



PHMSA/NFA Town Hall Meeting Report
*Emergency Preparedness Issues Related to
Proposed LNG Transportation by Rail*

Lancaster County (PA) Public Safety Training Center

November 18, 2019

Sponsored by the USDOT Pipeline and Hazardous Materials Safety Administration (PHMSA), the FEMA U.S. Fire Administration (USFA)



LNG Rail Transport Town Hall Meeting Report

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I. EXECUTIVE SUMMARY

As part of an anticipated future permitting process on the transportation of Liquid Natural Gas (LNG) via rail transportation, the United States Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Emergency Management Agency (FEMA) National Fire Academy (NFA) conducted a Town Hall Meeting in Lancaster County, Pennsylvania, on October 14, 2019. The purpose of the Town Hall Meeting was to seek the input from and concerns of the emergency preparedness community and its stakeholders in the mid-Atlantic region and specifically Pennsylvania and New Jersey. This report documents the proceedings of the Town Hall Meeting and the inputs and articulated concerns of the emergency preparedness attendees.

In the meeting, attendees received a series of technical presentations on LNG transportation risks and incident response protocols, and then participated in open discussions related to the topics in question and the general LNG rail transportation focus of the meeting. In general, the inputs from attendees focused on scientific and technical issues related to improving an effective response capability in the event of a possible rail accident involving an LNG release. There was no particular heightened concern expressed regarding the proposed rail transport of LNG because the hazardous materials preparedness community was already well oriented to the challenges of LNG incident response in other transportation modes and fixed facility environments. However, there were several very useful discussions and ideas explored by attendees about ways Mid-Atlantic region response and planning capabilities might be improved, both for LNG rail transport issues and for regional response to hazardous materials risks in general.

To stimulate feedback and input from the Town Hall Meeting attendees, six topical areas were identified related to the issues associated with LNG rail transport. Each topical area was introduced with a presentation followed by attendee discussion and issues identification. The six topical areas were:

1. The Transportation Research Board Special Report (TRB) 325: Safely Transporting Hazardous Liquids and Gases in a Changing U.S. Energy Landscape (NOTE: Electronic copies of the TRB report were provided to all attendees prior to the Town Hall.)
2. Emergency Responder Perspectives on LNG
3. Marine Transport of LNG
4. Risk Assessment of Surface Transport of LNG
5. LNG Transportation: Terminal and Transfer Operations
6. LNG Transportation by Rail

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In the report below, summaries of the presentations and of the attendees subsequent discussions are presented in the sequence they occurred in the meeting. As noted in the attendee list below, there were approximately 30 emergency preparedness representatives from the Mid-Atlantic region, and 10 federal government and federal contractor attendees. In all discussions, the federal attendees were observers only and were not discussion participants. The guidance to the emergency preparedness attendees was that there were no restrictions whatsoever on the topics they wished to discuss or issues they wished to raise. Rather the only guidance provided to the attendees was to ensure that ideas and opinions would be fairly and respectfully heard by the group.

Meeting goals were to:

1. Provide science-based/risk-based data and information to the emergency response community on LNG storage and transportation.
2. Provide a forum for PHMSA and USFA NFA to seek input and concerns of the emergency preparedness community on rail transportation.
3. Keep communities and emergency responders safe.

II. MEETING PARTICIPANTS

Special Acknowledgments

Special acknowledgment is given to Gregory Noll, member and past chairperson of the National Fire Protection Association (NFPA) Technical Committee on Hazardous Materials / Weapons of Mass Destruction Emergency Response and member and past chairperson of the InterAgency Board for Emergency Preparedness and Response—Training and Exercise SubGroup (IAB), who acted as meeting leader and facilitator.

Special acknowledgement is also extended to Drue Pearce, Bill Quade, Aaron Mitchell, and Wayne Yoder.

Finally, special acknowledgment is given to the U.S. Department of Transportation—Pipeline Hazardous Materials Safety Administration, and the United States Fire Administration—National Fire Academy, without whose sponsorship, this Town Hall meeting would not have been possible.

