

Item #882037 (Rev. 3/15)

**NS NORFOLK SOUTHERN**  
*One line, infinite possibilities.*

Norfolk Southern Railway Company  
Safety & Environmental Department  
1200 Peachtree Street, NE – Box 13  
Atlanta, GA 30309

# RAILROAD EMERGENCY RESPONSE PLANNING GUIDE

March 2015





## **NORFOLK SOUTHERN VISION**

**Be the safest, most  
customer-focused, and  
successful transportation  
company in the world.**

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Hazardous Materials Pocket Response Guide

NS System Map

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## **1.0 INTRODUCTION**

The Norfolk Southern Emergency Response Planning Guide has been developed by Norfolk Southern Railway Company (Norfolk Southern) to assist local emergency response organizations in their efforts to plan for and respond to railway related incidents or emergencies. It is also designed to be utilized as a reference resource, and hand-out to supplement training programs presented by Norfolk Southern to the emergency response community.

Because this Guide is designed to augment the local response plan(s), it is purposely brief to cover only the key information that would be needed by planners and response organizations if an incident involving Norfolk Southern should occur. The Guide is subdivided into four main sections, addressing Prevention, Preparedness, Response, and Recognition & Identification. Appendices are included which contain other pertinent railroad information. Important components of the Planning Guide include:

- Phone numbers and points of contact in the event of a Norfolk Southern related incident;
- Notification procedures in the event of a hazardous materials incident;
- Information on how to identify ownership of local rail lines;
- Information pertaining to monitoring and air dispersion modeling;
- Bridge and Tunnel incident considerations;
- Hazardous materials shipping paper descriptions and examples;
- Rail car placarding requirements and sources of additional information on hazardous materials and hazard identification;
- Additional resources available to Norfolk Southern and the Local Emergency Planning Committees (LEPCs) in the event of an incident;
- Training and emergency response exercise opportunities available from Norfolk Southern.

The information will assist local planners to prepare for and respond to any potential rail incident or emergency. This Plan is also designed to provide responders with accurate and efficient access to Norfolk Southern staff and resources, so that the necessary local and private resources can be engaged should the need arise.

## **2.0 PREVENTION**

Accident and incident prevention are the primary focus and challenge of Norfolk Southern's hazardous materials program, with the goals of minimizing risks to the community, and maximizing employee and transportation safety and protection of the environment. These goals are accomplished throughout Norfolk Southern through a strict program of effective employee training, regulatory and rule compliance, and risk assessment. In addition, Norfolk Southern has a dedicated maintenance program designed to ensure ongoing proper maintenance of the operating system infrastructure. This includes frequent inspections and upgrades to rail equipment and track. In addition, Norfolk Southern coordinates with the shipper following any rail incident to ensure against reoccurrence of the situation and controlling factors.

## **3.0 PREPAREDNESS**

The primary goal of transporting hazardous materials is to move each and every shipment in a timely manner from origin to destination safely and without incident. In the event of a hazardous materials incident, the goal becomes to (1) effectively prevent injuries, (2) minimize property damage, and (3) safeguard against significant environmental impact.

Preplanning and preparedness are essential to achieving timely and effective incident response. An effective state of preparedness is accomplished through good emergency planning and training, comprehensive emergency response exercises, and the performance of regular evaluations of the effectiveness of response plans.

To better facilitate emergency preparedness activities with local communities, Norfolk Southern is an active participant in the TRANSCAER® Program (Transportation Community Awareness and Emergency Response). TRANSCAER® is a nationwide community outreach program designed to address community concerns about the transportation of hazardous materials through planning and cooperation. The program provides assistance for communities to develop and evaluate their emergency response plans for hazardous materials transportation incidents.

Norfolk Southern encourages local emergency management and response groups to incorporate this Guide into their own plans and take the opportunity to preplan at the Norfolk Southern facilities in their area of responsibility. Local emergency response personnel should familiarize themselves with the layout and operation of Norfolk Southern properties in their area.

**For information about TRANSCAER® efforts at the local level, or to obtain information about training opportunities with Norfolk Southern for their community, local planners may contact the Norfolk Southern Safety & Environmental Department, Attention: Manager, Hazardous Materials, 1200 Peachtree Street, NE - Box 13, Atlanta, GA 30309, email [HMTraffic@nscorp.com](mailto:HMTraffic@nscorp.com).**

### **3.1 Coordination with Norfolk Southern Staff**

Norfolk Southern has a staff of hazardous materials and environmental professionals who can respond as necessary to any incident or emergency. These personnel are strategically located throughout the Norfolk Southern Operating System and are available to assist company personnel and emergency responders in the mitigation of emergency situations.

Our hazardous materials and environmental personnel have a variety of response tools and resources available for use in an emergency. These personnel will work with other company officials and the local incident command personnel to ensure safe and efficient handling of the incident.

A map of the Norfolk Southern Operating System, is included inside the back cover of this Guide, and contact information for NS Emergency Response staff is provided on the following page (Exhibit 1). NS Emergency Response staff can also be contacted 24 hours a day, 7 days a week, 365 days a year by calling the NS Police Communications Center (PCC) at 1-800-453-2530.

<b>EXHIBIT 1 Norfolk Southern Emergency Response Personnel</b>			
<b>Name</b>	<b>Title</b>	<b>Location</b>	<b>Office Phone</b>
<b>NORFOLK SOUTHERN HAZARDOUS MATERIALS GROUP</b>			
D. L. Schoendorfer	System Manager Hazardous Materials	Atlanta, GA	404-582-3762
<b>EASTERN REGION</b>			
P. B. Williams	Regional Manager Hazardous Materials	Roanoke, VA	540-524-6942
M. L. East	Hazardous Materials Compliance Officer	Charlotte, NC	<b>TBD</b>
<b>NORTHERN REGION</b>			
J. L. Taylor	Regional Manager Hazardous Materials	Harrisburg, PA	717-541-2203
J. W. Casey	Hazardous Materials Compliance Officer	Harrisburg, PA	717-541-2148
J. E. Lerner	Hazardous Materials Compliance Officer	Elkhart, IN	574-296-2215
<b>WESTERN REGION</b>			
R. C. Wood	Regional Manager Hazardous Materials	Atlanta, GA	540-529-2242
D. B. Lefler	Hazardous Materials Compliance Officer	Louisville, KY	502-775-4940
D. J. Wallace	Hazardous Materials Compliance Officer	Birmingham, AL	205-451-4687
<b>TBD - New</b>	Hazardous Materials Compliance Officer	Decatur, IL	<b>TBD</b>
<b>NORFOLK SOUTHERN ENVIRONMENTAL OPERATIONS GROUP</b>			
B. A. Naranjo	System Manager Environmental Operations	Atlanta, GA	404-582-3595
<b>EASTERN REGION</b>			
T. S. Carpenter	Regional Manager Environmental Operations	Roanoke, VA	540-524-5183
G. O. Turner	Engineer Environmental Operations	Charlotte, NC	704-378-3841
<b>NORTHERN REGION</b>			
P. Zottola	Regional Manager Environmental Operations	Pittsburgh, PA	412-893-7242
R. J. Scoble	Engineer Environmental Operations	Bellevue, OH	419-483-1450
H. H. Abdelghani	Facilities Engineer Environmental Operations	Altoona, PA	814-949-1235
<b>WESTERN REGION</b>			
D. M. Patten	Regional Manager Environmental Operations	Chattanooga, TN	865-521-1594
W. B. Salley	Engineer Environmental Operations	St. Louis, MO	314-679-1853
R. N. Williams	Engineer Environmental Operations	Atlanta, GA	404-529-2109

### 3.2 Hazardous Material Traffic

Data on the common types of hazardous materials being transported through local communities are useful for local emergency planners in developing effective and realistic emergency response plans. In general, the types of hazardous materials transported by rail through local communities do not vary significantly from the national average. The typical variance may be in the ordering of the “Top 25” products that are transported through various communities (see Exhibit 2 on page 4). To request Hazardous Material Traffic information for your jurisdiction, see Exhibit 3 on page 5.

**EXHIBIT 2**  
**Norfolk Southern 2014 Hazmat Traffic — Top 25 Commodities**

PROPER SHIPPING NAME	
1.	Mixed Freight – FAK* including Hazmat
2.	Petroleum Crude Oil
3.	Alcohols, n.o.s.
4.	Liquefied Petroleum Gas
5.	Elevated Temperature Materials
6.	Sodium Hydroxide Solution
7.	Combustible Liquids, n.o.s.
8.	Environmentally Hazardous Substances
9.	Flammable Liquids, n.o.s.
10.	Chlorine
11.	Sulfuric Acid
12.	Sulfur, Molten
13.	Engines, Internal Combustion
14.	Phosphoric Acid Solution
15.	Carbon Dioxide
16.	Hydrochloric Acid
17.	Ethylene Oxide
18.	Potassium Hydroxide Solution
19.	Methyl Methacrylate
20.	Sodium Chlorate
21.	Ethanol
22.	Methanol
23.	Phenol, Molten
24.	Ammonium Nitrate
25.	Hypochlorite Solutions

Total hazmat shipments in 2014 = **589,564**  
Top 25 represent **85.4%** of total shipments

\*FAK = **F**reight **A**ll **K**inds



**EXHIBIT 3**  
**Form to Request Hazardous Materials Flow Information**



**REQUEST FOR HAZARDOUS MATERIALS COMMODITY FLOW INFORMATION**

Organization Requesting Information: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Phone Number: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

(Street Address)

(City, State, Zip)

Geographical Description of Area for Study: \_\_\_\_\_

By signing below I acknowledge and agree to the terms set forth by Norfolk Southern Railway Company (NSRC) for use and dissemination of the NSRC Hazardous Materials Commodity Flow Information. NSRC considers this information to be restricted information of a security sensitive nature. I thus affirm and agree that the information provided by NSRC in this report will be used solely for and by bona fide emergency planning and response organizations for the expressed purpose of emergency and contingency planning. This information will not be distributed publicly in whole or in part without the expressed written permission of NSRC.

\_\_\_\_\_  
(Signature of person requesting commodity flow information)

Return completed form and a letter on official stationery requesting the information to:

**HMTraffic@nscorp.com**

(For NSRC Use Only)

Initials of person responsible for approval: \_\_\_\_\_ YES \_\_\_\_\_ NO Date: \_\_\_\_\_

Hazardous Materials Service Support:

Date Request Received: \_\_\_\_\_

Time Period Covered: \_\_\_\_\_

Date Report Sent: \_\_\_\_\_

Report sent via:  E-Mail  U.S. Mail

### **3.3 Training and Exercises (TRANSCAER®)**

Regular training and emergency response exercises help to facilitate safe and efficient operations during response. Norfolk Southern has emergency response plans in place to control and remediate hazardous materials incidents and to minimize the damage caused by them. However, due to the nature of the railroad network, Norfolk Southern recognizes that local emergency response personnel, such as firefighters, Emergency Medical Technicians (EMTs), and police will most likely be the first to arrive at the scene of a hazardous materials incident. Therefore, the best developed plans in place throughout the Norfolk Southern Operating System will not be 100% effective unless an efficient incident response capability is maintained by local communities along the right-of-way.

In response to this need, Norfolk Southern is an active participant in the TRANSCAER® initiative. A portion of this program includes training for fire departments and other local emergency response organizations. Norfolk Southern works with Local Emergency Planning Committees (LEPCs) to coordinate participation in exercises and regularly conducts two levels of emergency preparedness exercises: tabletop exercises and full-scale exercises. Tabletop exercises are designed to have the participants practice problem solving, generate discussion, and resolve questions about handling an incident, through the tabletop analysis of various incident scenarios. Full scale exercises test emergency procedures using props and equipment in the field, and tests emergency response plans, via the enactment of a full response to a mock incident.

### **3.4 Local Norfolk Southern Rail Lines**

It is important for local emergency planners to familiarize themselves with the local rail lines to know the ownership of the line and potential access routes for emergency response vehicles. As part of its grade crossing safety program, Norfolk Southern has posted a telephone hotline number (1-800-946-4744), along with the Federal Railroad Administration (FRA) unique Crossing Identification Number, at each Norfolk Southern crossing. This program allows people to report malfunctions in crossing safety devices to Norfolk Southern, but can also be used by emergency responders to identify Norfolk Southern rail lines in the event of a railroad incident. **A listing of the railroad crossings within a community can be obtained by contacting the Police Communications Center (1-800-453-2530).**

### **3.5 Grade Crossings**

All NS Railroad emergencies, including situations that could affect **PUBLIC SAFETY** or the **SAFE MOVEMENT of TRAINS**, should be reported to the NS Railroad Police Communications Center located in Atlanta, GA at **1-800-453-2530** or the number noted on the Emergency Notification Sign. This could include a stuck or stalled vehicle on a crossing, accidents at or near a crossing, or any event or situation taking place in which close clearance of train traffic may be a safety factor. If a NS train needs to be stopped, remain on the line with the Police Communications Center (PCC) specialist until you are assured that this is accomplished. It is important to communicate to the NS Police the DOT crossing number (shown in bottom portion of sign) so that the specific road crossing can be quickly identified. Also, include the city, state and location of the incident. **PLEASE NOTE:** A FRA Rule is now in effect that requires all Railroads to phase in newer styled Blue Emergency Notification Signs by September 2017 (shown on next page). Until that date, you may find an older style or newer style Emergency Notification Sign but they contain the same information.

### 3.5 Grade Crossings (continued)



At each PUBLIC road crossing there is a post mounted sign, as shown above, identifying the railroad name, the DOT crossing number, and the emergency telephone number. The reflective sign is the size of a vehicle license. Each PRIVATE road crossing is identified by the “Private Crossing” sign shown below on the right. The crossing identification number, the name of the railroad, and the emergency telephone number will be shown on a sticker, like the one shown in the center below, located on the reverse of the stop sign mounted above the “Private Crossing” sign.



### 3.6 Rail Crossing Locator Mobile Application



The Crossing Locator was developed by the Federal Railroad Administration to provide users with access to the highway-rail grade crossing database and map features from a mobile device. The tool allows users to locate crossings by USDOT Crossing ID, address or geo-location; access inventory records submitted by states and railroads; and view accident history. Users can also select from multiple base map features and identify railroad crossings by special characteristics. The information accessed in the mobile application is derived from the Safety Data website using information submitted by States and Railroads. While this is an effective tool, please use the ENS information and contact number during an emergency situation. More information on the mobile application can be found at: [www.fra.dot.gov/Page/P0703](http://www.fra.dot.gov/Page/P0703). The Crossing Locator App is currently available for your Apple and Android Devices.

