



December 2016

HAZARDOUS MATERIALS RAIL SHIPMENTS

A Review of Emergency Response Information in Selected Train Documents

GAO Highlights

Highlights of [GAO-17-130](#), a report to congressional committees

Why GAO Did This Study

In November 2012, a train derailed in Paulsboro, New Jersey, releasing about 20,000 gallons of vinyl chloride, a hazardous material. The National Transportation Safety Board (NTSB) found, among other issues, that the supplemental information in the train's documents on responding to emergencies involving vinyl chloride was inconsistent with and less protective than emergency response guidance in the *ERG*. Congress included a provision in statute for GAO to evaluate the differences between the emergency response information carried by trains transporting hazardous materials and the *ERG* guidance. This report examines (1) what emergency response information is carried on trains by selected railroads transporting hazardous materials and how responders use it, and (2) how selected railroads' supplemental emergency response information compares to information in the *ERG*.

GAO reviewed the *ERG* and other relevant literature and met with DOT and NTSB officials, among others. GAO interviewed all 7 larger Class I railroads and 11 smaller Class II and III railroads that carried hazardous materials in 2015. GAO compared the supplemental emergency response information with *ERG* information for 72 frequently shipped hazardous materials from a nonprobability sample of train documents provided by 10 of the 18 selected railroads.

What GAO Recommends

GAO is not making recommendations. DOT and NTSB provided technical comments, which GAO incorporated.

View [GAO-17-130](#). For more information, contact Susan Fleming at (202) 512-2834 or flemings@gao.gov.

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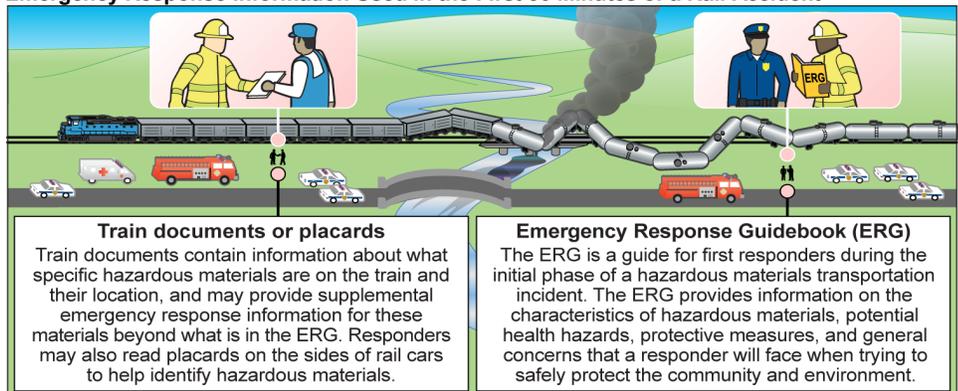
A Review of Emergency Response Information in Selected Train Documents

What GAO Found

To help emergency responders safely handle rail accidents involving hazardous materials, selected railroads transporting hazardous materials typically carry two sources of information: the Department of Transportation's (DOT) *Emergency Response Guidebook (ERG)* and information in the trains' documents. Federal Hazardous Material Regulations require railroads and other hazardous material transporters to carry emergency response information that describes immediate hazards to health and risks of fire or explosion, among other things.

Representatives from all 18 railroads GAO interviewed told us that they carry the *ERG* on their trains. According to DOT officials, the *ERG*'s use is not required by regulation, but the rail industry views it as a national standard for emergency response information. Our review of selected train documents showed that they always have a basic description of each hazardous material being transported, including the identification number and proper shipping name, as well as an emergency response telephone number. Six of the 7 Class I railroads and 5 of the 11 selected Class II and III railroads also included emergency response information in these documents. According to four emergency response associations, in the first 30 minutes after a rail incident, emergency responders primarily use the train documents to locate and identify hazardous materials and use the *ERG* to identify potential response actions.

Emergency Response Information Used in the First 30 Minutes of a Rail Accident



Source: GAO analysis. | [GAO-17-130](#)

GAO found that the emergency-response information in the *ERG* and the GAO-reviewed train documents of the selected railroads were generally similar, but differed somewhat in the level of specificity and type of information. For the 72 frequently shipped hazardous materials GAO selected, the train documents at times described hazards, mitigation measures, and protective-clothing requirements more specifically than the *ERG*. The *ERG* provided more detail on evacuation distances. However, for 6 selected hazardous materials, the recommended evacuation distances in the *ERG* differed from the supplemental emergency response information which is provided by the Association of American Railroads' (AAR) Hazardous Materials Emergency Response Database. AAR decided in August 2016 to discontinue the database, removing the potential for discrepancies between the *ERG* and the supplemental emergency response information from AAR going forward.

Contents

Letter		1
	Background	5
	Selected Railroads Carry the <i>ERG</i> and Train Documents; Responders Use This Information and Additional Sources to Determine How to Take Action	11
	Supplemental Emergency Response Information on Reviewed Train Documents Was Generally Similar to <i>ERG</i> Information	19
	Agency Comments	24
Appendix I	Objectives, Scope, and Methodology	26
Appendix II	GAO Contact and Staff Acknowledgments	31
Table		
	Table 1: Comparison of General Content of the <i>Emergency Response Guidebook (ERG)</i> and Supplemental Emergency Response Information in Selected Train Documents	21
Figures		
	Figure 1: Initial Response to a Rail Accident Involving Hazardous Materials	8
	Figure 2: Sample of Sections of the Department of Transportation's <i>Emergency Response Guidebook</i>	10
	Figure 3: Information Found in Reviewed Train Documents Regarding the Position and Content of Rail Cars and Emergency Response for Specific Hazardous Materials	13
	Figure 4. Timeline of When Specific Emergency Response Information is Used in a Rail Accident	17

Abbreviations

ASLRRA	American Short Line and Regional Railroad Association
AAR	Association of American Railroads
DOT	Department of Transportation
<i>ERG</i>	<i>Emergency Response Guidebook</i>
FAST Act	Fixing America's Surface Transportation Act
FRA	Federal Railroad Administration
HMR	Hazardous Materials Regulations
NIOSH	National Institute for Occupational Safety and Health
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
WISER	Wireless Information System for Emergency Responders

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December 2, 2016

The Honorable John Thune
Chairman
The Honorable Bill Nelson
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Bill Shuster
Chairman
The Honorable Peter A. DeFazio
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

According to AAR, freight railroads operating in the United States transported approximately 2.35-million carloads of hazardous materials in 2015.¹ In November 2012, a train derailed while traveling over a bridge in Paulsboro, New Jersey, releasing about 20,000 gallons of vinyl chloride, a hazardous material and human carcinogen.² Damage estimates were \$451,000 for equipment and about \$30 million for emergency response and remediation. During investigation of the incident, the National Transportation Safety Board (NTSB) found, among other issues, that the supplemental emergency response information for handling vinyl chloride that was contained in the train documents was inconsistent with and less protective than emergency response guidance in the *Emergency Response Guidebook (ERG)*, a manual published by the Department of Transportation (DOT), that emergency responders refer to when responding to hazardous materials incidents. NTSB concluded that such railroad-provided supplemental emergency response information that

¹Hazardous materials are 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. 49 U.S.C. § 5103(a).

²According to the Environmental Protection Agency, short-term exposure to high levels of vinyl chloride, which is used to make plastic and vinyl products, in air has resulted in central nervous system effects, such as dizziness, drowsiness, and headaches in humans. Cancer is a major concern from exposure to vinyl chloride via inhalation, as vinyl chloride exposure has been shown to increase the risk of a rare form of liver cancer in humans.

deviates from nationally recognized *ERG* information has the potential to confuse emergency responders faced with making timely decisions in response to hazardous materials releases, including decisions regarding distances from a release to protect people from vapors resulting from spills involving hazardous materials.³ Recent rail accidents, such as those in Mosier, Oregon, and Lac Mégantic, Quebec, have led to questions about the safety of rail shipments of hazardous materials and the resources and information available to local emergency responders in rural areas to allow them to take swift protective actions in the immediate aftermath of a serious accident.

Within DOT, the Pipeline and Hazardous Materials Safety Administration (PHMSA) has lead responsibility for ensuring the safe movement of hazardous materials across all transportation modes by issuing and enforcing safety regulations—including requirements for carriers and shippers, including railroads—to carry certain types of emergency response information. PHMSA coordinates with the Federal Railroad Administration (FRA) in developing hazardous materials transportation regulations and interpreting how they apply to rail transportation and FRA enforces these regulations.

