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November 2016

# HAZARDOUS MATERIALS RAIL SHIPMENTS

Emergency  
Responders Receive  
Support, but DOT  
Could Improve  
Oversight of  
Information Sharing

# GAO Highlights

Highlights of [GAO-17-91](#), a report to the Ranking Member, Committee on Transportation and Infrastructure, House of Representatives

## Why GAO Did This Study

Recent rail accidents involving hazardous materials, such as crude oil, have raised questions about local emergency responders' ability to take protective actions in the aftermath of such accidents. Along with FRA, PHMSA is responsible for ensuring the safe transportation of hazardous materials by rail through issuing and enforcing railroad- and shipper-safety regulations.

GAO was asked to review efforts that enhance preparedness for hazardous materials rail accidents. This report examines: (1) the factors selected local emergency planners report affect preparedness; (2) the actions selected railroads have taken to support preparedness; and (3) the actions DOT has taken to support emergency planners.

GAO reviewed laws and regulations and surveyed (1) emergency planners representing 25 counties and 17 states with the highest volumes of hazardous materials rail shipments and (2) all seven Class I railroads and four smaller railroads selected because they operate in the counties where GAO surveyed local emergency planners.

## What GAO Recommends

GAO recommends that DOT develop a process for regularly collecting information from state emergency-planning agencies about their distribution of railroad-provided hazardous materials shipping information to local emergency planning entities. DOT concurred with our recommendation.

View [GAO-17-91](#). For more information, contact Susan Fleming at (202) 512-2834 or [flemings@gao.gov](mailto:flemings@gao.gov).

November 2016

## HAZARDOUS MATERIALS RAIL SHIPMENTS

### Emergency Responders Receive Support, but DOT Could Improve Oversight of Information Sharing

#### What GAO Found

Emergency planners from most of the 25 selected counties in 17 states that GAO surveyed reported that training for responders and information about rail shipments of hazardous materials affect preparedness. Emergency planners from almost all of the selected counties reported that a majority of the emergency response personnel, such as fire fighters, who arrive first at an accident receive basic training that would enable them to take initial protective actions, including recognizing hazardous materials and calling for assistance in the event of a rail accident involving crude oil and other hazardous materials. Emergency planners from most counties reported that training related to rail hazardous materials was useful in preparing for accidents. Emergency planners reported that some factors present obstacles to responders' receiving training, such as neglecting one's professional duties to take time off for training. Emergency planners from most counties reported that railroads in their jurisdictions have provided them with information about hazardous material shipments and that this information is useful in preparing for potential accidents.

All seven of the largest railroads (called Class I railroads) and some of the four smaller railroads that GAO surveyed reported providing training and information about hazardous materials to local emergency responders and planners in recent years. The Class I railroads reported training through a variety of means, including locally delivered training exercises or off-site at industry-recognized training centers. In addition, railroads reported providing information about hazardous material shipments to state and local emergency planners in part due to a May 2014 Department of Transportation (DOT) Emergency Order requiring notification of state emergency-planning agencies about shipments of crude oil from North Dakota and Montana where the Bakken shale deposit is located. This information was intended to reach local emergency responders so that they could better prepare for rail accidents involving crude oil.

The Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Railroad Administration (FRA) within DOT have taken multiple actions to support emergency preparedness for rail incidents involving hazardous materials; some actions focused specifically on trains carrying Bakken crude oil. For example, PHMSA developed a web-based training curriculum on how to prepare for hazardous materials incidents, and FRA determined whether railroads provided information about Bakken crude-oil shipments to states. However, PHMSA learned that some states did not provide the information about Bakken crude oil shipments to local emergency planners, as called for in the Emergency Order. Recently enacted legislation expands FRA's oversight of railroads' actions moving forward; for example, railroads will be required to notify states of large shipments of other hazardous materials. However, FRA and PHMSA have not taken steps to understand whether the shipment information railroads are required to share with states is consistently disseminated to local emergency planners. Therefore, the extent to which DOT's information-sharing requirements have the potential to improve local preparedness for rail accidents involving hazardous materials is unclear.

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## Abbreviations

AAR	Association of American Railroads
ASLRRA	American Short Line and Regional Railroad Association
DOT	Department of Transportation
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
<i>ERG</i>	<i>Emergency Response Guidebook</i>
FAST Act	Fixing America's Surface Transportation Act
FEMA	Federal Emergency Management Agency
FRA	Federal Railroad Administration
HMEP	Hazardous Materials Emergency Preparedness grants
HMR	Hazardous Materials Regulations
LEPC	local emergency planning committee
NFPA	National Fire Protection Association
PHMSA	Pipeline and Hazardous Materials Safety Administration
SERC	state emergency response commissions
SERTC	Security and Emergency Response Training Center
TRANSCAER	Transportation Community Awareness and Emergency Response
TRIPR	Transportation Rail Incident Preparedness and Response training

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November 17, 2016

The Honorable Peter DeFazio  
Ranking Member  
Committee on Transportation and Infrastructure  
House of Representatives

Dear Mr. DeFazio:

Each year, freight railroads safely transport thousands of commodities, including hazardous materials, across the country. However, over the last several years, accidents involving crude oil, a hazardous flammable liquid, have occurred. For example, in June 2016 a derailment occurred near Mosier, Oregon, resulting in 47,000 gallons of crude oil being released near the Columbia River Gorge. Furthermore, in July 2013, a derailment in Lac Mégantic, Quebec, resulted in the deaths of 47 people and extensive damage to the city's downtown area. These accidents have occurred as railroads have increasingly been used to transport crude oil from certain regions, such as North Dakota and Montana, where the Bakken shale deposit lies. According to the Energy Information Administration, monthly shipments of crude oil transported by rail climbed from about 1-million barrels in January 2010 to nearly 36-million barrels in October 2014. Although rail shipments of crude oil have declined overall recently as domestic production levels have slowed, questions have been raised about the ability of railroads and local emergency responders to prepare for and take protective actions in the immediate aftermath of a serious accident, particularly in rural areas where there may be fewer resources to respond.

In light of these questions, the Department of Transportation (DOT) issued—and the Federal Railroad Administration (FRA) has since enforced—an Emergency Restriction/Prohibition Order (Emergency Order) in May of 2014 requiring railroads transporting large volumes of Bakken crude oil to notify states about their estimated operations in an effort to enhance local emergency responder preparedness.<sup>1</sup> Also within DOT, the Pipeline and Hazardous Materials Safety Administration (PHMSA) has lead responsibility for ensuring the safe movement of

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<sup>1</sup>DOT, *Emergency Restriction/Prohibition Order*, DOT-OST-2014-0067 (Washington, D.C.: May 7, 2014). This Emergency Order affects railroads that operate trains transporting 1,000,000 gallons or more of Bakken crude oil.

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hazardous materials across all transportation modes by issuing and enforcing safety regulations, including requirements for carriers and shippers to provide emergency response information and report accidents involving hazardous materials. PHMSA coordinates with FRA in developing and interpreting hazardous-materials transportation regulations related to rail transportation and FRA enforces these regulations.

You asked us to review efforts to enhance preparedness for accidents involving the transportation of crude oil and other hazardous materials by rail. This report examines: (1) the factors that selected local emergency planners reported as affecting preparedness for rail accidents involving hazardous materials, (2) the actions that Class I and selected other railroads reported taking to support local emergency planners' preparedness for rail accidents involving hazardous materials, and (3) the actions that DOT has taken to support state and local emergency planners' preparedness for rail accidents involving hazardous materials and additional actions, if any, that DOT could take. The scope of our review was limited to emergency planning and preparedness for rail accidents involving hazardous materials, and did not focus on other phases of emergency response for an accident, such as mitigation and clean-up activities, which are largely the responsibility of federal agencies other than DOT.<sup>2</sup>

To inform all of our objectives, we reviewed relevant literature about rail accidents involving hazardous materials and the response to such accidents, including journal articles and reports, as well as prior GAO reports on the transportation of hazardous materials by rail.<sup>3</sup> We also

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<sup>2</sup>The Federal Emergency Management Agency within the Department of Homeland Security works with state and local stakeholders to implement the National Incident Management System, a comprehensive, national approach to incident management that is applicable at all jurisdictional levels and across functional disciplines and the full spectrum of potential incidents, hazards, and impacts, regardless of size, location, or complexity. FEMA also manages the Emergency Management Performance Grant program that assists local, tribal, territorial, and state governments in enhancing and sustaining all-hazards emergency management capabilities. The Environmental Protection Agency and U.S. Coast Guard are the lead agencies for responding to hazardous materials substance releases for inland and coastal zones, respectively.

<sup>3</sup>GAO, *Oil and Gas Transportation: Department of Transportation is Taking Actions to Address Rail Safety, but Additional Actions are Needed to Improve Pipeline Safety*, [GAO-14-667](#) (Washington, D.C.: Aug. 21, 2004) and GAO, *Rail Safety and Security: Some Actions Already Taken to Enhance Rail Security, but Risk-Based Plan Needed*, [GAO-03-435](#) (Washington, D.C.: Apr. 30, 2003).

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reviewed relevant statutes, such as the Fixing America's Surface Transportation (FAST) Act of 2015<sup>4</sup> and the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)<sup>5</sup> and regulations, such as the Hazardous Materials Regulations (HMR)<sup>6</sup> to determine requirements for DOT and railroads related to transporting hazardous materials by rail, as well as requirements for federal agencies, states, and localities regarding emergency planning and reporting related to hazardous materials. In addition, we interviewed officials at DOT (including FRA and PHMSA officials), the Federal Emergency Management Agency (FEMA) within the Department of Homeland Security, the Environmental Protection Agency (EPA), and the National Transportation Safety Board to understand the roles and responsibilities of federal, state, and local stakeholders in emergency preparedness and response to rail accidents involving hazardous materials.

To identify views of selected local emergency planners on factors that affect preparedness, we conducted structured interviews with, and provided a questionnaire to a nonprobability sample of 25 local emergency planners, primarily from local emergency planning committees (LEPC)—the groups responsible for implementing emergency response plans and managing preparedness activities. We identified LEPCs to interview that were located in the three urban and three rural counties that had the highest volumes of hazardous materials in each of the five PHMSA regions and were able to contact LEPCs in 25 of the 30 counties. To estimate the volumes of crude oil and other hazardous materials transported by rail, we used the Surface Transportation Board's 2013 Waybill Sample, the most recent data at the time of the review. These data contain information on the origin and destination for a nationally representative sample of rail shipments. To determine the reliability of the data, we reviewed the documentation provided by the Surface Transportation Board on how the sample was taken and did electronic testing to ensure that we received the complete file. We determined that the data used in this report were sufficiently reliable for the purpose of our review. We received completed questionnaires from emergency planners in 24 of 25 counties and interviewed all 25 across 17 states. We then conducted an analysis of responses provided by these officials to the

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<sup>4</sup>Pub. L. No. 114-94, 129 Stat. 1312 (2015).

<sup>5</sup>Pub. L. No. 99-499, title III, 100 Stat. 1613, 1728 (1986).

<sup>6</sup>49 C.F.R. pts 171-180.



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questionnaire and structured interview questions. Because our work was based on a nonprobability sample of counties, the information we obtained and present in this report should not be regarded as an exhaustive list of factors local emergency planners may consider as affecting preparedness for rail incidents involving hazardous materials. Similarly, the information and perspectives that we obtained from these local emergency planners are not generalizable to other local planners or counties. Furthermore, we interviewed representatives from associations representing local emergency responders, such as the International Association of Fire Chiefs. We also reviewed training standards for first responders to understand hazardous materials training levels.

To understand the actions selected railroads have taken to support emergency preparedness, we developed a questionnaire and administered it to all seven Class I railroads and six smaller regional and short line railroads, known as Class II and Class III railroads respectively.<sup>7</sup> The Class II and Class III railroads were selected because they operate in counties where we conducted structured interviews with local emergency planners and to obtain variation in railroads operating in urban and rural counties. We sent our questionnaire to two Class II railroads and four Class III railroads, and received responses from both Class II railroads and two Class III railroads. We also interviewed officials from 5 of 7 Class I railroads, the Association of American Railroads (AAR), and the International Association of Sheet Metal, Air, Rail, and Transportation Workers. Because our work was based on a nonprobability sample of Class II and Class III railroads, the results of the questionnaires with the smaller railroads cannot be generalized to the entire population of Class II and Class III railroads.

