

# **BNSF Railway – Hazardous Material Transportation**

**4/15/15**

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BNSF Railway

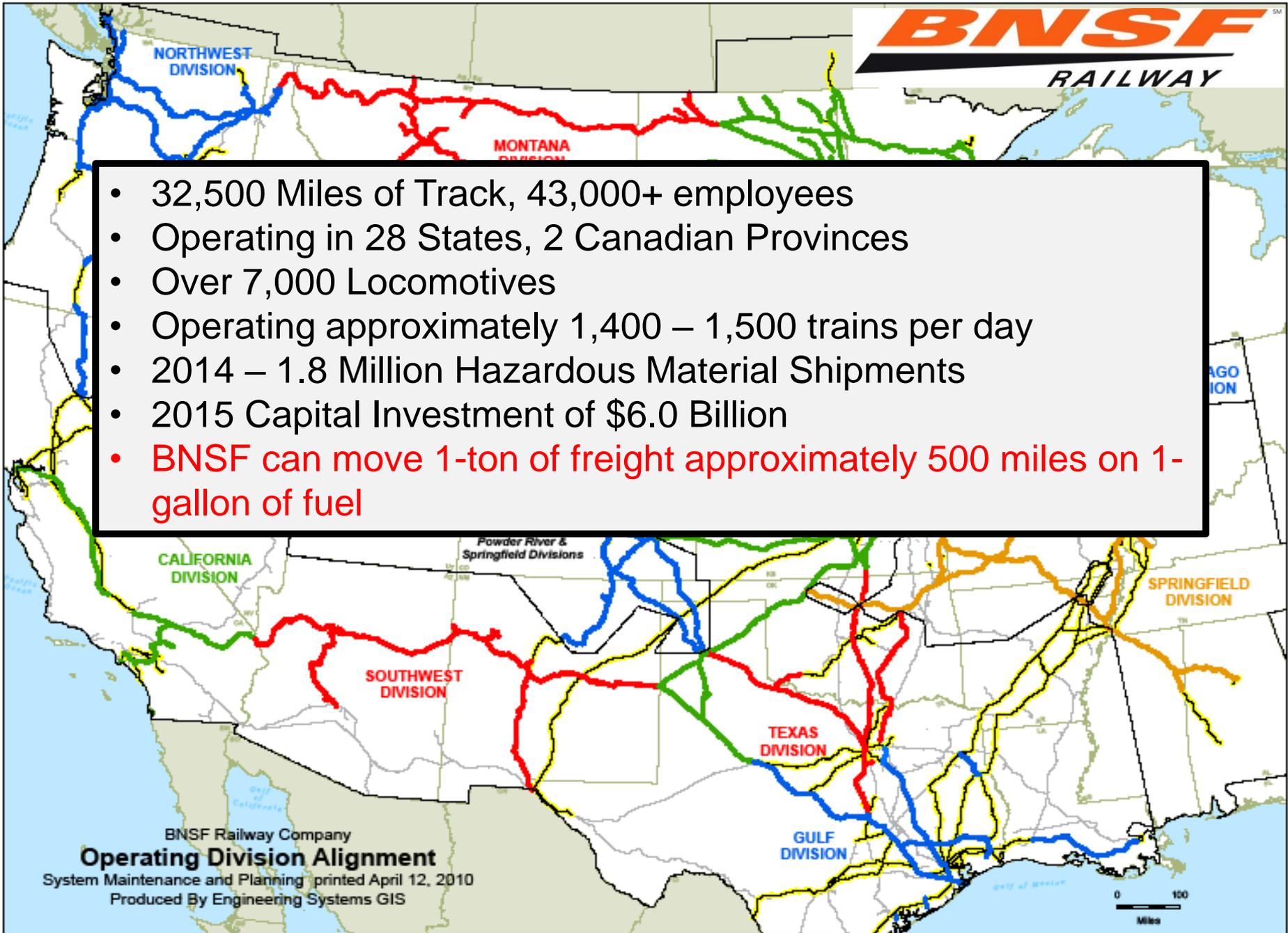


# Agenda

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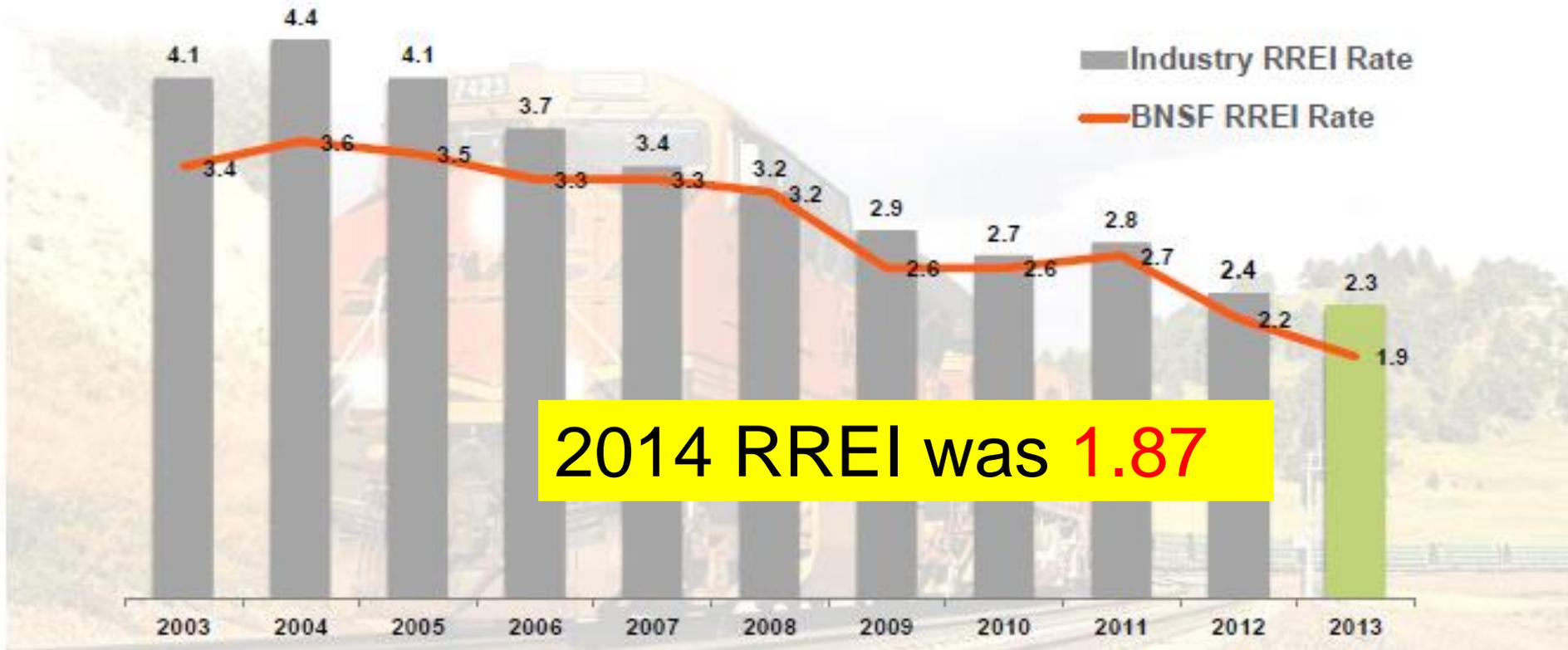
1. BNSF Railway – Our System
2. Hazardous Material Transportation
3. Emergency Planning/Preparedness
4. Accident Prevention
5. Emergency Response

- 32,500 Miles of Track, 43,000+ employees
- Operating in 28 States, 2 Canadian Provinces
- Over 7,000 Locomotives
- Operating approximately 1,400 – 1,500 trains per day
- 2014 – 1.8 Million Hazardous Material Shipments
- 2015 Capital Investment of \$6.0 Billion
- **BNSF can move 1-ton of freight approximately 500 miles on 1-gallon of fuel**