The Fixing America's Surface Transportation (FAST) Act included a provision for GAO to evaluate the differences between the emergency response information carried by train crews transporting hazardous materials and the emergency response guidance provided in the *ERG*.⁴ This report examines (1) what emergency response information is carried on trains by selected railroads that transport hazardous materials and how responders use it, and (2) how the supplemental emergency response information carried on trains of these railroads compares to the information in the *ERG*.

To address both of our objectives, we reviewed relevant literature, including the NTSB report on the Paulsboro, New Jersey, incident,⁵ the

³Supplemental emergency response information is information on responding to emergencies involving the release of hazardous materials that some railroads carry on their trains in addition to the *ERG*.

⁴ Pub. L. No. 114-94, § 7303, 129 Stat. 1312, 1596 (2015).

⁵National Transportation Safety Board, *Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey, November 30, 2012*, NTSB/RAR-14/01 (Washington, D.C.: July 29, 2014).

ERG, PHMSA's Hazardous Materials Regulations (HMR),⁶ the Association of American Railroads' (AAR) *United States Hazardous Materials Instructions for Rail*,⁷ and a prior GAO report on emergency response to rail incidents.⁸ Additionally, we interviewed officials from PHMSA and FRA within DOT and NTSB to understand their roles in developing, regulating, and making recommendations regarding emergency response information on trains.

To identify what emergency response information is carried on trains by selected railroads that transport hazardous materials and how responders use it, we interviewed two railroad associations, AAR and the American Short Line and Regional Railroad Association (ASLRRA), all seven Class I railroads, five Class II railroads, and six Class III railroads.⁹ ASLRRA told us it represents approximately 450 of the about 550 Class II and III railroads, of which 300 to 400 transport hazardous materials. We initially selected seven Class II and seven Class III railroads that carry hazardous materials and are ASLRRA members for interviews, but three did not respond to our requests for an interview. We selected these Class II and Class III railroads by searching PHMSA's Office of Hazardous Materials Safety Incident Reports Database for rail incidents involving hazardous materials in transit during 2015 and cross-referencing the carriers' names with ASLRRA's member list. The railroads we selected are also geographically distributed across the United States. The results of the interviews cannot be generalized to the entire population of Class II and Class III railroads. As described below, we also reviewed information on hazardous materials in selected train documents from some of these railroads. We interviewed local emergency responders from Montgomery

⁶49 C.F.R. pts. 171-180.

⁷Association of American Railroads, *United States Hazardous Materials Instructions for Rail* (June 30, 2015).

⁸GAO, *Hazardous Materials Rail Shipments: Emergency Responders Receive Support, but DOT Could Improve Oversight of Information Sharing*, [GAO-17-91](#) (Washington, D.C.: Nov. 17, 2016).

⁹Railroads 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. Class II and III railroads are commonly referred to as regional and short line railroads, respectively.

County, MD; Westmoreland County, PA; and Culbertson, MT. We selected the first based on proximity to the audit team in Washington, D.C., and the other two because of their involvement in responding to rail incidents involving hazardous materials in 2014 and 2015, respectively. Additionally, based on its criteria and resources, CHEMTREC identified and we spoke with three of the five largest shippers of hazardous materials in the United States.¹⁰ We also interviewed other stakeholders—including four emergency response associations, two train crew unions, and CHEMTREC—to learn their perspective on the emergency response information carried on trains and how and when emergency responders use the information.

To understand how the supplemental emergency response information carried on trains of selected railroads compares to the information in the *ERG*, we analyzed information on a nonprobability sample of hazardous materials discussed in the *ERG* and in selected train documents. We asked each of the 18 railroads that we interviewed to provide us with a nonprobability sample of their train documents, including the “train consist” and any supplemental emergency response information, for 15 trains carrying at least two different hazardous materials and traveling between May 12, 2016, and June 30, 2016.¹¹ Eleven of the 18 railroads included the supplemental information in their train documents, and for our sample, we selected 72 individual hazardous materials across 70 unique sets of train documents from 10 (6 Class Is, 2 Class IIs, and 2 Class IIIs) of these 11 railroads.¹² We selected hazardous materials that fell within either AAR’s list of top 125 most frequently transported by tank

¹⁰CHEMTREC, a program of the American Chemistry Council, serves as a round-the-clock resource for obtaining immediate emergency response information for incidents involving hazardous materials. According to CHEMTREC, CHEMTREC is linked to the largest network of chemical and hazardous material experts in the world, including chemical and response specialists, public emergency services, and private contractors.

¹¹The “train consist” is a term used to describe a document that reflects the current position in the train of each rail car containing a hazardous material as required by 49 C.F.R. § 174.26(a).

¹²We used the 2012 *ERG*, as opposed to the recently released 2016 *ERG*, because not all of the selected railroads had begun using the 2016 version during the time frame that the sample was taken. Only 8 train documents provided by one of the six Class I railroads met our criteria for selecting hazardous materials to include in our review, which is why there are two less unique train documents than hazardous materials. The eleventh railroad—a Class III—was not able to provide a sufficient sample of train documents that met our criteria. Furthermore, none of the train documents it provided contained hazardous materials that met our criteria for selecting hazardous materials to include in our review.

cars or top 25 most frequently transported by non-tank cars (e.g., intermodal trailers or containers on flat cars) in 2014.¹³ To make the comparisons, we first determined which parts of the *ERG* and the supplemental emergency response information in the train documents contained information associated with seven requirements for emergency response information outlined in the HMR.¹⁴ We then examined the relevant information associated with each hazardous material in the sample and determined where there were similarities and dissimilarities, as well as any conflicting information. Furthermore, AAR provided us access to its Hazardous Materials Emergency Response Database, which is the source for all of the supplemental emergency information in the selected train documents, and we compared the supplemental emergency response information in the train documents to the database to identify any discrepancies. We determined that the supplemental emergency response information associated with the sample of hazardous materials in the train documents from the 10 railroads we reviewed was reliable for the purposes of our report and objectives because all of the information came from the AAR Hazardous Materials Emergency Response Database. The results of our analysis are not generalizable to all train documents or all hazardous materials in the *ERG* or AAR's Hazardous Materials Emergency Response Database. For further details on our scope and methodology, see appendix I.

We conducted this performance audit from March 2016 to December 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.

Background

According to AAR, hazardous materials comprise about 8 percent of commodities shipped by rail in North America—about 2.35 million out of

¹³AAR, Bureau of Explosives, *Annual Report of Hazardous Materials Transported by Rail 2014*, BOE 14-1 (Washington, D.C.: July 2015).

¹⁴49 C.F.R. § 172.602(a).

29.4 million annual carloads shipped in 2015.¹⁵ According to the most recent Bureau of Transportation Statistics data available (2012), railroads ship about 4 percent of the hazardous materials in the United States by tonnage, but railroad shipments account for about 28 percent of distance traveled by hazardous materials. The freight railroad industry is dominated by the seven Class I railroads, which transport the majority of freight—including hazardous materials—in freight containers, portable tanks, and other types of rail cars, including tank cars that travel across a network of 140,000 miles of track. 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.¹⁶ Often providing “first mile” and “last mile” movements, these smaller railroads, taken together, operate on 50,000 miles of track or nearly 40 percent of the national railroad network and handle in origination or destination one of every four cars moving on the national system.

PHMSA, through its Office of Hazardous Materials Safety, regulates shippers and railroads transporting hazardous materials by rail and other modes. One way PHMSA fulfills this mission is through the promulgation of the HMR for the safe transport of hazardous materials. These regulations pertain to the classifying, handling, and packaging of shipments of hazardous materials, including rail shipments, and include seven requirements that emergency response information must include for each hazardous material being shipped.¹⁷ These are:

1. The basic description and technical name of the hazardous material.
2. Immediate hazards to health.
3. Risks of fire or explosion.
4. Immediate precautions to be taken in the event of an accident.

¹⁵There are 9 classes of hazardous materials, including Class 3 flammable liquids and combustible liquids (49 C.F.R. §173.120), such as petroleum crude oil and ethanol. The other classes are: explosives (Class 1)(49 C.F.R. § 173.50); gases (Class 2)(49 C.F.R. § 173.115); flammable solid, spontaneously combustible, and dangerous when wet (Class 4)(49 C.F.R. § 173.124); oxidizer and organic peroxide (Class 5)(49 C.F.R. §§ 173.127 and 173.128); poisonous materials (Class 6)(49 C.F.R. § 173.132); radioactive (Class 7)(49 C.F.R. § 173.403); corrosive (Class 8)(49 C.F.R. § 173.136); and miscellaneous (Class 9)(49 C.F.R. § 173.140).

