



U.S. Ethanol Growth

Kristy Moore
FRA Hazmat Seminar
Billings, MT
September 2013

About the Renewable Fuels Association (RFA)

- Trade association representing U.S. ethanol producers.
- Mission is to “Drive expanded production and use of American-made renewable fuels and bio-products worldwide”.
- Founded in 1981.
- Offices in Washington D.C., St. Louis (MO), and Omaha (NE).
- Member producers include large agribusinesses as well as small farmer-owned co-ops.
- Associate members include vendors, suppliers, supporters, etc.



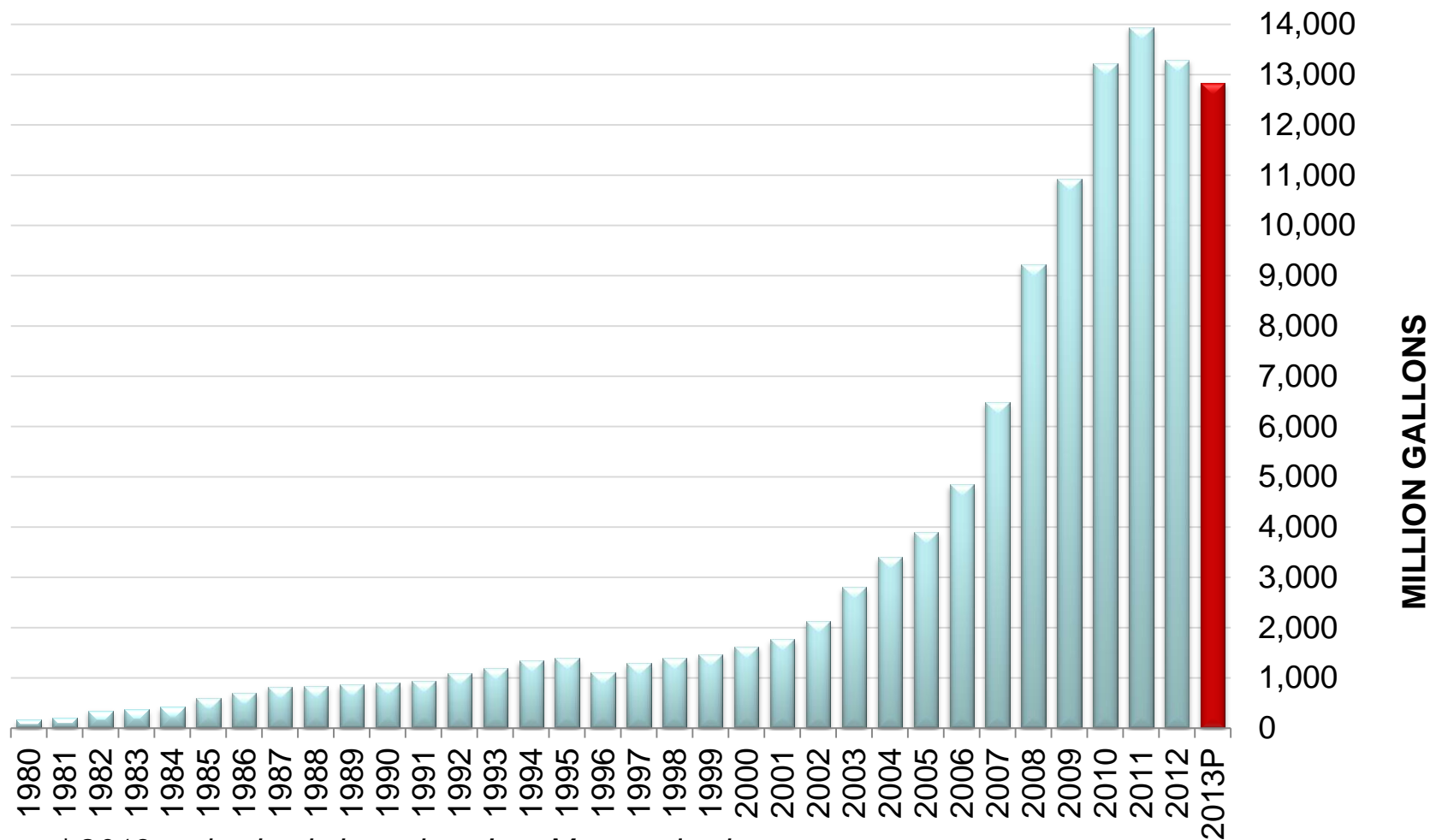
Ethanol Industry Trends

- Ethanol Production returning.
- Co-Products increasing value.
- Transportation.
- RFA Safety Resources.

U.S. Ethanol Industry

- Total production capacity of 14.7BGY.
 - 2011 Production: 13.9BGY
 - 2012 Production: 13.2BGY
 - Current capacity utilization: ~13.31BGY
- 211 plants in 26 states.
- Plants under construction and/or expansion, including next generation.

