Motor Carrier Hazardous Materials Safety Permits Study

U.S. Department of Transportation

Federal Motor Carrier Safety Administration

June 2018

FOREWORD

Section 33014 of the Moving Ahead for Progress in the 21st Century Act (MAP-21) required the Secretary of Transportation ("Secretary") to conduct a review of its Hazardous Materials Safety Permit (HMSP) program and report the findings to Congress. MAP-21 specified that the report to Congress should include "actions the Secretary could implement to improve the program, including whether to provide opportunities for an additional level of fitness review prior to the denial, revocation, or suspension of a safety permit." MAP-21 further required that the Secretary either "…institute a rulemaking to make any necessary improvements to the HMSP program…or publish in the Federal Register the Secretary's justification for why a rulemaking is not necessary."

This research was commissioned by Federal Motor Carrier Safety Administration (FMCSA) to respond to the MAP-21 requirements. The final report provides:

- The detailed analysis that supported the summary letter report that was submitted to Congress.

- Analysis used by FMCSA in responding to the petition titled "Petition for Rulemaking – Hazardous Materials Safety Permit," dated December 21, 2010.

- The supporting materials for FMCSA's policy and regulatory changes.

This report will be of value to FMCSA, the Pipeline and Hazardous Materials Safety Administration (PHMSA), trucking industry organizations and firms that haul hazardous materials (HM) subject to safety permits, trucking safety organizations, States, and other public individuals and organizations interested in truck safety.

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Technical Report Documentation Page

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16. Abstract

The Moving Ahead for Progress in the 21st Century Act (MAP-21) required the Federal Motor Carrier Safety Administration (FMCSA) to conduct a study of its Hazardous Materials Safety Permit (HMSP) program and report to Congress on the review's findings. This report provides the detailed description of the research that supported the summary letter report sent to Congress. It also includes: 1) analysis used by FMCSA in responding to the petition titled "Petition for Rulemaking – Hazardous Materials Safety Permit," 2) the 2015 change in policy regarding safety monitoring and renewal of HMSP permits for carriers, and 3) possibilities for how FMCSA may implement the remaining recommendations.

This report summarizes information from interviews with internal FMCSA staff and external industry stakeholders; outlines the history and similarities and differences of Federal HMSP and State Uniform HM programs; discusses the list of materials subject to HMSPs; analyzes the demographics and safety performance of permittees; and addresses the overall safety effectiveness of the HMSP program. The report considers alternatives and makes recommendations relating to initial permit issuance, ongoing monitoring of permittees, and permit renewals. Data and information technology needs related to the HMSP program are also discussed.

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SI* (MODERN METRIC) CONVERSION FACTORS

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				
in²	square inches	645.2	square millimeters	mm²
ft²	square feet	0.093	square meters	m²
yd²	square yards	0.836	square meters	m²
ac	Acres	0.405	Hectares	ha
mi²	square miles	2.59	square kilometers	km²
Volume (volumes greater than 1,000L shall be shown in m³)				
fl oz	fluid ounces	29.57	Milliliters	mL
gal	gallons	3.785	Liters	L
ft³	cubic feet	0.028	cubic meters	m³
yd³	cubic yards	0.765	cubic meters	m³
Mass				
oz	ounces	28.35	Grams	g
lb	pounds	0.454	Kilograms	kg
T	short tons (2,000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
Temperature (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/m²	cd/m²
Force and Pressure or Stress				
lbf	poundforce	4.45	Newtons	N
lbf/in²	poundforce per square inch	6.89	Kilopascals	kPa

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				
mm²	square millimeters	0.0016	square inches	in²
m²	square meters	10.764	square feet	ft²
m²	square meters	1.195	square yards	yd²
Ha	hectares	2.47	Acres	ac
km²	square kilometers	0.386	square miles	mi²
Volume				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	Gallons	gal
m³	cubic meters	35.314	cubic feet	ft³
m³	cubic meters	1.307	cubic yards	yd³
Mass				
g	grams	0.035	Ounces	oz
kg	kilograms	2.202	Pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2,000 lb)	T
Temperature (exact degrees)				
°C	Celsius	1.8c+32	Fahrenheit	°F
Illumination				
lx	lux	0.0929	foot-candles	fc
cd/m²	candela/m²	0.2919	foot-Lamberts	fl
Force and Pressure or Stress				
N	newtons	0.225	Poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in²

* 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 ABBREVIATIONS AND SYMBOLS

Acronym	Definition
APA	American Pyrotechnics Association
ARA	Agriculture Retailers Association
ATA	American Trucking Associations
BASIC	Behavior Analysis and Safety Improvement Category
CAP	Corrective Action Plan
CDL	Commercial Driver's License
CDLIS	Commercial Driver's License Information System
CI	Comprehensive Investigation
CR	Comprehensive Review (term no longer used by FMCSA)
CSA	Compliance, Safety, Accountability
CVSA	Commercial Vehicle Safety Alliance
DGAC	Dangerous Goods Advisory Council
FAST Act	Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94), December 4, 2015
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulation
HM	Hazardous Materials
HMSP	Hazardous Materials Safety Permit
HMTA	Hazardous Materials Transportation Act (of 1975)
HMTUSA	Hazardous Materials Transportation Uniform Safety Act (of 1990)
IFTA	International Fuel Tax Association
IME	Institute of Makers of Explosives
IRP	International Registration Plan
ISS	Inspection Selection System
IT	Information Technology

Acronym	Definition
L&I	Licensing and Insurance (system)
MAP-21	Moving Ahead for Progress in the 21st Century Act
MCS-90	Motor Carrier Safety Form 90 (Endorsement for Insurance for Public Liability) *[Incorporated into the new MCSA-1]*
MCS-150	Motor Carrier Safety Form 150 (application for USDOT number) *[Incorporated into the new MCSA-1]*
MCS-150B	Motor Carrier Safety Form 150B (Combined Motor Carrier Identification Report and HM Permit Application) *[Incorporated into the new MCSA-1]*
MCSA-1	Online Application for URS that combines all previous forms and rolled out for all carriers in late 2016.
MCMIS	Motor Carrier Management Information System
NACD	National Association of Chemical Distributors
NCSL	National Council of State Legislatures
NTTC	National Tank Truck Carriers
OOS	Out of Service
PHMSA	Pipeline and Hazardous Materials Safety Administration
PIH	Poison Inhalation Hazard
SA	Safety Assessment
SAFER	Safety and Fitness Electronic Records
SAFETEA-LU	Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users
SMS	Safety Management System
SSRS	Single State Registration System
THMSP	Temporary Hazardous Materials Safety Permit
TFI	The Fertilizer Institute
UCR	Unified Carrier Registration
URS	Unified Registration System

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EXECUTIVE SUMMARY

<u>Please note that since the initial writing of the draft for this report, there have been several changes to the HMSP program made or planned as a result of that analysis and recommendations. These actions or possible future changes since the draft report are presented in italicized text within this final report, while the remainder of the text (including any interviews, recommendations, or agency responses) has been kept within the context of the report's initial writing. The combination of the un-italicized and italicized information in this report provides an accurate representation of the current HMSP program.</u>

OVERVIEW

Section 33014 of the Moving Ahead for Progress in the 21st Century Act (MAP-21) required the Secretary of Transportation to conduct a review of the Hazardous Materials Safety Permit (HMSP) program and report the findings to Congress. MAP-21 also required the Secretary to, after submitting the letter report to Congress, either institute a rulemaking to make any necessary improvements to the HMSP program or publish in the Federal Register a justification for why rulemaking is not necessary. This research was conducted to support meeting those congressional requirements. The Federal Motor Carrier Safety Administration (FMCSA), which operates the HMSP program, managed the study.

This report includes:

- The detailed research results and supporting materials used for the original letter report to Congress (March 2014) and the follow-up summary letter to Congress (September 2014).[1,2]

- Initial actions taken by FMCSA in June of 2015 to implement some of the recommendations via policy change. **<u>Note that these actions taken since the draft report are presented in italicized text throughout this final report.</u>**

- Explanations for how FMCSA has taken other Agency actions, and may address more of the recommendations. **<u>Note that these other Agency actions and possible future actions are also presented in italicized text throughout this report.</u>**

APPROACH

First, the Agency conducted interviews with Federal subject matter experts, industry associations representing HMSP permit holders, and FMCSA personnel administering the HMSP program. Second, FMCSA reviewed all available data on the HMSP program and studied the applicability of the Compliance, Safety, Accountability (CSA) Safety Measurement System (SMS) to the HMSP program.

HMSP Program Overview

Motor carriers that transport congressionally specified quantities of certain types of hazardous materials (HM) are required to register as an HM transporter with the Pipeline and Hazardous

Materials Safety Administration (PHMSA) and obtain an HMSP from FMCSA. An HMSP is valid for 2 years from its date of issuance unless suspended or revoked.

To obtain or renew an HMSP, carriers must meet certain regulatory requirements, including: proof of financial responsibility, registration with PHMSA as an HM carrier, a satisfactory security program, and a communications plan.

In addition, carriers also must continue to meet four HMSP safety fitness thresholds for Crash rate and Driver, Vehicle, and HM out of service (OOS) rates ("HMSP thresholds"). The regulation states that FMCSA will not issue a safety permit to a carrier that has "a crash rate that is in the top 30 percent of the national average" or that has "a driver, vehicle, HM, or total out-of-service rate in the top 30 percent of the national average," as indicated by the data in the Motor Carrier Management Information System (MCMIS).[3] (Note. Operationally, these thresholds are calculated differently from what would be assumed from this description, as explained in online MCMIS documentation and in Section 5.4.) The carrier's performance is checked every 2 years at HMSP renewal.

New permanent HMSPs are only issued to applicants that have received a safety rating of "Satisfactory" from a comprehensive review (CR). *[This is now called a comprehensive investigation - CI. The abbreviation CI is used throughout the report instead of CR.]* If a carrier who has never received a CI applies for an HMSP and the carrier's safety performance data in MCMIS meets the other requirements, the carrier will be issued a temporary HMSP (THMSP). The carrier will be scheduled to receive a CI within 6 months, and a permanent HMSP will be issued if the carrier receives a safety rating of Satisfactory.

HMSP carriers got a "free" first year every time the HMSP was renewed. That is, an HMSP was issued for 2 years, but when the permit goes up for renewal, only the most recent 12 months of the carrier's HMSP OOS thresholds were examined.

> *The safety ranking process for HMSP carriers was changed by the Federal Register Notice (Vol. 80, No.118, p. 35253) issued on June 19th, 2015, titled* **Hazardous Materials Safety Permit (HMSP) Program: Amendment to Enforcement Policy.**
>
> *The previously required biennial reapplication process and review of the HMSP thresholds at renewal was replaced by monthly monitoring of SMS Behavior Analysis and Safety Improvement Categories (BASICs), which report a carrier's performance in various safety-related concerns. As a result, all HMSP carriers are in the Enhanced Oversight program that identifies HMSP carriers meeting certain parameters for investigation. Carriers may be identified for attention by the Enhanced Oversight for: 1) exceeding the HM BASIC threshold for 3 consecutive months; 2) exceeding 2 BASICs other than the HM BASIC for 3 consecutive months; or 3) having insufficient data, meaning that the carrier has no score in any BASIC for 48 months and the carrier's safety rating is 4 years old or older. This new process reduces the likelihood of surprise for carriers whose renewals would have been rejected at the previous 2-year reapplication and provides for due process should the carrier find itself in the position where their HMSP could be suspended or revoked.*

If an HMSP carrier receives a final safety rating below Satisfactory from a CI, the carrier's HMSP is suspended. In addition, if the carrier fails to meet other regulatory requirements (e.g., providing proof of financial responsibility), the carrier's HMSP may be suspended, and if a second incidence occurs, the HMSP may be revoked. A carrier whose HMSP is revoked may not be granted a new HMSP for at least 1 year.

It should be noted that many private HMSP carriers are small carriers, and a known weakness is that roadside inspection data reported to MCMIS (and thus SMS) does not receive enough roadside safety performance data to rank most small carriers by BASICs. That is addressed through the Enhanced Oversight program described above.

Since issuance of the new policy in 2015, the HMSP OOS rate thresholds are only used at initial application to determine eligibility to receive either a temporary or permanent HMSP.

MAP-21 Requirements

MAP-21 specified that FMCSA must consider revising the existing regulations to create a second level of fitness review prior to the denial, revocation, or suspension of an HMSP. Section 1 of this report, Background and Research Objective, presents this research's initial recommendations related to this requirement.

The June 2015 change in policy (referenced in above italicized text) implemented a process that establishes a second level of review before an HMSP is suspended or revoked.

Further, MAP-21 required a review of the following:

- The number of permits that have been issued, denied, revoked, or suspended since the inception of the program. (addressed in Section 5.3)

- The reasons for such denials, revocations, or suspensions (addressed in Section 5.4 and in Appendix C, which is in the separate document of all appendices).

- The number of carriers that have never had a permit denied, revoked, or suspended since the inception of the program (addressed in Section 5.3).

FMCSA's responses to these requests are summarized in Table 1.

Table 1. Responses to MAP-21 information requests.

Required Information	FMCSA's Response
The number of permits that have been issued, denied, revoked, or suspended since the inception of the program. (addressed in Section 5.3)	2,196 carriers received at least one permanent HMSP. 679 carriers received THMSPs but never received a permanent HMSP. 7 permits were revoked 200 suspension actions (includes any multiple suspensions on the same permit). 17,000 automated denials. Most of these do not represent an actual denial.
The reasons for such denials, revocations, or suspensions (addressed in Section 5.4 and in Appendix C, which is in the separate document of all appendices).	Denials (most of these denials were in error due to system constraints and were soon reversed or effectively never implemented): • The automatic check could not find the company registered with PHMSA (more than 10,000 actions) • The MCMIS database did not have the required minimum financial responsibility (liability insurance) • The company failed to submit an HMSP renewal application (approximately 1,000 actions) • The company did not certify that it had a satisfactory security program plan (more than 600 actions) • As pointed out above, the software associated with the MCS-150 automatically requires all intrastate applicants for HM to apply for an HMSP, which most do not need. When processed, they are switched from an HMSP application to an intrastate HM application. However, this shows up as a denial. Revocations: • Carrier received a safety rating of Conditional for the second time (2 revocations) • Related to conditions associated with carriers that were already suspended and going out of business (5 revocations) Suspensions: • Carriers received below a Satisfactory safety fitness rating and did not complete filing a CAP in time. (6 30-day suspensions) • Carrier's PHMSA hazmat registration was not found due to using a name match rather than USDOT number match. HMSP was immediately reinstated; functionally the carrier was never suspended (13 cases) • Carrier failed to pay a fine and received an OOS order (5 cases) • Carrier's safety rating was changed to below Satisfactory (80 cases). Many of these were reverted after the carrier's rating was changed back to Satisfactory. • Reasons for 102 actions could not be accounted for.
The number of carriers that have never had a permit denied, revoked, or suspended since the inception of the program (addressed in Section 5.3).	At least 1,567 of approved carriers were never denied, neither on application nor renewal. Of these: • 775 are still active HMSP carriers. • 506 are still active carriers, but are no longer HMSP carriers. • 286 are no longer active carriers.

Stakeholder Petition

On December 21, 2010, FMCSA received a petition entitled "Petition for Rulemaking—Hazardous Materials Safety Permit" from five industry associations representing private carriers. An excerpt from the petition is presented below:

"Petitioners ask FMCSA to modify the regulations governing the HMSP program to provide for the use of a six-year average when establishing the disqualification thresholds to reduce the impact of having carriers comply with a moving eligibility target, to smooth the differences that may occur from cycle-to-cycle, and to eliminate the impact of a single period with either abnormally high or abnormally low out-of-service rates. Petitioners also request that FMCSA begin averaging the vehicle, driver and hazardous materials out-of-service rates to create a blended disqualification threshold to avoid applying the disqualification criteria in a manner that renders more than 30 percent of the hazardous materials carriers ineligible to receive the HMSP and to reduce the bias against certain industry segments, such as the less-than-truckload, rural and local delivery carriers."

The petition was accepted by FMCSA on November 14, 2011, in the "Decision on Petition for Rulemaking." A copy of the petition and the FMCSA response is included at the end of Appendix A in the separate document. Section 8 of this report addresses how the recommendations of this study would address the points included in the petition.

Research Approach

The project scope and approach are described in the detailed work plan, included in Appendix P (in the separate document of appendices). The project addressed the questions in two parts. The first part was an interview process with Federal subject matter experts, industry stakeholders, and FMCSA program management staff. The second part was a data-driven analysis of MCMIS data. This involved analysis of the demographics of permittees and their safety performance both within the HMSP program and in general.

Analysis of Permit Holder Demographics and Safety Performance

Section 5 of this report examines HMSP thresholds, and it describes the hypothetical rates of violation of the HMSP thresholds if they were applied to: 1) all carriers, 2) HM carriers, and 3) HMSP carriers. Section 5 also presents the demographics of HMSP carriers with permits never denied, revoked, or suspended.

Section 5 describes how the 70–30 qualification concept was actually implemented for HMSP crash rates and vehicle, driver, and HM OOS rates. It presents analysis of the general impact of applying these thresholds to HMSP carriers, and it documents that this approach resulted in a much lower percentage of determinations not to renew than the petitioners alleged from the way the regulation language is stated.

Program Effectiveness Analysis

Section 6 of this report addresses several questions related to the effectiveness of the current HMSP program:

- Has the program improved the safety fitness of carriers enrolled in the program?

- Is the program, as currently constituted, accurate in identifying problematic carriers for sanctioning (i.e., denial, suspension, or revocation)?
- Does the program avoid sanctioning well-performing carriers?

This study's findings indicate that the safety performance of HMSP carriers: 1) is better than that of average carriers, and 2) was better than that of average carriers before receiving their HMSPs. Additionally, a modest improvement in the safety performance of HMSP carriers was found following the start of the HMSP program.

Evaluation of Alternatives

Interviewed stakeholders did not question the regulatory or compliance-based requirements of the HMSP. There was general agreement among all interviewees that these requirements are appropriate. Therefore, this report does not recommend changing the regulatory and compliance-based requirements. Rather, this report focuses on the safety performance criteria identified in the HMSP thresholds, and it focuses on their relationship to HMSP issuance, monitoring of safety performance, and renewal.

This report offers safety performance and enforcement/intervention-related alternatives in the following program elements:

- HMSP threshold calculation.
- Exceeding HMSP thresholds.
- Initial HMSP issuance.
- Monitoring safety performance of carriers with active HMSPs.
- HMSP renewal.

Section 9.2 provides a detailed evaluation of how each option addresses concerns in the petition and meets other MAP-21, administrative, and industry concerns.

RECOMMENDATIONS:

The resulting team recommendations are as follows:

Recommendation 1: Fully Utilize the SMS as Part of the HMSP Program

The study results indicated that the currency and accuracy of the data used to determine compliance with the HMSP requirements are major concerns for all involved. While the current established fixed rate for carrier OOS rates is an improvement over the recalculation of those rates every 2 years, wider use of available data will provide a more complete picture of motor carriers' compliance and safety histories. The following changes will be considered after conducting further analysis to determine the impacts on the use of SMS in the HMSP program:

- Utilize OOS and crash rates only on a carrier's initial application for an HMSP to determine whether the carrier should be denied entry into the program immediately.

HMSP thresholds are still used at the time of initial application to determine eligibility, but a different process for determining eligibility is applied at renewal time after the June 2015 policy changes.

- Place HMSP holders in the strictest SMS threshold category. This would lower the intervention threshold for HMSP carriers, aligning them with the standards for passenger carriers. This change addresses the potential for great harm resulting from a crash of a commercial motor vehicle (CMV) carrying an HMSP load.

After the June 2015 policy changes, HMSP holders are still evaluated at the HazMat threshold level.

- Increase oversight of HMSP holders by monitoring on a monthly basis using updated MCMIS data (rather than once every 2 years during the renewal process). Using this approach, poorly performing carriers could be identified for intervention much sooner. For example, if a carrier were to qualify for intervention from SMS BASICs or HMSP thresholds for 3 consecutive months, the carrier would be identified for a CI.

Monthly evaluation of carrier BASIC scores is now the implemented policy. However, FMCSA monitors the SMS BASICs at the HazMat threshold level, not the stricter Passenger threshold level. Because of budget limitations for software development, the recommendation to consider violations of the HMSP thresholds using the SDA process during monthly monitoring is not implemented. When needed, FMCSA conducts a CI as an intervention.

- Utilize the results of the CR*(CI)* intervention to determine whether the carrier is still able to operate under the HMSP requirements.

If the carrier fails the CI (receives a rating below Satisfactory), the carrier may appeal after assembling and submitting a corrective action plan (CAP) within a required time span.

Augmented monthly screening would provide a more powerful tool for promptly identifying HMSP carriers with serious safety problems, both overall and in particular areas of safety performance (i.e., crash rate, driver, vehicle, hazardous materials, or total OOS rates). Data sufficiency analysis (e.g., SDA) should be used to preclude inappropriate action against safe carriers mistakenly identified due to the randomness of limited data. This augmented SMS approach would:

- Eliminate the hardline denial of HMSP renewals for carriers demonstrating OOS and crash rates above those currently established.[i] This has been one of the industry's major concerns.

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[i] Vehicle OOS—33.33; Driver OOS—9.68; Hazardous Materials OOS—6.82; Crash Rate—0.136 (Crashes / # of Power Units).

- Provide a second level of review for upgrading a safety rating (that is below Satisfactory), using the administrative review process already in place (described in 49 CFR 385.17).

- Provide a strengthened, continuous monitoring process for HMSP carriers during the 2-year duration of the HMSP to promptly identify high-risk carriers that should receive a compliance review - *now comprehensive investigation* (to evaluate whether they still qualify for a safety fitness rating of Satisfactory).

In the proposed procedure, HMSP thresholds would be applied for the carrier's initial application. Once the carrier has a permanent HMSP, SMS would indicate whether a CI is needed prior to the recommended at least every 4 years. A rating of Satisfactory from the CI would allow the carrier to maintain its HMSP. If the rating is below Satisfactory, the carrier may apply the 49 CFR 385.17 process for upgrading a safety rating (thus providing the requested second level of review).

As noted above, a monthly screening of SMS BASICs has been implemented. Conducting a CI is limited to those who are identified by the Enhanced Oversight.

Recommendation 2: Institute an Ongoing Requirement to Conduct Compliance Reviews for HMSP Carriers with Insufficient Data for SMS to Calculate BASICs

It is recommended that HMSP carriers be required to have a CI at least every 4 years if sufficient safety performance data is not otherwise available. This will ensure that the carrier has either a current SMS safety performance ranking determination or a satisfactory "rating." Additionally, greater reliance on the CI safety rating process addresses industry concerns about the lack of a second level of review and corrective action plan (CAP) in the HMSP program. The CI safety rating process includes both an administrative review and the ability to petition for a change in safety rating based on corrective action (49 CFR 385.15 and 385.17, respectively).

As part of the June 2015 policy changes, small carriers with insufficient roadside safety performance data for safety performance ranking by SMS may only go 48 months before receiving a CI.

Note. This report identifies two additional statistical screening approaches of statistical significance for thresholds and SDA that could be implemented in the future to better identify small problem carriers with limited roadside inspection data more quickly.

Recommendation 3: Evaluate the Potential for an Automated Process for Monitoring Compliance with Financial Responsibility Requirements

The HMSP program review indicated that there is a significant workload and opportunity for error when it comes to determining permit holders' compliance with the financial responsibility requirements. As discussed above, many applications are initially denied or suspended due to the carrier's apparent lack of financial responsibility, only to be approved after FMCSA manually determines compliance. At the time of this analysis, the HMSP program is only able to verify compliance with insurance requirements manually every two years during application and

renewal. As such, there is some possibility that an unscrupulous carrier could lower its insurance coverage to the minimum required for a motor carrier, which is far below the HMSP-required level, without system detection after receiving an HMSP or renewal. An automated system to monitor and ensure that HMSP carriers possess and continue to maintain the required minimum financial responsibility could improve compliance with the financial responsibility requirements.

> *Further development of the Unified Registration System (URS), will require all motor carriers (for-hire and private) to provide proof of insurance at regular intervals, which will resolve this issue.*

Recommendation 4: Replace File Structure for HMSP Program

In undertaking the HMSP program evaluation, there were significant issues with retrieving, organizing, and managing data. Updating the file structures and supporting software used for the HMSP program would facilitate these functions for various actions and enable generation of reports that could routinely and more effectively evaluate program performance and trends. The initial step would be to develop functional requirements for supporting the HMSP program.

> *Further development of the URS could resolve a number of the cited information technology issues.*

Recommendation 5: Integration into the Motor Carrier Safety Assistance Program (MCSAP)

The study found a concern in the enforcement community regarding the States' inability/unwillingness to enforce the HMSP program requirements because they are not required to do so. Revising 49 CFR 350 (conditions for receiving MCSAP funds) to require States to adopt and enforce the HMSP regulations contained at 49 CFR 385, Subpart E would address this issue. In this scenario, the program would be strengthened, and newly-required State enforcement would allow FMCSA to identify carriers that are subject to the HMSP program but do not have an HMSP or have suspended or revoked permits. This would be especially helpful at the intrastate carrier level. To provide for a uniform and effective program, roadside inspections should be geared to identify and verify compliance of all carriers subject to the HMSP in all States, systematically.

> *In September of 2014, the Acting Administrator of FMCSA stated in a follow-up letter to the Senate Committee on Appropriations, "The Agency is planning a complete review of Part 350, which will commence in FY 2015. No additional authority is needed to implement this change. This change will improve the consistency and uniformity of interstate and intrastate hazardous materials programs."*

> *It is planned to address this as part of an update to the part 350 requirements for qualifying for MCSAP funds.*

Recommendation 6: Minor Revision to the PHMSA Registration Form

The lack of a direct cross-reference between data in FMCSA's systems and data in the PHMSA registration database for hazardous materials motor carriers created significant confusion and the potential for improper permit denials based on apparent lack of PHMSA registration as an HM carrier. If the USDOT number appeared as a mandatory field on the PHMSA registration form for HM carriers, it would significantly improve FMCSA's ability to interface with the PHMSA HM carrier registration database. A valid PHMSA registration as a HM carrier is an integral requirement for obtaining and retaining an HMSP, and requiring the USDOT number on the PHMSA registration form would streamline the HMSP process. By making the USDOT number a mandatory field for the registration information captured in PHMSA's database, MCMIS and the Hazardous Materials Intermodal Portal would be able to match information automatically and accurately.

> *As stated by FMCSA's Acting Administrator in the September 2014 follow-up letter to the Senate Committee on Appropriations, "Requesting a carrier include its USDOT number on the PHMSA registration form requires modifications to an Office of Management and Budget-approved PHMSA Information Collection." PHMSA's registration form now includes a field for the carrier's USDOT number, it just is not mandatory.*
>
> *It is planned to make providing the DOT number to PHMSA a required part of HMSP registration as part of the URS-2 planned rulemaking.*

SUMMARY

FMCSA provided the above recommendations for augmenting the HMSP program through rulemaking, policy changes, file structure and software changes, an enhanced screening methodology to identify HMSP carriers posing the highest safety risk, and implementing enforcement processes to address unsafe behavior in HMSP carriers. These recommendations:

- Address the need to harmonize operation of the HMSP program with SMS policies.
- Address petitioners' concerns regarding:
  - HMSP denial at renewal.
  - Undue hardship for small carriers caused by FMCSA's "statistically valid" standards for calculating a BASIC.
  - Primary criteria for retaining an HMSP (petitioners have stated that the primary criterion for retaining an HMSP should be maintaining a safety rating of Satisfactory).
- Incorporate a complete second level of fitness review—via the 49 CFR 385.17 appeal process—for established HMSP carriers that receive a rating below Satisfactory following a CI.
- Provide FMCSA with the policy flexibility needed for improved program monitoring and selectivity.

Efforts not addressed by the June 2015 policy changes remain contingent upon completion of other FMCSA priorities and the availability of resources to implement an enhanced HMSP program. FMCSA will continue to work toward implementing these changes in accordance with the requirements of MAP-21.

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1. BACKGROUND AND RESEARCH OBJECTIVE

Please note that since the initial writing of the draft for this report, there have been several changes to the HMSP program made or planned as a result of that analysis and recommendations. These actions or possible future changes since the draft report are presented in italicized text within this final report, while the remainder of the text (including any interviews, recommendations, or agency responses) has been kept within the context of the report's initial writing. The combination of the un-italicized and italicized information in this report provides an accurate representation of the current HMSP program.

1.1 PETITION FOR RULEMAKING

The petition entitled "Petition for Rulemaking—Hazardous Materials Safety Permit," dated December 21, 2010, was filed jointly by five groups representing private carriers whose dominant business is manufacturing hazardous materials (HM) commodities (and not for-hire transportation). That petition proposed regulatory changes for consideration by the Federal Motor Carrier Safety Administration (FMCSA). The petitioners stated that the proposed modifications were "necessary to ensure that qualified carriers are able to continue transporting permitted hazardous materials and to eliminate certain biases currently present in the program."[ii]

FMCSA accepted the December 2010 petition on November 14, 2011. In its response to the petition, FMCSA agreed to perform further analysis to develop recommended options, noting that the Agency would study each of the points suggested by the petitioners. However, the Agency noted that the study would take place after FMCSA issued a final rule regarding safety fitness determinations.

1.1.1 Key Petition Concerns

As mentioned above, the organizations who filed the December 2010 petition represented private carriers whose major economic activities are manufacturing HM commodities, not for-hire transportation. It should be noted that there was a split in opinion between these petitioners and the major associations representing for-hire, transportation-only providers.

The petitioners cited that many of their represented carriers use special equipment that cannot be used to transport other materials, and loss of their HMSP can effectively put these private carriers out of the business of transporting their own manufactured products. While the petition identified a number of detailed items, there were four key concerns, summarized below:

[ii] While revoking one of these private carriers' HMSPs may affect the carrier's operational approach for transporting its products, it would not necessarily put that parent company out of business. Other for-hire commercial carriers could transport the manufactured HM commodities (with the possible exception of explosive commodities that require special handling).

- Because the regulation cites four different 30 percent HMSP thresholds (crash rate, driver out-of-service [OOS] rate, vehicle OOS rate, and HM OOS rate), the petitioners asserted that more than 30 percent of HMSP applicants could be denied new permits or renewals.

- The application of the four HMSP thresholds can be arbitrary and capricious, resulting in biases in permit issuance that are based on the nature of the carrier's business or State of residence. This is because of differences in State enforcement practices regarding roadside inspections.

- There is no appeal process for the denial of an HMSP renewal. The petition states:

"Applying FMCSA's statistically significant standard, if two of at least three inspections result in an OOS violation in a 12-month period, the carrier will have to obtain at least 56 'clean' inspections using current HM OOS rates to qualify for an HMSP, and for each additional OOS violation the number of 'clean' inspections that must be obtained goes up by 28. In the rural and local delivery areas where these seasonal carriers operate, it is virtually impossible to obtain enough clean inspections to offset the impact of an OOS order, especially when the statistically significant standard is reached well into the 12-month period."

- There are opportunities for improvement in the administration of the HMSP system that would remove undue burdens on the carriers.

1.1.2 Analysis of Petition Concerns

1.1.2.1 Inaccuracy of the Allegation That More Than 30 Percent of HMSP Carriers May Be Denied Permits

The Federal Motor Carrier Safety Regulations (FMCSRs) specify denial of permits to carriers with crash and OOS rates in the top 30 percent of the national average, as indicated by data in the Motor Carrier Management Information System (MCMIS). As of January 25, 2013, there were more than 520,000 recently active carriers in MCMIS. A simple reading of this (using 520,000 as the base number) would be that an HMSP carrier's results must be no worse than the carrier ranked 364,000. However, only 31,390 of the 520,000 carriers had even 1 crash in 2012, which means 488,610 of the recently active carriers (94 percent) had no crashes. Thus, a simple interpretation of the top 30 percent could mean any carrier with even one crash would have a crash rate in the top 30 percent of the national average.

Similarly, only 10.1 percent of the recently active carriers had even one inspection with a driver OOS order, and only 19.4 percent of the recently active carriers had even one inspection with a vehicle OOS order in 2012. A simple interpretation of the specification in the regulation could mean that any carrier with even one inspection with a driver or vehicle OOS order would have an OOS rate in the top 30 percent of the national average.

Only 3.4 percent of the recently active carriers had even one HM inspection in 2012. Of the carriers that did have HM inspections, only 16.6 percent had an inspection with an HM OOS

order. A carrier with even one HM OOS order would not only be in the top 30 percent of the national average, it would be in the top 30 percent of carriers that had HM inspections.

In order to create a program that meets the test of reasonableness for HMSP thresholds, FMCSA made some assumptions when calculating the thresholds at the 70 percent mark. It only included carriers that had two or more crashes, or two or more of the specific type of OOS order. As a result, the calculated thresholds being applied by FMCSA are actually between three and seven times higher than the national average rates for HMSP carriers. This study estimated that just less than 5 percent of HMSP renewal applications were being denied at time of renewal for all of these thresholds combined. This is a stark contrast to the alleged more-than-30-percent asserted by the petitioners.