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Attendees

<p>John Al-Khal, Lehigh County Special Operations / HMRT</p> <p>Eric Bachman, Lancaster County EMA</p> <p>Walter Bair, PA Dept. of Environmental Protection</p> <p>Larry Bak, Delaware County (PA) Dept. of Emergency Services</p> <p>Jerry Bimle, PA Office of the State Fire Commissioner & PA State Fire Academy</p> <p>Chris Bosnyak, PA Dept. of Environmental Protection</p> <p>Richard Brooks, Cecil County (MD) Dept. of Emergency Services</p> <p>Arthur Buff, Pipeline and Hazardous Materials Safety Administration</p> <p>Nicole Burton, Lehigh County (PA) Special Operations / HMRT</p> <p>Tim Butters, Burke, VA Fire and Rescue Department</p> <p>Chris Callan, Camden County, NJ</p> <p>Chris Christopoulos, Lebanon (NH) Fire Department</p> <p>Susan Denning, US Fire Administration, National Fire Academy</p> <p>David Donohue, US Fire Administration National Fire Academy</p> <p>Patrick Durkin, Pipeline and Hazardous Materials Safety Administration</p> <p>Chris Fisher, Dauphin County (PA) Dept. of Public Safety</p> <p>Edward Fletcher, New York Division of Homeland Security & Emergency Services</p> <p>Edward Glassman, Camden (NJ) Fire Department</p>	<p>Sean Hart, Berks County, PA Dept. Emergency Services</p> <p>Larry Jantzen (RET), Austin (TX) Fire and Rescue</p> <p>William Kelly, Delaware State Fire Commission</p> <p>Joe Kratochvil, International Association of Fire Chiefs</p> <p>Kinha Lester, Bloomsburie LLC (Contractor)</p> <p>Mark Maday, Federal Railroad Administration</p> <p>Haydn Marriott, Montgomery County (PA) Dept of Public Safety EMA / HMRT</p> <p>Don McLaughlin, US Environmental Protection Agency</p> <p>Aaron Mitchell, Pipeline and Hazardous Materials Safety Administration</p> <p>Martyn Nevil, South Central (PA) Task Force</p> <p>Drue Pearce, Pipeline and Hazardous Materials Safety Administration</p> <p>Gregory Noll, GGN Technical Resources, LLC and South Central (PA) Task Force</p> <p>William Quade, Pipeline and Hazardous Materials Safety Administration</p> <p>Jim Rist, International Association of Fire Chiefs</p> <p>Scott Russell, Baltimore County (MD) Fire Dept HazMat Team</p> <p>Stephen Shaw, Fort Lauderdale (FL) Fire Rescue</p> <p>Frank Sullivan, Chester County (PA) Dept. of Emergency Services</p> <p>Mark Trombore, Allentown (PA) Fire Department</p> <p>Agri Verrija, Bloomsburie LLC (Contractor)</p> <p>David Willauer, Cambridge Systematics</p> <p>Wayne Yoder, US Fire Administration, National Fire Academy</p> <p>Cynthia Znati, US Coast Guard</p>
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Disclaimer

The Town Hall Meeting attendee discussions do not necessarily reflect the views of PHMSA or USFA. Please note that governmental representatives observed the LNG Rail Transport Town Hall Meeting process and provided agency subject matter expertise. They were not involved in drafting the meeting notes and neither they nor their agencies are responsible for any conclusions, suggestions, or recommendations contained within the report.

III. MEETING DISCUSSIONS

The Town Hall Meeting was organized into six topical areas. In each area below, the topical content that was presented and attendee discussions of that topic are summarized. The topics and discussion summaries below are in the meeting's chronological sequence.

1. Safely Transporting Hazardous Liquids and Gases in a Changing U.S. Energy Landscape, Transportation Research Board Special Report 325

Presented by Gregory Noll

(NOTE: Electronic copies of the TRB report were provided to all attendees prior to the Town Hall.)