To understand DOT's actions to support preparedness for rail accidents involving hazardous materials and additional actions, if any, it could take, we reviewed pertinent FRA and PHMSA documents related to these actions, including training materials and guidance, grant program documentation, and documentation on efforts to oversee the implementation of requirements for railroads to share information on train

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<sup>7</sup>Railroads are classified into three classes based primarily on annual operating revenues. According to the Surface Transportation Board, as of 2015, Class I railroads are those with annual operating revenues of at least \$457.9 million, Class II railroads are those with annual operating revenues of less than \$457.9 million but in excess of \$36.6 million, and Class III railroads are those with annual operating revenues of \$36.6 million or less. 49 C.F.R. § 1201.1-1. Class II freight railroads typically operate over 350 to 900 miles of track and Class III freight railroads typically operate over less than 350 miles of track.

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contents and movements. We compared the agencies' efforts to oversee the implementation of information-sharing requirements for railroads with pertinent *Standards for Internal Control in the Federal Government*.<sup>8</sup> We also interviewed emergency planners from 17 selected state emergency response commissions (SERC) on the use of PHMSA grants to support preparedness and response efforts.<sup>9</sup> These SERCs were chosen because their state coincided with the geographic location of the local emergency planners we selected. Because our work was based on a nonprobability sample, the information and perspectives we obtained from these state emergency planners is not generalizable to other state planners. See appendix I for a more detailed description of our objectives, scope, and methodology.

We conducted this performance audit from June 2015 to November 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

In the past several years, rail has increasingly been used to ship crude oil, a flammable liquid. Even though crude oil shipments by rail have declined in the past year, from January 2010 to October 2014 shipments increased over 30 times, peaking at almost 36 million barrels or about 51,000 rail carloads in October 2014 (see fig. 1).<sup>10</sup> This increase is due to pipeline capacity constraints in certain areas of the country, including the Bakken shale region in North Dakota.<sup>11</sup> As shipments of crude oil have increased, the number of rail accidents involving crude oil has also

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<sup>8</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

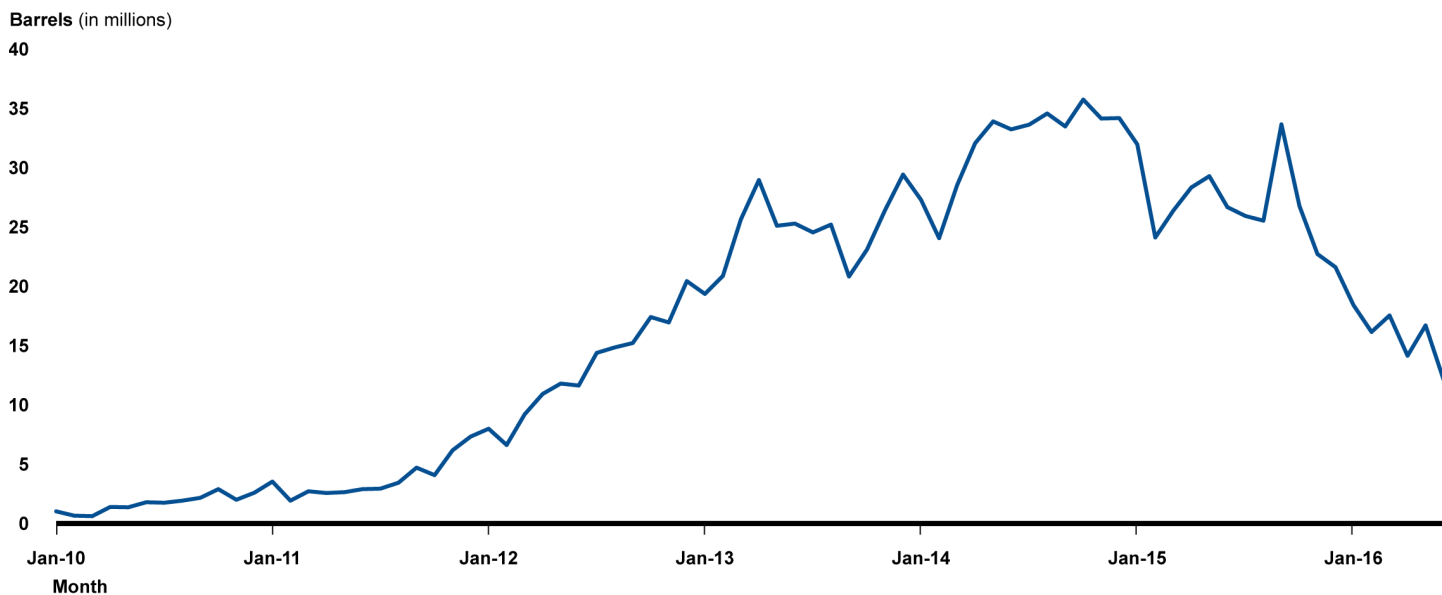
<sup>9</sup>We were unable to interview SERC officials in one of the states in which we conducted interviews with local emergency planners. However, we interviewed SERC officials in another state where we pre-tested our questionnaire and structured interview guide.

<sup>10</sup>Hazardous materials comprise a small portion of commodities shipped by rail—about 2 million out of 14 million annual carloads shipped by U. S. railroads in 2015.

<sup>11</sup>See GAO, *Oil and Gas Transportation: Department of Transportation is Taking Actions to Address Rail Safety, but Additional Actions are Needed to Improve Pipeline Safety*, [GAO-14-667](#) (Washington, D.C.: Aug. 21, 2014).

increased, even as rail accidents involving all hazardous materials have declined.<sup>12</sup> From 2006 to 2010, there were 19 rail incidents involving crude oil, 4 of which were designated by PHMSA as serious rail incidents—compared with 399 crude oil rail incidents from 2011 to 2015—21 of which were designated by PHMSA as serious.<sup>13</sup> Serious accidents can involve derailments, collisions, and release of materials. Depending on the commodities a train is carrying, releases can involve not only crude oil, which is flammable, but also a variety of chemicals such as sodium hydroxide which can irritate the eyes and burn the skin.

**Figure 1: Volume of Crude Oil Transported by Rail, January 2010 to June 2016**



Source: Source: U.S. Energy Information Administration. | GAO-17-91

<sup>12</sup>According to AAR, overall accidents that involved a hazardous material release declined 66 percent between 2000 and 2014.

<sup>13</sup>PHMSA’s Incident Reports Database designates some incidents as more serious than others. PHMSA’s definition of a “serious incident” is one that involves (a) a fatality or major injury caused by the release of a hazardous material, (b) the evacuation of 25 or more employees or responders or any number of the general public as a result of release of a hazardous material or exposure to fire, (c) a release or exposure to fire which results in the closure of a major transportation artery, (d) the alteration of an aircraft flight plan or operation, (e) the release of radioactive materials from Type B packaging, (f) the suspected release of a Risk Group 3 or 4 infectious substance, (g) the release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant, or (h) the release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material.

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The railroad industry is dominated by the seven largest railroads, known as Class I railroads, which transport the majority of rail freight—including hazardous materials—across a network of 200,000 miles of track, mostly in rural areas. In addition, numerous Class II and hundreds of Class III railroads have essential roles in moving freight, typically linking rural communities to the larger railroad network.<sup>14</sup> According to DOT, about 18 percent of all Class I carload freight originates or terminates on a Class II or Class III railroad, often called “first mile” and “last mile” movements.

Federal, state, and local entities all play a role related to emergency preparedness for rail accidents involving crude oil and other hazardous materials. For example, DOT oversees compliance with safety regulations applicable to the rail transportation of hazardous materials. Specifically, PHMSA—through its Office of Hazardous Materials Safety—issues regulations that apply to shippers and railroads transporting hazardous materials, like crude oil.<sup>15</sup> PHMSA also provides grants to states to fund training for local responders. As mentioned previously, DOT issued an Emergency Order in May 2014 that requires railroads planning to operate trains transporting 1-million gallons or more of Bakken crude oil to notify states of the expected movement along the routes. The Emergency Order focused on ensuring that state and local emergency responders know the frequency and number of Bakken crude-oil trains moving through their jurisdictions. FRA provides regulatory oversight for both passenger and freight rail, issuing and enforcing safety regulations.<sup>16</sup> FRA enforces its own regulations and the HMR, through its inspections and audits conducted by FRA officials and state partners in some states. In addition,

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<sup>14</sup>Class I railroads collectively accounted for more than 90 percent of annual railroad-freight revenues in 2012. In addition, approximately 560 smaller short-line and regional railroads, known as Class II and Class III railroads may transport hazardous materials over shorter distances.

<sup>15</sup>Hazardous materials are defined in DOT regulation as a group or class of materials that the Secretary of Transportation determines may pose an unreasonable risk to health and safety or property when transported in commerce in a particular amount and form. There are nine classes of hazardous materials, including Class 3 flammable liquids and combustible liquids, such as petroleum crude oil and ethanol. The other classes are: explosives (Class 1); gases (Class 2); flammable solid, spontaneously combustible, and dangerous when wet (Class 4); oxidizer and organic peroxide (Class 5); poison (toxic) and poison inhalation hazard (Class 6); radioactive (Class 7); corrosive (Class 8); and miscellaneous (Class 9).

<sup>16</sup>These include requirements governing track, signal and train control systems, highways-rail-grade-crossing warning systems, mechanical equipment including locomotives and cars, and railroad-operating practices. 49 U.S.C. § 20103.

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state officials, local emergency planners, and the railroads also play specific roles in planning and preparing for emergencies, specifically:

- Based on EPCRA, each state is required to establish a SERC that acts as the emergency-planning focal point and that is responsible for designating emergency-planning districts and appointing LEPCs for each district.<sup>17</sup> The SERC supervises the activities of the LEPCs. LEPC membership includes representatives from police, fire, civil defense, health, transportation (including rail), environmental agencies, among others. These entities plan, gather, and share information about emergency preparedness and arrange for emergency responders' training.
- Local emergency-planning agencies prepare local emergency plans that include emergency response plans, training requirements for emergency responders (e.g., police officers, firefighters, and emergency medical technicians), and other vital hazardous material response information.<sup>18</sup> Local emergency-planning agencies may also prepare commodity flow studies.<sup>19</sup> Most U.S. firefighters are volunteers.<sup>20</sup>
- Under DOT's Emergency Order, the railroads support emergency responders by providing SERCs with information about expected movements of trains carrying Bakken crude oil. In addition, since 1996, railroads that ship oil in containers exceeding 3,500 gallons must prepare response plans that document that they have trained personnel, placed equipment, and established procedures to respond to an oil spill.<sup>21</sup> PHMSA has recently proposed in coordination with

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<sup>17</sup>EPCRA established authorities for emergency planning and preparedness and emergency release notification reporting, among other things. Pub. L. No. 99-499, 100 Stat. 1613, 1729(1986).

<sup>18</sup>EPA officials told us that because LEPCs develop local emergency response plans that include transportation routes, it is important that SERCs share the information they receive from railroads.

<sup>19</sup>"Commodity flow studies" describe the types and amounts of hazardous materials transported through a specified geographic area—such as a single community, a large urban area, a region, or a state—and the modes of transportation.

<sup>20</sup>According to the National Fire Protection Association, in 2014, 69 percent of the 1.1 million U.S. firefighters nationwide were unpaid volunteers, and communities of 25,000 in population or less were more likely to have predominantly volunteer firefighters. NFPA, *U.S. Fire Department Profile—2014* (January 2016).

<sup>21</sup>49 C.F.R. Part 130.

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FRA, expanding the oil-spill response-planning requirements to require railroads to obtain FRA approval for more detailed, comprehensive oil-spill response plans for high-hazard flammable trains carrying petroleum oil.<sup>22</sup>

Recently enacted legislation may change the responsibilities of some stakeholders. In December 2015, President Obama signed into law the FAST Act,<sup>23</sup> which requires DOT to codify and expand the information sharing requirement relative to the existing Emergency Order's notification requirements for trains carrying 1-million gallons or more of Bakken crude oil.<sup>24</sup> In accordance with the FAST Act, in July 2016 PHMSA proposed regulations (the same as mentioned above) to require railroads to share information on a monthly basis about high-hazard flammable trains' operations with state (i.e., SERC) and tribal emergency response commissions. "High hazard flammable trains" are those that transport (1) 20 or more tank cars loaded with a Class 3 flammable liquid in a continuous block or (2) a total of 35 or more tank cars carrying such materials.<sup>25</sup> The FAST Act also directs DOT to require railroads to provide, through the applicable fusion center,<sup>26</sup> emergency responders with real-time access to information about the train's hazardous materials shipments in the case of a train accident.