1.1.2.2 The Denial Process is Arbitrary and Capricious Because of Differences in Enforcement

The complaints related to the "arbitrary" nature of the safety performance review of HMSP thresholds performed at renewal fall into two general groups:

- Issues with specific factors, such as the adverse impact of placarding regulations on the less-than-truckload industry, and the impact of geography (i.e., differences in enforcement patterns between States).
- The difficulties associated with low numbers of inspections.

Specific Factors

Based on an analysis of the OOS information in MCMIS, this research estimated that the current rate of HMSPs being denied for the HM OOS rate is slightly greater than 1 percent, which does not appear to be the major issue being asserted. There are other forums for carriers that have issues with specific regulations.

It is a well-known fact that there are substantial variations among States in factors such as what percentage of inspections are issued OOS orders and the time lag for when crashes are reported to MCMIS. It is FMCSA's policy, as outlined in the Compliance, Safety, Accountability (CSA) program, that those State-operations differences are not a focus of the Agency.

Low Numbers of Inspections

Many small HMSP carriers receive few roadside inspections, and this is clearly an issue. Guidance to the public on calculation of crash and OOS rates indicates that FMCSA "does not consider a single crash" or "a single OOS inspection in any category" to be statistically valid. In addition, for calculation of any OOS rate, there must have been three inspections in the previous 12 months.[4] However, for the many small HMSP carriers, or for the HMSP carriers that do not operate much on interstate highways (where most roadside inspections are performed), two vehicle OOS orders over the course of three inspections will cause the carrier to exceed the threshold.

The recommendation of this report is to change the details for the HMSP thresholds so that FMCSA only targets an HMSP carrier if they exceed a threshold and they show both a statistically significant pattern of behavior ("modified HMSP thresholds" recommendation) and safety performance that is worse than the behavior of average carriers ("deviation" criterion recommendation).

Specifically, the recommendation is that FMCSA only target an HMSP carrier when there is a pattern of behavior that meets the 98 percent confidence level when compared to all carriers, or the 99.5 percent confidence level when compared to HMSP carriers. Further, it is recommended that this targeting be done as a monthly evaluation, not at renewal of the HMSP, and if the carrier is identified as exceeding a threshold, it should lead to a comprehensive investigation (CI)—not immediate denial of the HMSP.

This augmented monthly monitoring would identify a larger percentage of small carriers who are performing poorly (as opposed to only applying the Safety Measurement System [SMS] Behavior Analysis and Safety Improvement Category [BASIC] thresholds), but a percentage of the very small carriers still might never get enough inspections to calculate a rate. Adding the additional criteria of significant pattern of behavior requirement would:

- Avoid targeting carriers with average safety performance.
- Continue to target HMSP carriers with significantly poor safety performance.

This could result in at least approximately 40 percent fewer carriers being denied an HMSP renewal—perhaps even less, depending on the result of the CI for those targeted and any possible subsequent appeal.

1.1.2.3   No Appeal Process

The HMSP renewal process has no functional appeal process for carriers denied HMSPs for poor crash or OOS rates.

That concern is addressed in the review of the alternatives and the final recommendations in Section 9, Improvement in the Administration of the HMSP Process.

> *As stated in the Executive Summary, the CI process, which has a built-in appeal process, has been incorporated into the HMSP program as of the June 2015 policy changes, thereby creating an appeal process.*

1.1.2.4   Improvement of the Administration of the HMSP System to Remove Undue Burdens from the Carriers

The petitioners requested a number of changes to the HMSP process:

- Eliminate the double-counting of HM OOS orders.
- Remove crashes from the calculations when the carrier was not at fault.
- Improve the speed and quality of State reporting of crashes to MCMIS.

- Extend the time that carriers have to renew from 30 to 60 days.

Two of these suggestions—removing crashes from the calculations when the carrier was not at-fault and improving the speed and quality of State reporting of crashes to MCMIS—are FMCSA-wide issues. These issues are not specific to the HMSP area and are being addressed by other parts of the organization. Other petitioner suggestions have been accepted by FMCSA, often subject to information technology (IT) constraints.

The HM program has submitted IT change requests for a considerable number of items that would address numerous concerns raised. Implementation of these requests is subject to FMCSA's budgets and thus prioritization. Some of these modifications would be rather complex and costly with the current software.

One critical recommendation is to improve the Web interface (and printed instructions) to carriers submitting an MCS-150 so that carriers do not inadvertently apply for an HMSP. The overwhelming number of HMSP "denials" are really for carriers that are not currently transporting sufficient quantities of HMs to require a safety permit; either they thought they might like to,[iii] were incorrectly forced to apply for an HMSP by the software for intrastate HM carriers, or were transporting HM that could require a permit if the amount passed a threshold that the carrier did not meet/exceed (i.e., the carrier did not need an HMSP because their shipments did not exceed specific quantities defined by Congress for their HM). One especially significant example is carriers transporting anhydrous ammonia in bulk, but not greater than 3,000 gallons. These denials are resolved by the HM staff and don't prevent the applicant from operating in commerce in the first place, but they are recorded as "denials" by the current system, even when that applicant is found to not require an HMSP.

> *The switch from using the then MCS-150 and MCS-150B to the MCSA-1 under the Unified Registration System (URS) implementation addressed some of these issues as part of the applicant carrier completing the MCSA-1. The system rolled out use of the MCSA-1 for new applicants in December 2015. Use of the MCSA-1 for existing users to update their census data was subsequently included in the URS-1 update carried out in the latter part of 2016.*

1.2 MAP-21 HMSP REQUIREMENT

Effective October 1, 2012, section 33014 of the MAP-21 Act required FMCSA within 1 year to conduct a study of its HMSP program and report to Congress on the review's findings, i.e. by October 2013. The report requirement was to recommend ways in which FMCSA could modify the existing regulations that specify the HMSP program in order to improve the efficiency and effectiveness of the program.

The Act further required that within 2 years FMCSA either "…institute a rulemaking to make any necessary improvements to the HMSP program … or publish in the Federal Register the

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[iii] It is usually not beneficial for a carrier to maintain an HMSP if they do not intend to use it. The financial responsibility requirement of an HMSP is costly and is often too expensive for smaller carriers.

Secretary's justification for why rulemaking is not necessary." A copy of the MAP-21 provisions is included in Appendix A in the separate document.

One of the provisions in MAP-21 was for FMCSA to consider revising existing regulations to create a second level of administrative review for renewals of HMSPs, in addition to that already specified in Section 385.423(c). This addition of a proposed second level of review would only apply to cases where renewal of the HMSP is denied based on one or more OOS rates (i.e., it would not apply to denials based on crashes).

> *All of these were addressed by the June 2015 Federal Register Notice. Details are explained in the following sections.*

1.3 HMSP PROGRAM

Creation of the Federal HMSP program was required by the Hazardous Materials Transportation Uniform Safety Act (HMTUSA) of 1990 (see Appendix A in the separate document for text). This requirement for the HMSP program is codified at 49 U.S.C. 5109 and incorporated into the regulations in Title 49 CFR Part 385, Subpart E. Details of the program were specified in FMCSA's final rule for the HMSP program, which became effective for motor carriers on January 1, 2005. The regulation specifies numerous details necessary to create a program that are not included in the general requirements of the Act for implementing the HMSP program requirements.

Other than the general requirement that FMCSA must implement the HMSP program, including a minimum list of HMs that must be included on the HMSP list designed by HMTUSA (see: 49 U.S.C. 5109(b) in Appendix A in the separate document), the details of the existing HMSP program are almost entirely the creation of FMCSA by FMCSA's final rule that became effective January 1, 2005. Thus, FMCSA has considerable flexibility in changing the HMSP program via regulatory modification, so long as it remains consistent with the underlying act.

1.4 RESEARCH APPROACH AND RESULTS

In 2013 FMCSA engaged an independent contractor to help address the questions raised by the Petition for Rulemaking and the MAP-21 requirements for a report to Congress with recommended changes. The project scope and approach is set out in the detailed work plan included as Appendix P in the separate document.

The project addressed the questions in two parts:

- The first part was interview-driven, with an intensive interview process engaging FMCSA personnel in the field and at headquarters, who have varying ongoing responsibilities for administering the HMSP, and also eight external interviewees representing organizations whose members are permit-holders (for-hire and private) and who have a direct interest in the program.

With respect to the question of equivalency of State HMSP Uniform Program and FMCSA's HMSP requirements, the team conducted an external interview with the responsible staff member of the National Council of State Legislators (NCSL).

With respect to the question of the list of materials subject to the safety permit program, the Team reviewed past lists and considered means of determining risks associated with transport of the materials. Additionally, the team received recommendations as part of the interview process.

- The second part was data-driven and involved analysis of the demographics of permittees and their performance within the HMSP and overall FMCSA safety performance measures. The analysis led to consideration of establishing alternative HMSP thresholds, consideration of alternative means of obtaining a new permit, and consideration of alternative means of monitoring carrier performance after permits are issued. The potential effects of alternatives on existing HMSP carriers were analyzed.

To respond to the MAP-21 mandate, the contractor considered two distinct components of the HMSP program: program administration efficiency and safety performance of HMSP carriers. These components are discussed throughout the remainder of the report.

The team also participated in working sessions with FMCSA HM Division personnel to obtain guidance in developing its approach and constructing alternatives for consideration. These discussions were invaluable in helping the Team focus on feasible and manageable alternatives, and to secure the information needed for analysis.

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2. FINDINGS FROM INTERVIEWS

Interview topics for external and internal stakeholders were designed to address the range of questions raised in the Petition for Rulemaking and the MAP-21 requirements. The topics covered are included in the detailed work plan in Appendix P in the separate document. Interviews were conducted in person when feasible or through a teleconference. External interviews were limited to nine.

The following is a high-level summary of findings from the interviews. More detailed responses to questions are included as Appendix O in the separate document.

2.1   INTERNAL INTERVIEWS

2.1.1   General Questions.

The Team gathered feedback using a structured set of questions on issues related to the HMSP program (a summary of the feedback per interview question is in Appendix O in the separate document). Input was sought from a wide variety of internal stakeholders. Interviewees included approximately 40 Federal employees with varying involvement with the program, including managers and technical personnel in the field; managers and technical personnel at headquarters; information systems personnel; Compliance, Safety, Accountability (CSA) personnel; data processing personnel; and those directly responsible for daily details of HMSP applications and renewals, both within FMCSA and from a small but comparably representative set of personnel from Pipeline and Hazardous Materials Safety Administration (PHMSA) since HM carriers must register with PHMSA. Consideration was given to the different perspectives among the internal stakeholders by using a different set of questions for upper management.

With the exception of those questions posed specifically to upper management among FMCSA and PHMSA, an identical structured question set was used for both the internal stakeholders and the external stakeholders discussed in the next section. A copy of the interview questions is contained in the detailed work plan in Appendix P in the separate document. Topics covered include problems experienced with the HMSP program, its supporting information systems, perceived changes needed, and benefits of the program. The team also gathered responses to questions related to the list of HMSP commodities: whether the list should be revised, how to determine the degree of risk that warrants a permit, and how to define severity of an HMSP crash. A more general question set was used for top management. The responses from the interviewees varied according to their level of involvement with the program.

Feedback obtained from upper management personnel at FMCSA and PHMSA indicated that, for the most part, the program is meeting its purpose and mission, although it was mentioned that the criteria for getting and keeping an HMSP might not be stringent enough, which is consistent with the views of the for-hire HMSP carriers. Generally, interviewees were in favor of redefining the safety monitoring process to be more similar to that used by the CSA program or to tie the system to CSA and its supporting information system, SMS, so identification of possible problem carriers could become more dynamic. Suggested improvements included: 1) more roadside HM inspections, 2) looking at more than 12 months' worth of data for HM OOS rates,

and 3) perhaps adding another level of review before denying a renewal. In general, the idea of corrective action plans (CAP), as used under new entrant and CSA programs, was met with approval, but it was pointed out that if this was implemented, it should be constrained. Perhaps there should be a probationary period since staff need to review the CAP to see if a carrier is administratively able to implement the needed changes.

The majority of problems identified by the internal stakeholders primarily had to do with the confusing user guidance for the online MCS-150 application and update process. The guidance provided by the user interface, specifically about which carriers actually need the HMSP permit, causes numerous carriers to erroneously apply for an unnecessary HMSP. There is also confusion and difficulty during the permit renewal process, particularly for inexperienced carriers, related to completion of the MCS-150 or MCS-150B for HMSP carriers.

This issue is directly related to known needs of the HMSP program, particularly the need to improve the MCS-150's user interface. Based on information the carrier provides on the MCS-150, the carrier may be inappropriately prompted to fill out an MCS-150B for an HMSP. There is also a desire to implement a better way of alerting carriers of their upcoming renewal date and clarifying the length of time in which the permit-renewal can and must be accomplished.

> *Note, the MCS-150 was replaced by the MCSA-1 with implementation of phase I of URS-1 in 2016. That replacement started in December of 2015 for new-entrant carriers and was further rolled out as part of the URS-1 software in late 2016, which addresses the online update by all existing carriers. The new online MCSA-1 form for both new entrants and the biennial renewals provides a different user interface. The requirement for a biennial renewal of the HMSP during specific dates was also ended for all carriers. There is no registration renewal for any carriers, including HMSP carriers, provided they have updated their MCSA-1 census information at any time, as long as it is done at least every 2 years, and the other requirements for holding an HMSP continue to be met.*

Most internal responses indicated they were unaware of any way to quantify whether or not the HMSP program has reduced crashes or incidents in the HMSP carrier population. The supporting information system currently has no way of comparing crash statistics and data analysis within the HMSP carrier population to before they received their HMSPs. Section 6.1 of this report provides analysis that contributes to the understanding that crash rates were lower for HMSP carriers after being granted their HMSPs.

The main benefit of the HMSP program cited throughout the internal interview process is that the HMSP program raises the bar for HMSP carriers who are transporting higher risk commodities. Looking at detriments of the program, the consensus was that, because of serious limitations in IT budgets supporting operations information system processes, the customer service for HMSP carriers is cumbersome and confusing to small inexperienced motor carriers and a considerable burden for FMCSA. Under the existing information system, there are considerable work-arounds required of the HM headquarters staff to administer the program.

Most participants were comfortable with the current list of materials that require an HMSP, which came directly from the HMTUSA of 1990. A few questions were raised about explosives

and packaging and about quantities for hauling certain materials in bulk. The quantities issue came up again in relation to the question of how to determine the degree of risk that warrants requiring a safety permit and the potential impact of these crashes and/or potential terrorist threats. This issue regarding quantities and risk was also brought up in regards to defining the severity of these types of crashes.

A more detailed summary of stakeholder responses to these general questions can be found in Appendix O in the separate document.

2.1.2   Permit Denial (Initial and Upon Request for Renewal), Suspension, and Revocation.

The biggest concern mentioned was informing carriers about permit denial, suspension, and revocation in a timely fashion. Internal stakeholders also indicated that, for a carrier with a revoked or denied HMSP, there needs to be a better monitoring system between the State and the FMCSA Division office in the State where that carrier is domiciled. Unlike the small private carrier petitioners, most respondents were generally comfortable with the program's criteria for permit denial, suspension, and revocation. They generally agreed a second level of administrative review would be helpful, but they were also concerned about how resource-intensive a new activity might be.

The internal stakeholder group was aware of the potential for carriers with a revoked, denied, or suspended HMSP to reincarnate themselves as a new entity in order to re-start the HMSP process with a new permit. They perceived frequency of reincarnation to likely be comparable between HMSP vs. non-HMSP carriers, but there is greater safety risk from a reincarnated HMSP carrier because of the higher-risk materials they would transport (the issue of how carriers are gaming the system via reincarnation is discussed in Section 8.6.3).

> *Note, as part of implementing the new URS, FMCSA has implemented an operational reincarnation screening program for all new applicants for a USDOT number. That implemented an increased capability to detect HMSP carriers who are trying to reincarnate and prevent them from obtaining a new USDOT number.*

Some internal respondents felt that it would be appropriate for a carrier who was denied a permit to lease onto another HMSP carrier in order to continue operating, as long as the permitted carrier (lessor) actually fulfilled the requirements of ensuring the continued safe operation of the leased-on carrier. However, continued operation as a leased carrier could be contrary to the FMCSR 49 CFR 386.73, "Operations Out of Service and Record Consolidation Proceedings" (reincarnated carriers), issued April 26, 2012. Each case of a carrier denied issuance of an HMSP which has leased onto another carrier to transport HMSP materials would have to be individually reviewed on its legal merits to determine whether the carrier's intent is to avoid complying with an FMCSA requirement.

Additional feedback was received from the internal stakeholders with regard to regulation flexibility for specific issues (i.e. whether a tow truck needs HMSP credentials to provide emergency service to a disabled HMSP load) and whether there should be a stronger monitoring and intervention process during the two-year HMSP. This feedback may be found in Appendix O in the separate document.

2.1.3 Qualifications for Hazardous Material Safety Permit Carriers and/or Drivers

It was generally a consensus among the respondents that the standard for safety performance of HMSP motor carriers should be higher than for other HM carriers, and that it is essentially already in place through the application of the HMSP thresholds for obtaining an HMSP.

> *The June 2015 policy replaced application of HMSP thresholds as part of the renewal process with monthly monitoring to possibly require a CI. For budgetary reasons the recommended modified HMSP thresholds were not implemented as part of the monthly SMS BASICs performance monitoring. Therefore, the thresholds are not currently part of identifying possible problem small HMSP carriers with insufficient data for receiving an SMS rating.*

There were differences between for-hire and private carriers in their answers on whether to make the criteria for issuing an initial temporary HMSP more stringent for either a new entrant or an existing carrier.

There was the suggestion that in the future, if the request for a temporary HMSP was associated with a new entrant motor carrier applicant for an interstate U.S. Department of Transportation (USDOT) number, there should be up-front requirements for that applicant to demonstrate proficiency before granting them a temporary HMSP. It was pointed out that this would be a logical thing to include as part of the MAP-21 mandated requirement that new entrant applicants must pass a proficiency test and whatever else is necessary to ensure understanding of the safety regulations. An overview of research and the recommendation for such a blended curriculum for training and testing applicant new entrants can be found in the brief of that research[5] (which also links to the full report).

For existing motor carriers applying for an HMSP, it could be made a requirement for them to successfully complete an HMSP training and testing module that could be developed for the new entrant curriculum.

The question of whether a safety rating of Satisfactory should be the prime determiner of HMSP eligibility regardless of age of when that rating was received had mixed responses. The general feeling was that while such a rating is better than nothing, FMCSA must consider that the safety fitness determination system has changed in the past and it is proposed to change in the future under the announced planned new rulemaking for Safety Fitness. The reluctance to accept an older Satisfactory rating comes from two things:

1. The meaning of that rating has changed substantially in the past decades.
2. With the passage of time and changes in management of the motor carrier, the safety performance of the carrier may have changed from when they received that rating.

The generally agreed-upon solution for addressing these problems is to specify that safety fitness ratings expire for purposes of obtaining or renewing an HMSP, and a couple of expiration timeframes were suggested.

Obtaining a current safety fitness rating is a question of available resources, which was a common concern of respondents. Under the current system a safety rating is determined only as a result of conducting a CI. Thus, for example, there currently are a few less than 1,500 HMSP active carriers. If the permit expired every 6 years, it would mean approximately 250 of them would need a CI every year to obtain a current safety fitness rating. If instead the permit expired every 4-years, that would mean approximately 375 CIs of HMSP carriers would be needed each year.

> *Effective via the Federal Register Notice of June 19, 2015, it became FMCSA policy that all HMSP holders with insufficient data to produce a score in any BASIC within the previous four years and with a safety rating that is four or more years old will receive a CI.*

It was almost universally agreed that drivers with an HM endorsement, who are required to receive separate training and certification every 3 years, should not be required to carry copies of certificates of HM training or HMSP-specific training. Instead it was fairly commonly agreed that it would be desirable to have information about the current status of HM certification available on the electronic driver record, comparable to what is being done for medical certification status.

2.1.4 Data Support/Applications Process

Internal field personnel's frustration with IT supporting the HMSP program cannot be overemphasized. By general consensus, improvements are critically needed in the user interface for the MCS-150 and MCS-150B online applications and in verifying accurate data. Field personnel voiced their experiences of many wasted hours.

> *The new MCSA-1 has replaced the MCS-150 and MCS-150B, and addressed the issues identified as being problems with the old online forms.*

The current automated HMSP system is incomplete and requires many manual work-arounds, which are resource intensive, cumbersome, and frustrating for both FMCSA and motor carriers.

The interview process also identified that when an existing motor carrier submits an MCS-150B to apply to become an HMSP carrier, information of this change from regular carrier to HMSP carrier is not communicated from MCMIS to the Licensing and Insurance (L&I) system. Thus, the L&I system does not know that the minimum required insurance must be increased from the $750,000 minimum for a regular motor carrier to possibly $5 million for certain HMSP carriers. This causes considerable frustrations and administrative workload with insurance companies, who as part of the carrier's requirement to maintain proof of financial responsibility, the insurance provider must annually report the insurance information to the L&I system. The information provided to them by the L&I system incorrectly still says only $750,000 is required, even though the carrier is now in the HMSP program.

Specific information system recommendations and issues related to data support and the application process can be found in Section 10 of this report.

After this research was completed, it was found that, although there were some problems with carriers making incorrect decisions while filling out the then MCS-150 because of the poor guidance provided by the MCS-150 user interface, the poor judgements are not as prevalent as they first appeared. There was another problem that was causing all intrastate HM carriers to automatically be required to submit an MCS-150B. That was fixed. More importantly, the MCS-150 and MCS-150B were subsequently replaced with roll out of the new URS system, with the multi-purpose MCSA-1 form replacing all other forms, including the MCS-150 and 150B.

The big problem was for intrastate applicants who were told to apply for the HMSP when they did not need to. That occurred because of a software simplification assumption made when the HMSP program was rapidly developed in 2004. The result was that every intrastate hazmat carrier was forced to get an HMSP, even though most HM carriers do not need that permit. Although this has not been addressed as part of the new logic that implemented the MCSA-1, it continues being handled manually by HM Division personnel who check and intervene to prevent these incorrectly software generated requirements from moving forward.

2.1.5 Enforcement

It was generally agreed that the fines in place for violations and violation notices are working. It was suggested that the best concept for getting HMSP carriers to comply would be to implement a monetary fine with potential for abatement; if things are done to correct a problem within a specified timeframe, its fine would be abated. Such an approach was used in the past and should be considered for reinstatement.

It was pointed out that fixed inspection places like scales, primarily on interstates, shouldn't be solely relied on for enforcement of HMSPs. Cooperation with the State police is needed to enforce on other roads, like Federal primary routes, to catch the smaller carriers operating locally.

To make States enforce the HMSP requirements, the MCSAP requirements established by part 350 should be revised to include enforcement of part 385 subpart E. The plan is to address this as part of the planned revision of part 350, which is discussed in greater detail in Section 8.6.2.

2.1.6 Carrier Concerns

FMCSA must process a large number of HMSP applications for carriers who don't need the permit. As noted above, this is partly because of the problematic user guidance for the MCS-150, which causes carriers to inappropriately stumble or be forced into the HMSP program.[iv] The more important issue, however, is that the older software incorrectly requires all intrastate HM carriers to apply for an HMSP.

[iv] As mentioned in italicized text earlier, this was not as significant of a problem as was previously thought, except for intrastate HM carriers.

The application process is also overly long, and there is confusion among the carriers when notification letters are received. At least one such letter notifies them their application is being processed, leading many to incorrectly assume the permit was issued.

A major concern among carriers, especially those who don't haul HMSP materials often, is how to get clean inspections reported to MCMIS in order to keep their OOS rates down. However, interviewees indicated part of this might be due to confusion over what qualifies as an inspection versus a screening or credential check to determine if a probable cause exists for an inspection. The common complaint is that inspections are targeted towards vehicles with observable violations because of some States being probable cause States. It is impossible to get clean inspections reported by such States[v]

2.1.7 Uncertainty in Program's Usefulness

Some participants questioned whether the HMSP program is needed. Their suggestions involved evaluating what the program's goals are, whether they are being achieved, and whether the program should continue to exist (Section 6 of this report discusses the overall effectiveness of the program).

Given that the program is mandated by congressional legislation, discontinuing the program is not an option.

2.1.8 Suggestions

Internal interviewees provided the following suggestions:

- Change the timeframe for permit renewal from 2 years to something longer (e.g., 4 or 6, years) and make the process clearer by implementing better user interfaces.
- Assure that applications will not be pending for months.
- Increase transparency, consistency, and communication; automate more.
- Start with the data—needs to be reliable and accurate.

As indicated above, generally the internal participants who were interviewed did not have many ideas beyond some adjustments to the current HMSP program.

2.2   EXTERNAL INTERVIEWS

Interviews with eight of the nine external stakeholder groups used the same structured question sets as interviews with the internal stakeholders. The interviews were structured to conform to each group's individual role and relation to HMSPs.

Six of the eight stakeholder associations represented small private motor carriers whose primary business is not for-hire transportation. Their members are engaged as a combination of private motor carriers, shippers, and industry entities associated with HMSP transport, including

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[v] Under the CSA program, States are encouraged to upload reports of their screenings in addition to their inspections

manufacturing, labeling, packaging, loading, and so forth. Five were signatories of the petition for rulemaking filed on December 21, 2010, that suggested regulatory changes to the HMSP program. These six are:

- Institute of Makers of Explosives (IME), Washington, D.C.

- The Fertilizer Institute (TFI), Washington, D.C.

- American Pyrotechnics Association (APA), Bethesda, MD.

- Agricultural Retailers Association (ARA), Washington, D.C.

- National Association of Chemical Distributors (NACD), Arlington, VA.

- Dangerous Goods Advisory Council (DGAC), Greenbelt, MD.

For the interviews, a number of representatives from these stakeholders met together in a group session.

On the other hand, the members represented by the following two associations are dominantly for-hire motor companies. Many of these have at least some portion of their business engaged in hauling ordinance or other materials for the U.S. Department of Defense. There were noticeable differences in their opinions about the program and on what changes should be made in the HMSP program.

- American Trucking Association (ATA).

- National Tank Truck Carriers (NTTC).

The interview with the NCSL about the Alliance for Uniform HM Transportation Procedures focused primarily on State programs' equivalency to the HMSP program, with NCSL's representation of the public through a bipartisan assembly of legislators and staffs of the Nation's 50 States, its commonwealths, and its territories. Results from that are presented in Section 3.

2.2.1   General Questions

There was very strong consensus among the six groups representing private carriers whose primary business is not for-hire transportation ("private carrier groups/stakeholders") that they do not believe the criteria for issuance or renewal of an HMSP is appropriate for measuring safety. Further, they do not believe that the problem the HMSP program was supposed to fix actually exists.

Among the six private carrier groups, the major issue raised was the uncertainty that many of their member motor carriers face when it comes to renewal of their 2-year HMSP. This is largely driven by uncertainty of how their vehicles are selected for a roadside inspection that will be reported to MCMIS. The groups assert that it is extremely difficult in a number of geographic locations to be selected for an inspection that will be reported as a good or clean inspection. Thus, it is impracticable, and perhaps impossible, for some carriers to lower their OOS rates by getting clean inspections. They felt strongly that until administration of the inspection system is changed, the HMSP program should be suspended or discontinued.

(In noticeable contrast, as pointed out by the for-hire carriers below, only inspections with OOS violations count in the calculation of the OOS rates; inspections with violations unrelated to the OOS criteria have no effect on OOS rates. This means the petitioning carriers' problem is not having flawless inspections; their problem is that their inspections frequently end in OOS violations. That implies they likely have a safety issue they are not appropriately addressing.)

The six private carrier stakeholders felt that this program is not intended to reduce crashes, and these six stakeholders assert the data shows it has not done so. An additional detriment to the program, in their view, is that FMCSA is very slow in responding to and addressing their perceived issues. It was suggested that the list of materials requiring an HMSP be revised. See Section 1 for a discussion.

Generally, these six stakeholders desire some latitude to mitigate issues with the permit renewal process that they alleged to be circumstantial. They say there needs to be an opportunity for a direct appeal or a waiver as part of the permit denial process.

On the other hand, ATA and NTTC (representing for-hire carriers) recommended virtually the opposite. Namely, there should be additional and more stringent criteria imposed for qualification, comprehensive investigations, levels of financial responsibility, and more. From ATA and NTTC's perspective, the thresholds force the applicants and permit holders to get better, and there's no problem with the way FMCSA implemented the 30 percent thresholds.

Several external stakeholders noted that the petitioners' fixation on getting clean inspections is misinformed. Only OOS violations are considered in the framework of HMSP as counting toward one of the thresholds. Therefore, an inspection may find violations, but from an HMSP threshold perspective, it could still be a "good" inspection, so long as there were no OOS violations.

2.2.2   Qualification for HMSP Carriers and/or Drivers

The six private carrier groups claimed that relying on OOS rates for HMSP renewal is a problem. They feel their excessive OOS orders are more issues of compliance with the Federal Motor Carrier Safety Regulations (FMCSRs) and Commercial Vehicle Safety Alliance's (CVSA's) OOS criteria rather than an actual lack of safety; they believe that the OOS criteria, in a number of cases, are not really crash-related (see Appendix Q in the separate document for an analysis that contradicts their assertion and supports the predictive nature of these violations and OOS orders). They also mentioned that until they know what the announced planned new safety fitness determination process will be (i.e., the planned rulemaking revising the safety fitness determination), it can't be determined whether HMSP renewal should continue to depend on motor carriers having Satisfactory safety ratings.

2.2.3   Data Support/Applications Process

Stakeholders brought up that the inspection and crash data used to calculate a motor carrier's crash and OOS rates is not recorded into the system in real time. In particular, crashes can lag in being recorded. MCMIS's data may be out-of-date at the time of renewal, including OOS and crash rate data, causing uncertainty in the accuracy of an evaluation during the small 30-day window of time allowed for renewal.

The use of HMSP crash and OOS rates for determining renewal of an HMSP was replaced by the new policy issued in June of 2015.

2.2.4 Enforcement

There was consensus among the six private carrier stakeholders that there needs to be clarification both in FMCSA's systems and in policies followed by State enforcers. In particular, they were concerned that only a limited number of roadside inspectors are qualified to do HM inspections, which further limits the number of roadside inspections that can be conducted and reported.

2.2.5 Carrier Concerns

The carrier feedback that the six private carrier representative groups provided about application processing and renewals is that the timeframe for renewal (30 days) is very short. The mandated renewal time period can occur during the busiest time of year for some of their members, when they do not have spare time for administrative matters. They pointed out the time required includes dealing with numerous logistical issues discussed above when submitting MCS-150Bs and especially the other manual information required by FMCSA.

The concern about possible borderline HMSP threshold rate status, especially for denial of HMSPs, caused by targeted roadside inspections illustrates the need for there to be an appeal process for addressing performance-mitigating circumstances.

In sharp contrast, the two for-hire carrier representative groups had no major concerns.

> *At the time this analysis began, the renewal timeframe was 30 days before the end of the 2-year permit. It was then expanded to 60 days. However, subsequent to completion of this analysis FMCSA changed its policy for all carriers regarding the required biennial update of census data. Namely, new FMCSA policy now allows for any carrier to update their census data anytime during the two years they so desire. The only restriction is there must be such an update at least every 2 years or the carrier's USDOT number will be canceled.*

> *A result of that policy change meant that HMSP carriers could update their then MCS-150B any time they wish, i.e., the 60-day window was no longer applicable. The June 2015 policy notice in the Federal Register for HMSP carriers mentioned this change. Thus, as long as an HMSP carrier updated its then MCS-150B within the 2 years and was compliant with the criteria in §385.421, the carrier would be renewed. (In December of 2016 with the rollout of URS, the MCS-150B was replaced with the MCSA-1.) The carrier is separately subject to possibly being prioritized by SMS to receive a CI. Carriers with insufficient roadside inspection data to be ranked by any SMS BASIC and who have a safety rating 48 months or older will receive a CI.*

2.2.6 In Summary

The consensus of the six private carrier groups recommended doing away with the HMSP program. Other options were to 1) suspend it until there are more resources, 2) provide an additional level of review and due process, or 3) fix the HMSP so carriers are subject to SMS BASICs thresholds rather than the HMSP thresholds.

These groups also want a process for small carriers to be allowed back into good graces – they believe there is a problem with what they perceive as the 30 percent HMSP thresholds at renewal and difficulty of getting "clean" inspections reported to MCMIS. The stakeholder groups claim small carriers might be just as safe as larger carriers but were silent on why small private carriers have higher crash and OOS rates than the for-hire HMSP carriers, who are not having a problem with the current HMSP program.