This topical area focused on LNG safe transportation issues identified in the Transportation Research Board Special Report on safely transporting hazardous liquids and gases, on related preparedness issues including Local Emergency Planning Committee (LEPC) planning challenges, and on concurrent supporting observations in the 2019 HazMat Roundtable report. Topics addressed in the presentation and subsequently discussed in the Town Hall meeting were:

- The origins and mission of the Transportation Research Board
- The role of LEPCs in preparing for future LNG transport
- Evolving US energy landscape and regional variations in hazmat transport
- The need to foster strategies to blend local response preparedness with various federal agencies.
- The need to reduce the separation of hazmat and environmental related issues in the LEPC process.
- The need for improved guidance materials / training educational opportunities focusing in identifying risks.
- Need to ensure delivery of hazmat is done on risk-based basis.
- The need for increased training delivery and adoption of more risk-based training and exercise opportunities.
- The need to develop information and training materials to response community in timely manner.
- The need for clearer standard of care for hazmat emergency planning and response.
- The need for improved *Information Sharing* at local/regional levels of emerging threats, risks, operational, and support capabilities.

Key points of the presentation and follow-on discussions included the following:

- Recommendations from the Joint PHMSA / USFA-NFA / IAFC HazMat Roundtable (February 2019) pertaining to emergency preparedness were noted.

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- It was observed that the TRB reports contain a lot of good information, and that attendees should attempt to read the summaries of the different reports as they relate to emergency response, and to incorporate some of the operational recommendations into their respective response planning and preparation.
- The role and importance of both the State Emergency Response Commission (SERC) and the Local Emergency Planning Committees (LEPCs) was also noted. It was observed that those states with an active, responder-represented SERC tend to have more effective and active LEPCs.
- What will the future look like for the emergency preparedness community? As it related to the Town Hall, attendees concurred that we will continue to see new challenges for many parts of the emergency response community being generated by our national “energy renaissance.”
- Emergency preparedness (prevention, planning, response, recovery) must be considered when assessing Management of Change (MOC) as outlined in both regulatory and consensus standards.

2. Emergency Responder Perspectives on LNG

Presented by Larry Jantzen, Assistant Chief, Special Operations (Retired), Austin TX Fire and Rescue

This topical area focused on identifying what is already known in the emergency response and preparedness community regarding LNG, known hazards in emergencies involving the release of LNG, known procedures for handling LNG and responding to an accidental release, and the readiness of the trained emergency response community to safely handling LNG emergencies.

Topics addressed in the presentation and subsequently discussed in the Town Hall were:

- LNG Awareness
- LNG and Its Expanding Horizon
- LNG as a Fuel
- LNG as a Transport Fuel
- LNG Safety
- What is LNG
- Properties of LNG (Methane)
- Properties of LNG
- Producing LNG
- Storing LNG
- Storing LNG – Insulation
- Safety and Control Features
- LNG Refueling Station
- Road Transport LNG Experience
- LNG Release
- Impact of LNG Release

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- Managing LNG Incidents
- No Release
- Release with No Ignition
- Release with Ignition
- Extinguishment / Fire Control
- Water Application
- Foam Application
- Dry Chemical Application
- Standards
- Codes / Regs/ Permits
- References

Key points of the presentation and follow-on discussions included the following:

- In general, it was felt that the hazards and challenges of a potential LNG transportation release are fairly well understood by a portion of the emergency response community, mainly depending upon their training and skill level - especially those at the Hazardous Materials Technician level. There is an increasing body of knowledge pertaining to LNG as a motor fuel, cargo tank truck transport, and marine transport.
- Attendees noted that the emergence of LNG transportation coincides with it being used as fuel source to power locomotives, ships, motor-vehicles, etc.
- A key question is what additional training is needed for local responders, especially those below the Technician level, to be ready to address potential LNG release challenges. For experienced personnel, it was noted that they use/deal with products with far greater potential hazardous results/impact daily than LNG. However, any guidance on the handling of LNG incidents must be based upon risk-based response procedures.
- There was discussion of the physical and chemical properties of LNG impacting its behavior when released and the tactics to handle the released product. It was noted that LNG is stored in both bulk and non-bulk containers similar to a regular thermos container. Such tanks are equipped with relief valves or systems to recover vapors as the LNG warms, such as re-liquefaction, used as a fuel or sent to a pipeline system/grid. LNG as a transportation fuel comes in two forms: unsaturated and saturated. Unsaturated LNG can be used by “dual-fuel” engines and saturated LNG is used by newer engines. LNG fuels stations are typically equipped with both cold (unsaturated) and warm (saturated) LNG to allow the refueling of either type of LNG powered vehicle engine.
- A clear distinction must remain between liquified petroleum gas (LPG) and LNG. Many incidents in the past involving LPG were reported as LNG incidents, whereas the two are different in terms of chemical properties and behavior, both in storage and when released. In handling LNG, especially in cases of spills and leaks, atmospheric conditions play a key role in its behavior.

