Petroleum Crude by Rail

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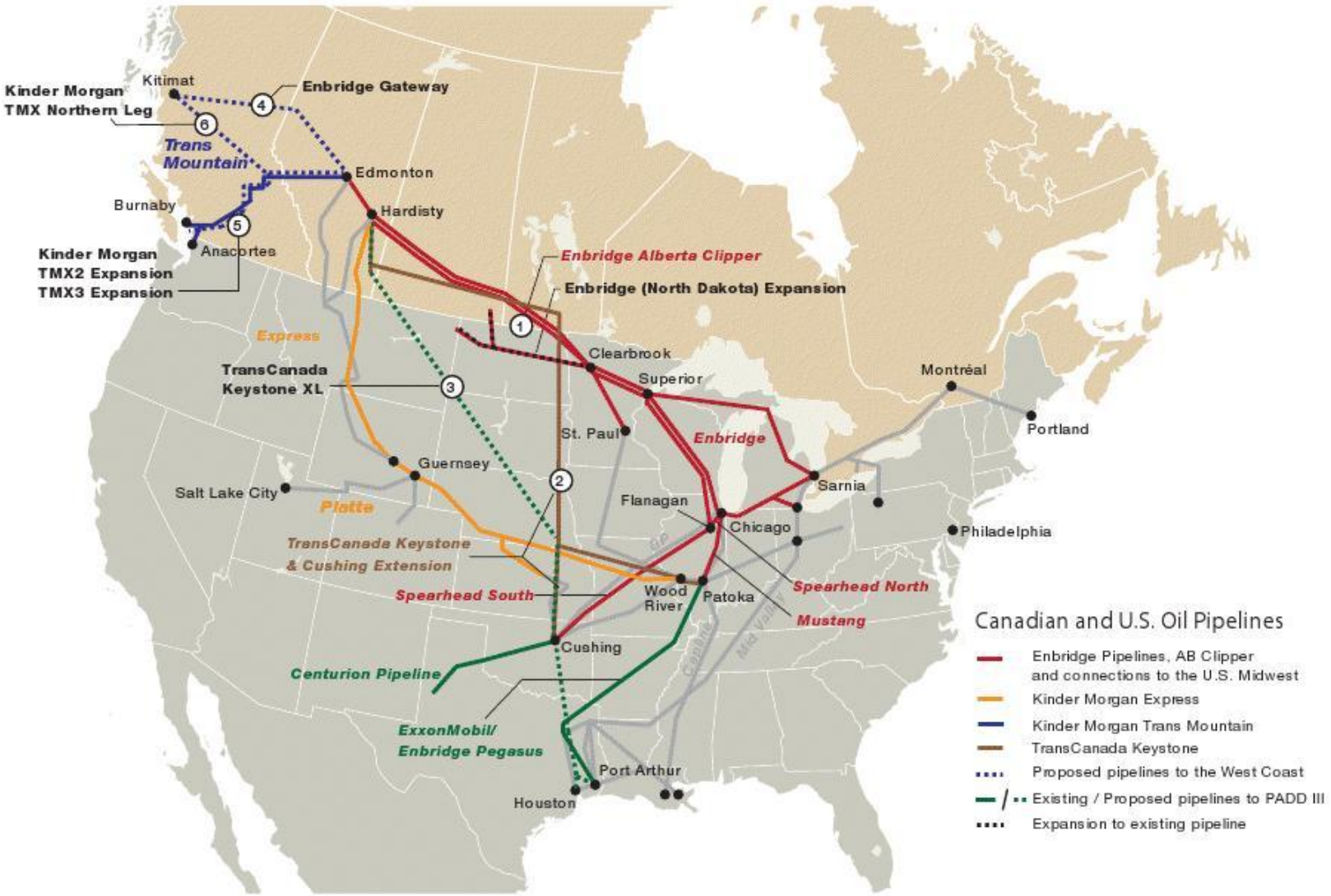
Petroleum Crude Facts

