

Hazard Materials 2023 FLOW STUDY

Local Emergency Planning Committee (LEPC)
Springfield-Greene County Office of Emergency Management

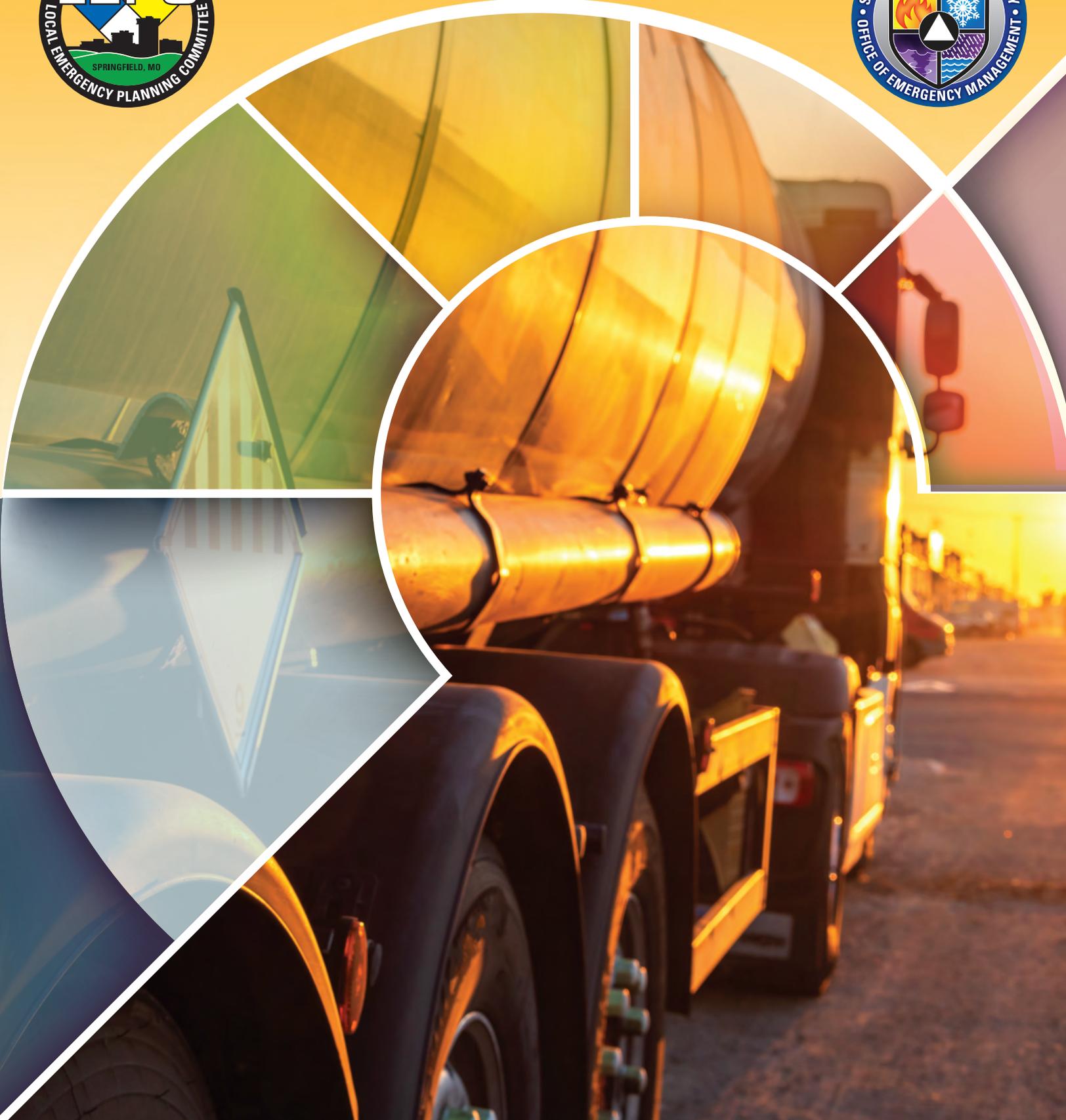


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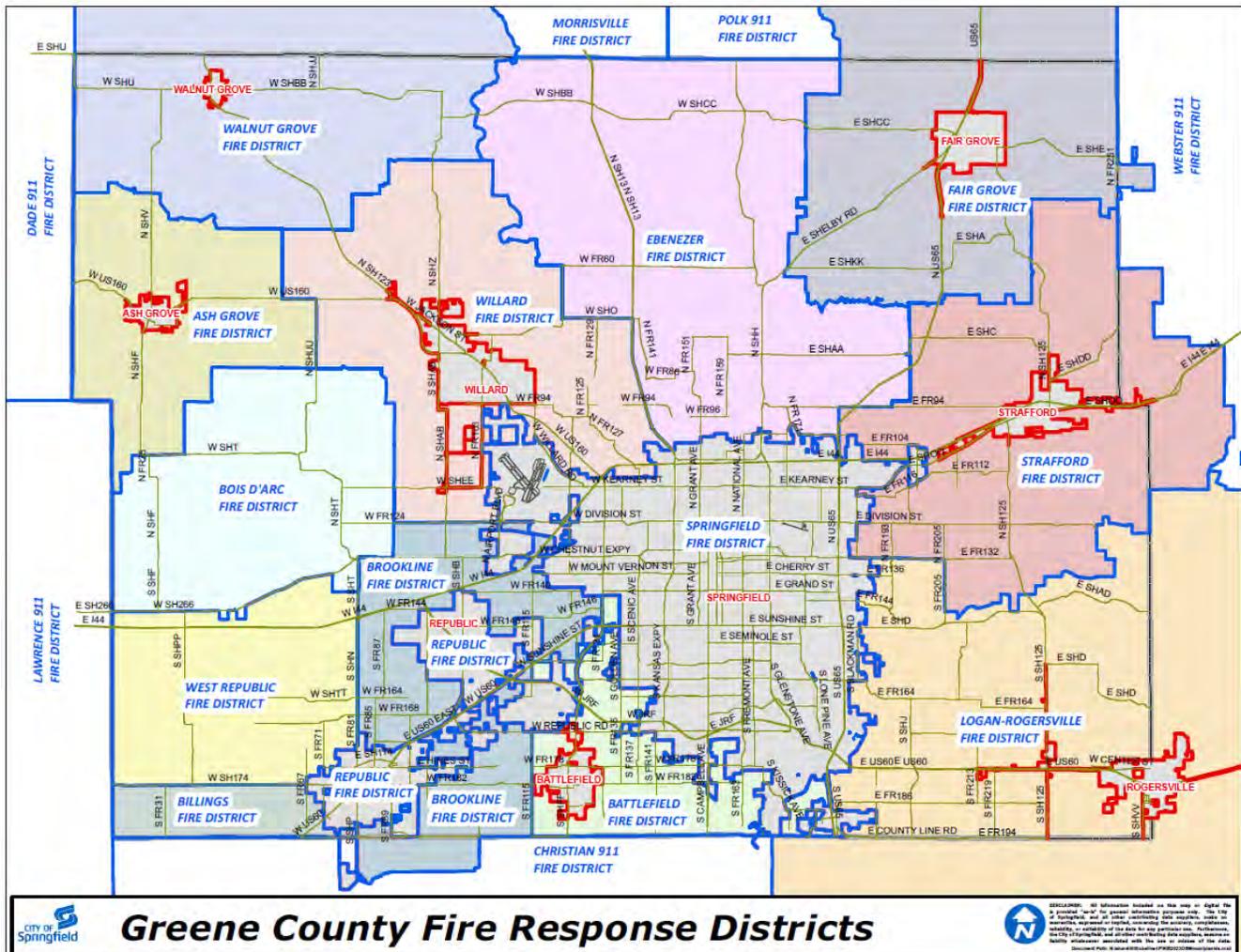
INTRODUCTION

STATEMENT OF PURPOSE

This Hazardous Material Transportation Flow Study was carried out within the boundaries of Greene County, Missouri starting in March of 2023 and ending in August of the same year. The data found in this study will enhance all Greene County Fire Fighters' understanding of hazardous materials in the area and enable the departments to increase the effectiveness of their emergency response capabilities to hazardous material transportation events within Greene County.