¹⁶Class I railroads collectively accounted for more than 90 percent of annual railroad-freight revenues in 2012.

¹⁷49 C.F.R. § 172.602(a).

-
5. Immediate methods for handling fires.
 6. Initial methods for handling spills or leaks in the absence of fire.
 7. Preliminary first aid measures.

The HMR also require railroads to have a document, often referred to as the train consist, that identifies basic information about the position in the train of each rail car containing hazardous materials.¹⁸ The consist also typically includes information on the train's contents, including basic descriptions of the hazardous materials transported, and their destinations, and may include supplemental emergency response information, such as details on how to respond to releases of specific hazardous materials.

FRA provides regulatory oversight for passenger and freight rail, issuing and enforcing safety regulations through its Office of Railroad Safety.¹⁹ FRA enforces the HMR and its own regulations through inspections and audits by FRA officials, including about 400 federal safety inspectors and state partners in some states. For example, according to DOT officials, FRA conducts inspections to ensure that railroads carry the required emergency response information mentioned above as well as an emergency response telephone number in train documentation and conduct and keep records of required general-awareness and function-specific hazardous material training for train crews.

When a rail accident occurs, local emergency responders—police, emergency medical technicians, and firefighters—and railroad train crews are typically first on the scene of, and often provide the initial response to, a rail accident involving hazardous materials.²⁰ For example, local and sometimes regional officials may be responsible for advising the public on taking shelter-in-place actions or conducting evacuations of affected populations.²¹ In addition, assuming the crews are not affected by an

¹⁸49 C.F.R. § 174.26(a).

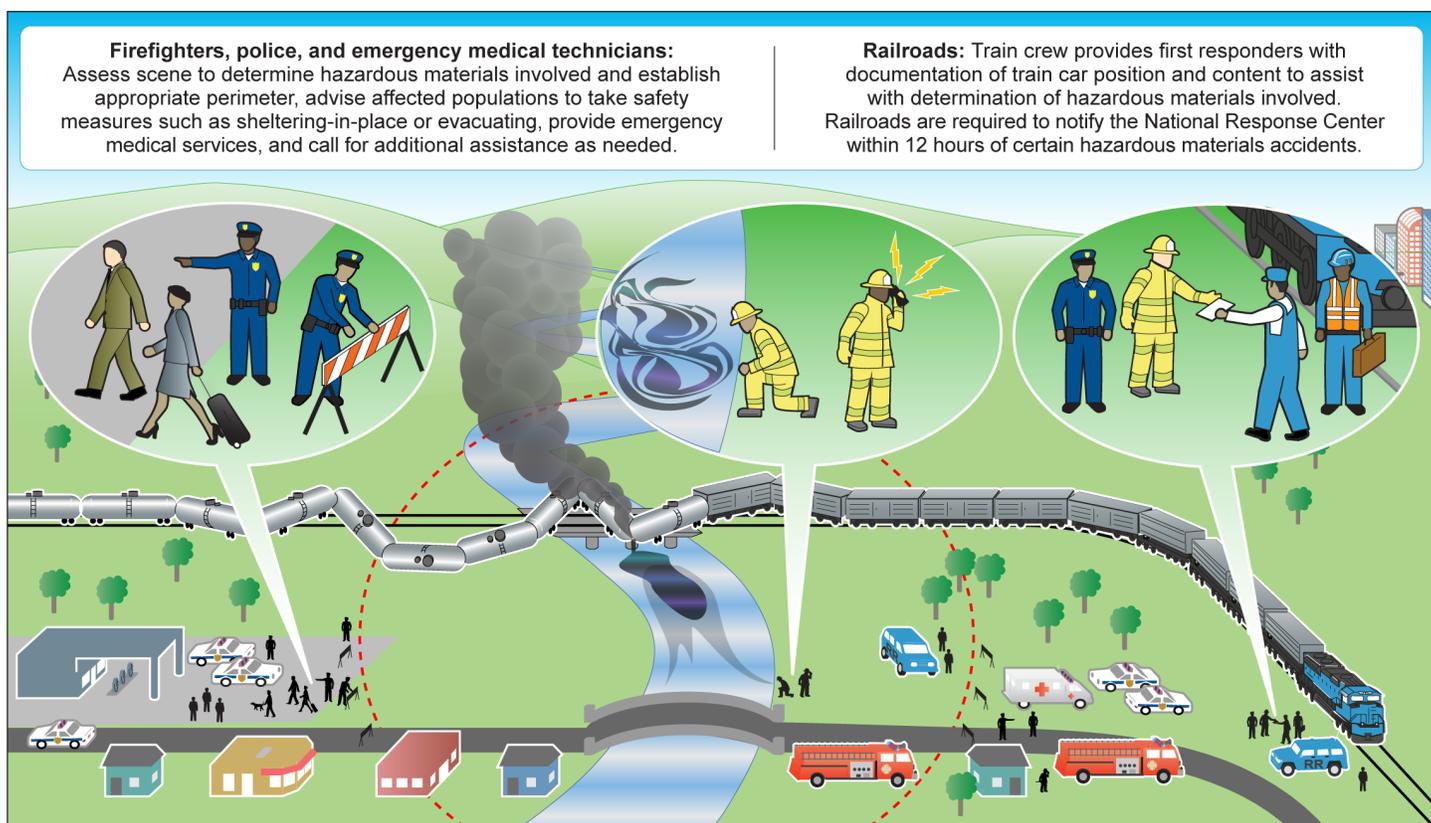
¹⁹49 U.S.C. § 20101.

²⁰According to the National Fire Protection Association, in 2014, 69 percent of the 1.1 million U.S. firefighters nationwide were 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.

²¹The National Incident Management System provides a common standard for overall incident management, including emergency response to rail incidents. It was established by the Department of Homeland Security in 2004 to improve coordination and cooperation between public and private entities in a variety of incident management activities.

accident, railroad train crews are expected to provide local emergency responders with information about the position, type, and quantity of hazardous materials on the train as well as written emergency-response and contact information for the specific commodities (see fig. 1). The HMR also requires railroads to provide immediate notice of certain hazardous materials accidents to the National Response Center.²²

Figure 1: Initial Response to a Rail Accident Involving Hazardous Materials



Source: GAO analysis. | GAO-17-130

²²49 C.F.R. § 171.15. 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 the Environmental Protection Agency. 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.