While planning is conducted by a range of participants, local emergency responders and railroad train crews are typically first on the scene in the immediate aftermath of this type of accident. Firefighters, police, and emergency medical technicians assess and secure the scene, as described in figure 2. For example, local and sometimes regional officials may be responsible for advising the public on taking shelter-in-place

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<sup>22</sup>81 Fed. Reg. 50068 (July 29, 2016).

<sup>23</sup>Pub. L. No. 114-94, 129 Stat. 1312.

<sup>24</sup>The Emergency Order indicates that a train comprised of approximately 35 tank cars would carry 1-million gallons or more of Bakken crude oil, assuming each tank car contains 30,000 gallons of crude oil.

<sup>25</sup>Pub. L. No. 114-94, §§ 7302(b)(6) and 7303(a)(3).

<sup>26</sup>Fusion centers are state and local agencies that provide multidisciplinary expertise and situational awareness to inform decision making at all levels of government. They conduct analysis and facilitate information sharing while assisting law enforcement and homeland security partners in preventing, protecting against, and responding to crime and terrorism. For more information on fusion centers, see GAO, *Information Sharing: DHS Is Assessing Fusion Center Capabilities and Results, but Needs to More Accurately Account for Federal Funding Provided to Centers*, [GAO-15-155](#) (Washington, D.C.: Nov. 4, 2014).

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actions or conducting evacuations of affected populations.<sup>27</sup> In addition, assuming they are not affected by an accident, railroad train crews are expected to provide local emergency responders with information about the type and quantity of hazardous materials on the train, the position of the train's contents, and the emergency contact information (referred to as hazardous materials documentation), as described in figure 2. According to the HMR, railroads are required to provide notice of certain hazardous materials accidents<sup>28</sup> to the National Response Center.<sup>29</sup>

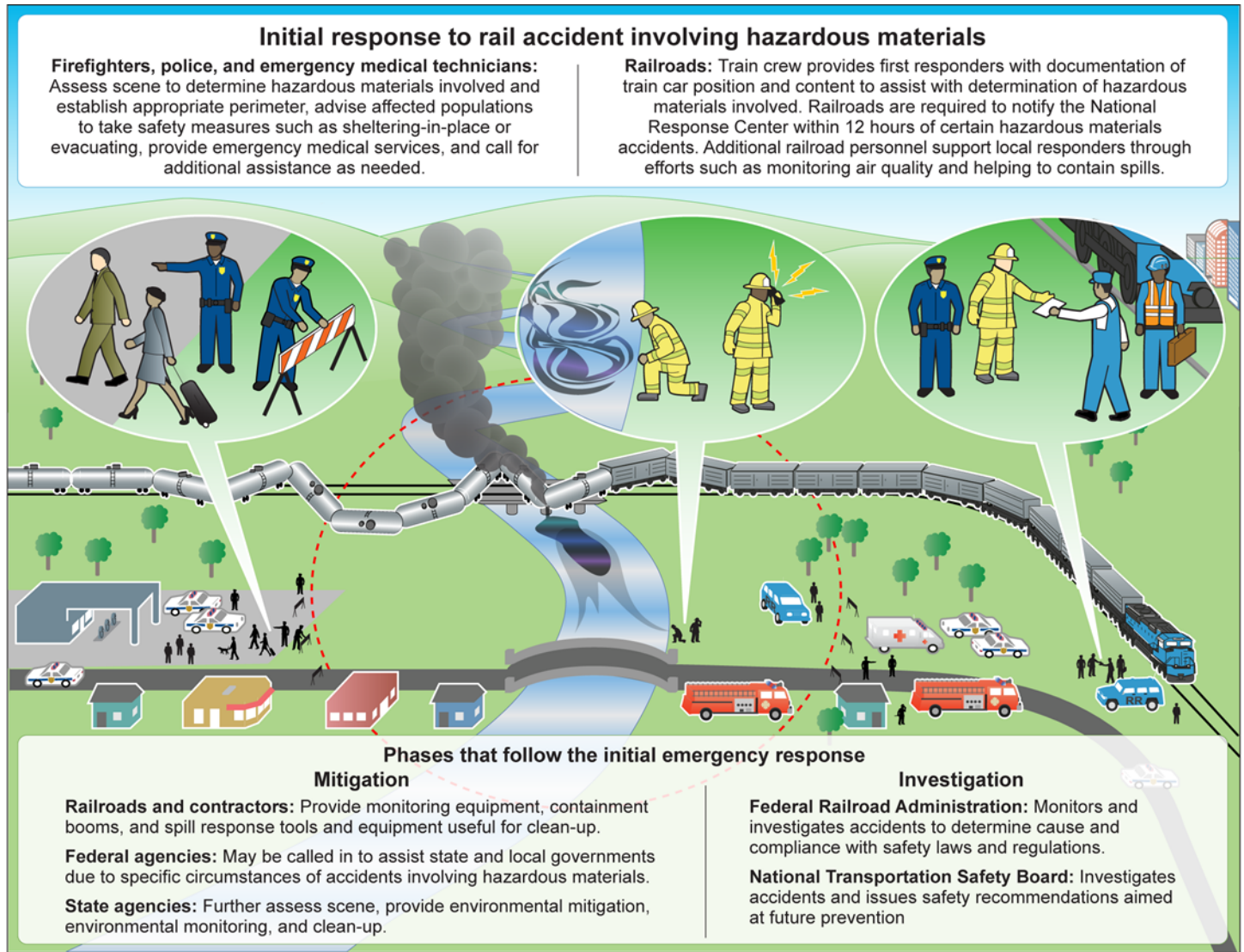
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<sup>27</sup>Emergency response to rail incidents follows the approach established by the National Incident Management System, which was established by the Department of Homeland Security and which provides a common standard for overall incident management.

<sup>28</sup>49 C.F.R. § 171.15.

<sup>29</sup>The National Response Center is the sole federal point of contact for reporting oil and chemical spills and serves as the communications and operations center for the National Response Team, which is led by EPA. The National Response Center is continuously manned by the U. S. Coast Guard to provide a single point of contact for receiving and disseminating information in the event of a pollution incident.

**Figure 2: Responsibilities of Key Actors in Responding to a Hazardous-Materials Rail Accident**



Source: GAO. | GAO-17-91



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After the initial response, local emergency responders and railroads as well as state and federal agencies have various responsibilities for mitigating and investigating an accident (see fig. 2 above).<sup>30</sup>

- Mitigation: According to AAR, railroads have hazardous materials accident management personnel and employ hazardous materials response contractors and environmental consultants that provide spill response tools and equipment. Federal and state environmental agencies are responsible for assisting this effort and monitoring and evaluating the environmental damage. States are required to notify EPA and the U.S. Coast Guard, which may send representatives to the accident scene to assist in or direct response activities resulting from a hazardous materials release or discharge.<sup>31</sup>
- Investigation: FRA monitors train accidents and investigates their causes and compliance with existing safety laws and regulations. Per its discretion, the National Transportation Safety Board investigates some railroad accidents and issues safety recommendations aimed at preventing future accidents.

Training is a key aspect of planning and preparing for emergency response and mitigation. Federal regulations require that firefighters and other responders receive hazardous-materials emergency response training. When such training is provided, federal statutes regarding occupational health and safety indicate that it must be based on training standards set by a recognized, standard-setting organization, such as the National Fire Protection Association (NFPA).<sup>32</sup> NFPA standards detail the specific knowledge that trainees must have to be considered competent to provide varying levels of response to hazardous materials accidents, as we describe later in this report. Additionally, DOT officials stated that

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<sup>30</sup>In this report, we use the term “mitigation” to describe activities such as cleaning up and assessing a hazardous-materials accident scene. According to the National Incident Management System, mitigation involves actions to reduce or lessen the impact of hazards and threats.

<sup>31</sup>The *National Oil and Hazardous Substances Pollution Contingency Plan*, more commonly called the *National Contingency Plan*, is the federal government’s plan for responding to both oil spills and hazardous substances releases. The lead federal agencies for responding to hazardous materials substance releases under the *National Contingency Plan* are EPA for inland zones and the U.S. Coast Guard for coastal zones. EPA proposed changes to the *National Contingency Plan* in January 2016 to align the plan with the *National Incident Management System*.

<sup>32</sup>Occupational Safety and Health Act of 1970, Pub.L. No. 91-596, 84 Stat. 1590 (1970). 29 C. F. R. § 1910.120(q) and 40 C. F. R. § 311.

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FEMA's Emergency Management Institute serves as the national focal point for the development and delivery of emergency management training to enhance the capabilities of state, local, and tribal government officials, volunteer organizations, FEMA's disaster workforce, federal agencies, and the public and private sectors to minimize the impact of disasters and emergencies.

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## Selected Emergency Planners Reported That Responder Training and Railroads' Information Sharing Affect Preparedness

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### Emergency Planners Reported That Responder Training for Rail Hazardous Materials Accidents Is Useful, but Some Encounter Impediments to Participating in Training

Local emergency planners from almost all of the counties we contacted reported that their emergency responders participated in training, exercises, or drills ("training") to prepare for responding to rail hazardous materials incidents. Specifically, emergency planners from 21 of 22 counties<sup>33</sup> (13 urban and 8 rural) indicated that emergency responders had participated in rail hazardous materials classroom or hands-on training and 20 reported their emergency responders had participated in rail hazardous materials exercises or drills. About half of the emergency planners (13 of 22) reported that their emergency responders had received rail hazardous-materials training by independent study or webinar. Hazardous materials training may be provided by state or local emergency management agencies, colleges and associations with specialized programs, chemical producers, and railroads, among others. As discussed later, PHMSA provides grants to states to fund training for local responders. Also, as noted earlier, FEMA's Emergency Management Institute serves as a national focal point for emergency management training.

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<sup>33</sup>We provide information about the number of county respondents in this section because, although we interviewed emergency planners from 25 counties (14 urban and 11 rural), and received questionnaires from 24 counties; not all questions were answered.

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Most local emergency planners reported that the rail hazardous-materials training was useful for helping their emergency responders prepare for and respond to rail hazardous materials incidents. Local emergency planners from 18 counties (9 urban and 9 rural) reported that such training was very useful, 4 reported it was somewhat useful, and 3 reported they were uncertain about its usefulness. Some emergency planners told us that training that involved “hands on” experience was particularly helpful because it facilitated direct interaction with devices and props that emergency responders would not normally encounter except in a real-world incident. Other emergency planners told us that training provides a way for emergency responders to interact face to face with some of the stakeholders they might normally encounter in an incident, such as railroad hazardous materials experts and personnel from other fire departments. Such interaction can facilitate relationships among stakeholders by increasing familiarity and building trust. For example, one local emergency planner told us that the first responders from his county attended a railroad-sponsored hazardous materials exercise that was coincidentally held a week before a hazardous materials train derailment. The emergency planner noted that when the accident happened, responders were already familiar with the railroad and stakeholders, familiarity that facilitated cooperation and trust.

Local emergency planners reported on the percentage of their first responders who received various levels of hazardous-materials response training, from basic to more advanced. Generally, as discussed below, a greater percentage of these first responders received basic training than received more advanced levels of training, according to responses to the questionnaires we received. As described previously, there are federal requirements that firefighters and other responders receive hazardous-materials emergency response training, and when such training is provided, it must adhere to federal requirements and must be based on training standards set by a recognized, standards-setting organization, such as the NFPA.<sup>34</sup> NFPA’s standards identify the types of training needed to achieve professional competence at four levels, from “awareness”, the most basic level, to “incident commander,” the most advanced (see table 1).

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<sup>34</sup>Occupational Safety and Health Act of 1970, Pub.L. No. 91-596, 84 Stat. 1590 (1970). 29 C. F. R. § 1910.120(q) and 40 C. F. R. § 311

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**Table 1: The National Fire Protection Association’s Levels of Professional Competence for Responders to Hazardous Materials Incidents**

Level	Definition
Awareness	First responders with awareness level training are expected to detect the presence of the hazardous materials, protect themselves, call for trained personnel, and secure the scene.
Operational	First responders trained at this level must meet the National Fire Protection Association’s awareness level training as well as any additional competency designed to allow the responder to implement or support actions to protect nearby persons, the environment, or property from the effects of the release.
Technician	Responders trained at this level must use a risk-based response process by which they analyze a problem involving hazardous materials, select applicable decontamination procedures, and control a release using specialized protective clothing and control equipment.
Incident commander	Individuals with this level of training are responsible for all incident response activities, including the development of strategies and tactics as well as ordering and distributing resources.