Greene County has a total of 14 fire districts; they are located on the map below:

- | | |
|------------------------------|--------------------------------------|
| 1. Ash Grove Fire District | 8. Logan-Rogersville Fire Department |
| 2. Battlefield Fire District | 9. Republic Fire District |
| 3. Billings Fire District | 10. Springfield Fire District |
| 4. Bois D'Arc Fire District | 11. Strafford Fire District |
| 5. Brookline Fire District | 12. Walnut Grove Fire District |
| 6. Ebenezer Fire District | 13. West Republic Fire District |
| 7. Fair Grove Fire District | 14. Willard Fire District |





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The purpose of this study is as follows:

1. To identify the shipment modes of hazardous materials that originate in or are destined to pass through Greene County.
2. To identify the routes that involve the most significant flow of hazardous materials in Greene County.
3. To focus on roadway intersections attributed to the highest occurrences of accidents within the County's boundaries.
4. To obtain a functional understanding of the amount of hazardous materials that passed through the County over a defined period, for this study, that period is defined as March of 2023 to August of 2023.

AREA OF STUDY

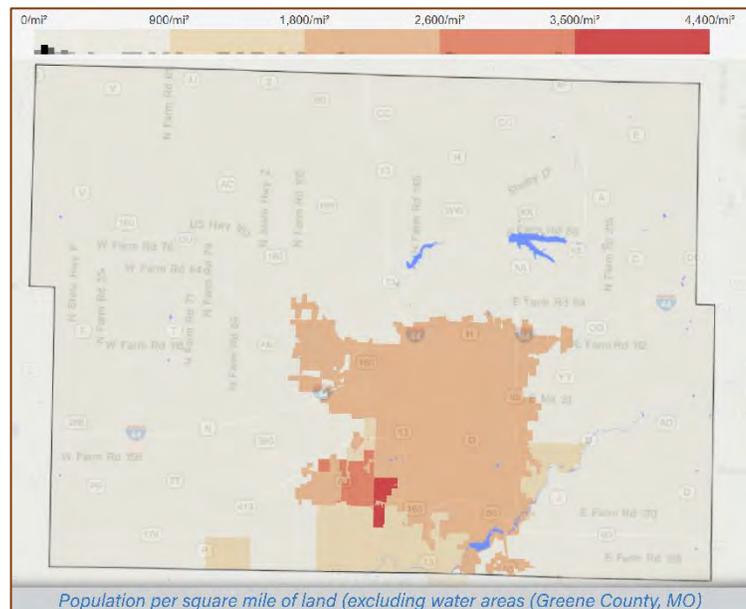
GREENE COUNTY

The Greene County Local Emergency Planning Committee (LEPC) is responsible, under the Emergency Planning and Community Right-to-Know Act of 1986, for the development of Greene County's Hazardous Materials Response Plan. The Greene County LEPC conducted a Hazardous Materials Flow Study in March of 2023, which intended to examine methods of transportation of hazardous materials within the boundaries of Greene County.

The possibility of an accident involving hazardous materials exists in many areas of Greene County at any hour of the day. It is a real and ever-present concern for the community, elected officials, and public safety professionals. This study is not a detailed enumeration based on 100% of the inventory of every possible possession or instance of travel through the Greene County area. Rather, it is a snapshot based on the most current data provided through public reports, traffic observations, and supplied information by entities that have been identified within the County that carry, transport, or house hazardous materials.



According to the United States Census Bureau, in April of 2020, when the last census was completed, Greene County was made up of 298,915 residents. It is estimated that the current population is closer to 303,293 residents. The U.S. Census Bureau additionally reports that, on average, there are 443 persons per square mile within the County. With the majority of the population and traffic within the Springfield area, the population density on average increases to 2,052 persons per

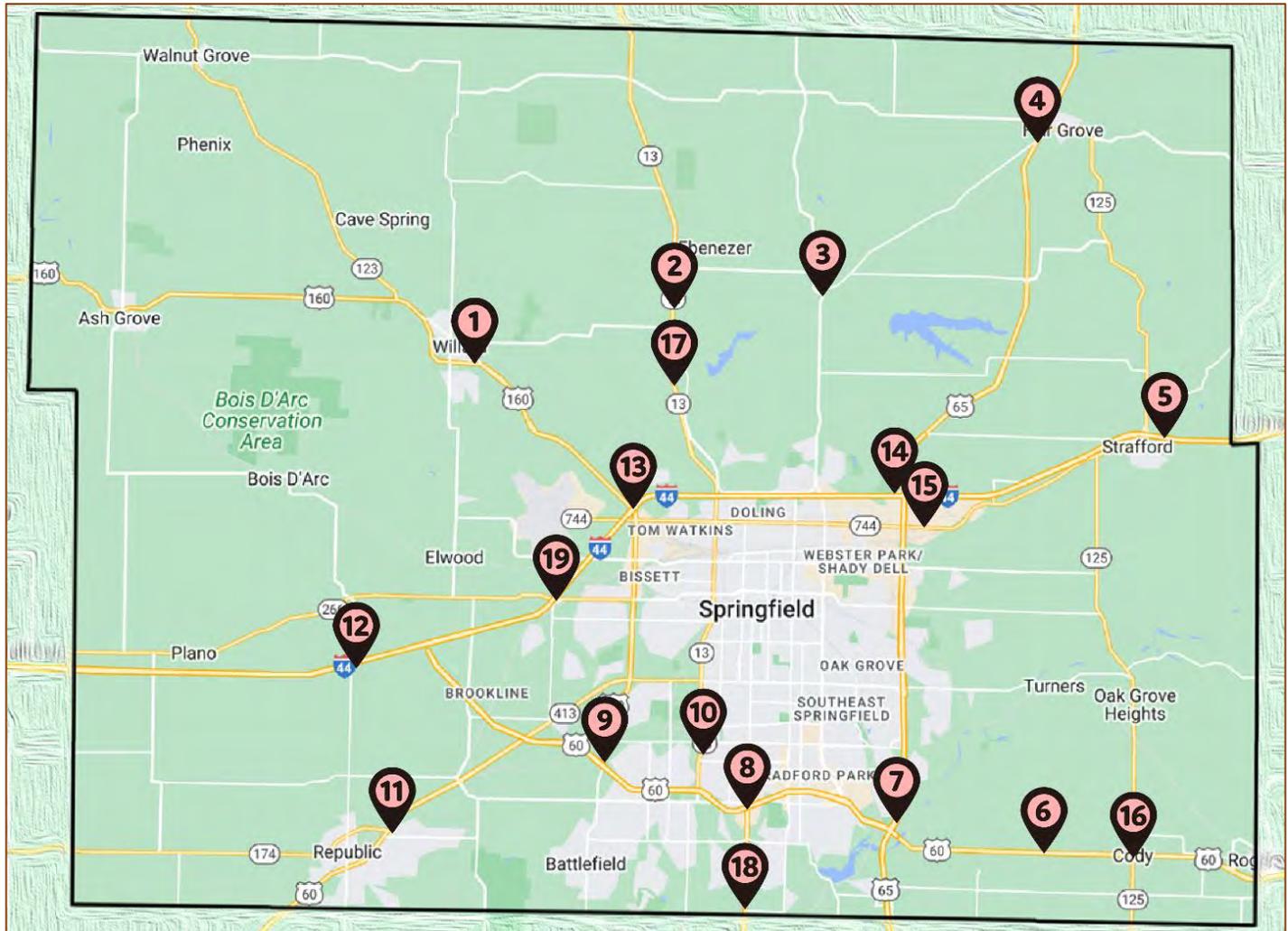


square mile. Furthermore, Greene County has a vast network of pipelines that supply the County with natural gas and transport other materials such as fuels like gasoline, diesel, and jet fuel. In addition, the Springfield-Greene County area has one major railyard, BNSF Railway Company, and they operate railways throughout the County and the western two-thirds of the country. They provide transportation and storage of railcars, which regularly contain hazardous substances. This study will discuss these hazards as well as examine the large number of fixed businesses in Greene County that produce and/or store hazardous materials. As for the transportation of materials, several major roadways traverse through Greene County and are common routes for the transportation of hazardous substances. Nineteen points of interest were observed over the course of this study; the next page includes a list and points marked on a map of these locations.