Annual U.S. Ethanol Production

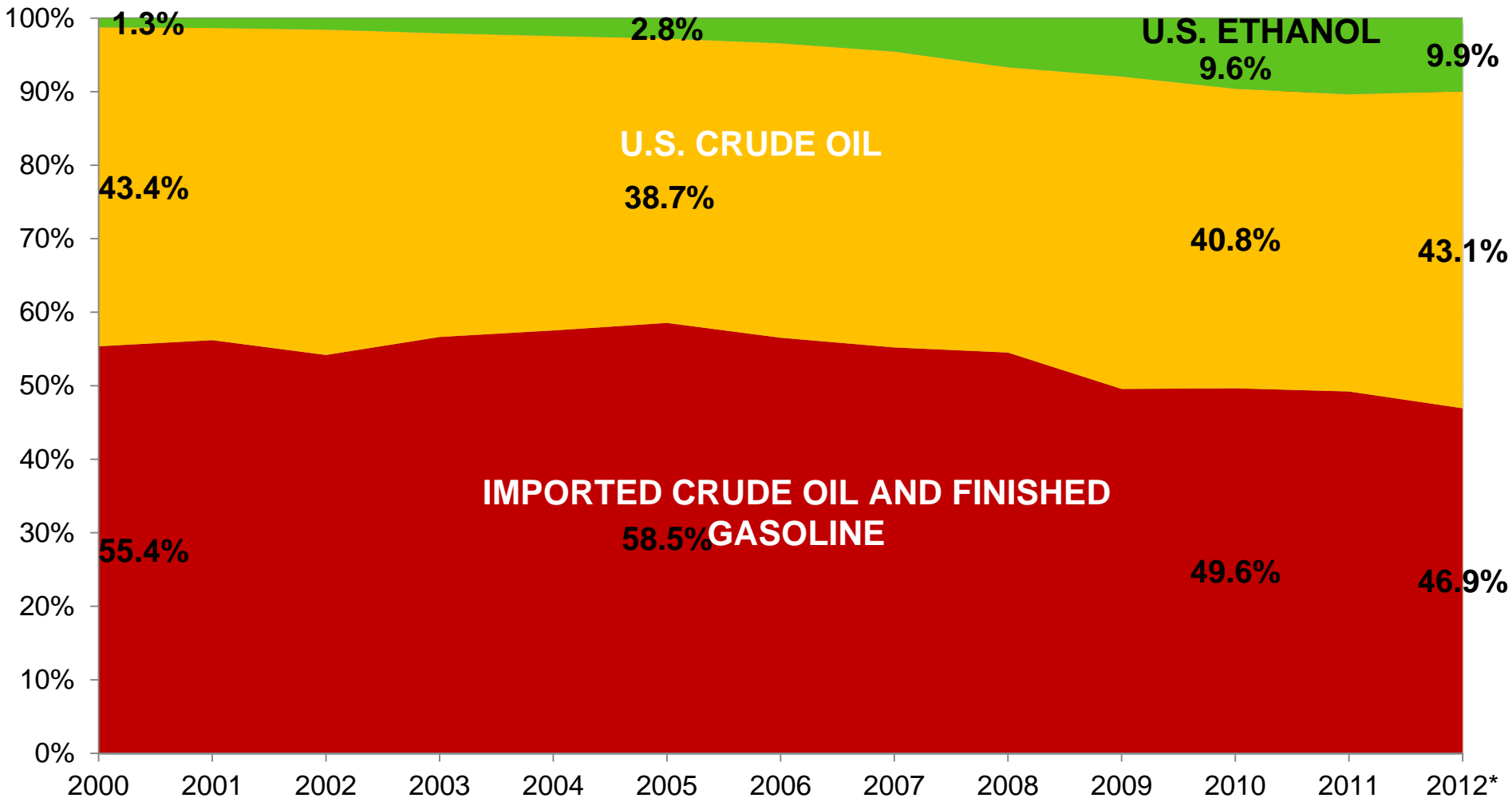


* 2013 projection is based on Jan.-May production

Source: DOE/EIA

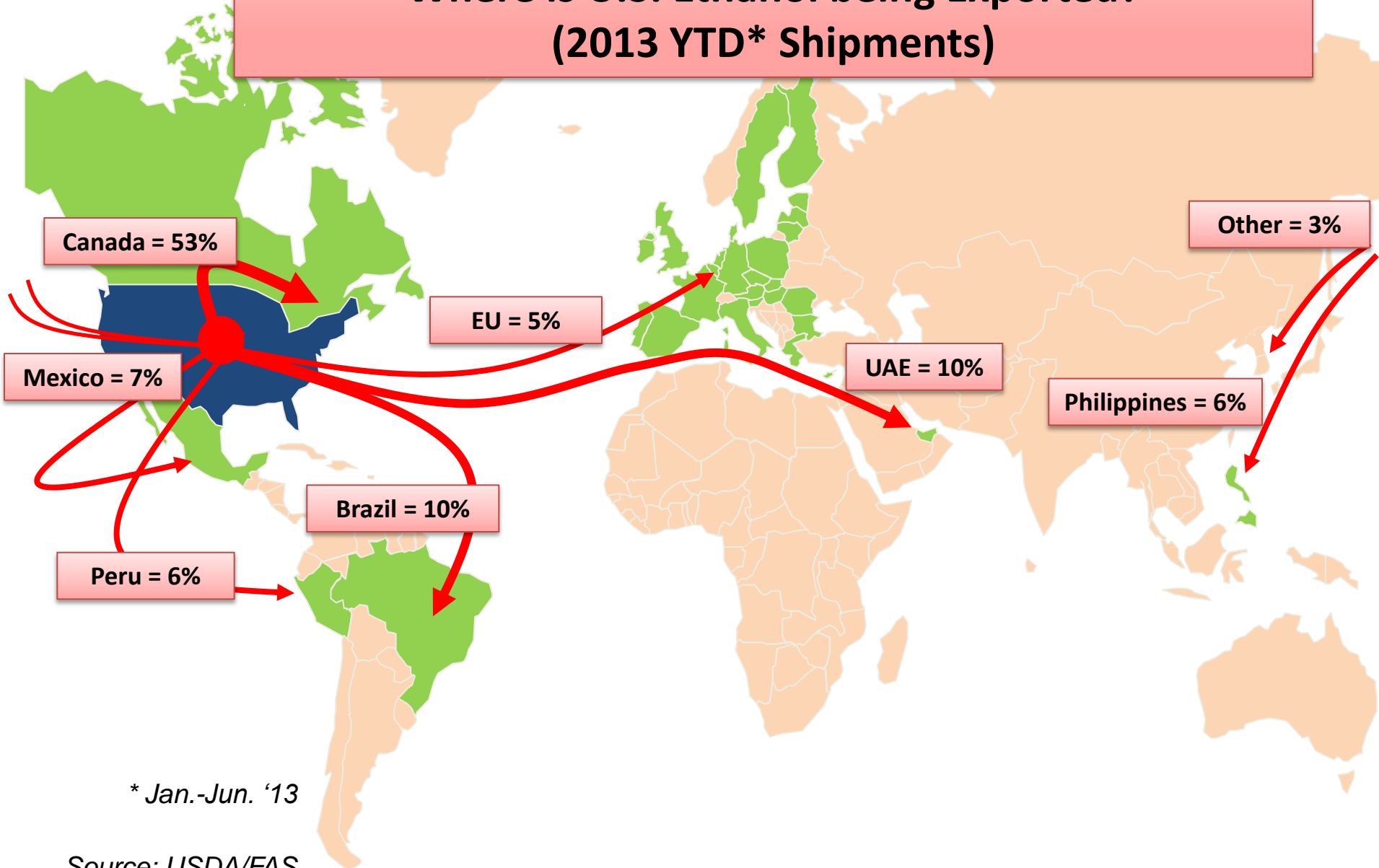
U.S. Ethanol Makes Up 10% of the Gasoline Supply Today

SOURCES OF U.S. GASOLINE SUPPLY (BY VOLUME), 2000-2012



Source: ENERGY INFORMATION ADMINISTRATION
*2012 is estimated

Where is U.S. Ethanol being Exported? (2013 YTD* Shipments)