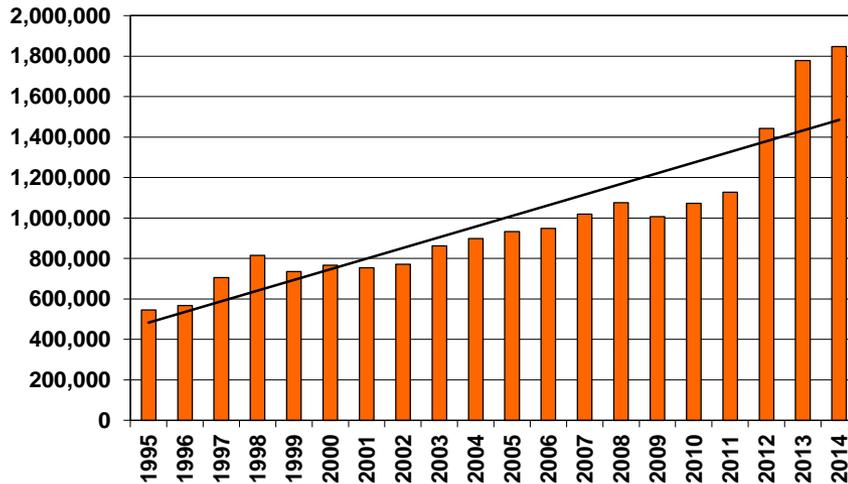


# BNSF: Safety Leader for Continuous Risk Reduction

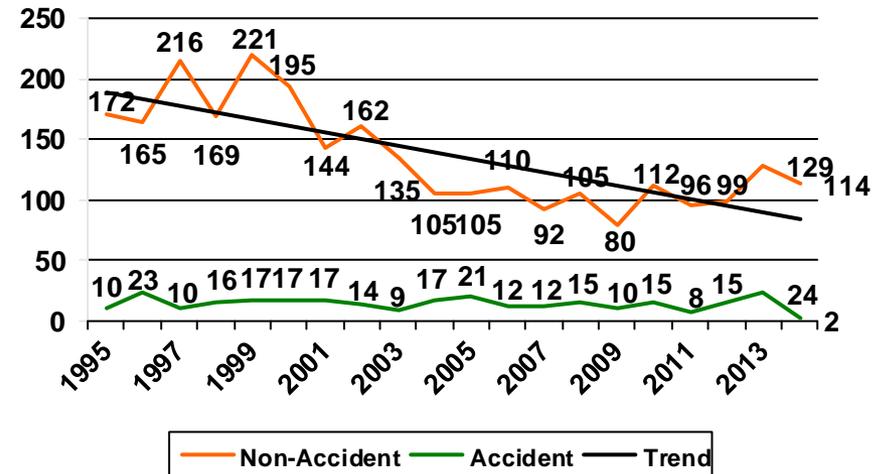
BNSF vs. Industry Reportable Rail Equipment Incident Rate (*Incidents per Million Train Miles*)



# BNSF Hazardous Material Stats



BNSF Number of Hazmat Shipments



BNSF Total Hazmat Releases

- BNSF is now the largest transporter of HAZMAT in North America
- 99.9999% of BNSF shipments of hazardous materials reached their destination without a release caused by a train accident

# Hazmat Release Analysis

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<b>HAZMAT TRENDS</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Accident Release (AR) Yearly Totals</b>	10	15	8	15	24	2
<b>Number of Derailments with an AR</b>	7	9	5	4	6	2
<b>AR per 100 K Hazmat Shipments</b>	0.99	1.40	0.71	1.04	1.35	0.11
<b>Non Accident Release (NAR) Yearly Totals</b>	80	112	96	99	129	114
<b>NAR per 100K Hazmat Shipments</b>	7.9	10.4	8.5	6.9	7.3	6.2

# Hazardous Materials

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*For US Railroads Hazardous Materials Account for:*

5% of total U.S. freight rail carloads

5% of tonnage

6% of ton-miles

68% of rail hazmat travels in tank cars

28% on intermodal flat cars, and the remainder in covered hoppers, gondolas, and other car types

The most potentially hazardous materials, termed toxic inhalation hazards (TIH) are nearly all transported in tank cars. TIH materials constitutes only about 0.3 % of all rail carloads.

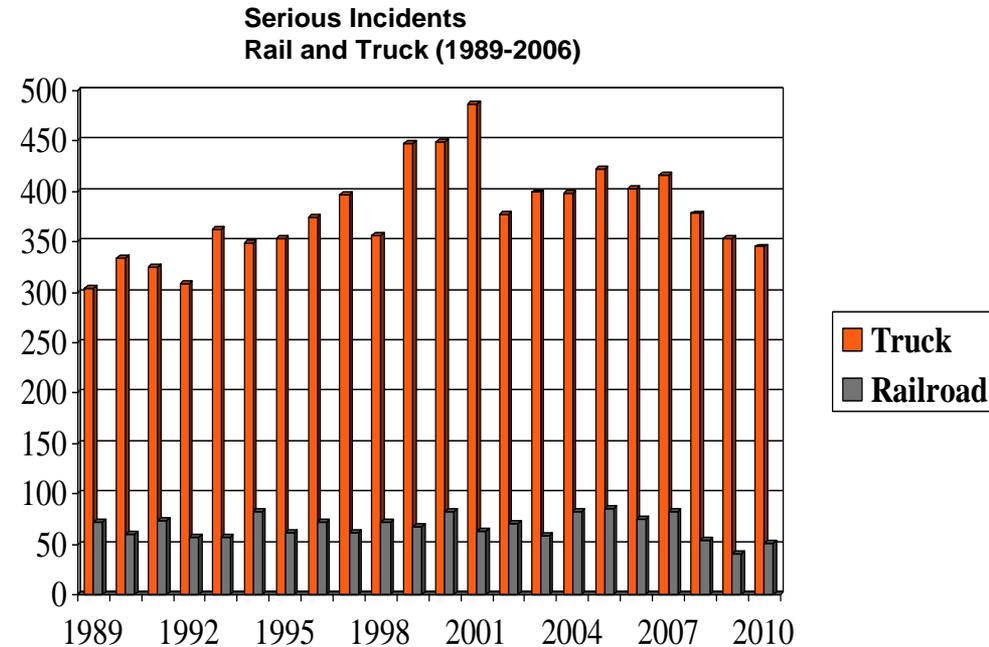
# Hazardous Materials Transport

*As common carriers, railroads are required under federal law to move hazardous materials*

Virtually all are shipped without an accident release (99.997%)

Hazmat accident rates have declined by 91% since 1980 and nearly 50% since 1990

Moving hazardous materials by rail is 16 times safer than moving them on the roads



# Crude-by-Rail Safety – Core Focus Areas

- Derailed Prevention
- Addressing risks inherent with DOT-111 tank cars & proper product classification
- Strengthening Emergency Response capabilities