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1. Willard: Highway 160 (West Bypass) and Farm Road 123, at the intersection of Farm Road 123
2. Highway 13 (Kansas Expressway) and State Highway O
3. Highway H (N. Glenstone) and Highway WW (1/8 mile north of the intersection)
4. Fair Grove: U.S. Route 65 and State Highway CC at the on-ramp for U.S. Route 65 southbound
5. Stafford: Interstate 44 (I-44) at mile marker 89.4, located at truck parking eastbound on I-44
6. U.S. Route 60 at Farm Road 189 (east of Springfield) near the private lot at Citizens Bank of Rogersville
7. Interchange of U.S. Route 60 and U.S. Route 65, north of interchange off S. Brunswick Road
8. U.S. Route 60 at underpass for Republic Road (eastern underpass)
9. U.S. Route 60 at West Bypass at the overpass (parked in the grass)
10. S. Kansas Expressway at S. Erie Street southbound (in the triangular median at the intersection)
11. Republic: U.S. Route 60 and E. Farm Road 174 in Walmart parking lot (1/10 mile east of the intersection)
12. I-44 at State Highway N/State Highway T exit, from W. Farm Road 146 frontage road (1/4 mile east of exit)
13. I-44 and Highway 160 (West Bypass) at the on-ramp for I-44 West
14. I-44 and U.S. Route 65 exchange
15. E. Kearney Street and S. Eastgate Avenue intersection
16. Rogersville: U.S. Route 60 at Missouri Route 125
17. Highway 13 North at Fantastic Caverns
18. S. Campbell Avenue and W. Farm Road 192
19. W. Chestnut Expressway and I-44 intersection



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STATE OF MISSOURI

Formal local and state compliances within this study are addressed and met while acknowledging hazardous materials both stationary and in transit. The State Emergency Management Agency (SEMA), as part of the Missouri Department of Public Safety, in the established Rules of Public Safety (Title 11CSR 10-11.210) outlines the Missouri Emergency Response Commission’s (MERC) mission, which “... is to protect public health and the environment by assisting communities with chemical incident prevention, preparedness, response, and recovery.” Additional compliance measures defined the “Missouri Hazardous Material Emergency Planning and Response Act (EPCRA) that formalized county compliance with the Federal Emergency Planning and Community Right-To-Know Act of 1986, which sought to improve offsite safety around chemical facilities”; The Superfund Amendment Reauthorization Act (SARA) Title III, while requiring the State Emergency Response Commission (SERC), “... also creates a supplemental emergency preparedness funding base for chemical emergency preparedness at the county and state levels based upon fees collected from the chemical industry.”; and Tier II, the Emergency and Hazardous Chemical Inventory Report. This and additional information can be found on the official SEMA website for the State of Missouri; the link can be found in the Reference Links section of this document.



Furthermore, former reports from industry sectors, local agencies, and state departments about hazardous material inventories and accidents involving hazardous materials, assist in developing local industry trends, travel routes, and preparedness measures needed to mitigate current and future industry safety and public safety and are used as supporting information. The following is an example of a report used to help determine driving trends and motorist safety:



“Troop D ended the year with a one percent (1%) decrease in motor vehicle fatalities from the previous year. The troop saw a three percent (3%) increase in the number of fatalities who were not wearing a seat belt (55%) at the time of the crash. Greene County, which has the highest density in population, led with 44 fatalities.”

– Missouri Highway Patrol report

However, the Missouri State Highway Patrol (MSHP) also stated, Missouri has seen a 16% increase in total annual traffic fatalities since 2015.

The Missouri Department of Natural Resources (DNR) also releases information about hazardous material responses when roadway events occur. Regarding their response efforts and what they do in hazardous material events, they state, “Most environmental cleanups are risk-based, meaning the site is cleaned up to a specific level, such as residential or non-residential, based partly on its likely future use. Risk-based corrective action, or cleanup, may include physical controls, like barriers and caps, or specific activity and use limitations on the property to prevent exposure to any remaining contamination.”

DNR also produces an interactive map which can be found in the reference section of this study, that provides information on hazardous material site investigations and clean-ups within the state of Missouri.





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METHODS

ROADWAYS

One area of focus for this study was major roadways throughout the Greene County area, including Highway 65, Interstate 44, U.S. Route 60, Missouri Highway 13, and U.S. Route 160. Along each roadway, nineteen points of interest were selected as viewing posts, or sites, where observational data was recorded. Observational data included identifying hazardous substance placards on commercial vehicles and the type of vehicles transporting the hazardous materials. This study concluded that there were 11 unique kinds of trucks transporting these materials during the road study. Additionally, the time of day and the site from which the data was observed were also recorded.

Each of the sites was observed a minimum of two times throughout this study. After four weeks of using the original 14 locations, the observer noticed that traffic was not comparable to the 2015 study, so to broaden the scope of understanding how much and what kinds of hazardous materials are coming in and out of the County within the timeline defined for this study, five additional locations were added. The observer recorded information in these locations for two to six-hour increments during the study and on various days of the week and hours of the day to gather as much data as possible. As shown in **Figure 1**, the majority of traffic, 73% of it, took place after 12:00 pm. However, not indicated on the pie chart is the diversity in the recorded hazardous materials over the duration of the study. Additional information on the materials identified within the County and their frequency can be found in the Data Analysis section of this study. Furthermore, the analysis of each roadway was done using the data collected in this observation. It is not an accurate representation of how much and what kinds of materials are being transported every day of the year, but rather a snapshot of what traffic could look like at any given time. This information can be very useful to emergency management personnel and emergency responders when developing response plans to incidents that can occur within the county.

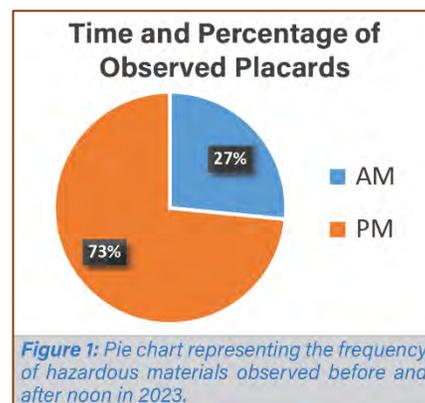


Figure 2 illustrates the U.S. Department of Transportation (DOT) placard identification classes used by observers during this study. This classification of materials helped determine the type of product being transported. Some vehicle placards displayed the name of the hazard with no classification specified. Additionally, vehicles with no placards can contain mixed-load cargo. The Department of Transportation (DOT) has an identification system seen in **Appendix A**.

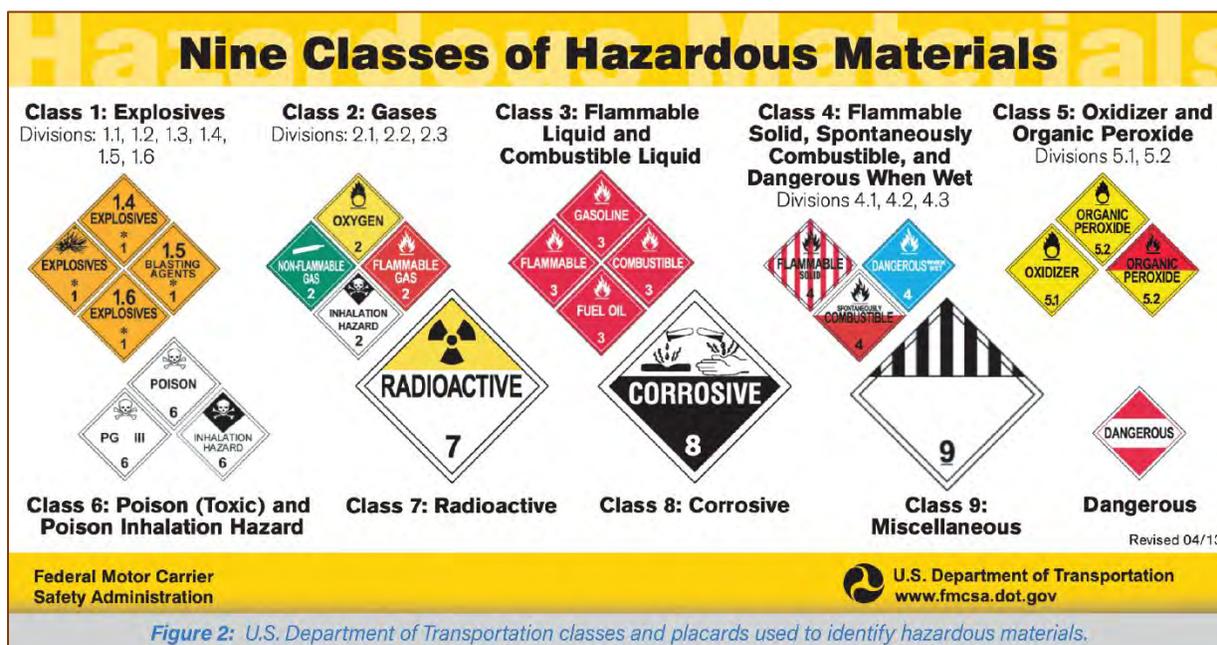


Figure 2: U.S. Department of Transportation classes and placards used to identify hazardous materials.



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This study used and applied United Nations Code (UN) and Hazardous Class Numbers (Universal Standard) to the data. Below, **Figure 3** is a table of the classes used in this study:

Class 1	Explosives
Class 2	Gases
Class 3	Flammable liquids (and combustible liquids [US])
Class 4	Flammable solids; spontaneously combustible materials; and dangerous when wet materials/water-reactive substances
Class 5	Oxidizing substances and organic peroxides
Class 6	Toxic substances and infectious substances
Class 7	Radioactive materials
Class 8	Corrosive substances
Class 9	Miscellaneous

Figure 3: Table of Hazardous Materials Classifications.