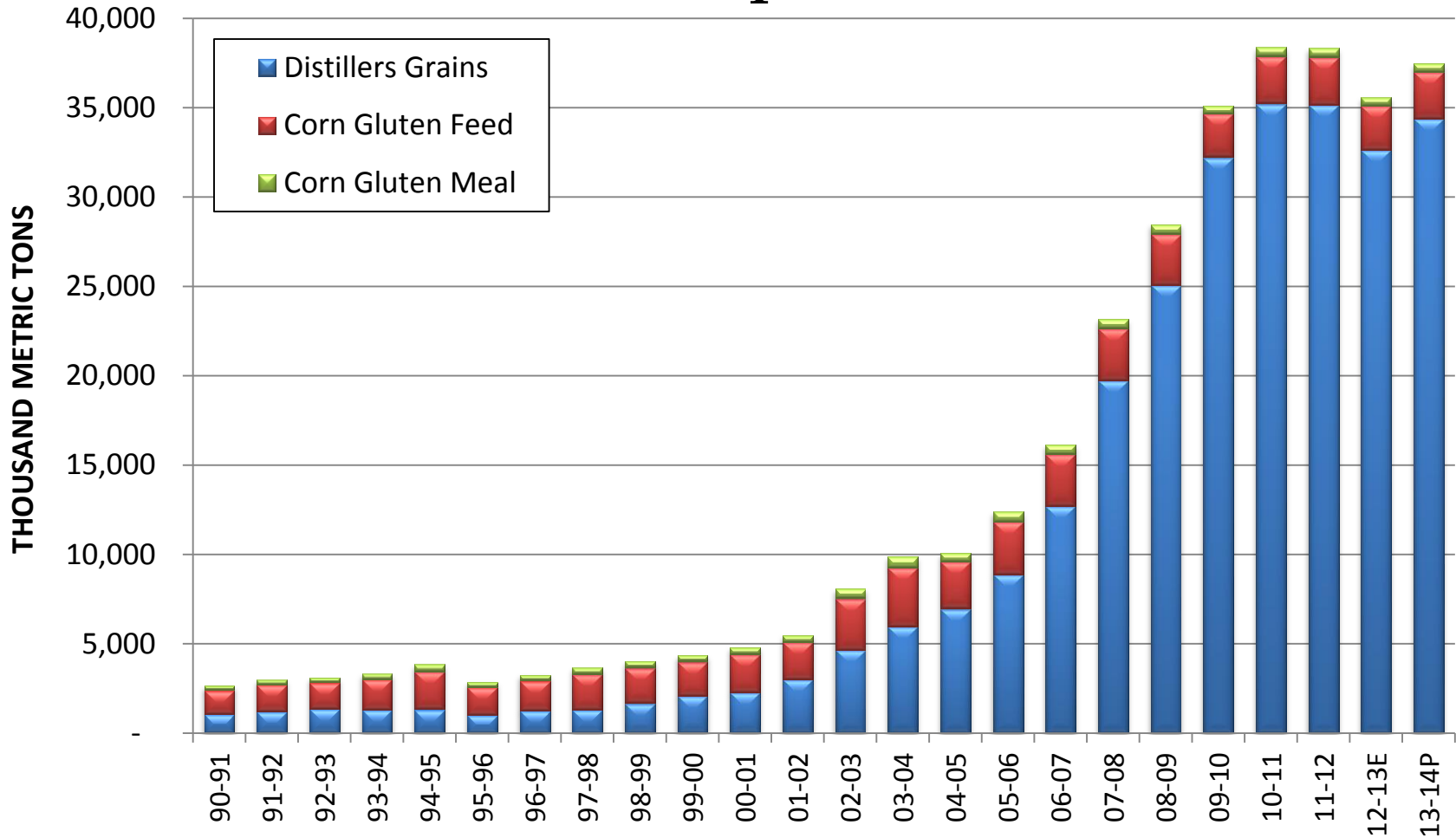
* Jan.-Jun. '13

Source: USDA/FAS

Biorefineries Diversifying

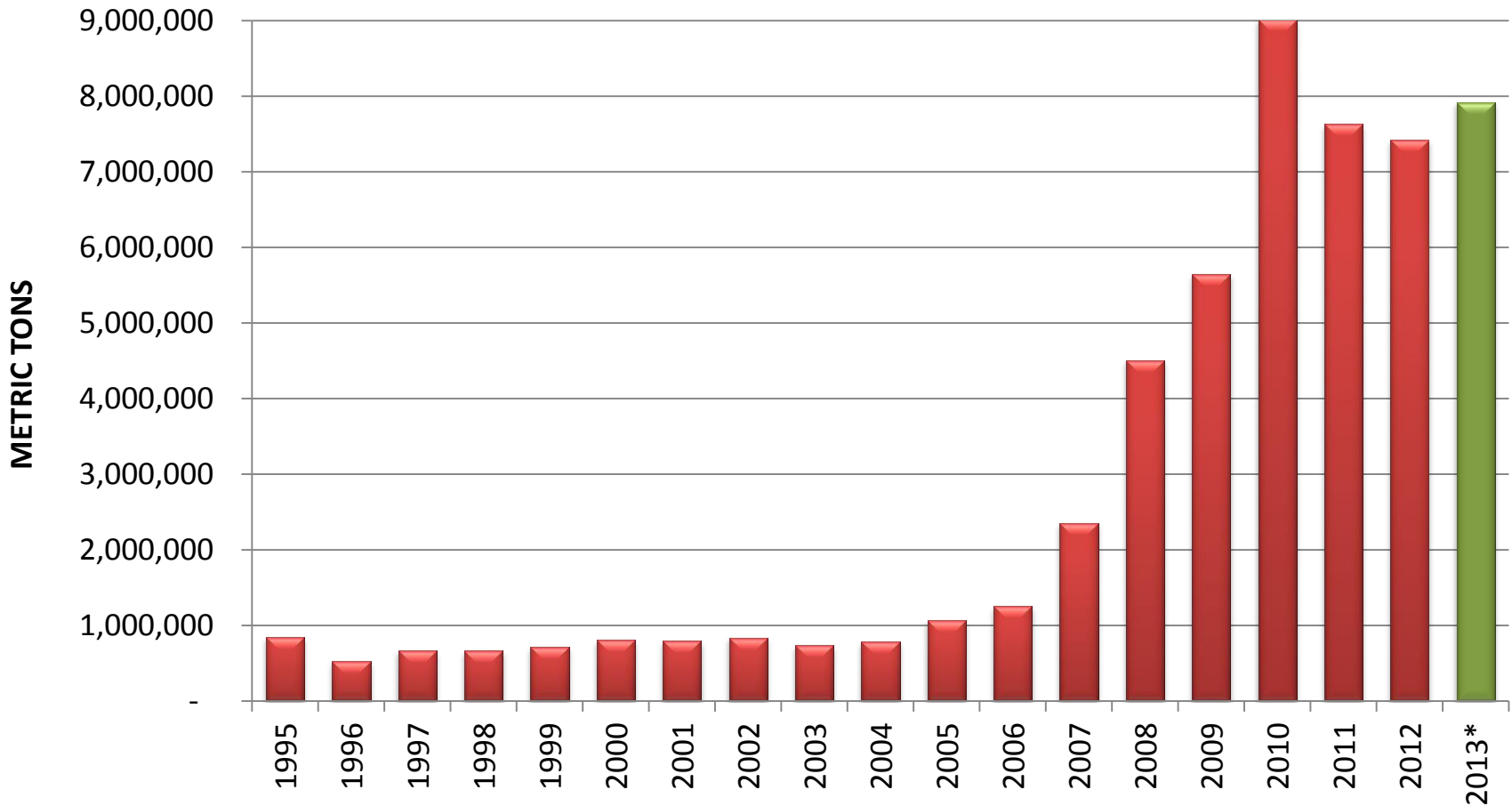
- Co-product volume increasing.
- Trend of feeding operations locating near DDGS availability.
- High quality Distiller's Corn Oil volume ever increasing.
- International shipments of DDGS important for feeding operations.