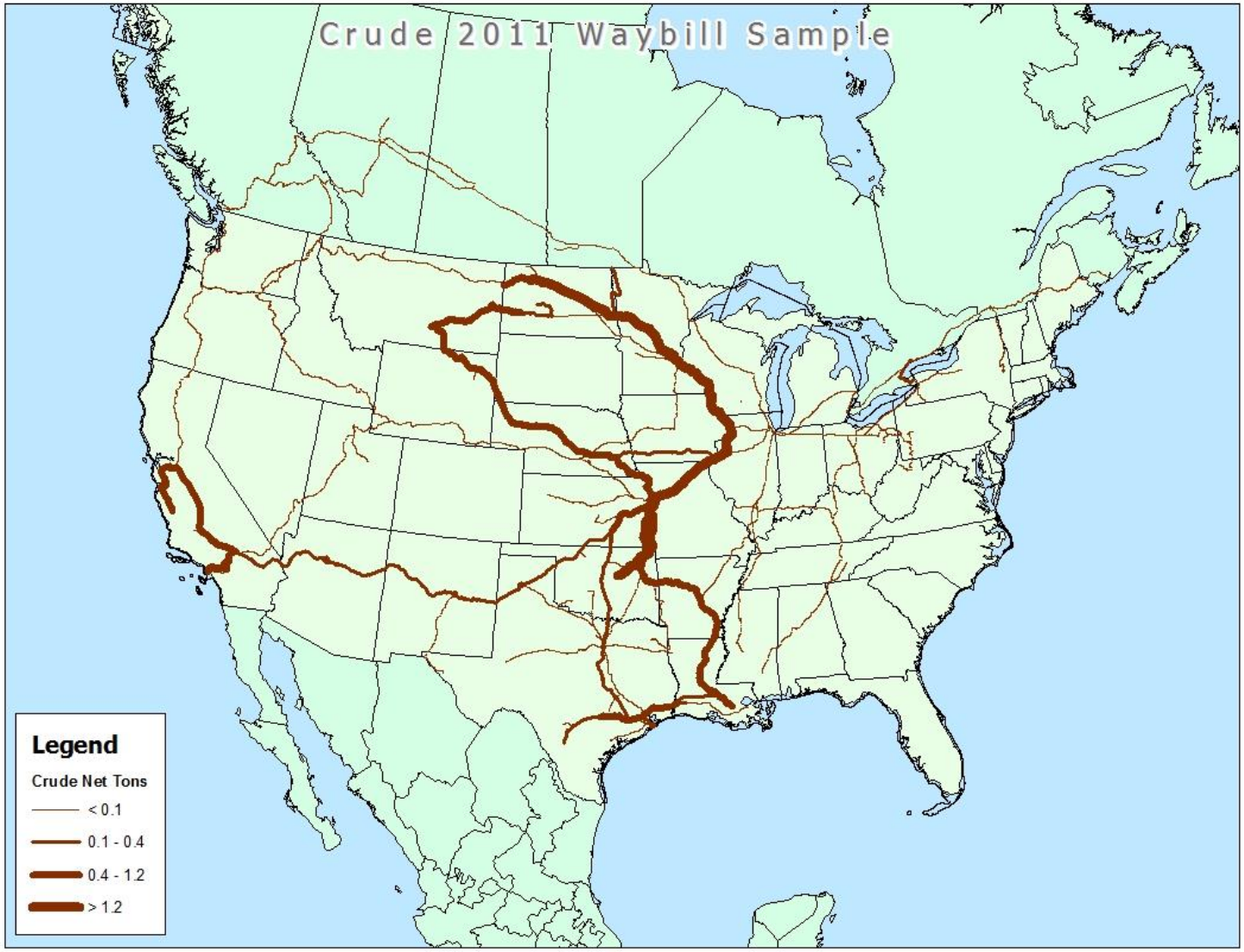
- According to the AAR *Annual Report of Hazardous Materials Transported by Rail* for 2012, crude oil shipments have increased 443 percent since 2005.
- The first quarter of 2013 saw a 166 percent increase in crude oil shipment by rail over the first quarter of 2012
- Growth is expected to continue for the foreseeable future.
- The most frequently transported hazardous material in 2012.


