35	5 (14.3%)
Michigan (6.1%/19.0%)	8	1 (12.5%)	3	0 (0.0%)
Total (2008 National Driver/Vehicle OOS Rates: 6.4%/22.3%)	94	5 (5.3%)	86	16 (18.6%)

Source: Special Study Survey Data and MCMIS Data Snapshot for December 18, 2009.
Note: Asterisk denotes rate is statistically significant compared to the State or national rate using a one-tailed test at a level of α=0.05

6.1.3 Agricultural and Utility Carriers Operating Within or Beyond 100-Air-Mile Radius

The survey data for the four States were combined and driver and vehicle OOS rates were calculated for agricultural commodity carriers identified as operating within a 100-air-mile radius, representing those that are exempt from the HOS requirements. Similar rates were calculated for the agricultural carriers identified as operating beyond a 100-air-mile radius, representing those not exempt from the HOS requirements. The rates for the two groups were then compared to determine if there was a statistically significant difference in OOS rates. As shown in Table 15, the agricultural carriers operating beyond a 100-air-mile radius had a statistically higher driver OOS rate than the carriers operating within a 100-air-mile radius. But the results were just the opposite for vehicle OOS rates, with the agricultural carriers operating within a 100-air-mile radius having a statistically higher OOS rate than the carriers operating beyond a 100-air-mile radius. Given that the "within 100-air-miles" carriers are exempt from the HOS requirements, it is not surprising that their driver OOS rate was found to be lower than the "beyond 100-air-miles" carriers. The finding that their vehicle OOS rate is higher than the "beyond 100-air-miles" carriers is consistent with the Phase 1 analysis results.

The same procedure was used to compare utility service carriers identified in the survey as operating within a 100-air-mile radius with those operating beyond a 100-air-mile radius. The differences in driver and vehicle OOS rates were not statistically significant between the two groups of utility carriers (see Table 14). It should be noted that the small number of inspections and OOS violations affected the statistical test. For example, even though the vehicle OOS rate for utility carriers operating within a 100-air-mile radius (23.3 percent) was five times greater than the vehicle OOS rate for those operating beyond a 100-air-mile radius (4.6 percent), because there were 60 vehicle inspections and 14 OOS violations for those driving within the 100-air-mile radius and only 22 vehicle inspections and 1 OOS violation for those driving beyond the 100-air-mile radius, the proportion test was determined to be statistically not significant at the 95 percent confidence level (Z = 1.632).

Table 14. Driver/Vehicle OOS Rates by Agricultural and Utility Carriers Driving Beyond and Within 100-Air-Mile Radius in the Four Survey States Combined

Type of Carrier and OOS Rate	Driving Within 100 Air-Mile Radius	Driving Beyond 100 Air-Mile Radius
Agricultural Carriers' Driver OOS Rate	3.1% (n=260)	9.0% * z = 2.885 (n=440)
Agricultural Carriers' Vehicle OOS Rate	25.5% * z = 2.037 (n=231)	17.8% (n=297)
Utility Service Carriers' Driver OOS Rate	4.8% (n=63)	0.0% (n=25)
Utility Service Carriers' Vehicle OOS Rate	23.3% (n=60)	4.6% (n=22)

Source: Special Study Survey Data.
Note: Asterisk denotes rate is statistically significant compared to the corresponding carrier group operating beyond 100-air-mile radius using a one-tailed test at a level of α=0.05

To determine if the only difference in driver OOS rates between exempt and non-exempt carriers was that the non-exempt group was subject to HOS requirements, an additional comparison was made. HOS-related OOS violations were removed from the driver violations data for agricultural commodity carriers operating beyond a 100-air-mile radius. This produced a reduction from 40 total violations to 13 violations, having removed 27 HOS-related violations, and resulted in a driver OOS rate of 3.0 percent. When this adjusted rate is compared to the 3.1 percent OOS rate for the agricultural carriers operating within a 100-air-mile radius, the difference is no longer statistically significant (see Table 15). This indicates that the reason the carriers operating beyond a 100-air-mile radius have a higher OOS rate than carriers operating within a 100-air-mile radius is based on one being subject to HOS requirements and the other not.

