

Analysis of Tank Car Fleet Options and Retrofitting Capacity

In Connection With Docket No. PHMSA-2012-0082 (HM-251) Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains

presented to

The White House Office of Management and Budget

presented by

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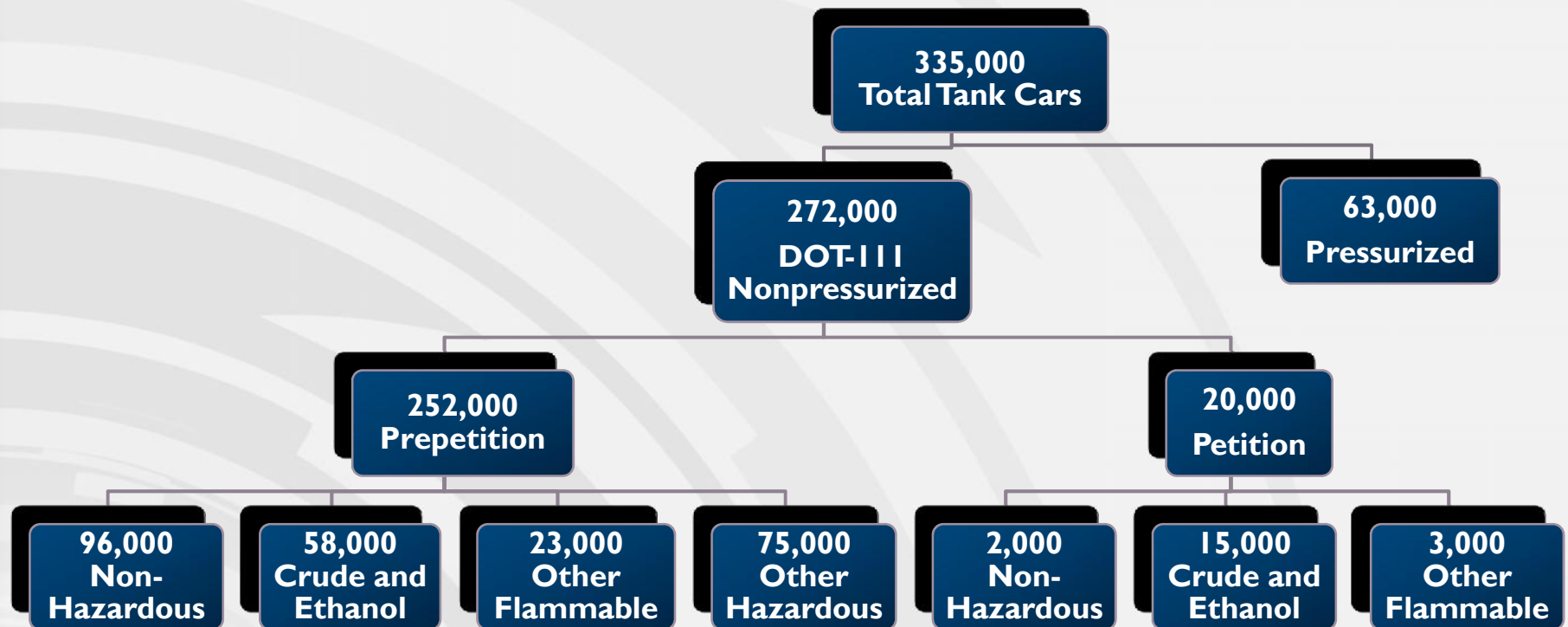


Background on PHMSA Proposed HM-25 I Rulemaking

- High-Hazard Flammable Train (HHFT) concept
- Retrofitting of existing flammable liquids tank car fleet
- Implementation of ECP brakes
- Need for harmonization with Canada is critical

Our focus is on retrofitting the tank car fleet...

North American Tank Car Fleet



Note: “Prepetition” represents tank cars ordered prior to October 2011 built to the long established industry standard.
“Petition” represents the current industry standard voluntarily adopted by AAR, for cars ordered after October 2011.