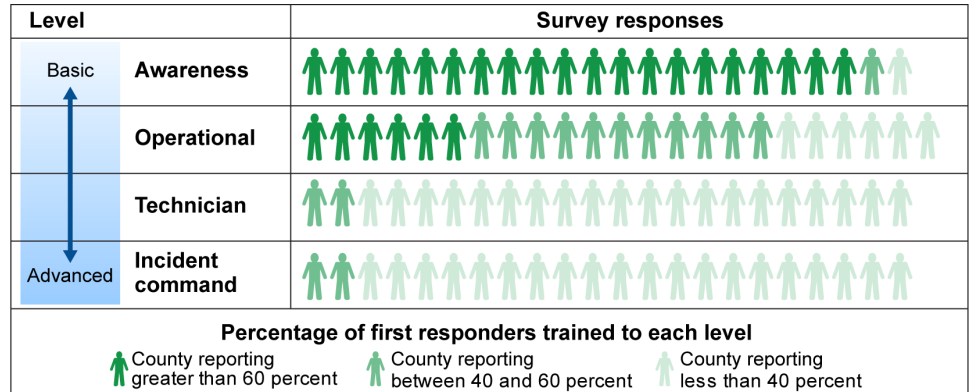
Source: National Fire Protection Association. *NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 edition. | GAO-17-91

Local emergency planners from most counties (20 of 22) reported that more than 60 percent of their first responders were trained at the awareness level, which enables first responders to recognize that they are dealing with a hazardous materials incident and call for trained response personnel. However, emergency planners from few (6 of 23) counties reported that more than 60 percent of their first responders were trained at the operational level, which allows first responders to take defensive action in the event of a hazardous materials release.<sup>35</sup> Emergency planners from even fewer counties reported emergency responders trained at the technician and incident command levels, a finding that is to be expected given that these advance levels of competency require additional hours of training and certification (see fig. 3).

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<sup>35</sup>According to the National Volunteer Fire Council, operational level training is the ideal level for training first responders to properly conduct a defensive response by taking actions to protect nearby persons, the environment, and property from the release of the hazardous material.

**Figure 3: Portion of First Responders in Selected Counties Who Are Trained at Various Levels of Professional Competence for Responding to Hazardous Materials Accidents, as Reported by Local Emergency Planners**

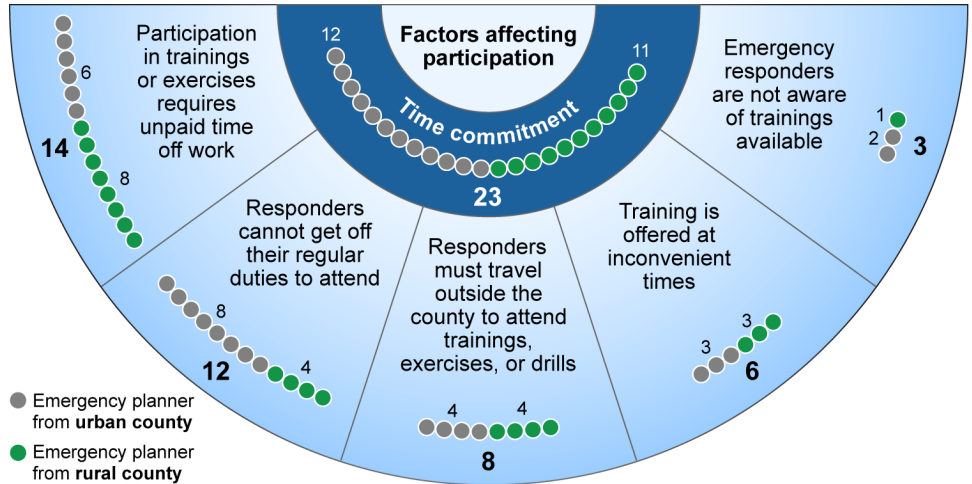


Source: GAO analysis of survey results. | GAO-17-91

Note: The number of total surveys may vary because a county may not have answered a question in a way in which we could analyze the response.

Local emergency planners in select urban and rural counties reported that various obstacles impede their emergency responders' participation in training activities—activities that would help prepare them to take defensive action to a rail accident involving hazardous materials. Factors such as dedicating time for training, taking unpaid time off of work, and being able to get off from their regular duties may discourage participation in training (see fig. 4).

**Figure 4: Significant Factors That Discourage Emergency Responders' Participation in Training, Exercises, and Drills, according to Local Emergency Planners in Select Counties**



Source: GAO analysis of information from local emergency planners in 23 counties. | GAO-17-91

Local emergency planners from 23 counties reported that the leading factor discouraging participation in rail hazardous-materials training was the time commitment to attend a training activity. As one emergency planner put it, despite the fact that the state developed a variety of rail hazardous materials training and exercises for a county's emergency responders, the ability to make use of the training opportunities ultimately rests on emergency responders' being able to attend without neglecting other professional and personal responsibilities. Local emergency planners from rural counties with largely volunteer firefighter workforce (i.e., unpaid) reported the dilemma of having to take unpaid leave from their primary workplace to attend training. One emergency planner told us that some training providers recognize this limitation and try to schedule training for periods when volunteers may be more available, such as evenings and weekends. However, even when training is offered during weekends or non-work hours, emergency planners told us that it can be difficult to get participants because of family commitments and other responsibilities. Along this same line, FRA officials told us that communities can be unwilling to send employees to training because they do not want the employees to be away from their professional duties, despite the fact that the cost of the training itself may be covered by other entities, such as a railroad, and free to the employer.

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Local emergency planners reported another obstacle to participating in training is that of backfill—the situation where a replacement worker needs to cover the shift of the person attending training. As indicated above, 12 of 23 emergency planners reported that emergency responders sometimes are not able to get off their regular duties to attend training because, for example, a replacement cannot be found. Emergency planners reported that backfill can be difficult and expensive. According to one emergency planner from an urban county, most fire departments operate with the bare minimum workforce so sending anyone away to training has a big impact on the budget because the county may need to pay existing staff overtime to work an additional shift. One described backfill as being cost prohibitive, noting that replacing absent workers can cost up to three times as much as the cost of the training itself. Emergency planners also told us that a consequence of such obstacles is that fire departments are not able to train their entire force at one point in time and that their responders have varying levels of training. Whether the workforce is comprised of volunteers or career fire fighters, planners told us that sending their entire force to training is cost prohibitive and otherwise impractical. In addition, an emergency planner illustrated this by stating that in a recent railroad scenario-based exercise, only one shift participated.

Most emergency planners viewed their emergency responders as prepared to take defensive actions, such as evacuating affected populations, sheltering in place, and setting up an incident command post in the event of a rail hazardous materials accident. Emergency planners from 22 of 25 counties reported their emergency responders as very (9 counties) or somewhat (13 counties) prepared for taking such actions. Emergency planners told us that there were differences in preparedness level within their counties, stating that some jurisdictions place a higher priority on preparedness than others. One emergency planner indicated a distinction between urban and rural locations, explaining that urban areas may have a heightened awareness to hazardous materials by rail because of the steady presence of trains on their rails. Other planners attributed a greater level of preparedness to a heightened awareness of rail accidents in recent years and to increased training. In a related issue, local emergency planners from all selected counties reported having mutual aid agreements—pre-established agreements in which first responders call for assistance from other fire departments—in place. Such agreements can increase a county's preparedness since they increase the resources (and in some instances expertise level) available for immediate response.

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## Emergency Planners from Most Counties Reported That Information from Railroads and SERCs Is Useful for Hazardous Response Planning and Preparedness

Local emergency planners from most of the selected counties reported that railroads and SERCs have provided them with a variety of information for planning and preparing for hazardous materials accidents and that this information is useful. The types of information provided include:

- *Railroads' emergency-response-planning guides:* Emergency planners from two-thirds of the counties (16 of 24) reported railroads operating in their jurisdictions provided them a copy—or copies if provided by multiple railroads—of their emergency-response-planning guides. (Emergency planners from 8 counties reported that they had not been provided guides.) Railroads' emergency-response-planning guides may include information about critical railroad contacts and railroad incident response guidelines. Emergency planners from most of the counties that received guides described the guides as being useful or very useful for preparing for a potential rail accident because they contained information about what the railroads' response activities would be. One planner told us that a guide typically includes information that can be readily incorporated into a local entity's own hazardous-materials response plan. Emergency planners from three counties told us about deficiencies with the guides and one noted that the information was not particularly useful because the plan referenced the national rail network rather than the locality and focused more on pollution response than on life safety planning. Another told us that the plans had information that was redacted or included such strict non-disclosure statements as to prevent incorporating it into local emergency-planning documents.
- *Hazardous materials information:* Local emergency planners from most counties (22 of 24) reported having been provided information about hazardous materials transported through their areas, including a few that told us their SERCs provided them with information about Bakken crude-oil shipments. In addition, most (14 of 20) indicated having no difficulty getting information. (As discussed below, emergency planners from six counties indicated they had difficulty getting information.) According to DOT, besides obtaining information about planned Bakken crude-oil shipments through the May 2014 Emergency Order, bona fide emergency responders are able to obtain information on other types of hazardous materials moving through



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their community by requesting the information from the railroad.<sup>36</sup> Emergency planners from 11 counties reported that railroads provided such information upon request, 6 reported that railroads voluntarily provided them with such information, and some reported they received information from SERCs and other entities such as the U.S. Coast Guard or the Army Corps of Engineers. Some emergency planners reported receiving information from multiple sources. Emergency planners from 17 counties reported finding the information somewhat to very useful and 4 not useful for planning and preparing for potential accidents involving hazardous materials transported by rail. One local emergency planner told us that having this information in advance of an accident helped in putting the appropriate response plans in place when a derailment involving ethanol and propane occurred. Some local emergency planners described incorporating the hazardous materials information into plans and guidance, such as emergency response plans, commodity flow studies, and county hazardous-materials plans. One said the information was used to fine tune the hazardous materials team's training exercise by focusing on the use of fire suppression foam since the information indicated an uptick in the volume of crude oil shipments. In addition, some emergency planners reported discussing the information with local emergency responders in order to increase their awareness of hazardous materials shipments.

Emergency planners from some (6 of 20) counties reported difficulty getting information about hazardous materials shipments from the railroads or SERCs. In describing the behaviors that impeded information sharing, one emergency planner told us that the railroad was reluctant to release information because it considered the information security sensitive. Another noted that the formal process for requesting information from railroads gets bogged down, perhaps because it is administered by a different office than the personnel with whom informal relationships were developed.

With respect to DOT's Emergency Order related to railroads transporting Bakken crude oil, emergency planners from 9 of 25 counties told us that the Emergency Order improved their access or had other positive outcomes, while 11 of 25 counties told us that the Emergency Order had

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<sup>36</sup>In its *Recommended Railroad Operating Practices for Transportation of Hazardous Materials*, AAR establishes industry-accepted operating procedures and recommends that railroads provide information on hazardous commodities to bona fide requesters, including emergency planners and response agencies. AAR, *Circular OT-55P* (Jan. 19, 2016).

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little or no impact on their ability to access hazardous materials information. Emergency planners from five counties told us that the effect of the Emergency Order was unclear. Of the emergency planners who told us that the Emergency Order improved access to information from the railroads, one told us that the railroad not only provided information about Bakken crude shipments but information about the 10 most shipped commodities as well. Other positive outcomes were related to providing a broader view of hazmat shipments and improving situational awareness. Emergency planners reporting little or no impact explained that in some situations they had adequate access to information prior to the Emergency Order. A couple of planners told us that the Bakken crude information is very generic and provides only generalities that they could ascertain just as readily by observing the train traffic. One emergency planner told us that the information is already accessible because at least one state provides the Bakken crude-oil information on its website for the public to access and review.

The hazardous materials information described above is used by local emergency planners from railroads and other entities to develop commodity flow studies. As mentioned previously, these studies describe the types and amounts of hazardous materials transported through a specified geographic area and the modes of transportation. Ten emergency planners told us that information provided by commodity flow studies were particularly useful as comprehensive reference guides. According to one emergency planner, a commodity flow study helps responders focus on the right response based on the potential hazard. A recent transportation study found that local emergency planners use this information as part of their all-hazards-planning process, in which understanding the risks posed by transporting hazardous materials through a community is a key component.<sup>37</sup>

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## Emergency Planners Reported That Information on Hazardous Materials Shipments Is Important for Response

Local emergency planners in the 24 counties who responded to this question told us that once a rail accident involving hazardous materials has occurred the most important information for first responders is the type and volume of hazardous materials involved—information that is found in the train’s hazardous materials documentation. In addition, emergency planners from five counties reported it was useful to know the

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<sup>37</sup>Transportation Research Board, *Hazardous Materials Cooperative Research Program Report 3: Guidebook for Conducting Local Hazardous Materials Commodity Flow Studies* (Washington, D.C.: 2011).