The two for-hire groups are supportive of the HMSP program and even favor establishing more stringent requirements. From a for-hire carrier's perspective, the HMSP program is both an asset from a marketing perspective and a powerful defense mechanism for when they are involved in crash litigation. (The HMSP inhibits the rise of unsafe competition and certifies a company as having safety performance adherent to a government standard.)

The internal interviewees' and external stakeholders' general feedback and suggestions for possible changes to the HMSP program are summarized above; specific recommendations from either group that relate to possible regulatory changes, if any, are itemized below.

Significant recommendations for regulatory changes to the HMSP program are as follows:

- FMCSA needs more authority over every aspect of HM transportation, not just the motor carriers.

    (While not exactly dealing with authority, how to more meaningfully carry out FMCSA's oversight and enforcement responsibilities for other aspects of the HM program than carriers is a subject of a separate research project. That project has identified significant IT limitations, which while quite different are also quite analogous to those identified in this research project. The two projects could possibly commonly benefit from implementation of supplemental communicating IT system capabilities with MCMIS.)

- States should be required to adopt and enforce 49 CFR part 385 subpart E.

- Clarification on how shippers verify the validity of a carrier's HMSP. This could be provided in the required revision to the HMSP regulations.

- The information system should be revised to show active HMSP carriers still have a valid permit during the renewal process.

- For the list of commodities requiring an HMSP to ship, there should be clarification on explosives and possible changes to hazardous zone D, which includes anhydrous ammonia, possibly up to eliminating that category.

- Modify the permit denial, suspension, and revocation process based on the upcoming Safety Fitness Determination (SFD) rulemaking.

- Fix the hole for "implements of husbandry"—FMCSA's current position, which has no basis in regulation, is to honor each State's position on intrastate transportation of these items—currently some States have no requirements for driver qualifications, lights, brakes, etc.

- Provide more resources to upgrade the data support/application processes, the first priority being the MCS-150 interface and instructions.

The MCS-150 was replaced in December of 2016 with the new unified form, MCSA-1.

Recommended regulatory changes from the external stakeholder groups (e.g., IME, TFI, APA, ARA, NACD, DGAC) are as follows:

- Verbiage in the rule needs to be changed; this was addressed in the Petition for Rulemaking and is further discussed in Section 1.1 above and Section 9.2.2 under Table 10.

American Trucking Associations (ATA) and National Tank Truck Carriers (NTTC), the for-hire carrier representatives:

- The contrasting position to the six private carrier groups related to any potential regulatory changes are addressed in both section 2.2 and in the separate appendices document.

3. STATE-EQUIVALENCY AND UNIFORM PROGRAM OPTIONS FOR SAFETY PERMITS

MAP-21, Section 33014 directs the Secretary of Transportation to review the criteria used by FMCSA to determine whether an HM permit issued by a State is equivalent to the HMSP. As background for addressing this requirement, the team reviewed the history of the equivalency concept, related fee systems, industry related concerns, and the plan for the Uniform Program (explained in Section 3.1) put together by the working groups authorized by Congress in the HMTUSA and Safe Accountable Flexible Efficient Transportation Equity: A Legacy for Users (SAFETEA-LU) act. These provide background to possible approaches for development of equivalency criteria and administration of an equivalency concept with the States' Uniform Program. As part of this review, the team interviewed the lead staff official of the NCSL, and obtained documentation produced by the working groups chartered by Congress to review the Alliance for Uniform HM Transportation Procedures.

3.1 PROGRAM HISTORY

Through the HMTUSA of 1990, Congress authorized chartering a working group of State and local officials to devise a uniform approach for States' registrations, permit forms, and procedures for HM carriers.

Titled, "Alliance for Uniform HM Transportation Procedures," the working group consisted of 28 elected and appointed officials from 22 States and several organizations. The uniform procedures called for a reciprocal, uniform, base State system for ensuring HM transportation safety, with a State-operated regulatory methodology similar to the International Registration Plan (IRP), International Fuel Tax Association (IFTA), State HM routing, and Uniform Registration System (old Single State Registration System [SSRS]), whereby a motor carrier's base State would issue the uniform registration and permit and collect fees.

The authorizing legislations, both HMTUSA and SAFETEA-LU, forbade the working group from setting fees that could be charged by States. However, during the court challenges to the flat fee systems then in use by some States, the courts had found that flat fees are unconstitutional, because they assess all payees the same regardless of their proportional impact and presence in the State. Therefore, the Alliance recommended an "apportioned" fee system as a way to overcome the legal challenges of State flat fees, lending revenue stability to State registration and permit programs. The NCSL Web site addresses the fee-structure recommendations of the Uniform Program as follows:

> The recommended program did not mandate a fee structure. States can still assess fees as they decide as long as the revenue is used for hazardous materials transportation activities and they don't interfere with interstate commerce. Fees must also meet the fairness test under the dormant commerce clause found in Evansville (92 S. Ct. 1349) (1972). This test says a fee is fair if it is based on a fair approximation of use of the State facilities, is not excessive in relation to benefits conferred, and does not discriminate against interstate commerce. "Flat tax" fees assessed per vehicle or per trip per vehicle have

been preempted because they fail the "internal consistency" test of the commerce clause as an undue burden on interstate commerce. Essentially, these fees are not equitable to nationwide carriers. To address these fee issues, the Alliance has recommended a fee structure that apportions fees based on miles and hazmat activity.

States that issue permits under the Uniform Program's recommended fee structure would have reciprocity with each other. In keeping with the authorizing legislation, States would retain individual enforcement authority. A governing board of participating States would oversee the uniform administration of the program and settle disputes. States participating in the Uniform Program would use the same forms and procedures. Conversely, States that choose to not regulate in such a manner would not have to participate in the Uniform Program and could continue operating their intrastate HM programs autonomously.

The HMTUSA of 1990 essentially exempted participating States from the antitrust provisions of the Sherman Act for the Uniform Program. Through an open process that included State, industry, and environmental representatives, a strong, State-based and nationally uniform program was devised.

HMTUSA Section 5119 (see Appendix A in the separate document) specifies that FMCSA must issue regulations for accepting permits from participating uniform States if 26 of them adopt the uniform forms and procedures. This number of 26 States (i.e., the majority of States) contributes to an understanding that the uniform forms and procedures are intended as a functional analogue to what was accomplished via other cooperative State programs. Examples include IFTA, IRP, the Unified Carrier Registration (UCR) plan which replaced SSRS, the HMs routing, and the Commercial Driver License (CDL)/CDL information system (CDLIS) programs. (In the last case, the standards are set by FMCSA, not by the States.) The goal is to standardize administration and collect State fees/taxes for State HM permits while achieving at least some minimum level of improved safety performance. There is no preclusion from FMCSA accepting permits from participating uniform States for those States that currently participate.

Moreover, section 7116(f) of SAFETEA-LU requires the Secretary to issue a regulation(s): "Not later than 18 months after the date the working group's report is delivered to the Secretary, the Secretary shall issue regulations to carry out such recommendations of the working group as the Secretary considers appropriate. In developing such regulations, the Secretary shall consider the State needs associated with the transition to and implementation of a uniform forms and procedures program." The SAFETEA-LU requirement does not include any numeric level for number of States.

Notwithstanding, this provision implies that the Secretary is required to issue a regulation implementing the Uniform Forms and Procedures and that consideration should be given to a Federal support program to assist bringing it to fruition. Federal grant funds were initially provided to assist the creation and functioning of the State Uniform HM working groups (Federal grant funding of the working group was terminated at the end of 2009 for the Uniform Program).

The criteria and standards for the Uniform Program appear in the NCSL's administrator's manual for the uniform State HMs transportation and motor carrier permit and registration

program. It was developed by the Alliance for Uniform HM Transportation for NCSL in consultation with alliance member States, with Legal Assistance from Fairfield and Woods, P.C.

As of 2013, the fifth revision of that publication, dated July 15, 2009, is provided to participating States by the NCSL. The 95-page publication includes an introduction, history, and complete overview of the program, including methodology for participation, uniform program applications, permits and registration, forms, method and procedures for processing and reviewing applications, governance of the program, and dispute resolution, with appendices describing laws and member State contacts.

3.2   PILOT PROGRAM AND STATE INVOLVEMENT

A pilot test evaluation of the uniform program began in March of 1996 and included Minnesota, Nevada, Ohio, and West Virginia. Illinois became the fifth State to adopt the uniform program, but later opted out.

Michigan considered joining the program in the mid-90s and had legislation pending in both houses. Tennessee also entertained legislation at that time, but it became embroiled in a dispute over which agency would run the program and the disposition of an existing permit program with a $650 fee (that fee was an example of what has now been determined an unconstitutional flat fee).

Interest had been expressed in many States, including California, Colorado, Missouri, New Jersey, New York, Oklahoma, Wisconsin, and Wyoming. California and New Jersey studied the uniform program extensively and had representation in the original working group. According to NCSL, these two States became skeptical about how rigorously other States would implement it given no Federal regulation to equivalate the Uniform Program permit with the Federal HMSP. Potential State entrants were said to hesitate due to the lack of Federal action confirming the Uniform Program. States would not want to adopt the existing uniform program and then need to change if the Federal rule became different.

3.3   STATES' PERSPECTIVE OF THE UNIFORM PROGRAM

The State uniform program's feasibility can be drawn from the past efforts of the NCSL, the uniform pilot program conducted in the 1990s, and the status of the uniform program today.

Currently (2013) there are five States engaged in the uniform program: Michigan, Nevada, Ohio, Oklahoma, and West Virginia. The NCSL Website shows status of individual States' involvement in HMs registration and permitting.[6]

3.4   NCSL UNIFORM STATE PROGRAM COMMENTS

This section provides a commentary (acquired through an interview with a staff member of the NCSL) on the uniform program, a review of materials provided, and their Website description for the uniform program, which is as follows:

The essence of the program is a base State system whereby a motor carrier of hazardous materials obtains credentials in the State the carrier travels the most miles. These credentials are good in all participating jurisdictions. A benefit of the program, if adopted, is that a State can now more carefully evaluate fewer trucking companies because the burden is spread among the member States. States may choose to regulate all hazardous materials or a subset like hazardous waste. The program consists of three components-registration, permitting, and hazardous/radioactive waste disclosure. A governing board, made up of participating States, oversees the program to ensure consistent program standards and to build trust among States.

Since 1994, NCSL has officially supported the Uniform Program, meaning three-fourths of States represented by NCSL have agreed to this position.

It is important to note that the Uniform Program is for all HMs (i.e., it is not limited to the minimal commodities spelled out in section 5109 of the HMTUSA, which the Federal HMSP program regulates). Of the five States currently participating in the Uniform Program, West Virginia's and Ohio's provisions come closest to those of the Federal HMSP program. Other States involved are Nevada and Oklahoma, with a variation of uniformity.

A dozen States have taken a close look at this. Massachusetts considered legislation that was not passed, as did Texas, Washington, and Idaho. The list of HMs taken from the HMTUSA was the same for both States and Federal. Two States dropped out because their intrastate motor carriers did not want to pay nominal fees. The benefits of the program are mostly for the regional and national carriers, who under this program can be approved to transport HM in all the States that participate in the Uniform Program.

At this point in time, a number of States are not interested. This is because in January 2005 the Federal Government finally implemented the HMSP program required by the HMTUSA, which covers the very dangerous commodities specified in Section 5109 of the HMTUSA. However, there are different issues. The Uniform Program addresses the State-permitting requirements for transportation of the commodities. The Federal HMSP program addresses whether the carrier is qualified to transport the commodities, not the State permitting requirements. Intrastate carriers would not benefit from the Uniform Program since they only need to deal with a single State's HM regulations.

If the Federal HMSP program addresses the same problem as the Uniform Program (and does so adequately), NCSL finds the Uniform Program potentially unnecessary. A concern at one point for the NCSL group was whether the Federal HMSP overlapped the States', but that is not much of an issue now that many States have withdrawn from the Uniform Program.

Interstate carriers may be interested in raising the issue of a State Uniform Program again. However, States have less incentive to support the effort since the Federal HMSP program is already in place. States don't want more regulation, and their intrastate motor carriers do not see any benefit.

In essence, the States generally feel the HMSP is sufficient and have little incentive to pursue the Alliance's Uniform Program approach. This, together with the termination of Federal grant funding in 2009, has caused the Alliance to lose virtually all of their momentum for implementing a uniform State HM permit program.[vi] Additional information is contained on the Website for the NCSL.[(7)]

Based on recommendations in this report, FMCSA will presumably revise the requirements for obtaining and retaining an HMSP. According to the requirement specified at 49 CFR 385.407, FMCSA could recognize a motor carrier as having met the requirements of obtaining an HMSP if the issuing "…State has adopted and implemented safety fitness procedures that are equivalent to the procedures in subpart A of this part…" (i.e., if the State standards are equal or more strict than FMCSA's standards). This flows from the fundamental FMCSA requirement that a carrier must have a Satisfactory safety rating to qualify for an HMSP.

FMCSA announced a planned rulemaking effort to revise the procedures for determining the safety fitness of a motor carrier. In order for the Uniform Program to be recognized as equivalent to FMCSA's HMSP program, the States' Uniform Program would need to determine a safety fitness rating for applicant carriers in a manner equivalent to whatever is used by FMCSA, which would also apply to the HMSP program.

3.5   CONCLUSION

Based on the reported lack of support by the dominant intrastate motor carrier industry and the majority of State legislatures not participating in the Uniform Program, it seems unnecessary to specify procedures for State-issued HMSP-equivalent permit programs. States appear to think that it would be inefficient for each of them to duplicate at their expense the Federal HMSP program.

[vi] It should be noted that the sensitivity by the States for their sentiment regarding a lack of Federal support, including pecuniary and encouragement, occurred in the early to mid-1990s, which considerably predates FMCSA's implementation of the HMSP program; the States' assumption may not be factual at this time.

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4. HOW MIGHT THE LIST OF HAZARDOUS MATERIALS REQUIRING SAFETY PERMITS CHANGE

USDOT regulates the transportation of all HM under the Hazardous Materials Transportation Act of 1975 (HMTA) and helps ensure that United States regulations are consistent with international regulations. USDOT uses a United Nations classification system to divide all HM into nine hazard classes. [8]

The list of HM proper shipping names (PSN) appears in Title 49 CFR Section 172.101 issued by PHMSA. As new HM PSN are created, they are added to the list.

The list of HM requiring an HMSP is a subset of the HM list and addresses only high hazard HM; the list also specifies the minimum quantities for each material to require an HMSP.

HMTUSA specifies that high explosives, radioactive material, high methane content compressed natural gas, and poison inhalation substances must be treated with special care for transport. Congress mandates that certain of the defined hazardous commodities be included in the HMSP list: for example, Divisions 1.1, 1.2, 1.3, and 1.4S in quantities requiring placards; substances designated as a poison inhalation hazard (PIH); liquefied natural gas; and any highway-route-controlled quantity of radioactive material, as defined by the Secretary of Transportation.

On the other hand, there are substances that are not included as requiring an HMSP: for example, flammable gas. Several Federal employees interviewed opined that there is no substantial difference between liquefied natural gas and liquefied petroleum gas, and why one is included on the HMSP list and the other is not makes little sense in their opinion, except for adhering to the minimum requirements mandated by Congress. Even more interesting is that gasoline in large bulk tank trucks is more likely to contribute to roll-over crashes, which can be quite consequential, but it is not included on the list for an HMSP.

In gathering responses to questions related to the list of HMSP commodities—whether the list should be revised, how to determine the degree of risk that warrants a permit, and how to define severity of an HMSP crash—most interviewed participants were comfortable with the list of HMSP materials as it is currently written, which comes directly from the HMTUSA.[9]

USDOT currently classifies individual HM PSNs by their type of hazard but not necessarily by their degree of hazard. It is conceivable that the list of HM could change by focusing more systematically on a "degree-of-hazard" approach. This would involve a complex risk analysis, using methodology to account for factors such as dedicated routing, weather, geographical terrain, population, property damage, and truck operational cost. Such an analysis is beyond the scope of this project.

FMCSA concludes that while a degree-of-hazard approach for this list could be explored, the complexity and methodology required to take this approach is outside the agency's current expertise and would require additional unplanned contract dollars.

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5. ANALYSIS OF PERMIT HOLDER DEMOGRAPHICS AND SAFETY PERFORMANCE

Unless specified, the data in this report section is based on the MCMIS snapshot from January 25, 2013. Where counts are provided, unless otherwise specified, these are counts as of January 25, 2013. Where rates are provided, these rates are provided for calendar year 2011, using the January 25, 2013 data.

This analysis, the analysis in the following sections, and the supporting documentation in the appendices addresses the safety performance of specific carriers. These carriers are not identified by name in this report. Rather, they are identified as Carrier 1, Carrier 2, etc. These carriers are identified consistently by the same number throughout this report, so if tables contain an entry for "Carrier 12," these tables are referencing the same carrier.

5.1 BACKGROUND—HAZARDOUS MATERIALS SAFETY PERMIT HOLDERS

To provide a context for assessing the behavior of HM and HMSP carriers, data for all interstate motor carriers is provided as background with additional data provided for the safety performance of HM carriers and for the subgroup that has HMSPs.

5.1.1 General Measures of Motor Carriers

Table 2 provides reference data for the total population of carriers.[vii]

[vii] This particular analysis was performed based on a June 22, 2012 extract, as it was performed before receipt of the January 25, 2013 data. It was not rerun, since the crash data for 2012 would have been rather thin, as shown in Appendix B. Further, the relative relationships would not change.

Table 2. General measures of motor carrier safety performance.

Group/ Measure	Number of Carriers	Total Power Units	Inspection Count	Crash Rate— Crashes Per Hundred Power Units	Driver OOS Rate	Vehicle OOS Rate	HM OOS Rate
All Recently Active Carriers	520,268	4,572,838	2,844,219	1.82	4.54%	18.57%	3.11%
Recently Active Carriers with Valid Ratios	518,410	4,329,541	2,819,242	1.89	4.53%	18.57%	3.11%
Recently Active Carriers with Inspections	247,201	3,285,585	2,844,219	2.42	4.54%	18.57%	3.11%
Recently Active Carriers with Inspections and Valid Ratios*	246,125	3,089,020	2,819,242	2.53	4.53%	18.57%	3.11%
Recently Active Carriers that Have HM Inspections	18,466	1,421,760	1,129,870*	2.41	2.83%	15.51%	3.11%

*The 18,466 carriers that had HM inspections in 2011 had a total of 1,129,870 inspections. Of these, 212,934 were HM inspections.

FMCSA has identified a number of events that meet FMCSA's definition for marking a carrier as "Recently Active." If a carrier has any one of these events in the prior 3 years, FMCSA considers the carrier recently active. These events include filing an MCS-150, inspections, crashes, CIs, and filing insurance (activity in the L&I system). Therefore, every carrier with an active HMSP is by definition recently active since a carrier with an HMSP must have filed an updated MCS-150B, the required census update, every other year or their HMSP would have been canceled. Further, the list of recently active carriers is limited to carriers that are considered active on MCMIS. Assuming that a private carrier had updated their census data within the past 2 years, the only reason MCMIS would consider such a private carrier to be inactive within 3 years of recent activity would be if the carrier reported to FMCSA that they were no longer in business. This contrasts the built-in information flow about the status of for-hire carriers; the status is switched to inactive if the carrier's insurance company fails to annually report maintenance of financial responsibility.

(The forms MCS-150 and MCS-150B are now combined within the MCSA-1.)

Prior research has demonstrated that crash rates (defined as crashes per power unit) can be skewed by carriers that report an unreasonable number of power units. To avoid this problem, the John A. Volpe National Transportation Systems Center (Volpe Center) determined that there are several conditions that should be considered when determining invalid ratios of power units to drivers. For this analysis, the relevant Volpe guidance is that a carrier should not have five times or more power units than drivers. Of the 520,268 recently active interstate motor carriers, 1,858 carriers had such invalid ratios. Excluding data for this four-tenths of 1 percent of all

carriers results in a 4 percent change in the crash rate. This demonstrates that using data that includes carriers with invalid ratios skews results.

The carriers that had inspections in 2011 represent less than half of recently active carriers, and they had more than 70 percent of the reported power units. This demonstrates that larger carriers (as well as carriers more actively operating on the interstates) are more likely to have inspections. Further, these carriers had more than 95 percent of the crashes. Understanding the reasons why these carriers had 95 percent of the crashes is beyond the scope of this project, although a quick conjecture is that they have the largest crash-risk exposure.

There were 1,533 carriers that had post-crash inspections in 2011 but had no other inspections of any type that year.

5.1.2   HM Carriers

There are several ways to identify HM carriers in MCMIS.

- In the June 2012 extract, MCMIS identified 16,352 carriers as having an HM flag of Y. This means that the carrier had self-identified as an HM carrier on its most recent MCS-150. However, many such carriers were not detected carrying such HM commodities at roadside inspections. This is because many carriers establish that they are authorized to carry HM but generally do not receive HM loads. Thus, a new definition system was developed for subsequent years.

- Thus, by the January 2013 extract, FMCSA had changed the definition of when the carrier would have an HM flag set. Rather than use the MCS-150 self-identified report from the carrier, the definition was revised. Under the newer and narrower definition, only 8,104 carriers had the HM flag. Setting of the HM flag is now driven by SMS, which then uses the flag to determine the intervention threshold for BASICs. Now in order to have an HM flag, the carrier must satisfy the following rules:
  - The carrier must have received at least two vehicle inspections in the past 24 months transporting placardable amounts of HM.
  - The carrier must have received at least one vehicle inspection in the past 12 months transporting a placardable amount of HM.
  - At least 5 percent of the carrier's vehicle inspections must have been inspections transporting placardable amounts of HM.

FMCSA also notes that it is possible for a carrier to transport HM but not be subject to the more stringent SMS HM BASIC threshold. In cases where the carrier does have enough inspections, the lack of an HM flag will indicate that the carrier is not subject to the greater SMS HM enforcement threshold. The carrier might have fewer than 5 percent of their inspections while transporting placardable amounts.

Of the 833 active HMSP carriers that had HM inspections in 2011, there were 33 carriers with less than 5 percent of their inspections transporting placardable amounts of HMs. As noted elsewhere, one possibility for this lack of HM inspections is the shortage of State inspectors operating under MCSAP who are trained in performing HM roadside inspections.

There were 18,466 carriers identified as having had at least one HM inspection in 2011 while transporting a placardable amount of the HM.

Figure 1 shows the relationship between the number of all recently active carriers, recently active carriers with inspections (in 2011), and recently active carriers with HM inspections (in 2011).
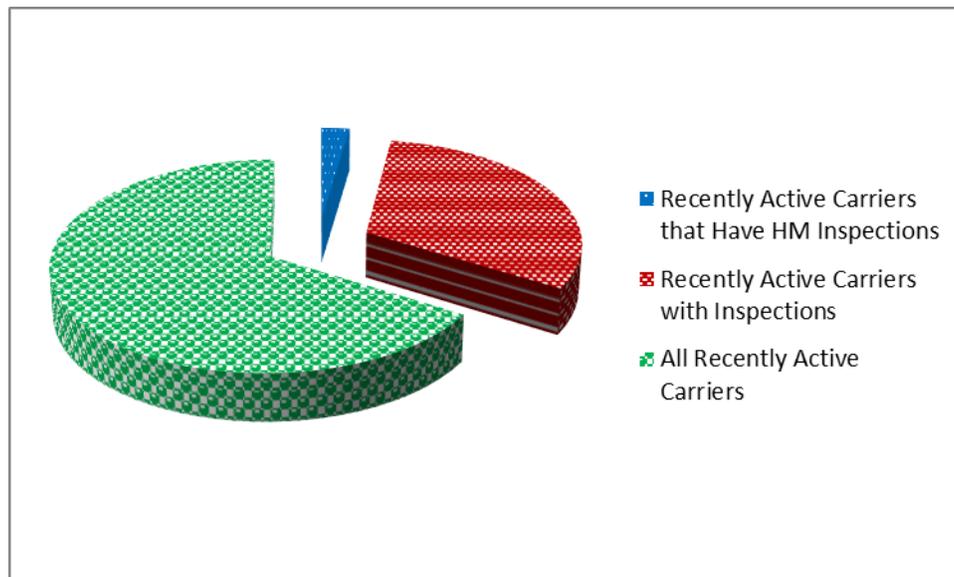
Figure 1. Recently active carriers—inspections and HM inspections.

Carriers with HM inspections (i.e., transporting a placardable amount of an HM), are a very small portion (less than 4 percent) of all recently active carriers.

5.1.3 HMSP Carriers

Table 3 provides a number of general measures for HM and HMSP carriers. Note, because crash rate is included, Table 3 excludes data for carriers with invalid power unit to driver ratios. The counts in Table 4 include all carriers, not just the ones with valid ratios, since Table 4 is not addressing crash rates.

Table 3. General measures for HM and HMSP carriers.

Group/ Measure	Number of Carriers	Total Power Units	Inspection Count	Crash Rate— Crashes Per Hundred Power Units	Driver OOS Rate	Vehicle OOS Rate	HM OOS Rate
Recently Active HMSP Carriers	1,236	119,757	106,466	2.17	1.74%	11.36%	1.46%
Recently Active Carriers that Have HM Inspections that are not HMSP Carriers	17,703	1,308,753	1,025,261	2.43	2.94%	15.97%	3.72%
Recently Active HMSP Carriers with Inspections	967	118,077	106,466	2.20	1.74%	11.36%	1.46%
All HMSP Carriers	1,485	123,477	107,223	2.13	1.74%	11.64%	1.47%
All HMSP Carriers with Inspections	1,071	121,126	107,223	2.16	1.74%	11.64%	1.47%

The January 2013 extract identifies 1,448 carriers with active HMSPs—1,390 carriers with permanent permits and 58 carriers with pending temporary permits. However, this represents a systematic undercounting.

Carriers that have a permanent HMSP must reapply for a new permit every 2 years. When a carrier that has an existing HMSP applies for a new HMSP, MCMIS changes the carrier's permit type from permanent to application and the status of the HMSP from active to pending (MCMIS also makes a number of other changes as part of the application process). This causes several problems during the renewal process, including:

- It is difficult to accurately report the number of active HMSP carriers.
- Safety and Fitness Electronic Records (SAFER) reports to field staff and inquiring shippers that the carrier does not have an active HMSP.
- The MCMIS user interface also reports that the carrier does not have an active HMSP.

This is one of the issues the petitioners cited as an administrative concern. The HM Division has requested this MCMIS issue be fixed through an IT change.

Note. The 2015 Policy change replaced applying for a permit renewal with continuous monitoring and a requirement to update their registration data at least every 2 years, now via the MCSA-1. A supposition is that since there is no initiation of a renewal, there should be no changing of the status from permanent to pending. If so, then a side benefit of the revised approach is that the HMSP carriers no longer have the period of time during which they do not

have an active status. Plus, it could make it possible to accurately determine the number of active HMSPs.

For this analysis to address this systematic underreporting, we made use of the June 2012 MCMIS snapshot available to this project. The following logic was applied: if the January 2013 extract showed a carrier with an application-in-pending status, we looked at whether the carrier had an active HMSP in June 2012 that expired after January 25, 2013. If so, then for this report's counting, that carrier was considered to have an active HMSP. There were 86 such carriers. Consequently, a total of 1,534 carriers were identified as having HMSPs for this analysis.

Of these 1,534 carriers, 1,497 had a status of active and 37 had a status of inactive. Going forward, the 1,497 carriers are identified as HMSP carriers. While there is no record of the reason why an HMSP carrier was made inactive, the most likely reason is that those may be for-hire carriers that did not maintain their insurance. Of these 1,497 carriers, 1,485 carriers had valid driver to power unit ratios and 12 did not.

Of the 1,497 HMSP carriers, 1,246 were self-identified as interstate carriers. Two hundred fifty were self-identified as intrastate HM carriers, and one was self-identified as an intrastate non-HM carrier but with an HMSP (this is likely an error in the self-reporting, because otherwise it would seem to violate the requirement to have registered as an HM carrier with PHMSA to qualify for an HMSP from FMCSA). This data is from the MCMIS carrier table. The MCMIS census table provides slightly different results.

Table 4 summarizes this data and provides additional background data for HMSP carriers.

Table 4. Additional measures related to HMSP carriers.

HMSP Measure	Count
Carriers with Active HMSPs in the Renewal Process	86
Carriers with Active THMSPs	58
Carriers with Active, Permanent HMSPs	1,390
Total Carriers with HMSPs	1,534
Carriers with HMSPs and Inactive Status on MCMIS	37
Carriers with HMSPs and Active Status on MCMIS (HMSP carriers)	1,497
HMSP Carriers with Valid Ratios	1,485
HMSP Carriers with Invalid Ratios	12
HMSP Carriers with Inspections (in 2011)	1,080
Recently Active HMSP Carriers (Interstate Carriers)	1,246
Percent of HMSP Carriers that are Interstate Carriers	83.2%
Intrastate HMSP Carriers	250
Intrastate HMSP but non-HM Carriers	1
HMSP Carriers with HM Inspections	833
HMSP Carriers with Driver and/or Vehicle Inspections but No HM Inspection	247
Interstate HMSP Carriers with Inspections	975
Intrastate HMSP Carriers with Inspections	104
Intrastate non-HMSP Carriers with Inspections	1
Interstate HMSP Carriers with HM Inspections	768
Percent of all Inspections on HMSP Carriers that are Inspections on Interstate HMSP Carriers	99.3%

HMSP Measure	Count
Percent of all Inspections on HMSP Carriers that are Inspections on Intrastate HMSP Carriers	0.7%
Intrastate HMSP Carriers with HM Inspections	65
Interstate HMSP Carriers with Driver and/or Vehicle Inspections but No HM Inspection	207
Intrastate HMSP Carriers with Driver and/or Vehicle Inspections but no HM Inspections	40
Interstate HMSP Carriers with No Inspections	271
Intrastate HMSP Carriers with No Inspections	146
Percent of Interstate HMSP Carriers with Inspections	78.3%
Percent of Intrastate HMSP Carriers with Inspections	41.8%

5.2   OBSERVATIONS

5.2.1   Comparing Hazardous Material Carriers to All Carriers

Comparing inspected HM carriers who were not HMSP carriers to all carriers, the HM carriers:

- Had 4 percent fewer crashes per power unit.
- Had almost 35 percent fewer of their inspections result in driver OOS orders, and 14 percent fewer of their inspections result in vehicle OOS orders.

5.2.2   Comparing HMSP Carriers to Other HM Carriers

Comparing inspected interstate HMSP carriers to inspected HM carriers without HMSPs:

- HMSP carriers had 10 percent fewer crashes per power unit than other HM carriers.
- HMSP carriers had 41 percent fewer inspections result in driver OOS orders than other HM carriers.
- HMSP carriers had 29 percent fewer of their inspections result in vehicle OOS orders than other HM carriers.
- HMSP carriers had 61 percent fewer of their inspections result in HM OOS orders than other HM carriers.

The safety performance of HMSP carriers is clearly superior to the safety performance of other carriers that had HM inspections. Further, carriers that had HM inspections performed better than the overall population of non-HM carriers.

This relationship remained true in 2012, as shown in Table 5. The actual performance of HMSP carriers is far superior to the performance of the general population of carriers.

5.3   PERMITS ISSUED, DENIED, REVOKED, AND SUSPENDED

HMSP data in MCMIS only contains data on the current status of an HMSP. It does not contain historical data that identifies individual denial, revocation, or suspension actions, or reasons for any of the preceding.

However, since the start of the program in January 2005, the audit trail tables have tracked changes to a carrier's status, permit type, security plan certification, financial flag, and safety rating. Thus, it was possible to identify the original status, the updated status, and the date that a carrier's status changed. It was also possible to identify a carrier's previous permit type and their new permit type after a change. Using the date of a status change, it was possible to connect it to changes in permit type, security plan certification, financial flag, and safety rating. From this, it was possible to make some inferences about permits issued, denied, revoked, and suspended.

5.3.1   Permits Issued

Overall, since January 2005, 2,875 carriers received HMSPs. Of these:

- 2,196 received at least one permanent HMSP.

- 679 received THMSPs but never received a permanent HMSP.

Further, of the total of these 2,875 HMSP carriers above:

- 1,598 received at least one THMSP because they did not have a safety rating at the time of their application for the HMSP.

- 1,277 received permanent HMSPs without ever having a THMSP because they had a safety rating on file in MCMIS when they applied for the HMSP.

5.3.2   Never Revoked or Suspended

According to the audit trail records, at least 1,567 of approved carriers entered the HMSP program and were never denied, neither on application nor renewal. Of these:

- 775 are still active HMSP carriers.

- 506 are still active carriers but are no longer HMSP carriers.

- 286 are no longer active carriers.

5.3.3   Permits Recommended for Denial

Since inception of the program in 2005, the audit tracking identifies there have been almost 17,000 automated denials. As noted above, most of these do not represent an actual denial. The data show the most commonly recorded reasons for HMSP denials at the time of application or renewal were:

- The automatic check could not find the company registered with PHMSA (more than 10,000 actions), perhaps because the USDOT number was not on the PHMSA database.