Because the survey data did not record any OOS violations for utility carriers operating beyond a 100-air-mile radius there were no HOS violations to be removed. Therefore, the comparison of utility carrier driver OOS rates did not change from what was presented in Table 14, and the difference remained statistically insignificant.

Table 15. Driver OOS Rates of Agricultural Commodity & Utility Carriers Driving Beyond or Within a 100-Air-Mile Radius (HOS violations removed from Beyond 100-Air-Mile Group) in the Four Survey States Combined

Type of Carrier and OOS Rate	Driving Within 100 Air-Mile Radius	Driving Beyond 100 Air-Mile Radius
Agricultural Carriers' Driver OOS Rate	3.1% (n=260)	3.0% (n=440)
Utility Service Carriers' Driver OOS Rate	4.8% (n=63)	0% (n=25)

Source: Special Study Survey Data.

6.2 CRASH RATES

6.2.1 Agricultural Carriers Operating Within or Beyond 100-Air-Mile Radius

The agricultural carriers inspected in the survey were matched with their MCMIS registration and crash information, sorted as described in the Phase 2 Methodology section of this study, and two groupings were created: (1) Carriers that exclusively drive within 100-air-miles and are exempt from the HOS requirements, and (2) Carriers that exclusively drive beyond 100-air-miles and are subject to the HOS requirements. Crash rates per 100 power units were calculated for each group for 2007 and 2008 (Table 16 and Table 17).

The difference between these crash rates indicates that the agricultural carriers operating beyond a 100-air-mile radius and subject to the HOS requirements had a higher crash rate than those operating within a 100-air-mile radius and exempt from the HOS requirements.

Table 16. Crash Rates by Time Period for Agricultural Commodity Carriers in the Phase 2 Survey and by Driving Distance (Exclusively Within a 100 Air-Mile Radius)

Time Period	Carriers	Crashes	Power Units	Crash Rate
2007	39	15	509	2.95
2008	42	26	548	4.74

Source: Special Study Survey Data, MCMIS Data Snapshot for May 22, 2009, and December 2007 and 2008 SafeStat runs.

Table 17. Crash Rates by Time Period for Agricultural Commodity Carriers in the Phase 2 Survey and by Driving Distance (Exclusively Beyond a 100 Air-Mile Radius)

Time Period	Carriers	Crashes	Power Units	Crash Rate
2007	330	392	6,444	6.08
2008	379	371	6,910	5.37

Source: Special Study Survey Data, MCMIS Data Snapshot for May 22, 2009, and December 2007 and 2008 SafeStat runs.

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7. PHASE 2 CONCLUSIONS

The Phase 2 analysis of the safety of agricultural and utility carriers and the impact of the HOS exemption yields the following conclusions:

- In the four States participating in the survey (Idaho, Kansas, Maryland, and Michigan), the driver and vehicle OOS rates of the surveyed agricultural carriers were statistically no different from the OOS rates of all carriers in their States. Exceptions were in data from Idaho and Maryland where the agricultural carriers' vehicle OOS rate was higher than the average rate for all carriers in each State, respectively.
- When data from the four survey States were combined, the aggregated driver OOS rate was statistically higher than the national average driver OOS rate, but the vehicle OOS rate was not different from the national average. The States' higher driver OOS rate for the agricultural carriers in the survey is most likely due to the fact that the majority of inspections came from Kansas (Table 11), which has a higher driver OOS rate than the national average (8.8 percent vs. 6.4 percent).
- None of the States had utility carrier driver or vehicle OOS rates that differed from their State average OOS rates. When the data were aggregated, the utility carrier driver and vehicle OOS rate were not statistically different from the national averages.
- When separating the agricultural carriers in the survey into two groups—those recorded as driving within a 100-air-mile radius and those that drove beyond a 100-air-mile radius—those operating beyond a 100-air-mile radius had a statistically higher driver OOS rate, but those operating within a 100-air-mile radius had a statistically higher vehicle OOS rate. After removing the HOS OOS violations from the agricultural carriers operating beyond a 100-air-mile radius, there was no statistical difference between the carriers operating within and those operating beyond a 100-air-mile radius. An analysis of utility carrier OOS rates showed no statistical difference between the two groups for either driver or vehicle OOS rates.
- Agricultural carriers in the survey that were subject to the HOS requirements had higher crash rates per power unit than carriers exempt from the HOS requirements.