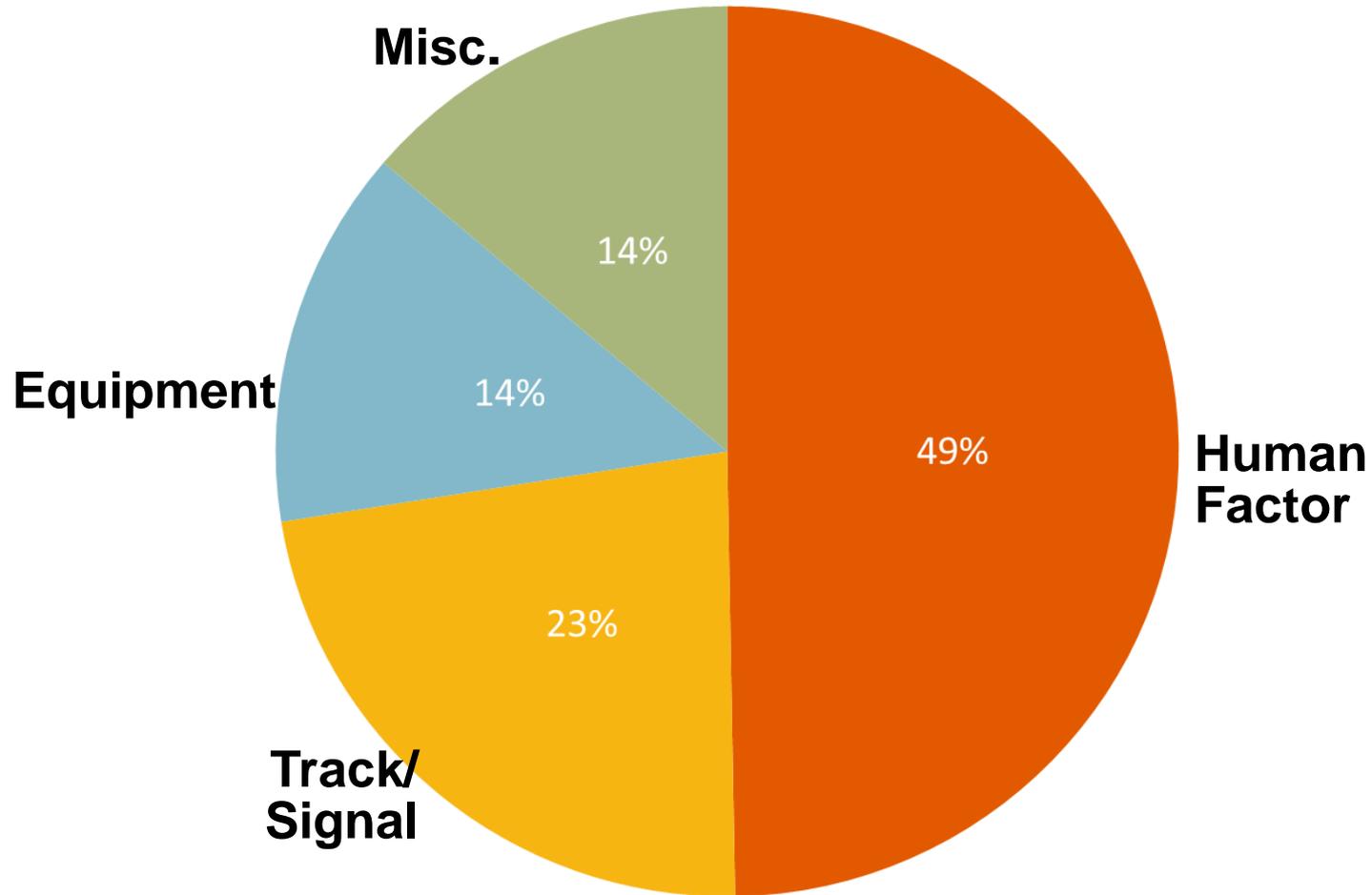
Prevention

Mitigation

Response

# Prevention: Four Main Causes for Derailments

BNSF Reportable Rail Equip Incident Causes - 2014



# Prevention: Actions Plans To Reduce Risk

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## Human Factor

- Training
- Remote monitoring
- Positive Train Control
- Self reporting protocol

## Equipment/Mechanical

- Ultrasonic Inspection
- Detector Network, such as:
  - Dragging equipment
- Technology, including:
  - Force-based/strain gage systems
  - Thermal/infrared scanning for warm bearing detection

## Track/Signal

- Enhanced track inspection training
- Continued elimination of jointed rail
- Strong capital program for tie renewal
- Technology, including:
  - Ground penetrating radar
  - Enhanced geometry testing

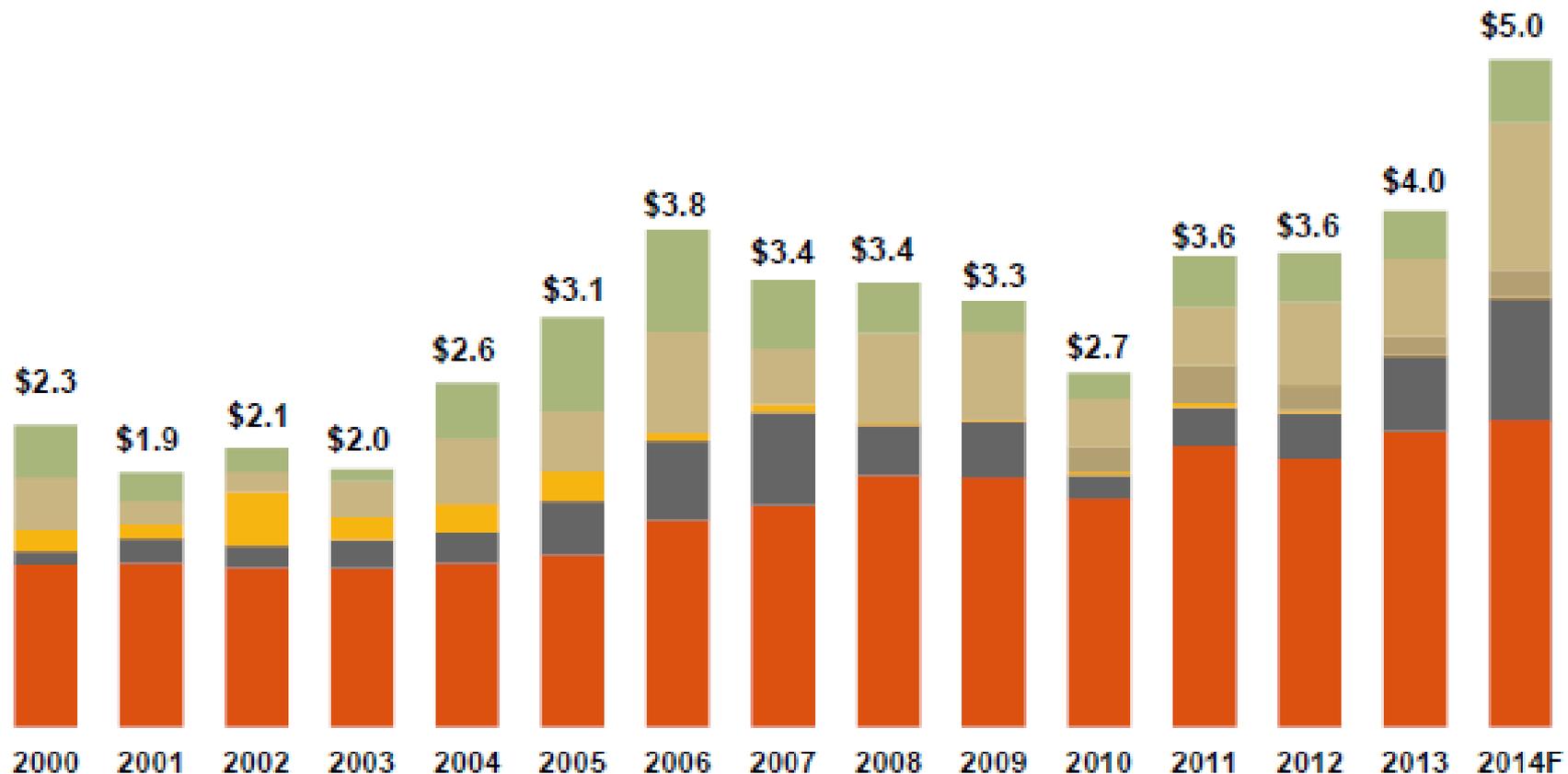
## Miscellaneous

- Operating Practices/Alerts
  - High wind: staging and/or speed requirements
  - Tornado: requirements to stop, inspect trains
  - Flood: speed restrictions, additional inspections
  - Cold weather: speed restrictions

# We have the capital and are deploying it

\$ Billions

■ Replacement Capital ■ Expansion ■ Other ■ PTC ■ Locomotive ■ Equipment



# Prevention: Inspection/Condition Based on Safety Approach

- **Bridge and track inspections**

- **BNSF inspects tracks and bridges more often than required by FRA**
  - Most key routes on BNSF are inspected 4 times per week and the busiest main lines are inspected daily
- **Track inspections include state-of-the-art technology to detect internal and external flaws in the rail and track structure**
- **Weather and earthquake inspections**

- **Proactive Rail Equipment Defect Detection**  
**Devices deployed across the network**

- **Wheel Impact Load Detector**
- **Warm Bearing Detection System**
- **Hot / Cold Wheel Detector**
- **Acoustic Bearing Detectors**



# Prevention: Additional Operating Practice Risk Reduction Measures for Crude Transportation

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## Speed Restrictions

- Speed restrictions of 40 mph for Key Trains carrying crude in DOT-111 tank cars through High Threat Urban Areas (HTUAs) (additional 36% reduction in Kinetic Energy. 56% overall reduction in KE)
- BNSF-specific action to voluntarily limit shale crude oil trains to 35 mph through municipalities of 100,000 or more -effective March 25, 2015

## Risk-based Routing

- Apply PHMSA's *Rail Corridor Risk Management System* (RCRMS) and its 27 Risk Factors that define the "most safe and secure" route for trains carrying TIH/PIH, to unit crude trains

## Derailment Prevention

- Wayside Detector Network –a max of 40 mile spacing of Defective Bearing detectors on key crude oil routes (detects flaws with equipment wheels as they pass detector device)
- Rail Detection –At least one additional internal rail inspection than required by FRA
- All key crude trains operated with Distributed Power (DP) or an operative two-way End of Train Device (ETD) -All BNSF crude trains operate with DP
- Additional Hot Bearing Detectors (HBD) on crude oil routes (max 40 mile spacing)
- BNSF-specific action for HBD spacing of 10 miles on crude routes that parallel critical waterways
- BNSF-specific action for Key Trains stopped by HBD must set-out the indication car
- BNSF-specific action Key Trains with Level II Wheel Impact Load Detector (WILD) defect (120-140 Kilopound) will be handled as LEVEL I defect (immediate set-out) -effective March 25, 2015
- BNSF-specific action to increase rail detection frequencies along critical waterways as BNSF went from 2.0 to 2.5 times frequency –effective April 1, 2015

# Crude-by-Rail Safety – Core Focus Areas

- Derailment Prevention
- Addressing risks inherent with DOT-111 tank cars & proper product classification
- Strengthening Emergency Response Capabilities

Prevention

Mitigation

Response

# Mitigation: Tank Car Standards

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Rail industry voluntarily adopted stronger tank car standards in Oct. 2011 & November 2013:



DOT 111

## "New" 1232 Cars vs. "Old" DOT 111 Cars

- 1/2" or 7/16" jacketed shell vs. 7/16"
- 1/2" extra protective head shield
- Roll over protection (top fitting protection)
- Larger pressure release valve
- 47 - 77% better crashworthiness

# Mitigation: "Next Generation Tank Car" NGTC

## EVOLUTION OF RAIL INDUSTRY TANK CAR STANDARDS FOR CRUDE OIL

The railroad industry is proposing to increase the federal tank car design and construction standards for new tank cars used to transport crude oil. This proposal comes after a previous upgrade proposal which the industry voluntarily adopted and has been observing since October 2011. This graphic shows the additional tank car components included in the latest rail industry proposal.