- The MCMIS database did not have the required minimum financial responsibility (liability insurance), possibly because the application software changes the MCMIS financial responsibility status for existing HMSPs to "N" (almost 5,000 actions) when a renewal is initiated. It is also highly likely that some portion did not want an HMSP, but the current user software does not sufficiently inform applicants of what kind of shipments require an HMSP or what the requirements for obtaining/maintaining an HMSP are (namely, the $5 million insurance coverage). Alternatively, applicants may have been intrastate HM carriers, which the software forced to apply for an HMSP, even when they did not want one.

- The company failed to submit an HMSP renewal application (approximately 1,000 actions).

  The requirement for the biennial reapplication has been replaced by the requirement to update their MCSA-1 at least every two years, which can be done whenever they choose, and review of the thresholds by continuous monitoring to determine if they should receive a CI.

- The company did not certify that it had a satisfactory security program plan (more than 600 actions). Most of these were resolved manually when the carrier provided the plan.

- As pointed out above, the software associated with the MCS-150 automatically requires all intrastate applicants for HM to apply for an HMSP, which most do not need. When processed, they are switched from an HMSP application to an intrastate HM application. However, this shows up as a denial.

  This MCS-150 software issue was fixed as part of roll out of URS-1 with the new MCSA-1 online application.

More details on the system-based reasons for denial, suspension, and revocation are provided in Appendix C in the separate document.

In many of the denial recommendations, the carriers had no need for an HMSP. In most of those cases, these carriers fell into one of the following three categories:

- Carrier identified on their MCS-150 that they carried HMSP materials, but they did not carry sufficient volumes to require an HMSP. The system generates an application for an HMSP even though it is not needed. This occurs because the existing online user interface for filling out the MCS-150 does not properly assist applicants in distinguishing when they do not transport the minimum specified quantities and thus do not require a permit. Additionally, the user interface lacks sufficient options for carriers to accurately respond without applying for an HMSP. For example, if a carrier ships an HM in bulk, but still under the amount which requires an HMSP, they do not have a means to specify this middling bulk-size.

- Carrier identified on their MCS-150 that they might transport HM requiring an HMSP in order to 'preserve their options' to carry the material, even though the carrier had no immediate intention of hauling these materials. Upon finding out that higher insurance levels are required, many of these carriers withdraw their application. However, the information system tracks these actions as a denial.

As noted above, if the carrier was an intrastate operator who hauled HM, the online software for the MCS-150 application incorrectly forced the carrier to apply for an HMSP via an MCS-150B as part of the filing to be an intrastate HM carrier.

This was fixed as part of the new URS-1 online application form/software, MCSA-1, rolled out for all in late 2016.

- A number of the denial recommendations are due to system constraints and do not represent any actual business event.
  - Periodically, the system checks the PHMSA database. Although the USDOT number is requested on the PHMSA form, that field is not mandatory for the registrant to provide. If PHMSA does not have a DOT number and there is not an exact name match, MCMIS automatically generates a denial (and a denial letter) at the point of application for a permit renewal. To handle such cases, FMCSA staff intercept the denial letters. Staff then manually verify that the carrier was registered with PHMSA. If the carrier really is registered with PHMSA (and the overwhelming majority are), staff update MCMIS. The intercepted denial letter is never sent out.

The planned future fix for this administrative shortcoming is to require as part of the planned FMCSA rulemaking for URS-2 that all applicants for an HMSP must provide a USDOT number to be included on the PHMSA database. If they do not provide a USDOT number on the PHMSA database, their HMSP will be canceled.

Matching the application to a carrier's data in PHMSA was made more problematic because of a legacy issue in the current MCMIS design. When MCMIS was first being developed, database storage was critically limited/expensive, so commas and periods were suppressed from legal names in MCMIS. The PHMSA database was developed much later when storage was much more available/cheaper; thus, the PHMSA database contains commas and periods. As a result, any name in MCMIS which should have a comma(s)/period(s) will not find an exact match in PHMSA's data.

As of April 10, 2015, new carrier data entered into the MCMIS census file no longer suppresses commas and periods.

- As part of the HMSP renewal process, MCMIS automatically changes the financial responsibility flag to 'N.' Any time that any requirement is met, MCMIS automatically attempts to issue the HMSP. So, continuing the example, after the PHMSA match failed and an FMCSA staff member manually corrected the PHMSA flag, MCMIS would attempt to issue the HMSP. However, since the MCMIS HMSP

software had incorrectly changed the financial responsibility flag to 'N', MCMIS would then issue a denial based on lack of proof of financial responsibility in MCMIS. The FMCSA staff must again intercept the denial letter. When the carrier provides a copy of their MCS-90 and the MCMIS financial responsibility flag is updated, MCMIS then automatically issues an HMSP. The carrier would have no hint of either 'denial' being generated. However, the denials show in the system stats.

To estimate the number of denials that would occur from exceeding HMSP thresholds, we applied the thresholds as if all existing HMSP carriers were applying for renewal on January 1, 2013. That analysis determined that under the current rules, the rate of denial would be less than 5 percent for all four of the HMSP thresholds combined, approximately 67 carriers of the 1,497 active carriers as of January 1, 2013. Details are provided in 5.4.3 below

5.3.4 Permits Recommended for Revocation or Suspension

The audit trail was analyzed to determine how many revocations and suspensions there have been since the inception of the program in 2005. Where possible, a manual review of the audit trail revocation and suspension records shows other simultaneous changes, suggesting the reason for the suspensions and revocations.

- Six 30-day suspensions. These likely are associated with carriers that received below a Satisfactory safety fitness rating and did not complete filing a CAP in time.

- Seven revocations.
  - One revocation was the second time that the carrier received a conditional safety rating. That permit was reinstated 4 days later.
  - One revocation was for the second time that the carrier received a conditional safety rating. That permit was not reinstated.
  - The remaining five revocations were related to conditions associated with carriers that were already suspended and going out of business.

- Two hundred twelve recommendations for suspension, or suspension actions on the database.
  - Eleven carriers had multiple suspension actions. In 10 cases, the suspension was incorrectly lifted through a manual action, and MCMIS reinstated the suspension. In one case, the carrier had suspensions on two different (consecutive) permits.
  - One hundred eighty-eight carriers had one suspension action.

- In total (including the above numbers), there were 200 different suspension actions issued by the system. Of these:
  - In 13 cases, the suspension was a result of a batch process that used a name match, rather than a USDOT number match, to identify carriers that did not have PHMSA hazmat registration. In each of these cases, the suspension notification was intercepted before it was sent to the carrier, and the HMSP was immediately reinstated on the system. Functionally, the carrier was never suspended.

- In five cases, the suspension was a result of a carrier OOS order. In all five cases, the OOS order was issued as a result of a failure to pay a fine.
- In 80 cases, the suspension was a result of a change in safety rating.
  › In seven cases, the carrier's permit was reinstated within 5 days because their safety rating was changed back to Satisfactory.
  › In nine cases, the carrier's permit was reinstated within 6–10 days because their safety rating was changed back to Satisfactory.
  › In 29 cases, the carrier's safety rating was changed back to Satisfactory after the carrier was suspended for at least 10 days.
  › In the remaining 35 cases, the carrier's safety rating was changed to Conditional or Unsatisfactory, and the safety rating was never again Satisfactory.
- For the remaining 102 suspension actions, the audit trail does not provide an apparent reason for the suspension. It cannot be clearly determined whether a manual action was taken to prevent an operational suspension or the carrier was actually suspended.

5.4   HMSP CRASH AND OOS THRESHOLD ANALYSIS

There are two critical concerns related to the HMSP thresholds, as identified in 49 CFR 385.407:

- How are the HMSP thresholds calculated?
- How does the implementation of these HMSP thresholds affect HMSP carriers?

For background, Table 5 shows the crash and OOS rates for all carriers from 2012, the crash and OOS rates for HMSP carriers in 2012, and the fixed HMSP thresholds. It also shows the threshold as a percent of the actual rates for the population of HMSP carriers.

Table 5. Threshold rates and average rates from 2012.

Rates in 2012	All carriers	HMSP carriers	Fixed threshold rate	Threshold as a percent of HMSP carriers' average (fixed threshold rate / actual rate for HMSP carriers)
Crash Rate (Crashes per Power Unit)	1.98%	1.92%	13.6%	708%
Driver OOS Rate	4.68%	1.56%	9.68%	621%
Vehicle OOS Rate	18.87%	11.10%	33.33%	300%
HM OOS Rate	3.59%	1.43%	6.82%	477%

This data comes from the January 25, 2013 extract from MCMIS. As is shown in Appendix B in the separate document, it is anticipated that the crash counts for 2012 represent less than 85 percent of the crashes that will ultimately be posted to MCMIS. However, this is an accurate

representation of the criteria that FMCSA applies at the time of a permit renewal application. As the renewal application occurs in real time, an even smaller percentage of a carrier's recent crashes may be on MCMIS at the time of processing the permit application.

5.4.1 70–30 Concept—Actual Implementation

FMCSR Section 385.407 states, in part two:

> *(2) FMCSA will not issue a safety permit to a motor carrier that:*
>
> > *(i) Does not certify that it has a satisfactory security program plan as required in Section 385.407(b);*
> >
> > *(ii) Has a crash rate in the top 30 percent of the national average as indicated in the FMCSA Motor Carrier Management Information System (MCMIS); or*
> >
> > *(iii) Has a driver, vehicle, HMs, or total OOS rate in the top 30 percent of the national average as indicated in the MCMIS.*

Looking at crash rate for the years 2011 through 2012, for the 520,286 recently active carriers, 58,726 carriers had crashes. (This is a combined total for crashes in those 2 years.) Only 35,402 recently active carriers had crashes in 2012. As is shown graphically in Figure 2, 11.3 percent of all recently active carriers had crashes in 2011 or 2012, while 88.7 percent of all recently active carriers had no crashes.
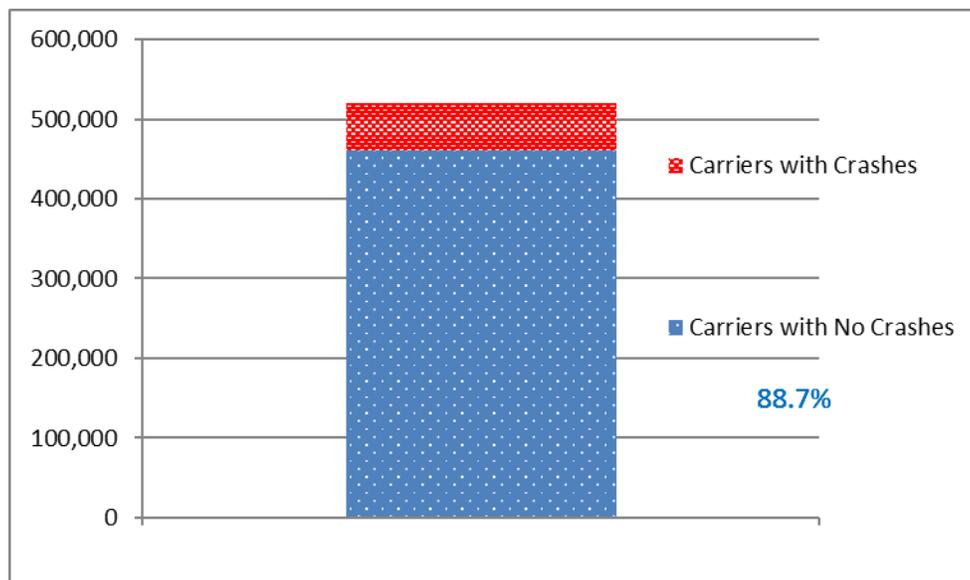

Figure 2. Recently active carriers, percent that had crashes in 2011 or 2012.

For the recently active carriers, the 70th percentile from the bottom, or 30th percentile down from the top, would be the 156,080th carrier down from the top. Since only 58,726 carriers had any crashes, the crash rate for the 156,080th carrier down from the top would be zero.

Instead of this method, which would invalidate a carrier upon any crash, FMCSA applied the HMSP crash threshold in a way that functionally operationally increased it to be greater than the 70-30 threshold. When calculating the HMSP crash rate that is actually applied, instead of calculating it including all carriers, FMCSA instead only included carriers that had at least two crashes for the prior 2-year period. This substantially raised the value of what is considered the HMSP crash rate threshold. The same was done with the HMSP OOS thresholds.

Originally, those were variable rates that were periodically recalculated, based on the current data in MCMIS. A group of carriers later wrote to FMCSA saying that such periodic recalculation meant they did not know whether they would qualify for a renewal of their HMSP, since the crash or OOS thresholds could be different in the future. FMCSA agreed with them and responded by creating stable, fixed rates as the thresholds.

In order to create the current fixed rates for the HMSP thresholds, FMCSA developed a more complex algorithm for combining data from the past 8 years in groups of 2 years for calculating the thresholds. Details of the algorithm, as well as supporting details for all of the remaining information provided in this section, are included in Appendix E in the separate document.

5.4.2   70–30 Concept—General Impact if HMSP Thresholds Were Applied to All Carriers

Because of the small number and superior safety performance of HMSP carriers (relative to the general carrier population), the HMSP thresholds' effect on HMSP carriers may seem insignificant. To provide a better perspective, an analysis looked at how many of all recently active carriers would have been affected by the HMSP thresholds (had they needed to apply for HMSP permits).

This analysis was performed using all carriers in 2012. All analyzed inspections are roadside inspections.

Overall:

- 0.5 percent of the recently active carriers would have failed the HMSP crash threshold.

- 2.1 percent of the recently active carriers would have failed the HMSP driver OOS threshold.

- 4.6 percent of the recently active carriers would have failed the HMSP vehicle OOS threshold.

- 0.07 percent of the recently active carriers would have failed the HMSP HM OOS threshold. (Most carriers are not HM carriers, so they cannot receive HM inspections resulting in HM OOS orders, making this percentage meaninglessly small.)

  If instead we calculated this using only carriers that received an HM inspection (HM carriers, including HMSP carriers), then 3.0 percent would have been found to have failed the HMSP HM OOS threshold.

This result is affected by significant operational issues:

- Very few State inspectors receive training in HM, which causes many roadside inspections of HM carriers to ignore consideration of their HM;

- for HMSP carriers, inspectors with HM training may still ignore the HMSP requirements; and

- HM inspections are sometimes incorrectly coded.

However, those issues are outside the scope of this analysis for HMSP carriers.

Additional detail is presented in Appendix E in the separate document.

Figure 3 provides a graphic representation, showing a Venn Diagram with the overlap between carriers that would have been denied for the crash threshold, the driver OOS threshold, and the vehicle OOS threshold.

Recently Active Carriers

Carriers that would fail Vehicle OOS Threshold (4.6%)

Carriers that would fail Driver OOS Threshold (2.1%)

Carriers that would fail Crash Threshold (0.5%)

Carriers that would fail Any Threshold (6.4%)
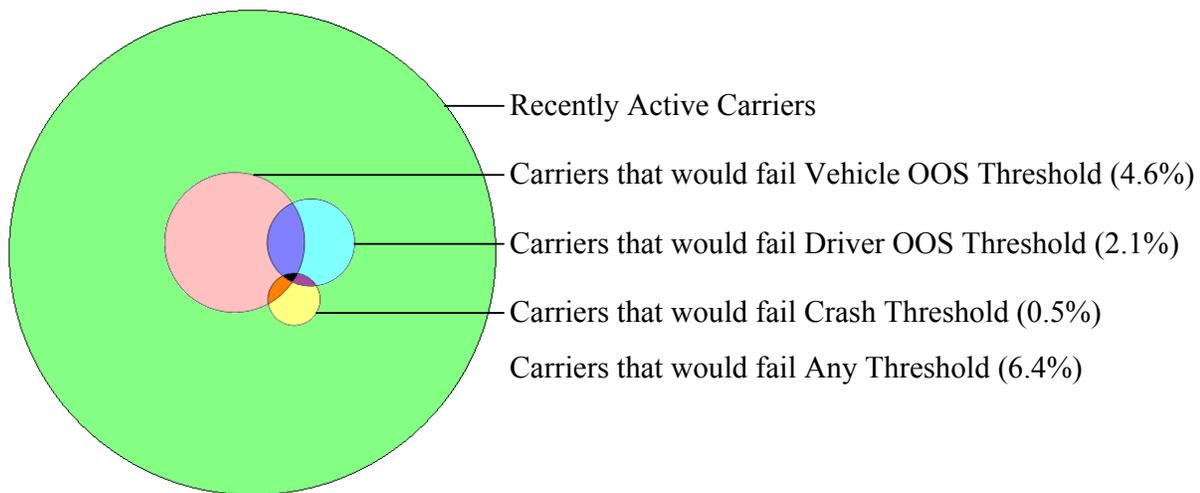
Figure 3. How many carriers would have been denied for any threshold, 2012.

Overall, 6.4 percent of all recently active carriers would have failed at least one of the 70–30 HMSP thresholds as operationally implemented, including the HMs OOS threshold.

5.4.3   70–30 Concept—Specific Impacts of HMSP Thresholds on HMSP Carriers

One of the goals for the analysis of the HMSP program was to review the performance of carriers that had been denied HMSPs in the year 2012 based on the various HMSP threshold criteria. However, MCMIS does not store information about the reason for a denial, so an alternative approach had to be applied.

Just as was done in section 5.4.2 for all carriers, the data in MCMIS was analyzed using an 'as-of' date of January 1, 2013. This identified carriers that would have been denied a renewal on their HMSP if they had applied on January 1, 2013. This is not the list of carriers that were actually denied renewal. Many carriers would have been denied renewal had they applied on a different date, but they were renewed based on their information at the actual time of application.

What this analysis provides is a clear perspective on the nature of renewal denial for carriers failing to meet the HMSP thresholds.

Again, details related to this analysis are included in Appendix E in the separate document.

Overall:

- Six carriers, 0.4 percent of the active HMSP carriers, would have been denied renewal based on the HMSP crash threshold.

- Twelve carriers, 0.8 percent of the active HMSP carriers, would have been denied renewal based on the HMSP driver OOS threshold.

- Forty-four carriers, 2.9 percent of the active HMSP carriers, would have been denied renewal based on the HMSP Vehicle OOS threshold.

- Sixteen carriers, 1.1 percent of the active HMSP carriers, would have been denied renewal based on the HMSP HMs OOS threshold.

5.4.4 Summary

Applying the HMSP operational thresholds to the January 1, 2013 data identified 76 cases where HMSP carriers exceeded HMSP thresholds, which would have resulted in the denial of new HMSP permits. There are 67 carriers, 4.5 percent of the active HMSP carriers, that exceeded at least 1 threshold. 58 carriers exceeded 1 threshold, and 9 carriers exceeded 2 of the 4 thresholds.

There were 34 cases, 2.3 percent of the active HMSP carriers, where a carrier would have been denied based on the HMSP crash, driver, or HM threshold. None of these carriers violated another one of these three HMSP thresholds, but 9 of these 34 carriers would also have been denied based on the HMSP vehicle OOS threshold.

Although the counts are small and their percentages are significantly affected by even minor changes, Table 6 illustrates that, in each case, a smaller percent of the HMSP carriers would have been denied renewal of their HMSP than the percent of all carriers (if all carriers applied for an HMSP).

For example, Table 6 shows that on average 1.8 percent of all recently active carriers had two or more crashes. Of those, 0.5 percent would have been denied, based on the HMSP operational threshold if it applied to them. In comparison, on average 14.9 percent of the HMSP carriers had two or more crashes. However, only 0.4 percent would have been denied renewal based on the HMSP crash threshold.

Compared to the small average number of crashes by the set of all recently active carriers, a far greater percentage of the recently active HMSP carriers (14.9 percent versus 1.8 percent) had on average two or more crashes.

There is a very straightforward explanation for why HMSP carriers have a higher "average number of crashes." There is a marked difference in makeup of the two above groups, and that has a dramatic impact on the average number of crashes by type of carrier and thus the percentage that would fail the HMSP crash threshold. Namely, approximately 30 percent of the

1.8 percent (0.3*0.018=0.0054 or 0.54 percent) of recently active carriers with two or more crashes would have been denied for failing the HMSP crash threshold, while only approximately 3 percent of the 14.9 percent (0.03*0.14=0.0042 or 0.42 percent) of HMSP carriers that had two or more crashes would have been denied for failing the HMSP crash threshold. These numbers are shown in Table 6.

This difference can be explained by examining the crash rate statistic (crashes per power unit), which is very different from average number of crashes per type of carrier. In contrast to the average number of crashes by type of carrier above, within the three sets of carriers having two or more crashes (all, HM but non-HMSP, and HMSP carriers), we see the opposite result for average number of crashes versus crash rate. All carriers had the highest crash rate, the HM but non-HMSP carriers had the next highest crash rate, and HMSP had the lowest crash rate.

Reasons contributing to the higher average number of crashes but lower crash rate for HMSP carriers are the following:

- Size distribution of carriers – There are dramatically more very small carriers among all carriers than there are among HMSP carriers. Most of those very small carriers do not have the number of power units with the number of miles of driving to have the exposure to have two or more crashes. The large number of such small carriers who thus have few crashes brings the average number of crashes down for the set of all carriers. In contrast a much larger percentage of HMSP carriers are larger carriers, though many are still small carriers. There is a much higher probability such larger carriers will have two or more crashes because of exposure, so HMSP carriers as a group are more likely to have two or more crashes, and thus a higher average as a group.

- Safety culture of carrier – In general, the larger the carrier, the more resources they tend to dedicate to safety. We see that the safety violations and crash rates of newer and smaller carriers tend to be higher, and there is considerably more formation and failure of very small carriers in the set of all carriers. Additionally, for a carrier to obtain and maintain an HMSP in the first place, they must meet stricter safety requirements.

Table 6. Percent of all recently active and current HMSP carriers that would have been denied, as of January 1, 2013.

Threshold	Percent of Recently Active Carriers that Would Have Been Subject to the Threshold	Percent of Recently Active Carriers that Would have been Denied for the Threshold	Percent of HMSP Carriers that Would Have Been Subject to the Threshold	Percent of HMSP Carriers that Would have been Denied for the Threshold
Crash Threshold	1.8%	0.5%	14.9%	0.4%
Driver OOS Threshold	3.3%	2.1%	11.8%	0.8%
Vehicle OOS Threshold	8.3%	4.6%	29.3%	2.9%
HM OOS Threshold	3.8%	2.0%*	7.2%	1.1%
At least one Threshold	6.4%	9.8%	31.2%	4.5%

*Percent of carriers with HMs inspections that would have been denied for the threshold.

6. PROGRAM EFFECTIVENESS ANALYSIS

This analysis addresses the following two elements of program effectiveness related to the HMSP program:

- Has the program improved the safety fitness of the carriers that are in the program?

- Is the program, as currently constituted, effective in accurately identifying carriers for sanctioning (denial, suspension, or revocation) and in avoiding sanctioning carriers that should not be sanctioned?

6.1 SAFETY FITNESS HISTORY OF HMSP CARRIERS

In order to determine the effectiveness of the HMSP program in altering behavior of HMSP carriers, the safety performance of HMSP carriers prior to receiving their HMSPs is compared to their safety performance afterward.

Of the 1,497 carriers that currently have active HMSPs, 1,265 carriers received their USDOT numbers at least a year (365 days) before they received their first HMSP. The safety performance of each of these carriers is compared for the year before the issuance of their first HMSP and the year after the receipt of their first HMSP.

Table 7 shows the changes in carrier measures for these 1,265 in the year (365 days) before the issuance of their first HMSP and in the year after the issuance of their first HMSP.

Table 7. Carrier safety performance measures in the year before and the year after issuance of an HMSP.

Rate	Rate in Year Prior to HMSP Issuance	Rate in Year After HMSP Issuance	Percent Change
Driver OOS Rate	2.55%	2.47%	-3.01%
Vehicle OOS Rate	13.82%	13.61%	-1.50%
HM OOS Rate	2.23%	2.21%	-0.97%
Crash Rate (Crashes per hundred power units)	2.62	2.52	-3.91%

This analysis shows there were improvement in all four of these rates, and the greatest improvement was in the crash rate.

Unlike OOS rates, a crash rate analysis requires a measure of exposure. Consequently, the crash rate analysis could only be performed for the 1,126 carriers that had initial HMSP permits in 2011 and earlier that had valid power unit to driver ratios for both the year of the issuance of the HMSP and the year before. These carriers had 1.1 percent more total crashes in the year after the issuance of their HMSPs than in the year prior to the issuance of their HMSPs.

This increase could cause some to incorrectly conclude that the new HMSP carriers performed worse in 2012 based on the raw number of crashes. However, the opposite is true. In 2012 the

carriers that obtained their HMSPs had more business, deduced from their reported 5.3 percent increase in power units in the year after getting their HMSP. Assuming the additional power units had approximately the same number of miles driven as the previous power units, that means those new HMSP carriers had more exposure. When expressed as a crash rate, instead of raw total crashes, that means their crash rate actually dropped 3.91 percent.

However, there was a significant drop in crash rates for trucking overall between 2008 and 2009 associated with the recession. In order to isolate the impact of receiving an HMSP from the general drop in crash rates, a separate analysis was performed for the 812 carriers with valid ratios that received their first HMSP in the period 2005–07.

Again we see the same pattern. These carriers had 1.89 percent more crashes in the year after the issuance of their HMSP, but they reported having 5.6 percent more power units. The crash rate for these carriers therefore dropped 3.56 percent in the year after HMSP issuance. OOS rates for HMSP carriers, both before and after HMSP issuance, are far lower than the rates for average carriers. Not only is the safety performance of the carriers that have HMSPs better than that of average carriers, but their safety performance was better than that of average carriers even before the issuance of their HMSPs.

The crash rate for current HMSP holders that existed for a year prior to obtaining their HMSPs is slightly but statistically significantly lower in the year after issuance of the HMSP than in the year before.

It is clear that the HMSP thresholds prevent unsafe carriers from obtaining HMSPs. Thus, the HMSP program and its application of the HMSP thresholds during permit issuance ensure that carriers with poor safety performance do not qualify to transport high-risk HMSP commodities.

6.2   ACCURACY IN IDENTIFYING CARRIERS FOR ACTION

This section presents a structure for assessing the effectiveness of the HMSP program in identifying the correct carriers for intervention. It is a tool for measurement that could be applied to evaluate the likely risk of the carriers that were identified by violation of an HMSP threshold, as shown in 5.4.3.

6.2.1   Theoretical Structure

Table 8 shows the standard theoretical structure for analysis of the effectiveness of a program such as the HMSP program.

Table 8. Table of error types.

Accept/ Reject Hypothesis that Carrier is Good	True Reality: Good Carrier	True Reality: Bad Carrier
Accept Hypothesis that Carrier is Good	Appropriate Outcome—No Action Taken Against a 'Good' Carrier	Type 2 Error—No Action Taken Against a 'Problem' Carrier
Reject Hypothesis that Carrier is Good	Type 1 Error—Denial or Sanction Applied to a 'Good' Carrier	Appropriate Outcome—Denial or Sanction Applied to a 'Problem' Carrier

There are two appropriate outcomes:

- No action should be taken against a good carrier.
- Some sanction, such as a denial, should be taken against a problem carrier.

There are two inappropriate or undesirable outcomes:

- Type 1 Error—when some sanction, such as a denial, inappropriately is applied to a good carrier.
- Type 2 Error—when no action is taken against a problem carrier.

There is no question that it should be an overall goal of the HMSP program, or of any program, to maximize the appropriate outcomes and minimize the inappropriate outcomes.

Typically, however, there is a range for setting the line, or threshold, depending on whether the goal is to minimize Type 1 errors or to minimize Type 2 errors. So, for example, in medical testing, a Type 1 error would say that the patient has a disease when the patient does not have that disease. A Type 2 error would be to say that the patient does not have the disease when, in fact, the patient does have the disease. In medical testing, tests are generally constructed to minimize Type 2 errors and accept Type 1 errors. This is because the consequence of not treating a patient because of a missed diagnosis may be far worse than the consequence of treating a patient who is not really ill.

In motor carriers, the line between a good carrier and a problem carrier is not so clear. An action that puts a good carrier out of business is a serious concern. Allowing some marginally bad carriers to continue operations, to avoid the inappropriate costs of action against good carriers, may not be that great a risk.

There can be some discussion as to where to draw the line to either minimize Type 1 or Type 2 errors. Industry advocates presumably would be more likely to favor minimizing Type 1 errors (i.e., minimize the number or good carriers who are identified as high risk for an intervention), while safety advocates would presumably prefer minimizing Type 2 errors (i.e., minimize the number of high risk carriers who are not detected as high risk.)

Based on results from the interviews with HMSP carriers represented by ATA and NTTC, for-hire HMSP carriers with good safety performances who are usually safely outside the range of type 1 errors may be either neutral or even prefer to minimize Type 2 errors instead. Historically

such a pattern has been true of carriers with good safety performance, whose services would be in greater demand if other unsafe carriers are detected and not allowed to continue competing against them.) In general, all should agree that minimizing errors and maximizing appropriate outcomes should be a goal for the HMSP program.

6.2.2 Statistical Deviation Analysis—A Tool for Measuring Carrier Safety Performance

It is necessary to determine who the problem carriers are in order to determine whether the errors described in 6.2.1 are actually occurring. Further, unlike the example of the medical testing scenario where the patient either does or does not have the disease being tested for, identifying poor safety performance of a motor carrier is not simply a yes/no issue. There are varying levels of carrier safety performance.

SMS is very good at ranking medium to large carriers with numerous inspections (enough inspections for SMS to calculate BASIC scores). Unfortunately, many HMSP carriers, especially the private ones, are quite small and therefore very little safety performance data is reported to MCMIS. It is a known issue that small problem carriers are not adequately identified by the current operations of the SMS algorithm.

Thus, a new or supplemental ranking measure is needed to rank small carriers with limited data. This study tested a process called "statistical deviation analysis" (SDA) to determine its usefulness in analyzing very small carriers with limited data. This methodology is based on the concept of assessing how far a carrier's safety performance deviates from the norm (or average carrier performance) in the four HMSP thresholds.

Because the HMSP carriers' safety performance was substantially better than the average safety performance of all carriers, some perspective may be useful. To obtain this perspective, for each of the four HMSP thresholds, each HMSP carrier's rates were compared to both the rates of all carriers and the rates of just HMSP carriers. **Carriers were ranked, and the carriers with the most (worst) deviation from the average were ranked at the top.**

For the analysis in this report, this approach treated performance on all four HMSP thresholds equally in calculating overall ranking to identify underperforming carriers. So, just as below-average performance in some HMSP thresholds helped carriers get ranked higher (worse), above-average performance in other HMSP thresholds helped carriers get ranked lower (better).

- So, for example, while Carrier 71 had a very high crash rate (that deviated substantially from the average crash rates), Carrier 71 had rather low OOS rates. Consequently, Carrier 71 was not one of the carriers determined to rank very high (this raises the question of whether crash rate should be weighted heavier than OOS rates in calculating statistical deviation).

- In contrast, Carrier 10's performance was not above the HMSP threshold rate for crashes or any of the OOS rates. However, Carrier 10 had overall relatively poor safety performance on each of the four HMSP thresholds (i.e., had a statistical deviation on all four), and thus overall ranked higher.

Additional explanation of the actual method used is presented in Appendix L in the separate document. This analysis developed a SDA list of the 47 worst HMSP carriers using this metric. This list of 47 is used as a reference point going forward in this report for other evaluation metrics. These 47 carriers had overall safety performance substantially deviant from average (i.e. much worse than average). These carriers are identified as Carriers 1-47. The safety performance of the carriers higher on the list deviated further (worse) from the average. (Note. As pointed out early in this report, just because a particular carrier's safety performance is deviant from the average, it is not necessarily a statistically significant difference.)

HMs program experts reviewed this SDA list and believe that this approach produced a reasonable assessment for identifying HMSP carriers with poor safety performance but limited data. Thus, this metric is a candidate for use in combination with statistical significance for balancing the need to avoid erroneously sanctioning safer carriers while still doing a much better job of identifying problem carriers than the current SMS BASICs.

This statistical deviation analysis won't produce a perfect list of poor performers. Further, this is only an analytical presentation. This methodology has not been vetted within FMCSA. There are certainly other statistical methods that can be used to identify problem carriers. The methods used by SMS for the CSA program take a range of other relevant factors into account.

Still, this report asserts that SDA could supplement a known weakness in the current SMS algorithm. Namely, SMS's inability to evaluate small carriers with insufficient roadside inspection data to be identified by SMS BASICs. This is critically important for the HMSP program because a substantial portion of the carriers hauling particularly dangerous cargo are small carriers who are unlikely to be identified by SMS's procedures because of lack of sufficient roadside inspection data.

The subsequent analysis in this report assumes that the carriers noted by SDA, and especially the carriers ranked near the top of the SDA list, may be carriers of considerable concern. Further, based on statistical significance, if an HMSP carrier is not ranked by SDA as a poor performer, then perhaps the carrier should not be a candidate for sanctioning, even if the carrier exceeded one of the four HMSP thresholds.