For statistical significance and report accuracy, Location 3, Highway H (North Glenstone) and Highway WW, 1/8-mile north of the intersection, was removed from additional observational data when it was determined that travel on that route was statistically insignificant with less than three observations of a placarded material within two hours and less than ten total observations over the course of the study. This is not to be misinterpreted to mean that there are no hazardous materials at this location, only that it served less statistical relevancy compared to the other locations observed during this study. The hazardous materials recorded at Location 3 can still be found in **Appendix C**, Complete List of Hazardous Materials.

RAILROADS

BNSF Railway Company (BNSF) provided information used to generate calculations as they applied to hazardous materials carried by rail. The data provided covers the dates from April 11, 2022 through April 11, 2023. BNSF provides this data to select community officials outlined in the following notice and regulatory agencies:



“Federal Regulation prohibits Sensitive Security Information (SSI) relating to transportation shipments from being released. The SSI regulations are under three different federal agencies:

- Department of Transportation: 49 CFR Subtitle A (Part 15)
- Department of Homeland Security: 49 CRF Chapter XII (Part 1520)
- Pipeline and Hazardous Materials Safety Administration: 49 CFR Subtitle B Chapter 1 (Part 172.820)”

BNSF is the only rail service that travels through the Springfield-Greene County area. Additionally, there are currently no passenger services or other commercial rail transports. In general, the rail system uses the same placards as highway vehicles because rail flatcars with trailer loads are transferred to trucks for final delivery or vice versa, where truck trailers may be loaded onto a flatcar for rail transport.

Appendix B illustrates the types of transport trailers and railcars used. Hazardous material placards may be placed in different locations on either railcars or transport trailers, thus sometimes making it difficult to identify. Understanding the types of cars and trailers used for transportation helps determine whether a hazardous material exists in an accident or emergency.



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PIPELINES

Greene County has six pipeline companies that supply various materials to the area, such as natural gas. Additionally, they transport materials through the county, such as crude oil and jet fuels, that may not have a purpose within the county. Most of the information gathered for this study was provided by the companies found below, and supporting information was gathered from the National Pipeline Mapping System (NPMS). This resource is managed by the Pipeline Hazardous Materials Safety Administration, and the NPMS shows the geographic locations of pipelines. Due to the sensitive nature of pipelines and public security, an application process is required before any detailed information, such as exact locations, can be provided to either public or private entities. Additional information used in this study was found within the Tier II reports that companies dealing with hazardous materials must file each year. Further data and information can be found in the Data Analysis section of this flow study.

AIRPORTS

Springfield-Branson National Airport, owned by the City of Springfield, is located within the boundaries of Greene County. Information on hazardous cargo such as contracted fuel and domestically used fuel for equipment is reported annually with a delay to the public to maintain national security and safety, as well as give time for information to be reported accurately. The information provided for the year 2022 and the most recent data provided by The Missouri Department of Transportation and The Federal Aviation Administration was used in this study. In addition, the Springfield-Branson National Airport provided supplemental information about the fuel stored at the airport for the entire year of 2022, which was also delayed allowing time for accurate reporting. Further information can be found under the Data Analysis section of this flow study.

NAVIGABLE AND LOCAL WATERWAYS

There are no major navigable waterways within the boundaries of Greene County and, therefore, have not been studied. However, there are numerous creeks, streams, rivers, and man-made lakes that can be impacted by hazardous material spills and could have lasting effects on the environment and drinking water supplies for the Springfield-Greene County area. This flow study looked at the amount of traffic that passes over these areas with information from the Missouri Department of Transportation and examined the hazardous materials found near water sources in Greene County. The county has more than 40 small watersheds (**Figure 4**) that feed into two large watersheds, the James River and the Sac River. Watersheds are defined by the City of Springfield as the following, “The area of land that drains to a waterway such as a river or a lake is its watershed. Each watershed is part of a bigger watershed.”



Figure 4: Map of individual Greene County watersheds.

Information about hazardous materials near the waterways is sourced from City Utilities, the Department of Natural Resources, and Springfield Environmental Services. The park board of Springfield, Missouri has also provided supplemental information about the various lakes and parks near bodies of water it maintains. Additionally, Tier II reports have been used to supplement information about businesses near local waterways that store or transport hazardous materials.



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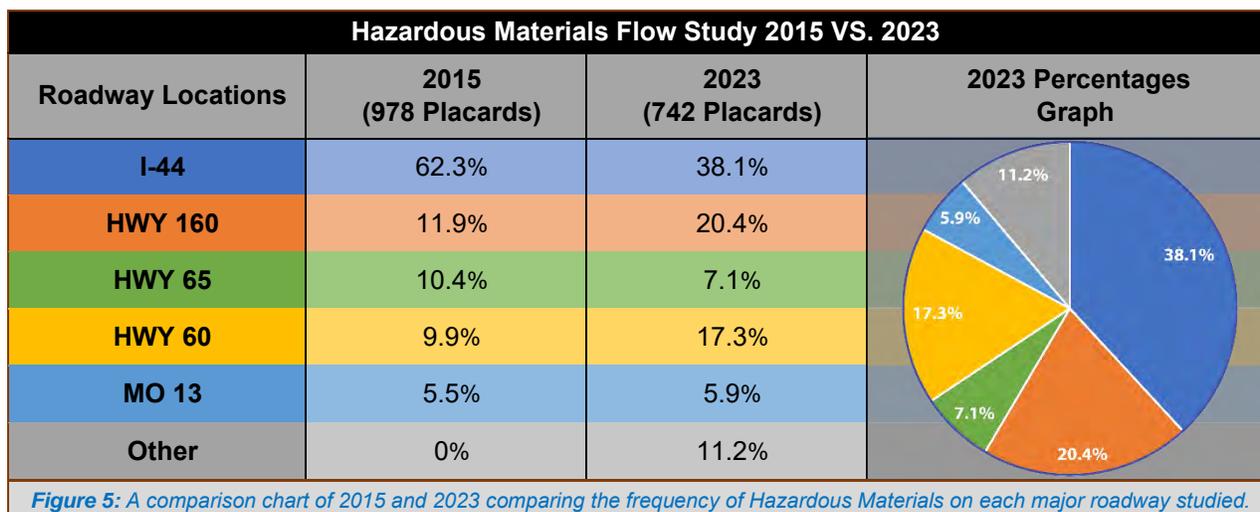
EPA REGULATED SITES

The United States Environmental Protection Agency (EPA) has a data-rich mapping system called EnviroMapper. EnviroMapper is a dynamic mapping system that contains multiple layers of data that can be queried and sorted. The information that can be found using these layers includes location, industry, programs, chemicals (specific), and green house gasses. Each data pool is documented within Tier II reports required by the EPA and state regulators. EnviroMapper also allows the user to see data at state, county, and city levels for more specific information.

DATA ANALYSIS

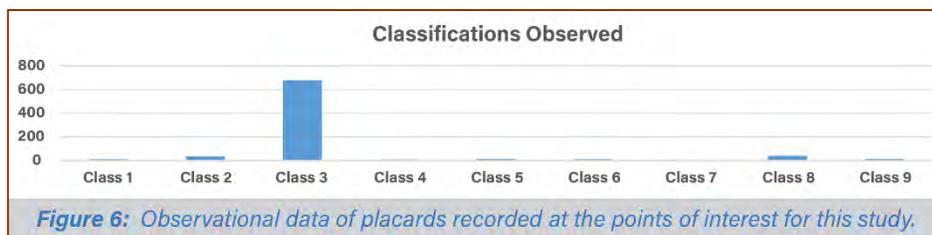
ROADWAYS

Over the course of this study, 742 placards were identified across 19 points of interest along several major highways within the county. In 2015, 14 locations were observed, and the study concluded with 978 recorded placards. **Figure 5** displays the percentages of hazardous material on each of the following major roadways, I-44, U.S. 160, U.S. 65, U.S. 60, and Highway 13, in both 2015 and 2023.



Most notably, Interstate 44 saw the largest change in the frequency of hazardous material traffic, with a 33% decrease in placarded traffic. While U.S. Highway 160 saw the most increased traffic with a 16% change between 2015 and 2023. During this traffic study, five additional locations were added to clarify where hazardous materials traveled in Greene County. This study found that 11% of hazardous materials were transported on the following roadway locations: S. Campbell and Farm Road 157, E. Kearney and S. Eastgate, and a small amount, rounded up to 1% of that traffic was found at Highway H (N. Glenstone) and Highway WW, 1/8-mile north of the intersection. Expanding the locations observed in this study helped identify that, from 2015 to present, the flow of hazardous materials traffic has shifted.