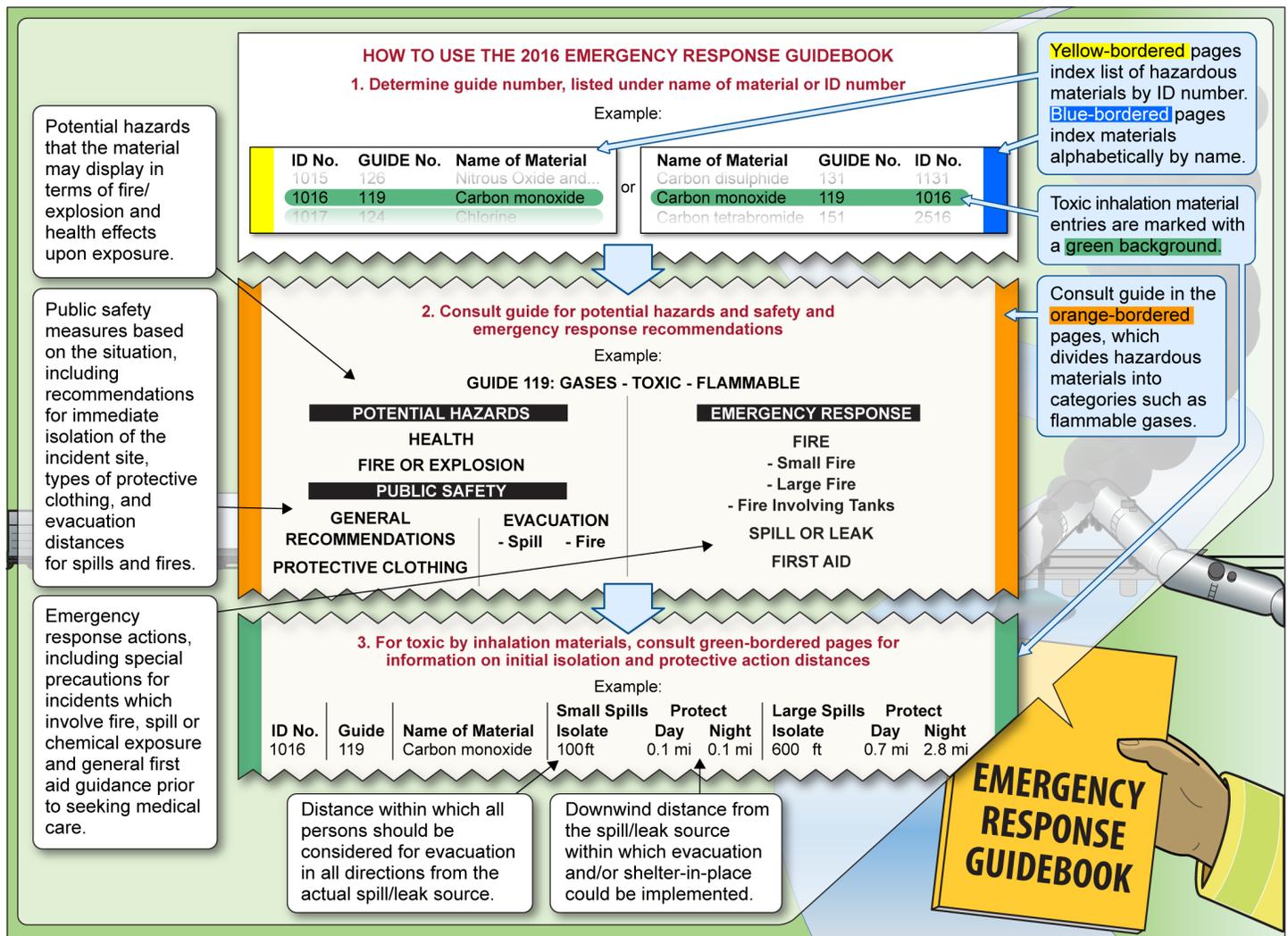
The *ERG*, published every 4 years by PHMSA, is a 400-page document that contains emergency response information for thousands of hazardous materials and for all modes of transportation. It is intended to help first responders identify the characteristics of the hazardous materials involved in an accident through a table of markings, labels, and placards, specific risks associated with the hazardous materials how first responders can protect themselves, and procedures for containing the accident as quickly and safely as possible.²³ The *ERG* is organized into four color-coded sections to help users navigate the document. For example, the orange section of the *ERG* divides hazardous materials into 63 categories—such as flammable liquids-toxic, flammable gases, and oxidizers—with an individual guide for each that provides information on types of potential hazards each category poses, including health, fire, or explosion hazards.²⁴ The green section provides specific information, such as initial isolation and protective action distances for small or large spills occurring during the day or night, for hazardous materials that are considered to be a toxic inhalation hazard (see fig. 2).²⁵

²³A placard is a notice or sign for public display that is used in rail transportation to identify hazardous materials on rail cars.

²⁴According to federal regulations, an oxidizer is a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials. 49 C.F.R. § 173.127(a).

²⁵An initial isolation and protective action distance suggests a distance useful to protect people from vapors resulting from spills involving hazardous materials that are considered toxic by inhalation. According to the *ERG*, the initial isolation zone defines an area surrounding the incident in which persons may be exposed to dangerous and life-threatening concentrations of material. The protective action zone defines an area downwind from the incident in which persons may become incapacitated and unable to take protective action and/or incur serious or irreversible health effects. A toxic inhalation hazard is a term used to describe gases and volatile liquids that are toxic when inhaled.

Figure 2: Sample of Sections of the Department of Transportation's *Emergency Response Guidebook*



Source: GAO analysis of the 2016 Emergency Response Guidebook. | GAO-17-130

To assist railroads in complying with the HMR, AAR, with the input of railroads, develops and makes available to all subscribing railroads the *United States Hazardous Materials Instructions for Rail*, which provides general guidelines to the train crew on handling hazardous material shipments or incidents safely and efficiently and in accordance with local, state, and federal regulations. For example, this document provides information on required emergency response information, how the train crew and emergency responders are to interact, and what to do when a

fire or vapor cloud is visible. This document also recommends that train crews carry the *ERG*.

Selected Railroads Carry the *ERG* and Train Documents; Responders Use This Information and Additional Sources to Determine How to Take Action

All Selected Railroads Told Us They Carry the *ERG*, While Some Also Carry Supplemental Information

Selected railroads typically carry two sources of emergency response information—the train documents and the *ERG*—to meet the emergency response information requirements in federal regulations. Our review of selected train documents determined that they always contained the position and content of rail cars and the basic descriptions of hazardous materials on board the train. In addition, our analysis determined that the train documents sometimes included supplemental emergency response information. Fifteen of the 18 railroads we spoke with told us that they use AAR's *United States Hazardous Materials Instructions for Rail* as their guidance for meeting train documentation requirements, including emergency response information.²⁶ According to the train crews' unions, the *ERG* and the train documents are kept in the locomotive of the train by the train crew, usually a conductor and an engineer. According to FRA and PHMSA officials, the *ERG*'s use is not required by regulation, but is viewed by the rail industry as a national standard for emergency response information requirements.²⁷ All railroads that we interviewed told us that

²⁶The other three railroads use guidance that they say is consistent with the *United States Hazardous Materials Instructions for Rail*. For example, one railroad uses a different hazardous material handling rules document developed by a private consulting company that was based on AAR's *United States Hazardous Materials Instructions for Rail*.

²⁷According to PHMSA, the *ERG* is the commonly used national guide for meeting the requirement for carrying hazardous materials emergency response information under 49 C.F.R. § 172.602. However, it is important to note that although a shipper must have emergency response information, there is flexibility to utilize whatever option a shipper chooses to satisfy this requirement, which could be the *ERG*.

the *ERG* is carried aboard its trains as a source of emergency response information.

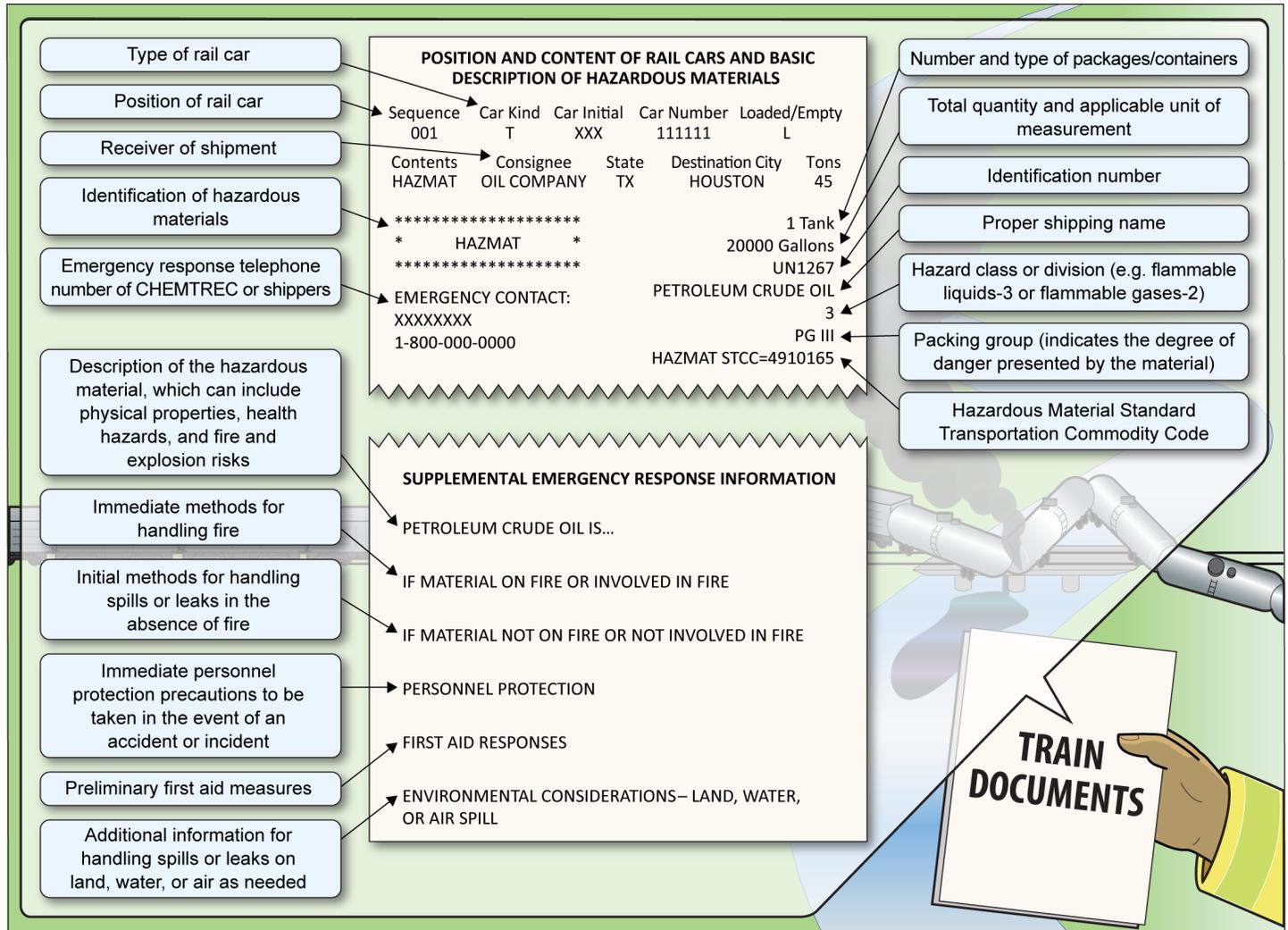
For shipments of hazardous materials, the HMR requires the train crew to carry documents with specific information about the hazardous materials on board.²⁸ Our review of selected train documents showed that the selected railroads included this information in their train documents. Additionally, most of the selected railroads included the information in their train consist, which identifies the position in the train of each rail car and includes other information about the rail car, such as its contents and destination. This information includes a basic description of each hazardous material being transported on that train, including the identification number and proper shipping name, as well as an emergency response telephone number, which is provided by the shipper of the regulated hazardous material (see fig. 3).²⁹ This telephone number is required to be located on documentation carried by the train crew on the shipping documents for transportation of the material.³⁰ This basic description of the hazardous material the train is transporting meets the first of seven emergency-response information requirements in the HMR.