## **4.0 RESPONSE**

Norfolk Southern will respond to all known hazardous material incidents that occur in the course of transportation over the Norfolk Southern Railway system. Norfolk Southern's primary objectives at the scene of a hazardous materials incident are to:

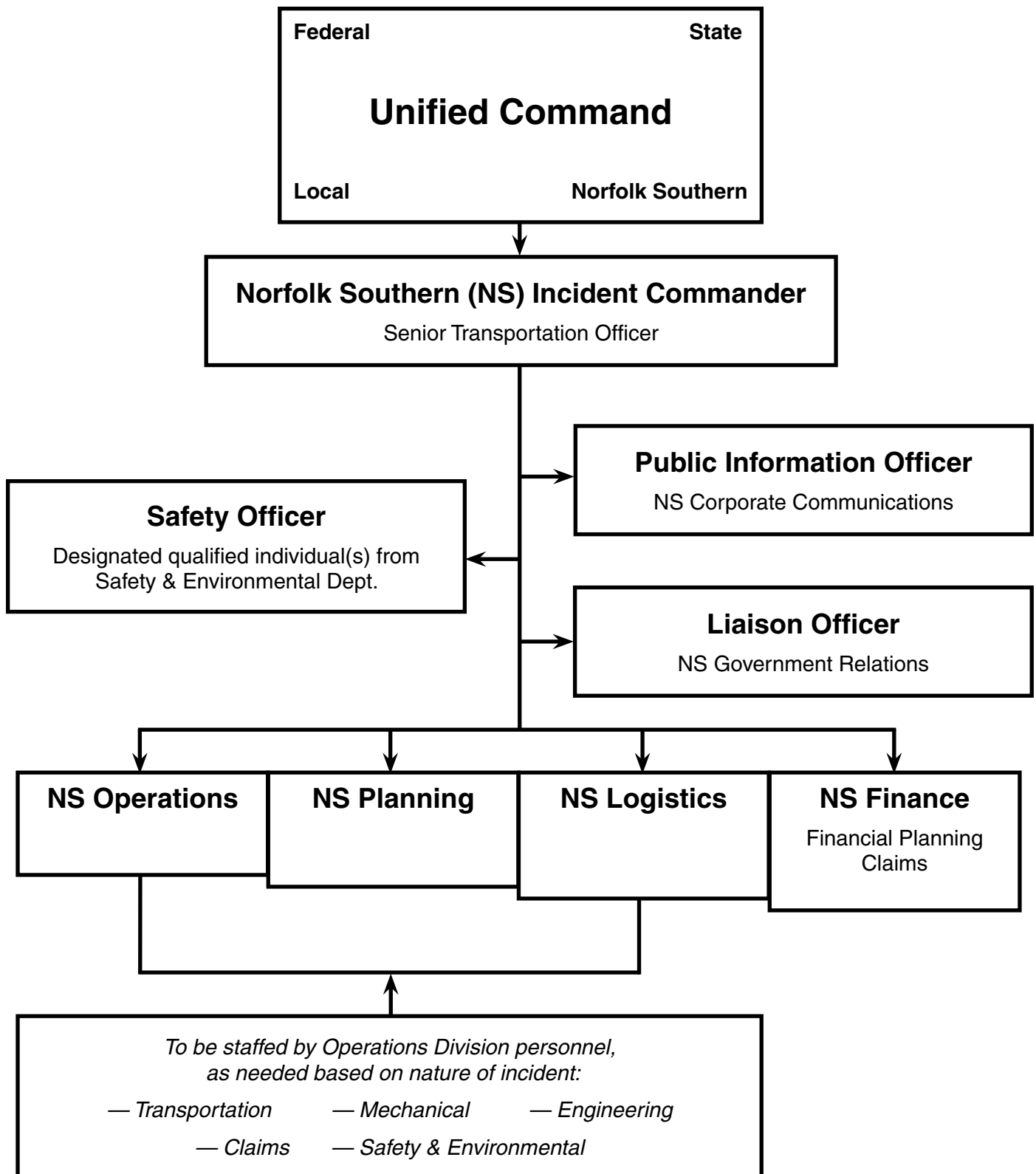
- Protect life and health;
- Protect property and the environment;
- Cooperate with and assist governmental authorities; and
- Comply with local, state, and federal regulations.

### **4.1 Incident Levels (I, II, III)**

Norfolk Southern has developed an internal incident level response system based upon the designation of hazardous materials incidents as either Level I (Low Hazard), Level II (Medium Hazard), or Level III (High Hazard) Incidents. Incident response Levels are determined on a variety of hazard assessment criteria, which include:

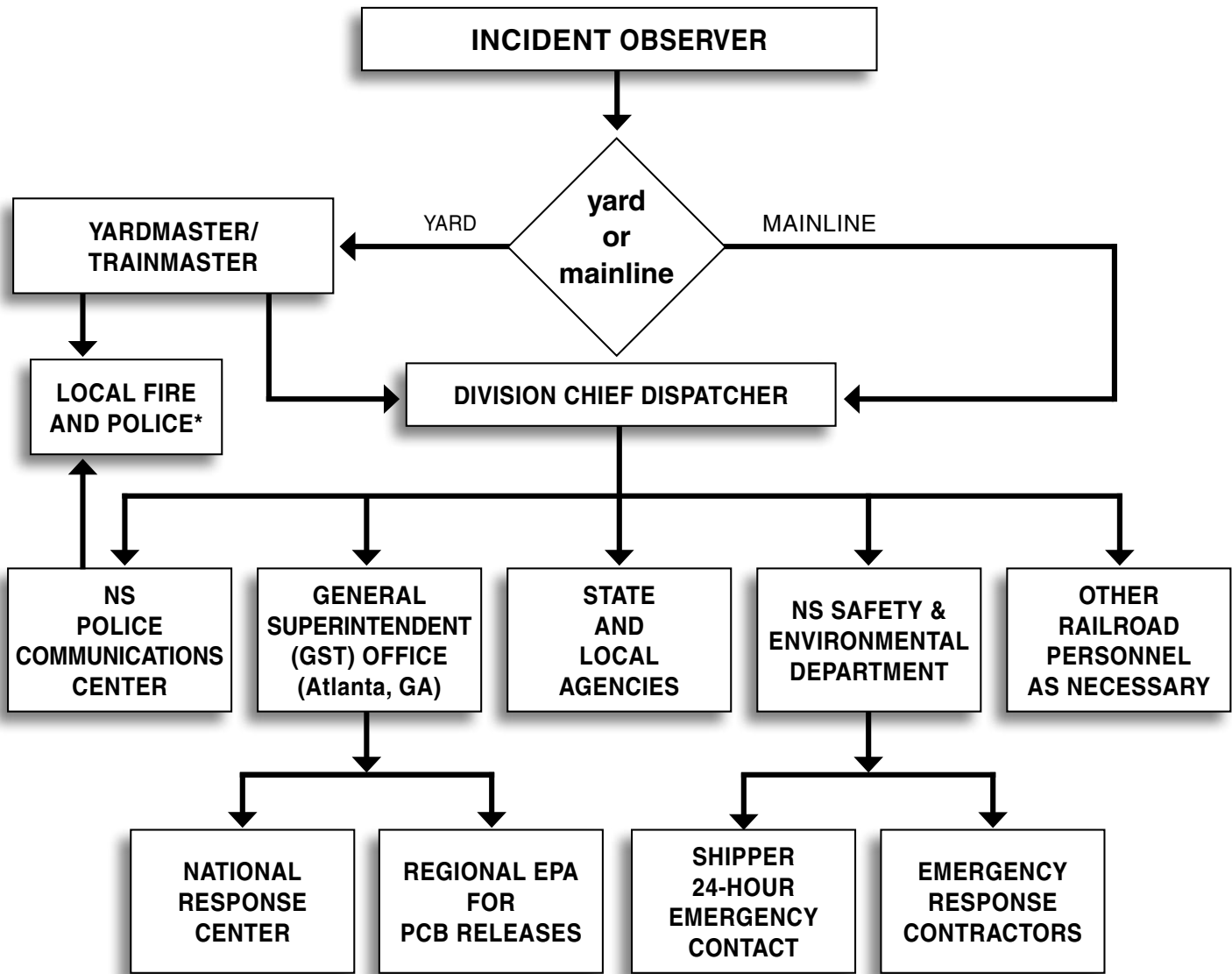
- Nature of Commodity or Hazard Class
- Leak Severity (Amount Released)
  - Location of Release (Valve versus Tank Failure)
  - Accessibility of Response Equipment to Leaking Car
  - Ease of Containment (Can Release Be Readily Stopped?)
- Potential Threat to Life or Safety (Including Public Drinking Water Supply)
- Fire/Explosion Potential
- Potential Environmental Impact to Water (Including Pipes, Drains, and Ditches), Land, and Air
- Container Integrity (Transloading Required?)
- Tank Car Derailment Status (Upright versus On Side)
- Oil Discharge (Locomotive Spills)

## 4.2 Unified Incident Command System



4.3 Notification Procedures

**NORFOLK SOUTHERN NOTIFICATION PROCEDURES**



\*Local Fire and Police must be notified if any of the following criterion are met:

- Fire, smoke, violent ruptures, and/or explosions.
- Leaking tank cars placarded Poison Gas or Flammable Gas.
- Leaking tank cars with moderate or major leaks (Level II or III Incidents).
- Leaks (hazardous or non-hazardous) which enter yard drains, drainage ditches, culverts, sewers, or water courses or threaten to do so.
- A situation exists of such a nature (i.e., a continuing danger to life and health exists at the scene of the incident) that, in the judgement of the carrier, should be reported even though it does not meet above criteria.
- Spills, discharges or releases that go or threaten to go beyond company property or create an emergency situation or result in an evacuation.
- Any other situation as deemed appropriate by the individual making the notification calls.

#### **4.4 Norfolk Southern Response Resources**

In the case of most derailments or spills, local responders do not have the equipment or expertise to handle large spill cleanup or railroad re-railing operations. Norfolk Southern recognizes its role in providing this specialized expertise and equipment to mitigate an incident. Norfolk Southern maintains standing contracts and agreements with various suppliers of these services.

Examples of these contractors are provided below.

- Railroad re-railing and wreck response contractors provide heavy equipment such as cranes, off track lifting equipment, heavy earth moving equipment, and the operators and ground crews to lift and re-rail damaged rail cars and locomotives.
- Emergency response (Hazmat) contractors provide vacuum equipment, pumping equipment, and cargo tanks for the recovery of spilled products.
- Containers and heavy equipment are available for recovery of solid materials.
- Personnel are trained and equipped with all levels of protective equipment for operations in close proximity to spilled products, and leak and spill control equipment to contain product from leaking containers.
- Environmental recovery contractors provide technical expertise in the on-site remediation or removal of contaminated water, soil, or debris from the incident site.
- Industrial hygiene and public health contractors provide technical expertise and equipment to perform on-site and off-site air and water sampling. These contractors are also used to develop work and exclusion zones, and to document any exposures.

Norfolk Southern's internal resources include:

- Transportation, Mechanical, and Engineering Departments;
- Safety & Environmental Department;
- Railroad Police;
- Damage Prevention;
- Casualty Claims Offices;
- NS Law Department & Risk Management Department; and
- Public Relations Department.

#### **4.5 External Response Resources**

There are several private and governmental organizations capable of providing emergency response assistance in the event of emergencies involving hazardous materials.

<b>EXHIBIT 4 External Response Resources</b>	
<b>Organization</b>	<b>Telephone Number</b>
CHEMTREC	800-424-9300
U.S. Coast Guard, National Response Center	800-424-8802
Federal Railroad Administration	800-RAIL-900
Nuclear Regulatory Commission	301-951-0550
Department of Energy	202-586-8100
U.S. Environmental Protection Agency	<By Region>

#### **4.6 Monitoring and Air Modeling**

In the aftermath of a chemical transportation accident, time and accurate information are critically important to saving lives and resources. To help incident commanders more competently assess the impact of a gas release on a community along Norfolk Southern lines, we have purchased a license for a software system called SAFER STAR (System for Transportation Accident Response). SAFER STAR is a state-of-the-art plume modeling technology which is used to protect many of the world's largest industrial plants and their surrounding communities from the consequences of a chemical release. Ultimately, SAFER software is designed to save lives and resources through the successful prediction and management of accidental chemical releases.

SAFER STAR combines the power of their proven Real-Time software with the flexibility of a Geographic Information Systems (GIS), ANYWHERE complex terrain generation, portable weather stations, and portable gas sensor networks, STAR can be setup to manage an event anywhere. SAFER STAR allows the user to quickly understand the magnitude and scope of the incident, as well as manage the event from thousands of miles away.

Properly relating this information to the general public is extremely important both before and after an emergency occurs. To assist in this effort, as well as gathering toxicological and chemical information, Norfolk Southern has retained the services of contractors with modeling experience to operate the SAFER system, if the need arises.

SAFER STAR is used to help manage an emergency and to provide early warning to those who may risk exposure to a potentially harmful substance. SAFER STAR accurately models the effects of chemical accidents (toxic releases, fires and explosions). The program includes the powerful SAFER algorithms for addressing atmospheric dispersion, thermal radiation and blast overpressure modeling. In addition, SAFER provides mapping and topographical databases for the region of interest. Once the release site is identified, SAFER STAR rapidly assembles appropriate maps and topographical data. Meteorology may be obtained from a mobile weather station or by interfacing to remote weather information (obtained from Internet sites or dedicated weather service providers).



## **4.7 Local Resources**

Norfolk Southern is a rail transportation company. In general, NS does not maintain resources such as fire fighting or water supply equipment, emergency medical personnel or medical transport services, command posts and canteens, or large-scale communications equipment. NS does have some foam trailers strategically located across the system.

During an emergency operation, Norfolk Southern relies upon local emergency officials to provide these types of resources. The senior or designated Norfolk Southern official will coordinate with the local Incident Commander to obtain these local resources. Local resources will remain under the control of the local authority.

## **4.8 Special Considerations**

### **4.8.1 Tunnels**

#### *Special Considerations Unique to Tunnel Incidents*

An incident in a tunnel involving a release of hazardous materials may create a greater risk than one in an open area. Toxic vapors are not readily dissipated and may displace air normally available for breathing. Fire may consume the air available for breathing leading to an oxygen deficient atmosphere.

Extreme care must be taken not to introduce additional hazards into the tunnel. The generation of a hazardous atmosphere from gasoline or diesel powered equipment, welding or burning fumes, chemical agents, and/or illuminating equipment may multiply the hazards already present.

Following is a list of additional factors to consider when responding to a rail incident inside a tunnel:

- Air monitoring — initial survey and continuous during response.
- Use of SCBA or respirator as determined by air monitoring results.
- Possible high temperatures due to presence of fire.
- Structural failure due to initial impact or fire/chemical damage.
- Tunnel lining type — stone, timber, steel, concrete or combination.
- Access points — portals, ventilation shafts, emergency exits, inspection manways.
- Variation in track grade may produce a chimney effect.
- Tunnel length, curvature, gradient, height and width should be determined.
- Visibility may be limited or non-existent due to smoke, soot, chemical vapors.
- Communications may be difficult or impossible using radios or cell phones.
- Communication and lighting devices should be intrinsically safe.
- A personnel log must be kept of all people entering and exiting the tunnel.
- Ventilation units may be beneficial to remove fumes and vapors.
- Ventilation units may prove harmful in spreading a plume and fueling a fire.
- Foam generators may be an effective tool for fighting a tunnel fire.
- Determine presence of electric, gas, water, fiber optic and pipeline utilities.
- Best alternative may be to seal the tunnel and smother the fire.
- Communication between the ends of the tunnel, especially, to control entry.

Norfolk Southern has developed a Tunnel Emergency Action Plan which includes a detailed list with specifications for all tunnels on the system.

## **4.8.2 Bridges**

### *Special Considerations Unique to Bridge Related Incidents*

Response to emergency situations on elevated structures creates distinct challenges due to the possibility of excessive heights and lengths along with the various building materials used in the construction of a span. Open, closed or non-existent deck walkways must be navigated with extreme caution, as some structures are not designed for pedestrian traffic.

Railroad and emergency response personnel must consider employee and public safety first priority followed by environmental concerns.

Various possible scenarios may exist when responding to an incident involving an elevated structure. Emergency responders must consider a bridge may span over populated areas, streets or highways, waterways, or other railroad right of ways. Coordination with responders and railroad representatives concerning conditions at location of incidents is imperative.

If passenger rail service is involved, any injured persons or those in need of special assistance (the very young, old and/or disabled) should be located, and assistance shall be provided to the maximum extent possible under the given circumstances.

Following is a list of additional factors to consider when responding to a rail incident on an elevated structure:

- Determine accessibility issues and required special assistance.
- Consider need for the U.S. Coast Guard, helicopter, high level rescue team.
- Consider impact on area dwellings and places of businesses.
- Consider closing and rerouting public and private access routes.
- Consider closing and rerouting navigable waterway traffic.
- Consider need for specially equipped boats, barges and emergency seafaring equipment.
- Consider need for downstream pollution control measures.
- Notify downstream communities of possible impacts.
- Notify other rail carriers whose movements may be impacted.
- Consider structural damage due to fire or derailed equipment.
- Identify utilities (electric, communications, water, sewer, pipeline) present.
- Consider industrial hygiene issues (air monitoring, lead paint on steel structures).

Additional hazards associated with bridges may include areas with limited natural airflow. Airborne chemical concentrations may become elevated in these areas.

### **4.8.3 Radioactive**

#### *Special Considerations for Radioactive Material Incidents*

Response to incidents involving radioactive material involves specialized equipment and trained personnel. Local emergency responder's primary consideration will be safely isolating the scene and preventing the spread of material to protect the public and minimize environmental impact.

This section describes initial response actions a first responder should take when arriving at the scene of a transportation incident involving radioactive material. The DOT Emergency Response Guidebook should be used to help make informed decisions about the types of hazards involved and the initial precautions to take in an emergency.