Source: DOT NPRM, RSI, AAR.

Purpose of Analysis

- ① Examine key characteristics of the affected tank car fleet and its impact on a retrofit program
- ① Examine in greater depth the contract shop industry's capacity to retrofit tank cars to the potential proposed standards
- ① Particular focus on crude oil and ethanol fleets
- ① Explore implications of timing and sequencing of retrofit program

Areas of Concern with Prior Analysis

- ④ Omission of new car manufacturing and shop capacity for retrofits
- ④ Utilization of current shops has not been properly specified
- ④ Double-counting of HM-216 or planned maintenance and retrofits overstates out of service times
- ④ Assumed retirement rate of 28% overstates transportation capacity shortfalls
- ④ Our analysis addresses these issues
 - » To the extent possible, we have used RSI's numbers for fleet size and shop utilization

Affected Fleet

- The proposed rule will impact the entire liquid flammable goods tank car fleet of approximately 154,000 cars, comprised largely of DOT 111 and CPC-1232 spec cars
- Some elements of this fleet have shown extraordinary growth in response to shipment growth
 - » Crude oil shipments handled by U.S. Class I railroads went from 9,500 in 2008 to 435,000 in 2013
 - » Typical annual mileage for crude oil fleet is currently on the order of 60,000 miles per car, far higher than historic levels for tank cars
 - » Shift from individual car to unit train movement
- Overall annual retirement rate of approximately 3.5% applies, based on an expected 35-year life, and current industry practices

Fleet Characteristics

Tank Cars in Flammable Liquids Service

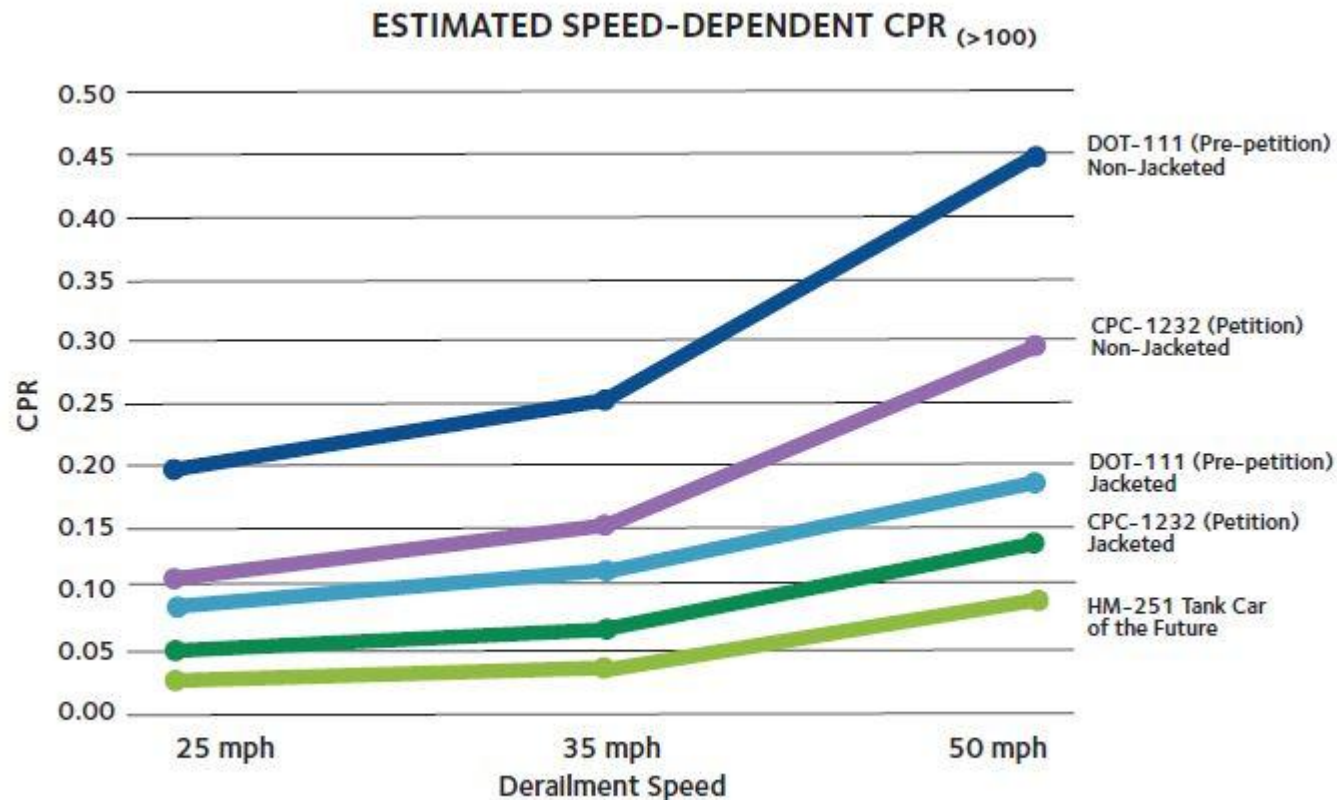
Service	CPC 1232		DOT 111 Legacy		Totals
	Jacketed	Unjacketed	Jacketed	Unjacketed	
<i>Projected 12/31/2015</i>					
Crude Oil	35,408	21,993	7,016	23,090	87,507
Ethanol	23	751	88	27,037	27,899
Other	1,975	2,944	9,413	24,790	39,122
Total					154,528