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order of the train cars. Train crews are required to make train documentation showing the current position of each rail car in the train immediately available to first responders in the event of an accident.<sup>38</sup>

As discussed in more detail later, AAR has developed a smart phone application and railroads are beginning to make it available to assist responders in identifying train cars' contents. Nearly all emergency planners in urban counties (13 of 14) and about half of the planners from rural counties (6 of 11) reported being familiar with this application. Emergency planners from 15 counties reported that their responders have access to the AskRail application, and 12 found it to be very useful. However, some emergency planners described some concerns about the adequacy of cellular connectivity. Emergency planners in one urban county told us they had a preference for a hard copy of a train's hazardous materials documentation because of the difficulty of reading such detailed information on a cell phone.

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## Class I Railroads and Selected Class II and III Railroads Reported Supporting Preparedness for Rail Accidents Involving Hazardous Materials

### Class I Railroads Reported Increasing Training and Support of Emergency Responders in Recent Years

Although not required by DOT, all seven Class I railroads we surveyed reported that they have provided training in the past 5 years to local emergency responders related to emergency preparedness for and response to rail accidents involving hazardous materials. Class I railroads reported directly providing or funding a variety of training, including classroom and hands-on training delivered at designated training sites and brought to responders' locations, as well as scenario-based discussions and full-scale emergency preparedness exercises. For example, one Class I railroad told us that it provides training to fire

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<sup>38</sup>49 C.F.R. § 174.26(a) states that trains crews must maintain documents that reflects the current position of each rail car containing a hazardous materials and update it to indicate changes.

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departments using props such as tank cars. Five Class I railroads reported targeting training resources to communities based on such things as the type of hazardous materials being transported in their area, the volume of such materials, and the train routes. Six Class I railroads told us that awareness- and operational-level training comprised from 50 to 80 percent of the training they offer. Railroads told us that they advertise their training to emergency planners and responders in a variety of ways, including: (1) directly to local fire departments, LEPCs, and county emergency management agencies; (2) to emergency responder organizations, conferences, and training organizations; and (3) to state agencies, including SERCs, emergency management agencies, and states' fire marshal offices. All seven Class I railroads reported providing at least part of their training through third-party organizations, such as Transportation Community Awareness and Emergency Response (TRANSCAER) or the Security and Emergency Response Training Center (SERTC), which are industry recognized and known for providing hazardous material planning and preparedness training.<sup>39</sup>

Class I railroads reported having significantly increased their training related to hazardous materials in terms of dollars spent since 2011. According to data provided by five Class I railroads, their combined total spending on training increased from about \$1.5 million in 2011 to \$4.6 million in 2015—an increase of more than 200 percent (see table 2 below). AAR officials attributed the increase in spending in part to a response to a call to action by the Secretary of Transportation in January 2014, after which Class I railroads provided \$5 million to develop additional curriculum specifically on emergency response to crude oil derailments and train first responders.<sup>40</sup> In addition, AAR officials told us that Class I railroads significantly increased their hazardous materials training efforts over the last several years in part because of the

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<sup>39</sup>All seven Class I railroads we interviewed reported providing training through TRANSCAER, a voluntary national outreach effort that focuses on assisting communities prepare for and respond to hazardous materials transportation incidents, including railroad incidents. Other railroads reported they provide tuition support for responders to attend training at SERTC. SERTC is a training center located in Pueblo, Colorado and is operated by the Transportation Technology Center, Inc., a subsidiary of AAR. It focuses on training railroad officials, emergency responders, and others to safely handle accidents involving tank cars carrying hazardous materials.

<sup>40</sup>U.S. DOT Secretary Foxx issued this “Call to Action” in response to accidents involving crude oil shipments by rail in the U.S. and Canada, calling on rail company executives, associations, shippers, and others to discuss how stakeholders can prevent or mitigate the consequences of rail accidents that involve flammable liquids.

tremendous increase in the volume of Bakken crude oil shipped by rail and high-profile accidents, such as the one in Lac Mégantic, Quebec.

**Table 2: Spending (in Millions) on Training Local Emergency Responders on Hazardous-Materials Rail Accidents, as Reported by Five of Seven Class I Railroads, 2011 to 2015**

2011	2012	2013	2014	2015
\$1.5	\$1.5	\$1.9	\$5.9	\$4.6

Source: GAO analysis of Class I railroad questionnaires. | GAO-17-91

Note: This table includes information from five of the seven Class I railroads. We did not include information for two Class I railroads because they either provided incomplete data or no data on training expenditures. In addition, it was beyond the scope of this engagement to independently validate this information.

Relatedly, railroads reported having trained more responders since 2011. The seven Class I railroads reported training more than 40,000 first responders and other emergency officials in 2015, an increase of over 80 percent from 2011 (see table 3 below).

**Table 3: Emergency Responders and Others Trained (in Thousands) on Hazardous-Materials Rail Accidents by Class I Railroads, as Reported by All Seven Class I Railroads, 2011 to 2015**

2011	2012	2013	2014	2015
22.2	23.8	27.6	35.9	40.9

Source: GAO analysis of Class I railroad questionnaires. | GAO-17-91

Note: "Others" includes emergency response contractors, police officers, emergency medical services, emergency planning personnel, and state and federal responders. In addition, it was beyond the scope of this engagement to independently validate this information.

Class II and III railroads can also provide training on preparing for and responding to hazardous materials rail accidents. Of the four Class II and III railroads we surveyed, two reported providing training to local emergency responders.<sup>41</sup> According to officials from the American Short Line and Regional Railroad Association (ASLRRA), its member railroads reach out to local emergency responders and have offered training on hazardous materials in response to recent accidents. However, according to ASLRRA officials, Class II and III railroads generally have fewer resources than Class I railroads to provide training to emergency

<sup>41</sup>Of the 2 Class II railroads that said they provide training to local emergency providers, neither one was able to provide information about whether the number of emergency providers trained had increased or decreased in recent years.

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responders and others. The officials told us that frequently the most effective way for Class II and III railroads to provide training to local emergency responders is for them to collaborate with Class I railroads. For example, an official from one short-line holding company (i.e., a company with a controlling interest in multiple Class II and III railroads) we interviewed told us that one of its railroads recently partnered with a Class I railroad to gain access to tank car training equipment so that responders along its line could undergo training on how to respond to an accident involving a tank car.

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**Class I and Selected  
Class II and Class III  
Railroads Report  
Providing More  
Information Than Required  
to States and Conducting  
Community Outreach**

All Class I railroads reported complying with the Emergency Order by reporting the Bakken crude-oil shipment information to the relevant SERCs. The Class I railroads also told us that they maintain accurate hazardous materials documents, an HMR requirement, with most doing so through paper records and new electronic systems. As discussed later, FRA officials told us that the agency contacted railroads to confirm that the railroads shared the information about Bakken crude-oil shipments and did not find evidence that any railroad failed to comply.

In addition to responding to these DOT requirements, Class I and selected Class II and III railroads described taking the following actions in the area of information sharing to support emergency responders' preparedness and response for rail accidents involving hazardous materials:

- *Providing additional information about hazardous materials:* All seven Class I railroads reported they also provide additional information—upon request from bona fide emergency planners and responders—on hazardous materials shipped by rail through their communities. Two of the smaller railroads (one Class II and one Class III) reported they provide information on hazardous materials. This practice follows industry-accepted operating procedures that railroads provide information on hazardous commodities, as well as work to improve community awareness, emergency planning, and incident response to rail hazardous-materials accidents.<sup>42</sup> The seven Class I railroads reported receiving between 17 and 225 such requests from LEPCs in 2015. Two of the four smaller railroads (one Class II and one Class III railroads) reported receiving one to five requests in 2015. While five of

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<sup>42</sup>AAR, *Recommended Operating Practices for Transportation of Hazardous Materials*, Circular OT-55P (Jan.19, 2016).

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the Class I railroads reported an increase in requests over the last 3 years and three reported an increase of 100 percent or greater, the number of requests appears low relative to the number of counties and communities through which these materials are transported. For example, in 2015, six of the railroads received requests from less than a third of counties where they own track, with the seventh railroad receiving requests equaling just over a third. While the Class I railroads reported that they actively advertise the availability of the hazardous materials information to bona fide entities, AAR officials agreed that the number of requests was low, but did not know the reason why.

- *Making emergency response information available electronically:* All 7 Class I railroads reported they make information on train's contents available electronically to emergency responders via smart phone applications, such as AAR's AskRail application or their own mobile application. AAR officials said that AskRail—the system used by all seven Class I railroads—offers access to emergency response information similar to that on a train's hazardous materials documents.<sup>43</sup> AAR officials reported that from the initial rollout in October 2014 through March 2016, 13,000 responders had been invited to download the AskRail application and 6,500 had done so. However, not all responders have access to this application, as discussed previously.<sup>44</sup> According to AAR, future iterations of the application could include making it available on other platforms, such as web-based devices. The four Class II and III railroads reported that they do not provide electronic information on train contents; one Class II and one Class III reported that they had not received requests to do so.
- *Conducting community outreach:* Six of seven Class I railroads told us about various methods to contact emergency-planning and response agencies regarding preparedness for a rail accident, such as by letter, Internet, telephone, providing an emergency response planning guide, or through presentations, training, or training materials or LEPC meetings. Five railroads told us that they contact all communities along their railroad, covering between 10 percent and 100 percent of

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<sup>43</sup>AAR officials also noted that the application provides access to the *Emergency Response Guidebook (ERG)* to assist responder's understanding of train contents and emergency response procedures in absence of the hazardous materials documents.

<sup>44</sup>One Class I railroad, in addition to using the AskRail application, has its own web-based tool, which it stated was designed to provide emergency responders with access to the contents of a train's cars in real-time and offers additional information.

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the communities along their respective lines each year; another said it does not have enough resources under its current program to contact all communities but is developing a digital program to improve contact. Furthermore, all seven Class I railroads reported engaging in relationship-building activities with communities, such as participating in LEPC meetings or meetings with local and state officials and training events such as classes and table top exercises. One Class II and one Class III railroad reported they contact emergency responders to discuss their preparedness for a rail accident and another (Class II) indicated it planned to begin an outreach program this year. The fourth railroad (Class III) did not conduct outreach except by making its emergency response guide available upon request.

- *Developing emergency response planning guides:* All seven Class I railroads reported that they had developed emergency response-planning guides that include information for communities. However, most of the seven railroads restrict access to their respective emergency response planning guides or do not produce it in written form. Only one of the Class I railroads reported sending the guide to all communities along its lines without being requested to do so and provided a means to order the guide on its website. Two other railroads told us that they made their guides available on their websites, while three railroads told us that they shared them at training events and one said the guide was also available through other communications. One railroad said it provides this information orally, but does not share it in written form. Two of the four Class II and III railroads (one Class II and one Class III) reported having emergency-planning guides that responders must request and the other two (one Class II and one Class III) did not have guides. As we discussed above, local emergency planners from most of the counties we contacted found these guides, when provided, useful in planning and preparing for hazardous materials accidents.



**DOT Has Taken Multiple Actions to Support Preparedness for Rail Accidents Involving Hazardous Materials but Could Improve Oversight of Information Sharing**

DOT has taken multiple actions to improve emergency preparedness for rail accidents involving hazardous materials, with some of the actions recent and focused specifically on rail-transported Bakken crude oil. For example, DOT enforces the requirement that train crews maintain accurate hazardous materials documentation detailing shipments' contents and containing other information that is critical for emergency responders in an accident. In addition, as previously discussed, DOT issued an Emergency Order in May 2014 requiring railroads expecting to carry large volumes of Bakken crude oil to notify officials in states along the routes. DOT's contact with SERCs has expanded in recent years as DOT fulfills its regulatory role of ensuring railroads followed the Emergency Order. DOT expects to expand the information-sharing requirements further with proposed regulations (consistent with the FAST Act) to include all high-hazard flammable train operations, not just trains carrying crude oil from Bakken sources, steps that will affect its oversight of railroads' actions moving forward. Although DOT is working to finalize these regulations, it is not clear that the information that railroads are currently required to share with SERCs on shipments of Bakken crude oil is consistently reaching local first responders.