### HIGH CAPACITY PRESSURE RELIEF VALVE

**Current Standard:**  
No requirement

**Latest Rail Industry Proposal:**  
Requires a high capacity pressure relief device to protect against a rise in internal pressure resulting from fire. Provides for faster release of product.

### TOP FITTINGS PROTECTION

**Current Standard:**

Requires top fittings protection to protect the integrity of valves and fittings used to load product in the event of an accident.

**Latest Rail Industry Proposal:**

Contains the same requirements.

### STEEL TANK

**Current Standard:**

Requires a minimum 1/2 inch thick steel tank for unjacketed cars and a minimum 3/8 inch thick steel tank for jacketed cars.

**Latest Rail Industry Proposal:**

Requires a minimum 3/4 inch thick steel tank.

### HEAD SHIELDS

**Current Standard:**

Requires minimum 1/2 inch thick half height head shields at both ends of the tank car to improve puncture resistance.

**Latest Rail Industry Proposal:**

Requires 1/2 inch thick full height head shields at both ends of the tank car.

### BOTTOM OUTLET HANDLES

**Current Standard:**

No requirement

**Latest Rail Industry Proposal:**

Requires bottom outlet handle reconfiguration to prevent the handle from inadvertently opening the bottom outlets in the event of an accident.

### JACKET AND THERMAL PROTECTION

**Current Standard:**

Requires a minimum 3/8 inch thick steel tank OR a 1/2 inch thick steel jacket.

**Latest Rail Industry Proposal:**

Requires the addition of both a 1/2 inch thick steel jacket around the tank car and thermal protection.

Source: Evolution of Steel on Rails, February 2011

# Crude-by-Rail Safety – Core Focus Areas

- Derailment Prevention
- Addressing risks inherent with DOT-111 tank cars & proper product classification
- Strengthening Emergency Response capabilities



# Response: First Responder Coordination

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- Shipment **Information Access** by First Responders
- **Training** First Responders, Employees and Customer Employees
- **Mobilizing** in the event of an incident

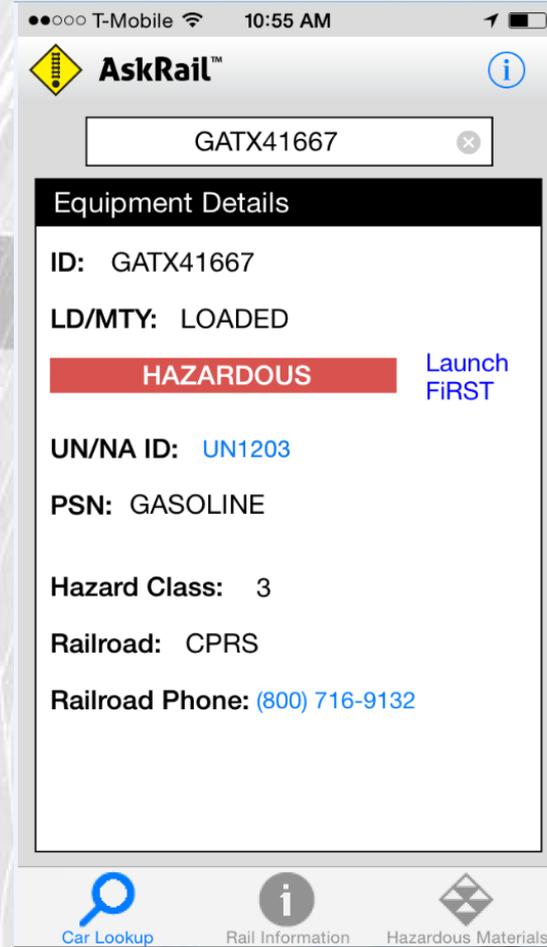
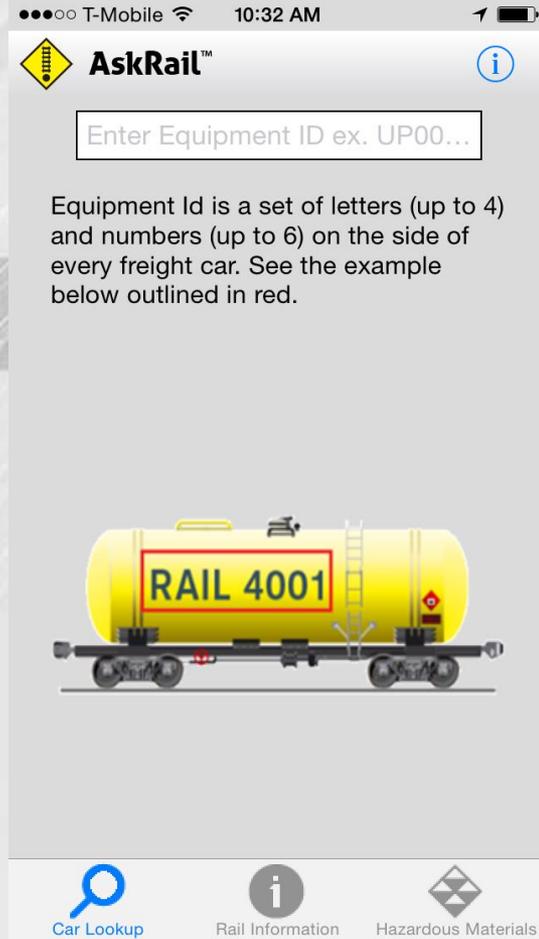
# Emergency Planning

## Community Hazardous Materials Flow Study Support:

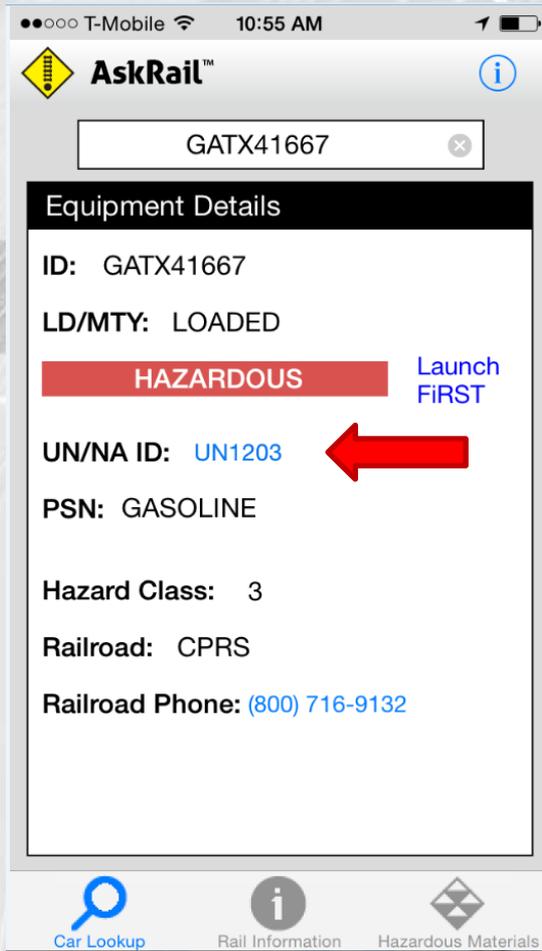
-Security Sensitive Information – Distributed on a “need to know basis”