The U.S. Department of Energy is expected to provide qualified emergency response personnel to provide assistance in minimizing hazards to the public from any radiological emergency regardless of magnitude or source. DOE uses a regional approach in providing assistance ranging from advice and consultation to actual response by specially equipped and trained teams of product specialists.

Following is a list of additional factors to consider when responding to a rail incident involving a radioactive material:

- Notify federal, state and local radiological control agencies.
- Do not enter the scene unless necessary to evacuate, administer first aid or rescue victims.
- Minimize the time in the incident area.
- Maintain as much distance as possible from the radioactive material package.
- Do not touch damaged packages or spilled material.
- Use available material for shielding whenever possible.
- Isolate the area to minimize exposure and reduce the spread of material.
- Alert local medical facilities that possible contaminated patients may be transported.
- Consider gross decontamination if a release has occurred.

Norfolk Southern has developed a Radioactive Shipment Emergency Action Plan which includes a detailed description of emergency response activities associated with an incident involving radioactive materials.

#### **4.8.4 Pipelines**

Many railroad rights-of-way contain underground pipelines which transport hazardous materials. These pipelines may be in a common right-of-way, in a parallel right-of-way, or actually cross the right-of-way and run under the tracks. Typical pipeline commodities include natural gas, liquefied petroleum gas, gasoline, kerosene, diesel fuel and other petroleum products.

A railroad incident which results in a derailment, requires heavy equipment operations in the right-of-way, or otherwise disturbs the right-of-way has the potential of damaging underground pipelines. Derailed cars and locomotives can directly impinge on a pipeline. Loads imposed on a pipeline from a derailed train or cleanup equipment, or striking the pipeline with digging equipment can result in immediate or future failure. Therefore, the presence of underground pipelines carrying hazardous materials must always be considered when responding to a rail incident.

Following is a list of additional factors to consider when responding to a rail incident which may be adjacent to a pipeline:

- Look for posted pipeline markers and warning signs.
- Identify and notify the pipeline owner/operator.
- Determine the commodity transported through the pipeline.
- Determine if the pipeline may have been breached.
- Look for pools of liquid, hissing sounds, odors indicating a release.
- Leave the area immediately if a release is discovered.
- Do not touch, breathe, or make contact with vapors or liquids.
- Do not light a match, start an engine, use a telephone, switch lights on/off.
- Notify local emergency responders through 911 system.
- Warn others in the area and restrict access.

Pipeline operators have their own emergency response protocols when notified of possible damage to one of their lines. Immediate identification and notification of the pipeline operator is very important to minimize any release.

#### **4.8.5 Other Railroad Right of Way Issues**

In addition to pipelines, there may also be fiberoptic cables or other buried communication lines. These lines are usually marked with signs on posts. To be certain, always check with the railroad Engineering Department before digging on any right of way.

#### **4.8.6 Passenger Trains**

##### *Special Considerations for Passenger Train Incidents*

At many locations, passenger rail entities operate commuter and passenger trains on NS owned and operated tracks. When operating on NS, these trains are under the operational control of an NS train dispatcher. In the event of an emergency involving a passenger train, NS officials will coordinate with the passenger rail entity officials to manage the evacuation of passengers and mitigation of the emergency. Notifications of the incident will be essentially the same as for other emergency situations. NS, in conjunction with officials from the passenger railroad, will respond to an incident to provide needed services and resources.

Passenger service on NS is primarily operated by AMTRAK and any incidents should be reported immediately to the NS Police Communications Center at 1-800-453-2530. NS Police will contact AMTRAK.

Further information regarding AMTRAK and passenger train emergency planning is available online at [www.amtrak.com](http://www.amtrak.com).

## **4.8.7 Petroleum Crude Oil**

### *SUMMARY OF CRUDE BY RAIL*

Technological advances in horizontal drilling have led to higher U.S. crude oil production. Historically, most crude oil has moved from production areas to refineries by pipeline. However, due to the development of shale sands in the Marcellus and Bakken regions much of the production areas are not served by pipeline so the increases in crude oil output has moved by rail.

In 2008, U.S. Class I railroads originated just 9,500 carloads of crude oil. In 2012, they originated nearly 234,000 carloads and in 2013 originated over 400,000 carloads.

Railroads in the United States have an excellent safety record regarding crude oil transportation. Based on U.S. DOT data, the crude oil “spill rate” for railroads from 2002–2012 was an estimated 2.2 gallons per million ton-miles. Railroads are continuously striving to further improve the safety of moving crude oil by rail. For example, in 2011, the rail industry in coordination with shippers and tank car owners voluntarily adopted new standards for tank car construction that requires cars used to transport crude oil or ethanol to have thicker tanks, head shields, top fitting protection and bottom outlet handle protection. The rail industry has also formally petitioned federal regulators to toughen existing standards for new tank cars and require that the existing fleet be retrofitted with advanced safety-enhancing technologies or, if not upgraded, phased out.

### *TANK CARS*

The most common tank car used to transport crude oil is the DOT111A100W1. It may have various types and configurations of top and bottom fittings for loading/unloading. Cars transporting Bakken crude are generally not insulated, thermally protected or jacketed. These cars typically have a capacity of 30,000 U.S. gallons. Cars transporting heavy Canadian Tar Sands crude generally need to be heated, so they have steam coils, insulation and a jacket and typically have a capacity of 27,000 U.S. gallons.

Cars ordered after October 2011, known as CPC-1232 cars, have the top valves in a strong protective housing (similar to a pressure car), ½" thick head shields (half height on non-jacketed cars, generally full height on jacketed cars), and tanks at least ½" on non-jacketed cars. While the railroads and shippers voluntarily instituted these enhanced safety standards, they have not yet been mandated by DOT.

The railroad industry has proposed additional changes to improve the survivability of cars used to transport crude oil and other flammable liquids, see next page for comparison with CPC-1232 car.

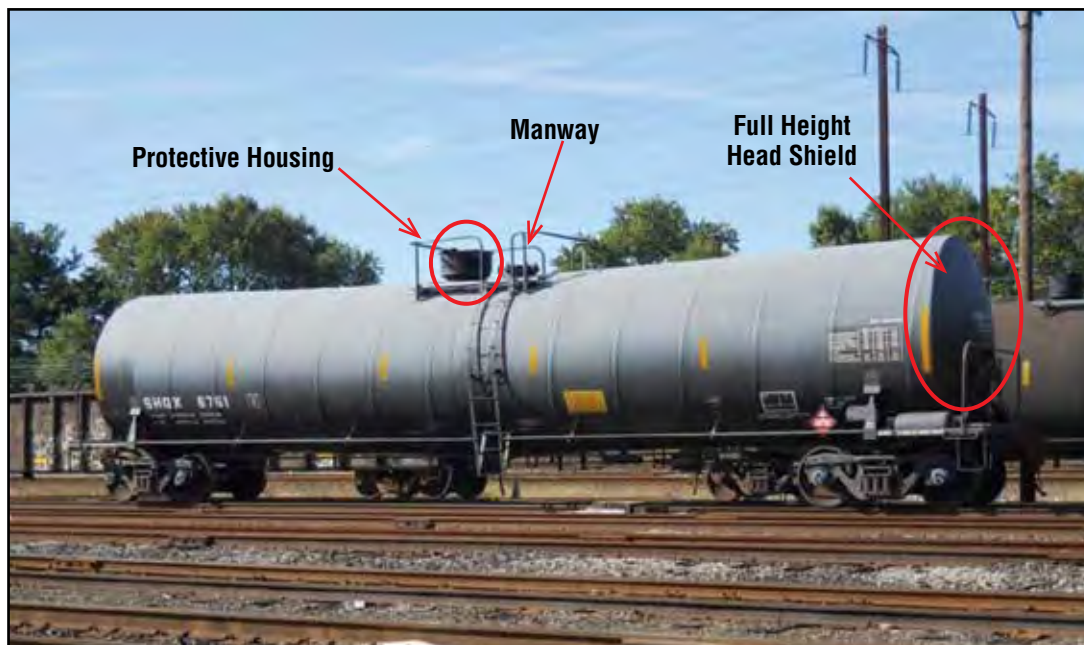


**UN 1267 Placard  
Petroleum Crude Oil**

#### 4.8.7 Petroleum Crude Oil (continued)



Example of a bare skinned or non-jacketed CPC-1232 tank car.



Example of a fully jacketed CPC-1232 tank car.



This is a typical arrangement of valves and fittings found in the protective housing on top of the CPC-1232 cars.

#### 4.8.7 Petroleum Crude Oil (continued)

##### CRUDE OIL BASICS



**Crude oil is not all the same; color, viscosities, and flammability can vary greatly!**

Crude can be a dark thick liquid, a light colored thin liquid, or somewhere in between. The vapors are heavier than air and will generally contain hydrogen sulfide (H<sub>2</sub>S). Crude oil can have a petroleum-like odor or sulfur odor. The material is flammable.

Crude is usually referred to as “sweet” or “sour”. Sweet crude has less than 0.05% sulfur in it while sour crude will have a greater quantity. Sour crude tends to have the distinctive “rotten egg” smell because of the presence of hydrogen sulfide, which is a colorless, flammable, extremely hazardous gas. With continuous low-level exposure, or at high concentrations, a person loses his/her ability to smell the gas even though it is still present (olfactory fatigue). Therefore, do NOT rely on your sense of smell to indicate the continuing presence of hydrogen sulfide or to warn of hazardous concentrations. In addition, hydrogen sulfide is a highly flammable gas and gas/air mixtures can be explosive. Hydrogen sulfide is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system. Effects can occur within a few breaths, and possibly a single breath.

Different crudes have a wide range of compounds and significant variations in BTU content. Flashpoint and boiling points vary, hence DOT packing group may vary by source / shipment. Flashpoint can be lower than gasoline or higher than diesel fuel. Crude transported in tank cars in the same train can originate from a variety of wells and the industry has found that characteristics of the crude in each car can vary greatly even when loaded at the same place. Even crude produced from wells within the same field can vary significantly. In the event of a release do not assume you know the properties, contact the shipper, get a Safety Data Sheet (SDS), read it carefully, conduct air monitoring and take the proper precautions.

#### **4.8.7 Petroleum Crude Oil** *(continued)*

##### **“LIGHT” BAKKEN CRUDE**

This crude is generally lighter crude both in color and specific gravity. It contains higher levels of benzene, butane, and light aromatics, which could build up vapor pressure in the tank car.

Flash point will be very low, comparable to gasoline in most cases. Material floats on water and will penetrate into ground readily.

##### **“HEAVY” CANADIAN TAR SANDS CRUDE**

This crude is heavier both in appearance and specific gravity. It contains lower levels of benzene and light ends, but more tars and related materials. Material is heated to load and unload from tank cars so it will flow.

Flash point will be higher range, comparable to diesel fuel in most cases but could be lower. Material penetrates the ground slowly. This crude will initially float but may form “tar balls” that sink.

#### **RESPONDING TO INCIDENTS**

Refer to Guide 128 in the Emergency Response Guidebook.

Without limiting guidance in the ERG, the following are typical measures to be taken. Do not extinguish fire unless flow can be stopped. The use of foam is preferable to stop a fire. **DO NOT RUSH IN!**

Tank cars of the lighter Bakken crude oil in pool fires have failed in less than 30 minutes. Fight fire from as far away as possible. Cool non-jacketed cars to prevent a sudden failure of the tank but take precautions to prevent, dam, or contain runoff. Non-jacketed cars generally fail before jacketed cars in pool fires, but conditions can vary. If no fire, monitor for LEL, VOC, H<sub>2</sub>S, etc. before entry. Be aware vapors can travel and are heavier than air. They will flow to low lying areas and may accumulate in confined areas. Air monitoring is extremely important. Crude is **FLAMMABLE** regardless of origin! Regardless of its viscosity, crude oil will flow downhill.

If crude oil is leaking from a tank car and **NOT** on fire, some factors to consider are:

- Conduct constant air monitoring for flash point and hazardous constituents. Are vapors accumulating in low lying areas?
- Can flow be stopped or directed? Be prepared to dam, dike, or divert flow.
- Are there drains or underground pathways that the crude can enter?
- Is there a waterway, creek, river, pond, etc., that the flowing material can reach?

A reference document for responding to crude oil derailments has been developed by DOT's Pipeline and Hazardous Material Safety Administration (PHMSA). The Commodity Preparedness And Incident Management Reference Sheet for Petroleum Crude Oil can be found on PHMSA's website at [www.phmsa.dot.gov](http://www.phmsa.dot.gov) under Training and Outreach.



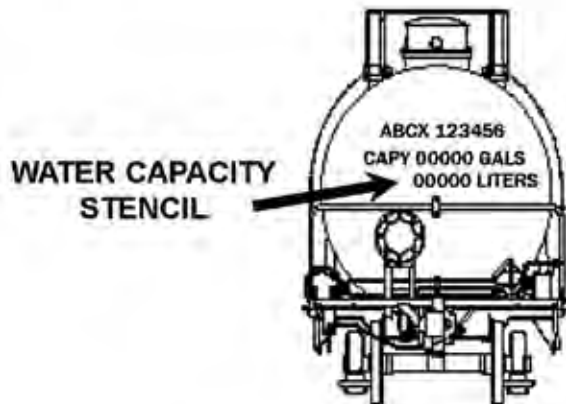
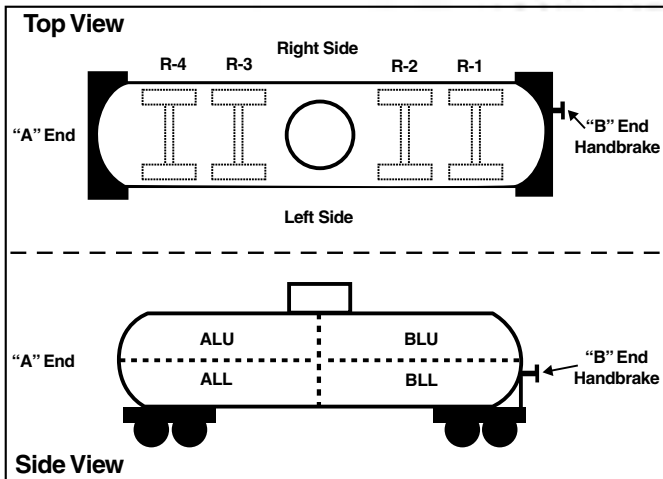
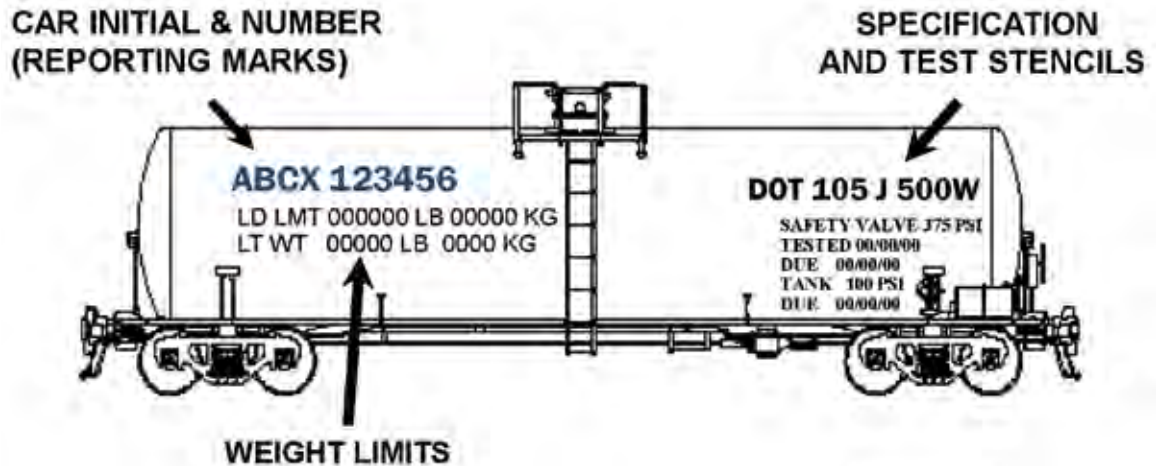
#### **4.8.7 Petroleum Crude Oil** *(continued)*

##### **SUMMARY**

- Crude oil shipped by rail can vary greatly in viscosity and appearance.
- Expect that it will be flammable.
- Crude may have hydrogen sulfide and other chemicals like benzene present in vapors.
- Continual air monitoring is critical.
- Any release will potentially impact the ground.
- Crude will usually float on water, but due to the presence of a wide range of compounds, it may also be miscible in water to some degree.