**PHMSA Has Developed Training Materials and Published Guidance Related to Rail Accidents Involving Hazardous Materials**

PHMSA has produced a variety of training and other materials for emergency planners and responders, most of them in the past 2 years, intended to improve emergency preparedness for rail accidents involving hazardous materials in general and Bakken crude oil in particular (see table 4).

**Table 4: Department of Transportation's (DOT) Training and Materials Related to Emergency Preparedness for Rail Accidents Involving Hazardous Materials**

DOT activity	Description
Transportation Rail Incident Preparedness and Response (TRIPR) training	In April 2016, the Pipeline and Hazardous Materials Safety Administration (PHMSA) released an online training program designed to be used by instructors to prepare first responders to manage rail incidents involving flammable Class 3 hazardous liquids. <sup>a</sup> TRIPR's curriculum covers all phases of emergency response from pre-incident planning and preparedness to clean-up and post-emergency operations and incorporates interactive scenarios and videos. The training is available free by downloading it from the PHMSA web-site, and instructors are able to modify the modules to suit their specific needs.

DOT activity	Description
Commodities Preparedness and Incident Management Reference Sheet for Petroleum Crude Oil	In September 2014, PHMSA introduced this reference sheet that summarizes best practices for emergency response operations for incidents specifically involving crude oil. Developed in conjunction with FRA and industry stakeholders, the reference sheet describes planning, preparedness, and response principles and can be used as an incident management guide for a rail incident involving crude oil.
<i>Emergency Response Guidebook (ERG)</i>	The <i>ERG</i> is a guidebook that provides emergency responders with information to help manage the first 30 minutes of an incident involving hazardous materials. Updated every 4 years, most recently in 2016, the <i>ERG</i> contains information that decodes hazardous materials placards, identifies critical properties of hazardous materials (e.g., whether poisonous by inhalation), and other information that helps responders make determinations about how best to respond. In 2013, PHMSA introduced a mobile application that makes the <i>ERG</i> available for download on multiple software platforms.

Source: GAO analysis of DOT information. | GAO-17-91

<sup>a</sup>There are nine classes of hazardous materials, including Class 3 flammable liquids and combustible liquids, such as petroleum crude oil and ethanol. The other classes are: explosives (Class 1); gases (Class 2); flammable solid, spontaneously combustible, and dangerous when wet (Class 4); oxidizer and organic peroxide (Class 5); poison (toxic) and poison inhalation hazard (Class 6); radioactive (Class 7); corrosive (Class 8); and miscellaneous (Class 9).

Although we did not ask local emergency planners from selected counties about their specific experiences with the TRIPR training or the crude-oil reference sheet, we did inquire about their views about the usefulness of the *ERG*. Local emergency planners from all of the counties we contacted who provided a response reported that the *ERG* was useful—with all but one (23 of 24) finding it very useful. Local emergency planners from a few counties also told us that the guide is particularly useful for the initial first response and contains information not commonly known, but critical, for responding to hazardous materials accidents.

## PHMSA and FRA Provide Grants to Support Emergency Preparedness

PHMSA administers the Hazardous Materials Grant Program, which distributes a series of grants that support state and local emergency-response planning and training activities related to the transportation of hazardous materials for all modes, including rail.<sup>45</sup> Established by the Hazardous Materials Transportation Uniform Safety Act of 1990, this program is funded by registration fees collected from shippers and carriers that transport hazardous materials and consists of three types of grants, the largest of which are Hazardous Materials Emergency

<sup>45</sup>The Hazardous Materials Grant Program is a fee-based program. Currently, small businesses pay \$275 annually and larger businesses pay \$2,600 annually, both including a \$25 administrative fee. These fees provide funding for training and planning grants, monitoring and technical assistance, curriculum development, and staffing costs.

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Preparedness (HMEP) planning and training grants.<sup>46</sup> In fiscal year 2015, PHMSA awarded \$19.9 million in these grants to states, territories, and Native American tribes, allowing them to be used to design and implement planning and training programs according to need.<sup>47</sup> For example, SERCs can use the HMEP funds to conduct commodity flow studies, support training exercises, or to send responders to hazardous materials conferences or provide grants to LEPCs for the similar activities.<sup>48</sup> The Hazardous Materials Grant Program also includes (1) Hazardous Materials Instructor Training grants (\$3.3 million in fiscal year 2015) to train instructors who then are able to train hazardous materials employees in their area and (2) Supplemental Public Sector Training grants (\$927,000 in fiscal year 2015), which support trainer instruction for hazardous materials response educators.<sup>49</sup>

Some state and local emergency planners have reported that HMEP grants—which can be used in a variety of ways as previously discussed—have helped them to improve their emergency preparedness. State emergency planners we interviewed stated that they have used a portion of their HMEP grant allocation for state-wide activities in addition to making funds available to LEPCs or tribal organizations. For example, in 2015, DOT reported that one state emergency planner said funds were recently used to conduct a state-wide study of hazardous materials

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<sup>46</sup>According to PHMSA, each state’s governor or counterparts within territories or tribes designate an agency to receive their HMEP grant funds, such as the state emergency management agency or SERC that is responsible for completing an annual application to PHMSA requesting funds for proposed activities. PHMSA evaluates the applications to ensure that they support the program’s mission. PHMSA determines the level of funding for each applicant using formulas for planning and training funds with the exception of Native American Tribes, for which there is a separate formula.

<sup>47</sup>In total, PHMSA has awarded approximately \$182 million in HMEP planning and training grants since 1993.

<sup>48</sup>The FAST Act included changes to PHMSA’s HMEP grant program including expanding the program’s performance period from one-year to multi-year use and, according to PHMSA officials, allowing grantees more time to plan how to use their allocations. Emergency planners from 9 of the 17 states we spoke with said this expanded funding window will provide flexibility for selecting projects and targeting funds. In addition, the FAST Act merges the program’s historically separate training and planning allocations into a single allotment for each grantee. Prior to fiscal year 2016, each grant allocation was comprised of two specific allocations: training and planning. Pub. L. No. 114-94, §7203, 129 Stat. 1589.

<sup>49</sup>In July 2016, PHMSA announced the issuance of \$2.7 million in Hazardous Materials Instructor Training grants to 6 grantees and one \$932,000 Supplemental Public Sector Training grant for fiscal year 2016.

travelling through the state’s communities in 2014, while another state used its funds to train 3,100 emergency responders about hazardous materials preparedness. Local emergency planners from 8 of 24 counties reported that they have received HMEP funding from their SERCs in the past few years and that the funds improved their ability to plan, prepare for, and respond to rail accidents involving hazardous materials.

PHMSA and FRA have also recently introduced other grant programs that support state and local emergency preparedness efforts (see table 5).

**Table 5: Recently Introduced Department of Transportation (DOT) Grant Programs Related to Emergency Preparedness for Rail Accidents Involving Hazardous Materials**

Grant program, DOT agency	Description
Community Safety Grant Program, PHMSA	This grant program was established in 2015 by the FAST Act to provide \$1 million to non-profit organizations to fund community outreach and training related to the safe transport of hazardous materials. This program is to be funded annually. <sup>a</sup>
Assistance for Local Emergency Response Training program, PHMSA	This \$5.9 million grant program was established in September 2015 and funded by unused and recovered funds from PHMSA’s Hazardous Materials Emergency Preparedness grant program. The grants are to be used to train volunteer or rural emergency responders to prepare for incidents involving rail shipments of flammable liquids. Although PHMSA is authorized to fund the grant program in 2016, officials stated that they do not plan to fund a second round of grants until they assess the results of the 2015 grant awards. <sup>b</sup>
Safe Transportation of Energy Products by Rail Program, FRA	The Consolidated and Further Continuing Appropriations Act of 2015 made \$10 million available to support state projects that improve railroad grade crossing and track safety on routes that transport crude oil, ethanol, and other flammable energy products. In February 2016, FRA announced grant awards for 9 projects in 8 states. <sup>c</sup>

Source: GAO analysis of DOT information. | GAO-17-91

<sup>a</sup>Pub. L. No. 114-94, § 7301, 129 Stat. 1312, 1594 (2015).

<sup>b</sup>The Assistance for Local Emergency Response Training grants were introduced after the Consolidated and Further Continuing Appropriations Act of 2015 (Pub. L. No. 113-235) allowed PHMSA to use money recovered from prior year’s HMEP grants to fund them. In 2016, PHMSA approved ALERT grants to the University of Findlay (All Hazards Training Center), the International Association of Fire Chiefs, and the Center for Rural Development.

<sup>c</sup>Pub. L. No. 113-235, div. K, § 153, 128 Stat. 2130, 2718 (2014). A DOT official told us that FRA has obligated the funds for three of the awarded projects and continues to work on obligating the funds for the remainder of the projects awarded.

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## DOT Has Established Information Sharing Requirements for Railroads but Could Better Understand Whether Shipping Information Will Reach Local Emergency Planners

### Hazardous Materials Documentation Requirements for Trains

As previously discussed, DOT has required that train crews operating trains carrying hazardous materials maintain information on the nature and location of those materials that can be shared with responders at the scene, should an accident occur. As railroads continue to ship large quantities of crude oil and other hazardous materials across the nation, emergency responders need to be aware of the location and the nature of the hazardous materials present at the scene of an accident so they are able to be properly equipped to protect themselves and their community. As discussed earlier, local emergency planners from the 24 counties who provided a response told us that the type and quantity of hazardous materials are the most important pieces of information for first responders at the scene of an accident. The HMR requires that a train crew carry hazardous materials documentation including both “shipping papers”<sup>50</sup>—information about the hazardous materials being carried and the shipper’s emergency contact information—and the train’s “consist”<sup>51</sup>—a document detailing the current position and contents of the cars carrying hazardous materials.<sup>52</sup> According to officials from AAR, this documentation is the official record of the order of a train’s cars and its contents, and train crews will update this copy as the train’s order or contents change along its route. DOT officials explained that the HMR also requires train crews

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<sup>50</sup>49 C.F.R. Part 172, subpt. C.

<sup>51</sup>The FAST Act also directs DOT to require railroads to provide hazardous materials train consist information to include faster, real-time access by first responders after an accident. DOT officials told us that they are in the process of developing a rulemaking that will include this requirement for public comment. Pub. L. No. 114-94, § 7302, 129 Stat. 1312, 1594.

<sup>52</sup>49 C.F.R. §§ 174.26(a) and (b). 49 C.F.R. §§ 174.26(a) states that trains crews must maintain documents that reflects the current position of each rail car containing a hazardous material and update it to indicate changes; 49 C.F.R. § 174.26(b) states that a crew transporting hazardous materials must maintain information on the material(s) and emergency response information.

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to provide their hazardous material documentation to the local emergency responders in the event of an accident to help them identify the location of hazardous materials on a train and inform appropriate defensive response actions (e.g., wearing proper protective equipment and establishing a safe perimeter). FRA conducts inspections to determine railroads' compliance with safety regulations including those related to hazardous materials documentation. FRA officials told us that as part of FRA's routine inspections of railroads' compliance with safety regulations, inspectors collect information on whether or not train crews are in possession of the required hazardous material documentation and whether the documentation is accurate. If the documentation is not accurate or is missing, FRA may cite the railroad for failing to comply with the requirements by citing a defect or issuing a violation and assessing fines.

Information Sharing  
Requirements for Trains  
Carrying Bakken Crude Oil and  
Other Flammable Liquids

As previously discussed, in the wake of railroad accidents involving crude oil, DOT issued the Emergency Order in 2014 to improve information sharing between railroads and emergency planners by requiring railroads to provide advance notification of Bakken crude oil train movements through states. Prior to the Emergency Order, railroads could provide information about the types of hazardous materials moving through local communities to bona fide emergency response authorities upon request, as described previously. Thus, unless they requested information, state and local emergency planners may not have known if, or how many such trains carrying large quantities of Bakken crude oil were moving through their jurisdiction until after an accident was reported. However, the Emergency Order has since required each railroad transporting 1-million gallons or more of Bakken crude oil in a single train to provide the following information in writing to the SERC for each state in which it operates such a train:

- a reasonable estimate of the number of high-hazard flammable trains expected to travel through each county within a state per week;
- the routes of these high-hazard flammable trains;
- a description of the materials shipped;
- all applicable emergency-response information; and
- a point of contact at the railroad.

Furthermore, the Emergency Order requires railroads to update this information whenever their reported volumes vary by more than 25 percent, and calls on SERCs—entities that the Emergency Order indicates are best situated—to convey the information about shipments of

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Bakken crude oil to LEPCs in affected counties. This basic information was meant to inform local emergency responders about the presence of trains carrying Bakken crude oil.