²⁸49 C.F.R. § 172.202.

²⁹The identification number is a four digit number assigned to hazardous materials to help identify the hazardous material during emergency response.

³⁰49 C.F.R. § 172.604.

Figure 3: Information Found in Reviewed Train Documents Regarding the Position and Content of Rail Cars and Emergency Response for Specific Hazardous Materials



Source: GAO analysis of train documents. | GAO-17-130

Our review revealed that some railroads also include supplemental emergency response information for each hazardous material on the train at the end of the train consist or in a separate document. According to AAR, it provides this information to some railroads from its Hazardous Materials Emergency Response Database, which AAR develops and maintains. Six of the 7 Class I railroads and 5 of the 11 selected Class II

and III railroads included this supplemental information in their trains' documents.³¹ Our analysis showed that the amount and content of the supplemental emergency response information varied depending on the number and type of hazardous materials being transported on a train. For each hazardous material on the train, the information can include 5 to 10 paragraphs, covering 1 to 2 pages of paper. Supplemental emergency response information may include information on how to handle fires; precautions to be taken in the event of an accident; first aid responses; or how to handle air, water, or land spills for that particular hazardous material (rather than groups of hazardous materials as with the *ERG*). AAR told us the railroads carry this information because, prior to the development of the *ERG*, it was the only source of emergency response information carried on trains. However, as discussed later, AAR plans to discontinue the use of this database because, among other reasons, new sources of information, along with the *ERG*, have become available to emergency responders that contain this type of information.

According to Emergency Response Stakeholders, Emergency Responders Primarily Use the Train Documents and the *ERG* in the First 30 Minutes of a Rail Incident before Obtaining More Specific Emergency Response Information

According to the four emergency response associations we spoke to, when responding to a rail accident involving hazardous materials, emergency responders primarily rely on information from the train documents and the *ERG* during the first 30 minutes. These associations and two local responders we spoke to told us that responders will want to immediately learn what hazardous materials are on the train and their exact location. There are a couple of ways a responder might begin to identify what is on the train. According to all selected responders, if the train crew is located quickly, responders would use the train documents to identify and locate the hazardous materials on the train. If the train crew is incapacitated or cannot be found right away, responders could use placards, labels, or markings on the train to identify the hazardous materials, according to one emergency response association. According to four emergency response associations, responders then may consult the *ERG* to gather more information about the hazardous materials. PHMSA, the four emergency response associations, and one local responder told us that the *ERG* is the go-to source for first responders during the first 30 minutes or initial phase of an accident. In addition, two selected responders told us that the train documents are the best source

³¹The remaining Class I railroad told us that it only carries the *ERG* along with the basic description of the hazardous materials in the train because (1) it prefers to use one source for consistency and (2) some of the supplemental emergency response information and information in the *ERG* is repetitive.

for the most updated list of the hazardous materials on the train and their locations.

According to officials from two emergency response associations, emergency response should be thought of in terms of an accident timeline. According to these officials, the goal of emergency responders is to obtain more specific and detailed information as time goes on, beyond the first 30 minutes. During the management of an accident, emergency responders move from having unknowns to knowns. According to four emergency response associations and two local responders we interviewed, as the incident timeline matures, a responder should be seeking more comprehensive sources of information on the hazardous materials involved in the incident (see fig. 4). One emergency response association told us that a responder might consult CHEMTREC, the Wireless Information System for Emergency Responders (WISER) application, the *National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards*, or hotlines for the hazardous materials shippers themselves to obtain more specific information on chemical properties or tactical information.³² Below is an example of a sequence of actions a responder might take in the event of a hazardous materials accident, according to our analysis and interviews:

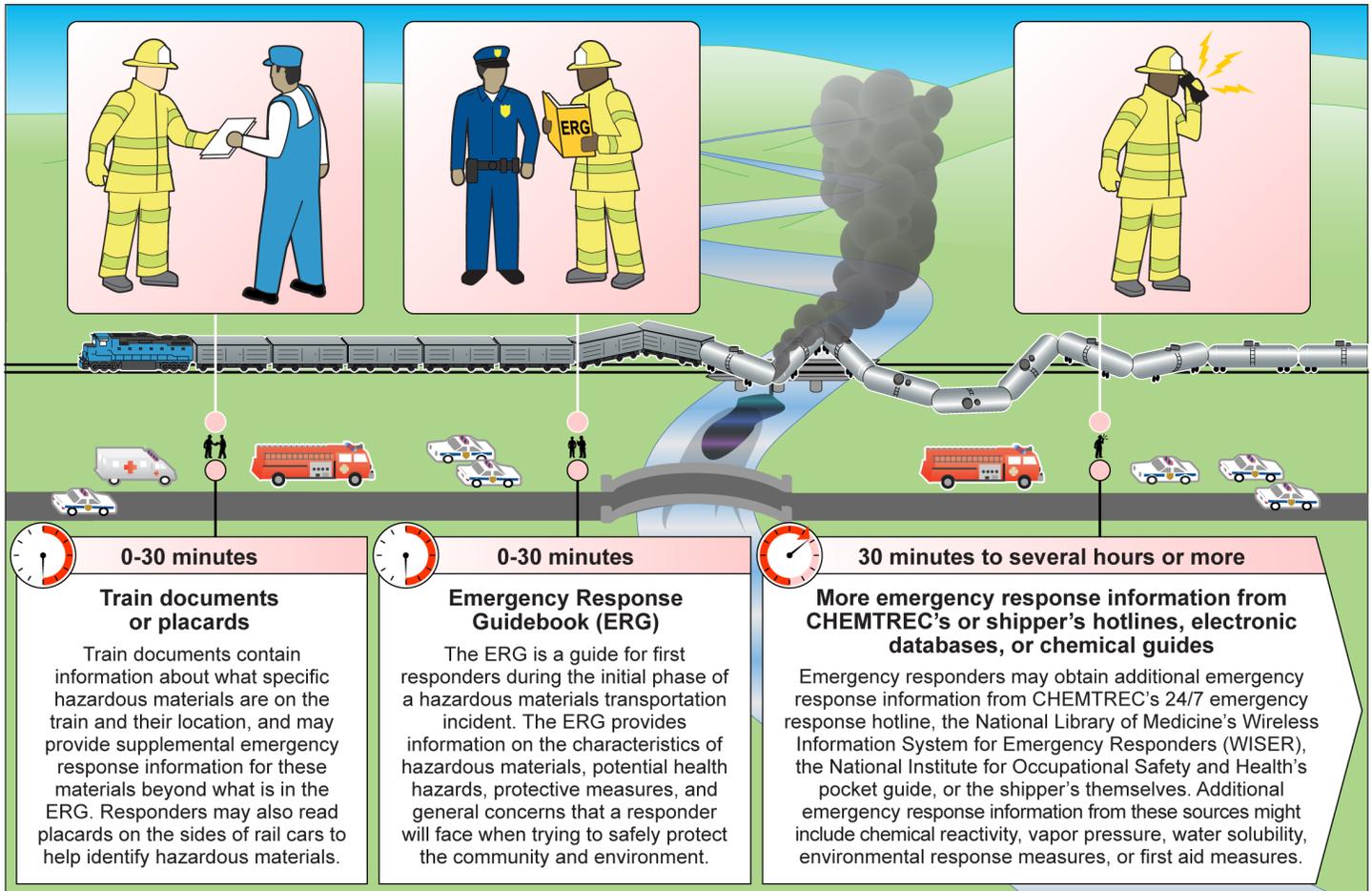
- A responder must first identify the hazardous material involved and its location. This could occur using the train documents from the train crew if they are located quickly, or if the train crew is incapacitated or cannot be found right away, using placards, labels, or markings on the train.
- Next, the responder determines initial response actions. Using the *ERG*, the responder might locate the material in the *ERG* and determine which of the 63 guides (orange section) applies. These guides provide the basic hazardous material information that a responder might want to know immediately, such as evacuation distances, risks of fire or explosions, potential health hazards, or