## 5.0 RECOGNITION & IDENTIFICATION

### 5.1 Rail Car Markings



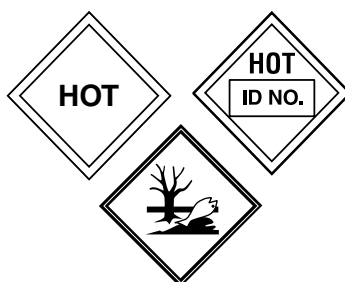
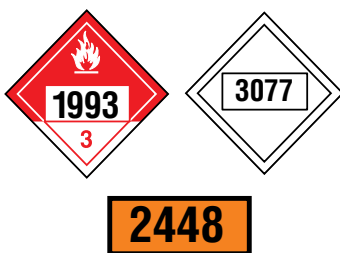
#### Other Rail Car Markings and Stenciling

**Car Initial and Number** — Needed to access Norfolk Southern Information Systems. Letter prefix often indicates the owner/shipper of the car (e.g. DUPX = Dupont).

**Commodity Name** — The DOT requires that certain hazardous materials have their name stenciled on the side of the tank car.

**Placards** — Tell you that the commodity is hazardous. May provide the DOT's identification number on a numbered placard or on an orange panel. Provide the hazard class of the material.

#### Markings and Identification Numbers



#### Fumigant Marking

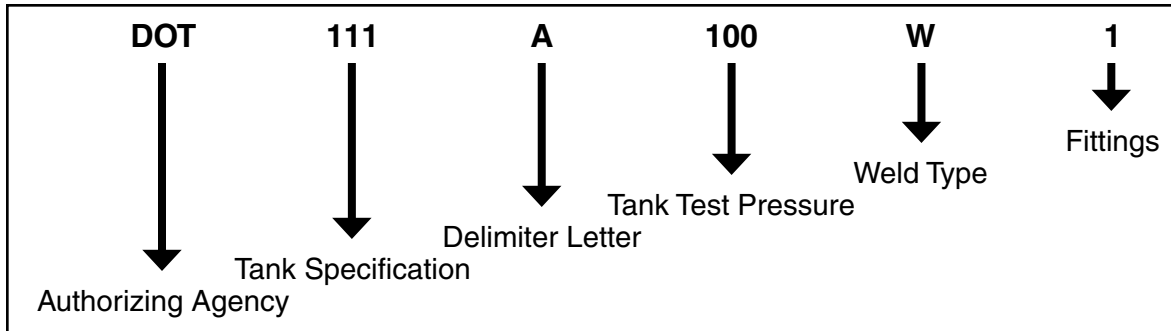


#### Limited Quantity



### 5.1.1 Tank Car Specification Stencil

The specification is stenciled on the side of car. A typical entry could be 111A100W1:



#### Authorizing Agencies

- DOT — US Department of Transportation
- CTC — Canadian Transport Commission
- TC — Transport Canada
- AAR — Association of American Railroads

#### Tank Specification

- |                 |                |
|-----------------|----------------|
| General Service | Pressure Tanks |
| 111, 115        | 105, 112, 114  |

#### Delimiter Letter

- A — No special feature
- S — Equipped with head puncture protection
- T — Thermal protection & head protection
- J — Jacketed with Thermal protection & head protection

#### Tank Test Pressure

Hydrostatic test pressure (*not the Burst Pressure*)

#### Weld Type

- W — Fusion Welded tank
- If constructed of other than carbon steel will be indicated by letters AL

#### Fittings

Indicates allowed fittings, linings, etc., as shown in chart:

Specification	Insulation	Bottom Outlet	Bottom Washout	Other
111***W1	Optional	Optional	Optional	
111***W2	Optional	Prohibited	Optional	
111***W3	Required	Optional	Optional	
111***W4	Required	Prohibited	Prohibited	
111***W5	Optional	Prohibited	Prohibited	Lined
111***W6	Optional	Optional	Optional	
111***W7	Optional	Prohibited	Prohibited	

## **5.2 Shipping Papers**

### **5.2.1 Shipping Paper Information: What They Tell You as an Emergency Responder**

**Car Initials and Numbers**: One of the most important pieces of information to obtain in order to access information on the car's contents.

**Load or Empty**: The shipping paper will indicate if the car is loaded or contains a residue.

**Shipper and Consignee**: Shipper area will show who shipped the car and where it originated; Consignee area will show who is receiving the shipment and the destination.

**Proper Shipping Name**: DOT name of the hazardous material.

**Hazard Class**: Shows the appropriate hazard class or division number of the product. There are nine major hazard classes: explosives, gases, flammable liquids, flammable solids, oxidizers and organic peroxides, poisonous and infectious substances, radioactive materials, corrosives and miscellaneous hazardous substances (refer to Exhibit 8).

A secondary hazard class must be shown.

**Identification Number**: Indicates the 4-digit UN (United Nations) or NA (North American) identification number.

**Packing Group**: A grouping of hazardous materials indicating relative severity of a material within its hazard class. Required except for classes 2 or 7 or ORMD's. PG I or I shown using roman numerals, great danger; PG II or II, medium danger; PG III or III minor danger.

**Quantity**: The shipping paper will indicate how much product is being shipped, if loaded.

**Emergency Response Phone Number**: 24 hour phone numbers supplied by the shipper.

**Poison Inhalation Hazard** (P.I.H.): indicates certain gases or liquids that may cause health problems if inhaled.

**Reportable Quantity**: The letters "RQ", where required indicate that the material is also classified as a hazardous substance and that a release of the hazardous material, over a specified amount, necessitates notifying the National Response Center.

**Standard Transportation Commodity Code (STCC)**: A number assigned by railroads for the specific product being shipped. Hazardous Materials STCC's begin with the numbers "49" or "48".

**Marine Pollutant**: Release of the product into a waterway will harm the environment.

**Limited Quantity**: LTD QTY, a product with a labeling and packaging exception.

**DOT Special Permit**: Allows an exception to DOT hazardous material regulations.

5.2.2 Freight Train Consist

**EXHIBIT 5**  
**This Train Contains The Following "Key Train" Hazardous Materials Loads:**

	IN	SET-OUT/PICK-UP			
	TRAIN	_____	_____	_____	_____
POISON INHALATION HAZARD COMMODITIES	0	_____	_____	_____	_____
OTHER LOADED HAZMAT CARS OR IM TANKS	2	_____	_____	_____	_____
<b>TOTALS</b>	<b>2</b>				

**CARS IN THIS CONSIST COUNT FROM FRONT TO REAR**

HAZARDOUS CONSIST FOR TRAIN 41KB430  
 DEPARTED KANKAKEE IL

PAGE 01 OF \_\_\_\_  
 PRINTED 08/01/2015 11:00 AM  
 OFF DUTY: \_\_\_\_\_

ON DUTY: \_\_\_\_\_

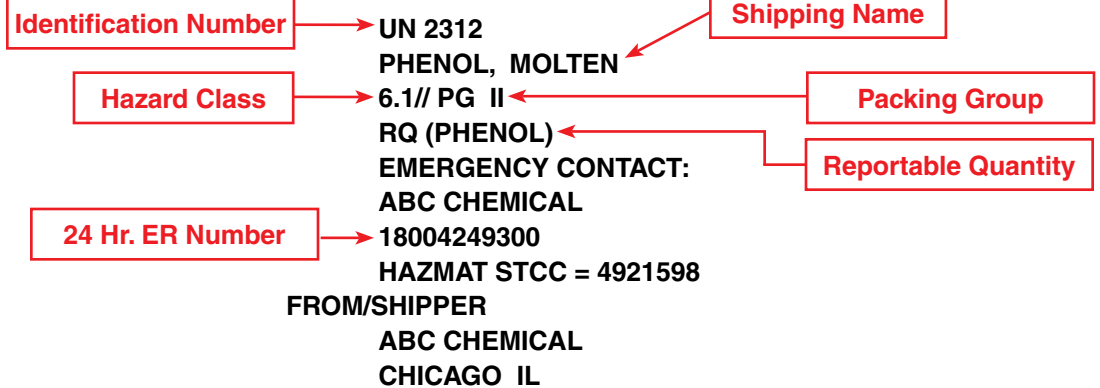
\*\*CARS SET OUT\*\*

SEQ	INIT	NUMBER	L/E	DEST/OFFJCT	NXRD	TON	CONSIGNEE	STCC	TYPE	TIME	TRACK	LINE
000	LMX	E08578	E			000				_____	_____	_____
000	BN	E08026	E			000				_____	_____	_____
001	CNWX	111804	L	TOLEDO OH		109	ANDERSON	0113310	C113	_____	_____	_____
002	CNWX	110103	L	TOLEDO OH		112	ANDERSON	0113310	C113	_____	_____	_____
003	CR	369236	L	TOLEDO OH		104	ACME	2099511	R410	_____	_____	_____
004	CR	369254	L	TOLEDO OH		098	ACME	2099511	R410	_____	_____	_____
005	CR	369171	L	TOLEDO OH		102	ACME	2099511	R410	_____	_____	_____
006	CR	369319	L	TOLEDO OH		104	ACME	2099511	R410	_____	_____	_____
007	AM	002517	L	TOLEDO OH		101	ACME	2099511	A346	_____	_____	_____
008	NS	463472	L	TOLEDO OH		124	BESTPROD	2621115	A632	_____	_____	_____

UNLOAD AS PLACARDED  
 PLACE FOR UNLOADING AS PLACARDED.  
 009 GATX 016254 L TOLEDO OH 135 MESTERESIN 4921598 T106  
 ENDORSED AS HAZARDOUS MAT

1 TNK

\*\*\*\*\*  
 \* HAZARDOUS \*  
 \* MATERIALS \*  
 \* \* \*  
 \*\*\*\*\*



TO/CONSIGNEE  
 MESTE RESINS  
 TOLEDO OH

FROM/SHIPPER  
 ABC CHEMICAL  
 CHICAGO IL

### 5.2.2a Intermodal Train Consist

Because of the trailers/containers on the rail cars, the Train Consists for Intermodal Trains are slightly different from other freight trains. The trailers or containers are listed after the rail car.

**Position in Train** (points to 005)  
**Rail Car** (points to L ATLANTA GA)

005 TTAX 556852 L ATLANTA GA 093 UNIPARSE 4950150 Q752 \_\_\_\_\_  
 ENDORSED AS HAZARDOUS MAT  
 \*\*\*\*\*  
 0  
 \* HAZARDOUS \*  
 \* MATERIALS \* TOFC FLATCAR  
 \*\*\*\*\*  
 SEE INDIVIDUAL WAYBILLS  
 HAZMAT STCC: 4950150  
 TO/CONSIGNEE: FROM/SHIPPER:  
 UNITED PARCEL SERVICE INC UNITED PARCEL SERVICE INC  
 ATLANTA GA HODGKINS IL

**Trailer** (points to UPSZ 871373)

UPSZ 871373 L ATLANTA GA 022 UNIPARSE 4950150 Z249 \_\_\_\_\_  
 ENDORSED AS HAZARDOUS MAT  
 \*\*\*\*\*  
 1 TRL  
 \* HAZARDOUS \*  
 \* MATERIALS \*  
 \*\*\*\*\*  
 4 PCS 16 LT  
 UN 1262  
**OCTANES**  
 3//PGII  
 EMERGENCY CONTACT:  
 CONTRACT# 000ABC  
 (800) 424-9300  
 1 PCS 12 QT  
 UN 1133  
**ADHESIVES**  
 3//PGII  
 EMERGENCY CONTACT:  
 ABQ Chemical 000ABC  
 (800) 424-9300  
 1 PCS 15 LT  
 UN 1219  
**ISOPROPANOL**  
 3//PGII  
 EMERGENCY CONTACT:  
 XYZ Distiller  
 (800) 255-3924

Three different commodities in this trailer.

HAZMAT STCC=4910241  
 FROM/SHIPPER:  
 UNITED PARCEL SERVICE INC

TO/CONSIGNEE:  
 UNITED PARCEL SERVICE  
 HODGKINS IL

REAZ 216654 L ATLANTA GA 022 UNIPARSE 4611110 Z276 \_\_\_\_\_  
 REDZ 234512 L ATLANTA GA 022 UNIPARSE 4611110 Z256 \_\_\_\_\_  
 TIPZ 227798 L ATLANTA GA 022 UNIPARSE 4611110 Z278 \_\_\_\_\_  
 UPSU 621226 L ATLANTA GA 022 UNIPARSE 4611110 U249 \_\_\_\_\_

Four other trailers and containers on same flat

5.2.3 Position-In-Train Document

<b>EXHIBIT 6</b>														
<b>Notice of Rail Cars &amp; Intermodal Units Containing Hazardous Materials</b>														
Train #:			41KB430			Location:			KANKAKEE IL			08/01/2015 11:00AM		
<p>The following rail cars &amp; intermodal units containing hazardous materials are located in your train. They must be positioned in your train in accordance with the train placement chart. Revision columns are to be used to make placement changes en route.</p>														
INIT	NUMBER	L E	CONTAINER		L E	COMMENT	I.D. NO.	TRAIN POSITION	REVISION					
			INIT	NUMBER					1ST	2ND	3RD			
GATX	016254	L	_____	_____	—	_____	2312	009	_____	_____	_____			
LTCX	001610	E	_____	_____	—	_____	1951	016	_____	_____	_____			
CELX	023148	E	_____	_____	—	_____	1173	021	_____	_____	_____			
UTLX	200801	E	_____	_____	—	_____	1301	022	_____	_____	_____			
UTLX	201183	E	_____	_____	—	_____	1301	023	_____	_____	_____			
UTLX	202872	L	_____	_____	—	_____	1090	028	_____	_____	_____			

## **5.2.4 Emergency Handling Instructions**

**IN THE EVENT OF ACCIDENT THESE INSTRUCTIONS MUST PROMPTLY BE MADE AVAILABLE TO EMERGENCY, FIRE OR POLICE PERSONNEL. FOR ADDITIONAL EMERGENCY INFORMATION AND ASSISTANCE CALL CHEMTREC — TELEPHONE 1-800-424-9300**

009 FROM ENGINE	GATX 016254
PHENOL, MOLTEN	4921598
DIVISION 6.1 (POISONOUS MATERIALS)	UN 2312
ENVIRONMENTALLY HAZARDOUS SUBSTANCE (RQ-1000/454)	

Phenol, Molten is the white crystalline solid shipped at an elevated temperature to form a semi-solid. It is very hot and may cause burns from contact and also may cause ignition of combustible materials. It is toxic by ingestion, and inhalation of its fumes, and skin absorption. It may also be very irritating to skin and eyes. It is used to make other chemicals.