Additionally, **Figure 6** displays the classifications of the kinds of materials that traveled in and out of Greene County during the duration of this study. The largest identified group of placards was Class 3 products. Class 3 is defined as flammable liquids (and combustible liquids) and accounted for 89% of all total traffic observed during the study. The next largest group was Class 8. This class is defined as corrosive substances and consisted of 4% of the total traffic within the county. Class 2, defined as gases, also comprised 4% of observed traffic. The remaining classes were either not observed or totaled less than 1% of the observed traffic. In 2015, Class 7, defined as radioactive materials, was observed. However, even though it was not observed in this study, that is not to say that radioactive materials are not still transported through the Greene County area.





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UN Number or Description > 1%

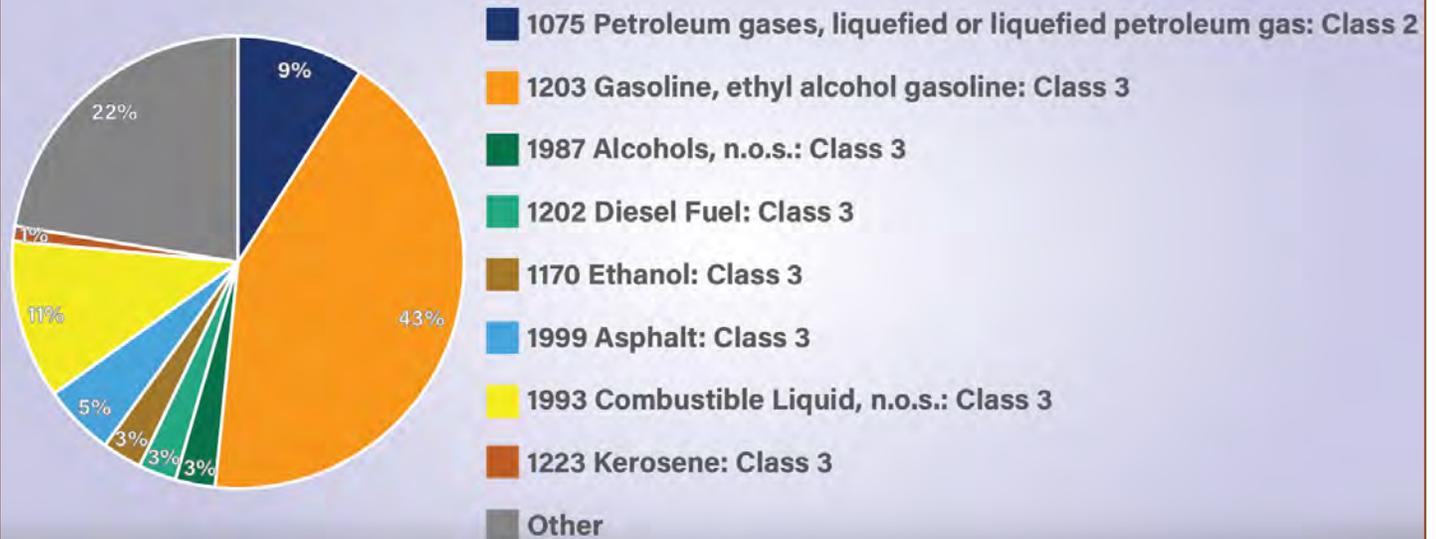


Figure 7: UN Numbers observed during the 2023 study. UN Number definitions can be found at phmsa.dot.gov.

Furthermore, using the Department of Transportation’s Pipeline Hazardous Materials Safety Administration Placarding System, and the UN Identification System, **Figure 7** displays the percentage of the most common hazardous materials identified in this study, each accounting for at least 1% of total hazardous materials traffic. Gasoline (UN 1203) is responsible for 43% of all total hazardous materials traveling through the Greene County area. Followed by UN 1993, defined as a combustible liquid, which accounts for 11%. The third most common material is petroleum (UN 1075) at 9%. Asphalt (UN 1999) is at 5% and ethanol (UN 1170), diesel (1202), and alcohols, n.o.s. (UN 1987) all represent 3% of total hazardous materials traffic. The remaining materials, 22% of the total materials, each make up less than 1% on their own. A complete list of the materials observed and how many of each were recorded within this study is found in **Appendix C**.

Types of Vehicles

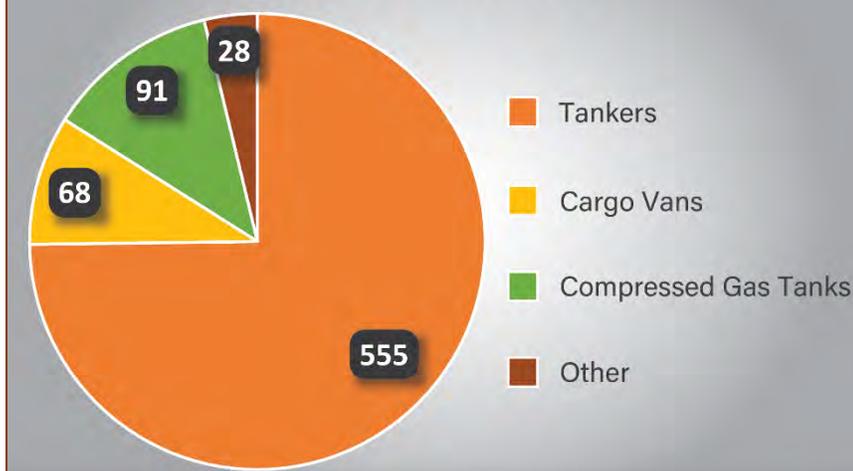


Figure 8: Vehicle types transporting hazardous materials in Greene County.

The type of vehicle is also important to consider when evaluating the hazards that may come in and out of the county. Over the span of this study, 11 unique vehicle types transported placarded hazardous materials through the Greene County area. **Figure 8** depicts the breakdown of the most common vehicles across 19 points of interest. The most common vehicle was tankers, which accounted for 75% of the total. Next was compressed gas tanks, responsible for 12%, and cargo vans 9%. The remaining vehicles observed represented less than 1% each. When combined, those vehicles represented 4% of the overall total. These vehicle descriptions can be found in **Appendix D**.



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Traffic on Greene County Roadways

Approximately 25,000 to 30,000 vehicles travel through Greene County daily using I-44; the vast majority of travel is seen shortly after 12 pm and again at 5 pm. Most of the traffic consists of privately owned vehicles and passenger cars. The other roads in this study exhibit similar proportions of personal vehicles vs. commercial transportation of hazardous materials. **Figure 9** displays the 2022 Missouri Department of Transportation (MoDOT) observed traffic flows for the Springfield-Greene County area.

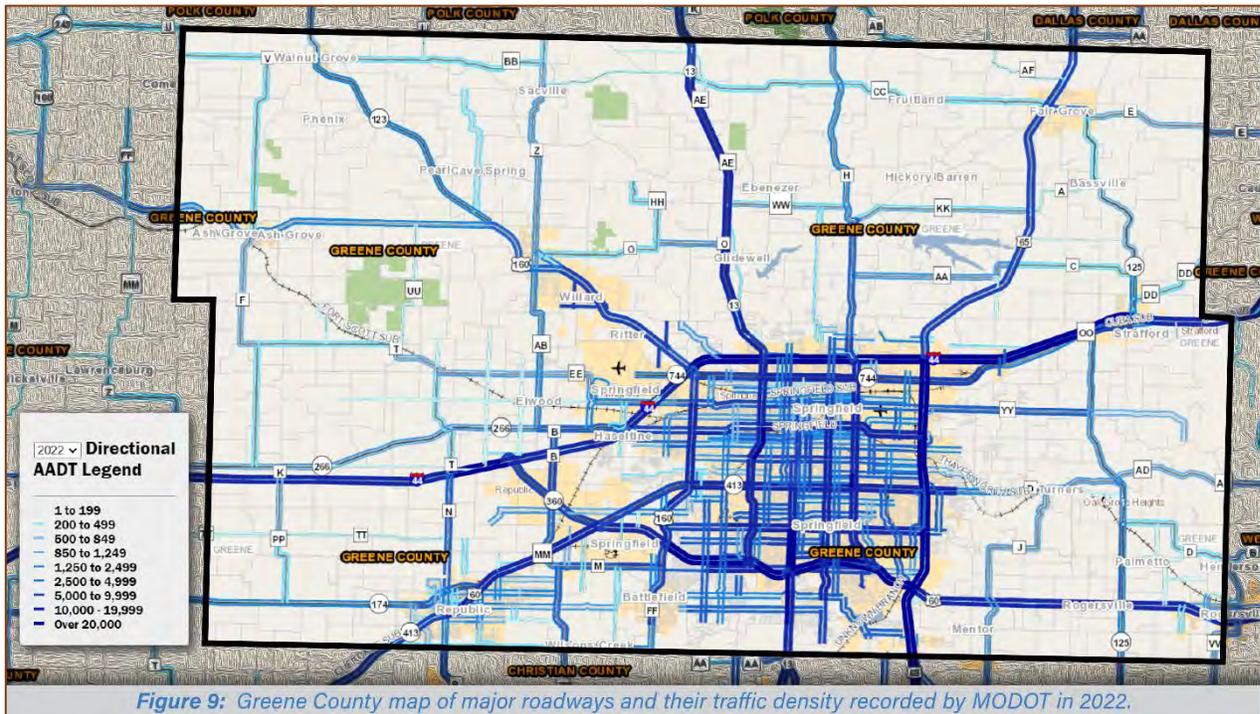


Figure 9: Greene County map of major roadways and their traffic density recorded by MoDOT in 2022.