STCC NUMBER	STCC DESCRIPTION	CLASS CODE	RESIDUE CAR COUNT	LOADED CAR COUNT	RESIDUE INTER-MODAL	LOADED INTER-MODAL	TOTAL LOADED COUNT	
4909152	ALCOHOLS, N.O.S.		3	4501	5754	0	0	5754
4910165	PETROLEUM CRUDE OIL		3	2378	3500	0	0	3500
4905752	LIQUEFIED PETROLEUM GAS		2.1	3870	2438	0	0	2438
4961605	ELEVATED TEMPERATURE LIQUID, N.O.S.		9	2022	2169	0	0	2169
4905421	LIQUEFIED PETROLEUM GAS		2.1	1362	1274	0	0	1274
4907439	HYDROCARBONS, LIQUID, N.O.S.		3	938	1236	0	0	1236
4907265	STYRENE MONOMER, STABILIZED		3	590	927	0	0	927
4905424	BUTANE		2.1	238	719	0	0	719
4914110	GAS OIL	CL		101	666	0	0	666
4920523	CHLORINE		2.3	1026	646	0	0	646
4935240	SODIUM HYDROXIDE SOLUTION		8	385	451	0	0	451
4930228	HYDROCHLORIC ACID		8	465	398	0	0	398
4904509	CARBON DIOXIDE, REFRIGERATED LIQUID		2.2	414	360	0	0	360
4945770	SULFUR, MOLTEN		9	316	359	0	0	359
4914168	FUEL OIL	CL		302	354	0	0	354

## Single Car Lookup



# View Response Guide



# Response: BNSF/First Responder Local Training

- BNSF and the railroad industry train first responders in their communities under a longstanding program called “TRANSCAER” (Transportation Community Awareness and Emergency Response)
  - Hands-on equipment in field – Instructor lead
  - Train list / shipping papers
  - Placards
  - Equipment
  - Incident Assessment
- BNSF trains an average of 3,500 local emergency responders each year in communities across network
- More than 65,000 emergency responders trained since 1996



# Local Responder Training

“Centerpiece of our training efforts”



# Response: Training First Responders at Pueblo, CO National Facility

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- Security and Emergency Response Training Center (SERTC) at Pueblo, Colorado national railroad research/training facility (TTCI)
- In-depth hazmat emergency response training to more than 30,000 emergency responders and railroad and chemical industry employees.
- Going forward, additional \$5 million industry commitment to train additional first responders from across the rail network; railroad company cost share with local communities (80/20 local)

# Emergency Preparedness and Planning

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## SERP Identifies how the BNSF responds to Incidents

### Contents:

1. Notifications, Public Affairs, Hazard ID, Incident Classification, Incident Management, Resource Utilization, Safety & Health, Reported Chemical Exposures, Terminating an Incident, Roles and Responsibilities, Security of HAZMAT shipments

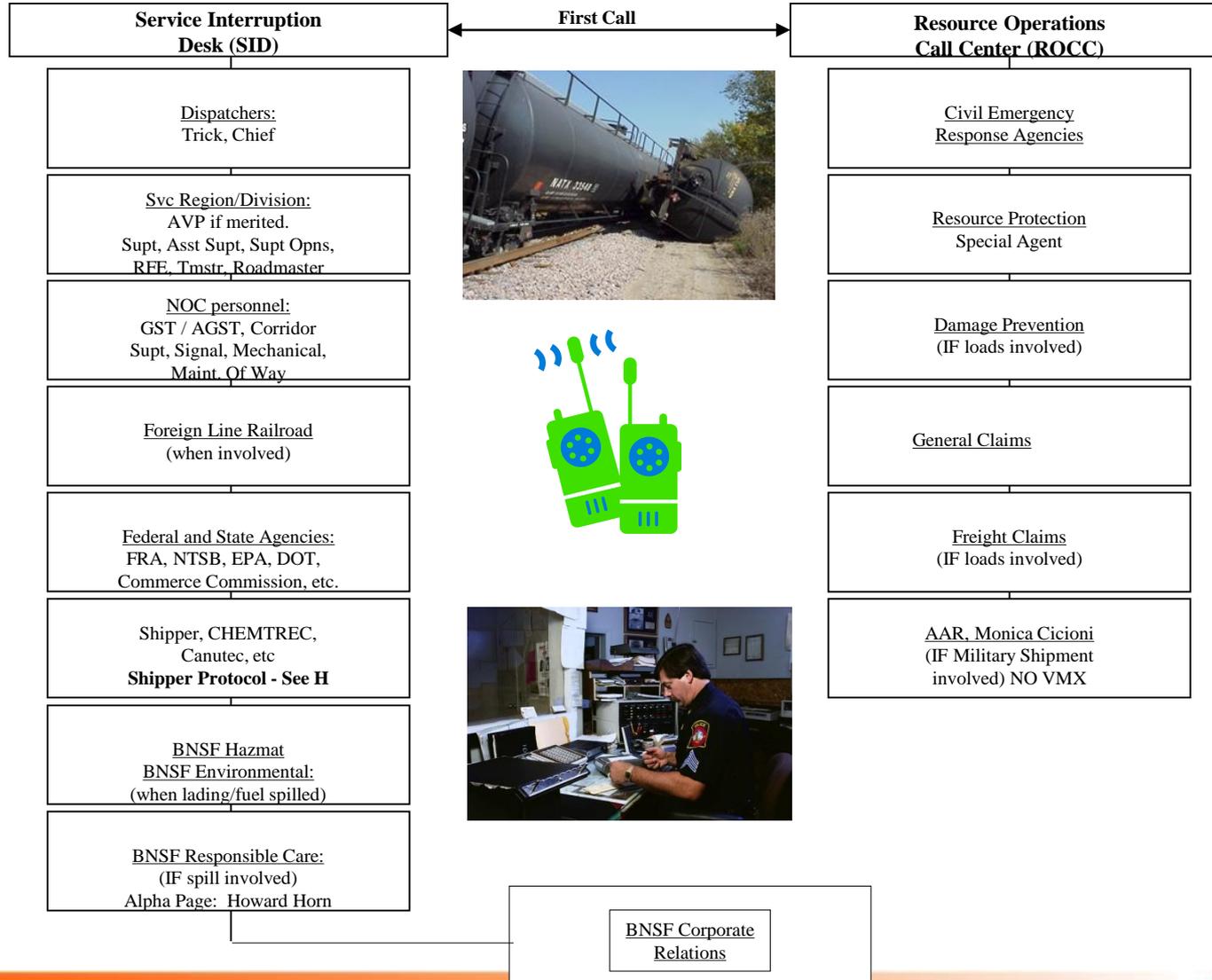
### Appendices:

- LERP's (Local Emergency Response Plans)
  1. Developed for our Large Fixed Terminals
  2. Contains Site/Location Specific Information/Resources
  3. Conduct Drills at over 45 locations per year (full scale or TTX)
- LRP's (Local Reaction Plans)
  1. Specific Location Threats – Pueblo Weapons Depot etc.
  2. Environmental Sensitivities – Geographical Response Plans/Strategies

# Mobilization Emergency Response

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# Incident Notification



# NIMS Incident Command System

- BNSF Railway will initiate, manage and maintain a rapid, aggressive, well coordinated, and effective response
- BNSF hazardous material responders, contractors, operations supervisors and train crews will work within the Unified Incident Command Structure