3. Marine Transport of LNG

Presented by Cynthia Znati, Ph.D., Lead Chemical Engineer, U.S. Coast Guard, Hazardous Materials Division

This topic focused on the role of the U.S. Coast Guard (USCG) in managing LNG marine transport emergency preparedness and addressed some of the current issues faced in LNG marine transport nationally. Topics addressed in the presentation included:

- U.S. Coast Guard Role in Shipping
- Transport of LNG in Bulk
- Transport of LNG as Packaged HazMat
- LNG as Fuel

Key points of the presentation and follow-on discussions included the following:

- USCG deals with the prevention and shipping of LNG into the United States via marine vessels. The USCG has dual role - domestic and international. Internationally, USCG represents the US as both flag and port state. Domestically, it carries regulatory authority for bulk shipments design standards and operating standards.
- The U.S. has additional regulations in addition to international regulations that stipulate various additional features that ships/tankers must have. For example, the steel chosen for vessels must meet cold water temperatures in the U.S. where the vessel will operate.
- One of the main USCG goals in regulating LNG marine transport is *prevention*, including the applicability of international codes. As regulations for LNG do not apply retroactively, the USCG makes sure that ships bringing LNG in the US meet the code(s) they were issued when the vessel initially entered service. It also oversees the compliance of IGC codes and U.S. regulations.
- U.S. regulations tend to be stricter and mandatory for ships bringing LNG in the U.S. It was noted that most LNG tankers worldwide are built in accordance with U.S. standards.
- LNG can be found in bulk shipments on a tanker or as a packaged hazardous material (e.g., portable tank container).
- There was some discussion regarding the LNG quantities when shipped in packaged hazmat shipments. For example, the volume of LNG is inversely related to the number of passengers on a vessel (i.e., more passengers will result in less LNG on the ship).
- Tanks are built so that no venting is allowed during the journey.

4. Risk Assessment of Surface Transport of LNG

Presented by David Willauer, Cambridge Systematics, Bethesda, MD

This topical area focused on the known risks and emergency preparedness challenges of current modes of surface transportation of LNG. Topics addressed in the presentation and discussions included:

- Natural Gas Properties, Trends
- Marcellus/Utica Region
- Supply Chain Analysis
- Quantitative Risk Assessment
- Rail LNG Risk Factors
- LNG Hazard Characteristics
- Emergency Response
- Study Findings

Key points of the presentation and follow-on discussions included the following:

- Natural gas is often generated through the extraction of crude oil. Separation of natural gas in product streams remains a challenge in certain areas of the U.S. given the enormous surplus currently found in the country and the limited number of separation and cracking facilities.
- There is an increasing utilization of natural gas for export activities; primarily from the U.S. Gulf Coast by ship. The leading countries that are financing the construction of U.S. LNG facilities and subsequently importing LNG include Japan, India and the Pacific Rim.
- Natural gas is used for commercial, residential and industrial heating purposes in the U.S. and will be used a replacement of nuclear and coal generated energy as the latter are phased out.
- Long distance shipments of LNG by rail are less likely in the future because it is less expensive to transport natural gas in a pipeline, and the U.S. has an extensive natural gas pipeline network.
- Reiterating an earlier point that rail supplements pipeline networks, tank trucks (MC-338) are currently used to transport LNG in places where a pipeline network does not exist (e.g., New England).
- There was considerable discussion of ideas to improve LNG emergency response. The importance of first responder information and training were noted, including response to incidents involving crude oil and ethanol shipments and high hazard flammable trains (HHFT). Since HHFTs are defined as shipments of Class 3 (flammable liquids) such as crude oil and ethanol, LNG by rail would not currently be defined as HHFT since LNG is classified as 2.1 (flammable gas). As LNG transportation increases, first responders in communities through which LNG is transported will require supplemental information and training that complements current hazmat training.