RAILWAYS

Rail traffic is another point of concern for emergency services in the Greene County area as they are capable of carrying large quantities of materials. The BNSF Railway Company (BNSF) railroad supplied the following data used in this study. Approximately 39,431 railcars carried hazardous materials through the county during 12 months between April 2022 and 2023. **Figure 10** shows the most common classifications of hazardous materials in railcars that traveled through Greene County. The majority, approximately 37%, are reported as Class 9, which includes miscellaneous hazardous materials as well as dangerous goods and articles. Class 3, flammable and combustible liquids, comprised 28% of the total traffic. Class 8 corrosive substances, Class 2 gases, and Class 5 oxidizing substances and organic peroxides, account for 17%, 11%, and 3% respectively. The remaining classes were found to make up less than 1% of traffic and together represent 4% of traffic. For this study, there was no separation of data between full and residual (empty) cars. Residual cars can still pose a threat because of the previously contained hazardous materials. BNSF also reported combustible liquids (CL) as its classification; however, it made up less than 1% of the total hazardous materials being transported when labeled this way.

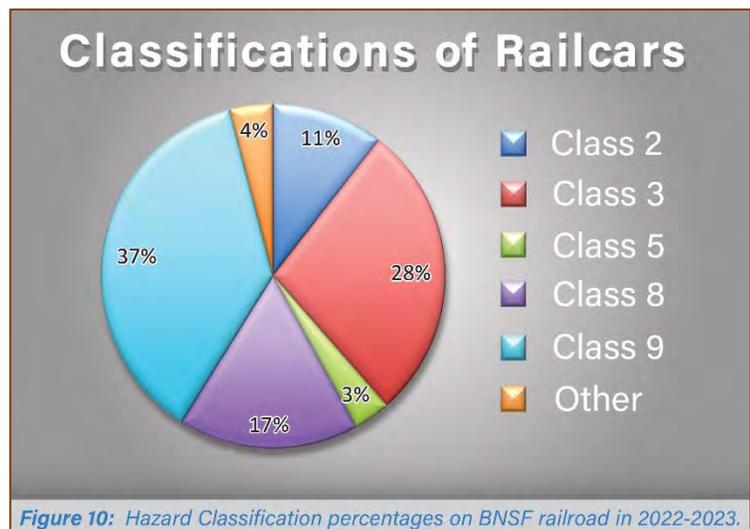


Figure 10: Hazard Classification percentages on BNSF railroad in 2022-2023.



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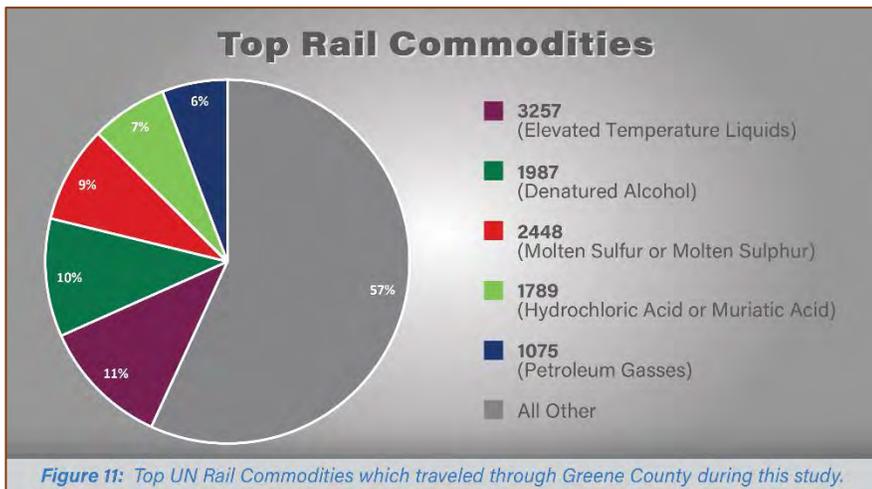


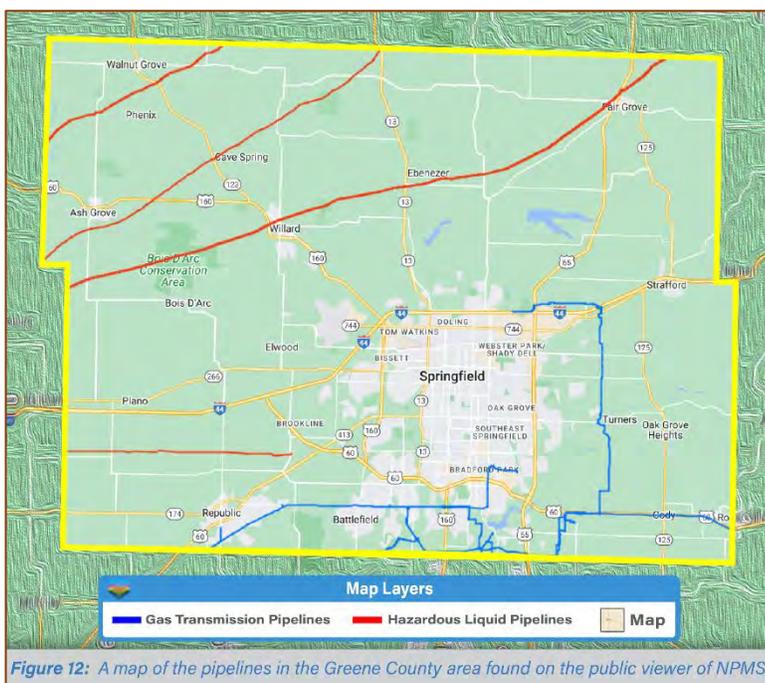
Figure 11 displays the top 5 UN numbers that traveled through the Greene County area during the 12 months of the study. Freight of all Kinds (included in Other), Class 9, miscellaneous materials, is the largest single percentage of traffic in the Springfield Greene County area. It is reported to be 15% of all rail cars in the set period and is most commonly a way to identify mixed loads of hazardous materials. Additionally, alcohols, n.o.s., denatured alcohol (UN 1987), and elevated temperature liquid, n.o.s., at or above 100 degrees Celsius, and below its flash point (UN 3257), are reported as 10% and 11%, respectively, of the rail traffic. Molten sulfur

(UN 2448) and hydrochloric acid or muriatic acid (UN 1789) accounted for 9% and 7%, respectively. Some of these materials may have no purpose within the county and are only transported through. It is helpful to know what kind of materials are in the area at any given time so that emergency personnel have an idea of what an incident may contain. As with the other sections of this study, this data is offered from a limited time frame and does not reflect what is happening daily on the railroads through Greene County. However, BNSF provides emergency responders and emergency management organizations with quality information regarding the materials they transport. They also have a procedure for these groups to request information about hazardous materials in their area over a 12-month window.

PIPELINES

Six major pipeline companies travel through the Greene County area. This includes City Utilities, Explorer Pipeline, Magellan Pipeline, Marathon Pipeline, Southern Star Pipeline, and Summit Natural Gas of Missouri Pipeline. The information within this study was provided by these companies, and supporting information was sourced from their filed Tier IIs and the National Pipeline Mapping System (NPMS). **Figure 12** shows a map of the major pipelines within the county found on the public viewer of NPMS. A link to this website can be found in the Reference Links section of this study. Additionally, information such as whom to contact with questions for each pipeline can be found in **Appendix E**.

City Utilities provides natural gas (UN 1972) to the Springfield area homes. They have a series of pipelines within the city, including small ones that go to individual homes. Occasionally these pipelines are supplemented by liquid propane (UN 1975) which is stored near Lake Springfield. This propane, however, is trucked in rather than traveling through another pipeline. In 2022, City Utilities reported transporting 16.3 billion cubic feet of natural gas. City Utilities did not provide the length or diameter of their pipelines as they traverse through the county.