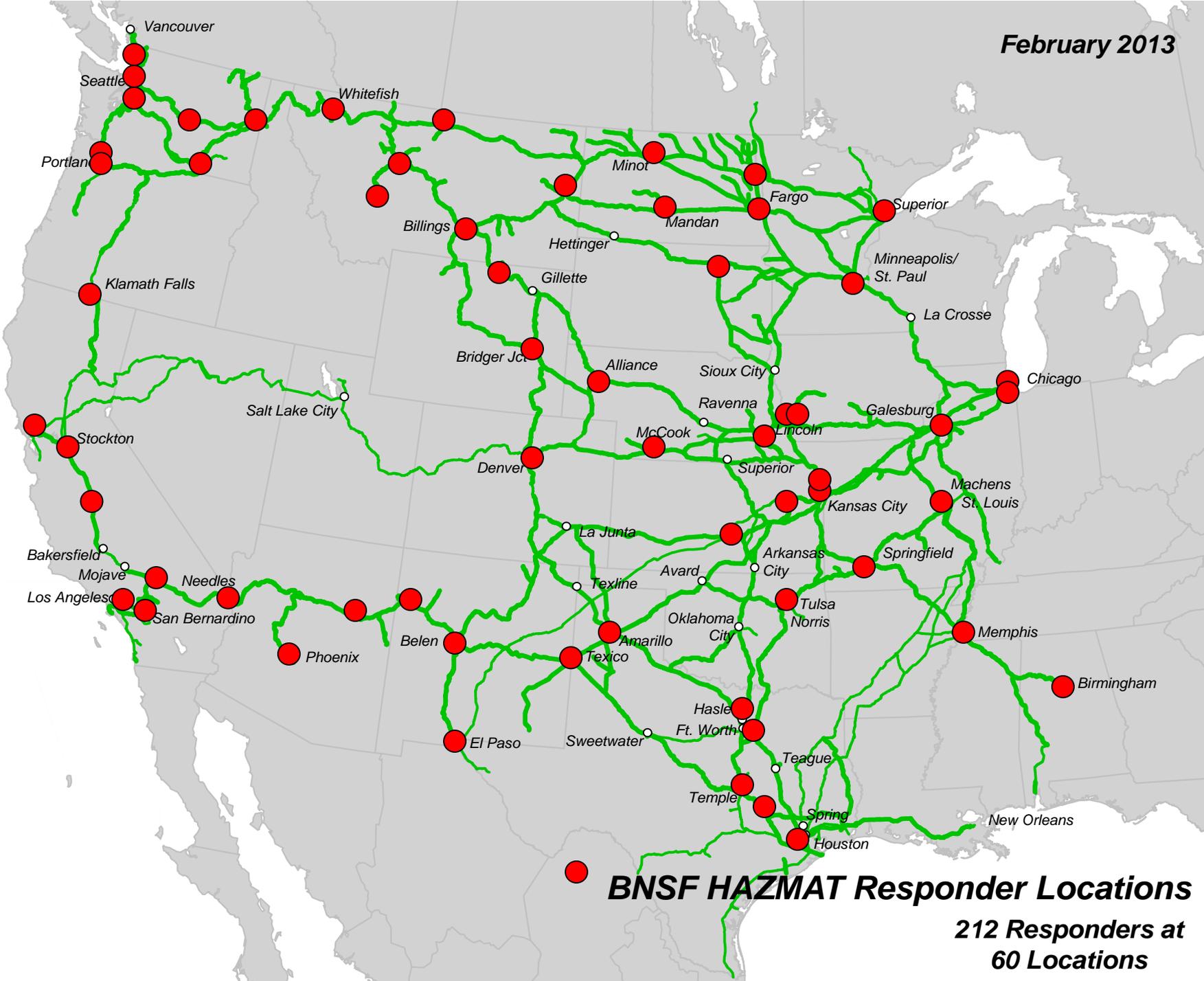
# Response: Incident Mobilization

BNSF pre-positions  
212 first responders  
and equipment at 60 locations  
across the network.

- Industrial fire-fighting foam trailers
- Emergency breathing air trailers
- Chlorine kits
- Midland kits
- Air monitoring assets



February 2013



**BNSF HAZMAT Responder Locations**

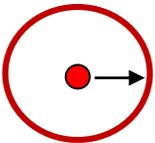
**212 Responders at  
60 Locations**

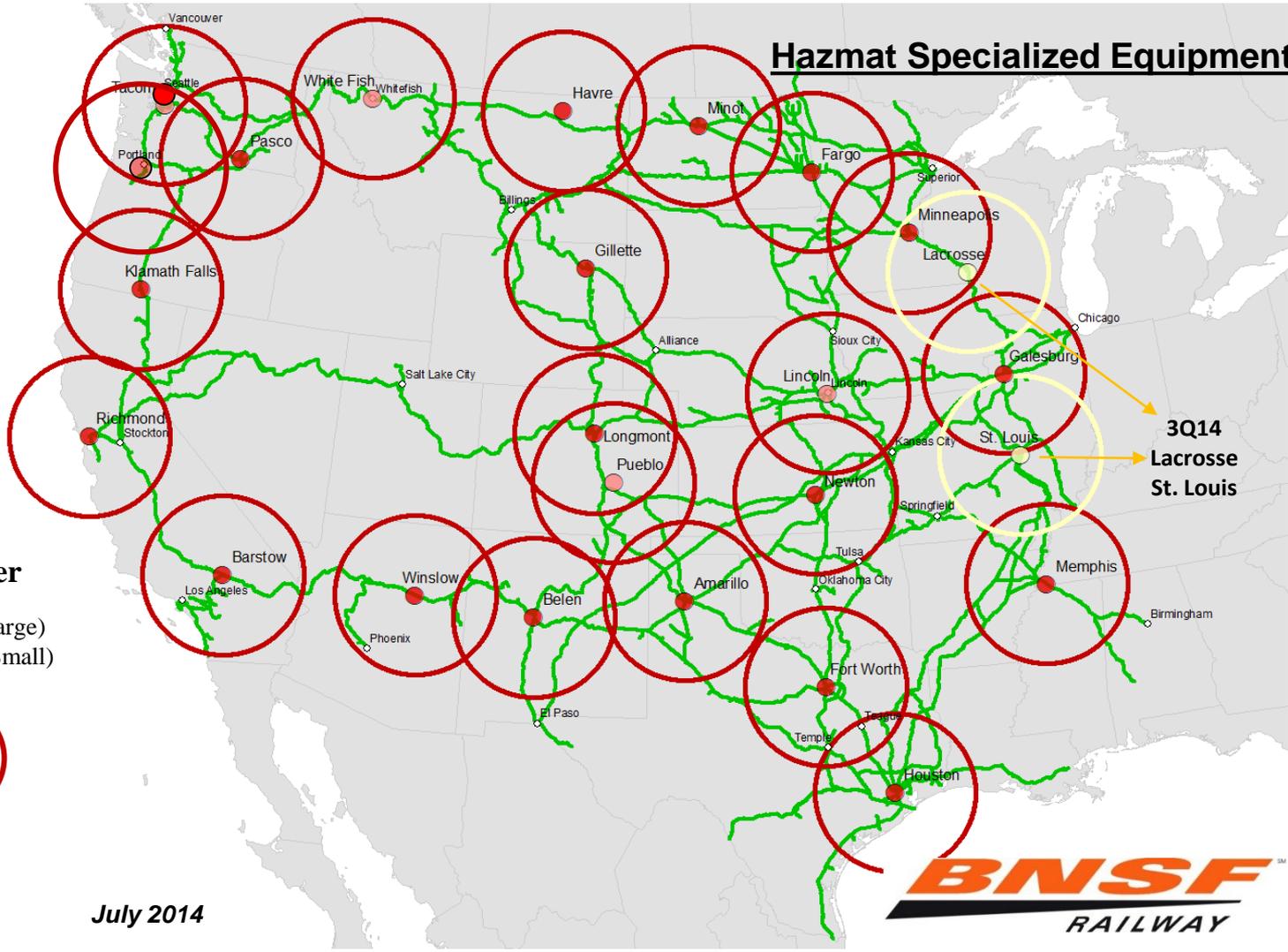
# AR-AFFF Fire Trailer Program

1. Designed to address the surge in Ethanol and Crude Oil shipments.
  2. Provide equipment, supplies and contract Firefighters in response to polar solvent and fire incidents
- Currently **25** trailers throughout system location based on HM



# Hazmat Specialized Equipment

- Fire Trailer**
- Type I (Large)
  - Type II (Small)
- 
- 150 Miles



July 2014



# Emergency Breathing Air Trailers



# **BNSF Tactical Toxicology (Tac Tox) Program**

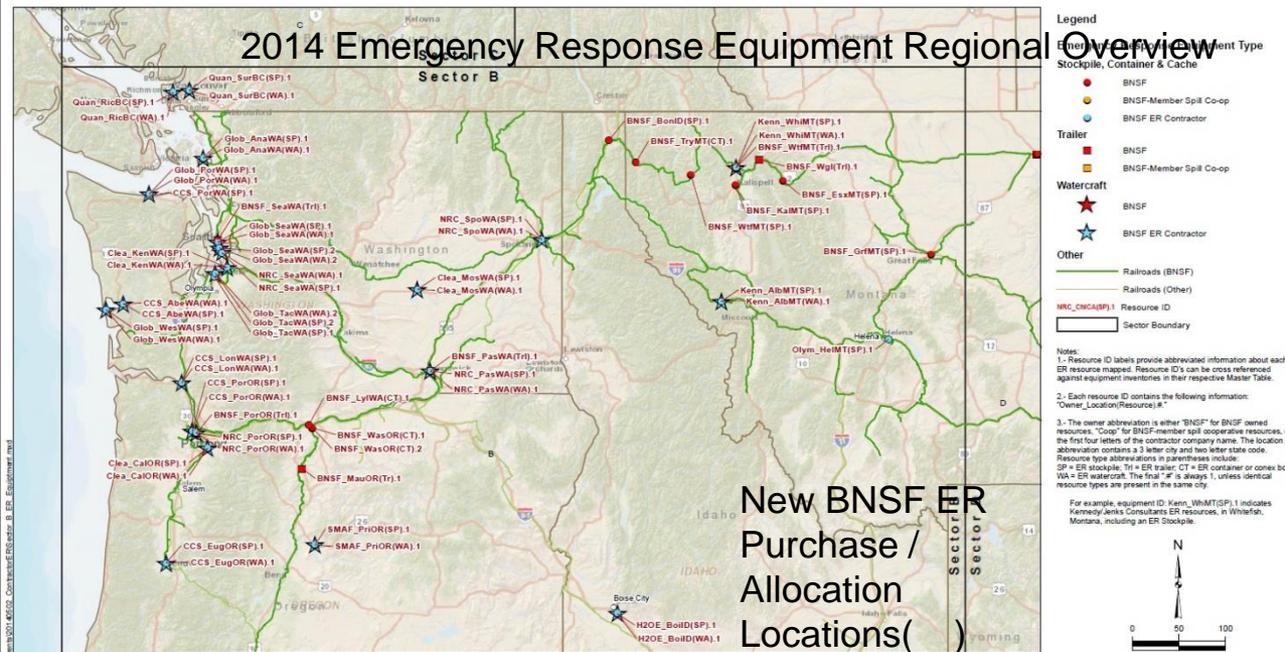
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- 1. Utilized to provide rapid data acquisition and real time air monitoring results for incidents throughout our system.**
- 2. CTEH**
  - 24 hour access to PhD Toxicologists and Dispersion Modelers
  - Utilize Safer® Star Air Dispersion Model offering topographical model input
- 3. Kit Contents (19 Kits total)**
  - PID, 4 gas monitor, Kestrel weather meter, Solar Irradiance meter, Detector Tubes/pump, GPS, Calibration gasses and equipment