> With the June 2015 Federal Register Notice, HMSP renewals are no longer being denied if a carrier exceeds one of the HMSP thresholds. A carrier's SMS BASICs are evaluated at the hazmat thresholds to determine if a carrier ranks high enough to receive a CI (for violating the thresholds), or a mandated CI if there was insufficient data within the previous 48 months to calculate at least one SMS BASIC. The results of the CI's safety rating determines if the HMSP should be suspended, revoked or denied. The carrier has an appeal right under § 385.17.
>
> For developmental and budgetary reasons, the June 15 Notice to apply SMS BASICs thresholds at the hazmat level did not include application of the SDA and modified HMSP thresholds methodology discussed in this section as part of the monthly screening of the HMSP carriers. Thus, poorly performing small carriers with limited data likely will be missed by the current SMS BASICs threshold methodology. These will be identified to receive a mandatory CI if there is

insufficient data from the past 4 years to calculate the SMS BASICs. Use of the modified HMSP thresholds as part of monthly screening may be included in the future.

Additional details related to the performance of these carriers are presented in Appendix M in the separate document.

6.2.3 Accuracy of SDA Using Existing HMSP Thresholds in Avoiding Errors

Section 5.4.3 explains why the SDA could be useful for application to carriers that exceed an HMSP threshold. Appendix F in the separate document identifies the actual carriers that would have been denied renewal based on the HMSP thresholds. The analysis in this section compares these HMSP threshold results to the SDA results discussed in 6.2.2.

As an example, let's apply SDA to the examples shown in Section 5.4.3 of carriers who would be denied renewal under the existing HMSP thresholds without SDA:

- Six carriers, 0.4 percent of HMSP carriers, would have been denied renewal based on the HMSP crash threshold. Using SDA instead, only four of those six carriers would be ranked as poorly performing carriers on the SDA list.

- Twelve carriers, 0.8 percent of HMSP carriers, would have been denied renewal based on the HMSP driver OOS threshold. Using SDA instead, only 9 of those 12 carriers would be ranked as poorly performing carriers on the SDA list.

- Forty-four carriers, or 2.9 percent of HMSP carriers, would have been denied renewal based on the HMSP vehicle OOS threshold. Using SDA instead, only 11 of those 44 carriers would have been ranked as poorly performing on the SDA list. Far more carriers would have been identified (recommended for denial) by failure of the HMSP threshold for vehicle OOS than by the other three HMSP thresholds combined. However, a large percentage of these carriers who exceeded the HMSP threshold for vehicle OOS do not show a significant statistical deviation from average safety performance.

- Sixteen carriers, or 1.1 percent of HMSP carriers, would have been denied renewal based on the HMSP HMs OOS threshold. Using SDA instead, only 10 of those 16 carriers would be ranked as poorly performing on the SDA list.

  A comparison of the 16 carriers that would have been denied renewal based on exceeding the HMSP HM OOS threshold versus those that would have been denied using the SDA methodology illustrates that:
  - Of the 10 worst-performing carriers on the list of 16, 9 of those 10 carriers were on the SDA list.
  - Only 1 of the 6 best performing carriers on the list of 16 was on the SDA list.

In summary, of the 67 carriers identified by failing the HMSP thresholds, mentioned in Section 5.4.3, only 25 would have been identified as poorly performing using the SDA approach. The overwhelming majority of the carriers not identified by SDA analysis (33 of 42) were only

identified in the HMSP threshold analysis by the vehicle OOS threshold, which has the weakest correlation in predicting crashes.

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7. PROGRAM ALTERNATIVES

This section examines alternatives to address the issuing/renewal of permits and the process of monitoring carrier safety performance and regulatory compliance during the period that their permit is active.

7.1   INTRODUCTION

The components of both permit issuance and carrier monitoring can be divided into two functional categories:

- Regulatory- or compliance-based requirements.

- Safety performance- or rate-based requirements and enforcement interventions.

The portion of the HMSP program related to regulatory- or compliance-based requirements was not questioned by the stakeholders. There is general concurrence among all interviewees that these requirements are appropriate. These are requirements such as:

- The carrier may not have a final safety rating that is below Satisfactory.

- The carrier must demonstrate current financial responsibility.

- The carrier must be registered with PHMSA as an HM carrier.

- The carrier must have a current satisfactory security plan.

- The carrier must have a current satisfactory communications plan.

- A carrier will have their HMSP suspended (or revoked) if it is found unfit to transport those HMs or if it fails to comply with an OOS order.

The regulations are included in Appendix A in the separate document.

The core issues identified in MAP-21, and in the petition, relate to the safety performance thresholds and their relationship to HMSP issuance and particularly to renewal.

7.1.1   Stakeholder Assertions

The private carrier petitioners, with other stakeholders, had several concerns with the HMSP regulations and their implementation. These were discussed above in section 1.1.2 as being inaccurate perceptions. Among the major assertion concerns were:

- The eligibility criterion disqualifies more than 30 percent of registered HM motor carriers.

- Application of FMCSA's standard for statistical validity under SMS causes undue hardship to small carriers.

- Unlike SMS, in which safety performance ranking is recalculated monthly, the permit application thresholds are applied only once every 2 years at the time that the carrier

must file a renewal application. In calculating a carrier's rates for comparison to the thresholds, the HMSP program uses only the latest year's data. From the perspective of operations, this provides a carrier with a first year "free pass," during which there is essentially no effective oversight.

- If at the time of renewal application the carrier is identified as exceeding an HMSP threshold (i.e., being in the top 30 percentile for that HMSP threshold), causing the renewal application to be denied, there is no due process for appeal that the carrier may not be an unduly unsafe carrier.

7.2 PROGRAM ALTERNATIVES

Analysis and discussion presented earlier in section 1 of this report established and documented that most of these assertions by the petitioners are inaccurate. Based on FMCSA's current implementation of the regulations, it is not true that more than 30 percent of the registered HMs motor carriers are disqualified at renewal. However, due to limitations of the current information system database structure, it is not possible to get a direct exact count. Based on indirect analysis, it is clear that well under 10 percent of all applicants are denied HMSPs based on the HMSP thresholds, and the analysis in section 5.4.3 indicates the renewal denial rate is more likely closer to 4.5 percent.

7.3 ALTERNATIVE PATHS FOR ANALYZING WHETHER A CARRIER SHOULD BE DENIED RENEWAL

In response to these (and other) petitioners' concerns, and in response to issues identified by the interviewees, alternative paths for identifying whether a carrier should be denied a renewal are presented for the following elements of the HMSP program:

- HMSP threshold calculation.
- Exceeding HMSP thresholds.
- Initial HMSP issuance.
- Monitoring performance of carriers with Active HMSPs.
- HMSP renewal.
- Additional program elements.

These are not fully independent alternatives; selection of some of the alternatives will impact the implications of other alternatives.

The next sections of this report evaluate the impact of each alternative. The implications of these alternatives are then referenced back to the goals and issues identified in MAP-21 and in the petition.

7.3.1 HMSP Threshold Calculation

The petitioners requested that the thresholds be set at a fixed rate, rather than changing every 2 years. FMCSA responded to this request in "Change to FMCSA Policy on Calculating and Publicizing the Driver, Vehicle, and HMs OOS Rates and Crash Rates" signed by the Administrator and published on June 21, 2012. This met that request in the petition (i.e., the rates became fixed).

7.3.2 Exceeding HMSP Thresholds

Petitioners expressed concern that application of FMCSA's "statistically valid" standard causes undue hardship to small carriers, especially carriers that have difficulty obtaining enough 'clean' inspections to overcome the impact of random or unlucky OOS orders (as mentioned previously, any inspection without an OOS violation will lower their OOS rates [i.e., they do not need a clean inspection, only one that does not include that type of OOS order]. Others have argued that receiving enough OOS orders to exceed a threshold very likely indicates that there is a cultural element within the carrier allowing such a high level of violations to consistently occur).

This report suggests that an alternative to FMCSA's "statistically valid" standard could be to ensure that the carrier's safety performance shows a statistically significant pattern of behavior that is worse than the behavior of an average carrier. Details of how this alternative could be applied are described in Section 8.2.1.

In conjunction with SDA, discussed above, the addition of a statistically significant approach could further address the petitioners' concern that application of FMCSA's "statistically valid" standard for the minimum number of roadside inspections necessary before calculating a BASIC causes undue hardship to small carriers. The statistical significance approach is another method by which FMCSA could address the concern about the percent of carriers being denied permits, as the number of carriers that would be denied permits by exceeding the raw HMSP thresholds would be cut by more than half. Further, the projected results indicate that addition of statistical significance to SDA would better address FMCSA's goal of taking action against carriers with patterns of unsafe or unfit behavior while avoiding taking action against safer carriers.

7.3.3 Initial HMSP Issuance

Currently, when a carrier first applies for an HMSP:

- If the carrier's crash rate or one of their OOS rates in the prior year is over an HMSP threshold, the application is denied. This likely has no practical meaning for a new carrier since they have no prior year's data, but it is likely an incentive for poor-performing existing carriers to attempt reincarnation to get rid of that prior year's data.

- If the carrier's crash and OOS rates in the prior year are below the HMSP thresholds and the carrier has a Satisfactory safety rating (and all other requirements are met), the HMSP is issued. If the carrier has a safety rating below Satisfactory, the application is denied.

- If the carrier does not have a safety rating and all other requirements are met, the carrier is issued a THMSP. The carrier should receive a CI within 6 months. If

FMCSA is unable to perform a CI within 6 months, the carrier is granted a 3-month extension. This requirement to have a CI instead of a safety assessment (SA) is what applies to new entrants who apply for an HMSP.

There has been no suggestion that application of the thresholds at the point of initial issuance is an unreasonable barrier to entry into the HMSP program. These thresholds are meant to prevent carriers with far worse-than-average safety performance from obtaining an HMSP (as mentioned earlier, the organizations representing for-hire HMSP carriers suggested that the HMSP safety performance thresholds for obtaining an HMSP may be too lax).

As noted above, it is possible for a true new entrant, which has no safety performance history, to receive a THMSP until receiving a CI, after which the carrier would receive an HMSP (assuming a CI rating of Satisfactory). One of the suggestions from the interviewees representing for-hire HMSP carriers was that FMCSA should adopt a system like the military's. A carrier would need to operate for some period of time to establish a safety performance record before they are eligible to apply for an HMSP. Logically they could start out as HM carriers, but not as HMSP carriers.

Another alternative is that when MAP-21's new entrant proficiency requirement is implemented, it could involve a training and testing module specifically for new entrants who apply for an HMSP; if they don't pass that module, they should not get a THMSP.

7.3.4   Monitoring Performance of Carriers with an Active HMSP

7.3.4.1   Current Monitoring

Currently, the safety performance of all carriers is monitored through the CSA SMS process. Ultimately, being identified for further scrutiny from the CSA process leads to some form of targeted intervention, the most thorough of which is a CI. Under the current monitoring system for HMSP carriers, because of the sensitivity of their loads, HMSP carriers do not receive any of the lesser targeted interventions, they only receive CIs.

Also by policy, if a carrier had a CI in the prior 12 months and received a Satisfactory safety rating, no matter what is seen at the roadside, the carrier commonly is not scheduled for another CI during that year. Because of the higher risk of their commodities, perhaps this policy should be revised for HMSP carriers who are identified for targeted intervention so that they would receive a CI even if they had one within the prior 12 months. This application of a CI to review the current safety rating is consistent with the HMSP program, where a safety rating other than Satisfactory (assigned in a CI) leads to suspension of the HMSP.

7.3.5   Enhanced Monitoring of HMSP Carriers.

There are several suggested elements to an enhanced monitoring of HMSP carriers.

1. There are three current groups of CSA standards/SMS thresholds for when to intervene against an unsafe carrier: basic, HM, and passenger carrier, each set of standards more stringent than the last. HMSP carriers should possibly be placed under the passenger carrier (highest) standards due to the danger of their cargo.

2. Second, CSA identifies carriers for intervention based on BASIC scores, and SMS requires a minimum number of inspections to generate a ranking. Many HMSP carriers are too small to generate sufficient data to be ranked by SMS on any BASIC. There are numerous such carriers which nonetheless have particularly poor safety performance records. Because of the greater risks associated with HMSP commodities, it is important that FMCSA considers implementing some enhanced safety assessment process for when the current SMS algorithm fails due to limited roadside inspection data.

   Therefore, there is a need for additional criteria to identify those very small HMSP carriers who should be targeted to receive a CI. This could be done by scheduling an HMSP carrier for a CI any time that: 1) the carrier's crash or one of their OOS rates in the prior 12 months exceeds the HMSP thresholds, and 2) the HMSP carrier's performance demonstrates a statistically significantly worse than average pattern of behavior.

   Functionally, this would mean applying the current HMSP thresholds as part of the established FMCSA cycle of once a month, in contrast to once every 2 years at the point of renewal. This would identify smaller carriers that have particularly poor performance in individual areas.

3. Third, as part of the monthly monitoring of HMSP carriers, apply other tools, such as SDA, to identify carriers with overall poor performance, as opposed to poor performance in one particular area. The above analysis (Section 6.2.2) indicates this approach would be the best at avoiding sanctioning good HMSP carriers while also successfully identifying the majority of poorly performing HMSP carriers for a CI.

Figure 4 presents a graphic overview of this approach.
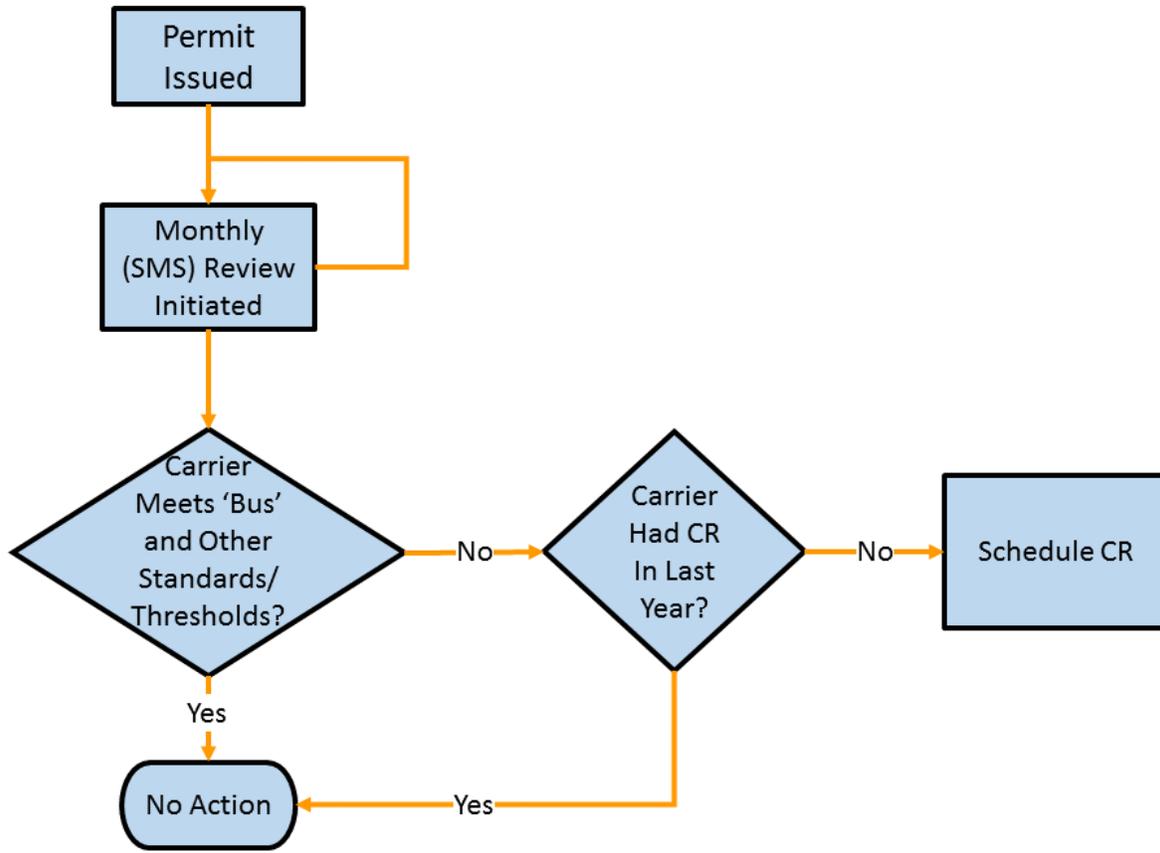
Figure 4. Overview of continuous monitoring process.

Technically, it appears the best means for implementing these changes would be to make them a part of the CSA monthly evaluation process applied to HMSP carriers.

7.3.6   HMSP Renewal

There are three alternatives identified for a revised HMSP renewal processing.

- Retain The Thresholds—the first alternative is to continue to apply the HMSP thresholds but also require that the carrier's performance demonstrates a statistically significantly worse-than-average pattern of behavior before denying renewal.

- End Thresholds at HMSP Renewal—the second alternative would be to apply HMSP thresholds at the point of initial application and monitor them monthly afterwards to target carriers needing a CI.

- Modify Application of the Thresholds at Renewal—the third alternative would be to modify the way that thresholds are applied at the point of HMSP renewal to require that, in addition to exceeding the threshold, the poor safety performance must be statistically significant, though it need not be worse than average.

These HMSP renewal alternatives are described more fully the explanations of the other program alternatives, and the implications of these alternatives are analyzed in Section 8.5.

7.3.7 Additional Program Elements

This study identified the following alternatives/recommendations related to other program elements.

- Periodic CIs—FMCSA currently has no policy on safety ratings expiring. Although the safety rating process has changed substantially in the past decades, once assigned, they are currently treated as if they never expire. Thus, there are a number of HMSP carriers that have a safety rating that was determined decades ago. Some of these were determined under a more lenient safety review process before the current CI was defined. An alternative is that, regardless of what roadside inspection data is received for SMS BASICs to rank the carrier, all HMSP carriers should receive a CI at least once every 4 years.

Effective June 2015, policy was published as a Federal Register Notice that a CI will be required at least every 4 years for every HMSP carrier that has not received enough roadside inspection data to calculate at least one BASIC in that timeframe.

- States Enforce the Requirement for HMSPs—although Federal law and regulations require that carriers transporting certain amounts of specific HMs have an HMSP and comply with the regulations found in part 385 subpart E, there are insufficient enforcement actions to ensure these carriers are compliant. Additional State MCSAP action is needed to improve the amount of enforcement resources directed toward enforcing the HMSP program.

It is planned to address this as part of an update to the part 350 requirements for qualifying for MCSAP funds.

- Require a CI within 6 months for all new entrants who request an HMSP, allow no exceptions—under current policy an HMSP new entrant carrier can avoid both the normal SA and/or the HMSP-required CI. Most new entrants receive an SA. However, if a new entrant applies for an HMSP, they do not get scheduled for the SA. Instead they are scheduled to receive a CI within 6 months. However, when called to schedule the CI, if the carrier reports they have not yet carried an HMSP load, the CI is delayed until the carrier reports carrying an HMSP load. Thus, a new entrant carrier can scam the system and avoid both an SA and a CI. The recommended alternative is to perform a CI for every HMSP new entrant carrier within 6 months, regardless of whether the carrier ever carried an HMSP load.

- Immediate Improvement of User Interface—there have been a number of concerns identified by non-HMSP carriers regarding the MCS-150/MCS-150B forms and the user interface for the online MCS-150.

The new user interface for the MCSA-1 was implemented in December of 2016 as part of implementation of the URS-1 that addresses this. The phase-in approach first applied that form to new entrants, and the biennial updates/renewals were included in late 2016.

- Fix the Core Information System—there are a large number of change requests related to the software used during HMSP initial application, monitoring, and renewal processing of HMSPs. A solution with a longer-term approach, rather than piecemeal fixes, is needed.

As part of implementation of URS-1, and as part of interactions with PHMSA's information systems, there are plans to address a number of these.

8. EVALUATION OF PROGRAM ALTERNATIVES

This section presents detailed descriptions and analysis of the alternatives identified in Section 7 above.

Where appropriate, the results that would have occurred, had the alternative been used as of January 1, 2013, are then presented. These results are then compared to the results that would have come from the existing program (had all these carriers applied for renewal on that date), and then the results of the different alternatives are compared to each other.

This section further presents a recommendation for selection of options and explains how each of the options addresses an issue identified by the petitioners and by MAP-21.

8.1   THRESHOLD CALCULATION

The petitioners requested that FMCSA "reduce the impact of having carriers comply with a moving eligibility target." The policy titled "Change to FMCSA Policy on Calculating and Publicizing the Driver, Vehicle, and HMs OOS Rates and Crash Rates," dated June 21, 2012, set fixed rates, which meets this request.

The petitioners also requested, "<u>In no case should more than 30 percent of the hazardous materials motor carriers be deemed ineligible to hold an HMSP.</u>" (emphasis in original.) As explained in Section 1.1.2, not withstanding the language in the regulations being referenced, the methods FMCSA used to calculate the thresholds, as explained in the online documentation for MCMIS, guarantees that far less than 30 percent of HMSP carriers have ever been deemed ineligible to renew or to hold an HMSP. This analysis estimated the actual rate of HMSP renewal denial has more likely been approximately 4.5 percent.

Because the HMSP thresholds are accepted policy, no additional analysis of the thresholds is provided.

8.2   EXCEEDING HMSP THRESHOLDS

The following recommendation applies to the application of the HMSP thresholds, whenever the thresholds are applied.

- At the time of this study, the HMSP thresholds were applied at initial issuance and at renewal.

- Going forward, depending on what recommendations are accepted and budgeted, it is possible that modified HMSP thresholds could be applied as part of the CSA's monthly screening process to better detect small carriers with limited safety performance data. If so, then it would be logical to stop applying them as a part of the HMSP renewal process.

FMCSA announced in the June 2015 policy notice that it had implemented a continuous monthly screening, but using SMS BASICs at the hazmat thresholds. Due to IT budget limitations and timing limitations for rolling out URS, it did not implement the recommended statistical significance criterion and SDA as part of the monthly SMS BASICs monitoring.

Based on future IT budget funding availability, the statistical significance criterion and SDA could be added to the monthly monitoring for more effectively detecting poorly performing small carriers with insufficient data to calculate BASICs to be targeted for a CI sooner than 4 years.

The following recommendation applies regardless of when the HMSP thresholds are applied.

In order to develop a better understanding of the number of denials that may have occurred due to exceeding one or more HMSP thresholds, an analysis was performed to see how many HMSP carriers would have been denied on these bases if their renewals were all processed on January 1, 2013. A review of these potential denials was detailed in Section 6, which identified two patterns:

- Based on the analysis that examined the hypothetical impact of applying the HMSP thresholds to all general carriers, a number of general carriers would have exceeded an HMSP threshold, particularly vehicle OOS rate, even though their actual overall behavior was not statistically significantly different from the behavior of all carriers. In some cases, the overall safety performance of the general carriers was not even significantly different from the superior safety performance behavior of HMSP carriers. Further, for such general carriers who would have exceeded an HMSP threshold, other indicators of overall safety performance generally suggested that those non-HMSP carriers were not particularly dangerous carriers.

- In contrast, there were also a number of carriers that would have exceeded an HMSP threshold, and their pattern of behavior was significantly worse than the pattern of all carriers. Without regard to other indicators, these carriers demonstrated poor safety performance. Further, for most of these carriers, other indicators also suggested poor safety performance.

An analysis compared the various possible combinations of HMSP thresholds which would have identified a carrier. Again, as was done in Section 6, it was performed for both all carriers in 2012 and for HMSP carriers in 2012. Based on this, the following recommendation is made. Even when an HMSP threshold is exceeded, an HMSP renewal should only be denied when the carrier shows a statistically significant pattern of behavior that:

- Exceeds the published HMSP thresholds, and
- Is statistically significantly worse than the performance of the average carrier.
  - At the 98 percent confidence level as compared to all carriers.
  - At the 99.5 percent confidence level as compared to HMSP carriers.

8.2.1 Recommended Modifications of the HMSP Thresholds for Significant Behavior

In order to implement a requirement that there should be a significant pattern of poor behavior before denying a renewal for exceeding a modified HMSP threshold, the following modifications to the program policy (and to the wording provided to the public) are recommended:

FMCSA will only deny HMSPs in situations where:

- The carrier's crash or an OOS rate is above the value published for the HMSP threshold in MCMIS documentation, and

- The carrier's safety performance for that HMSP threshold shows a pattern of behavior that is statistically significantly worse than the average HMSP carrier's performance for that threshold.

Significance for carrier's crash rate:

- For the crash rate threshold, any situation where the carrier has had two or more crashes in the year and exceeds the published HMSP threshold will meet the statistical significance of this criteria.

Significance for driver OOS rate:

- If the carrier had 12 or fewer driver inspections with 2 or more driver OOS orders, this is a significant pattern of behavior.

- If the carrier had 22 or fewer driver inspections with 3 or more driver OOS orders, this is a significant pattern of behavior.

- If the carrier had four or more inspections with driver OOS orders and the percent of the carrier's driver inspections resulting in driver OOS orders exceeded the threshold, this is a significant pattern of behavior.

Significance for vehicle OOS order rate:

- In no case where the carrier had two vehicle OOS orders is it considered to be a significant pattern of behavior.

- If the carrier had five or fewer vehicle inspections and three or more of these inspections resulted in vehicle OOS orders, this is a significant pattern of behavior.

- If the carrier had eight or fewer vehicle inspections and four or more of these inspections resulted in vehicle OOS orders, this is a significant pattern of behavior.

- If the carrier had 12 or fewer vehicle inspections and 5 or more of these inspections resulted in vehicle OOS orders, this is a significant pattern of behavior.

- If the carrier had 15 or fewer vehicle inspections and 6 or more of these inspections resulted in vehicle OOS orders, this is a significant pattern of behavior.

- If the carrier had seven or more vehicle inspections resulting in vehicle OOS orders and the percent of the carrier's vehicle inspections resulting in vehicle OOS orders exceeds the threshold, this is a significant pattern of behavior.

Significance for HM OOS orders:

- If the carrier had 16 or fewer HM inspections and 2 or more of these inspections resulted in HM OOS orders, this is a significant pattern of behavior.

- If the carrier had 32 or fewer HM inspections and 3 or more of these inspections resulted in HM OOS orders, this is a significant pattern of behavior.

- If the carrier had 50 or fewer HM inspections and 4 or more of these inspections resulted in HM OOS orders, this is a significant pattern of behavior.

- If the carrier had five or more HM inspections resulting in HM OOS orders and the percent of the carrier's HM inspections resulting in HM OOS orders exceeded the threshold, this is a significant pattern of behavior.

The following sections present summaries of how application of this filter of a "Significant Pattern of Behavior" would have affected the selection of carriers for denial from the January 1, 2013 analysis, which is given in Appendix F in the separate document. Supporting details are found in Appendix G in the separate document.

8.2.2   HMSP Crash Rate Threshold—With a Significant Pattern of Behavior

The HMSP crash threshold as calculated according to the explanation in MCMIS is far greater than the average crash rate of all carriers; it is far more lenient than the petitioners presume according to the explanation in the regulation, especially for HMSP carriers, as HMSP carriers have better safety performance (as shown in Table 5 in Section 5.4). Consequently, any time that an HMSP carrier has two (or more) crashes and has a crash rate higher than the HMSP threshold, that represents a significant pattern of behavior. In such cases, application of the significant pattern of behavior would not cause any change from the initial HMSP threshold-only list.

However, by comparison, if the SDA method were used, only four of the six carriers violating the HMSP crash threshold would identified by SDA.

8.2.3   HMSP Driver OOS Rate—With a Significant Pattern of Behavior

The original analysis that used just HMSP thresholds identified 12 carriers for denial based on driver OOS rate. However, even though those 12 carriers exceeded the HMSP driver OOS threshold, the overall safety performances for 4 of these carriers do not show statistically significantly different patterns of behavior.

By comparison to that list of 12 carriers, which would have been denied for exceeding the driver OOS threshold, only 9 of those 12 carriers were also identified by the SDA methodology (see Appendix E in the separate document).

After applying the recommended filters of requiring both a statistically significant pattern of behavior and being identified by SDA, seven of the eight carriers identified by statistical significance remained recommended for denial.

Comparing the modified Driver OOS threshold analysis results to the SDA ranking:

- By applying the statistical significance methodology, 3 of the 12 carriers which violated the driver OOS threshold are not denied, even though they violated the HMSP Driver OOS rate threshold.

- One carrier identified by the SDA methodology, Carrier 15, would have been taken off from the unmodified threshold list upon applying the statistical significance criteria. This is because Carrier 15 is a rather small company, with five power units, and only two driver OOS orders in 17 inspections in 2012. However, it is important to note that because Carrier 15 also had a generally poor safety performance, it still would have been identified for attention by SMS alerts, based on two of the methods that use BASIC scores.

8.2.4   HMSP Vehicle OOS Rate—With a Significant Pattern of Behavior

The HMSP threshold-only analysis showed that 44 carriers would have been denied HMSPs based on vehicle OOS rates (see Appendix F in the separate document). Of these, only 18 would have remained for attention after also applying the statistical significance criteria.

In contrast, 11 of the 44 carriers were identified for intervention by the SDA methodology. Only 8 would be identified by both the significant pattern of behavior standard and SDA (see Appendix G in the separate document). Reviewing the three carriers identified by SDA but dropped when applying the significant pattern of behavior criteria, we can say:

- Carrier 27 was dropped from the original threshold-only list. With two vehicle OOS orders in three inspections and one crash with only three power units, this carrier's behavior was highly deviant from the norm. However, the carrier was too small to be caught by any SMS enhanced method for the pattern of behavior standard. Only SDA would have identified this carrier.

- Carrier 33 and Carrier 30 would only have been denied based on their HMSP driver OOS rates.

Consequently, the statistically significant pattern of behavior standard would have only missed one small carrier that was identified by SDA.

The statistically significant pattern of behavior list (see Appendix G in the separate document) contains 10 carriers more than what SDA would have identified. However, even that additional 10 more than what SDA would have identified is a much less disruptive type I error result than the additional 33 carriers that would have been denied based on the current method for applying the HMSP vehicle OOS threshold. As noted elsewhere, the vehicle OOS measure is a poor predictor of future crashes. So, either the statistically significant or SDA approaches (recommended they be used together) would be a substantial improvement over the HMSP threshold method.

8.2.5 Hazardous Material Safety Permit HM OOS Rate—With a Significant Pattern of Behavior

The HMSP threshold analysis method would have denied 16 carriers based on the HM OOS threshold. Of these 16 carriers, 13 would still be identified for intervention after applying the significant pattern of behavior criterion.

Of the remaining 13 carriers, 10 were on the SDA-identified list (see Appendix G in the separate document).

8.2.6 Summary—Impact of the Proposed Modification of HMSP Threshold Analysis to also Require Significant Pattern of Behavior

The proposed application of a statistically significant pattern of behavior ("modified") to the HMSP thresholds would have identified 11 of the top 12 SDA-identified problem carriers, and 23 of the total 47 SDA-identified carriers overall.

Application of the recommended statistically significant pattern of behavior standard for determining HMSP thresholds would not have created any type 1 errors. In contrast, using the existing HMSP thresholds would have incorrectly identified 29 reasonably good carriers for denial. On the other hand, at most, application of the existing standard for HMSP thresholds would have created only two type 2 errors by not identifying Carrier 15 and Carrier 27 for denial of renewal. However, together those two carriers only had a total of seven power units, so the public exposure would have been small.

Applying the recommended statistically significant pattern of behavior filter for HMSP thresholds would substantially improve identification of only problem carriers in the HMSP program. It would eliminate numerous denials against carriers with reasonable safety performance while continuing to identify truly problematic carriers with poor safety performance for denial.

8.3 INITIAL HMSP ISSUANCE

There appears to be no issue about the core process of initial HMSP issuance. There is little question about the efficacy of the program when an existing carrier applies for an HMSP. However, when a new entrant carrier applies for an HMSP, there is a concern. Specifically:

- As a group, new entrants go on to have greater crash rates and OOS rates than do existing carriers. HMSP materials are exceptionally dangerous, and the risks associated with a crash of a truck carrying HMSP materials are much greater than the concerns over a crash involving a "normal" load.

- Successful reincarnation is a way for a carrier to fraudulently obtain a clean safety performance record to qualify for an HMSP.

- Applying for an HMSP is a way for a new entrant to avoid any scrutiny via an SA. The reason they apply for an HMSP is because a CI is supposed to be scheduled instead of an SA. However, by policy, the carrier may avoid the CI by never carrying

an HMSP load. Information about the possibility of using this practice to avoid scrutiny is available via the informal networks of carriers (i.e., "via the grapevine").

Consequently, three specific alternatives were suggested:

- New entrant carriers should not be allowed to apply for a THMSP until they have operated for some period of time, such as 6 months or a year, as is done by the military when granting approval to haul explosives.

- If the proficiency (training and testing) program is implemented for new entrant carriers, it should include a module required to obtain a THMSP.