North American shale plays
(as of May 2011)
Muskwa-Otter Park, Evie-Klua
Lower Besa River
Muskwa-Otter Park
Montney
Doig Phosphate
Colorado Group
Niobrara*
Bakken ***
Cody
Heath**
Gammon
Mowry
Hilliard- Baxter-Mancos-Niobrara
Niobrara*
Mancos
Hermosa
Monterey-Temblor
Monterey
Lewis
Pierre-Niobrara
Excello-Mulky
Woodford
Fayetteville
Bend
Avalon
Barnett
Barnett-Woodford
Eagle Ford
Eagle Ford, La Casita
Eagle Ford, Tithonian
Pimienta
Pimienta, Tamaulipas
Maltrata
Haynesville-Bossier
Tuscaloosa
Floyd-Neal
Chattanooga
Conasauga
New Albany
Antrim
Utica
Frederick Brook
Horton Bluff
Devonian (Ohio)
Marcellus
Utica
Current shale plays
Stacked plays
Shallowest / youngest
Intermediate depth / age
Deepest / oldest
* Mixed shale & chalk play
** Mixed shale & limestone play
*** Mixed shale & tight dolostone-siltstone-sandstone play
Prospective shale plays
Basins
Miles
0
200
400
600
800
eia

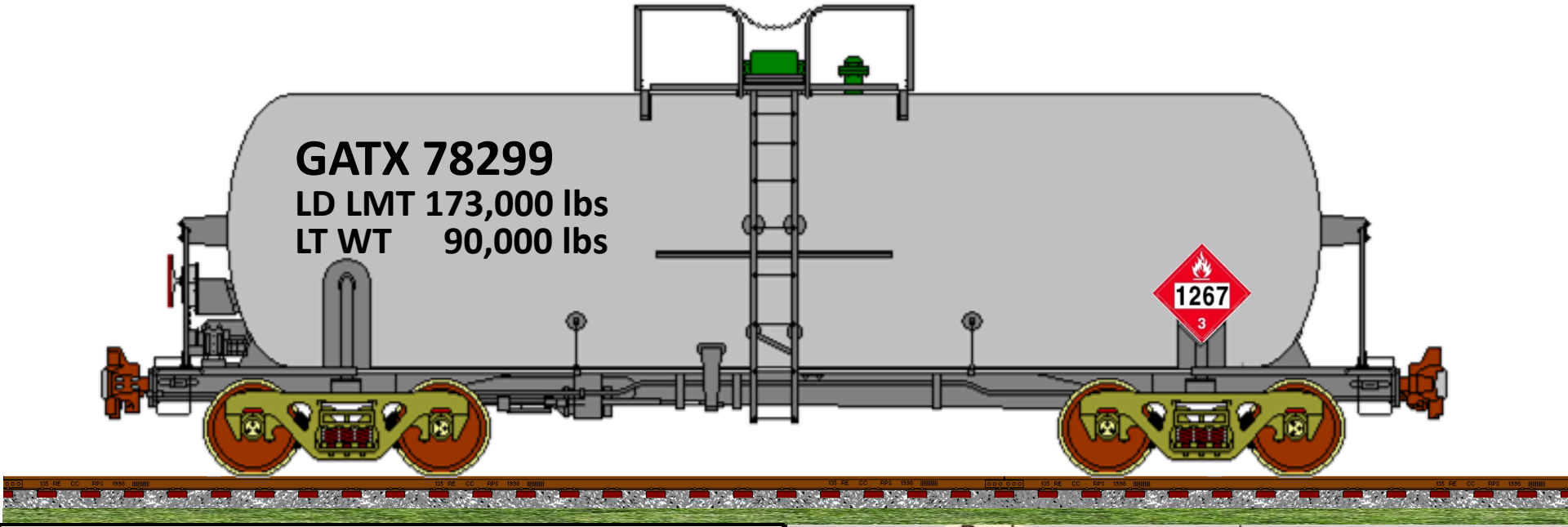
U.S and Canadian Pipelines



Waybill Sample Crude



Classifying Petroleum Crude Oil



Challenges – Rail Transportation

- Multiple truck loads from different well sites being transloaded into a single car
- High levels Hydrogen sulfide gas
  Severe corrosion to tank & service equip
- Impurities in the mix *(wax, sludge, H_2O)*
- Lack of product testing
- Improper classification
- Overloads/Overfilled
- Shortage of tank cars to meet the need

Petroleum Crude Oil

§172.101 Hazmat Table

Proper Shipping Name	Class	ID No.	Packing Group	Special Provisions	Packaging (§173.***)		
					Exception	NB	Bulk
Petroleum Crude Oil	3	UN1267	I	**144, 357, T11, TP1, TP8**	**150**	201	**243**
Petroleum Crude Oil	3	UN1267	II	**144, 357, IB2, T4, TP1, TP8**	**150**	203	**242**
Petroleum Crude Oil	3	UN1267	III	**144, 357, B1, IB3, T2, TP1**	**150**	203	**242**

Residue in underground storage tank requirement

Marking requirement on bulk pkg of Crude Oil emitting **Hydrogen sulfide vapors** - *§172.327*

If the material has a flash point at or above 38ºC (**100ºF**) & below 93ºC (**200ºF**), then the bulk requirements of **§173.241** of this subchapter are applicable. If the material has a flash point of **< 38ºC** (**100ºF**), then the bulk packaging requirements of **§173.242** of this subchapter are applicable.