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- The USCG and MARAD continue to examine LNG fueling operations in light of interest on the part of cargo ships, cruise ships and petroleum supply vessels being fueled by LNG or as a dual (diesel/LNG) fuel. Some vessels are using LNG for both propulsion and cargo transport. This will impact bunkering operations in marine ports, including Jacksonville, FL, Miami, FL, Houston, TX, and Fourchon, LA.
- It was observed that with increasing use rail transportation for LNG, it will be very important that the Mid Atlantic regional area improve its LNG incident preparedness. Pennsylvania is second only to Texas in terms of railway miles and is also a most important center of domestic natural gas production.
- There was significant support among attendees on the need to ensure improved emergency preparedness.

5. LNG Transportation: Terminal and Transfer Operations

Presented by Arthur Buff, Community Liaison, PHMSA Office of Pipeline Safety / Southern Region

This topical area focused on LNG terminal and transfer operations, on PHMSA's mission as a federal partner in the regulation of the LNG industry, and on the state of the LNG industry both today and in the future, including the rationale for considering rail transport of LNG nationally. Topics addressed in the presentation and discussions include:

- Who is PHMSA?
- Our National Presence
- PHMSA Office of Pipeline Safety
- Regulated Pipeline Systems (as of Oct. 2019)
- LNG Facilities PA and NJ
- Why Pipeline Safety Laws?
- Energy Friendly Administration
- Prudhoe Bay Oil Field, North Slope
- What is LNG?
- LNG Exports
- LNG Incidents in U.S.
- Is LNG Hazardous or Toxic?
- LNG Vapors – Non-Toxic
- LNG Does Not Harm Fish
- LNG Does Not Burn
- Drinking Water with LNG
- LNG Risks
- Types of LNG Facilities
- Gas Purification
- LNG Import Terminal

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- LNG Export Terminal
- LNG Export Production to Distribution
- Federal Oversight of Liquefied Natural Gas Value Chain
- PHMSA and FERC Regulatory Authority
- Pipeline Safety Regulations
- Regulations Open to Interpretation
- Part 193 Regulatory Requirements
- Liquefaction Refrigerants
- Liquefaction LNG Chain
- Elba Island LNG Expansion
- Elba Island LNG Facility
- Eagle/Crowley LNG Facility, 1,000,000 Gallon Storage, 200,000 gpd, Maxville, FL
- Proposed Northstar Jacksonville LNG Piping along Pier to Serve Marine based Markets (fuel for ships)
- Small-Scale LNG Facilities
- Miami LNG Plant – 100,000 gpd
- LNG Safety Research and Studies
- LNG Plant Requirements - FAQs
- LNG Advisory Bulletins (ADB)

Key points of the presentation and follow-on discussions included the following:

- The U.S. is the #1 producer of oil and gas and is now energy independent and moving towards energy dominance.
- Approximately 81% of the 2.8 million miles of pipelines in the U.S. are used for natural gas distribution and are regulated by PHMSA.
- With a 1:600 liquid to vapor expansion ratio, there are significant advantages in liquefying natural gas for rail, highway, and marine transport. Shipping natural gas in its liquid form remains the most economical method for transporting and storing natural gas.
- PHMSA regulates LNG facilities used in the transportation of natural gas if there is a pipeline transporting natural gas to or from the LNG facility. PHMSA currently regulates 26 interstate and 131 intrastate LNG facilities. FERC is responsible for siting onshore and near shore LNG import or export facilities and issuing permits.
- A total of 17 LNG export terminals have been approved by FERC and are either under construction or are awaiting construction.
- Since 1964 – 33,000 LNG ship voyages (>60,000,000 miles) have occurred without a significant spill, loss of cargo, or environmental incident. Insurance rates for LNG marine shipments 25% less than crude oil rates.
- LNG plant requirement Frequently Asked Questions (FAQ) can be found at <https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-plant-requirements-frequently-asked-questions>.