Source: Brattle Group Report, Table 4.

Older unjacketed cars represent the highest risk.

Unjacketed Cars are Most Vulnerable

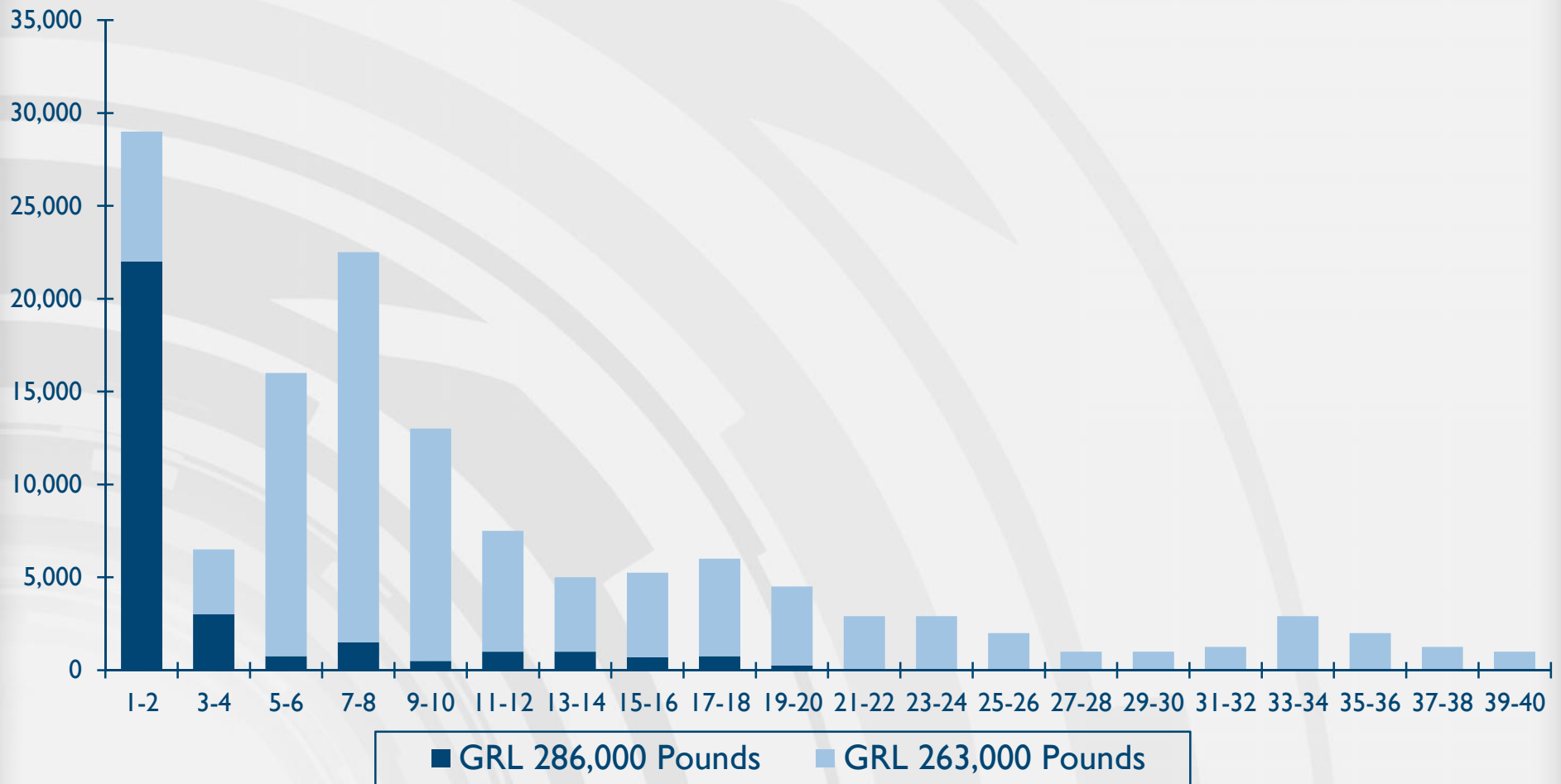
Conditional probability release studies (CPR) measure the likelihood of tank car spills by different speeds and car types. This chart shows the likelihood of spilling more than 100 gallons of liquid at variable rates of speed.