Annual U.S. Ethanol Feed Co-Product Output



Source: USDA/OCE

Annual U.S. Distillers Grains Exports



**Projected*

Source: USDA/FAS

U.S. Ethanol Production Drivers

- Fuel Performance
 - Ethanol a primary Octane booster
 - Allows blending with sub-octane gasoline
 - Blending octane of 112.5 at 10%
- Environmental Goals
 - Clean Air Act Amendments 1990
 - RFG & Oxy Fuel Program
- Energy Security
 - Clean Air Act
 - Energy Policy Act 2005, Renewable Fuels Standard
 - 20 in 10 Presidential Initiative
 - Energy Independence and Security Act of 2007

U.S. Energy Independence and Security Act of 2007

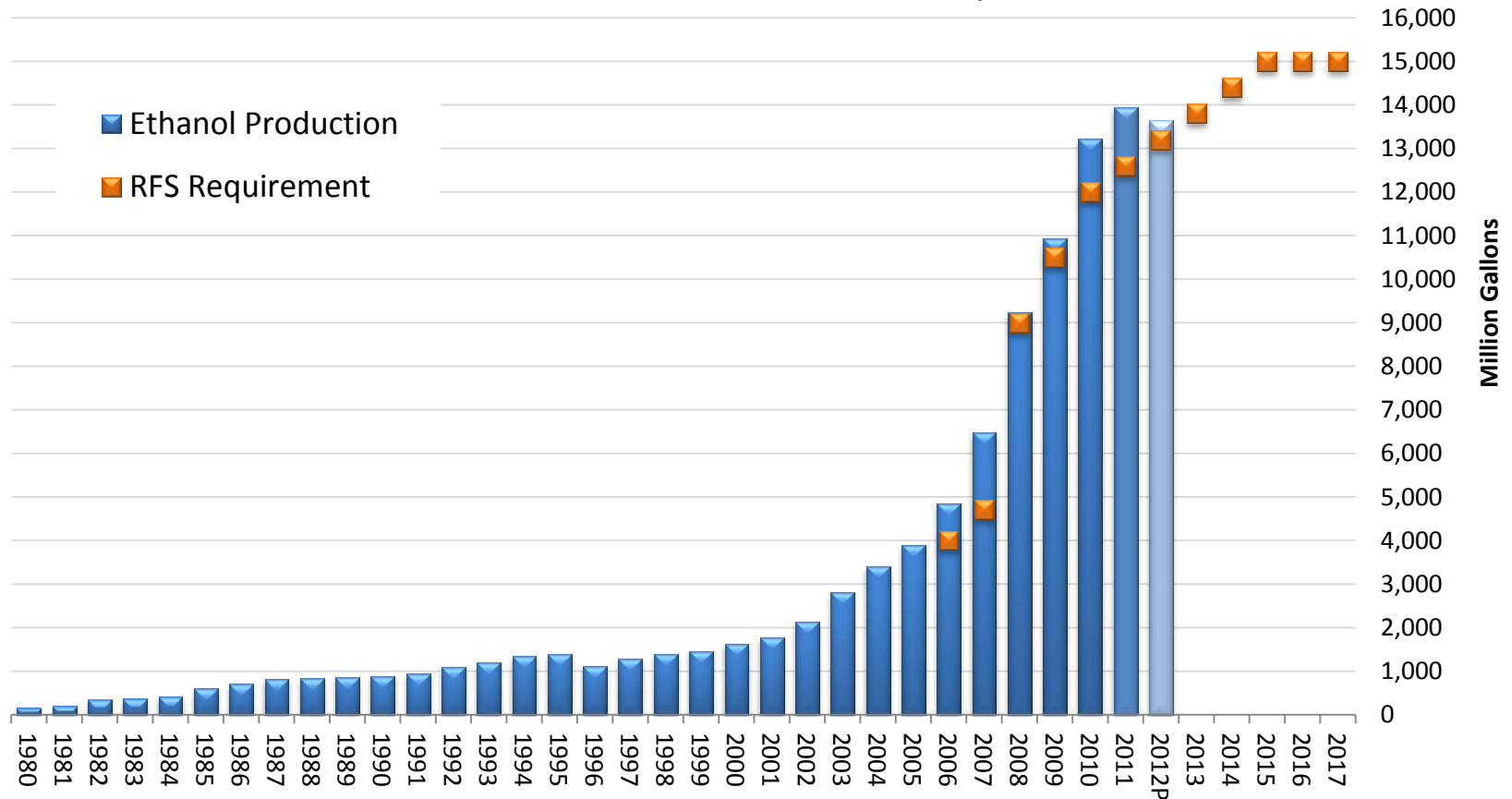
- Regulations effective July 1, 2010, implemented as Renewable Fuels Standard.
- Rule establishes volume and GHG reduction requirements for specific categories of biofuels.