### **IF MATERIAL ON FIRE OR INVOLVED IN FIRE**

- Do not extinguish fire unless flow can be stopped
- Extinguish fire using agent suitable for type of surrounding fire (material itself does not burn or burns with difficulty)
- Use water in flooding quantities as fog
- Cool all affected containers with flooding quantities of water
- Apply water from as far a distance as possible
- Use foam, dry chemical, or carbon dioxide
- Keep run-off water out of sewers and water sources

### **IF MATERIAL NOT ON FIRE AND NOT INVOLVED IN FIRE**

- Keep sparks, flames, and other sources of ignition away
- Keep material out of water sources and sewers
- Build dikes to contain flow as necessary
- Do not use water

### **PERSONNEL PROTECTION**

- Avoid breathing vapors, keep upwind
- Wear positive pressure self-contained breathing apparatus
- Do not handle broken packages unless wearing appropriate personal protective equipment

### **ENVIRONMENTAL CONSIDERATIONS – LAND SPILL**

- Dig a pit, pond, lagoon, holding area to contain liquid or solid material
- Cover solids with a plastic sheet to prevent dissolving in rain or fire fighting water
- Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete

### **ENVIRONMENTAL CONSIDERATIONS – WATER SPILL**

- Use natural barriers or oil spill control booms to limit spill travel
- Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material at bottom
- Remove trapped material with suction hoses

### **FIRST AID RESPONSES**

- Move victim to fresh air; call emergency medical care
- If not breathing, give artificial respiration
- If breathing is difficult, give oxygen
- Remove and isolate contaminated clothing and shoes at the site
- In case of contact with material, immediately flush skin and eyes with running water for at least 15 minutes
- Keep victim quiet and maintain normal body temperature
- Effects may be delayed, keep victim under observation



5.2.5 Rail Car Waybill Examples

**EXHIBIT 7  
Memo Waybill**

```

***** 555 - NORFOLK SOUTHERN - 555
* HAZARDOUS * HAZARDOUS SER 2074567066 IMAGE ID E9083115492283
* MATERIALS * * MEMO WAYBILL *
***** EDI-BOL MERCHANDISE WAYBILL
*****REPRINT*****
AOC 08/01/2015 03:06A W01

GATX 16254 T135 PLATE B CAR 66'03" 08/01/2015 394277
T
B

72712 TOLEDO OH 11089 CHICAGO IL
55555 ATLANTA AOC GA
NS S 802-0708 1250610019
ABC CHEMICAL
855 2ND STREET S W
SUITE 3990
CHICAGO IL
MES RESINS 08-01-10 00:06 0005170
1801 E. SEPULVEDA BLVD.
TOLEDO OH
1250610019
ABC CHEMICAL
855 2ND STREET S W
SUITE 3990
CHICAGO IL
SEAL 1 - 89922

PREPAID NO SHIPPER WEIGHT AGREEMENT
240,798
105,400
4921598 135,398

1CAR OSA 149398 MEMO WAYBILL
UN 2312 REVENUE WAYBILL WILL BE MAILED
PHENOL, MOLTEN TRANSMITTED TO DESTINATION ROAD
6.1//PG II BY ATLANTA REVENUE ACCOUNTING OFC
RQ (PHENOL)
ERG 153
(CARBOLIC ACID)
EMERGENCY CONTACT:
ABC CHEMICAL
8004249300
HAZMAT STCC=4921598
GATX 16254 GAL CP= 24698
    
```

5.2.5 Rail Car Waybill Examples (continued)

**EXHIBIT 7A  
Empty Waybill**

\*\*\*\*\* 555 - NORFOLK SOUTHERN - 555  
 \* HAZARDOUS \* HAZARDOUS SER 2068132154 IMAGE ID D01599H23Q3700  
 \* MATERIALS \*  
 \*\*\*\*\*

EMPTY WAYBILL  
 \*\*\*\*\*REPRINT\*\*\*\*\*

GATX 16254 T135 PLATE B CAR 66'03" 08/01/2015 394277  
 T  
 B

VERSION 1 EDI

72712 TOLEDO OH 11089 CHICAGO IL  
 S 802-0708 55555 ATLANTA AOC GA  
 1250610019

NS ABC CHEMICAL  
 855 2ND STREET S W  
 SUITE 3990  
 CHICAGO IL

08-01-10 00:06 0005170

MES RESINS  
 1801 E. SEPULVEDA BLVD.  
 TOLEDO OH

1250610019

SEAL 1 - 89922 ABC CHEMICAL  
 855 2ND STREET S W  
 SUITE 3990  
 CHICAGO IL

PREPAID NO

SHIPPER WEIGHT AGREEMENT

240,798  
 105,400  
 135,398

4921598

1CAR OSA

RESIDUE LAST CONTAINED  
 UN 2312  
 PHENOL, MOLTEN  
 6.1//PG II  
 RQ (PHENOL)  
 ERG 153

(CARBOLIC ACID)

EMERGENCY CONTACT:  
 ABC CHEMICAL  
 8004249300  
 HAZMAT STCC=4921598  
 GATX 16254 GAL CP= 24698

### 5.3 Placarding and Hazard Classes



















The Code of Federal Regulations (CFR), 49 CFR Part 172, prescribes that square-on-point shaped placards must be placed on the outside of certain bulk container rail cars carrying hazardous materials, or residues of such materials. Placards must also be placed on the exterior of some intermodal containers carrying amounts of hazardous materials in excess of certain regulatory thresholds. Placards can tell the responder the DOT hazard class involved and thus provide a general idea of the hazards present and preliminary response requirements. Keep in mind that many materials possess characteristics of more than one hazard class, and therefore hazard class information should generally not be used independently. Check shipping paper for more details.

#### 5.3.1 UN/DOT Hazard Classes



























Hazardous materials are classified according to their chemical and/or physical properties. There are two worded classes and nine numeric classes, some of which may be divided into divisions. A hazardous material is assigned to only one class, even if it meets the definition of more than one hazard class. Exhibit 8 lists the hazard classes and divisions.

<b>EXHIBIT 8</b>	
<b>Hazard Classes and Divisions</b>	
<b>Numbered Classes and Divisions</b>	
<b>1 — Explosives</b>	
1.1 — Explosive with mass explosion hazard	
1.2 — Explosive with projection hazard	
1.3 — Explosive with predominantly fire hazard	
1.4 — Explosive with no significant blast hazard	
1.5 — Very insensitive explosive; blasting agent	
1.6 — Extremely insensitive detonating substance	
<b>2 — Gases</b>	
2.1 — Flammable gas	
2.2 — Non-flammable, nonpoisonous (nontoxic) compressed gas	
2.3 — Gas poisonous (toxic) by inhalation	
<b>3 — Flammable Liquids</b>	
<b>4 — Flammable Solids and Reactive Solids/Liquids</b>	
4.1 — Flammable solid	
4.2 — Spontaneously combustible material	
4.3 — Dangerous when wet material	
<b>5 — Oxidizers and Organic Peroxides</b>	
5.1 — Oxidizer	
5.2 — Organic peroxide	
<b>6 — Poisonous (Toxic) Materials and Infectious Substances</b>	
6.1 — Poisonous (toxic) material	
6.2 — Infectious substance	
<b>7 — Radioactive Materials</b>	
<b>8 — Corrosive Materials</b>	
<b>9 — Miscellaneous Hazardous Materials</b>	
<b>Worded Classes</b>	
<b>Combustible Liquid</b>	
<b>ORM-D (Other Regulated Materials)</b> <i>(Exempt from placarding and labeling in rail transportation, but subject to packaging, marking, and possibly, shipping paper requirements.)</i>	

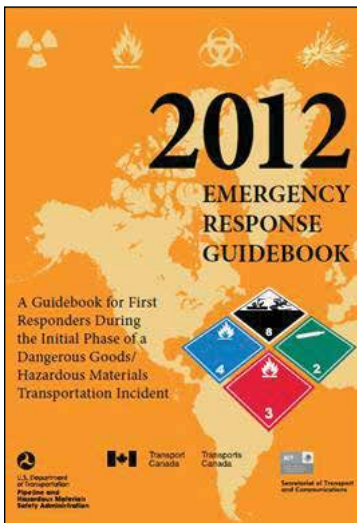
### 5.3.2 Placarding Chart

Placards for Hazardous Materials by Hazard Class		
<b>Class 1 (Explosives)</b>		
 Division 1.1 (Explosive with Mass Explosion Hazard)	 Division 1.2 (Explosive with Projection Hazard)	 Division 1.3 (Explosive with Predominantly a Fire Hazard)
 Division 1.4 (Explosive with no Significant Blast Hazard)	 Division 1.5 (Very Insensitive Explosive)	 Division 1.6 (Extremely Insensitive Explosive)
<b>Class 2 (Gases)</b>		
 Division 2.1 (Flammable Gas)	 Division 2.1 (Flammable Gas in cryogenic form in DOT-113 Tank Car)	 Division 2.2 (Non-flammable Gas)
 Division 2.3 Zone A (Poison Gas)	 Division 2.3 Other than Zone A (Poison Gas)	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>International Placard</b></p> <div style="display: flex; justify-content: space-around;">   </div> <p><b>NOTE:</b> The word "TOXIC" can be used in place of the word "POISON."</p> <p>May appear in conjunction with U.S. "POISON" GAS Placard (INHALATION HAZARD CLASS 2) on Canadian or International Shipments.</p> </div>
 Oxygen		
 Anhydrous Ammonia Canadian Only		
<p><b>Class 3 (Flammable Liquids)</b></p>  Class 3 (Flammable Liquid)	<p><b>Class 3 (Combustible Liquids)</b></p>  Class 3 (Combustible Liquid)	

5.3.2 Placarding Chart (continued)

Placards for Hazardous Materials by Hazard Class		
<b>Class 4 (Flammable Solids &amp; Reactive Solids/Liquids)</b>		
  Division 4.1 (Flammable Solid)	  Division 4.2 (Spontaneously Combustible)	  Division 4.3 (Dangerous When Wet Material)
<b>Class 5 (Oxidizers &amp; Organic Peroxides)</b>		
  Division 5.1 (Oxidizer)		  Division 5.2 (Organic Peroxide)
<b>Class 6 (Poisonous Materials)</b>		
  Division 6.1 Zone A [Poison or Toxic Inhalation Hazard (PIH or TIH)]		  Division 6.1 Zone B [Poison or Toxic Inhalation Hazard (PIH or TIH)]
  Division 6.1 PGI [Other than Poison or Toxic Inhalation Hazard (PIH or TIH)], PGII, or PGIII		 Division 6.1 PGIII NOTE: The word "TOXIC" can be used in place of the word "POISON."
<b>Class 7 (Radioactive Materials)</b>  Class 7 (Radioactive Material)	<b>Class 8 (Corrosive Materials)</b>   Class 8 (Corrosive Material)	<b>Class 9 (Miscellaneous Hazardous Materials)</b>   Class 9 (Miscellaneous Hazardous Material)
<b>Mixed Load</b>  U.S.	<b>Limited Quantity Marks</b>  	<b>Marine Pollutant Marking</b> 

## 5.4 Emergency Response Guidebook



The Emergency Response Guidebook contains general emergency response information for hazardous materials. To use the guides (orange bordered pages), you must know either the DOT 4-digit identification number (yellow bordered pages), the proper shipping name (blue bordered pages), or the placard affixed to the car. The Emergency Response Guidebook also contains initial isolation and protective action distances (green bordered pages) for some commodities.

This guidebook will assist responders in making initial decisions upon arriving at the scene of a dangerous goods incident. It should not be considered as a substitute for emergency response training, knowledge or sound judgment. ERG2012 does not address all possible circumstances that may be associated with a dangerous goods incident. It is primarily designed for use at a dangerous goods incident occurring on a highway or railroad.

## 5.5 AskRail Mobile Application

AskRail is a free mobile application that provides immediate access to accurate, real-time information about railcars carrying hazardous materials on a train. It serves emergency responders who arrive first to the scene of a rail incident and helps them make informed decisions about how to respond to a rail incident.

AskRail allows emergency responders and other authorized users to:

- Query the contents of a railcar with a simple Equipment ID search to see whether a railcar is carrying hazardous materials. AskRail returns the following information:
  - Loaded or empty status
  - United Nations/North America (UN/NA) Identification Number for any located hazardous materials
  - Proper Shipping Name (PSN) for the railcar's contents
  - Hazard class for the railcar's contents
  - Railroad name
  - Railroad's emergency contact information
- Read published guidance for response to situations involving any located hazardous materials.
- View a list of the 125 hazardous materials most commonly shipped via rail as reported in the latest AAR/BOE Annual Report of Hazardous Materials Transported by Rail.
- Access a list of emergency contact phone numbers for all seven Class I railroads (the largest freight railroads) and Amtrak passenger railroad.

## 5.5 AskRail Mobile Application *(continued)*

AskRail was been implemented in two phases. The first phase, implemented in October 2014, enables the look up information for individual railcars. The second phase, implemented in March 2015, allows the look up of full consist details (i.e., returns information for all railcars on a train).



To get the AskRail mobile application, contact [HMAAskRail@nscorp.com](mailto:HMAAskRail@nscorp.com).

System Requirements are: Android — 4 and above — Samsung Galaxy, HTCone, etc.  
iOS — 7.1.2 and above — iPhone, iPad, etc.

## 5.6 FiRST Responder Support Tools



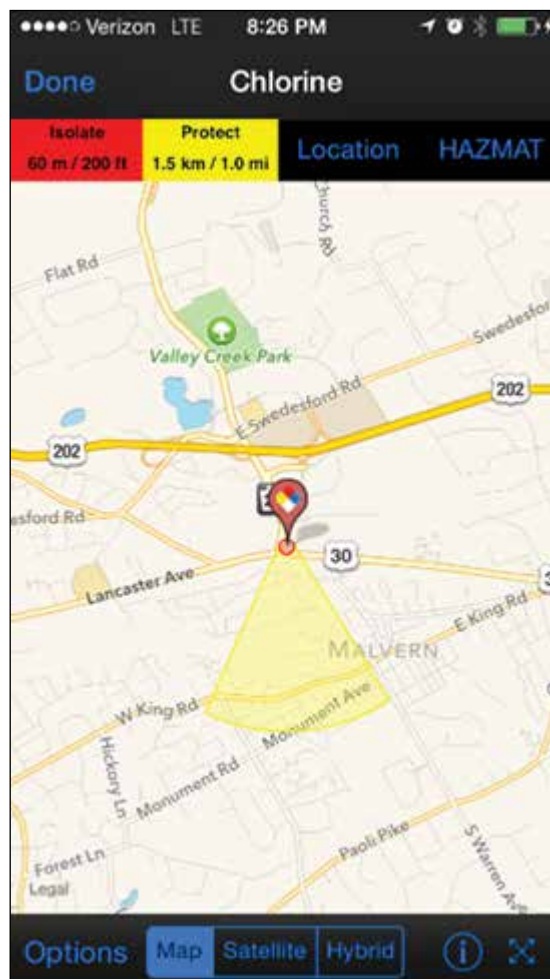
The First Responder Support Tools (FiRST) application (version 3.23 or higher) is designed to integrate with AskRail and gain access to additional emergency response functionality.

You can use FiRST to:

- identify and share your location on a map;
- retrieve current weather conditions to determine wind direction and identify downwind hazard areas;
- plan roadblocks to isolate the area;
- identify isolation and evacuation distances that match the green pages in the DOT Emergency Response Guidebook.

Used in conjunction with the FiRST Sharing Service, organizations can share incident GIS data across mobile, Windows PC, and browser-based systems. AskRail provides links to the FiRST application.

For more information, go to [www.firstsupporttools.com](http://www.firstsupporttools.com). The screen below shows a sample of FiRST functionality.





## 6.0 APPENDICES

### 6.1 Railroad Safety Checklist (Guidelines)

#### Walking near or across tracks:

Before attempting to walk or work on railroad property, tell the railroad you are there! Before entering a rail yard, responders should be aware that some locomotives are not manned during switching operations and are controlled remotely. Just because you can see the cab of a locomotive that is running does not mean that it is occupied and the operator can see you. The operator could be up to a half mile away from the locomotive. These remote control locomotives will have flashing yellow lights when being operated in “remote” mode. Exercise extreme caution and give yourself plenty of room when crossing tracks occupied by a remote control locomotive.



The walking surface (ballast) is uneven and difficult to walk on; be careful! If possible, cross only at a grade crossing which provides a better walking surface.

If you must cross tracks, stay at least 25 feet from the ends of equipment and look both ways; be sure no equipment is moving toward you. When near any track, expect a train to move in either direction at any time. Cross tracks at a right angle to maximize the field of vision within the fouling space.

Don't cross tracks near switches or any other movable track structure, and never step on rails or other parts of the structure which may be slippery. Cross tracks at a 90 degree angle.

Ensure there is 50 feet of clearance between two pieces of standing equipment (**Operating Rule 22**) while maintaining 10 feet of personal clearance from either side before attempting to cross between them.

Perform a job briefing with employees to review any necessary safeguards for the task to be performed.

## 6.1 Railroad Safety Checklist (Guidelines) *(continued)*

### **Fouling (obstructing) the track or dragging hoses across tracks:**

Never climb over or under rail equipment unless the area has been secured and is being protected by railroad personnel.

Position yourself or equipment at least 25 feet away from the nearest rail. If you and your equipment are within 4 feet of the nearest rail, there is immediate danger of being struck either by equipment or material carried by rail cars. If you find that you must obstruct the track, then you must contact the railroad (via the Police Communications Center) and receive positive verification from the railroad that it is safe to do so.