³²WISER is a system designed to assist emergency responders in hazardous material incidents. Developed by the National Library of Medicine, WISER provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression guidance. The *NIOSH Pocket Guide to Chemical Hazards*, published by the National Institute for Occupational Safety and Health, is a source of general industrial hygiene information for workers, employers, and occupational health professionals. The pocket guide presents key information and data for 677 chemicals or substance groupings that are found in the work environment.

protective clothing to wear. If the hazardous material is a toxic inhalation hazard, the *ERG* would direct a responder to its green section to gather additional information on isolation and protective action distances for small and large spills during the day or night.

- After locating the train crew and the train documents, a responder might also consult the supplemental emergency-response information in the train's documents for specifics about the hazardous materials involved in the accident. The new AskRail app, developed by AAR with data from all the Class I railroads, is another tool that provides first responders immediate access to information about the hazardous materials on the train. It provides access to real-time train consist information and corresponds directly to the emergency response information in the *ERG* associated with each hazardous material on the train.
- Later, after the material has been identified and initial response actions have been taken, a responder could consult previously mentioned sources such as WISER or CHEMTREC about the reactivity of the chemical, suggested environmental response measures, or suggested first aid measures for that particular hazardous material rather than a group of hazardous materials.

Figure 4. Timeline of When Specific Emergency Response Information Is Used in a Rail Accident



Source: GAO analysis. | GAO-17-130

The interaction between the train crew and emergency responders after a rail accident is important because it is the train crew who must provide train documents to the responders that lets them know the rail car order, the contents of the rail cars, and emergency response information for any hazardous materials that the train is transporting. The *United States Hazardous Materials Instructions for Rail* provides guidelines for how this interaction between the train crew and responders is to occur. Each railroad may modify parts of the *United States Hazardous Materials Instructions for Rail* to reflect their individual policies. Our analysis of the instructions provided by selected Class I, II, and III railroads found that they had generally consistent guidance on train crew cooperation with emergency responders. In each of the instructions that we reviewed, the

train crew is expected to immediately share any requested information from the train documents with emergency response personnel. In addition, the train crews are instructed to help emergency response personnel identify the rail cars and commodities involved, using train documents or observation from a safe distance. Five of the seven Class I railroads added information to their hazardous materials instructions on the process for sharing information with emergency responders. As an example, the guidance of one Class I railroad says, "If an extra copy is not available, share (DO NOT SURRENDER) the copy you have with the emergency response personnel." One Class II railroad asks its employees to note the time, along with the name and title of the person provided with the (emergency response) information.

Training received by emergency responders informs the emergency response actions taken following a rail hazardous materials accident.³³ For example, according to one emergency response association we interviewed, emergency responders with basic training, called awareness level training, receive training on the *ERG*, how to read train documents, and the other sources of emergency response information that provide more specific information on hazardous materials. On the other hand, according to one emergency response association and one local responder, responders with more advanced training may consult other sources of information even in the first 30 minutes of a response. For example, a hazardous materials technician for a local responder in Montgomery County, MD, told us that he does not use the *ERG*, but instead relies on the NIOSH pocket guide in the first 30 minutes of an incident because it provides more precise information than the *ERG*.

Training for emergency responders may be provided by emergency response associations, railroads, or state and local emergency

³³There are federal requirements that firefighters or other responders receive hazardous materials emergency response training, and when such training is provided, federal statutes regarding health and safety require that it must be based on training standards set by a recognized standard-setting organization, such as the National Fire Protection Association. Occupational Safety and Health Act of 1970, Pub. L. No. 91-596, 84 Stat. 1590 (1970). 40 U. S. C. § 311 and 29 C. F. R. § 1910.120(q). These standards detail the specific knowledge that trainees must have to be considered competent to provide varying levels of response to a hazardous materials incident.

management agencies, among others.³⁴ According to PHMSA, PHMSA also conducts outreach to emergency responders to train them on the *ERG*, including any changes to the *ERG* if a new version is forthcoming. For example, PHMSA officials visited 46 firehouses in fiscal year 2016—including visits in Olympia, WA, Houston, TX, and Greenville, SC—to provide training on the *ERG*. PHMSA also developed a new online training program in April 2016 that introduces emergency responders to the hazardous materials regulations and that may also be used to meet the requirements for awareness level training, or as the basis for developing more advanced training programs.

Supplemental Emergency Response Information on Reviewed Train Documents Was Generally Similar to *ERG* Information

While Generally Similar,
the Reviewed Information
in Places Provided
Different Levels of
Specificity and Types of
Information

The content in the *ERG* and the supplemental emergency response information in the train documents we reviewed was generally similar, largely aligning with the seven categories of required emergency response information for hazardous materials shipments set forth in the HMR (see table 1).³⁵ We used the seven requirements in the code of federal regulations as a baseline by which to compare the *ERG* and supplemental emergency response information. The specific content was

³⁴GAO, *Hazardous Materials Rail Shipments: Emergency Responders Receive Support, but DOT Could Improve Oversight of Information Sharing*, [GAO-17-91](#) (Washington, D.C.: Nov. 17, 2016). We found that most local emergency planners we contacted reported that rail hazardous-materials training was useful for helping their emergency responders prepare for and respond to rail hazardous materials incidents. However, the emergency planners also reported that various obstacles impede responders' participation in training activities, such as dedicating time for training, taking unpaid time off of work, and being able to get off from their regular duties.

³⁵49 C.F.R. § 172.602(a).

the same in certain instances. For example, both sources recommended that, in response to an incident involving propane, responders move victims to fresh air and give them artificial respiration if they are not breathing. The existence of identical content was, in part, because the *ERG* was one of the sources for the information in the AAR Hazardous Materials Emergency Response Database, which, as discussed earlier, was the source of the supplemental emergency response information in the train documents we reviewed. While the general content and certain information in the *ERG* and the supplemental emergency response information we reviewed was similar, the *ERG* mostly provided emergency response information for groups of hazardous materials based on their general hazards, while the supplemental emergency response information was specific to each hazardous material onboard the train (see table 1).