- If a new entrant carrier applies for a THMSP, a CI should always be performed within the 6-month window, even if the carrier has not hauled an HMSP load.

Each of these specific alternatives are reviewed in more detail below.

8.3.1   No Temporary HMSP for New Entrant Carriers

In interviews with the for-hire HMSP carrier associations, the suggestion arose that, like the military's policy for permitting the hauling of explosives, new entrant carriers should not be allowed to apply for a THMSP until they have been in business for some period to demonstrate they have a safety-oriented operating culture (this prohibition is not recommended to be applied to all HM loads, only to HMSP loads). Reference was made to a similar practice in the U.S. Department of Defense, although no specific program was identified.

This recommendation would force a carrier to provide a reasonable period of safety performance before being eligible to receive even a THMSP. It would prevent inexperienced carriers from carrying loads that present especially high risks to the public.

However, such a new requirement could generate resistance from some stakeholders. Some possible issues could include:

- There are a number of legitimate issues for why an already-established operation might want a new USDOT number. For example:
  - The company might be sold, and the new owners want a new USDOT number.
  - A company might be split, where at least one of the child companies would need a new USDOT number.
  - A private carrier (e.g. for an explosives powder company) that already had a trucking operation for miscellaneous activities might want to spin off a separate trucking operation just to haul the explosives powder.

- This would be a barrier to entry for a specialized private carrier, which would have as its primary business only transporting the HMSP commodities of their parent manufacture. For example, an explosives powder company that has used contractors for hauling their product might want to bring their trucking operation in-house. They might have no significant opportunity to haul anything other than their HMSP

materials, and thus would not be able to demonstrate safe operation for the minimum required time.

- As petitioners noted, "some of the materials … [that] trigger the obligation to obtain a permit require a large capital investment in specialized equipment (e.g., stainless steel cargo tanks or multipurpose bulk trucks)." If a new entrant carrier has a potential client with materials that require this equipment, then the carrier would be forced to be in a different business for some period prior to beginning to engage in their anticipated core business.

Note, there is nothing that would prevent a company from applying for a USDOT number and then not engaging in any active business for the required waiting period, at least not according to implementation of this alternative for a waiting period.

Finally, while new entrants in general are more dangerous than experienced carriers, the data does not support the assertion that new entrant carriers that receive THMSPs are any more dangerous than the average HMSP carrier. This may be because although a new applicant for a THMSP is considered a new entrant because they just applied, in many cases, these applicants are long established firms who are just entering the HMSP market.

In all cases the HMSP thresholds must be met by all new entrants to receive a THMSP. Thus, for non-new entrants the barrier is already set much higher than for all other non-HMSP new entrant motor carriers. In fact, while there is not enough data for it to be statistically significant, the new entrant THMSP carriers in the HMSP program, as a group, had a crash rate that was lower than the average crash rate for previously existing HMSP carriers in both 2011 and 2012.

Restricting when a new entrant is eligible to apply for a THMSP would be a change in the existing rule and thus would require a rulemaking to implement.

8.3.2 HMSP Module in New Entrant Proficiency Training and Testing

MAP-21 mandated that FMCSA create a proficiency requirement and other requirements to ensure applicants for an interstate USDOT number understand applicable safety regulations. Research examined the possibility of meeting this requirement via a training and testing curriculum requirement.[10] Such an approach could include a module for HMSP (as well as possibly a module for HM) in new entrant training and testing for HMSP applicants. This could be required for all new entrant applicants for an THMSP (i.e., require that they satisfactorily complete the HMSP training and testing before being issued their interstate USDOT number and the THMSP, the latter until performance of the CI to determine if they get a Satisfactory rating). Existing carriers applying for a THMSP could be required to take just the HMSP module.

8.3.3 Always Perform a CI Within 6 months if a Carrier Applies for an HMSP

This requirement proposes the applicant HMSP carrier receive a CI within 6 months, whether or not it has hauled an HMSP load. This would plug a loophole and accomplish a couple of things:

- This would discourage carriers from applying for an HMSP to avoid scrutiny via an SA. By declaring they are an HMSP carrier, a new-entrant carrier's SA is canceled in

place of a CI, but their CI may be delayed indefinitely until the carrier hauls an HMSP load.

- This requirement would also discourage carriers from trying to reincarnate by using the new entrant/HMSP gambit to avoid detection via performance of the SA.

8.4 MONITORING PERFORMANCE OF CARRIERS WITH ACTIVE HMSPS

FMCSA continuously monitors the safety performance of all carriers, other than HMSP carriers. Currently the primary monitoring tool is the SMS analysis under the CSA program. This monitoring approach is used to identify and target possible problem carriers for enforcement intervention. The strictest intervention is a CI. Ranking an HMSP carrier to receive a CI is consistent with the existing HMSP program, where receiving a safety rating less than Satisfactory from a CI leads to HMSP denial, suspension, or revocation regardless of HMSP thresholds but allows for appeal.

This report's recommendation is that FMCSA should implement an enhanced, continuous monitoring of HMSP carriers (see Section 7.3.5).

Specifically, this recommendation includes the following three elements:

- Apply the SMS passenger carrier threshold standards to HMSP carriers. (Stricter standards.)

  FMCSA found that the higher SMS passenger threshold really made very little difference in the results of the SMS monitoring. In the June 2015 Federal Register notice, they left it at the second SMS level, the HM level.

- Apply the BASIC thresholds as part of the current SMS monthly analysis, but include that the carrier must exceed the BASIC for the two preceding periods and the current period before an intervention would be initiated. This would work well for medium and larger carriers but does not reliably work for small carriers with limited exposure.

- Apply an additional screening method, such as SDA, to identify smaller carriers with poor overall performance and to avoid taking action based on exceeding the HMSP thresholds when the carrier's rates are not significantly worse than the average behavior.

These recommended elements do not preclude the possibility of adding, at a future date, additional measures for monitoring the performance of HMSP carriers.

Each of these specific elements or methods is defined below. The methods and measures are applied to the January 25, 2013 MCMIS snapshot. Finally, the effects of each of these tools are compared.

8.4.1 Begin Applying Passenger Carrier BASIC Threshold Standards to HMSP Carriers.

Different levels of CSA SMS thresholds are applied depending on the type of carrier being reviewed:

- Regular.

- HM.

- Passenger.

The existing CSA BASIC SMS thresholds applied to passenger carriers could also be applied to HMSP carriers. Since these carriers are hauling particularly dangerous loads, then any time an HMSP carrier is identified for intervention by the SMS, those HMSP carriers should receive a CI and not any lesser intervention (as is current practice).

SMS currently uses four different combinations of failing SMS BASIC thresholds to identify carriers, including passenger carriers, for possible further intervention. These qualifiers are:

- Four or more BASICs greater than the average thresholds for their classes of SMS BASIC. (see 8.4.1.1)

- One very high BASIC (e.g., greater than 85) for the crash, HOS compliance, or the unsafe driving BASIC, in addition to another BASIC greater than any SMS BASIC threshold.

- High risk for 2 consecutive months.

- Three BASICs greater than the SMS thresholds for those BASICs.

Summary results of applying each of these criteria on the HMSP carriers (using Passenger Carrier thresholds) as of January 25, 2013, are presented below. Details supporting the data in this section are provided in Appendix H in the separate document.

8.4.1.1 Four or More BASICs Greater Than the CSA SMS BASIC Thresholds for Passenger Carrier

The following BASIC scores are identified as SMS BASIC thresholds (percentiles) for passenger carriers (and are recommended for HMSP carriers).

- For the unsafe driving BASIC, the HOS compliance BASIC, and the crash BASIC: 50.

- For the driver fitness BASIC, the controlled substances/alcohol BASIC, and the vehicle maintenance BASIC: 65.

- For the HM compliance BASIC: 80.

Based on the data from the January 25, 2013 extract, there were six HMSP carriers that had four or more BASIC scores above the SMS passenger threshold values. Data for these carriers is presented in Appendix H in the separate document.

Four of these six carriers were targeted by the SDA.

8.4.1.2   One Very High BASIC (greater than 85) and Another Exceeding Its Threshold

A second method of identifying carriers for further scrutiny is checking if the carrier has a BASIC score of 85 or above for the Crash, HOS Compliance, or the Unsafe Driving BASIC and also has a second BASIC above its SMS threshold, identified in 8.4.1.1.

Eleven HMSP carriers would have been targeted using this criterion. These carriers are identified in Appendix H in the separate document.

- Eight of these 11 carriers were also targeted by SDA.
- Two of the 11 identified by these criteria would also have been identified by the criterion of having four or more BASICS exceeding their thresholds.

8.4.1.3   High Risk for Two Consecutive Months

Since the snapshot used in this analysis was taken on a single day, it does not provide the data to identify the carriers that had high risk flags in prior months.

Six of the HMSP carriers had a high risk flag in the extract. All of these six carriers were identified by the SDA methodology. Further, each of the six carriers was identified by one of the other sets of SMS criteria.

8.4.1.4   Three BASICs Exceeding the Threshold

The CSA documentation currently states that a full CI is recommended, but not required, for a carrier exceeding three BASIC thresholds. There were 12 HMSP carriers that had three BASIC scores exceeding their thresholds as of January 25, 2013.

Eight of the 12 carriers were among those identified by the SDA. Four of the 12, including 1 carrier not identified by SDA, were also in the list of carriers that had one of the key BASICs at 85 or greater and another BASIC exceeding its threshold.

8.4.2   Monthly Evaluation of Modified HMSP Thresholds

In order to evaluate the effectiveness of monthly applying the modified HMSP thresholds created by application of the statistically significant filter (see section 8.2.1 above) for identifying small carriers with limited safety performance data, compared to using only the SMS passenger thresholds, all four HMSP threshold analyses were run with three additional "as-of" dates. So in addition to the January 1, 2013 as-of date, the three additional as-of dates of November 1, 2012, September 1, 2012, and July 1, 2012 were analyzed. In addition to the substantial duplication over time, with poor carriers consistently showing as poor, this provided additional insights into their ongoing behavior.

8.4.2.1   Modified HMSP Crash Threshold

Eleven different carriers would have been identified by the three additional as-of-date runs of the **modified HMSP crash threshold analysis**:

- Four of the six carriers from the modified HMSP crash threshold list for the as-of January 1, 2013 analysis would have been identified in one of the three prior as-of date analyses. One carrier, Carrier 40, would have been identified in July, with 7 crashes in the prior 12 months and 48 power units. Three of Carrier 40's crashes 'aged off' in July and August, and the carrier was not on the September crash threshold list. However, with crashes in July, August, and October, the carrier exceeded the crash threshold by November.

- Of the seven carriers that were on one of the three other modified HMSP crash threshold lists (from the as-of-date analyses) but not on the January 1, 2013 list, three were carriers identified by the SDA methodology, and four were not. All four of the carriers that were not identified by the SDA methodology had crash rates of at least 17 crashes per 100 power units. This is another illustration that perhaps crashes should be weighted more heavily than the equal treatment used in this analysis of the SDA methodology.

- Illustrating the substantial type II errors made by SMS of not identifying small carriers with insufficient safety performance data to receive BASIC scores, no such carriers were identified by the BASIC methods. (This is a known weakness of the SMS BASICs for small carriers.)

8.4.2.2   Modified HMSP Driver OOS threshold

Eleven different carriers would have been identified by the three additional as-of-date analyses of the **modified HMSP driver OOS threshold**:

- Five of these carriers were among the eight carriers that would have been identified for denial on January 1, 2013. Four of those five were identified by SDA.

- Six carriers that were not on the January 1, 2013 list would have been denied because of driver OOS rate. Of these, two were identified by SDA.

- Again, the BASIC threshold methods did not identify any of these carriers because none of them had enough safety performance data to receive a BASIC score.

8.4.2.3   Modified HMSP Vehicle OOS threshold

21 different carriers would have been identified by the three additional as-of-date analyses of the **modified HMSP vehicle OOS threshold**:

- 12 of these carriers were among the 18 carriers that would have been identified on the January 1, 2013 list. Seven of these 12 were identified by SDA.

- There were nine carriers identified that were not on the January list of carriers denied for the modified vehicle OOS rate. Of these, two were identified by SDA.

- One carrier, Carrier 39, was also identified by the SMS BASIC threshold analysis. This carrier was not on the January list of carriers denied for vehicle OOS rate.
  - With 38 inspections out of 109 that resulted in vehicle OOS, Carrier 39 would have exceeded the HMSP threshold in November.

– With 39 inspections out of 116 that resulted in vehicle OOS, Carrier 39 also would have exceeded the HMSP threshold in September.

8.4.2.4 Modified HMSP HM OOS threshold

18 different carriers would have been identified by the three additional as-of-date analyses of the **modified HMSP HM OOS threshold**:

- Eleven of these carriers were among the 13 carriers that would have been denied based on the January 1, 2013 analysis. Nine of these 11 are carriers identified by SDA.

- Seven carriers were not on the January 1, 2013 list of carriers that would have been denied for exceeding the modified HMSP HM OOS threshold. None of these seven were SDA-identified.

- Two SDA-identified carriers, Carrier 2 and Carrier 12, would have failed the HMSP HM threshold multiple times and were also identified by the SMS BASIC analysis.
    - Carrier 2 received 13 HM inspections between the evening of June 30, 2012, and July 4, 2012. The carrier had no inspections before June 30 or after July 4. Seven of the 12 inspections resulted in HM OOS orders. Carrier 2 failed the modified HMSP HM threshold as a result.
    - Carrier 12 would have failed the modified HMSP HM OOS threshold in July, September, and January, but not in November.

In summary, there are many cases where carriers would have failed modified HMSP OOS thresholds over significant periods of time. There are also many cases where carriers would have only appeared in these as-of-date runs for one or two months.

In general, the carriers that remain over the modified HMSP thresholds for long periods of time have events that 'age off' the HMSP threshold analysis after a year, but they also have newer OOS events that replace the older ones.

Use of the modified HMSP threshold analysis, augmented by requiring statistical deviation from behavior of other carriers, would be quite useful in identifying small carriers with limited safety performance data who have poor safety performance across time, not just at the point of renewal. This method is particularly valuable at identifying small carriers with one particular problem area that are not identified by SMS BASICs.

> *Due to budget and development requirements, use of the modified HMSP thresholds was not included in the June 2015 revision of policy regarding monthly monitoring of HMSP safety performance. This is something FMCSA may revisit in the future.*

8.4.3 Use of the SDA/Ranking

The SDA methodology used in this report is explained in Section 6.2.2 and more extensively explained in Appendices L and M in the separate document. This technique was developed to

support the analysis in this report. There is no assertion made that the SDA method described is the best possible method. Nonetheless, it presents an initial representation of how to identify carriers too small to be identified by SMS BASICs but who nonetheless have safety performance far worse than the average carrier or average HMSP carrier.

Thus, SDA in conjunction with the modified HMSP thresholds could help plug the substantial hole in the current SMS approach that does not reliably identify poor-performing small carriers with limited safety performance data. As presented, SDA with the modified HMSP thresholds offers the start of a tool that could identify problem carriers for scrutiny (i.e. to receive a CI).

8.4.4 Comparisons

This section compares the results of the various methods identified in Sections 8.4.1, 8.4.1.1, and 8.4.1.2 that may be used to identify carriers for scrutiny.

This comparison is only concerned with each method's effectiveness at obtaining good outcomes and avoiding type 1 and type 2 errors. It does not take into account the impact of the alternatives in sanctioning (i.e. denial of an HMSP renewal versus triggering a CI). A CI affords the carrier a range of review and appeal processes that are not available under the existing practice of simply denying a permit for exceeding an HMSP threshold.

8.4.4.1 Comparing Carriers Identified By SMS to Carriers Identified by SDA

The SMS BASIC scores, without any modification, would have identified 23 carriers for a CI. Appendix H in the separate document presents this list, including an indication of whether the carrier had a high risk flag and the carrier's rank on the proposed SDA list.

15 of the 23 carriers identified by the SMS BASIC analysis were identified by SDA. This includes 2 of the 10 carriers worst-ranked by SDA and 8 of the 21 worst-ranked by SDA.

8.4.4.2 Comparing SDA-Identified Carriers to Carriers Identified by SMS BASIC Analysis

Appendix H in the separate document lists all of the 47 SDA-identified carriers and provides background on their BASIC scores. As noted above, because of the many type II errors SMS makes in not identifying small problem carriers with limited safety performance data, many of the 47 SDA-identified carriers were not identified by the SMS BASICs analysis.

- Five of the 47 SDA-identified carriers had no BASIC scores.

- Another nine of these carriers had one SMS BASIC score. Consequently, 30 percent of the SDA-identified carriers did not have enough SMS BASIC scores to even be considered for targeting.

- The data was thin for many of the other SDA-identified carriers as well. Eight carriers (17 percent) had three BASIC scores. Only 24 of the 47 carriers, 51 percent of the carriers, had four or more BASIC scores. With such a low percentage of carriers identified by the proposed SDA methodology receiving SMS BASIC scores, many could not have three or four BASIC scores exceeding the recommended SMS thresholds.

Overall, only 15 of the 47 SDA-identified carriers, including 4 of the worst-performing 12, would have been identified using the SMS BASIC-based algorithms.

- Five of the 12 worst-SDA-ranked carriers had fewer than three SMS BASIC scores. These are small carriers, but they have very poor safety records that deserve an intervention.

- The carrier that was missed by the four HMSP threshold analyses, Carrier 10, would have been identified by two of the four SMS BASIC identification methods (Carrier 10 had one critical BASIC ≥ 85 and another BASIC exceeding its threshold. Carrier 10 was also identified by SMS as a high-risk carrier).

In general, there are three groups of carriers in the proposed SDA list of carriers which were not identified by the SMS analysis of BASIC scores.

First are the carriers that are simply too small:

- As noted, 30 percent of the carriers identified by SDA had too few SMS BASIC scores to even be considered for targeting by SMS.

- Further, many other carriers on the proposed SDA list had only one or two BASIC scores, which via SMS's algorithm would not initiate a recommendation for an intervention.

Second are carriers that had only one major problem. For example:

- Carrier 1 had only one BASIC, an HM compliance BASIC of 100. None of their other BASIC scores were great enough for SMS to recommend them to receive an intervention. The primary reason that this carrier is number 1 on our proposed SDA list is that they had 13 HM inspections, of which 7 resulted in HM OOS orders.

- Carrier 3 had an HM compliance BASIC score of 99. None of their other BASIC scores exceeded 34, so SMS would not recommend them to receive an intervention. However, via the proposed SDA methodology, their relatively better performance on other HMSP thresholds was not enough to offset their terrible performance in HM OOS rate, and that got them identified by SDA.

- Carrier 14 had two SMS BASICs greater than the SMS thresholds: a vehicle maintenance BASIC of 90, which is very high for vehicle maintenance, and an HOS BASIC of 63. The carrier's safety performance also yielded an HM compliance BASIC of 78, which is less than the threshold of SMS, 80. With only two BASIC scores exceeding the SMS thresholds, the SMS algorithm does not recommend receiving an intervention. In contrast, the proposed SDA algorithm identified their behavior as substantially deviant from the norm of other carriers.

Third are large carriers that:

- Have performance that is relatively average compared to all carriers.

- Have performance which is substantially worse than the performance of HMSP carriers.

8.4.5 Comparing Carriers Identified by HMSP Thresholds to Carriers Identified By SMS BASIC Analysis

The modified HMSP thresholds (without SDA) compared to the SMS BASICs algorithms analysis:

- The modified HMSP thresholds analysis list of problem carriers is a much more inclusive list of carriers than was obtained by using just the SMS BASICs thresholds.
  - It contains 22 of the 47 proposed SDA-identified carriers. The SMS BASICs approach identified 15 of the SDA-identified carriers.
  - However, the modified HMSP thresholds list contains more carriers unidentified by the proposed SDA than does the SMS BASICs approach.
  - Most but not all of the carriers identified by the modified HMSP threshold approach, but unranked by the proposed SDA, had failed only one HMSP threshold, namely, the vehicle OOS threshold, which is considered the OOS rate least predictive for future crashes. Thus, simple application of the modified HMSP thresholds would appear to create more type 2 errors (inappropriately taking action against carriers that are not truly safety performance deviant).

- The simple modified HMSP thresholds list contained more of the poorest-performing SDA-identified carriers, including 11 of the top 12. The SMS BASICs list contained only 4 of the top 12.

- The modified HMSP threshold list only identified two of the six SMS-identified-high-risk carriers. The SMS BASICs approach identified all six high-risk carriers (as this was one of its criteria). However, each of these carriers was also identified by another SMS method as well. All six high-risk carriers were identified by the proposed SDA.

- There is minimal overlap between the modified HMSP thresholds and the SMS BASICs lists. Overall, only four carriers were identified by both the SMS BASICs approach and the modified HMSP thresholds. This included both high-risk carriers who were also on the modified HMSP thresholds list.

- The modified HMSP thresholds list did a better job identifying smaller carriers with serious problems or with one major problem area.

- As noted above, the SMS list did better in identifying larger carriers with overall poor performance but no single glaring issue.

8.4.6 Summary

In summary, it appears that the 'net' cast by using the SMS BASICs analysis is quite effective in identifying medium and large problem carriers and avoiding inappropriately identifying medium and large carriers that do not deserve further attention. It would cause few type 1 errors—where action is recommended against a relatively good carrier.

However, the SMS BASICs approach is ineffective at identifying the group of problem carriers that slip just below the size parameters for receiving BASIC scores, which is a considerable percentage of HMSP carriers. Thus, if we were to only use the SMS BASICs approach for HMSP carriers, it appears that the evaluation process would experience a number of type 2 errors. (Although not analyzed by this study, the same phenomenon seems likely to also apply to the rest of the HM carriers. Namely, application of the proposed SDA methodology and perhaps some variation on the modified HMSP thresholds may be valuable for identifying small problem, non-HMSP HM carriers with little data in MCMIS.)

In contrast, the existing HMSP threshold-based approach, as indicated by the petitioners, appears to cause many type 1 errors. This was mostly, but not completely, limited to the carriers that would have been identified based solely on the vehicle OOS HMSP threshold.

On the other hand, the combination of the proposed SDA and modified HMSP thresholds-based approaches generates far fewer type 2 errors than the SMS BASICs process. However, unlike the SMS BASICs approach, the proposed SDA combined with the modified HMSP thresholds approach is not especially effective in identifying carriers with overall poor performance but no single glaring problem area.

8.4.7 Implications

Clearly, the SMS BASIC approach is an appropriate tool for identifying some of the larger HMSP carriers with poor safety performance, especially those larger carriers with sufficient safety performance data from inspections.

Still, because of the high potential costs and risks associated with crashes of trucks carrying HMSP commodities, FMCSA should seriously consider also employing the proposed SDA and modified HMSP thresholds processes to identify problem carriers that are too small to be identified by the SMS BASICs methodology. It is observed that:

- The modified HMSP thresholds approach is effective at identifying carriers with a single, glaring problem.

- The proposed SDA approach is effective in identifying carriers with overall poor safety performance. It is also effective in identifying carriers with one glaring problem.

Thus, the combined proposed SDA and modified HMSP thresholds approaches seem more appropriate for smaller carriers. The SMS BASICs approach seems more appropriate for larger carriers. That raises the question of determining where that size transition of analysis methodology would be appropriate. That would be an appropriate future research effort to examine.

If the enhanced monitoring of HMSP carriers' recommendation from Section 7 is accepted, details of the methods used to identify carriers for CIs can still be worked out at a later date.

8.5   HMSP RENEWAL

This section presents a high level analysis of alternatives for the for a revised 2-year HMSP renewal process identified in Section 7.

8.5.1   Retain Modified HMSP Thresholds

The first option would be, as proposed in Section 8.2.1 above, to retain use of HMSP thresholds for denial of renewal, but require use of a statistical significance filter (modified HMSP thresholds).

- This would provide the capability for a "hard stop" recommendation of a CI for carriers that have particularly poor safety performance.

- If, in future years, there are budgetary problems and FMCSA cannot perform CIs every 4 years for all HMSP carriers as proposed to assure safety, this would provide a backup enforcement mechanism. However, that would mean such small carriers with limited safety performance data and no statistically significant outstanding performance area would never be identified.

This alternative is much more appealing than the current method because it requires a carrier's pattern of behavior to be significantly worse than average for denial. This report's analysis indicates that if the modified HMSP thresholds approach was applied, instead of the current HMSP threshold approach at the 2-year renewal, then the denial rate at renewal would likely drop from the current less than 5 percent to less than 3 percent. The few HMSP carriers with safety performance that is quite worse than average would still be denied the ability to continue hauling HMSP loads.

However, continuing to use the existing absolute denial process, as defined under the current HMSP rule, even when requiring statistical significance and deviation, would still lack a due process appeal option. Like all processes, even SMS, it would continue to generate some type 1 errors, especially on carriers which have high rates of vehicle OOS orders but have safety performance that is not otherwise significantly worse than average.

8.5.2   Move OOS HMSP Threshold Analysis to Monthly Monitoring Rather than 2-Year Renewal

If instead the application of the proposed SDA and modified HMSP thresholds were moved to application as part of the monthly SMS monitoring process for recommending performance of a CI, then identification of an HMSP carrier with poor safety performance would not result in denial of a renewal of the HMSP, but instead it would create a recommendation to schedule a CI for that carrier.

If the enhanced monitoring of HMSP carriers were moved to the monthly SMS evaluation cycle, there may no longer be a need to deny a carrier's HMSP at renewal, as any underperforming carrier would be identified to receive a CI (or two) during the period of their HMSP. If, as a result of those CIs, the carrier continues to hold a Satisfactory safety rating and the carrier continues to meet all the minimum requirements for an HMSP, then the carrier should not be denied renewal of the permit.

This would clearly meet the overarching goal of providing an appeal review process before a carrier is denied renewal of their HMSP.

8.5.3 Modify Application of the Thresholds at Renewal

Two alternatives were suggested for modifying the application of the thresholds at renewal.

- The first alternative is that, if the carrier failed a threshold at the time of renewal and had not had a CI in the prior 12 months, the carrier would be issued a THMSP and be scheduled for a CI within the next 6 months.

- The second alternative is that, if the carrier failed a threshold at the time of renewal and had not had a CI in the prior 12 months, the HMSP would be denied.

The first alternative would apply the thresholds, and the action identified by that application would be taken. Further, the carrier would obtain access to the appeal process provided by the 385.17 procedure for a carrier that receives less than a Satisfactory rating from a CI. However, other than the limitation that this screening process would only be applied once every 2 years, there is really no difference between this and moving the application of modified thresholds described in Section 8.2.1 into a continuous monitoring process. In either case, the carrier would be recommended for a CI, and the carrier's ability to retain the HMSP would be based on the results of the CI. Note: This alternative may not be allowed under the current rule; issuing a THMSP when a carrier fails an HMSP threshold at the time of renewal may not be allowed. If so, that would require a rulemaking to implement this approach.

Under the second alternative, in the face of tight staffing resources that limit CIs, FMCSA would retain the ability to sanction a carrier that appears to have a poor safety record. As noted, this alternative would continue to create type I errors that sanction good carriers that were unlucky in what safety performance data was reported in the second year of the permit. This has the appeal of doing more with less, but it would retain some of the issues petitioned against.

To an extent, a carrier's ability to stay in business would be determined by FMCSA's allocation of resources for CIs (however, it could incentivize carriers to facilitate, rather than impede, the CI process). Carriers denied for a reason other than receiving a safety rating less than Satisfactory would not qualify for the 385.17 due process (a limitation of this approach is that it would mostly catch carriers that had problems in the few months just before their renewal period. It would not address the issue regarding safety performance during the first year of the permit).

8.6 ADDITIONAL PROGRAM ELEMENTS

Individual program element alternatives are reviewed below. These program elements include two items related to the information system's deficiencies. These deficiencies are detailed in Section 10. Two high level items are included in the analysis of alternatives, as these are summarizations of many of the problems.

8.6.1 Periodic Comprehensive Investigations

A number of HMSP carriers have Satisfactory safety ratings that are quite old and were issued under a different safety rating system. As of January 25, 2013:

- 246 of the 1,496 active HMSP carriers had a safety rating that was more than 10 years old.

- 96 of these carriers had a safety rating that was more than 20 years old.

Because there is not enough roadside inspection information for many small carriers with insufficient exposure to inspections to demonstrate good safety performance, it is recommended that:

- Any HMSP carrier that does not have enough data for SMS to calculate rankings for all four HMSP metrics must receive a CI at least every 4 years.

  As noted above, the June 2015 Policy Memo and the FAST Act of 2015, established that a CI will only be recommended for those HMSP carriers who have not received enough roadside inspections to be rated on at least one BASIC in the previous four years.

- A carrier should not be denied renewal of its HMSP if the carrier's most recent CI is not timely.

8.6.2 Enforce the Requirement for HMSPs as Part of Roadside Inspections

There is concern about the almost non-existent level of HMSP enforcement by State roadside inspections.

The data implies that there may be substantial issues occurring in inspections:

- In some cases, trucks containing amounts of HMs requiring placarding are inspected, and the materials are not defined on the inspection report. Perhaps this is due to the very limited number of inspectors who are qualified to perform HM inspections?

- Certain classes of HMSP materials, particularly explosives, only require an HMSP to transport if meeting or passing a quantity threshold. Inspectors should not apply HMSP requirements in cases where the quantity transported falls below the threshold.

  The same is particularly relevant for anhydrous ammonia. If the bulk amount is less than 3,000 gallons, an HMSP is not required.

In addition, the MCMIS database structure for HMSP specific data makes it virtually impossible, without manual review of the records, to determine whether a carrier had a valid HMSP on any given date in the past. The current database structure only tells whether the HMSP is currently valid at that particular moment in time, not its history of when it was or was not valid.

An analysis was performed on inspections from the year 2010 through the date of the snapshot to identify situations where there was an inspection on an HMSP load and its carrier never had an HMSP. Of the 13,774 inspections identified as being on HMSP loads, on 1,806 of those

inspections, or 13 percent of those inspections, the carrier did not have an HMSP and never had one.

- It is possible that the amount of material being carried at the time of the inspection was below the threshold amount in 811 of these inspections, on materials where the definition of the HM on the inspection report does not include a measure of weight or volume.

- However, in 995 of these inspections, the carrier was clearly carrying a load of a size that required an HMSP, where the definition of the material on the inspection report matches the definition requiring an HMSP. This indicates an ongoing issue needing attention regarding roadside inspections of HMSP carriers, given that only 9 of the total 1,806 HMSP load inspections resulted in a violation being assigned.

Further information on this analysis is found in Appendix R in the separate document.

In these 1,806 inspections:

- The carrier was assigned a violation for not having an HMSP on only 9 of the 1,806 inspections (identified by a violation of part 385 subpart E.). Note: in 4 of the 9 inspections, the violations were written against 385.403 (specifies who must have an HMSP), and there was no indication of a violation of 385.415 (specifies the operational requirements for a carrier transporting an HMSP load).

- The carrier was only assigned an HM violation (identified by a violation of Part 172 or Part 173) in 254 of the 1,806 inspections.

Previously, FMCSA petitioned CVSA to include violation of 385.415 (a)(1) - (3) as part of CVSA's OOS criteria.

CVSA essentially responded that, under specifications currently in the part 350 regulations regarding States' operation of the MCSAP program, there currently is no regulatory requirement for States to enforce subpart E of part 385 regarding HMSP commodities and carriers transporting them. Thus, in their opinion, it is not appropriate for CVSA to include an OOS requirement in the CVSA OOS criteria for something the States are not required to be involved with enforcing.

> *FMCSA plans to make enforcement of subpart E of part 385 a requirement for the MCSAP program regulated by part 350. FMCSA plans to include this requirement as part of the forthcoming revision of part 350.*

8.6.3 Reincarnated Carriers

As noted in Section 7, Program Alternatives, the current interaction between the HMSP program and the new entrant program creates an opportunity for a carrier to inappropriately dodge scrutiny from either the normal SA or the CI for HMSP carriers. All new entrants receive a SA, except when the new entrant carrier applies for an HMSP. In such cases, the policy is that there is no need to schedule an SA since the carrier will be scheduled to receive a CI within 6 months to obtain a safety fitness rating for the HMSP.

However, just as a new entrant that has not yet performed an interstate movement does not get scheduled for an SA, FMCSA similarly does not schedule a CI for an HMSP carrier that has not yet had at least one shipment of HMSP materials. Thus, that new entrant carrier can avoid the CI by reporting that they have not yet transported HMSP commodities. It is reported that use of this as a "dodge" for the SA may be increasingly employed by reincarnated carriers, who have no intention of transporting HMSP commodities.

There is some data that shows that not only is this loophole being exploited, it is being exploited with increasing frequency. The following analysis is based on the January 25, 2013 snapshot data.

- In 2010, there were 132 new entrant carriers that applied for HMSPs and did not receive SAs. Of these, 49 carriers received CIs, and 83 did not. Of the 83 carriers that did not receive either a CI or an SA, 33 remained in business at the start of 2013, and another 31 had remained in business for more than a year and a half (the defined new entrant timeframe) before becoming inactive at the start of 2013.