(f) Authorizes classifying the material as a **Combustible liquid** in bulk pkgs

(a) **Rail cars**: Class DOT 103, 104, 105, 109, 111, 112, 114, 115 or 120 tank car tanks; Class 106 or 110 multi-unit tank car tanks & AAR Class 206W tank car tanks.

(a) **Rail cars**: Class DOT 103, 104, 105, 109, 111, 112, 114, 115 or 120 fusion-welded tank car tanks; & Class 106 or 110 multi-unit tank car tanks

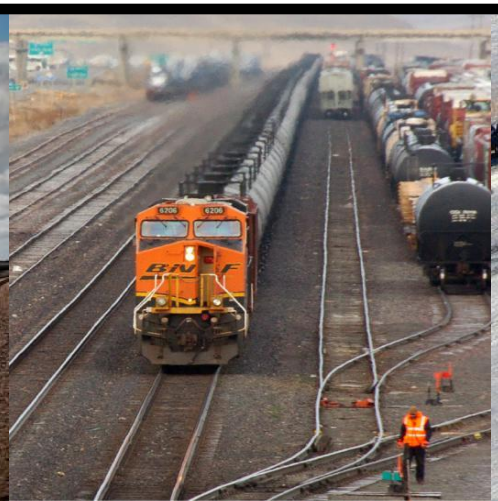
Petroleum Crude Oil

§173.241 – Bulk packagings for certain low hazard liquid & solid materials.

***(a)* Rail cars: Class DOT 103, 104, 105, 109, 111, 112, 114, 115 or 120 tank car tanks; Class 106 or 110 multi-unit tank car tanks & AAR 203W, 206W, and 211 W tank car tanks.**

§173.121(a)

Packing Group	Flash Point *(Closed-cup)*	Initial Boiling Point
I	-	≤ 35ºC (95ºF)
II	< 23ºC (73ºF)	> 35ºC (95ºF)
III	≥ 23ºC, ≤ 60ºC (≥ 73ºF, ≤ 140ºF)	> 35ºC (95ºF)



Concerns…

- Train…
  - Derailments
  - Securement
  - Handling
  - Emergency Response
- Proper Material Classification
- Appropriate Packaging

NTSB Recommendations to FRA

- Require expanded hazardous materials route planning for railroads to avoid populated and other sensitive areas. (Already required for Explosives, PIH, RAM)
- Develop an audit program to ensure rail carriers that carry petroleum products have adequate response capabilities to address worst-case discharges of the entire quantity of product carried on a train.
- Audit shippers and rail carriers to ensure that they are properly classifying hazardous materials in transportation and that they have adequate safety and security plans in place.

PHMSA Alert

The Pipeline and Hazardous Materials Safety Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
www.phmsa.dot.gov

Safety Alert -- January 2, 2014

Preliminary Guidance from OPERATION CLASSIFICATION

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is issuing this safety alert to notify the general public, emergency responders and shippers and carriers that recent derailments and resulting fires indicate that the type of crude oil being transported from the Bakken region may be more flammable than traditional heavy crude oil.

Based upon preliminary inspections conducted after recent rail derailments in North Dakota, Alabama and Lac-Megantic, Quebec involving Bakken crude oil, PHMSA is reinforcing the requirement to properly test, characterize, classify, and where appropriate sufficiently degasify hazardous materials prior to and during transportation. This advisory is a follow-up to the PHMSA and Federal Railroad Administration (FRA) joint safety advisory published November 20, 2013 [78 FR 69745]. As stated in the November Safety Advisory, it is imperative that offerors properly classify and describe hazardous materials being offered for transportation. 49 CFR 173.22. As part of this process, offerors must ensure that all potential hazards of the materials are properly characterized.