Table 1: Comparison of General Content of the *Emergency Response Guidebook (ERG)* and Supplemental Emergency Response Information in Selected Train Documents

Emergency Response Information Requirements^a	ERG	Supplemental Emergency Response Information in Selected Train Documents
The basic description and technical name of the hazardous material	Lists the proper shipping name and universal identification number for all hazardous materials.	Lists the proper shipping name, universal identification number, and hazard class for each hazardous material onboard. ^b
Immediate hazards to health	Identifies potential health hazards for groups of hazardous materials.	Describes each hazardous material onboard; description may or may not include, among other things, health hazards.
Risks of fire or explosion	Identifies potential fire or explosion hazards for groups of hazardous materials.	Describes each hazardous material onboard; description may or may not include, among other things, fire or explosion risks.
Immediate precautions to be taken in the event of an accident or incident	<p>Recommends precautions following incidents involving groups of hazardous materials, including:</p> <ul style="list-style-type: none"> • general public safety actions, • protective clothing to wear when responding to an incident, and • evacuation distances. <p>Identifies initial isolation and protective action distances for individual hazardous materials considered toxic by inhalation.</p>	<p>Recommends precautions following incidents involving each hazardous material onboard; precautions may or may not include:</p> <ul style="list-style-type: none"> • general personnel-protection actions, • protective equipment materials that are safe to wear when responding to an incident, and • evacuation distances.
Immediate methods for handling fire	Recommends emergency response actions for groups of hazardous materials in incidents involving a fire.	Recommends emergency response actions for each hazardous material onboard for incidents in which the material is on fire or involved in a fire.
Initial methods for handling spills or leaks in the absence of fire	Recommends emergency response actions for groups of hazardous materials in incidents involving a spill or leak.	<ul style="list-style-type: none"> • Recommends emergency response actions for each hazardous material onboard for incidents in which the material is not on fire or not involved in a fire. • May recommend environmental considerations for each hazardous material onboard for land, water, and/or air spills involving the material.
Preliminary first aid measures	Recommends first aid responses for groups of hazardous materials.	Recommends first aid responses for each hazardous material onboard.

Source: GAO analysis of Code of Federal Regulations, ERG and supplemental emergency response information data. | GAO-17-130

^a49 C.F.R. § 172.602(a).

^bThe train documents we reviewed of one railroad did not include some of this information in its supplemental emergency-response information.

The supplemental emergency response information that we reviewed was intended to augment the *ERG* and provided more specificity in certain areas.

- For example, for an incident involving chlorine, the supplemental emergency response information we reviewed recommended digging a pit, pond, lagoon, or holding area to contain the spill, while the *ERG* generally recommended preventing entry of the spill into waterways, sewers, basements, or confined areas, but did not offer a specific means by which to do so.
- Additionally, for an incident involving sodium hydroxide solution—which is commonly present in commercial drain and oven cleaners—the supplemental emergency response information we reviewed recommended the use of specific materials for protective clothing, such as butyl rubber and neoprene, while the *ERG* generally recommended wearing protective clothing recommended by the manufacturer of the hazardous material.
- The supplemental emergency response information we reviewed also provided information that went beyond what is required by federal regulations and included in the *ERG*, such as physical characteristics of the hazardous material, uses, water solubility, and environmental hazards.

However, in one area, the *ERG* often provided more detail than the supplemental emergency response information we reviewed. The *ERG* provided specific initial isolation and evacuation distances for incidents involving groups of hazardous materials, while the supplemental information offered no distance recommendations or deferred to the *ERG* in most of the train documents we reviewed. For example, for a large spill of gasoline, the *ERG* recommended an initial downwind evacuation of at least 300 meters, while the supplemental emergency response information we reviewed said to consult the *ERG* for all evacuation distances.

The *ERG* and the supplemental emergency response information we reviewed also at times differed on the type of information that was given for certain emergency response recommendations. For example, for handling spills or leaks, the *ERG* often provided recommendations according to the size of the incident, such as small or large spills, while the supplemental information we reviewed often provided recommendations according to the environment, such as air, land, or water spills.

We Found Several Inconsistencies in Prescribed Evacuation Distances, but Recent AAR Plans Would Eliminate Potential for Similar Discrepancies

In reviewing the *ERG* and train documents in our nonprobability sample belonging to our selected Class I, II, and III railroads, we found inconsistent information for 8 of the 72 hazardous materials we selected.

- Two inconsistencies involved differences in a first aid response recommendation regarding the amount of time to flush skin or eyes with running water in case of contact with the substance. The differences were 5 minutes in one instance and 10 minutes in another.
- Six inconsistencies involved discrepancies between the recommended evacuation distances in the two sources.
 - For four of the six hazardous materials with evacuation distance inconsistencies, the supplemental emergency response information recommended an evacuation distance of a half mile for an incident involving fire, while the *ERG* recommended one mile. These four hazardous materials were all labeled as United Nations identification number 1075, which represents multiple liquefied petroleum gases.
 - For another of the hazardous materials, sodium chlorate, the *ERG* recommended an evacuation distance of a half mile, while the supplemental emergency response information recommended the same distance, but only if the resulting fire was uncontrollable.
 - For the final hazardous material, ammonium nitrate, the *ERG* recommended an evacuation distance of a half mile in all directions for an incident involving fire, while the supplemental emergency response information recommended one mile for an uncontrollable fire.

The NTSB report on the Paulsboro, New Jersey, incident highlighted inconsistencies between recommended evacuation distances in the supplemental emergency response information in the train documents and the *ERG* for two of the hazardous materials on the train, chlorine and vinyl chloride.³⁶ This finding led to NTSB's recommendation that AAR update its database to ensure that its guidance is consistent with and at least as protective as the *ERG*.³⁷ In response to NTSB's

³⁶Unlike the *ERG*, the vinyl chloride supplementary emergency response information appended to the train consist did not specify an initial evacuation radius for a "release without fire." Additionally, its guidance for evacuations during a fire was only half the evacuation distance (0.5 miles) recommended by the *ERG* (1 mile).

³⁷National Transportation Safety Board, *Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey, November 30, 2012*, NTSB/RAR-14/01 (Washington, D.C.: July 29, 2014).

recommendation, AAR replaced all existing evacuation distance statements in its Hazardous Materials Emergency Response Database, effective August 1, 2014, with a statement to consult the *ERG* for protective action considerations, including initial isolation or evacuation distances and shelter-in-place recommendations. Additionally, AAR made other changes to the database effective December 1, 2014. NTSB found AAR's response actions to be unacceptable because AAR did not revise emergency response information that was less conservative than the equivalent precautions contained in the *ERG*.

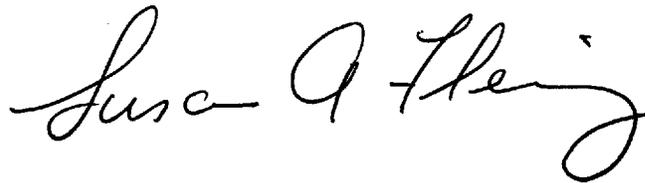
As described above, our analysis showed that some railroads did not capture these changes, including the new evacuation distance recommendations, and continued to provide specific evacuation distances for hazardous materials in their train documents that were inconsistent with the *ERG*. AAR is planning a change that is intended to remove the potential for such discrepancies. Specifically, according to AAR, AAR hazardous materials committee members—which consist of representatives of the 7 Class I railroads—unanimously voted in August 2016 to discontinue the support, production, and distribution of the AAR Hazardous Materials Emergency Response Database. According to AAR, although the Class II and III railroads did not vote on the change, the database will no longer be supported, produced, or distributed, making it effective for all railroads. Since emergency responders have access to the *ERG* and other resources with more specific information than the *ERG*—such as WISER, the NIOSH pocket guide, safety data sheets, CHEMTREC, and the shipper—the supplemental emergency response information has become obsolete, according to one AAR official.

Agency Comments

We provided a draft of this report to DOT and NTSB for their review and comment. DOT provided a technical comment about hazardous material training requirements, which we incorporated. NTSB provided a technical comment about AAR's response to their recommendation to revise discrepancies between emergency response information found in AAR's database and the *ERG*, which we incorporated.

We will send copies of this report to the appropriate congressional committees and to the Secretary of Transportation and the Chairman of the National Transportation Safety Board. In addition, the report will be available at no charge on the GAO website at <http://gao.gov>.

If you or your staff have any questions about this report, please contact Susan Fleming at (202) 512-2834 or flemings@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Major contributors to this report are listed in appendix II.

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

Susan Fleming
Director, Physical Infrastructure Issues

Appendix I: Objectives, Scope, and Methodology

Our objectives were to examine: (1) what emergency response information is carried on trains by selected railroads that transport hazardous materials and how responders use it and (2) how the supplemental emergency response information¹ carried on trains of these railroads compares to the information in the *Emergency Response Guidebook (ERG)*.

To inform both of our objectives, we reviewed relevant literature, including the National Transportation Safety Board (NTSB) report on the Paulsboro, New Jersey incident,² the *ERG*, and a prior GAO report on emergency response to rail incidents.³ We reviewed the Association of American Railroads' (AAR) *United States Hazardous Materials Instructions for Rail*, to understand industry guidelines on how to meet federal hazardous material regulations, including the emergency response information to be carried on trains and how railroad personnel are expected to interact with first responders.⁴ We also examined relevant sections of the Hazardous Materials Regulations (HMR) to determine requirements for railroads related to emergency response information carried on trains transporting hazardous materials.⁵ Additionally, we interviewed officials from the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Railroad Administration (FRA) within the Department of Transportation (DOT) and NTSB to understand their roles in developing, regulating, and making recommendations regarding emergency response information on trains.