- In the first half of 2011, there were 91 new entrants that applied for HMSPs and did not receive SAs. Of these, 28 received CIs, and 63 did not.

- In the second half of 2011, there were 106 new entrants that applied for HMSPs and did not receive SAs. Of these carriers, 16 received CIs, and 90 did not.

- For many of the 2012 new entrants, the up-to-9 months (6 plus possible 3-month extension) to complete a CI had not transpired, so meaningful statistics could not be calculated.

The recommendation for preventing this dodge is that, if a new entrant carrier applies for an HMSP, by policy the carrier should always receive a CI within 6 months, regardless of whether the carrier transports an HMSP load.

If the carrier is really serious about transporting HMSP loads, even if they have not yet had any, this can be an important and valuable intervention to prevent unsafe carriers from carrying HMSP loads.

- If the carrier is a reincarnated carrier, they are far more likely to be identified and sanctioned as a reincarnated carrier based on receiving a CI.

- This would also put an effective way to stop the ploy being used by reincarnated carriers once the message gets out that it no longer works.

8.6.4 Improved User Interface

There have been a number of concerns identified related to the MCS-150/MCS-150B forms as they relate to the online user interface associated with applying for and renewing an HMSP. A range of the stakeholder concerns relate back to user interface issues. The poor online user interface creates extra work for both carriers and for FMCSA HM staff. There are real staff savings to be gained by improving the user interface. Among the high priority concerns for the online MCS-150 user interface are:

- Definition of bulk and non-bulk are not clear and not accurate on the form or instructions. These definitions should be clarified in the user interface and should be accurate.

    – It should be possible on the first level screen for the carrier to report that they do or may carry bulk quantities of HMSP materials, but there needs to be a second level for further refinement which deals with the amount of materials transported; the second level guidance needs to clarify if the carrier will always be transporting HMs in less than the quantity requiring an HMSP (e.g., the transport of anhydrous ammonia, where many carriers transport it in bulk but always within the allowed 3,000 gallons, which does not require an HMSP).

- If the carrier does select materials and quantities that will require an HMSP, the requirements for an HMSP (i.e., required registration with PHMSA as an HM carrier, financial responsibility requirement, automatic CI, security and communications plans) should be made very clear to the applicant carrier. Carriers with no real intent to carry HM loads in HMSP-requiring quantities sometimes make the first level bulk selection on their MCS-150 to retain flexibility. Making this unnecessary first level choice can prove costly and time-consuming to both the carrier and FMCSA since the carriers likely will not want to maintain an HMSP upon realizing the costs of doing so. Adding a second level screen to clarify these requirements would help. The system also currently inappropriately forces all HM intrastate carriers to apply for an HMSP in order to be processed by the system. Inappropriate choices on the MCS-150 that lead to an HMSP requirement could be avoided with improvements in the form and instructions guidance.

FMCSA addressed this issue via the new MCSA-1 that replaced the MCS-150 as part of the new URS system. Use for new entrants was introduced in December 2015. Use by others for biennial updates took place in later 2016.

8.6.5 Fix the Core Information System

There are many change requests regarding initial application, monitoring, and renewal processing that relate to the HMSP processing software. Many problems, in addition to the problems identified in the existing change requests, are identified in Section 10.

- Only a few of these problems are related to the user interface. Many are related to software that does not correctly support the associated business process.

- Further, many of the problems are related to underlying design flaws in the database structure and system software.

For example, when a carrier that has a current HMSP applies to renew their HMSP, FMCSA's system changes the data in MCMIS so that during the renewal process it begins reporting that the carrier no longer has an active HMSP or current financial responsibility/insurance.

- People (including shippers and for-hire HMSP carriers) that depend on this data are deceived. A number of carriers report that they lost work because of MCMIS

reporting to shippers during the application renewal process that the status of their HMSP was not currently valid.

- This inappropriate categorization of the carriers' statuses during the renewal process has also apparently resulted in a number of cases of FMCSA underreporting the number of active HMSPs to outside organizations, including but not limited to Congress.

- Further, because of design flaws in the database structure and recorded data supporting the HMSP process, it is impossible to fix this one problem without major changes to the software and database structure.

Because of the design issues, there can be no realistic expectation that the existing software can be successfully modified to support the needed new work flows recommended in this report. The existing database structure and software cannot be easily modified to effectively support even the current business processes, let alone the recommended processes.

It would normally seem that fixing the existing database structures and software supporting HMSP processing would be the appropriate recommendation. However, it appears a more cost effective approach would be to re-design the database structures and supporting software systems. MCMIS operates in an Oracle relational database environment. This is a powerful and flexible environment that can support such a redesign to meet the business process needs of the HMSP program.

> *It is planned to incrementally address some of these business and reporting requirements as part of the ongoing efforts to implement the more integrated URS system over coming years, in cooperation with PHMSA's information system capabilities that every HMSP carrier must also register with.*

> *There are examples where the central data resides in MCMIS, but coordinated supplementary system capabilities were implemented to address needs deemed not appropriate to try building into MCMIS processing. A relatively recent example of such a coordinated supplemental system is one implemented to assist the registration process for highlighting applicants who may be trying to reincarnate. Perhaps the needs identified for HMSP and other HM program oversight and enforcement needs might benefit from such an approach.*

9. RECOMMENDATIONS AND EVALUATION

Based on the analysis of the alternatives presented in Section 8, this section converts the list of alternatives presented in Section 7 into specific recommendations for changes in the HMSP program. In addition, this section provides explanations of how these recommendations meet the MAP-21 requirements and the stated objectives of the petitioners and other industry stakeholders, and how they further FMCSA's program goals.

9.1 RECOMMENDATIONS

These recommendations do not follow the program process structure; rather, these recommendations follow the overall structure of FMCSA's HMSP operations and strategic plan. The goals of the following recommendations are to:

- Improve the program's ability to identify small, high-risk HMSP carriers for intervention, which are hard to identify because of little to no roadside inspection data.

- Maximize the number of correct identifications of high-risk HMSP carriers to be recommended for a CI.

- Ensure that if a new safety fitness rating from a CI is less than Satisfactory, there will be a path for appeal, as the provisions of 49 CFR 385.17 provide.

- Enable the Agency to administer a stronger HMSP program that provides higher levels of safety.

Following are the specific recommendations. Note: there is no recommendation related to the repeated recalculations of HMSP threshold levels, as that subject is now moot given the decision of FMCSA to treat them as fixed. The petitioners' request has already been accepted and implemented as policy.

9.1.1 Recommendation 1: Fully Utilize the Safety Measurement System (SMS) as part of the Proposed SDA and Modified HMSP Thresholds Program

The following potential changes should be considered after conducting further analysis to determine the impacts on the HMSP program as it relates to SMS.

- Change the SMS BASICs intervention threshold for HMSP carriers to be aligned with what now apply only to passenger carriers (higher standard). This change is because there is potential for great harm resulting from a crash of a CMV carrying an HMSP load.

- Incorporate calculation and evaluation of the modified HMSP thresholds into the monthly SMS updates. If the carrier has exceeded either the modified HMSP thresholds or the BASIC intervention thresholds for 3 consecutive months, the carrier could be identified for intervention (i.e. a CI). Small carriers who do not demonstrate

a pattern of behavior that is significantly different from an average HSMP carrier should not be targeted for additional scrutiny, regardless of threshold scores.

- Consider use of a tool like the proposed SDA in conjunction with the modified HMSP thresholds. The combination of these analysis tools very powerfully complements the SMS BASICs processes. The proposed SDA-HMSP thresholds method is much better at identifying smaller problem carriers with insufficient data for SMS to rank. This method is especially effective for identifying carriers that have overall poor safety performance but not one particularly poor performance area. It could reside entirely within the existing SMS evaluation framework. The result of being identified for scrutiny would be a recommendation for a CI. The only way that a carrier would be suspended would be if the carrier receives a safety rating less than Satisfactory and does not satisfactorily meet the appeal process of 385.17.

These augmentations to the SMS monthly screening would provide a much more powerful tool for identifying all HMSP carriers that have serious problems, either overall or in one particular area of safety performance (i.e. crash rate; driver, vehicle, or HM, or total OOS rates), while avoiding taking inappropriate action against safe carriers because of the randomness of limited data for the many small HMSP carriers. Creation of such an augmented SMS approach would achieve both goals desired by industry, namely:

- Provide for a second level of review through use of the administrative review process based on a carrier submitting a Comprehensive Action Plan (CAP) for review and determination of whether to upgrade the safety rating that is below "Satisfactory."

- Provide a strengthened, continuous monitoring process during the 2-year duration of the HMSP to identify high-risk carriers that should receive a CI to evaluate whether they still qualify to hold a safety fitness rating of Satisfactory.

Federal Register Notice (Vol. 80, No.118, p. 35253) issued on June 19th, 2015 implemented use of the SMS BASICs at the hazmat threshold level.

Due to IT budget and time limitations for rolling out URS, it was not possible to implement either recommended analysis tool (SDA or the modified HMSP thresholds) as part of the monthly SMS BASICs monitoring with the June 2015 policy changes.

Based on IT budget funding availability, the SDA and the modified HMSP thresholds may be added to the monthly monitoring in the future for better detecting poorly performing small carriers with limited safety performance data sooner.

9.1.2   Recommendation 2: Institute an Ongoing Requirement to Conduct CIs for HMSP Carriers with Insufficient Data to Rank in SMS or the Proposed SDA and Modified HMSP Thresholds.

HMSP carriers should not be allowed to go more than four years either without having enough safety performance data in SMS to evaluate all four HMSP thresholds based on roadside

inspection data, or without receiving a CI to collect additional safety performance data not being obtained from roadside inspections.

By instituting a specific CI cycle for HMSP carriers with insufficient safety data in SMS, they will become subject to increased oversight.

> *This recommendation based on SMS evaluation was implemented in the June 2015 policy and was subsequently mandated in the Fixing America's Surface Transportation (FAST) Act signed December 4, 2015. As noted above, SDA and modified HMSP thresholds were not implemented.*

9.1.3 Recommendation 3: Evaluate the Potential for an Automated Process for Monitoring Compliance with the Financial Responsibility Requirement

As noted earlier, a substantial number of existing HMSP carriers do not appear to have the required minimum insurance. It is recommended that FMCSA create an ongoing process to ensure that HMSP carriers have and continue to maintain the required minimum financial responsibility during the entire 2 years of the permit, not just at application and renewal. At the moment, the HMSP program can only verify the insurance level manually at application and once every 2 years at renewal. This is because:

- For for-hire carriers, their insurance providers report to the Licensing and Insurance (L&I) system. However, if a carrier became an HMSP carrier after initially getting its operating authority, MCMIS does not report or record that change in operating type to L&I, even though the minimum insurance required is raised. Thus, after completion of the renewal process, FMCSA's HMSP staff force an HMSP carrier to manually provide a copy of the MCS-90 submitted by their insurance provider as proof of having the required higher HMSP minimum coverage; this still does not affect their information in L&I, however.

  As an example, the required minimum for the commodities hauled by a hypothetical carrier is $5 million and L&I does not know this is an HMSP carrier because it originally was not an HMSP carrier. After providing the required proof to the FMCSA Hazmat staff, the carrier can subsequently lower their insurance coverage to the minimum required for non-HMSP carriers, which is $750,000. That lowering of insurance will not cause the L&I system to flag them as having less than the required minimum. This is because L&I does not know that the carrier had become an HMSP carrier, requiring a higher minimum.

- For private carriers, FMCSA does not have a system for reporting or monitoring insurance at all, even though both HM and HMSP carriers are required by 49 CFR 387.3(b) to have the required minimum coverage for the commodities they transport. The insurance level of private carriers must be checked manually by the HMSP staff at the point of application or renewal, just as it is for for-hire carriers. Thus, private carriers, which many HMSP carriers are, could even drop their insurance entirely, and there is no way that FMCSA would know until the next renewal.

  This issue of minimum insurance and how FMCSA anticipates addressing it is discussed in more detail below and in Section 10.

9.1.4 Recommendation 4: Improve User Interface and Help for Completion of the MCS-150

When an applicant selects HMSP, the system should advise the applicant of the higher insurance requirement for HMSP commodities and provide a way for the user to back out of that application if they want to. When the applicant specifies at a first level screening that they will be hauling commodities that may require an HMSP, the interface should provide the applicant with second level guidance on the minimum bulk quantities of HMs that must be transported for an HMSP to be required (any quantity below that minimum does not require an HMSP).

There is the additional problem with the existing software in that it automatically forces all intrastate HM applicants to apply for an HMSP when they do not need this permit.

> *Through the Agency's Unified Registration System (URS) software development, the agency updated the user interface, instructions, and content of the newer MCSA-1 form from what was provided for the older MCS-150 in order to better assist motor carriers in accurately completing the form. This is especially important for the large number of carriers who transport HMSP commodities, but in insufficient quantities to require an HMSP. The new MCSA-1 was rolled out for new applicants in December 2015. It was rolled out for renewals later in 2016.*

9.1.5 Recommendation 5: HMSP Program Software Support

At a minimum, the file structures and supporting software used for the HMSP program need to be updated to:

- Enable capturing data regarding specific actions on permits and establish an archival history of all actions taken on each permit.

- Capture the reason for each action taken on a permit.

- Retain history of all business action activities.

- Allow having both an active permit and a submitted renewal application simultaneously.

The current structure, which only retains information about the current status of the HMSP, is sufficient for many program operations but not all, and it is clearly insufficient for program management and program evaluation. For example, there are a number of actions that all have to be true (completed) in order for an HMSP to be awarded.

Each of those actions and dates need to be tracked, not just for an already-awarded HMSP, but also for its renewal application in parallel. Further, the application processes need to be changed to record the above recommended details in an expanded data structure providing detailed history of each data element for program review oversight.

The initial step is to document functional requirements. The documentation should address this recommendation and the IT systems requirements of all previous recommendations.

As noted above, it could be more practical to implement some or much of this historical tracking in a separate, supplemental coordinated system. Such a separate supplemental coordinated system was used to assist the registration process screening for highlighting possible applicants trying to reincarnate. Such a system for HM might assist in this HMSP and perhaps other HM program requirements.

9.1.6   Recommendation 6: Integration into the Motor Carrier Safety Assistance Program

Revise 49 CFR 350 conditions for receiving MCSAP funds to include requiring States to adopt and enforce 49 CFR 385 subpart E. This would systematically begin identifying motor carriers subject to the HMSP program who either do not have an HMSP or are suspended or revoked. This is especially true at the intrastate carrier level. In order to provide for a uniform and fair program, all motor carriers subject to the HMSP should be systematically identified as part of the MCSAP roadside inspection processes in all States. This will make it possible for FMCSA to work with CVSA to include HMSP requirements as part of OOS criteria.

> *FMCSA has plans via a rulemaking update to issue a revised part 350 in the foreseeable future and to include this recommendation in that effort.*

9.1.7   Recommendation 7: Minor Revision to the PHMSA Registration Form

Either revise the USDOT number field on the PHMSA registration form to make it mandatory or make it a requirement under the HMSP application and renewal process that the applicant provide it to PHMSA. Having a valid hazmat registration with PHMSA is an integral requirement for a carrier to obtain and retain an HMSP. Requiring the USDOT number be included on the PHMSA database will make it easier for FMCSA to automatically match the MCMIS information with PHMSA's registration database and reduce FMCSA staff time manually intervening and trying to match the information.

For example, a carrier might show up in MCMIS as ABC Trucking, Inc. and in the PHMSA database as ABC Trucking, Incorporated. While to a human reader it would be clear that is the same company, without the USDOT number, the software will not automatically match the different company names. This causes an automatic generation of a denial recommendation. This can happen for the HMSP application, renewal, or the annual check to see if the carrier has a current PHMSA registration, which can result in a suspension recommendation. By making the USDOT number a mandatory field on the PHMSA registration and recording it on PHMSA's database, MCMIS and the HM Intermodal Portal would be able to match information more accurately and easily.

> *FMCSA plans to implement required actions from MAP-21 that are referred to as URS-2. That rulemaking will include requiring HMSP carriers to provide their USDOT numbers to PHMSA. So indirectly by the planned FMCSA requirement for HMSP carriers, the USDOT number will become a required field for the PHMSA database.*

9.1.8   Summary

The outlined approach addresses the petitioners' concerns:

- It would harmonize the program with the policies used in CSA.

- It would fix what some perceive as the arbitrary nature of HMSP denial at renewal with no right of appeal. In fact, the recommendations propose moving HMSP intervention for safety performance issues into continuous monitoring. Based on that analysis method, any intervention would be to schedule a CI, and it would not usually need to be taken at renewal time.

- For carriers that already have an HMSP, it provides a complete second level of fitness review via the 49 CFR 385.17 appeal process when a CI produces a safety rating below Satisfactory.

- It solves the petitioners' concern that FMCSA's statistically valid standard (not statistically *significant* standard) causes undue hardship on small carriers.

- It recommends using the CI, which is already in place for HMSP carriers and has an appeal process already implemented.
    - It does not create a new program, with the attendant concerns of unintended consequences with any new program.
    - It meets the petitioners' request that maintaining a (reasonably current) Satisfactory safety rating should be the primary criterion for retaining an HMSP.

- The recommendations would provide policy flexibility for FMCSA, allowing FMCSA to monitor and adjust the program to improve its selectivity.

- It would eliminate the first year "free-pass" that HMSP carriers currently receive. It meets the petitioners' goal of continuous monitoring of underperforming HMSP carriers.

- It would address the petitioners' concerns about the information system in terms of both the user interface and the basic flaws at the core of the system.

Some of these recommendations may require regulatory changes. More of these recommendations likely can be made as policy changes in how the HMSP program is run, which only require a Notice in the Federal Register. FMCSA should begin the process of developing these proposed regulations and policy changes so it can seek stakeholder and public comments.

> *FMCSA already issued a Federal Register Notice (Vol. 80, No.118, p. 35253) on June 19th, 2015, addressing a number of these recommendations that could be implemented via a policy change, i.e., did not require rulemaking.*

A more detailed analysis of the impact of specific recommendations on meeting specific goals and objectives is presented in Section 9.2.

9.2 IMPACT OF RECOMMENDATIONS IN MEETING PETITIONER REQUESTS AND MAP-21 REQUIREMENTS

This section addresses how the above recommendations would meet issues identified and changes requested by the petitioners and other stakeholders and how the above recommendations would meet FMCSA program objectives. Addressed below are:

- The general elements of what were identified as program improvement goals.

- Specific program enhancements.

- The Administrative Items identified as desirable in the Appendix to the Petition (see Appendix A in the separate document).

- MAP-21 requirements.

9.2.1 General Elements

Table 9 shows the general elements of program improvement specified in MAP-21 and requested in the petition, and it shows how the various suggested alternatives would address these elements.

Table 9. How the alternatives address general elements for program improvement.

General Elements	Relationship of Alternatives to Program Improvement Elements
Second Level of Fitness Review—Impact on Corrective Action Plan concepts	A second level of fitness review would be provided by scheduling a CI in place of immediate denial; receiving a Satisfactory rating from the CI would prevent the carrier's denial. This would automatically allow for a second level of review under the provisions of section 385.17 of the FMCSRs. The critical issue here is HMSP Renewal. 1. If the recommendation to adopt the Enhanced Monitoring of HMSP Carriers using both SDA (which uses the HMSP thresholds) and SMS BASICs is accepted and implemented, then there would always be a second level of review. 2. If instead the HMSP Thresholds at renewal are retained, also employing the SDA process, then there would be no second level of review when the carrier has a rate above a HMSP threshold and a pattern of behavior significantly worse than other carriers. Reference is made to the Corrective Action Plan (CAP) process. Section 385.17 establishes a CAP process associated with the CI process. This would remain unchanged. If a carrier has deficiencies identified in their CI, there is an opportunity for a CAP. The other alternative would be to add a new review process that would occur after a threshold-based denial. Adding a new second level of review to the current system would require defining a new process and is not recommended.
Additional Level of Review Based on OOS Rate Prior to Denial	The inclusion of SDA and significant pattern of behavior criteria, instead of just using the raw HMSP thresholds, are an additional safeguard against inappropriate denial. It is not, however, a second level of review. See the above explanation.
Interventions Modeled on CSA Approaches—Denials or	Acceptance of the "Enhanced Monitoring of HMSP Carriers" recommendation (SDA and SMS BASICs) would not only be entirely consistent with the CSA

General Elements	Relationship of Alternatives to Program Improvement Elements
Suspensions Dependent on Intervention Results	approach, it could work entirely within the CSA framework. 1. Retaining the HMSP Thresholds at Renewal (with or without modification) is not consistent with the progressive sanctioning model.
Policy Flexibility for Addressing Minor or Specific Issues	The "Enhanced Monitoring of HMSP Carriers" alternative would provide great flexibility for addressing minor or specific issues. 1. The selection criteria could be altered to include new and different methods of selection, emphasizing factors found to be correlated to crashes, and deemphasizing factors found to be uncorrelated to crashes. 2. The selection criteria could be altered to include or exclude carriers that have specific traits. 3. All issues are available to be considered in the CI. The alternative recommendation is to only deny an HMSP based on a significant pattern of behavior but continue application of the HMSP thresholds at renewal; this may be viewed as an administrative improvement, but implementation would not provide additional policy flexibility in implementation.
Program Efficiency	Application of the SDA and Significant Pattern of Behavior standards could have positive operational resource implications but would require budgeting to implement initially. If the appropriate IT changes cannot be made initially, i.e., if there is delay in the implementation of the SDA together with the modified HMSP thresholds, this may require manual work-arounds to continue. As details of such a work-around have not been worked out, a cost cannot be estimated. This analysis previously calculated that, as of January 1, 2013, if all HMSPs were renewed, there would have been 67 carriers denied HMSPs for exceeding a threshold. Application of the SDA and Significant Pattern of Behavior criteria would have reduced that number to 39 – a reduction of 28 per year. Thus, if the alternative to solely retain the HMSP thresholds at renewal is continued for budgetary reasons for some period without automated implementation of SDA and Significant Pattern of Behavior, then about 2 ½ denials per month could be avoided using manual work-arounds to apply the SDA and Significant Pattern of Behavior screenings. If the HMSP thresholds are only used at initial HMSP issuance, the number of refusals would amount to only a handful per year. If the full 'Enhanced Monitoring of HMSP Carriers' alternative is accepted, it would mean a few more CIs each year, perhaps as many as 2 - 3 more per month (nationwide). If the Periodic CI recommendation is accepted, it would mean even more CIs, perhaps as many as another 20 – 30 per month, nationwide. Redesigning the user interface as part of the MCSA-1 would save a great deal of effort by reducing questions from carriers and by reducing processing of inappropriate HMSP applications. Redesigning the core system could halve the effort needed to process HMSPs. Further, making detailed actions and when they occurred easily accessible would empower field staff to assist carriers and reduce the time that staff experts spend answering questions deriving from data anomalies and inaccuracies.
Safety Effectiveness	Application of the SDA and Significant Pattern of Behavior standards would prevent actions against carriers that do not have behavior that deviates significantly from average and target only problem carriers instead. Under the Enhanced Monitoring of HMSP Carriers alternative: 1. The application of SMS BASICs using Passenger thresholds would identify a few more large carriers that have poor overall safety

General Elements	Relationship of Alternatives to Program Improvement Elements
	performance but do not have any individual rates high enough to reach an HMSP threshold. 2. The application of the simple HMSP thresholds as part of the monthly screening would identify smaller (but not necessarily small) carriers that do not have enough data to get BASIC scores but have one or more glaring problems. 3. Use of SDA in conjunction with the HMSP thresholds would identify smaller (but not necessarily the smallest) carriers that do not have enough data to get BASIC scores but nonetheless have overall safety performance far worse than the average HMSP carrier.
Reliance on Satisfactory Safety Rating 1. Stringency of Temporary Permit Criteria 2. Relevancy of older safety ratings	The "End application of HMSP Thresholds at Renewal" alternative would completely rely on the safety rating (except for administrative items, such as failure to comply with an OOS order or failure to maintain adequate insurance). The only performance-related trigger for suspending an active HMSP or denying a renewal would be a safety rating below Satisfactory. The alternative, "Retain Thresholds at Renewal," would not rely solely on a Satisfactory safety rating. Nonetheless, if a carrier with an HMSP received a safety rating below Satisfactory, the carrier's HMSP would be suspended.
Prevalence of high risk HM carriage without a permit	There is clearly a problem here. The "Enforce the Requirement for HMSPs" recommendation addresses this concern.
Potential Crash Statistics Bias 1. Geographic variations 2. Randomness factors 3. Currency of statistics	Geographic Bias – None of these alternatives specifically address geographic bias. However, the data suggests that the HMSP thresholds are so far above average safety performance that geographic bias should not be a major concern. In the future, if the Enhanced Monitoring of HMSP Carriers showed geographic bias, it could be modified. Randomness – The general concern of the randomness of the process is addressed through the assurance that carriers will not immediately be denied an HMSP renewal but will instead be identified for a CI. Randomness coming from other elements, such as geographic bias or inspector tendencies, cannot be addressed. Currency of statistics – Because the HMSP threshold calculations and the BASICs are based on a snapshot, there is little that can be done about the currency of statistics. Like the issue of crash posting, lack of data currency could lead to a Type 2 error, where no action is taken against a problem carrier. However, there should be no complaint if current data leads to an action taken against a problem carrier.
Consistency with FMCSA Safety Management Programs and Systems Relationship to Safety Fitness Determination Evolution	The HMSP thresholds are unique to the HMSP program. While CSA makes extensive use of the underlying data, the thresholds are not used directly. BASIC levels are used instead to trigger alerts. Acceptance of the alternative to "Retain Thresholds at Renewal" with the alternative to apply the Significant Pattern of Behavior standard is more consistent with the current safety management programs in that it more fully implements the policy that action is only taken when the carrier demonstrates a "significant pattern of behavior." However, the direct application of the HMSP thresholds to deny renewal of a permit would be inconsistent with the direction that the Safety Fitness Determination rulemaking effort appears to be taking. The acceptance of the "Enhanced Monitoring of HMSP Carriers" recommendation, along with the "End Thresholds at HMSP Renewal" alternative, would make the HMSP program far more consistent with other FMCSA Safety Management Programs. It is also more consistent with the

General Elements	Relationship of Alternatives to Program Improvement Elements
	evolution of the Safety Fitness Determination process.
ISS Integration	ISS should be modified to support the carriers' desire for more inspections so that they can improve their inspection-based statistics.
	This issue is not unique to the HMSP program. FMCSA has separately determined that any program allowing carriers to request additional inspections is inappropriate and not consistent with FMCSA's mandate, as a government entity, to optimize resource utilization.
	However, as part of the CSA program, FMCSA is encouraging States to upload results of screenings in addition to full inspections. This may see fuller implementation in the future that would address the petitioners' concern for additional inspections.

9.2.2 Specific Items

Table 10 shows the specific program improvement requested in the petition and how the identified alternatives address these elements.

Table 10. How the alternatives address specific petition elements for program improvement.

Petition Elements	Relationship of Alternatives to Petition Elements
Fixed 70-30 Rates, eliminate fluctuating criteria, Set rates at average since 2005	FMCSA is committed to fair thresholds that keep unsafe carriers off the road while not imposing excessive burden on safe carriers.
	As a part of that commitment, FMCSA took this recommendation and set fixed rates in the Administrator's policy memorandum dated June 21, 2012.
Aggregation of criteria rates – Average OOS Rates.	Simply aggregating OOS rates mistakenly places emphasis on the prevalent but less crash-predictive vehicle OOS events while putting less emphasis on driver and HM OOS events, which are the better crash predictors. Vehicle OOS events occur far more often but are less predictive of crashes. Such a simple aggregation would create additional burden on carriers and underemphasize the more predictive Driver and HM OOS rates. The requirement that the carrier shows a significantly worse pattern of behavior in addition to having an OOS rate above the HMSP threshold would better ameliorate the problems associated with few inspections.
	Under the "Enhanced Monitoring of HMSP Carriers" alternative, other methods for identifying problem carriers could be used. Methods such as SDA do depend on aggregation of data.
More than 30 Percent of HMSP Carriers Are Disqualified	Under the current HMSP thresholds, fewer than 5 percent of carriers are denied renewal.
	If inclusion of the requirement that the carrier have a significant pattern of behavior were incorporated, less than 3 percent would be denied.
	Of course, if the alternative "End HMSP Thresholds at HMSP Renewal" is accepted, the only safety performance-related suspension process will be that, if a carrier is identified as a potential problem carrier, they receive a CI and will have their HMSP suspended if they receive a rating below Satisfactory.

Petition Elements	Relationship of Alternatives to Petition Elements
Original Agency Intent Appears to Have Been to Disqualify Carriers with Below a Satisfactory Safety Rating	This analysis cannot comment on the original agency intent. However, there is no suggestion that a carrier with a safety rating below Satisfactory should be allowed to retain an active HMSP. If the alternative to "End Thresholds at HMSP Renewal" is accepted, the only safety performance-related suspension process will be that, if a carrier is identified as a potential problem carrier, they receive a CI and will have their HMSP suspended if they receive a rating below Satisfactory.
Original Agency Intent Appears to Have Been to Use Thresholds Only for Carriers that Did Not Have Safety Ratings.	This analysis cannot comment on the original agency intent. As noted above, if the alternative "End Thresholds at HMSP Renewal" is accepted, the only safety performance-related suspension process will be that a carrier receives a CI if identified as a potential problem carrier, and if the carrier subsequently receives a rating below Satisfactory, then their HMSP is suspended. There appears to be complete agreement with the petitioners' suggestion that thresholds should be used for initial issuance of HMSPs to carriers that do not have a safety rating.
The placarding regulations are too complex. Many large LTL carriers do not qualify for the HMSP. Vocational Bias in HM OOS Criteria. (Certain OOS criteria seem to unfairly target specific vocational industries.)	Based on data as of January 1, 2013, 3.8 percent of all carriers and only 1.1 percent of HMSP carriers would have been denied renewal for HM OOS rates. The percent drops to under 1 percent when applying the requirement that the carrier's record must show a significant pattern of behavior. This suggests that the overwhelming majority of HMSP carriers are capable of complying with the HM placarding regulations and that this is not a major issue. It is suggested that, if petitioners have concerns about the wording of specific regulations or whether certain violations should lead to OOS orders for certain vocational activities, they should either petition the Pipeline and Hazardous Materials Safety Administration for a change in the regulations and / or take their concerns over the OOS Criteria to the Commercial Vehicle Safety Alliance's (CVSA's) HMs Committee. If the alternative "End Thresholds at HMSP Renewal" is accepted, this point becomes moot.
Eliminate First Year "Free Pass."	FMCSA agrees with the petitioners that the first year 'free pass' does not enhance safety. Under the "Enhanced Monitoring of HMSP Carriers" recommendation, enhanced monitoring begins in the first month after issuance of an HMSP, i.e., the "free" year would be eliminated.
Use VMT with Power Units for Normalization	The current crash rate HMSP threshold is set at just over 7 (seven) times the average crash rate of HMSP carriers and just under 7 times the average crash rate of all carriers. As of January 1, 2013, less than 0.5 percent of HMSP carriers would have failed the crash rate threshold. Most observers feel that this rate is more than generous and that no additional effort to relax this rate (through a VMT adjustment or any other adjustment) would be appropriate. The calculation underlying the SMS crash rate BASIC uses a rather complex algorithm to create a VMT adjusted crash rate. That crash rate includes not only a modification for VMT, but it also includes a modification for the type of trucks the carrier has. As the HMSP program moves towards more use of CSA methods, an adjustment for VMT automatically becomes part of the new processes.
Exclude Non-Preventable Crashes in Crash Rate Calculation	FMCSA is addressing non-preventable crashes at an agency wide level for all carriers. It would not be appropriate to consider any alternative approach prior to the agency developing a policy for all carriers. At the time that such a policy is created, it will be applied to the HMSP program, if appropriate.

Petition Elements	Relationship of Alternatives to Petition Elements
Geographic Bias in Reporting Crashes	FMCSA has, for a number of years, placed high priority and emphasis on data quality. The data provided by the petitioners is dated. Consequently, even if it was deemed appropriate, no adjustment for data quality could be made based on the data presented.
	The current HMSP crash rate threshold is approximately 7 times the crash rate of the average HMSP carrier. At the current threshold rates, 0.4 percent of HMSP carriers would be denied renewal based on crash rate. Geographical bias in inspection outcomes can be argued, but crashes are firm data points that geographic basis of attribution cannot be considered a real problem for carriers. That is more in the control of the carriers and their drivers.
	Rather, it is a problem for FMCSA that carriers with high crash rates in certain geographic areas may not be as well reported due to geographically-related data quality problems. FMCSA is working to improve the overall quality of crash reporting.
	Carriers with many crashes could get lower (better) than appropriate scores due to a bias in crash non-reporting. However, the petitioners did not seem to be complaining that a carrier would have a higher crash rate if the crashes had been reported to FMCSA.