The Explorer Pipeline traverses through 15 counties and stretches 1,900 miles, transporting six kinds of hazardous materials. Within Greene County, they run a 24" pipeline which moves materials northeast. In 2022, Explorer Pipeline



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transported four types of materials including diesel (UN 1202), gasoline (UN 1202), jet fuel (UN 1863), and diluent or natural gasoline (UN 1203). Explorer, like all companies that deal with hazardous materials, files a Tier II each year. The information within this report as well as any information additionally provided by the company will be used in this study. In 2022, Explorer transported 1,000,000-9,999,999 pounds of each material at various points throughout the year. Diesel was transported 59 days, gasoline 170 days, jet fuel 36 days, and diluent or natural gasoline 100 days in the year 2022.

Magellan Pipeline runs an 8” diameter pipeline through the county that transports diesel fuel (UN 1202) and gasoline (UN 1203). This pipeline is dependent upon commercial demand in terms of how much material flows through it at any given time. However, Magellan Pipeline, as a company, has analyzed their pipeline and estimated the largest amount of diesel or gasoline that could spill in the case of an accident is approximately 1,200 barrels of either fuel. Each barrel contains 42 gallons.

Marathon Pipe Line, LLC operates the 22” Ozark Pipeline, which traverses Greene County, MO. This pipeline carries crude oil (UN 1267) from Cushing, OK to Wood River, IL. The pipeline has the capacity to carry up to 360,000 barrels per day of crude oil and typically operates at a pressure of around 500 psi.

Southern Star Pipeline transports methane or natural gas (UN 1972) through a 16” diameter pipeline that runs west across the county. They also have three smaller pipelines, 4”, 6”, and 10” in diameter, respectively, that also transport natural gas (methane) but travel north to south. According to the Tier II filed by Southern Star Pipeline for 2021, they transported, on average and at most, 10,000-24,999 pounds of natural gas (methane) daily.

Summit Natural Gas of Missouri (SNGMO) transports natural gas through the county in a high-pressure steel transmission line that runs from the Southern Star Intake Station east to Rogersville. It is 12” in diameter for approximately 0.7 miles before changing to 8” for 8.5 miles. Summit Natural Gas of Missouri (SNGMO) did not provide how much natural gas they transported. However, when creating plans for emergency response, it is to be assumed a pipeline’s flow is constant and at its maximum capabilities.

AIRPORTS

The Springfield-Branson National Airport maintains a record of hazardous materials that it transports annually. In 2022, the Springfield-Branson National Airport transported 8,496,746 gallons of fuel. As shown by **Figure 13**, most of the fuel coming into the county through the airport is contracted fuel through Phillips 66, which made up approximately 89% of the total fuel transported in 2022. **Figure 13** shows that during the calendar year of 2022, the Springfield-Branson National Airport was primarily consistent between each month in the amount of reported hazardous cargo that traveled in and out of the county, with a slight increase over the summer months. This change was consistent along with an increase in monthly average passengers, so it can be assumed that more fuel is used during this season with increased activity. The highest number of materials were transported in July with 818,736 gallons and the least in February with only 582,751 gallons.

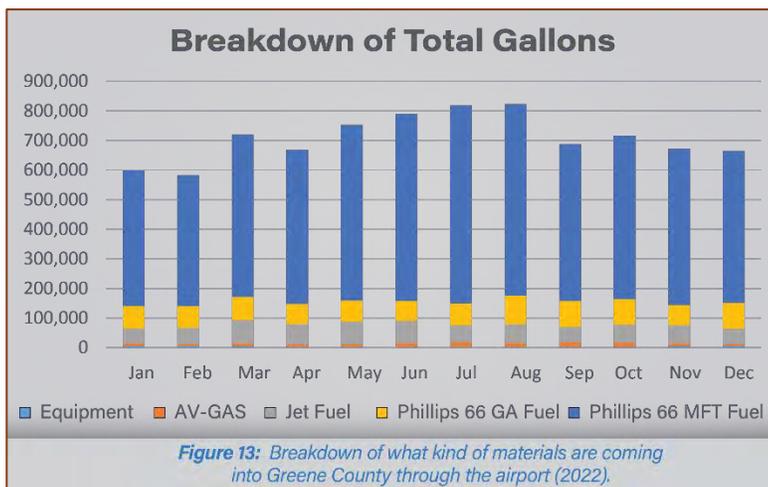


Figure 13: Breakdown of what kind of materials are coming into Greene County through the airport (2022).

Furthermore, the airport reported they annually store five hazardous materials that must be reported in a Tier II report. These materials are as follows: aviation gasoline (UN 1863), diesel fuel #2 (UN 1202), Jet A Fuel or straight-run kerosene (UN 1863), unleaded gasoline (UN 1203), and propylene glycol which is an aircraft de-icer and has no UN number or DOT label required. It has no hazard beyond that of another combustible material and must be preheated before ignition can occur but is still required to be stored properly and used with caution. It is generally marked with a Class 3 flammable placard. Transportation of hazardous materials via aircraft is regulated by the Federal Aviation Administration to maintain



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national security and safety. Airlines are, however, required to report onboard materials to the U.S. Department of Transportation using the reporting system known as COMAT, which stands for Air Carrier Company Materials. These materials must be properly classified and clearly labeled to handle and store safely. The employees that handle these reports are highly trained to ensure the safety of air transportation. More information on COMAT, provided by the Federal Aviation Administration, and its procedures can be found in **Appendix F**.

NAVIGABLE AND LOCAL WATERWAYS

The study conducted in 2015 did not assess local waterways and their relevance to a hazardous materials-related event. To provide a broader picture of not only how materials are transported into the county but how they could affect the community, this study focuses on several points of interest where bodies of water intersect with roadways and other hazards coming into the county. In August 2017, the Environmental Protection Agency (EPA) conducted a study of the quality of Springfield-Greene County rivers and waterways. In this study, which is found in the Reference Links and Supplemental Information section of this document, they examined eight river-crossing road locations in their study. The same eight locations have been observed in this study

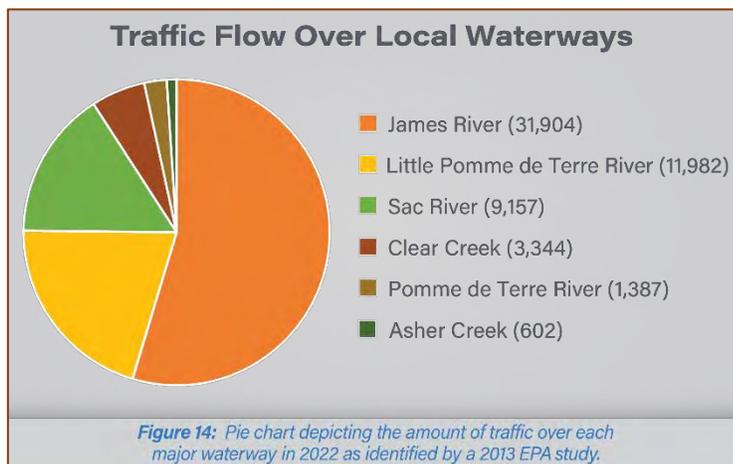


Figure 14: Pie chart depicting the amount of traffic over each major waterway in 2022 as identified by a 2013 EPA study.

using data from the Missouri Department of Transportation (MoDOT), as well as supplemental information found in company Tier II reports of locations near local waterways. MoDOT provides annual data about the roadways within the state, including county and city-level information. This information is delayed a year for accuracy, therefore, the information used in this section was collected in 2022. As seen in **Figure 14**, most of the traffic over a waterway took place over the James River which accounted for 55% of the total traffic recorded. The Little Pomme de Terre River also saw a considerable amount of traffic, 21% or 11,982 individual vehicles over the course of the year. Asher Creek saw the smallest amount of traffic, with only 1% of the total being recorded over the course of the year. Even though Asher Creek saw marginal traffic, it is still important to understand, when making emergency response plans, the impact an incident involving hazardous materials could have on freshwater supplies within the county.