Be careful when you must cross more than one track, parallel tracks may belong to two different companies or be under control of two different employees of the same company.

### **Stopping a train:**

Because of the weight of trains, request a train to stop by contacting the employee in charge of the movement by telephone well in advance if possible (Train Dispatcher, Yardmaster).

In an emergency, give a STOP signal to the train crew. Move your hand, flag, flashlight, or flare back and forth horizontally, at right angles to the track until acknowledged by a short blast of the locomotive horn or other response from the train crew. A train may require more than a mile to stop, so make sure you plan for adequate stopping distance.

### **Driving across tracks:**

Cross only at grade crossings, heed all crossing-warning devices and remember: only the vehicle driver can prevent a crossing collision.

### **Attendance and Securement:**

On July 6, 2013, the Montreal, Maine & Atlantic Railway experienced a catastrophic derailment involving a loaded unit crude oil train in the town of Lac Megantic, Quebec, Canada involving significant loss of life and destruction to the surrounding area. The train, consisting of 5 locomotives and 72 loads, was tied down on a 1.2 percent descending grade. The single Engineer crew secured the train and departed leaving the train unattended.

Approximately 50 minutes later, the fire department was called by a local resident to report a fire on the controlling locomotive. The fire department responded and shut down the lead locomotive, extinguished the fire, and departed. Less than an hour after the fire department departed the train began to roll downhill toward Lac Megantic, where the head 64 cars derailed.

Although the investigation is on-going, preliminary information indicates that insufficient hand brakes were applied to secure the train with air brakes released.

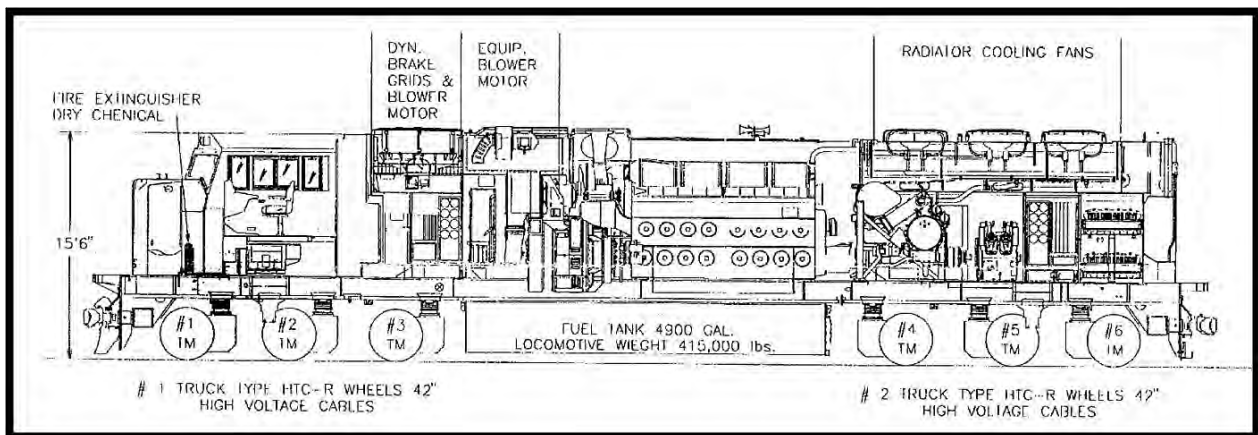
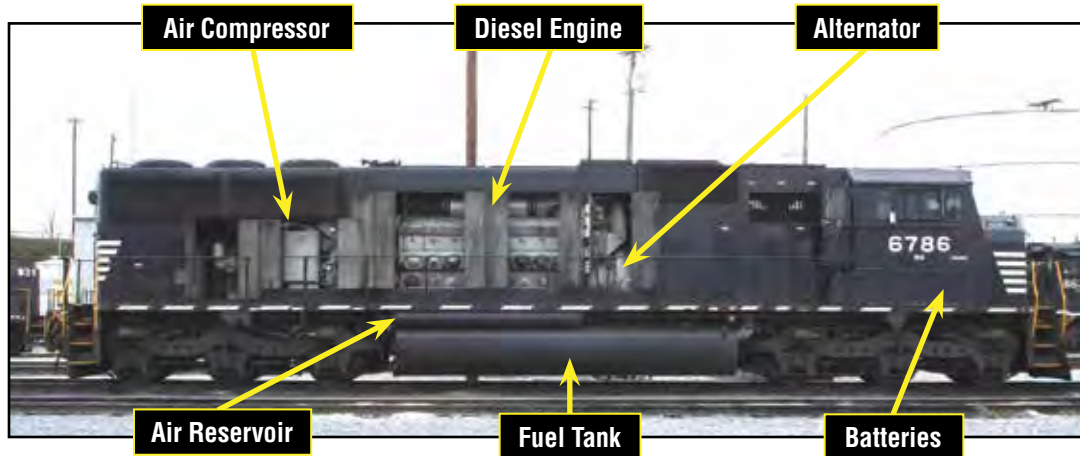
Subsequent to the Lac Megantic accident, the FRA issued an Emergency Order No. 28 on August 2, 2013, to establish additional requirements for “attendance and securement” of freight trains and rail cars transporting certain hazardous material shipments. One of the provisions of the Emergency Order addresses additional inspections required by the railroad when any emergency responder has been on, under, or between equipment.

In compliance with the Emergency Order, Norfolk Southern has issued special instructions stating:

“Anytime emergency responders have been on, under, or between rail equipment, the equipment must not be left unattended until an inspection for proper securement is performed by a qualified railroad employee.”

## 6.2 Railroad Equipment

- Locomotives:**
- ❖ Diesel Fuel Tanks — up to 5,000 gallons
  - ❖ Electrical — 600 volts DC, 220 Volts AC
  - ❖ Lube Oil — up to 410 gallons
  - ❖ Coolant — up to 380 gallons
  - ❖ Battery Acid — up to 50 gallons
  - ❖ Compressed Air



Fuel shutoff buttons are found on each side of the frame (on left) and on the electrical cabinet in the locomotive cab (on right).



## 6.2 Railroad Equipment (continued)

### Freight Cars

- The various types of freight cars include:
- ❖ Tank Car
  - ❖ Box Cars
  - ❖ Mechanical Refrigerator Cars
  - ❖ Covered Hopper Car
  - ❖ Open Top Hopper Car
  - ❖ Gondola
  - ❖ Flat Car
  - ❖ Automobile Carrier
  - ❖ Intermodal Double-Stack Well Car



#### Tank Car

- ❖ Pressure Car
- ❖ Protective housing
- ❖ No visible valves
- ❖ No bottom outlet
- ❖ Usually has a jacket, headshield, and insulation
- ❖ Shelf Couplers
- ❖ Transports gases and certain liquids

#### Tank Car

- ❖ General Service Car
- ❖ Valves visible on top  
May have bottom outlet
- ❖ May have a jacket and insulation
- ❖ Shelf Couplers
- ❖ Transports liquid or semi-solid materials



## 6.2 Railroad Equipment (continued)



### Box Cars

Can transport many materials in small packages.

May be insulated.

### Mechanical Refrigerator Cars

- ❖ Refrigeration unit
- ❖ Fuel tank
- ❖ Battery with acid



### Covered Hopper

Dry commodities like:

- Flour
- Grain
- Fertilizer (oxidizer)
- Cement

## 6.2 Railroad Equipment *(continued)*



### Open Top Hopper

Dry commodities:

- Stone
- Coal

Seldom carries hazardous materials.

### Gondola

Scrap metal, pipe,  
contaminated soil/waste

Hazardous material loads  
usually have a cover.



### Flat car

- Lumber
- Pipe
- Machinery

The car may have bulkheads or be equipped to carry autos, containers or trailers.



6.2 Railroad Equipment (continued)

**Auto carrier**

May have up to 18 Automobiles  
Danger from fuel, Battery acid,  
Air Bag inflators, Refrigerants



**Flat car carrying trailer**  
Also known as  
**Trailer on Flat Car or TOFC**

## 6.2a Railroad Intermodal Equipment



Intermodal container being lifted to put on rail car.

Five platform  
Double-Stack Car



Intermodal Tanks transport a wide range of commodities. The most common types have a capacity of 6,000 gallons.

Side View



Rear View





### 6.3 Tank Cars Valves & Fittings



**MANWAY**



**Vacuum Relief Valve**

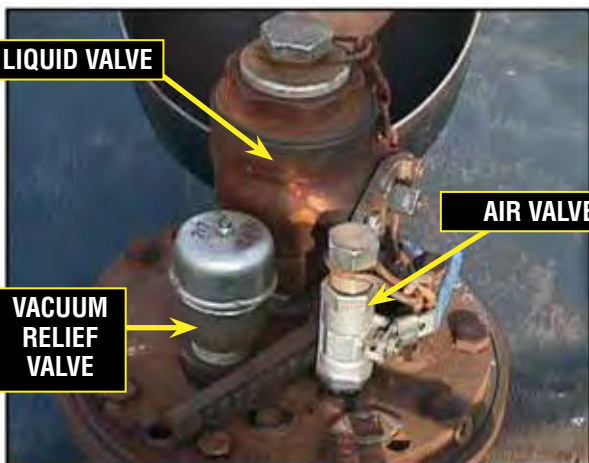
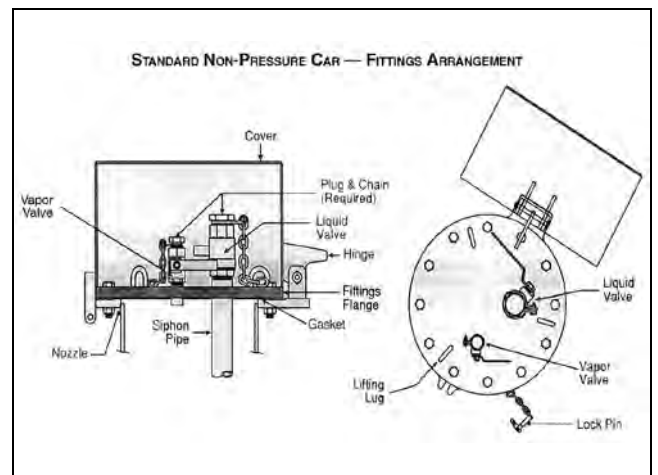


**Pressure Relief Device (PRD)**



**MAGNETIC GAUGING DEVICE**

**MANWAY**



**LIQUID VALVE**

**AIR VALVE**

**VACUUM RELIEF VALVE**



**Acid Fittings**

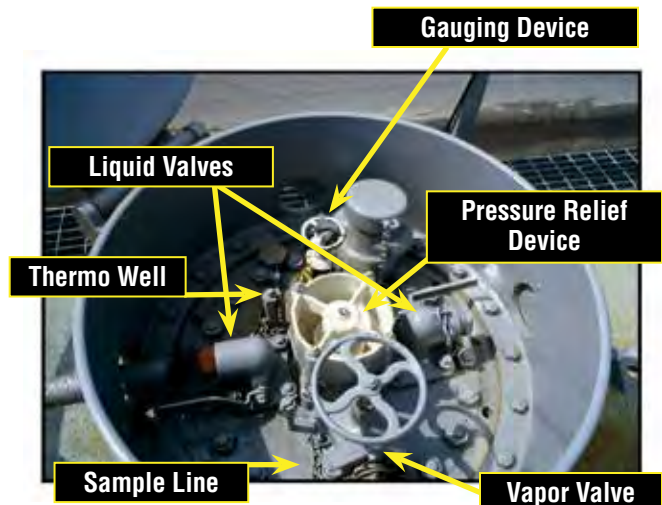
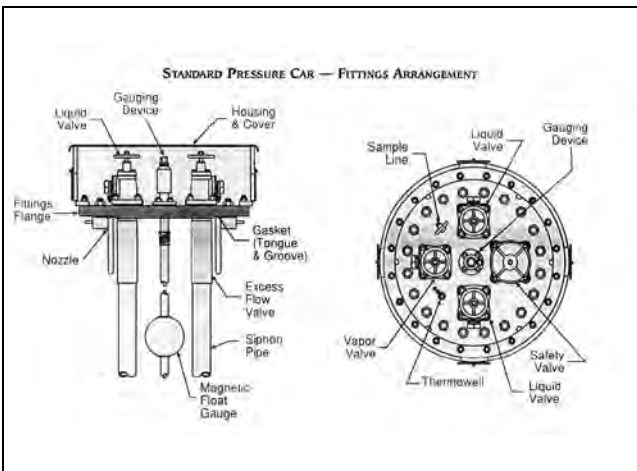
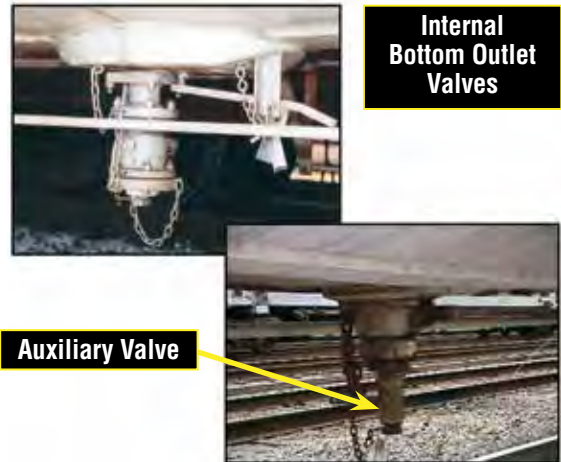
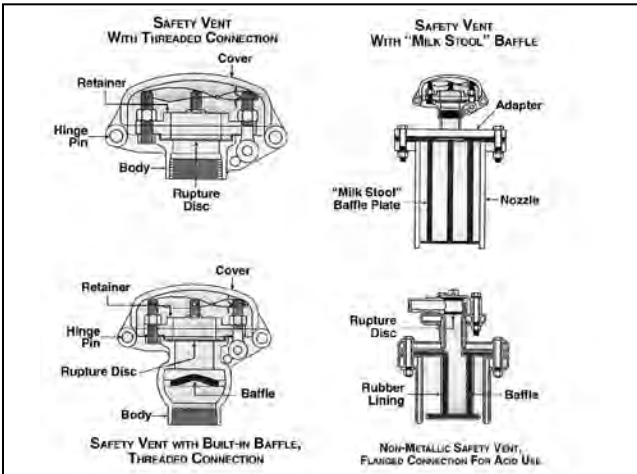
**Safety Vent/Air Line**