Source: Data obtained and extrapolated from RSI-AAR Railroad and Car Safety Research & Test Project, April 2014

Fleet Characteristics

Age of Large Tank Car Fleet (27,500 gallons and greater)*



Sources: *Railinc North American Railcar Review*, March 2014; STB Public Use Waybill Sample.

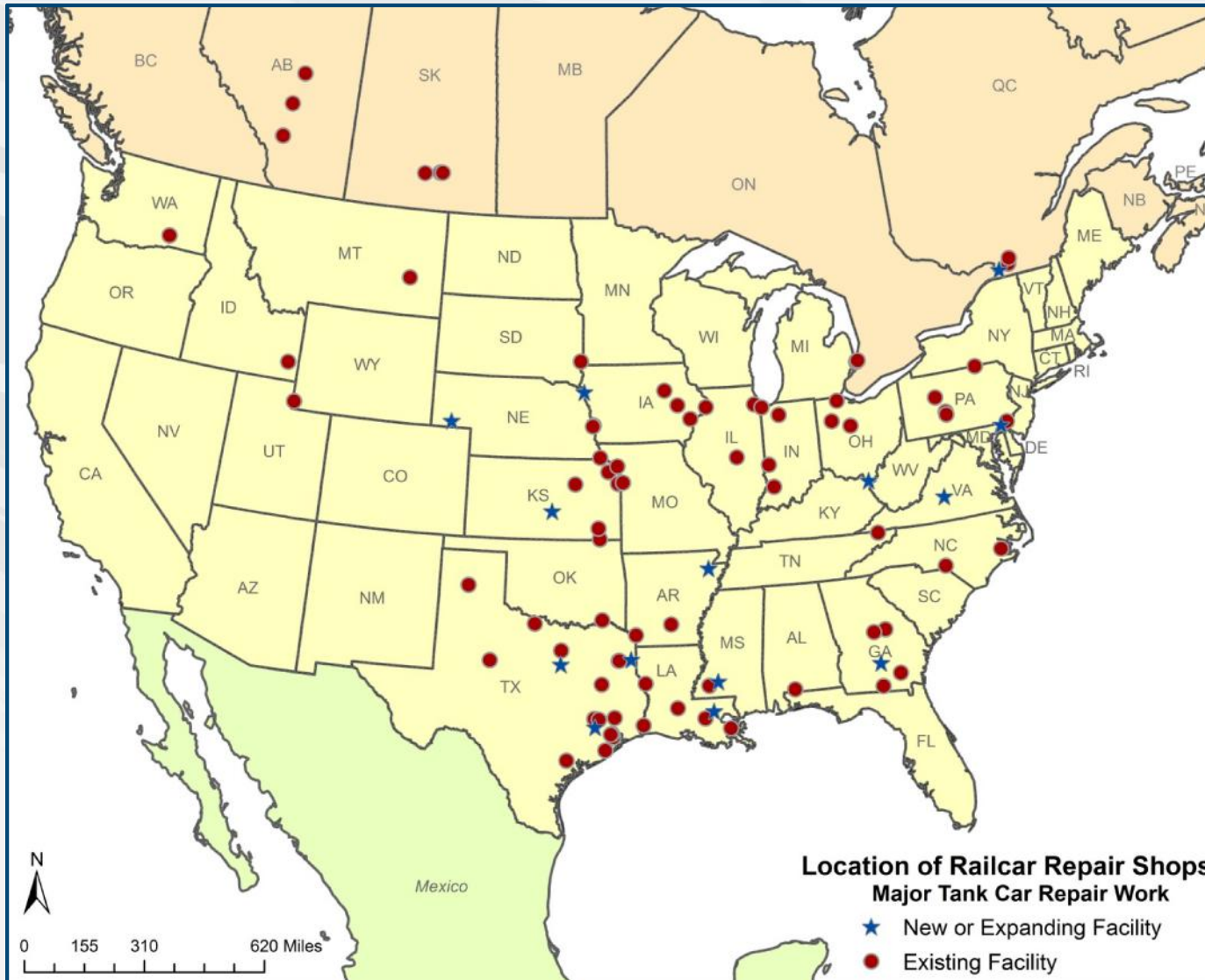
* As of End-of-Year 2013. Large tank cars represented 93% of all crude and ethanol shipments in 2013.

Retrofit Capacity Comes from Three Sources

1. New facilities and facility expansion
 - » Brattle appears to have overestimated barriers to entry
 - » We have found announcements for new or expanded facilities at 14 locations over the past 18 months
 - » Brattle appears not to have accounted for and included announced expansion by known players, including Progress Rail and GBW
2. Unused capacity currently found in industry
 - » AlltransTek reported that 70% of industry is working at less than 75% of capacity
3. Combination of high mileage and HM-216 requirements can be leveraged for opportunistic maintenance

RSI projection of 6,400 cars annually underestimates capacity

Retrofit Capable Certified Tank Car Shops Located Across U.S. and Canada



Estimating Additional Capacity

1. New facilities and facility expansion

- » Based on market share model we estimate that the new retrofit capacity will range from at least 8,400 to 19,600 cars per year in steady state

2. Unused capacity in existing facilities

- » At least 3,450 cars per year steady state with 90% utilization

3. Opportunistic maintenance/efficiency gains

- » Volume-based efficiencies estimated at 25-35%, we used 20%
- » Previous studies appear to double count out-of-service times associated with retrofit and other shop visits

Sequencing

- The regulation could require sequencing based on risk, commodity, or car type. Using a mid-range estimate of capacity produces the following retrofit times in years after ramp up:

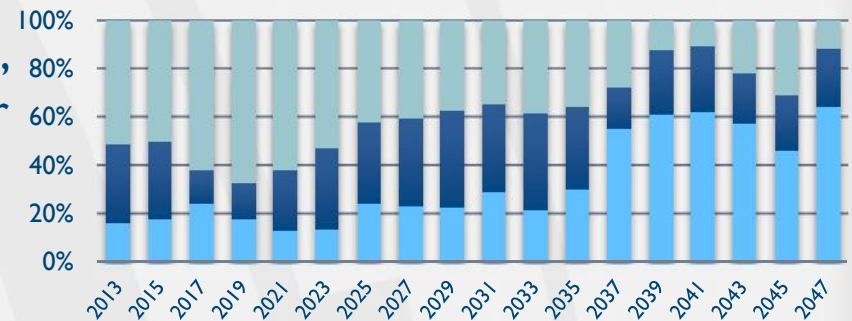
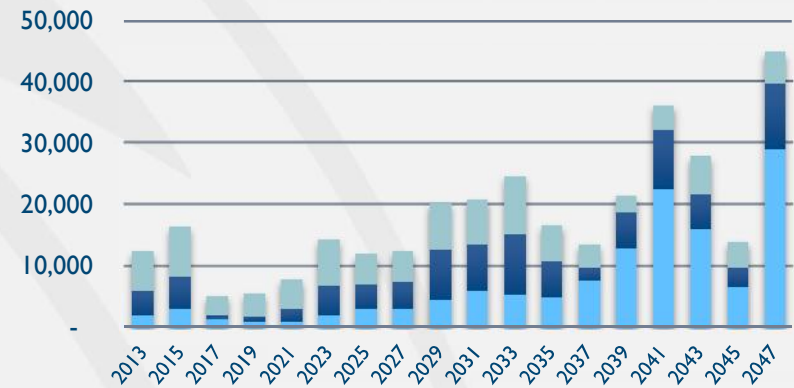
Specification	Crude Oil	Ethanol
<i>With 28% retirement from Brattle report</i>		
DOT-111	1.6	1.4
CPC-1232	3	.04
<i>With 10% retirement</i>		
DOT-111	2	1.8
CPC-1232	3.8	.1

- A 6 year or less window of implementation for the unjacketed DOT-111s and CPC-1232 is not an unreasonable standard
- We have not yet had time to consider the other cars in liquid flammable service that are not being used to haul ethanol and crude oil

Retirement of Tank Cars

- Retirements are based on engineering (i.e., fatigue or wear), or economics (the value of remaining service life)
- For the entire tank car fleet (approximately 335,000 units), steady-state replacement rate is approximately 10,000 annually
 - » Projected retirements through 2020 total approximately 56,000 and 90,000 through 2025
- For the high capacity tank car fleet (i.e., the primary crude oil and ethanol fleet), near-term retirements are significantly lower
 - » Projected retirements through 2020 total 9,400, and 15,300 through 2025
- RSI appears to have significantly overestimated crude and ethanol fleet retirements

Projected Retirement Year Distribution by Size
2-year intervals, assumed life of 35 years



■ Small Tank Cars (under 22.5k gallons)
■ Medium Tanks (22.5k-27.5k gallons)

Source: Railinc.

Relationship with New Build Capacity

- In 2014 approximately 35,000 tank cars entered service
 - » Approximately 25,000 were assigned to crude or ethanol service
- The combination of new build, retrofit capacity, and standard retirement rates do not support claims of impending shortfalls
- Overall replacement demand would consume less than one-third of existing new-build capacity of over 35,000 units annually
 - » Announced new tank car capacity would add at least another 5,000 units annually



Conclusions

- Final rule should prioritize unjacketed cars to remove risk as quickly as possible from tank cars in high mileage flammable liquids service
- Contract shops and new car manufacturers will respond to changes in demand, as evidenced by announcements of shop expansions and new car manufacturing capacity, leading to substantial job creation and a safer fleet
- Delaying rule or extending timelines penalizes firms that are being proactive
- Aggressive retrofit timelines for crude and ethanol are achievable
 - » Using the assumptions in the RSI analysis, the retrofit process for unjacketed cars can be completed in the first 5 years, and the entire fleet in 6.5 years

Questions