Category	GHG Reduction Req.	2022 Volume Req.
Conventional Biofuels	20%	15 bgy
Advanced Biofuels		21 bgy
Cellulosic	60%	16 bgy
Biomass-based diesel	50%	1 bgy
“Undifferentiated”	50%	4 bgy

- EPA includes indirect land use change emissions in determining GHG reductions.

Historical Ethanol Production and RFS Requirements

Annual U.S. Ethanol Production and RFS Requirements



Source: RFA and EIA

Fuel Ethanol Transportation

- Rail Transportation
 - DOT 111A 30k gallon capacity
- Truck Transportation
 - MC306/ DOT406 Transport Trucks
- Barge Transportation
 - Mississippi, Ohio, Missouri, Illinois, Columbia
 - 10k, 15k barrel inland capacity, Intercoastal barges
- Pipeline interest continues
 - Central Florida Pipeline (Tampa to Orlando), Brazil pipelines.
 - Matter of understanding “how” to move ethanol via pipeline.

Railroad Statistics for Hazmat

- About 1.7 million loads of Hazmat shipped via rail (2011)
 - 99.99% delivered with out accident
 - Overall train safety at 10 year best
- Ethanol is 26% of total number of hazmat shipments
 - Up from 20% in 2009
- Ethanol is 1.1% of all railroad shipments
 - Up from 0.7% in 2009
- 8 unit trains/day of ethanol
 - 9 unit trains/day of petroleum products

Ethanol Rail Impacts

- Continued growth of ethanol via rail transport.
- Continued growth of DDGs, Distillers Corn Oil via rail transport.
- Development of unit train capacity, both origin and destination.




Ethanol Plant Needs: 100 Million Gal./ Year Plant Example

- Logistics needs per year
 - 3448 railcars of Fuel Ethanol: 10 tank cars per day.
 - 9867 railcars of Corn
60% by Rail: 17 railcars per day.
 - 3048 railcars of DDGs: 9 hopper cars per day.