# ER Equipment Allocation in NW

2015 ~\$3.5 Million Pre-staged Oil Spill Equipment Caches:

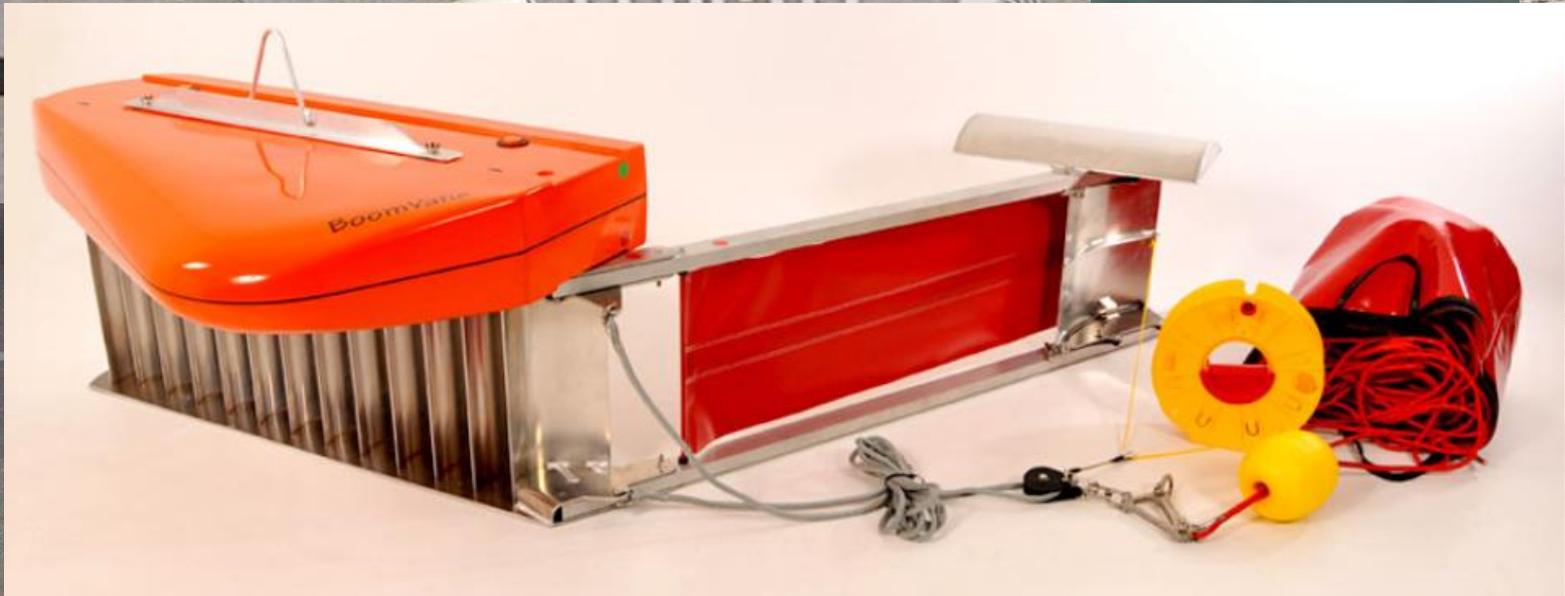
- Provide faster access to emergency response supplies in the event of an incident.
- Locate specialized equipment (oil spill containment booms, hydraulic skimming systems, oil recovery bladders and other equipment which has traditionally not been found in inland locations.

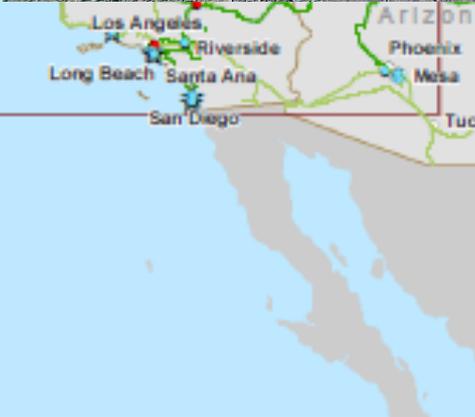
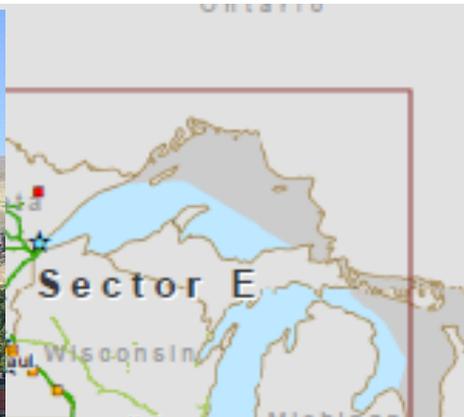