Misclassification

Associated Press
Feds: Oil from Dakota fields improperly classified
By Joan Lowy, Matt Brown
February 4

WASHINGTON — Government investigators have found crude oil being transported from North Dakota's Bakken region was misclassified in samples taken from 11 out of 18 truck shipments en route to rail loading stations, federal transportation officials said Tuesday.

$93,000.00 proposed penalties

EO-28

Establishes six requirements to eliminate the immediate hazard of death, personal injury, or significant harm to the environment, related to the securement of certain unattended equipment

EO-28 Appendix A Materials

- Five or more tank car loads of any one or any combination of materials poisonous by inhalation as defined in 49 CFR 171.8, and including anhydrous ammonia (UN 1005) and ammonia solutions (UN 3318); or
- 20 rail car loads or intermodal portable tank loads of any one or any combination of materials listed in (1) above, or, any Division 2.1 flammable gas, Class 3 flammable liquid or combustible liquid, Class 1.1 or 1.2 explosive, or hazardous substance listed in 49 CFR 173.31(f)(2).

EO-28 Requirements for Rail Carriers

1. Develop Securement Plan for leaving unattended trains outside yards and terminals
2. Develop a process for securing trains outside yard and terminals
    a) Locomotive cab and reverser
    b) Dispatcher communication
3. Review and update existing procedures for number of handbrakes
4. Implement operating rules requiring the discussion of securement of any train or vehicle
5. Inspection by qualified employee of any equipment that emergency responders have been on
6. All affected employees must receive notice of EO-28

ANPRM HM-251 P-1577
September 2013

New Car Construction

- PG I & II 286,000 GRL
- Shell Thickness TC 128B
  - 1/2” non jacketed
  - 7/16” jacketed
- Shell Thickness A516-70
  - 9/16” non jacketed
  - ½” jacketed
- ½” half head shields
- Heads and shells must be normalized steel
- Roll-over protection top fittings
- Reclosing PRD

Additional Considerations

- Thermal Protection
- Roll-over protection top and bottom fittings
- Improve hinged and bolted manways to address common leakage during accidents and NAR’s
- Bottom outlet elimination
- Increase outage from 1% - 2% to improve puncture resistance
- Train speed restrictions
- Electronically controlled Pneumatic Brakes (ECP)
- Emergency Response Planning

Railroad Initiative Feb 21, 2014

- 3/25 - Increased Track Inspections. One additional inspection than current FRA requirements
- 4/01 – Braking Systems. Add DPU or two-way telemetry EOT. Provides for more expedient emergency braking
- 7/01 – Use of Rail Traffic Routing Technology to determine safest and most secure rail routes
- 7/01 – Lower speeds with 20 or more and one older DOT 111 car to 40 mph in HTUA's and operate at 50 mph outside of HTUA's
- Continue Community Relations
- 7/01 - Increased Trackside Technology (every 40 miles)
- 7/01 – Increased ER Training and Tuition Assistance. 1500 first responders in 2014
- 7/01 – Develop an inventory of E/R resources for responding to the release of large amounts of crude oil. Provide DOT with information and upon request to appropriate emergency responders

UNITED STATES DEPARTMENT OF TRANSPORTATION

Petroleum Crude Oil Offerors)
&
Petroleum Crude Oil Rail Carriers) Docket No. DOT-OST-2014-0025

AMENDED AND RESTATED EMERGENCY RESTRICTION/PROHIBITION ORDER

February 25, 2014

By this Amended Order, DOT is:

- requiring persons who offer bulk quantities of petroleum crude oil for transportation in commerce by rail in rail tank cars to ensure that the material is properly tested (conducted with sufficient frequency and quality) and classed in accordance with this Amended Order and the HMR;

- requiring persons who offer bulk quantities of petroleum crude oil for transportation in commerce by rail in rail tank cars to treat Class 3 petroleum crude oil as a Packing Group (PG) I or PG II hazardous material only; and

- prohibiting persons who ordinarily offer petroleum crude oil for shipment as UN 1267, petroleum crude oil, Class 3, PG I, II, or III from reclassifying such crude oil with the intent to circumvent the requirements of this Amended Order.

Next Steps

- Implement NTSB Recommendations
- NPRM HM-251
- National Safety Program Plan
  - Verifying Railroad implementation of EO-28
  - Inspect unit trains for proper valve securement and classification of material
- Auditing process of RR ER Plans

Thank you!