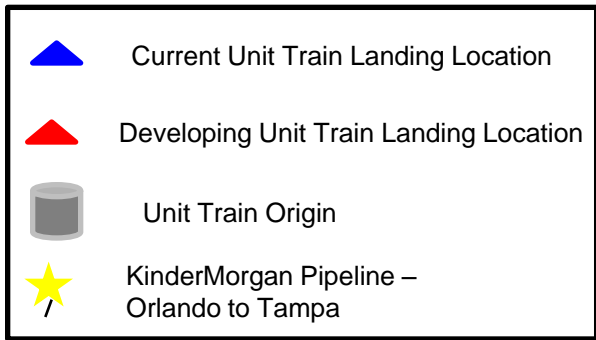
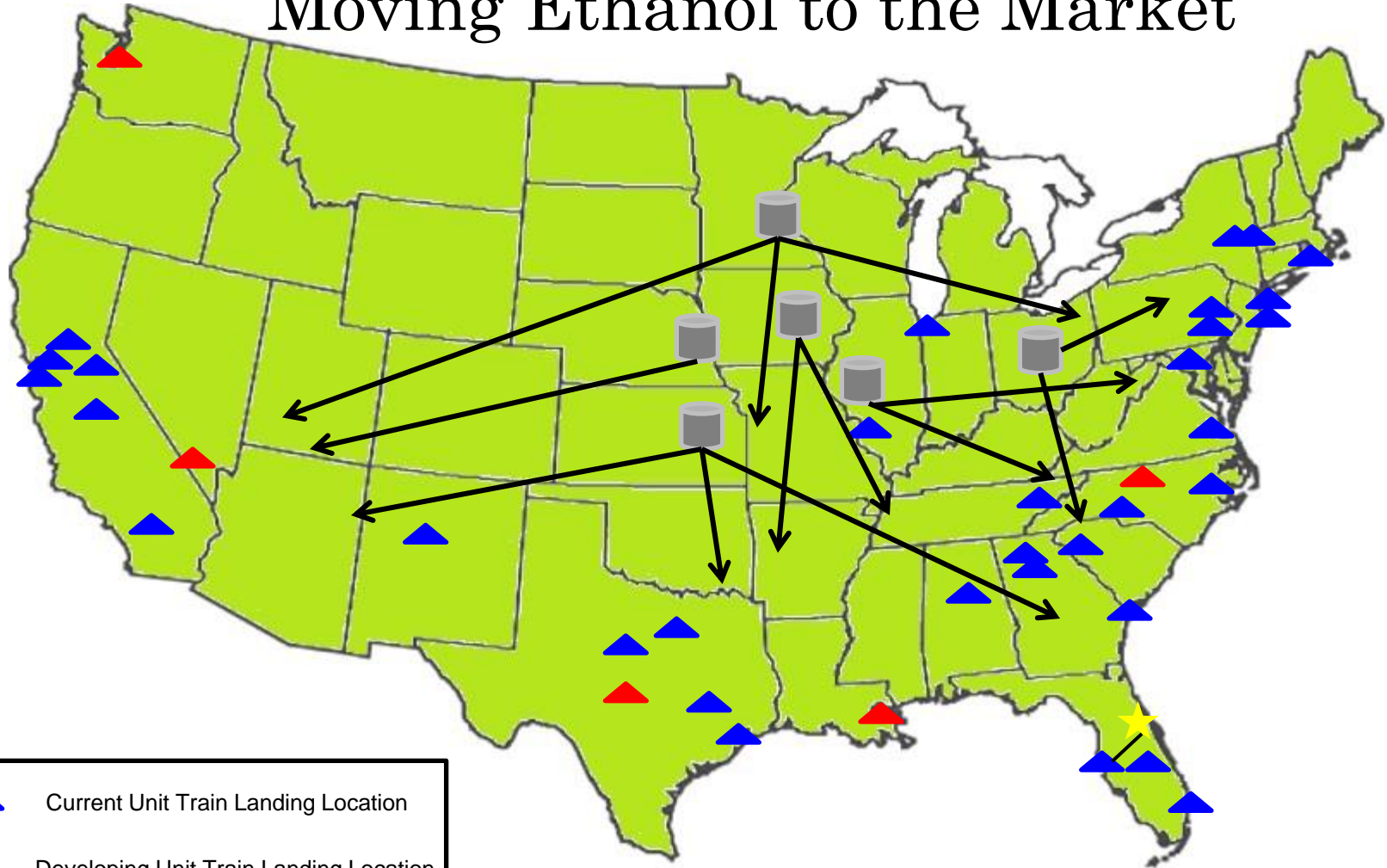
U.S. Unit Train Landing Locations



-  Current Unit Train Landing Location
-  Developing Unit Train Landing Location
-  KinderMorgan Pipeline – Orlando to Tampa

Source: Renewable Fuels Association (RFA) April 2013

Moving Ethanol to the Market



Source: Renewable Fuels Association (RFA) April 2013

RFA Safety Resources

- RFA Plant and Employee Safety Committee
- Ethanol Emergency Response Coalition
- TRANSCAER
- Industry Partnerships



<http://www.ethanolrfa.org/pages/industry-resources-safety>

FRA/ RFA Manway Safety Efforts

- Guidelines for Hinged and Bolted Manway Assembly.
 - Procedures and standards outlined- best practices.
 - Poster, resources under development for operators.
 - Special thanks to Watco, VSP, Salco.

How to Properly Close a Tank Car Manway

Follow these steps to ensure leak-free performance of a hinged & bolted manway

It is the shipper's responsibility to ensure that no ethanol is leaking from a tank car manway before it is shipped.

Eliminating leaks around a hinged & bolted manway protects against the risks to life, property, & the environment.

By following these steps, an operator can achieve a consistent, high-level, process of assembling a hinged & bolted manway.

Hinged & Bolted Manway Nomenclature Illustration

The key to eliminating NAR's around a hinged & bolted manway requires a high-level process of assembly to ensure leak-free performance over a broad range of temperatures & pressures.

Common elements to consider when assembling a hinged & bolted manway include:

- Gasket-contact surface finish without unacceptable imperfections
- Suitable gasket
- Maintaining sufficient contact pressure on the manway cover, manway nozzle, & gasket surfaces (i.e., gasket stress)
- Condition of the eyebolt
- Maintaining sufficient contact pressure must consider the maximum & minimum temperature range & the internal pressure the joint may experience in service
- Bolt stretch, or relaxation, or gasket relaxation, or flow may result because of changes in temperature & pressure
- Mechanical failure of an eyebolt may result from corrosion, fatigue, galling, self-loosening, stress corrosion cracking, & wear

- #### 1. Inspect the Manway Area

 - Examine the bolted manway cover for imperfections, bent & broken legs, damaged manway gasket grooves, & dimensional residue on the gasket & sealing surface.
 - Inspect the manway nozzle for imperfections.
- #### 2. Clean, Examine, & Install New Gaskets

 - Clean as necessary to observe imperfections.
 - Replace gaskets that have indications of abrasion, cuts, tears, or other damage that may affect the fluid sealing capability.
 - When there is a need to replace a gasket, remove the gasket from the manway cover and inspect the gasket-contact sealing surface on the cover.
 - Replace with gasket suitable for service.
- #### 3. Inspect & Lubricate the Eyebolts