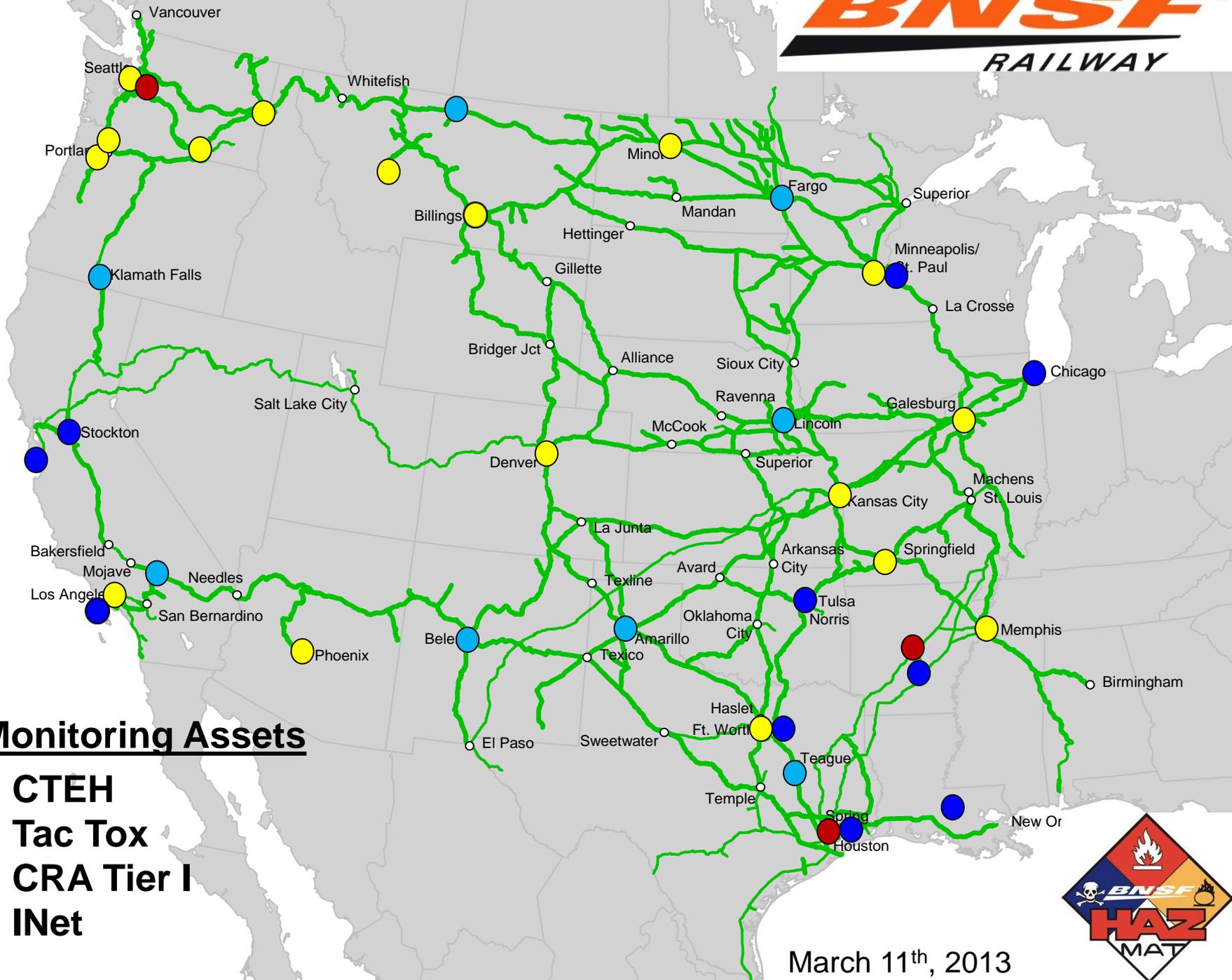
**Summary of Unique Trailers**

**2015 Emergency Response Equipment Purchase/Allocation**

Equipment Staging City, State	Trailer Type <sup>(a)</sup>	Drum Skimmers (Quantity)	Skimmer Support Equipment (Quantity)		Collapsible Tanks (Quantity)	Total Boom Length (feet)	50 ft. Boom Length Sections (Quantity)	Boom Length Sections (Quantity)	(presence/absence)			Boom Vane Type	Anchor Type	
			Diesel Powerpack						Group B: Boom Support	Group E: Absorbents	Group G, H & I: PPE			Group J, K & L: Decon & Misc.
Glasgow, MT Stockpile		2	2		2	2200	-	-					NA	
Missoula, MT Stockpile		1	1		1	1600	-	-					NA	
Livingston, MT Stockpile		2	2		2	2300	-	-					NA	
Custer, MT Stockpile		1	1		1	2600	-	-					NA	
Billings, MT Stockpile		1	1		1	1000	-	-					NA	
Miles City, MT Stockpile		1	1		1	1000	-	-					NA	
Glendive, MT Stockpile		1	1		1	2100	-	-					NA	
Guernsey, WY Stockpile		1	1		1	1100	-	-					NA	
Prague, WY Stockpile		1	1		1	1400	-	-					NA	
Bonnars Ferry, ID Stockpile		1	1		1	4800	-	-					NA	
Trailer #1	Item M.2 (Industrial Duty Enclosed Double-axle Bumper Pull)	1	1		1	1000	6	7	X	X	X	X	1.0 M	Danforth
Trailer #2	Item M.3 (Industrial Duty Enclosed Double-axle Tapered Gooseneck)	1	1		1	3800	0	38					None	Danforth
Libby, MT Stockpile		1	1		1	1000	-	-					NA	
Trailer #1	Item M.2 (Industrial Duty Enclosed Double-axle Bumper Pull)	1	1		1	1000	10	5	X	X	X	X	0.5 M	Rock Rake
Whitefish, MT Stockpile		1	1		1	1000	-	-					NA	
Trailer #1	Item M.2 (Industrial Duty Enclosed Double-axle Bumper Pull)	1	1		1	1000	6	7	X	X	X	X	0.5 M	Rock Rake
Sandpoint, ID Stockpile		1	1		1	1000	-	-					NA	
Trailer #1	Item M.2 (Industrial Duty Enclosed Double-axle Bumper Pull)	1	1		1	1000	6	7	X	X	X	X	0.5 M	Rock Rake
Mandan, ND Stockpile		2	2		2	9600	-	-					NA	
Brush, CO Stockpile		1	1		1	1150	-	-					NA	
Prairie Du Chien, WI Stockpile		3	3		3	8600	-	-					NA	
La Crosse, WI Stockpile		2	2		2	4800	-	-					NA	
<b>Totals:</b>		<b>23</b>	<b>23</b>		<b>23</b>	<b>46950</b>	<b>173</b>	<b>383</b>						







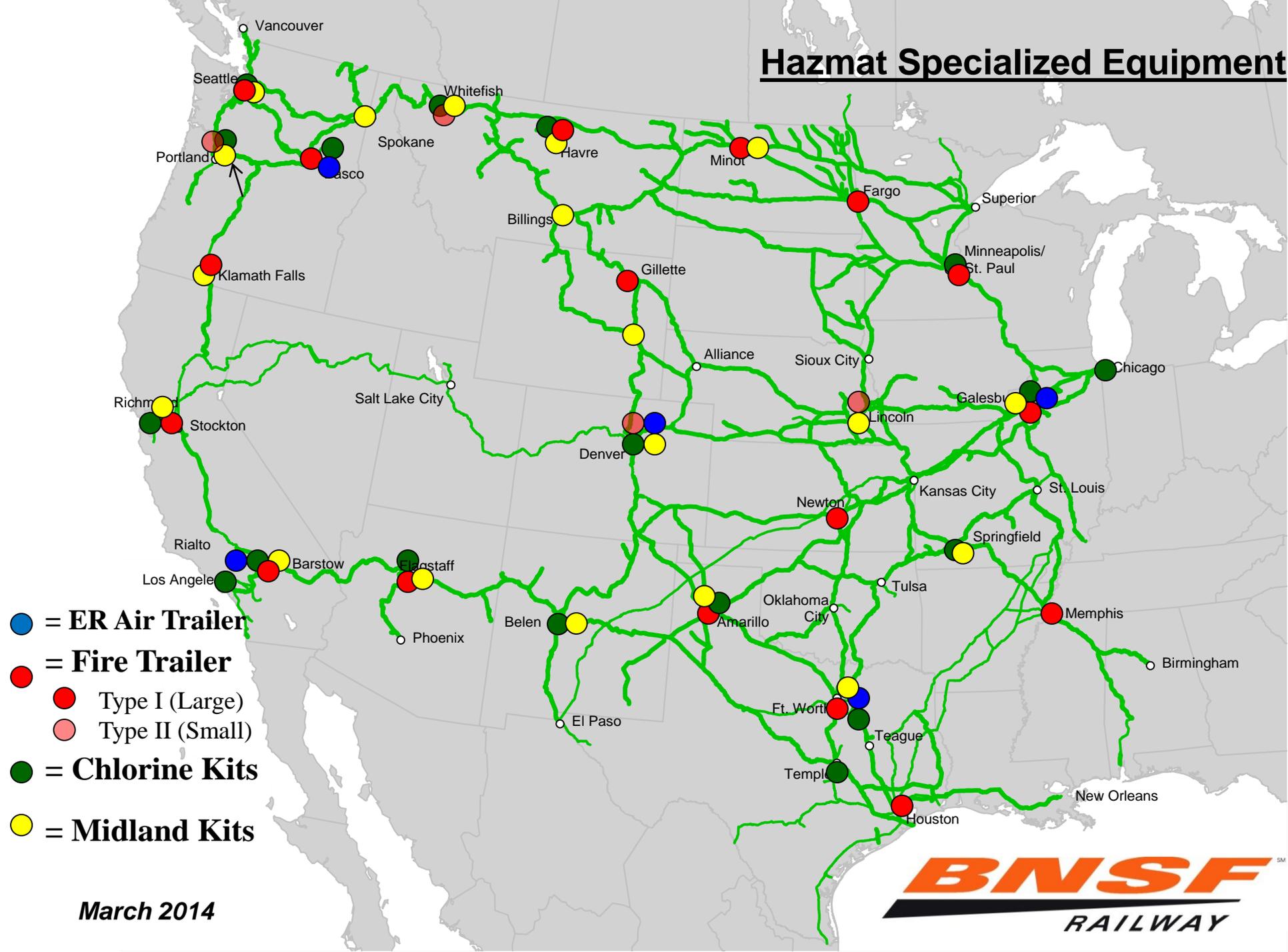
**Air Monitoring Assets**

- CTEH
- Tac Tox
- CRA Tier I
- INet



March 11<sup>th</sup>, 2013

# Hazmat Specialized Equipment



- = ER Air Trailer
- = Fire Trailer
  - Type I (Large)
  - Type II (Small)
- = Chlorine Kits
- = Midland Kits

March 2014



# Remediation

## BNSF will restore the site



Cameron, Texas, post derailment

- BNSF is responsible for mitigation of the spill and any restoration tasks
- BNSF contracts with pre-approved consultants and contractors to perform the remediation and restoration
- State agencies oversee the work and BNSF must obtain their concurrence before a site is acceptably closed

# ***BNSF***<sup>®</sup> ***RAILWAY***

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