**Liquid Line**

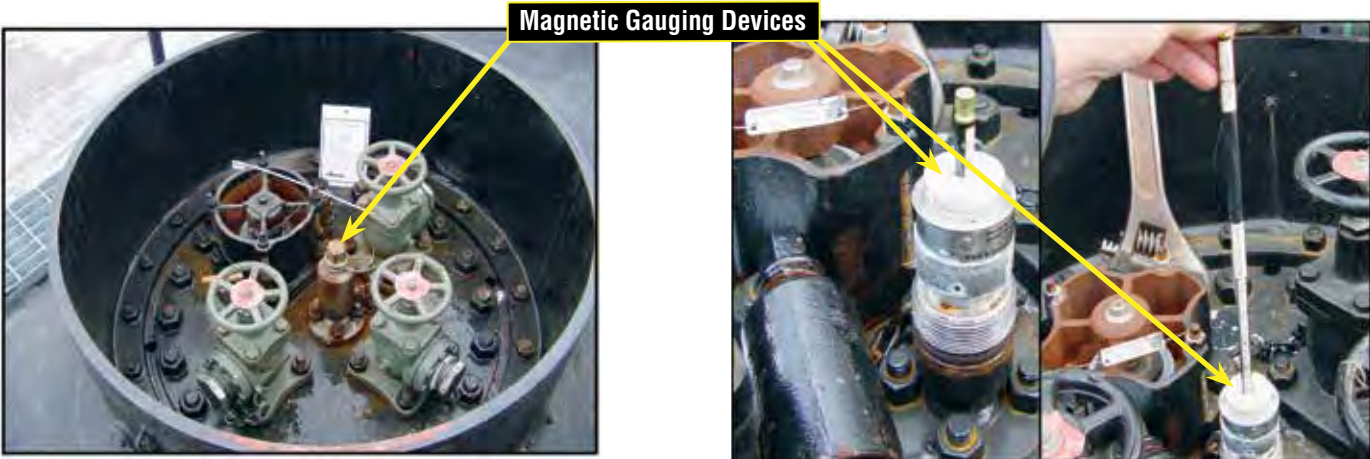
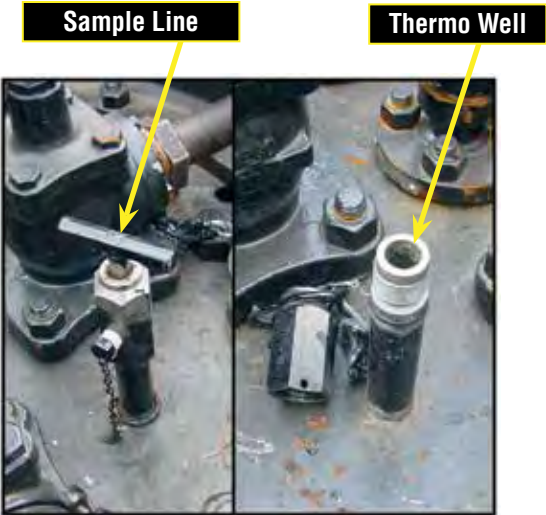
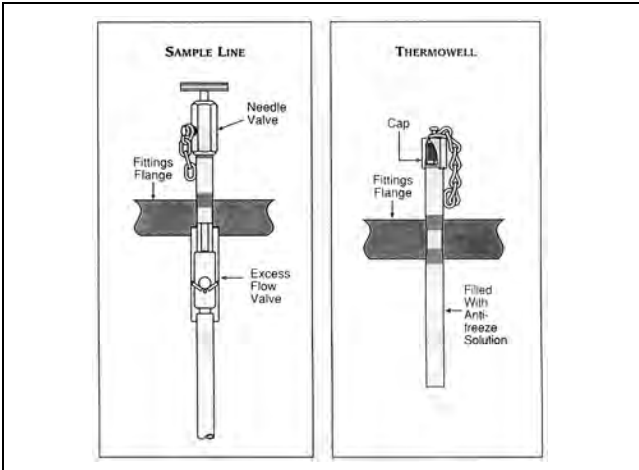
**Fill Hole**



### 6.3 Tank Cars Valves & Fittings (continued)



6.3 Tank Cars Valves & Fittings (continued)



### 6.3 Tank Cars Valves & Fittings (continued)

**Chlorine Fittings**



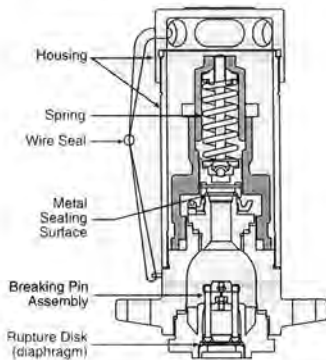
**Chlorine Angle Valve**



**Chlorine Safety Relief Device**

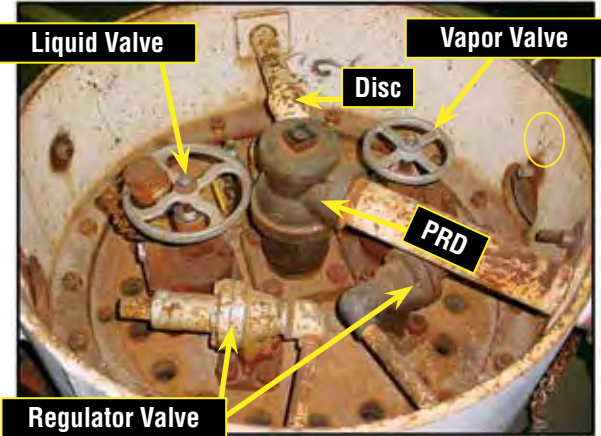
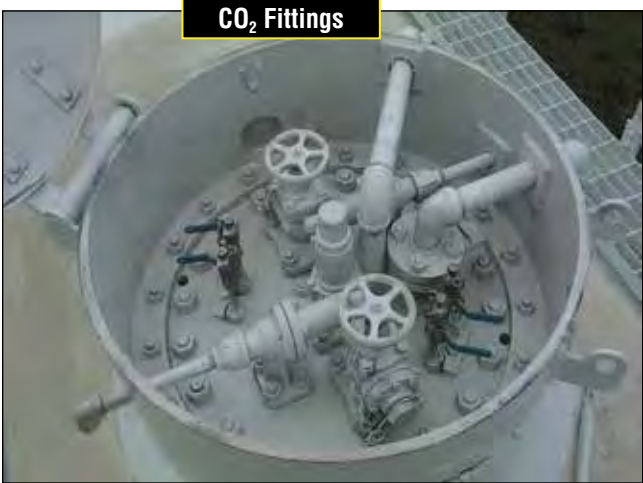


**COMBINATION SAFETY RELIEF DEVICE**



**New valve arrangement for Chlorine and other service**

6.3 Tank Cars Valves & Fittings (continued)



## **6.4 Freight Railroad Security**

America's railroads have a long history of emphasizing security and law enforcement issues. The tragic events of September 11, 2001 have brought a significant amount of attention to the issue of the security of hazardous materials and military shipments in transportation. At Norfolk Southern and throughout the rail industry in the United States and Canada, much has been done to identify potential targets and develop appropriate countermeasures to minimize the potential opportunity of hazardous materials being transported by rail becoming viable terrorists targets.

### **National Security Effort**

The nation's railroads, through an effort initiated by the Board of Directors of the Association of American Railroads (AAR), are in close regular contact with the U.S. Department of Homeland Security (DHS), Transportation Security Administration (TSA), Federal Bureau of Investigation (FBI), U.S. Department of Defense (DoD), United States Coast Guard (USCG) and the security and intelligence office of the U.S. Department of Transportation (DOT). Additionally, the AAR has a 24/7 Operations Center, the Railway Alert Network (RAN) to coordinate all freight railroad security actions with federal intelligence agency actions and plans.

### **Commitment and Vigilance**

Norfolk Southern remains deeply committed to the safe transportation of hazardous materials by rail. We also recognize that now, more than ever, this also means maintaining high levels of security.

As we move forward and deal with these potentially serious threats within our country, we ask your assistance in being vigilant and reporting any unusual persons or activities on or near railroad property. Any unusual activities involving Norfolk Southern property should be reported to the Norfolk Southern Police Communications Center (PCC) at 1-800-453-2530.

***PLEASE NOTE: The back cover of this book also contains the Norfolk Southern Police Communications Center phone number and can be copied and used as a notice to be posted at each 911, Communications, Dispatch, Emergency Medical Services (EMS) and Police Centers in areas served by Norfolk Southern Railway.***

## **6.5 NS Media Contacts**

Norfolk Southern procedures provide that communications with the media should be addressed through the local Incident Command System (ICS) by a Public Information Officer (PIO).

If a member of the media requests information from Norfolk Southern or seeks to talk with a NS public information representative, such requests/queries will be coordinated through Norfolk Southern's corporate communications main office: unless their representative is present at an incident site.

**For Media Inquiries Concerning Norfolk Southern please contact:**

**Norfolk Southern Corporate Communications  
1-757-629-2717**

**After Hours  
1-800-453-2530**

## 6.6 Online Sources of Information

American Chemistry Council — <a href="http://www.americanchemistry.com">www.americanchemistry.com</a>
American Short Line & Regional Railroad Association — <a href="http://www.aslrra.org">www.aslrra.org</a>
AMTRAK — <a href="http://www.amtrak.com">www.amtrak.com</a>
AskRail— <a href="http://www.askrail.us/">www.askrail.us/</a>
Association of American Railroads — <a href="http://www.aar.org">www.aar.org</a>
Center for Toxicology and Environmental Health — <a href="http://www.cteh.com">www.cteh.com</a>
CANUTEC (Canadian Transport Emergency Centre) — <a href="http://www.tc.gc.ca/canutec">www.tc.gc.ca/canutec</a>
CHEMTREC (Chemical Transportation Emergency Center) — <a href="http://www.chemtrec.com">www.chemtrec.com</a>
Chlorine Institute — <a href="http://www.cl2.com">www.cl2.com</a>
ERG 2012 Online — <a href="http://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Hazmat/ERG2012.pdf">http://www.phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/Hazmat/ERG2012.pdf</a>
Federal Emergency Management Agency — <a href="http://www.fema.gov">www.fema.gov</a>
Federal Railroad Administration — <a href="http://www.fra.dot.gov">www.fra.dot.gov</a>
LEPC/SERC Net — <a href="http://www.rtk.net/LEPC">www.rtk.net/LEPC</a>
National Oceanic & Atmospheric Administration — <a href="http://www.noaa.gov">www.noaa.gov</a>
National Safety Council — <a href="http://www.nsc.org">www.nsc.org</a>
National Transportation Safety Board — <a href="http://www.nts.gov">www.nts.gov</a>
Norfolk Southern Corporation — <a href="http://www.nscorp.com">www.nscorp.com</a>
Right-to-Know Network (searchable government databases) — <a href="http://www.rtk.net">www.rtk.net</a>
TRANSCAER — <a href="http://transcaer.teknicks.com">http://transcaer.teknicks.com</a>
Transport Canada — <a href="http://www.tc.gc.ca/rail/menu.htm">www.tc.gc.ca/rail/menu.htm</a>
Transportation Technology Center, Inc., Security and Emergency Response Training Center — <a href="http://www.aar.com">www.aar.com</a>
U.S. Department of Transportation — <a href="http://www.dot.gov">www.dot.gov</a>
U.S. Environmental Protection Agency — <a href="http://www.epa.gov">www.epa.gov</a>
U.S. Fire Administration (National Fire Academy) — <a href="http://www.usfa.fema.gov">www.usfa.fema.gov</a>
U.S. National Response Team (Oil & Hazmat Response) — <a href="http://www.nrt.org">www.nrt.org</a>
U.S. Coast Guard — <a href="http://www.uscg.mil">www.uscg.mil</a>



## **6.7 Glossary of Chemical Terms**

### **ACID**

Any chemical which undergoes dissociation in water with the formation of hydrogen ions. Acids have a corrosive effect on metals and may cause severe tissue burns. Acids turn litmus paper red and have a pH value of 0 to 6.

### **ALKALI**

Any chemical substance that in water solution is bitter and is irritating or caustic to skin and mucous membranes, turns litmus paper blue and has a pH value greater than 7.0. Alkalis are also referred to as bases. They may have a corrosive effect on metals and cause severe tissue burns.

### **APPEARANCE**

A description of a substance at normal room temperature and normal atmospheric conditions. Appearance includes the color, size, and appearance.

### **AUTO-IGNITION TEMPERATURE**

The temperature at which a closed, or nearly closed container must be heated in order that a flammable liquid, when introduced into the container, will ignite spontaneously or burn.

### **BONDING**

The interconnecting of two objects by means of a clamp and bare wire. Its purpose is to equalize the electrical potential between the objects to prevent a static discharge when transferring a flammable liquid or gas from one container to another. The conductive path is provided by the clamps which make contact with the charged object and a low resistance flexible cable which allows the charge to equalize.

### **COMBUSTIBLE LIQUID**

As defined by DOT as any liquid having a flash point at or above 141°F (60.5°C), but below 200°F (93°C), except any mixture having components with flash points of 200°F (93°C) or higher, the total volume of which makes up ninety-nine percent (99%) or more of the total volume of the mixture.

### **CORROSIVE**

As defined by DOT, a corrosive material is a liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the site of contact. In case of leakage from its packaging — a liquid that has a severe corrosive rate on steel. Two common examples are sodium hydroxide and sulfuric acid.

### **EXPLOSIVE**

A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure or high temperature.

### **FLAMMABLE LIQUID**

As defined by DOT is any liquid having a flash point below 141°F (60.5°C), except any mixture having components with flash points of 100°F (37.8°C) or higher, the total of which make up ninety-nine percent (99%) or more of the total volume of the mixture.

## **6.7 Glossary of Chemical Terms** *(continued)*

### **FLAMMABLE SOLID**

A solid, other than a blasting agent or explosive, that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.

### **FLASH POINT**

The temperature at which a liquid will give off enough flammable vapor to ignite if an ignition source is present.

### **HAZARDOUS MATERIALS**

Hazardous materials are defined as *“a substance or material which the Secretary of Transportation has determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce.”*

The term “hazardous material” includes hazardous substances, hazardous wastes, elevated temperature materials (HOT or MOLTEN), and marine pollutants.

### **IGNITABLE**

Capable of being set afire.

### **IMPERVIOUS**

A material that does not allow another substance to pass through or penetrate it.

### **INCOMPATIBLE**

Materials which could cause a dangerous reaction from direct contact with one another.

### **INSULATION**

A material used to maintain the temperature of the lading contain in a tank car. It may be made from fiberglass, rock wool, foam, cork, etc.

### **LC<sub>50</sub>**

(Lethal Concentration - 50) is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours and is usually measured in parts per million.

### **LD<sub>50</sub>**

(Lethal Dose - 50) means a dose of a substance when ingested, injected, or applied to skin produces death in 50% (one half) of a population of experimental animals. It is usually expressed as milligrams per kilogram (mg/kg) of body weight.

## **6.7 Glossary of Chemical Terms (continued)**

### **LOWER EXPLOSIVE LIMIT (LEL)**

Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash of fire in presence of an ignition source (arc, flame, heat). Concentrations lower than LEL are 'too lean' to burn. Also called lower flammable limit (LFL).

### **ORGANIC PEROXIDE**

Any organic (carbon-containing) compound having two oxygen atoms joined together (-O-O-). Organic peroxides can be severe fire and explosion hazards.

### **OXIDIZER**

A compound that spontaneously evolves oxygen either at room temperature or under slight heating. DOT defines it as a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials. Chlorate, permanganate, and nitrate compounds are examples of oxidizers.

### **POISON (TOXIC)**

A material that can cause short and/or long term systemic health problems and possibly death, through inhalation, ingestion, or absorption.

### **POISON INHALATION HAZARD (PIH) OR TOXIC INHALATION HAZARD (TIH)**

A DOT designation for gases and certain high vapor pressure liquids which, through the inhalation of small amounts, can cause severe health effects and even death.

### **POLYMERIZATION**

Polymerization is a chemical reaction in which one or more small molecules combine to form larger molecules. Some materials are shipped with an inhibitor (or stabilizing agent) to delay polymerization and are limited in the amount of time they can be in transportation. A hazardous polymerization occurs when a reaction occurs (due to loss of inhibitor, contamination, or exposure to heat) at a rate which releases large amounts of energy in a confined space such as a tank car.

### **PYROPHORIC**

Any liquid or solid that will spontaneously ignite in air at or below a temperature of 130°F (54.5°C).

### **REACTIVITY**

The tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects — such as pressure buildup, heat, formation of noxious, toxic, corrosive, or flammable by-products may occur because of the reactivity of a substance to heating, burning, direct contact with other materials or conditions in use or storage.

### **REDUCING AGENT**

A reducing agent is a chemical or substance which combines with oxygen or loses electrons to the reaction. In a reduction reaction (which always occurs simultaneously with an oxidation reaction) the reducing agent is the chemical or substance which combines with oxygen or loses electrons in the reaction.

## 6.7 Glossary of Chemical Terms *(continued)*

### **SOLUBILITY IN WATER**

A term expressing the percentage of a material (by weight) that will dissolve in water at ambient temperature. Solubility information can be useful in determining spill cleanup methods and fire-extinguishing agents and methods for a material. Terms used to express solubility are:

Negligible.....	< 0.1%
Slight.....	0.1 to 1.0%
Moderate .....	1 to 10%
Appreciable .....	More than 10%
Complete .....	Soluble in all proportions

### **SPECIFIC GRAVITY**

The weight of a material compared to the weight of an equal volume of water; an expression of the density of the material. Example: if a volume of a material weighs 8 pounds, and an equal volume of water weighs 10 pounds, the material is said to have a specific gravity of 0.8. Materials with a specific gravity of less than 1.0 will float on water. Materials with a specific gravity greater than 1.0 will sink to the bottom. Most (but not all) flammable liquids have a specific gravity of less than 1.0 and (if not soluble) will float on water.