By issuing the Emergency Order, DOT required railroads to take action to assist emergency responders in preparing for rail accidents involving crude oil by providing information important for local emergency preparedness. Specifically, the Emergency Order explained that it is essential that local responders be well informed about the presence of trains carrying Bakken crude oil because they are typically the first to arrive on the accident scene. Similarly, it states that local responders should be as well informed as possible prior to an accident involving a train carrying Bakken crude oil, and, without the requirement established by the Emergency Order, local emergency responders may not know to prepare for potential accidents involving these trains. Furthermore, as previously discussed, our review found that local emergency planners find this type of information useful. Specifically, local emergency planners from 17 of 21 counties reported that information about hazardous materials shipments was useful for planning and preparing for accidents. For example, local emergency planners told us that the type of information that is most useful for planning and preparing for a potential rail accident involving hazardous materials includes information about the type of hazardous material (including hazard classification and toxicity level), quantity of hazardous material, route of the shipments, and railroad emergency contact's name and phone number.

However, the extent that this information actually reaches local emergency planners is not clear. FRA officials said the agency contacted railroads and SERCs to confirm that railroads had shared the required information within 30 days of the Emergency Order's issuance in 2014, and then again in 2015, and did not find any evidence that any railroad had failed to comply. However, FRA officials told us that they did not collect information about whether the SERCs distributed the information to local planners. In 2015, PHMSA gathered some limited information from states about their efforts to distribute the information to local emergency planners and determined that some states did not share the information. Specifically, PHMSA participated in discussions with state officials from 48 states and the District of Columbia as part of an EPA-led

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initiative in January 2015.<sup>53</sup> Among the topics discussed was the extent to which state agencies passed the Bakken crude oil shipment information to local communities. According to PHMSA officials, although states indicated that they shared the railroad-provided information with local communities, some states indicated the information was heavily redacted. PHMSA officials also learned that some states did not provide any information to local communities because of varying interpretations about whether and how much information could be made publicly available. The extent that this occurred is unclear, however, because neither PHMSA nor FRA took steps to systematically collect additional information from SERCs about whether they disseminated the information required by the Emergency Order.

This lack of clarity notwithstanding, in July 2016, PHMSA proposed expanding the information-sharing requirement so that railroads would have to provide advance notification for all high hazard flammable trains and would continue to make the SERC the information focal point consistent with the FAST Act.<sup>54</sup> PHMSA's proposed rulemaking effectively codifies the Emergency Order but broadens it by requiring railroads to provide monthly reports to SERCs on high-hazard flammable trains, which carry other flammable liquids besides Bakken crude oil. The impending broadening of the Emergency Order is likely to expand its applicability beyond only states through which Bakken crude oil is transported by rail, and affect more railroads. The *Standards for Internal Control in the Federal Government* state that agencies should design and implement control activities so that they are aligned with their objectives and review control activities after any significant changes to activities to determine that the changes are designed and implemented appropriately.<sup>55</sup> As FRA is responsible for enforcing PHMSA's regulations

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<sup>53</sup>In January 2015, PHMSA participated in conference calls with 48 states in the lower continental U.S. and the District of Columbia to address emergency response to rail accidents involving crude oil. This activity was hosted by EPA and attended by other federal agencies, including DOT, FRA, and FEMA. The interagency team held discussions with states to collect information on preparedness efforts for responding to, and mitigating the impacts of, crude-oil-by-rail incidents.

<sup>54</sup>The Notice of Proposed Rulemaking broadens the notification requirement of the May 2014 Emergency Order to the movement of high hazard flammable trains which is defined in the FAST Act as a single train transporting 20 or more tank cars loaded with a Class 3 flammable liquid in a continuous block or a single train transporting 35 or more tank cars loaded with a Class 3 flammable liquid throughout the train consist. Pub. L. No. 114-94 § 7302(b)(6), 129 Stat. 1312, 1596.

<sup>55</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).



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in the rail mode, the proposed new reporting requirement would represent an expansion in FRA's activities and oversight; therefore, it will be important to determine if the activities are properly implemented.

Given the proposed expansion of the Emergency Order, this may be an opportune time for DOT to consider how it can determine whether the information-sharing requirements will reach their intended audience. Although increasing the number of trains to which this requirement will apply may increase the administrative burden to railroads—and, to a lesser extent, FRA—the agency is currently unaware whether SERCs have disseminated railroad-provided information to local emergency planners—information that can facilitate preparedness—as intended. However, PHMSA's January 2015 conversations with state officials demonstrated a shared-interest in enhancing preparedness to rail accidents and a willingness to share information with federal partners. Without an understanding of the extent to which the required railroad-provided information has been received by local emergency planners, it is unclear whether requiring railroads to share this information has the potential to improve emergency preparedness for a rail accident. Furthermore, without information on how consistently SERCs share information, it is possible that some LEPCs will not receive information on, and be unaware of, large shipments of flammable materials that would help them improve their preparedness for a potential accident. Finally, DOT has implemented a requirement without ensuring that the information reaches the intended audience—the emergency planners in local communities.

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## Conclusions

DOT has recently taken actions to enhance emergency preparedness in light of recent accidents involving Bakken crude oil. For example, DOT issued the Emergency Order to increase awareness of large shipments of Bakken crude oil. However, the extent to which local emergency planners in affected communities have received the information about these shipments is unclear because DOT has not taken steps to understand whether SERCs provided the information to local emergency planners, who in turn could use the information in preparing for potential rail accidents involving hazardous materials. Without knowing whether the states provided the information, it is unclear whether requiring railroads to share this information has improved emergency preparedness for such accidents. DOT has proposed regulations codifying the Emergency Order in accordance with the FAST Act. This proposal would expand the requirement for railroads to share information on planned large shipments of other hazardous materials with affected SERCs. However, without a

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process for understanding whether SERCs are providing the information to local planning entities, DOT cannot be assured that the information will ultimately reach the communities where it is needed or would be useful in preparing local responders for rail accidents involving selected hazardous materials. Furthermore, the agency may be missing an opportunity to optimize this requirement in a way that the information provided best meets the needs of emergency responders. Given that the expanded information-sharing requirement will likely include more railroads and hazardous materials shipments, monitoring whether emergency planners receive this information will become even more important in the future.

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## Recommendation for Executive Action

To continue the agency's efforts to improve state and local emergency preparedness for rail accidents involving hazardous materials, we recommend that the Secretary of Transportation:

- after the rulemaking is finalized, develop a process for regularly collecting information from SERCs on the distribution of the railroad-provided hazardous-materials-shipping information to local planning entities.

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## Agency Comments and Our Evaluation

We provided a draft of this product to DOT, the Department of Homeland Security, EPA, NTSB, and the Surface Transportation Board for their review and comment. We received written comments from DOT, which are reprinted in appendix II.

DOT concurred with our recommendation to develop a process for regularly collecting information from SERCs on the distribution of railroad-provided hazardous-materials-shipping information to local planning entities. DOT also highlighted recent actions it has taken to improve the ability of communities to prepare for and respond to accidents involving the transportation of crude oil and other hazardous materials, including the publication of proposed regulations in July 2016 that would require railroads to share information on high-hazard flammable train operations with SERCs and tribal emergency response commissions in accordance with the FAST Act. DOT also plans to issue regulations, also in accordance with the FAST Act, requiring Class I railroads that transport hazardous materials to generate and share real-time electronic consist information with applicable fusion centers. Finally, in October 2016, DOT awarded \$20.4 million in HMEP grants to states, territories, and Native American tribes to enhance their ability to respond to hazardous materials incidents.

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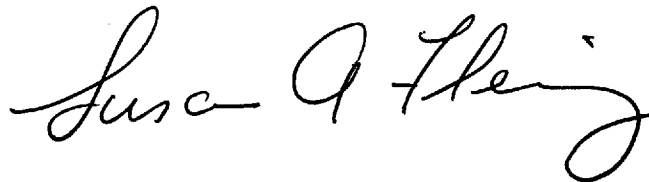
The Department of Homeland Security and EPA provided technical comments, which we incorporated in the report, as appropriate. NTSB and the Surface Transportation Board reviewed our report, but did not provide comments.

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We are sending copies of this report to the appropriate congressional committees, the Secretary of Transportation, Secretary of Homeland Security, the Administrator of the Environmental Protection Agency, and other interested parties. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or [flemings@gao.gov](mailto:flemings@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in black ink that reads "Susan A. Fleming". The signature is written in a cursive style with a large, looping 'S' and 'F'.

Susan Fleming  
Director, Physical Infrastructure Issues

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# Appendix I: Objectives, Scope, and Methodology

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Our objectives were to examine: (1) the factors selected local emergency planners report as affecting their preparedness for rail accidents involving hazardous materials; (2) the actions that Class I and selected other railroads report taking to support local emergency planners' preparedness for rail accidents involving hazardous materials; and (3) the actions that the Department of Transportation (DOT) has taken to support state and local emergency planners' preparedness for rail accidents involving hazardous materials and additional actions, if any, that DOT could take. The scope of the work was limited to emergency planning and preparedness for rail incidents involving hazardous materials, and did not focus on other phases of emergency response to an accident, such as mitigation and investigation, that are largely the responsibility of other federal agencies, such as the Federal Emergency Management Agency (FEMA) within the Department of Homeland Security, the Environmental Protection Agency (EPA), and the U.S. Coast Guard.<sup>1</sup>

To inform all of our objectives, we reviewed relevant literature, including journal articles and reports about rail accidents involving hazardous materials and the response to such accidents, as well as prior GAO reports on the transportation of hazardous materials by rail.<sup>2</sup> We also reviewed relevant laws, such as the Fixing America's Surface Transportation (FAST) Act of 2015,<sup>3</sup> the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA),<sup>4</sup> and regulations, such as the Hazardous Materials Regulations,<sup>5</sup> to determine requirements for

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<sup>1</sup>For example, FEMA works with state and local stakeholders to implement the National Incident Management System, a comprehensive, national approach to incident management that is applicable at all jurisdictional levels and across functional disciplines and the full spectrum of potential incidents, hazards, and impacts, regardless of size, location, or complexity. FEMA also manages the Emergency Management Performance Grant program that assists local, tribal, territorial, and state governments in enhancing and sustaining all-hazards emergency management capabilities. EPA and the U.S. Coast Guard are the lead agencies for responding to hazardous materials substance releases for inland and coastal zones, respectively.

<sup>2</sup>GAO, *Oil and Gas Transportation: Department of Transportation is Taking Actions to Address Rail Safety, but Additional Actions are Needed to Improve Pipeline Safety*, [GAO-14-667](#) (Washington, D.C.: Aug. 21, 2004) and GAO, *Rail Safety and Security: Some Actions Already Taken to Enhance Rail Security, but Risk-Based Plan Needed*, [GAO-03-435](#) (Washington, D.C.: Apr. 30, 2003).

<sup>3</sup>Pub. L. No. 114-94, 129 Stat. 1312 (2015).

<sup>4</sup>Pub. L. No. 99-499, 100 Stat. 1613, 1729 (1986).

<sup>5</sup>49 C.F.R. pts. 171-180

DOT and railroads related to transporting hazardous materials by rail, as well as requirements for federal agencies, states, and localities regarding emergency planning and reporting related to hazardous materials. In addition, we interviewed officials from the Federal Railroad Administration (FRA) and the Pipeline and Hazardous Materials Safety Administration (PHMSA) within DOT; FEMA; EPA; and the National Transportation Safety Board to inform our understanding about the roles and responsibilities of federal, state, and local stakeholders in emergency preparedness and response to rail accidents involving hazardous materials.

To identify views of selected local emergency planners on factors that affect their preparedness for rail accidents involving hazardous materials, we conducted structured interviews with, and provided a questionnaire to a nonprobability sample of 25 local emergency planners, primarily from local emergency planning committees (LEPCs) affiliated with county agencies—the groups responsible for developing and implementing emergency response plans and managing preparedness activities. We developed a questionnaire and structured interview guide based on our analysis of information gathered from interviews with stakeholders—such as Class I railroads, National Volunteer Fire Council, a state emergency response commission (SERC), and two LEPCs, among others—who were knowledgeable about emergency preparedness and hazardous materials rail accidents. We reviewed the National Fire Protection Association training standards for first responders to hazardous materials accidents to understand the levels of hazardous materials training for responders.<sup>6</sup> After developing and pre-testing a questionnaire and structured interview guide with local emergency planners and responders in 2 counties, we administered the questionnaires and conducted structured interviews with a nonprobability sample of local emergency planners, primarily from LEPCs, and conducted an analysis of open-ended questions provided by these officials in response to the questionnaire and structured interview questions. For some open-ended questions, we conducted a more detailed content analysis, and for other questions, we summarized the results or provided examples of responses.