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6. LNG Transportation by Rail

Presented by Mark Maday, Federal Railroad Administration, HM Division Office of Technical Oversight, Washington, DC

This topical area focused directly on the question of the viability of LNG transportation by rail, on the possible national need for increasing LNG transport through use of rail transportation, and on the hazards and concerns that need to be addressed in undertaking LNG rail transportation.

Topics addressed in the presentation and discussions include:

- Abundant Affordable Natural Gas from Shale
- UN1972, Methane, refrigerated liquid (cryogenic liquid), 2.1
- Flammable Commodity Comparison
- Modal Packaging Transport Of LNG
- Surface LNG Movements (Highway)
- Background
- Currently Approved Rail Movements of LNG in UN Portable Tanks
- UN Portable Tank Shipment Experience for LNG
- Relevant Tank Car Transportation Experience
- DOT-113C120 Cryogenic Tank Car
- DOT-113 FAQ's
- LNG Research
- Special Permit Request SP-20534
- Regulatory Actions
- LNG Use as a Locomotive Fuel

Key points of the presentation and follow-on discussions included the following:

- Attendees observed that the volume, abundance, and location of natural gas production locations may very well necessitate LNG transportation via rail. As noted throughout the program, rail transportation supplements the current pipeline network, with a major challenge being an insufficient number of rail cars currently available for LNG shipment.
- Methane, the main component of natural gas, is not currently an authorized commodity for transportation by rail. Current regs only authorize bulk shipments by rail in UN T-75 cryogenic portable tanks (10,000-gallon capacity) under a special permit. Federal Railway Administration (FRA) must approve the method of transportation on the rail car. All Class I railroads have prohibitions on Class 2 materials in Intermodal Service, and current regulations do not authorize shipments in tank cars.
- At the present time only two railroads have approached FRA to ask to move LNG via rail -Florida East Coast Rail (FECR) and the Alaska Railroad (AKRR). FECR transportation routes are limited to Port Everglades and from Hialeah (near Miami) to Jacksonville, FL, even though it has permit to move LNG across the country.

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- Cryogenic flammable gases such as ethylene have moved via rail for over 60 years with very sound safety record (DOT-113 tank car).
- Operational issues and/or challenges that were raised for the LNG rail transport included the following:
 - Cryogenic liquid tank cars are larger than regular tank cars.
 - As a time sensitive material, LNG would have 21 days to move from its initial shipping point to its destination.
 - There is currently no fleet of LNG tank cars; all tank cars would need to be custom built at an estimated cost of \$650,000 to \$750,000 per tank car.
- While Class I railroads have conducted tests using LNG as a fuel for locomotives, at the present times those projects have been postponed due to economic reasons (i.e., low cost of diesel fuel). FECR has used dual (LNG-diesel) for locomotive fuel without major issues, with performance better than originally expected.
- FRA discussions continue on requirements for the composition and thickness of the inner and outer tank shells. Full scale shell Impact Testing and analysis of a DOT-113 tank car will occur in November 2019, and an ISO tank fire test will occur in Spring 2020.

IV. OPEN DISCUSSION

Throughout the course of the Town Hall, numerous questions and discussions focused on the facts, science, risks and experiences associated with LNG transportation. At the conclusion of the Town Hall, there was agreement of the following points pertaining to LNG emergency planning and response:

1. There is a significant body of knowledge and experience-base associated with LNG transportation via cargo tank trucks, marine, and as a modal fuel source (e.g., trucks, locomotives, marine vessels).
2. The transportation and emergency response risks associated with the surface transportation of LNG are less than those associated with the transportation of Class 2.1 flammable liquefied gases (e.g., LPG), Class 3 flammable liquids (e.g., crude oil), and Class 2.3 Toxic Inhalation Materials (TIM).
3. The emergency planning and information sharing requirements promulgated for HHFT's (HM-251 B) represent a good starting point for developing commensurate requirements for the rail transportation of LNG.
4. Pending future regulatory actions, shipper, carrier and PHMSA actions should include developing and delivering critical product, container and emergency response information and related training materials for the emergency planning and response communities.

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Materials developed as a result of the HHFT issue (e.g., PHMSA TRIP-R Program, HHFT White Paper, EPA Region 5 HHFT Workshops) provide effective examples and a template for future actions.