To identify what emergency response information is carried on trains by selected railroads that transport hazardous materials and how responders use it, we interviewed two railroad associations, AAR and the American

¹Supplemental emergency response information is information on responding to emergencies involving the release of hazardous materials that some railroads carry on their trains in addition to the *ERG*.

²National Transportation Safety Board, *Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey, November 30, 2012*, NTSB/RAR-14/01 (Washington, D.C.: July 29, 2014).

³GAO, *Hazardous Materials Rail Shipments: Emergency Responders Receive Support, but DOT Could Improve Oversight of Information Sharing*, [GAO-17-91](#) (Washington, D.C.: Nov. 17, 2016).

⁴Association of American Railroads, *United States Hazardous Materials Instructions for Rail* (June 30, 2015).

⁵49 C.F.R. pts. 171-180.

Short Line and Regional Railroad Association (ASLRRA), and all seven Class I railroads.⁶ ASLRRA told us it represents approximately 450 of the about 550 Class II and III railroads, of which 300 to 400 transport hazardous materials. We selected seven Class II and seven Class III railroads that carry hazardous materials and are ASLRRA members, using PHMSA's Office of Hazardous Materials Safety Incident Reports Database and a member list provided by ASLRRA. We searched PHMSA's database for railroads that experienced an incident in transit during 2015, which resulted in a list of railroads that carry hazardous materials that we could cross-reference with the ASLRRA member list. The railroads we selected are also geographically distributed across the United States. Of those fourteen selected Class II and III railroads, we spoke with representatives of five Class II and six Class III railroads. The other three did not respond to our requests for an interview. The results of the interviews cannot be generalized to the entire population of Class II and Class III railroads. As described below, we also reviewed information on hazardous materials in selected train documents from some of these railroads. Fifteen (7 Class Is, 4 Class IIs, and 4 Class IIIs) of the 18 railroads we interviewed provided us with at least one set of train documents. We selected one set of train documents from each of those railroads to determine how the basic description and technical name of hazardous materials the train is transporting and the emergency response telephone number are displayed. The results of the analysis are not generalizable to all of the train documents of the selected railroads or all railroads. We also spoke with CHEMTREC regarding its role in providing information to first responders.⁷ Additionally, we interviewed three of the five largest shippers of hazardous materials in the United States—Exxon-Mobil, Dow Chemical Company, and BASF—to determine what emergency response information they provide to railroads and emergency

⁶Railroads 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.

⁷CHEMTREC, a program of the American Chemistry Council, serves as a round-the-clock resource for obtaining immediate emergency response information for incidents involving hazardous materials. According to CHEMTREC, CHEMTREC is linked to the largest network of chemical and hazardous material experts in the world, including chemical and response specialists, public emergency services, and private contractors.

responders. CHEMTREC identified and provided the contact information for the three shippers based on their criteria and resources.

We also interviewed local emergency responders in Montgomery County, MD, Westmoreland County, PA, and Culbertson, MT to learn their perspective on the emergency response information carried on trains and how and when emergency responders use the information. We chose the first organization because of its proximity to the audit team in Washington, D.C. and the other two because of their involvement in responding to rail incidents involving hazardous materials in 2014 and 2015, respectively. We determined their involvement by searching PHMSA's Incident Reports Database for serious rail incidents in transit over the last 5 years that resulted in a hazardous materials' release and talking to the first responders associated with the city or county listed in the database. We also interviewed representatives from four emergency response associations—three national associations representing local emergency responders, including the International Association of Fire Chiefs, International Association of Firefighters, and the National Volunteer Fire Council, as well as the National Fire Protection Association, which develops, among other things, standards for emergency response to hazardous materials incidents. Additionally, we spoke with two train crew unions—the Brotherhood of Locomotive Engineers and Trainmen and the International Association of Sheet Metal, Air, Rail and Transportation Workers—to understand the role of the train crews in emergency response and how they interact with emergency responders following a rail incident.

To understand how the supplemental emergency-response information carried on trains of selected railroads compares to the information in the *ERG*, we analyzed information on a nonprobability sample of hazardous materials discussed in the *ERG* and in train documents. We used the 2012 *ERG*, as opposed to the recently released 2016 *ERG*, because not all of selected railroads had begun using the 2016 version during the timeframe that the sample was taken. We asked each of the 18 railroads that we interviewed to provide us with a nonprobability sample of their train documents, including the “train consist”⁸ and any supplemental emergency response information, for 15 trains carrying at least two different hazardous materials and traveling between May 12, 2016, and

⁸The “train consist” is a term used to describe a document that reflects the current position in the train of each rail car containing a hazardous material as required by 49 C.F.R. § 174.26(a).

June 30, 2016. Eleven of the 18 railroads (6 Class Is, 2 Class IIs, and 3 Class IIIs) provided train documents that contained supplemental emergency response information. From those train documents, we selected a sample of 72 unique hazardous materials that were in either the AAR's top 125 hazardous commodities list as measured by loaded tank car originations or top 25 hazardous commodities list as measured by loaded non-tank-car originations (e.g., intermodal trailers or containers on flat cars) in 2014.⁹ The sample represented 70 unique sets of train documents from 10 of the 11 railroads that carried the supplemental emergency response information. The sample included 10 hazardous materials in 10 sets of train documents from five of the six Class I railroads, 10 in 8 sets of train documents from the sixth Class I railroad,¹⁰ 5 in 5 sets of train documents from both Class II railroads, and 1 in 1 set of train documents from two of the three Class III railroads.¹¹

To make the comparisons, we first determined which parts of the *ERG* and the supplemental emergency response information in the train documents contained information that is associated with the seven requirements for emergency response information outlined in the HMR.¹² We then examined each hazardous material in the sample by comparing the relevant sections in each source and determining where there are similarities and differences, as well as any conflicting information. The results of our analysis are not generalizable to all train documents or all hazardous materials in the *ERG*. Furthermore, AAR provided us access to its Hazardous Materials Emergency Response Database. We

⁹Association of American Railroads, Bureau of Explosives, *Annual Report of Hazardous Materials Transported by Rail 2014*, BOE 14-1 (Washington, D.C.: July 2015). The first list includes the top 125 hazardous commodities shipped in railroad tank cars in the U.S., Canada, and Mexico in 2014, ranked in descending order by number of originations. These 125 commodities account for approximately 95 percent of shipments of hazardous commodities in railroad tank cars. The second list includes the top 25 hazardous commodities shipped in railcars other than tank cars in the U.S., Canada and Mexico in 2014, ranked in descending order by number of originations. These 25 commodities account for approximately 71 percent of the rail shipments of hazardous commodities not transported in tank cars.

¹⁰None of the other train documents provided by this railroad met our criteria for selecting hazardous materials to include in our review.

¹¹The third Class III railroad was not able to provide a sufficient sample of train documents that met our criteria. Furthermore, none of the train documents it provided contained hazardous materials that met our criteria for selecting hazardous materials to include in our review.

¹²49 C.F.R. § 172.602(a).

determined that the supplemental emergency response information associated with the sample of hazardous materials in the reviewed train documents from the 10 railroads was reliable for the purposes of our report and objectives because all of the information came from the AAR Hazardous Materials Emergency Response Database. We determined that the database was the appropriate source of the information in the reviewed train documents through interviews with officials from each of the 10 railroads. We compared the supplemental emergency response information on the sample of hazardous materials in the reviewed train documents to the information on those hazardous materials in the source database for the time period reflected by the dates of the train documents (May 12, 2016, to June 30, 2016). The results of our analysis are not generalizable to all train documents or all hazardous materials in the AAR Hazardous Materials Emergency Response Database. We also interviewed supply chain software providers ShipXpress and GE Transportation to learn how the Class II and Class III railroads receive access to the AAR Hazardous Materials Emergency Response Database.

We conducted this performance audit from March 2016 through December 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: GAO Contact and Staff Acknowledgments

GAO Contacts

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Staff Acknowledgments

In addition to the individual name above, Nancy Lueke (Assistant Director), Kieran McCarthy (Analyst in Charge), Moira Lenox, Garrett Riba, Josh Ormond, William Egar, Dave Hooper, Delwen Jones, Reuben Montes de Oca, and Kelly Rubin made key contributions to this report.

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