In considering these conclusions, the reader should take into account that the number of participating States and the amount of data collected were less than what was called for in the Phase 2 study design (Table 11), so the statistical analysis of safety impacts was affected.

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APPENDIX A: FMCSA FORM MCS-150, MOTOR CARRIER IDENTIFICATION REPORT

OMB No. 2126-0013 Expiration Date: 03/31/2011

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2126-0013. Public reporting for this collection of information is estimated to be approximately 20 minutes per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory, and will be provided confidentially to the extent allowed by the Freedom of Information Act (FOIA). Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, Federal Motor Carrier Safety Administration, MC-RRA, 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

U.S. Department of Transportation
Federal Motor Carrier
Safety Administration

Motor Carrier Identification Report
(Application for USDOT Number)

REASON FOR FILING (Mark only one)

◯ NEW APPLICATION ◯ BIENNIAL UPDATE OR CHANGES ◯ OUT OF BUSINESS NOTIFICATION ◯ REAPPLICATION (AFTER REVOCATION OF NEW ENTRANT)

1. NAME OF MOTOR CARRIER		2. TRADE OR D.B.A. (DOING BUSINESS AS) NAME		
3. PRINCIPAL ADDRESS	4. CITY	5. STATE/PROVINCE	6. ZIP CODE+4	7. COLONIA (MEXICO ONLY)
8. MAILING ADDRESS	9. CITY	10. STATE/PROVINCE	11. ZIP CODE+4	12. COLONIA (MEXICO ONLY)

13. PRINCIPAL BUSINESS PHONE NUMBER	14. PRINCIPAL CONTACT CELL PHONE NUMBER	15. PRINCIPAL BUSINESS FAX NUMBER

16. USDOT NO.	17. MC OR MX NO.	18. DUN & BRADSTREET NO.	19. IRS/TAX ID NO.
			EIN SSN

20. INTERNET E-MAIL ADDRESS	21. CARRIER MILEAGE (to nearest 10,000 miles for last calendar year) YEAR

22. COMPANY OPERATION *(Mark all that apply)*

A. ☐ Interstate Carrier B. ☐ Intrastate Hazmat Carrier C. ☐ Intrastate Non-Hazmat Carrier D. ☐ Interstate Hazmat Shipper E. ☐ Intrastate Hazmat Shipper F. ☐ Vehicle Registrant **Only**

23. OPERATION CLASSIFICATION *(Mark all that apply)*

A. ☐ Authorized For-Hire
B. ☐ Exempt For-Hire
C. ☐ Private Property
D. ☐ Private Passengers (Business)
E. ☐ Private Passengers (Non-Business)
F. ☐ Migrant
G. ☐ U. S. Mail
H. ☐ Federal Government
I. ☐ State Government
J. ☐ Local Government
K. ☐ Indian Tribe
L. ☐ Other _____

24. CARGO CLASSIFICATIONS *(Mark all that apply)*

A. ☐ GENERAL FREIGHT
B. ☐ HOUSEHOLD GOODS
C. ☐ METAL:SHEETS, COILS, ROLLS
D. ☐ MOTOR VEHICLES
E. ☐ DRIVE AWAY/TOWAWAY
F. ☐ LOGS, POLES, BEAMS, LUMBER
G. ☐ BUILDING MATERIALS
H. ☐ MOBILE HOMES
I. ☐ MACHINERY, LARGE OBJECTS
J. ☐ FRESH PRODUCE
K. ☐ LIQUIDS/GASES
L. ☐ INTERMODAL CONT.
M. ☐ PASSENGERS
N. ☐ OIL FIELD EQUIPMENT
O. ☐ LIVESTOCK
P. ☐ GRAIN, FEED, HAY
Q. ☐ COAL/COKE
R. ☐ MEAT
S. ☐ GARBAGE, REFUSE, TRASH
T. ☐ U.S.MAIL
U. ☐ CHEMICALS
V. ☐ COMMODITIES DRY BULK
W. ☐ REFRIGERATED FOOD
X. ☐ BEVERAGES
Y. ☐ PAPER PRODUCT
Z. ☐ UTILITY
AA. ☐ FARM SUPPLIES
BB. ☐ CONSTRUCTION
CC. ☐ WATER WELL
DD. ☐ OTHER _____