### **SPONTANEOUSLY COMBUSTIBLE**

A material that ignites as a result of retained heat from processing, or which will oxidize to generate heat and ignite, or which absorbs moisture to generate heat and ignite.

### **TOXIC (POISON)**

A solid, liquid, paste, or semi-solid substance which is known (or presumed on the basis of animal testing) to be so toxic to humans as to afford a hazard to health during transportation. Exposure can cause short and/or long term systemic health problems and possibly death, through inhalation, ingestion, or absorption.

### **UPPER EXPLOSIVE LIMIT (UEL)**

Highest concentration (percentage) of a gas or vapor in air capable of producing a flash of fire in presence of an ignition source (arc, flame, heat). Concentrations higher than UEL are 'too rich' to burn. Also called upper flammable limit (UFL).

### **VAPOR DENSITY**

The weight of a vapor or gas compared to the weight of an equal volume of air; an expression of the density of the vapor or gas. Materials lighter than air have vapor densities less than 1.0. Materials heavier than air have vapor densities greater than 1.0. The vapors from materials with vapor densities greater than 1.0 are likely to migrate to low lying areas — along or under floors, in sumps, sewers and manholes, in trenches and ditches — where they may create fire or health issues or displace oxygen.

### **WATER REACTIVE**

A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

## 6.8 Acronyms

ACC	American Chemistry Council
AAR	Association of American Railroads
BNSF	Burlington Northern Santa Fe Railroad
BOE	Bureau of Explosives
CAER	Community Awareness and Emergency Response
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
CIA	Central Intelligence Agency
CN	Canadian National Railroad
CP	Canadian Pacific Railroad
CR	Conrail
CSXT	CSX Transportation, Inc.
DHS	Department of Homeland Security
DOD	United States Department of Defense
DOT	United States Department of Transportation
EBS	Emergency Broadcast System
EMS	Emergency Medical Services
EPA	United States Environmental Protection Agency
ERG	Emergency Response Guidebook
FBI	Federal Bureau of Investigation
FEC	Florida East Coast Railway
FEMA	Federal Emergency Management Agency
FRA	Federal Railroad Administration
GST	General Superintendent Transportation
HAZMAT	Hazardous Material
HAZWOPER	Hazardous Waste Operations and Emergency Response
HMERP	Hazardous Materials Emergency Response Plan
HMRC	Hazardous Materials Response Code
ICS	Incident Command System
KCS	Kansas City Southern Railroad
LEPC	Local Emergency Planning Committee
MSDS	Material Safety Data Sheet

## 6.8 Acronyms (continued)

NA	North America
NENA	National Emergency Number Association
NIMS	National Incident Management System
NRC	National Response Center
NS	Norfolk Southern Railway Company
NTSB	National Transportation Safety Board
OSHA	Occupational Safety and Health Administration
PCC	Norfolk Southern's Police Communications Center
PIH	Poison Inhalation Hazard (synonymous with TIH)
PIO	Public Information Officer
RQ	Reportable Quantity
SCBA	Self-Contained Breathing Apparatus
STB	Surface Transportation Board
STCC	Standard Transportation Commodity Code
STRACNET	Strategic Rail Corridor Network
TIH	Toxic Inhalation Hazard (synonymous with PIH)
TRANSCAER®	Transportation Community Awareness and Emergency Response
TSA	Transportation Security Administration
UN	United Nations
UP	Union Pacific Railroad
USCG	United States Coast Guard

# POLICE AND EMERGENCY RESPONDERS HAZARDOUS MATERIALS POCKET RESPONSE GUIDE

**TO USE THIS GUIDE** — review this side for general recommendations when you are first on scene at a hazmat incident.

**REVIEW SIDE 2** — for a brief description of the types of hazards and example materials associated with each of the U.S. DOT placards.

1. Immediately notify dispatcher that you are involved in a possible hazardous materials accident. Provide the following minimum information about the incident:
  - THE EXACT LOCATION
  - TYPE OF VEHICLE INVOLVED
  - INITIAL PRESENCE OF HAZARDOUS MATERIALS (PLACARDS, PANELS, etc.)
  - PRESENCE OF FIRE, SPILLED LIQUIDS, OR VAPOR LEAKS
  - KNOWN INJURIES
  - DO NOT ATTEMPT TO RESCUE INJURED OR RETRIEVE DOCUMENTATION UNTIL SITUATION IS ASSESSED.
2. Note the type of placards and numbers present. If possible, look for rectangular orange panels and note number. These numbers are UN/NA numbers and will aid in the identification of the contents.
3. Carefully observe the incident before approaching. Be alert to signs of leakage such as sounds of escaping gas, evidence of liquid leak, odd smells, vapor clouds.
4. Approach accident scene from the upwind side. Do not park in the potential path of leaking materials. **DO NOT DRIVE INTO VAPOR CLOUDS. Remember, VEHICLES ARE AN IGNITION SOURCE.**
5. Initially isolate the accident scene for a radius of 250 feet to allow room for response personnel. If cargo involved in fire or fire probable evacuate to a radius of 500 feet to allow firefighters additional working clearance. Adjust distances as conditions warrant.
6. **DO NOT USE FLARES** in the vicinity of the incident, flammable vapors may be present.
7. Prohibit traffic from passing through the incident. Do not allow bystanders to congregate around the incident.
8. Note wind direction. Note if material is running into sewers, waterways, ditches. If possible, estimate the quantity of material leaking. Pass this information to your dispatcher or responding fire units.
9. When isolating accident scene, give priority to removing persons from oncoming smoke or vapor.
10. Do not step in pools of liquid or any unfamiliar material. Avoid contact with any chemical material.
11. Do not open trailers of hazardous cargo. Trailers may contain hazardous vapors or loose cargo which may cause death or injury.

**NOTE:** Liquid oxygen may mix with asphalt to create a highly shock sensitive explosive. Do not contact liquid oxygen contaminated asphalt under any circumstances, it may detonate even under foot. Completely isolate contaminated asphalt.

# POLICE AND EMERGENCY RESPONDERS HAZARDOUS MATERIALS POCKET RESPONSE GUIDE



**CLASS 1 (EXPLOSIVES)** — Liable to detonation under appropriate circumstances such as fire or shock. Usually stable if not involved in fire or not moved. Do not handle unless trained and equipped. *Division 1.1* — Mass Explosion Hazard, *Division 1.2* — Explosion Hazard with Fragmentation, *Division 1.3* — Radiant Heat and/or Violent Burning Hazard, No Blast Hazard, *Division 1.4* — Small Hazard of Ignition or Initiation During Transport, *Division 1.5* — Mass Explosion Hazard But Very Insensitive, *Division 1.6* — Extremely Insensitive with No Mass Explosion Hazard.



**DIVISION 2.1 (FLAMMABLE GAS)** — Compressed gasses which are flammable. May also be toxic or corrosive. Vapors may travel considerable distance to a source of ignition and flash back to the source. Many of these gasses are heavier than air and will tend to spread close to ground level. *Examples:* Propane, Butane, and welding gasses such as Acetylene.



**DIVISION 2.2 (NON-FLAMMABLE GAS)** — Compressed gasses which are not flammable. May also be corrosive or toxic. These gasses may suffocate by oxygen displacement. While not flammable, some of these gasses may support and even accelerate a fire. High pressure containers can rocket or throw shrapnel if exposed to fire or ruptured. *Examples:* Anhydrous Ammonia, Compressed Air, Nitrogen, Argon, Carbon Dioxide.



**DIVISION 2.3 (POISON GAS)** — Extremely toxic compressed gas or high vapor pressure liquid. Even low level exposure to vapors or fumes may result in serious injury or death. May be flammable and/or corrosive as well. *Examples:* Chlorine, Hydrocyanic Acid, Phosgene, Ethylene Oxide.



**CLASS 3 (FLAMMABLE and COMBUSTIBLE LIQUIDS)** — One of the most common hazardous materials classifications including gasoline, some alcohols, paints, thinners, etc. May be toxic and corrosive as well. *Flammable liquids* evolve vapors which will generally ignite readily when exposed to an ignition source. Some of these vapors may be harmful. *Combustible liquids* will burn but require some effort to ignite. They do not meet the criteria for any other hazard class and range from paint thinners to heating oils. They are not regulated in shipping containers of 110 gallons or less.



**CLASS 4 (FLAMMABLE SOLIDS)** — This Class includes materials which are *FLAMMABLE SOLIDS* (Division 4.1), *SPONTANEOUSLY COMBUSTIBLE MATERIAL* and *PYROPHORIC LIQUIDS* (Division 4.2), and *DANGEROUS WHEN WET* (Division 4.3). These materials are liable through friction, contact with air, water, or by self heating, to ignite and burn with great intensity or produce flammable gasses. Many are toxic if taken internally such as through contaminated food, contaminated cigarettes, or water. Usually highly reactive and if involved in a fire may burst their containers. *Examples:* Phosphorus, Sodium Metal, Calcium Carbide.



**CLASS 5 (OXIDIZERS and ORGANIC PEROXIDES)** — Very reactive with wood, oils, fuels, paper, or any organic material, to generate heat, ignite or explode. Will promote and accelerate fires to the point of possible explosion. Will react with skin and clothing. Usually does not present a vapor hazard unless reacting or involved in a fire. On heating may decompose explosively. *Examples:* Hydrogen Peroxide, Potassium Permanganate, Ammonium Perchlorate, Dry Chlorine for swimming pools, some fertilizers.



**CLASS 6 (POISONOUS MATERIAL)** — Toxic liquids or solids. Not highly flammable, but may be mixed in oil carriers. Not severely corrosive. Primarily toxic by skin contact or ingestion. May be toxic by inhalation of vapors or dust if dust is airborne or material is on fire. May be extremely poisonous and if exposure occurs death may result very quickly. *Examples:* Arsenic, Sodium Cyanide, Strychnine, and many pesticides.



**CLASS 7 (RADIOACTIVE)** — Emits harmful radiation which can not be detected without specialized instruments. High level materials are packed in such strong packages that leakage is a very low possibility. Medical materials are often shipped in small lead vessels. Low level wastes include debris contaminated with small amount of radioactive material. These include such items as clothing, paper, tools, etc. Do not contact these materials or handle broken packages.



**CLASS 8 (CORROSIVE)** — Acids or bases which may be in liquid or solid form. They will attack a variety of metals and will produce severe damage to skin on contact. May react with other materials such as water to evolve heat and gasses. In a violent reaction, acids or bases may produce a large volume of corrosive vapors which may spread a considerable distance. *Examples:* Hydrochloric Acid, Sulfuric Acid, and Caustic Soda.



**CLASS 9 (Miscellaneous Hazardous Materials)** — Materials which do not fit another hazard class such as those which have an anesthetic, noxious, or other similar property which could affect a flight crew; or hazardous substances or hazardous wastes which do not meet the definition of another hazard class or division. *Examples:* Acetaldehyde Ammonia, PCB's, Sodium Chromate.



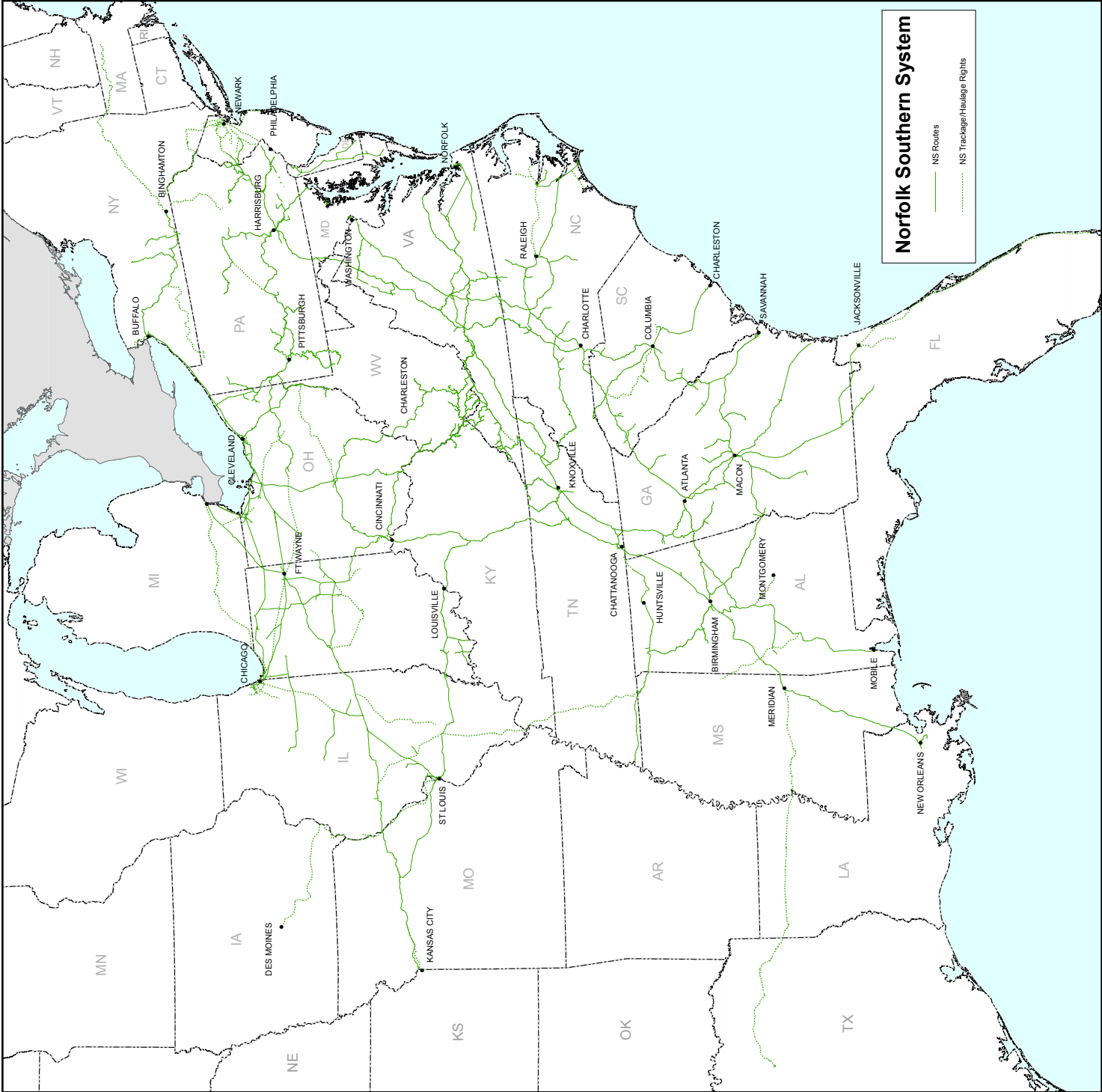
Indicates a Mixed load of Hazardous Materials on board.



Used in addition to placards to display UN/NA Number.

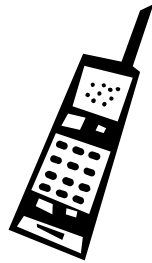
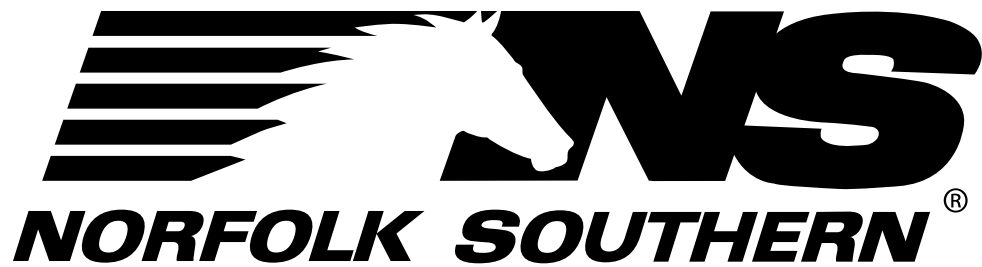
**NOTE:** Some materials (such as Poison By Inhalation) may require more than one placard or label.





**Norfolk Southern System**

- NS Routes
- NS Trackage/Haulage Rights



**FOR INCIDENTS/EMERGENCIES  
INVOLVING NORFOLK SOUTHERN  
TRACK OR EQUIPMENT**

***Call the Norfolk Southern  
Police Communications Center***

**1-800-453-2530**

**(24-HOUR)**