 - Examine eyebolt threads and hinge pins.
 - Examine each nut to ensure same design. Replace nuts that are broken, cracked, missing or rounded.
 - Use a proper lubricant on the eyebolts, safety eyebolts, & bearing surface of the nuts. Ensure the lubricant is compatible with the product.
- #### 4. Identify Eyebolt Number & Tightening Sequence

 - Reconfirm the numbering of the eyebolts beginning with the safety eyebolt near the right side of the lifting handle.
 - Follow the numbered sequence in a star pattern when tightening each eyebolt on to the manway.
 - Select a proper tool with appropriate torque setting.
- #### 5. Preferred Torque Sequence and Value

Requirement	VSP/CHELTIGHTS		SALCO Nucleo- or Hard Guard		Eaton/Conquest	
	6 Bolt	8 Bolt	6 Bolt	8 Bolt	6 Bolt	8 Bolt
String Torq (low)	String	String	String	String	String	String
1st Pass (low Pressure)	70 ft-lbs	70 ft-lbs	60 ft-lbs	60 ft-lbs	60 ft-lbs	70 ft-lbs
2nd Pass (low Pressure)	150 ft-lbs	150 ft-lbs	80 ft-lbs	80 ft-lbs	80 ft-lbs	100 ft-lbs
3rd Pass (low Pressure)	250 ft-lbs	250 ft-lbs	110 ft-lbs	110 ft-lbs	90 ft-lbs	110 ft-lbs
4th Pass (Cheater Bar)	300 ft-lbs	300 ft-lbs	110 ft-lbs	110 ft-lbs	90 ft-lbs	110 ft-lbs

 - ALWAYS use approved fastener lubrication on threads and nut bearing surface.
 - ALWAYS start with the #1 bolt.
 - DO NOT use a PIPE WRENCH, this will induce torque, resulting in a leak.
 - DO NOT use a CHEATER BAR, this will over torque, bend the manway cover nut, result in a leak.

Download the entire 'Guidelines for Hinged & Bolted Manway Assembly' at: www.ethanol-fra.org/manway-guidelines

This information, material herein, though believed to be accurate at the time of publication, should not be construed as legal advice or as a guarantee for a particular result. The authors do not accept any liability or responsibility for the accuracy, completeness, or applicability of the information presented in this document.

www.ethanol-fra.org | Copyright © 2012 Renewable Fuels Association. All Rights Reserved. | www.ethanol-fra.org

RFA's Safety Committee Efforts



Fuel Ethanol:

Guideline for Release Prevention & Impact Mitigation

March 2013

Published By: Renewable Fuels Association

Authored By: Pinnacle Engineering, Inc.

This document was prepared by Pinnacle Engineering Inc for the Renewable Fuels Association (RFA). The information, though believed to be accurate at the time of publication, should not be considered as legal advice or as a substitute for developing specific company operating guidelines. Pinnacle Engineering Inc and the RFA do not make any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or applicability of the information presented in this document.

- Rail Transport Best Practices
- Rail safety specific information.
- Ethanol Shipping Name Bulletin.
- Facility Compliance Guides.
- Guidelines for Release Prevention.

Recognizing Fuel Ethanol on the move....

Ethanol Concentration	Preferred Proper Shipping Name
E1 to E10	Gasohol, UN 1203 or Gasoline, UN 1203
E 11 to E 94	Ethanol and Gasoline mixture, UN 3475
E 95 to E99	Denatured Alcohol, NA 1987 or Alcohols n.o.s., UN 1987
E 100	Ethanol, UN 1170 or Ethyl Alcohol, UN 1170

RFA Safety Committee Efforts



Coming new from OSHA:

- Safety Data Sheets: previously known as Materials Safety Data Sheets (MSDS)
- RFA providing technical support for SDS content.
- Implementing new OSHA Haz Comm standard:

<http://www.osha.gov/dsg/hazcom/index.html>



- Public and Private Industry coming together to provide much needed emergency response information.
- Founding Members: RFA, ILTA, IAFC, Ansul, Williams Fire and Hazard Control, Industrial Fire World
- Ethanol Emergency Response information available: www.ethanolresponse.com



- Ethanol Emergency Response
 - Update of the 2007 materials including the addition of new supplemental emergency response information.
 - Will now be part of the TRANSCAER National Training Tour.
 - The classroom portion will be filmed and available on the DVD and online. We are going viral!
 - Expecting ~40,000 of the Training Guide Package to be distributed, donations from NS and CP.
 - Updated version should be available in 2014.

Ethanol Safety
Program
includes:

PowerPoints,
Instructor/
Participant
Manuals,
Videos, DOT
resources and
more.



May 14, 2007
Baltimore, Maryland

RFA Partners

- TRANSCAER
 - EERC
 - IAFC
 - DOT FRA
- Industry partners:
 - BNSF
 - NS
 - CP
 - CN
 - Watco
 - VSP
 - Salco

Thank You!



425 Third Street SW, Suite 1150 Washington, DC 20024

P: 202.289.3835 | www.EthanolRFA.org | F: 202.289.7519