25. HAZARDOUS MATERIALS (CARRIER OR SHIPPER) *(Mark all that apply)* (C) CARRIER (S) SHIPPER (B) BULK – IN CARGO TANKS (NB) NON-BULK – IN PACKAGES

	C	S	B	NB
A. DIV 1.1	☐	☐	☐	☐
B. DIV 1.2	☐	☐	☐	☐
C. DIV 1.3	☐	☐	☐	☐
D. DIV 1.4	☐	☐	☐	☐
E. DIV 1.5	☐	☐	☐	☐
F. DIV 1.6	☐	☐	☐	☐
G. DIV 2.1 (Flam. Gas)	☐	☐	☐	☐
H. DIV 2.1 LPG	☐	☐	☐	☐
I. DIV 2.1 (Methane)	☐	☐	☐	☐
J. DIV 2.2	☐	☐	☐	☐
K. DIV 2.2D (Ammonia)	☐	☐	☐	☐
L. DIV 2.3A	☐	☐	☐	☐
M. DIV 2.3B	☐	☐	☐	☐
N. DIV 2.3C	☐	☐	☐	☐
O. DIV 2.3D	☐	☐	☐	☐
P. Class 3	☐	☐	☐	☐
Q. Class 3A	☐	☐	☐	☐
R. Class 3B	☐	☐	☐	☐
S. COMB LIQ	☐	☐	☐	☐
T. DIV 4.1	☐	☐	☐	☐
U. DIV 4.2	☐	☐	☐	☐
V. DIV 4.3	☐	☐	☐	☐
W. DIV 5.1	☐	☐	☐	☐
X. DIV 5.2	☐	☐	☐	☐
Y. DIV 6.2	☐	☐	☐	☐
Z. DIV 6.1A	☐	☐	☐	☐
AA. DIV 6.1B	☐	☐	☐	☐
BB. DIV 6.1 POISON	☐	☐	☐	☐
CC. DIV 6.1 SOLID	☐	☐	☐	☐
DD. CLASS 7	☐	☐	☐	☐
EE. HRCQ	☐	☐	☐	☐
FF. CLASS 8	☐	☐	☐	☐
GG. CLASS 8A	☐	☐	☐	☐
HH. CLASS 8B	☐	☐	☐	☐
II. CLASS 9	☐	☐	☐	☐
JJ. ELEVATED TEMP MAT.	☐	☐	☐	☐
KK. INFECTIOUS WASTE	☐	☐	☐	☐
LL. MARINE POLLUTANTS	☐	☐	☐	☐
MM. HAZARDOUS SUB (RQ)	☐	☐	☐	☐
NN. HAZARDOUS WASTE	☐	☐	☐	☐
OO. ORM	☐	☐	☐	☐

26. NUMBER OF VEHICLES THAT WILL BE OPERATED IN THE U.S.

	Straight Trucks	Truck Tractors	Trailers	Hazmat Cargo Tank Trucks	Hazmat Cargo Tank Trailers	Motor-coach	Number of vehicles carrying number of passengers (including the driver)								
							School Bus			Mini-bus	Passenger Van		Limousine		
							1-8	9-15	16+	16+	1-8	9-15	1-8	9-15	16+
OWNED															
TERM LEASED															
TRIP LEASED															

27. DRIVER INFORMATION	INTERSTATE	INTRASTATE	TOTAL DRIVERS	TOTAL CDL DRIVERS
Within 100-Mile Radius				
Beyond 100-Mile Radius				

28. IS YOUR USDOT NUMBER REGISTRATION CURRENTLY REVOKED BY THE FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION? ◯ Yes ◯ No

If Yes, enter your USDOT Number. _____

29. PLEASE ENTER NAME(S) OF SOLE PROPRIETOR(S), OFFICERS OR PARTNERS AND TITLES (e.g. president, treasurer, general partner, limited partner)

1. _____ 2. _____

30. CERTIFICATION STATEMENT (to be completed by authorized official)

I, _____ certify that I am familiar with the Federal Motor Carrier Safety Regulations and/or Federal Hazardous Materials Regulations. Under penalties of perjury, I declare that the information entered on this report is, to the best of my knowledge and belief, true, correct, and complete.

Signature _____ Date _____ Title _____ (Please print)

Form MCS-150 (Revised: 6/12/2007)