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<sup>6</sup>National Fire Protection Association. NFPA 472: *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, 2013 edition.

We selected LEPCs as the primary contacts for our questionnaire and interviews because (1) they are responsible for implementing requirements established in EPCRA, including the development of emergency response plans that identify transportation routes of extremely hazardous substances; (2) because they include representatives from local emergency responders;<sup>7</sup> and (3) because the DOT Emergency Order required railroads to report Bakken crude oil information to SERCs, based on the idea that they are best positioned to convey the information to LEPCs in affected counties.<sup>8</sup>

To arrive at samples of local emergency-planning officials, we used Geographical Information System software to analyze all rail lines across the 48 contiguous states, the location of county lines, and the estimated amount (in tons) and routes of hazardous materials transported in 2013, based on the Surface Transportation Board's Carload Waybill Sample.<sup>9</sup> (The 2013 Waybill Sample was the most recent at the time of our review.) To determine the reliability of the data, we reviewed the documentation provided by the Surface Transportation Board on how the sample was taken and did electronic testing to ensure that we received the complete file. Because the waybill data only contain origins, destinations, and selected transfer points, we used the TRAGIS routing model developed by the Oak Ridge National Laboratory to estimate the rail routes for hazardous materials and determined that the data were reliable for the purposes of identifying counties with high volumes of hazardous materials and crude oil transported by rail. Using this analysis, we identified the 10 counties with the highest volumes of crude oil and other hazardous materials transported by rail within each of the five PHMSA regions in four categories: (1) urban counties with carloads of crude oil, (2) rural counties with carloads of crude oil, (3) urban counties with carloads of hazardous materials other than crude oil, and (4) rural counties with carloads of other hazmat. From this list, we identified 30 counties (three urban and three rural in each of the five PHMSA regions) to interview and were able to contact local emergency planning officials from LEPCs in 25 of the 30

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<sup>7</sup>Pub. L. No. 99-499, title III, 100 Stat. 1613, 1728 (1986) (codified at 42 U.S.C. § 11001).

<sup>8</sup>We contacted LEPCs in most of the counties we selected, but in one case a state did not have LEPCs, so we contacted the emergency management office for the county that had responsibilities for implementing EPCRA reporting requirements.

<sup>9</sup>The Carload Waybill Sample created by STB is a statistically representative sample of commodity flows in the U.S. In generating the tables for our selection process, we excluded counties with less than 400 carloads per year to protect confidentiality of waybill data.

counties. (Five counties did not respond to our requests for interviews.) We received completed questionnaires from 24 of 25 counties and interviewed local emergency planners from 25 counties—specifically at least two urban and at least two rural counties across all but one PHMSA region<sup>10</sup> for a total of 25 local emergency planners across 17 states.<sup>11</sup> Because our work was based on a nonprobability sample of counties, the information we obtained and present in this report should not be regarded as an exhaustive list of factors local emergency planners may consider as affecting preparedness for rail incidents involving hazardous materials. Similarly, the information and perspectives that we obtained from these local emergency planners are not generalizable to other local planners or counties.

We identified the 17 SERCs to interview based on the location of the four urban and four rural counties that had the highest volumes of hazardous materials in each of the 5 PHMSA regions we selected.<sup>12</sup> Finally, we interviewed representatives from associations representing local emergency responders, such as the International Association of Fire Chiefs, the National Volunteer Fire Council, and the International Association of Fire Fighters about factors affecting preparedness.

To understand the actions Class I and selected other railroads report having taken to support local emergency planners' preparedness for rail accidents involving hazardous materials, we developed a questionnaire and administered it to all seven Class I railroads and to six smaller regional and short line railroads, known as Class II and Class III railroads.<sup>13</sup> We interviewed 5 of 7 Class I railroads (selected in no priority

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<sup>10</sup>We obtained a response from only one rural county in PHMSA's southern region.

<sup>11</sup>Because the STB Carload Waybill Sample contains confidential information, we do not reveal the locations of the counties that had the highest volumes of hazardous materials transported by rail.

<sup>12</sup>We were unable to interview SERC officials in one of the states in which we conducted interviews with local emergency planners. However, we interviewed SERC officials in another state where we pre-tested our questionnaire and structured interview guide.

<sup>13</sup>Railroads are classified into three classes based primarily on annual operating revenues. According to the Surface Transportation Board, as of 2015, Class I railroads are those with annual operating revenues of at least \$457.9 million, Class II railroads are those with annual operating revenues of less than \$457.9 million but in excess of \$36.6 million, and Class III railroads are those with annual operating revenues of \$36.6 million or less. 49 C.F.R. § 1201.1-1. Class II freight railroads typically operate over 350 to 900 miles of track and Class III freight railroads typically operate over less than 350 miles of track.

order but which could be scheduled soonest) to develop an understanding of the types of training and other resources railroads provide to local emergency responders.<sup>14</sup> We developed the questionnaire based on our analysis of information gathered from interviews with stakeholders—such as five of seven Class I railroads, the Association of American Railroads (AAR), American Short Line and Regional Railroad Association, a SERC, two LEPCs, and FRA, among others—who were knowledgeable about hazardous materials information sharing, emergency preparedness and response training, community awareness efforts, and railroad response to hazardous materials accidents. The Class II and Class III railroads were selected using the Surface Transportation Board’s 2013 Carload Waybill sample to identify those railroads that operate in counties where we conducted structured interviews with local emergency planners and to obtain variation in railroads operating in urban and rural counties. We sent our questionnaire to two Class II railroads and four Class III railroads and received responses from both Class II railroads and two Class III railroads. Because our work was based on a nonprobability sample of Class II and Class III railroads, the results of the questionnaires with the smaller railroads cannot be generalized to the entire population of Class II and Class III railroads. We also reviewed AAR’s *Recommended Railroad Operating Practices for Transportation of Hazardous Materials*<sup>15</sup> and railroad documents such as emergency planning guides, examples of reports railroads sent to emergency planners, responder requests for information about hazardous commodities transported in their communities, and training and outreach material provided to local emergency responders such as the Transportation Community Awareness and Emergency Response training program. We also interviewed officials from AAR, the American Short Line and Regional Railroad Association, and the International Association of Sheet Metal, Air, Rail, and Transportation Workers about railroad requirements and actions for emergency preparedness and response to hazardous materials accidents, such as the development of electronic applications that can be used by emergency responders to identify commodities in the event of a hazardous materials accident. We also reviewed information on railroad websites, which are used to provide information to

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<sup>14</sup>We also obtained written responses to our interview questions from another Class I railroad.

<sup>15</sup>AAR, *Recommended Railroad Operating Practices for Transportation of Hazardous Materials*, Circular OT-55P (Jan. 19, 2016).



communities about hazardous materials and railroad response to accidents.

To understand DOT's actions to support preparedness for rail accidents involving hazardous materials and additional actions, if any, it could take, we reviewed pertinent FRA and PHMSA documents related to these actions, including training materials and guidance, grant program documentation, and documentation on efforts to oversee the implementation of requirements for railroads to share information on train contents and movements related to the May 2014 Emergency Restriction/Prohibition Order<sup>16</sup> (Emergency Order). We also reviewed comments the agency received related to the Emergency Order as part of its *Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains* rulemaking.<sup>17</sup> We compared the agency's efforts to oversee implementation of information-sharing requirements for railroads with pertinent *Standards for Internal Control in the Federal Government* and identified criteria about how agencies should review internal control activities to ensure they are implemented properly, particularly after a program change.<sup>18</sup> In addition, we analyzed information obtained from interviews with local emergency planners on how they used the information provided by railroads and with emergency planners from SERCs, including information provided in response to the Emergency Order, and their views on the usefulness of the information to support preparedness and response efforts. We also reviewed PHMSA guidance on Hazardous Materials Emergency Preparedness (HMEP) planning and training grants, Hazardous Materials Instructor Training grants, and Supplemental Public Sector Training grants. We analyzed information obtained from interviews with SERC emergency planners on how they used the PHMSA's HMEP grants. These stakeholders were chosen because their state coincided with the geographic location of the local emergency planners we selected, as discussed above. We also interviewed PHMSA and FRA officials about recent DOT actions to support emergency preparedness and response to rail hazardous materials accidents, such as the development of the crude oil reference sheet, the Transportation Rail Incident Preparedness and Response

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<sup>16</sup>DOT, *Emergency Restriction/Prohibition Order*, DOT-OST-2014-0067 (Washington, D.C.: May 7, 2014).

<sup>17</sup>80 Fed. Reg. 26644 (May 8, 2015).

<sup>18</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

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training program, and the Assistance for Local Emergency Response Training and Community Safety Grants grant programs.

We conducted this performance audit from June 2015 through November 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix II: Comments from the Department of Transportation



U.S. Department  
of Transportation

Office of the Secretary  
of Transportation

Assistant Secretary  
for Administration

1200 New Jersey Avenue, SE  
Washington, DC 20590

OCT 24 2016

Susan Fleming  
Director, Physical Infrastructure Issues  
U.S. Government Accountability Office  
441 G Street NW  
Washington, DC 20548

Ms. Fleming:

The Department of Transportation (DOT) employs a comprehensive approach to enhancing the safe transportation of energy products which includes prevention, mitigation, and emergency preparedness and response. Both the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Railroad Administration (FRA) are committed to implementing immediate and long-term solutions to prevent accidents from occurring and mitigating the consequences of rail accidents involving hazardous materials should they occur. The following examples represent DOT's recent efforts to improve the safe transportation of crude oil and other hazardous material and affect the communities' ability to prepare and respond to potential accidents:

- On July 29, 2016, PHMSA, in consultation with FRA, published a Notice of Proposed Rulemaking (NPRM) that proposes a number of practical measures that will better ensure the safety of communities living alongside railroads and protect our environment. One of the proposed measures in the NPRM is to require railroads to share information about high-hazard flammable train operations with State Emergency Response Commissions (SERCs) and Tribal Emergency Response Commissions to improve community preparedness in accordance with the Fixing America's Surface Transportation Act of 2015 (FAST Act).
- In accordance with the FAST Act, PHMSA, in cooperation with other Federal agencies, will issue regulations requiring Class I railroads transporting hazardous materials to generate and share real-time, electronic train consist information with applicable fusion centers. The railroads are required to provide fusion centers with secure and confidential access to the electronic information for each train in the fusion center's jurisdiction to share with State and local emergency responders, emergency response officials, and law enforcement personnel involved in emergency response activities.
- On October 3, 2016, PHMSA awarded \$20.4 million in Hazardous Materials Emergency Preparedness (HMEP) grants to States, territories, and Native American Tribes to enhance their ability to respond to hazardous materials transportation incidents. PHMSA's HMEP grants program allows recipients to design and implement planning

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**Appendix II: Comments from the Department  
of Transportation**

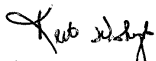
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and training programs according to their specific needs. PHMSA encouraged grantees to focus on developing or revising emergency plans and training activities to account for bulk transportation of energy product by rail and over the road; conducting commodity flow studies to determine the frequency and quantity of hazardous materials shipments being transported through local communities; and training emergency responders to respond appropriately to incidents involving hazardous materials.

Upon review of the draft report, we concur with the recommendation to develop a process for regularly collecting information from State Emergency Response Commissions on the distribution of the railroad-provided hazardous material shipping information to local planning entities. The Department will provide a detailed response to the recommendation within 60 days of the final report's issuance.

We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline M. Chulumovich, Director, Office of Audit Relations and Program Improvement, at (202) 366-6512 with any questions or if you would like to obtain additional details.

Sincerely,



Jeff Marootian  
Assistant Secretary for Administration

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# Appendix III: GAO Contact and Acknowledgments

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## GAO Contact

Susan Fleming, (202) 512-2834 or [Flemings@gao.gov](mailto:Flemings@gao.gov)

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## Staff Acknowledgments

In addition to the individual name above, Nancy Lueke (Assistant Director), Chris Keisling, Gail Marnik (Analyst in Charge), David Hooper, John Mingus, Joshua Ormond, Jaclyn Nelson, Amy Rosewarne, Kelly Rubin, Jim Russell, and Chad Williams made key contributions to this report.

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