9.2.3 Administrative Improvements

The original petition, included in Appendix A in the separate document, suggests a number of administrative improvements to the HMSP program. The staff at FMCSA appreciate the support of the petitioners. There is significant value in these suggestions.

- Unfortunately, some of the requested improvements would require substantial lead time for obtaining budgets and achieving information system changes, if implemented internal to the existing information system. For example, FMCSA has long outstanding requests for IT changes to address a number of the issues submitted in the petition, such as attempting to improve the information systems interface for PHMSA.

- FMCSA responded to some of the other requests coming from the petition and MAP-21, such as the request to extend the application period from 30 to 60 days. There was an informal administrative manual process used during the time waiting for the software fix that made it possible to correctly process the applications.

Since this analysis was performed, FMCSA made a significant change for all carriers in how they maintain their active status in MCMIS. Namely, they must file an update of the MCSA-1 at any time, but must do so at least every two years, but can be more often. This was also implemented for HMSP carriers for maintaining their HMSP status, subject to meeting the other requirements for holding an HMSP. There is no longer a 2-year renewal application requirement that must occur during a 60-day window.

- Some of these issues are related to all carriers, not just HMSP carriers. FMCSA is actively addressing the questions of non-preventable crashes and crashes where the carrier was not at fault as an agency issue for all carriers.

- Many of these issues are related to information systems constraints.

- For example, currently the information system reports that a carrier's HMSP status is "Pending" (instead of "Active") when the carrier applies for an HMSP renewal. This causes carriers to have a reportedly invalid HMSP status when their HMSPs were not yet truly invalid. This is a result of both:
  › an original design flaw when the supporting IT capabilities were rapidly implemented in the summer of 2004 in parallel with the mandamus rulemaking.
  › the propagation of that flaw through to several other reporting systems.

While FMCSA fully understands the serious implications of improperly reporting a carrier's HMSP status, it takes considerable time to get the budget resources necessary to fix such problems within the existing MCMIS.

FMCSA plans to address this as part of revising the system to become the more integrated URS. It could consider implementation of solutions in a supplemental, coordinated system for this and other HM programs, such as has been done for other capabilities.

- Similarly, the complex interaction of a number of IT systems makes the elimination of "double counting" for HM OOS orders a complex information systems problem. FMCSA staff has developed manual work-arounds to meet the industry's request when an instance of the problem is identified. However, when a carrier does not identify the issue, system results cannot be guaranteed.

Elimination of the currently hard-coded MCMIS limitation preventing separate reporting of HM OOS orders is anticipated as part of the additional ongoing URS development.

Table 11 addresses these specific concerns.

Table 11. Administrative improvements to the HMSP program.

Administrative Improvements	FMCSA Response

Administrative Improvements	FMCSA Response
Improve FMCSA's ability to verify a motor carrier's compliance with the financial responsibility regulations.	FMCSA agrees with the petitioners that there are issues with verification of financial responsibility for all carriers. For for-hire motor carriers, there is a need to establish connectivity between MCMIS and the L&I system, going both ways. 1. L&I should have an automated feed to MCMIS so that all FMCSA users can get up-to-date information from the carrier's insurance filings. 2. MCMIS should inform L&I of any changes in the identification of commodities hauled so that L&I can accurately report minimum insurance information to insurance companies about the carrier's financial responsibility requirement. When a carrier becomes an HMSP carrier after registering with L&I, L&I does not know that carrier has become an HMSP carrier. Thus, it reports to the insurance provider a minimum lower than what is required of an HMSP carrier. Further, the MCMIS nightly batch file update process should not change the value of an HMSP carrier's Financial Responsibility flag to N (for No) when they apply for HMSP renewal. For private HMSP motor carriers (there are many), there is no financial monitoring system in place. Thus, just as for the for-hire carriers, the HMSP program implemented its own manual financial responsibility reporting from all HMSP carriers as part of their two year renewal. This same lack of a process for reporting and enforcing the required higher financial responsibility requirements for private HMSP carriers also applies to the much larger number of private HM carriers.
Eliminate the double-counting of HM OOS violations with vehicle OOS violations.	FMCSA agrees with the petitioners' assertion that OOS orders based on HM violations should be counted as HM OOS orders, not as a vehicle or driver OOS order. FMCSA has identified this issue to be addressed when IT budget resources are available. In the meantime, the HMSP staff uses manual work-arounds. The current problem originates from the MCMIS legacy hardcoded software that constrains the data codes that the Aspen software can report to MCMIS. It is an IT constraint, not a policy constraint. If a carrier identifies this problem, FMCSA staff has a manual work-around in place. This problem will be far less of a concern if the recommendations "Enhanced Monitoring of HMSP Carriers" and "End HMSP Thresholds at Renewal" are chosen, as it would only be significant at the point of initial application.
Identify and remove non-preventable accidents from a motor carrier's crash rate calculation.	This issue is being addressed, in several different efforts, for all carriers. This issue extends far beyond just HMSP carriers; it is an issue for all carriers. Any action on this item in the context of only HMSP carriers would not be appropriate.
Add vehicle miles traveled as a normalizing factor for the calculation of motor carrier crash rates	See response above.

Administrative Improvements	FMCSA Response
Extend the period carriers have to renew applications from 30 to 60 days.	FMCSA agreed to this change and already implemented it. Those software changes allowed the renewal period for the HMSP to begin up to 60 days before expiration, instead of the previous restriction to only 30 days before expirations. That change did not address the issues related to the status change associated with filing the application. *Since completion of this analysis, in 2015 FMCSA further changed this process by eliminating the renewal application process. Now a carrier with an HMSP must update their MCSA-1 information at least every two years, and continue to meet the requirements of holding an HMSP.*
Ensure that existing HMSPs are not shown as "invalid" upon submission of a renewal application.	FMCSA agrees that it is entirely appropriate that existing HMSPs should not have their status changed from "valid" to "pending" upon application for renewal. This is a problem with the design of the software supporting the HMSP program. The problem starts in the changes the HMSP software makes in the MCMIS database, and it is propagated to a number of systems and applications that draw data from MCMIS. The problem that creates this outcome is deeply entwined into all of the software that supports the HMSP program. The IT budgetary cost of the changes needed to correct this very complex problem must be balanced with: 1. The benefits that would be derived from redesigning this legacy system process. 2. Other competing needs for software fixes. 3. The value that could be derived from using these resources for replacing, rather than simply fixing, legacy systems. *The plan is to address this problem as part of the redesign and replacement of the existing information systems, which is part of the current URS-1 effort and the forthcoming URS-2 effort.*
Establish a simplified on-line option for shippers and carriers to ascertain the HMSP status of carriers.	This is already available online from an electronic interface page which links to MCMIS, where this data is stored.[viii] All that a shipper needs is the carrier's USDOT number. However, the status shown is currently bound by the same constraints as stated directly above, namely carriers showing as pending instead of active during the renewal process.
Provide the HMSP community advance notice of disqualification rates.	FMCSA is committed to the highest possible level of communications with our partners in safety and with our stakeholders. As established by policy in 2012, there is no current plan for updating the threshold rates. At such a time when the rates might be updated, FMCSA is committed to informing the industry in the timeliest fashion possible.

[viii] Electronic page that interfaces to MCMIS to provide the current status of an HMSP carrier's permit - http://mcmis.volpe.dot.gov/mcs150t/pkg_shipper.prc_shipper_request

9.2.4 MAP-21 Requirements

In addition to responding to petitioners' requests, this report also addresses the Congressional requirement for reporting on the HMSP program, as included in MAP-21.

Table 12. Report responses to MAP-21 requirements.

MAP-21 Requirement	FMCSA Response
MAP-21, SEC. 33014. MOTOR CARRIER SAFETY PERMITS. (a) REVIEW.—Not later than 1 year after the date of enactment of this Act, the Secretary shall conduct a study of, and transmit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a report on, the implementation of the HMSP program under section 5109 of title 49, United States Code. In conducting the study, the Secretary shall review, at a minimum—	This detailed document is the background support for the letter Report to Congress that meets the MAP-21 requirement. The March 2014 Report to Congress is available at reference, [1] and the shorter September 2014 report to Chairman Mikulski is available at reference. [2]
(1) the list of HMs requiring a safety permit;	The list of HMs requiring a Safety Permit is included in Appendix A in the separate document. It is also available at several locations on the FMCSA web site, including: http://www.fmcsa.dot.gov/faq/what-hazardous-materials-require-hazardous-materials-safety-permit A good reference source for other information about the HMSP program can be found at: http://www.fmcsa.dot.gov/regulations/hazardous-materials/hazardous-materials-safety-permit-program-hmsp
(2) the number of permits that have been issued, denied, revoked, or suspended since inception of the program and the number of commercial motor carriers that have never had a permit denied, revoked, or suspended since inception of the program;	Because of limitations of the current HMSP data maintained in the MCMIS system, and because of the need to correctly administer the program despite information system deficiencies, it is not possible to extract exact counts of the number of permits that have been issued, denied, revoked, or suspended since inception of the program. However, the best possible information supporting these counts is presented in Section 5.3, "Permits Issued, Denied, Revoked, and Suspended." The data for permits never denied, revoked, or suspended since the inception of the program is also in Section 5.3.
(3) the reasons for such denials, revocations, or suspensions;	Again, because of limitations of the HMSP database structures used in the MCMIS system, it is not possible to extract exact counts of the reasons that permits that have been denied, revoked, or suspended since inception of the program. The best available information is presented in Appendix C in the separate document.

MAP-21 Requirement	FMCSA Response
(4) the criteria used by the Federal Motor Carrier Safety Administration to determine whether an HMSP issued by a State is equivalent to the Federal permit; and	A review of the Uniform Program is presented in Section 3, "State-Equivalency and Uniform Program Options for Safety Permits." This program is focused on administration of an HM permit/registration system. It is not focused on determining safety fitness as used in the Federal HMSP program. Their functions are not aimed at the same purpose. Thus, it is not possible for FMCSA to recognize a State permit as comparable to the HMSP. However, FMCSA could issue a rule to Federally sanction the Uniform Program for purposes of establishing uniform interstate criteria for administration of permits and registrations.
(5) actions the Secretary could implement to improve the program, including whether to provide opportunities for an additional level of fitness review prior to the denial, revocation, or suspension of a safety permit.	This report provides a set of recommendations in Section 9.1, "Recommendation." This report recommends using the existing Comprehensive Investigation process, which has built into it the additional level of appeal for fitness review when a carrier receives a safety rating below Satisfactory. Use of that provision as part of a CI avoids any need for creating a new program and offers the value of a program that is known and proven effective in its additional level of fitness review.
(b) ACTIONS TAKEN.—Not later than 2 years after the date of enactment of this Act, based on the study conducted under subsection (a), the Secretary shall either institute a rulemaking to make any necessary improvements to the HMs safety permit program under section 5109 of title 49, United States Code or publish in the Federal Register the Secretary's justification for why rulemaking is not necessary.	*As noted in indented, italicized text like this throughout this report:* › *FMCSA has already published a June 2015 Federal Register notice changing how HMSP holders are monitored throughout the 2-year cycle, and if they need attention, they are subject to a Comprehensive Investigation, which they can appeal if they receive below a Satisfactory rating; and* › *A number of plans for rulemakings and information system changes are noted addressing other identified needed improvements.*

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10. DATA NEEDS AND IT CONCERNS

This section chronicles and summarizes in one section the data needs and IT concerns identified during analysis for this report and from experiences of the HM Division staff since implementation of the HMSP program in 2005.

The following program concerns were reported by the users.

- MCMIS Software Functionality supporting the HMSP program is not documented. As a result:
    - Users and system programmers report that a great deal of time is spent trying to figure out how the system works by trial and error. HMSP carriers and other users of MCMIS are not especially sympathetic when such trial and error causes a malfunction in the operational capabilities they need.
    - Because of design complexity, a poor data model, and lack of documentation, it is reported that it is difficult within the existing software and database, which is embedded in the larger MCMIS system for all users, to implement small program changes due to the potential for unanticipated system responses. Thus, due to the high personnel costs for IT support, and user operations resistance to trial and error fixes that cause unintended results, many software fixes requested by the HM program office have not been ranked as high enough priorities for the limited IT resources, and allocated for in in IT budgets.
    - Program managers and other FMCSA staff:
        › Do not know how the current software works, and thus cannot explain to carriers and other stakeholders.
        › Are surprised by and need to respond to emails and letters sent to carriers that they did not anticipate. Further, they may not understand exactly what events or system states triggered the email or letter.
- The data sharing interactions/communications between MCMIS and L&I are not working.
    - There should be an automated link from MCMIS to L&I, or their replacements, so that L&I becomes informed and thus able to provide insurance companies with the correct minimum insurance amount that a carrier needs, based on changes in reported commodities hauled.
    - At least, as a stop gap, it is recommended that the L&I system should stop reporting to insurance providers what may be an incorrect minimum amount of insurance needed by that carrier. Instead L&I could provide a document with a list of the insurance requirements for each commodity and a link to that document on FMCSA's website so that the insurance company can determine the amount of insurance needed per the commodities their carrier listed on their most recent MCS-150 or MCS-150B *(now the MCSA-1)*.
    - An alternative stop gap to the above, while FMCSA is developing a link between MCMIS to L&I or their replacements, would be to authorize HMSP staff to update L&I to indicate the commodities being hauled by each carrier and thus the

minimum amount of insurance required that L&I should cite for that carrier to the insurance provider.

— Another alternative would be to assign a HM staff member with L&I update authority to work with an HMSP staff person in order to enter the needed data into L&I.

- The system did not allow a renewal to properly occur any time other than 30 days before the end date of an existing HMSP. This created numerous problems. It has already been changed to expand the renewal time to 60 days in advance of the HMSP expiration.

Subsequently in 2015 the requirement to renew every 2 years during the 60-day window was removed. Instead, the carrier is separately subject to possibly being prioritized by SMS to receive a CI. All HMSP carriers without sufficient roadside inspection data to receive a BASIC within the four years will be recommended to receive a CI.

— The extensive lead time that was associated with accomplishing the fix to change from a 30-day renewal window to a 60-day renewal window demonstrates the substantial budget and IT lead time necessary to get HMSP IT changes within the existing MCMIS framework, and perhaps the lack of flexibility in trying to accomplish such changes within the legacy system design.

- The interface for external users (i.e. the interface for carriers submitting a new or required update to their MCS-150) is difficult at best.

— The interface does not indicate that answering specific HM questions automatically generates an HMSP request. Thus, carriers that do not want or need an HMSP inadvertently are forced to apply, and for intrastate HM carriers, all are being required to obtain an HMSP. Many who don't need the HMSP then receive system-generated denial letters that staff try to intercept.

— Further, when the carrier answers a question that will generate an application for an HMSP, not only should the carrier be informed that they are applying for an HMSP, the carrier should also be informed of the requirements for an HMSP (e.g. Security Plan, $5 million in insurance). The system should allow the carrier to change their answers on the MCS-150 (and on the forthcoming MCSA-1) prior to unnecessarily sending in an HMSP application.

— The current user interface for the MCS-150 simply gives the carrier the option of saying that they do or do not transport HMs and in what amounts (via checkboxes next to pre-determined qualitative descriptions). But for many carriers, while they do carry the hazardous materials in bulk, the amounts they carry are less than the minimum amount that requires an HMSP. There is no current logic for dealing with that circumstance. The carriers do not want to provide false information on a government form, so they check that they carry the chemicals in bulk. The interface needs to provide a way that the carrier can provide accurate information without creating an undesired application for an HMSP. An example of this is for bulk anhydrous ammonia. The threshold when an HMSP is needed is 3,000 gallons or more, and that is not explained in the user instructions.

In addition to these issues being documented here, they were also made known to those developing the user interface for the new online MCSA-1 under the new URS system for fixing.

- After a carrier's information is put into MCMIS, it appears that MCMIS does not inform a carrier that their HMSP status is corrected. For example, if an HMSP carrier received a non-compliance letter (e.g., failure to renew their HMSP on time, failure to maintain PHMSA registration), the company must provide the required information. As a result of the system not notifying the carrier that the issue is resolved, FMCSA HM staff get calls from such carriers inquiring about the status of their application. The staff must then perform the research needed to let the carrier know that their application was accepted and their permit was issued or updated to active status on MCMIS.

- Any time that one of the requirements for a new HMSP or renewal is met (e.g. updating the fact that the carrier has a PHMSA registration, validating proof of insurance), MCIMS automatically proceeds to run the process to issue an HMSP. However, if only one or some of these requirements are fulfilled, but other requirements remain to be completed, MCMIS denies the application and creates a denial letter. FMCSA staff must intercept the letter and instead send a letter requesting additional information.
  – There should be a way to have the system or staff enter the fulfillment of some, but not all, requirements without triggering generation of a denial. (This might be easier to implement in a separate coordinated supplemental system which could ensure that all data has been collected, and then that system submit to MCMIS for processing.)
  – Further, if the update to MCMIS is performed by an automated action, e.g., through a PHMSA data feed, FMCSA staff might not even know that there was an update to the application, and thus a denial would be generated and FMCSA staff would not know.

- When a carrier is denied at renewal, there is no link between the data record and the explanation of a specific condition or conditions provided in the letter to the renewal applicant. Thus, the carrier cannot tell what specific events (e.g., crashes, inspections with OOS orders) caused the denial. This costs FMCSA staff substantial hours to manually track down the events if the carrier requests an explanation. Internal interview respondents described these requests as being "extensive research requiring excessive man-hours."

- The software used to record inspections in the field is constrained by legacy MCMIS hardcoded software, which predates initiation of the HMSP program. It requires that, if an HM OOS order is being issued, the inspector is forced to record it as either a driver or a vehicle OOS order. Both the HM OOS order and any possible second (driver or vehicle) OOS order are also assigned to the inspection. Thus, a carrier can receive both a driver OOS order and an HM OOS order, and both will be recorded and included in the calculation of the thresholds. However, an inspection that results in only an HM OOS order always must also be recorded as either a driver OOS order

or a vehicle OOS order. Carriers and FMCSA consider this to be double counting, in that one violation creates two OOS orders. When calculating the thresholds as part of the HMSP renewal process, FMCSA modifies the MCMIS data to temporarily remove the double counted driver or vehicle OOS order and recalculates the thresholds.

- There is no functional automated communication connection between L&I and MCMIS.
    – Consequently, if a for-hire carrier obtains their HMSP *after* being licensed (received MC number for operating authority) by the L&I system, they can drop their insurance below the amount required by 49 CFR 387.9 for their HMSP (quite possibly $5 Million), though not below the $750,000 required for a non-HM for-hire carrier, without triggering a notification to suspend the carrier's HMSP, plus L&I continues providing the incorrect lower insurance level as the minimum requirement to insurance providers.
    – If a private HMSP or HM carrier (interstate or intrastate) lowers their insurance to an amount below the amount required by 49 CFR 387.9 for their HMSP or HM (or even to zero), there is no reporting system for the carrier's insurance providers to notify FMCSA of the decrease in insurance coverage and that the carrier's HMSP should be suspended or revoked.
    – If a carrier updates their MCS-150 *(now MCSA-1)* to begin hauling certain types of HM, or if the carrier decides to become an HMSP carrier, information about the change in commodity transported does not get reported by MCMIS to L&I. Thus, L&I does not accurately know and report the higher new minimum insurance level required, i.e., L&I continues to report the minimum as $750,000 instead of increasing it to $1,000,000 or $5,000,000 (depending on what HM is being transported).

- When the carrier submits an updated MCS-150B *(now MCSA-1)* that functions as an application for HMSP renewal, MCMIS makes a number of database changes. Two of these changes are that the carrier's HMSP status is changed from Active to Pending and the financial responsibility status is changed to N (for No).
    – Based on this information, SAFER reports that the carrier does not currently have an active HMSP. This causes all sorts of problems, especially for for-hire HMSP carriers during the renewal process because shippers may refuse to use them.
    – Even the MCMIS interface used internally also reports that the carrier's HMSP is pending, not active. While this status is accurate for first time new applicants, of which there are now very few, application of that logic to the majority of renewing carriers is completely inaccurate, as the majority of renewing carriers hold active HMSPs during their HMSP renewal.

This is just another example of assumptions quickly made when the software was being quickly thrown together in 2004 in parallel with the mandamus rulemaking without a team effort in thorough planning.

10.1 STRUCTURAL DATA AND PROCESSING ISSUES

The following structural and data issues adversely affect program analysis, retrieval of management information, and the capability of the staff maintaining the system to make timely and effective enhancements to the system.

- The processing associated with HMSPs is based around the HMSP data in MCMIS. In order to evaluate program performance, this dataset should contain data about each action taken on an HMSP issued, i.e., there should be a separate record for each Safety Permit action. A new application and its associated permit or outcome should be a new record that does not overwrite previous records (as currently occurs). For example, if a carrier had two applications denied and four applications approved, then the Permit table should have at least six records. The current design contains a single record for a carrier. It has data about the current status of the carrier's HMSP, but it has no data about each application and determination. Some of the implications from that design approach are:

  — Most of the history of a permit and its associated actions are not kept. Some historical information can be gleaned from the Census Audit Trail tables. (These Audit Tables are not usually available to application-level users to analyze because no user software was implemented to provide such access.)

  — When a carrier applies for a renewal, the carrier's status is changed from Active to Pending, and the carrier's permit type is changed from Permanent to Application. Outside of extracting data from the Census Audit Trail or using prior archival copies of MCMIS data, it is impossible for the supplemental FMCSA system known as SAFER, an external shipper, or even an internal user to determine whether the carrier really does (or did) have an active HMSP. This prevents other supplemental FMCSA systems used by shippers, such as SAFER and the MCMIS user interface, from accurately reporting the status of the carrier's HMSP.

- Not only does this impact the data that is retained for historical analysis, it impacts data needed for current processing, as it relates to minimum financial responsibility requirements.

  — When the carrier applies for renewal, the carrier's HMSP Financial Responsibility Indicator is changed from Y to N. The system may also delete information about the amount of insurance that the carrier has.

  — Because MCMIS cannot inform L&I of a change in commodities transported, FMCSA staff must request a manual copy of the MCS-90; even though the for-hire carrier's insurance company has a currently-filed MCS-90 on L&I, it is perhaps at too low a level.

  — MCMIS does not send an update to L&I when a for-hire carrier obtains an HMSP, which likely increases the carrier's minimum insurance from the $750,000 minimum for all carriers. If the carrier originally obtained operating authority as a regular carrier, L&I likely will report that $750,000 is the minimum insurance required because L&I does not have full information about the current commodities transported by that carrier. Thus, the financial responsibility flag,

based on reporting from L&I, cannot be trusted to ensure that for-hire HMSP carriers have the minimum insurance. There is no information for private carriers.

— Because of the inadequate file structure currently used for the HMSP program, it is functionally impossible to generate historical data needed for trend analysis.

This is another example of a software limitation that should be addressed as part of the Agency's ongoing efforts to integrate the functions of the L&I software with MCMIS to produce URS.

- There are a series of reasons for why an HMSP may be denied and a similar set of reasons for why an HMSP may be suspended or revoked. However, there is no historical record of denials, suspensions, or revocations outside of the Census Audit Tables. While it is possible to identify the action, carrier, and date of the action from the Audit Tables, there is no connection, in MCMIS data, between the event and the reason for the event.

- MCMIS tracks when letters are generated. However, as identified above, there are several program problems which inappropriately cause letters to generate. Such inappropriate letters must then be manually intercepted to prevent them from being sent out. There is no capability to document whether letters are intercepted and not sent out. If the information about MCMIS letters was accurate and complete, it would still be impossible to track actual business activity and it could not be determined if a letter was sent out.

- MCMIS has a table titled HMP Letter Error. This appears to keep track of the reason(s) for the denial, suspension, or revocation of a permit. However, the data in this table contains only the key field to identify the associated letter and a code for the reason for the action. It contains neither the identification of the carrier nor the date of the event. Further, for this recordkeeping function, MCMIS does not provide database integrity (i.e. assuring that every child record in the HMP Letter Error table has an associated parent record in the HMP Letter table).

  — There are about four times as many entries in the HMP Letter Error table as there are in the HMP Letter table.

  — Less than 1/5 of the records on the HMP Letter table have matching records on the HMP Letter Error Table.

  — There is no matching HMP Letter entry for over 95 percent of the entries on the HMP Letter Error table.

In summary, unless there is some undiscovered mechanism for making connections, the data in the HMP Letter Error table cannot be used to connect reasons for actions with the carriers against which the actions were taken or with the dates of the actions.

- In short, there appears to be no connection in MCMIS data between the existence of a denial, suspension, or revocation event and either the reason for the event or the data that was used to support the decision.

- MCMIS has an internal structure element called a "delete table." These are used as a backup, when actual data in MCMIS is changed. For example, if Carrier B is

identified as the same business enterprise as Carrier A, all of Carrier A's inspections are assigned to Carrier B's USDOT number. The original record, assigning the inspections to Carrier A, is written to the Inspection Delete Table. Generally, these delete tables are ignored in MCMIS processing. However, there is an as-yet unexplained process that is writing a large number of HMSP records (and child records) to a set of delete tables. There clearly is a different process being applied than the standard MCMIS process. The current operators of the system do not have the documentation to explain exactly what is occurring and why. However, this structure of delete tables further complicates the effort to extract meaningful historical data.

10.2 SECONDARY ISSUE(S)

The following secondary issues were identified during creation of this report. These issues did not immediately affect the findings but may affect the long term quality of the MCMIS data.

- The CARRIER table on MCMIS and the CENSUS table on MCMIS should agree on data describing the type of Carrier Operation. In some cases they do not.

- Reporting of USDOT Numbers to PHMSA as part of HM carrier registration is not mandatory. While there is a field for reporting USDOT number to PHMSA, it is optional. Consequently, matching MCMIS and PHMSA data to determine if a carrier has a PHMSA registration does not always work. (Lacking USDOT number on the PHMSA registration form prevents automatic matching if the name of the carrier is written differently in MCMIS than on the PHMSA registration form; manual matching can still be possible.)

As part of future rulemaking referred to as URS-2, it is intended to revise the HMSP application requirements to specify that the applicant must provide their USDOT number to PHMSA. As part of FMCSA's annual verification that every HMSP carrier is registered with PHMSA, if an HMSP carrier without a USDOT number on the PHMSA database is discovered, that carrier will be given the options of providing the number on their PHMSA registration or having their HMSP revoked.

10.3 SUMMARY OF THE HISTORY OF HMSP PROCESSING

Both the software used for HMSP processing and the rule were developed in parallel very quickly in 2004 in response to a mandamus court order covering a number of rulemakings required in previous congressional Acts that FMCSA had not acted on for a number of years. In the case of the HMSP program, the individual or individuals who were assigned to supplement the available IT staff resources and who actually wrote the software, had minimal knowledge of overall MCMIS processing and how the software that they were developing for the HMSP program would fit into the overall system.

As a result of the "hurry-up" nature of the IT system development using individual without a history of knowledge of MCMIS, there is neither documentation of how the code works, nor institutional memory of what or why things were done the way they were.

There was pressure to immediately implement the needed capabilities to comply with the mandamus court order. It does not appear that any thought was given to downstream information management and reporting or future program evaluation requirements. This may be a reason why it is impossible to extract even simple summary data.

10.4 CONCLUSIONS

The limitations in the database design and structure of the HMSP processing software create a number of problems for the customer community.

- When a shipper inquires regarding a carrier's HMSP status when the carrier has submitted a request for an HMSP renewal, the shipper gets an inaccurate response. Initiation of the HMSP renewal causes the FMCSA systems, e.g., MCMIS and SAFER, to begin reporting that the carrier no longer has a current, active permit. The carrier does have a permit, but FMCSA systems instead report that the application status is pending.

- This renewal process is exacerbated by the fact that there is no way for the carrier to submit all the required paperwork online during the application process. The current process has the carrier apply for renewal of their HMSP by submitting an updated MCS-150B *(now MCSA-1)*. The carrier must then respond to a letter from FMCSA requesting a copy of the insurance provider's MCS-90, i.e., a copy of what for-hire carriers send through their insurance provider to the L&I system, in addition to a copy of the carrier's Security Plan.

These and other logistics problems also impact FMCSA staff:

- These limitations make FMCSA staff (and FMCSA overall) appear less helpful in the eyes of the community.

- For for-hire carriers, when the insurance provider has already filed an MCS-90 (which may not be sufficient coverage because of MCMIS and L&I not communicating), FMCSA staff should not need to duplicate that by requiring that the carrier provide a copy of the same document to the HMSP staff.

- FMCSA staff spend a great deal of time executing work-arounds for system problems. For example:
  - When a carrier has a single HM OOS order and the carrier is set to fail the Vehicle OOS threshold, based on the double counting of that HM OOS order as a Vehicle OOS order as well, FMCSA staff must take action to avoid an inappropriate denial of an HMSP. FMCSA staff will disassociate the inspection from the carrier in the MCMIS database, allow the overnight software to run— getting a corrected result for the HMSP threshold evaluation requirement—and

issue the HMSP. Then FMCSA staff manually re-associate the double counted inspection back with the carrier in the MCMIS database. These are completely manual ad hoc processes.

— There are a number of carriers that end up with more than one issue on their permit application. For example, suppose the carrier's application and PHMSA registration do not match due to differences in the registered names. Suppose also that MCMIS reports that the carrier does not have proof of financial responsibility, even though the carrier's insurance provider previously filed appropriate proof with the L&I system. When any such open issue is resolved by FMCSA staff and updated in MCMIS, MCMIS then automatically determines if an HMSP should be issued. So, if one of these proposed issues was solved, MCMIS would run the batch at night to try to issue a permit. The HMSP could be denied because not all of the issues were solved. FMCSA staff must again sort the next day's letters to assure that any such inappropriate denial letter is not sent to the carrier.

— The system should track individual requirements for HMSP issuance and tell FMCSA staff what the carrier has provided and what they still need to provide. Currently, the requirements for HMSP issuance are buried in the code for nightly batch processing. Consequently, only a staff member who is highly knowledgeable in both the HMSP process and MCMIS HMSP codes can predict whether a carrier's application will be accepted. Almost no HMSP staff member is knowledgeable of MCMIS HMSP code.

- FMCSA staff have a substantial intervention workload associated with processing HMSP applications that should have never been submitted to begin with.

- Because of the excessive difficulty of resolving the inappropriate software-caused issues, the small size of the HMSP program versus other FMCSA programs, and limited IT funds, FMCSA management has difficulty developing proper program management capabilities.

It appears that FMCSA has historically decided not to undertake a piecemeal approach to many fixes needed to resolve the underlying HMSP database structure problems.

Instead, FMCSA is in the process of incrementally implementing more integrated system capabilities as part of the URS implementation. That provides a path over the next years for incorporating upgrades needed to address some number of the above issues.

Redesigning the MCMIS portion of HMSP processing is a possibility. This could include:

- Redesigning the data structure.

- Substantially modifying or rebuilding most or all of the application software.

- Building additional software to meet unfulfilled requirements.

Doing so in a separate supplemental system that communicates with MCMIS could minimize the substantial difficulties that would be encountered by trying to do so within

the existing MCMIS environment and perhaps also address additional HM program requirements.

Separately, the online application software's user interface for what was the MCS-150 was updated to the MCSA-1 form; one goal was to stop the online application from inappropriately forcing HM carriers to obtain an HMSP (especially the case for intrastate HM carriers in PRISM States, which required the carrier to obtain a USDOT number).

There does not appear to be any structural impediment to fixing the new MCSA-1 to:

- Correct the instructions to make it clear to the carrier that they are applying for an HMSP and make clear what that entails, i.e., that it requires PHMSA registration, a security plan, and up to $5 million in insurance.

- Correct the form and the software for the form so that a carrier can indicate on the form that they will carry bulk amounts of HMSP materials but perhaps in amounts below the HMSP weight/volume thresholds. This correction should prevent them from being forced to apply for an HMSP.

- Provide appropriate first level guidance so that the carrier can accurately determine if the commodities they are transporting should be defined as Bulk or Non-Bulk.

- Provide appropriate second level guidance on the minimum amount which requires an HMSP for any selected bulk commodity.

- Provide accurate guidance to insurance providers on minimum insurance requirements for any selected commodity, even if the interim guidance informs that the system does not have the information to accurately determine the insurance requirement.

Until the new database structure and supporting software are built, either as part of implementing URS or via a supplemental communicating system, the existing IT systems issues and staff work-arounds will continue.

ACKNOWLEDGEMENTS

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APPENDICES ARE IN A SEPARATE DOCUMENT

The appendices for this document are quite large and detailed. Thus, for the convenience of the average reader, they are packaged as a separate document. They are available online at https://doi.org/10.21949/1503447.

The separate document contains 18 appendices, A through R. They are accurately referenced in this document, and there is a Table of Contents at the beginning of the appendices document.

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[9] The Hazardous Materials Transportation Uniform Safety Act – HMTUSA of 1990 §§ 5103(a) – Designating Material as Hazardous, 5108 – Registration, See APPENDIX A for copy.

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