In 2013, the James River saw 27,471 vehicles on average each day. In 2022, that number increased to 31,904 vehicles, a 16% increase in average daily traffic. Overall traffic over the eight waterways increased by 12% or roughly 6,313

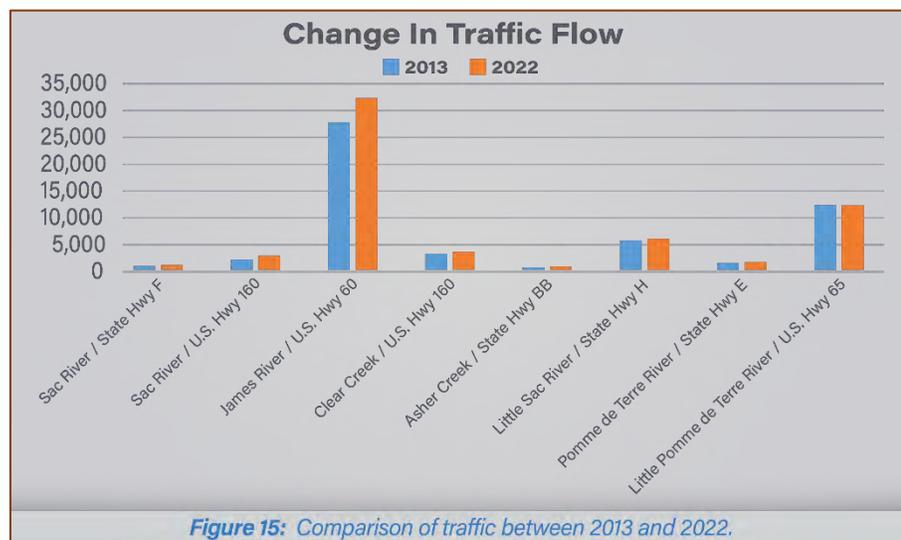


Figure 15: Comparison of traffic between 2013 and 2022.

additional vehicles daily on average. **Figure 15** shows the change in traffic between the two years. The State Highway BB and Asher Creek intersection saw the largest increase in traffic with 430 average daily vehicles in 2013 and 602 average daily vehicles in 2022, a 40% change or 172 additional average vehicles each day. Additionally, the U.S. Highway 160 and Sac River intersection saw almost the same growth with a 38% increase from 2013, which saw 1,892 average daily vehicles, to 2022 when traffic grew to 2,609 average daily vehicles. The State Highway F and Sac River intersection saw a 19% increase from its average daily



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traffic of 690 vehicles in 2013 to 822 in 2022. The State Highway E and Pomme de Terre River intersection, the U.S. Highway 160 and Clear Creek intersection, and the State Highway H and Little Sac River intersection saw 16%, 14%, and 6.2%, increases, respectively. The only location to not grow in traffic was the U.S. Highway 65 and Little Pomme de Terre River intersection. In 2013, an average of 12,062 vehicles traveled through this intersection daily. In 2022, this number decreased by 0.66%, which is an average per day of 11,982 vehicles.

MoDOT records traffic data by type of vehicle as well as average daily flow.

Figure 16 shows the breakdown of what kinds of vehicles traveled over Springfield-Greene County’s waterways on average daily. The U.S. 160 and Clear Creek intersection was the only one of the eight locations not to be monitored for the type of vehicles; however, for the remaining seven that do have data, most traffic is made up of private passenger cars. The Sac River sees the largest percentage of personal passenger vehicles, making up 67% of the average daily traffic over the intersection. While only 54% of the traffic at the State Highway BB and Asher Creek intersection was private passenger cars. In addition to private passenger cars, all the measured intersections also saw large percentages of panel trucks, often used for local and regional deliveries of goods and tools. These trucks are the ones recorded that are most likely to contain hazardous materials. MoDOT does not break down commercial vehicles any further, however, based on the roadway portion of this study above, it can be assumed that hazardous materials do occasionally traverse over Greene County waterways. The State Highway BB and Asher Creek intersection experienced the highest percentage of these panel trucks, with 39% of the traffic reported as such, compared to the traffic that goes over U.S. Highway 60 and the James River reported as only 27% panel trucks. MoDOT also accounts for motorcycles, buses, single-unit trucks, and combination semi-trucks, with each vehicle type making up less than 10% of traffic in all seven locations.

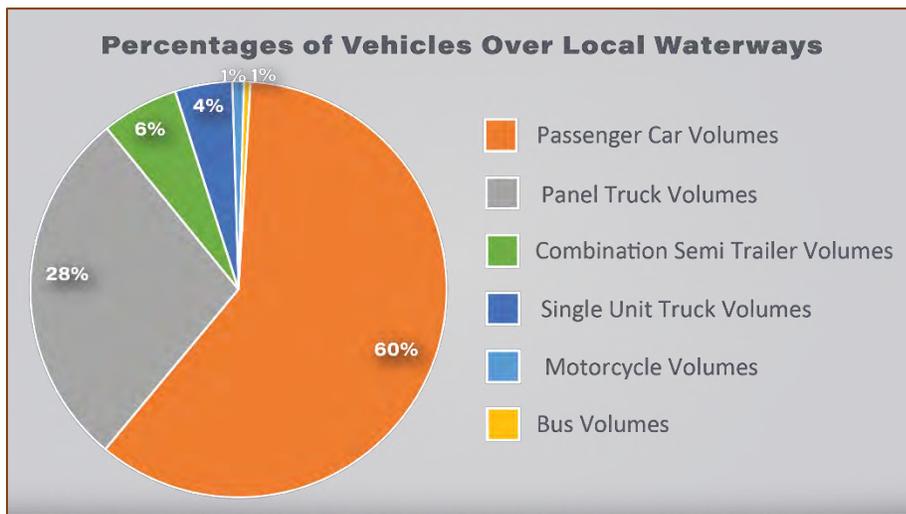


Figure 16: A visual representation of the modes of transportation over local waterways.

MoDOT also accounts for motorcycles, buses, single-unit trucks, and combination semi-trucks, with each vehicle type making up less than 10% of traffic in all seven locations.

In addition to the rivers, the Springfield-Greene County area also contains several lakes, one of which, Fellows Lake, is a water source for the drinking water supplied to the Springfield area. The lake is closed to recreational activities such as swimming; however, motorized and non-motorized boating and fishing are permitted. According to the Tier II filed by City Utilities in 2022 the maintenance building by the lake stored anywhere from 1,000 to 4,999 pounds of unleaded gasoline on average daily. In addition, the same building stored 1,000-4,999 pounds of No. 2 Fuel Oil on average daily. This supply fuels boats that City Utilities rents at the marina for recreational activities. As of 2020, the EPA stated that fish coming from Fellows Lake had levels of mercury that could be harmful if consumed. Currently, there is no listed plan for the restoration of fishing conditions or an updated status on the levels of mercury. Furthermore, in 2020 when the EPA last updated water information reports on Greene County’s waterways, 76% of the observed waters were impaired in some way. They also stated the following, “Impairments take many forms, often a result of human behavior. Water impairments are identified across 34 categories such as algae, mercury, pathogens, pesticides, trash, and more.”

Adding a hazardous material to an already damaged body of water could be devastating to fresh water and drinking water supplies. Several industries and businesses have permits to release very strictly monitored materials into waterways, and these companies are regulated and maintained by the EPA. They can be found on the EnviroMapper mentioned before, as well as on the EPA site “How’s My Water?”. Both will be found below in the Reference Links and Supplemental Information section of this study.



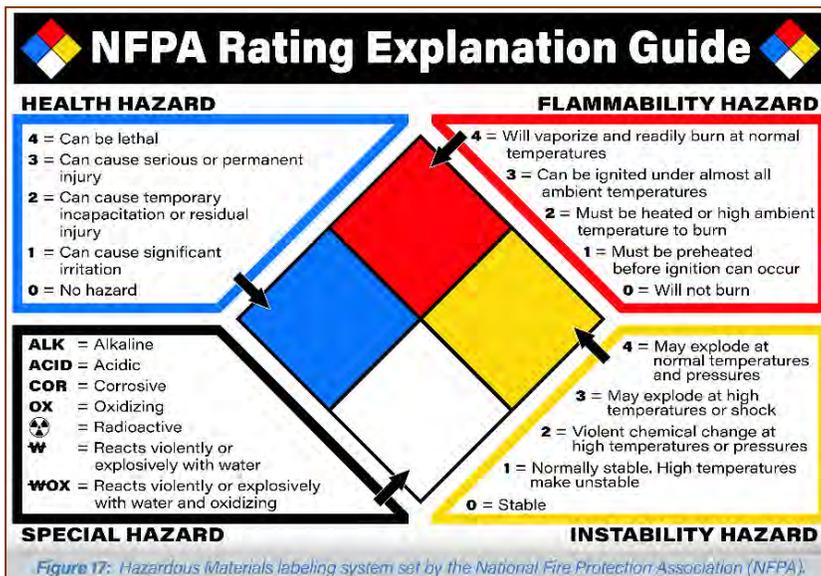
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EPA REGULATED SITES

More than 240 businesses have filed Tier II reports and are considered hazardous material sites within Greene County, Missouri. Private business and residential sites may reach reporting quantity thresholds set by The Occupational Safety and Health Administration (OSHA) and the EPA. Places that store these materials are required to be labeled, similarly to their transportation-based counterparts. OSHA has a set of labeling requirements that can be seen in **Figure 17**. These labels should be displayed on all tanks, boxes, cabinets, storage containers, and pallets inside the building.



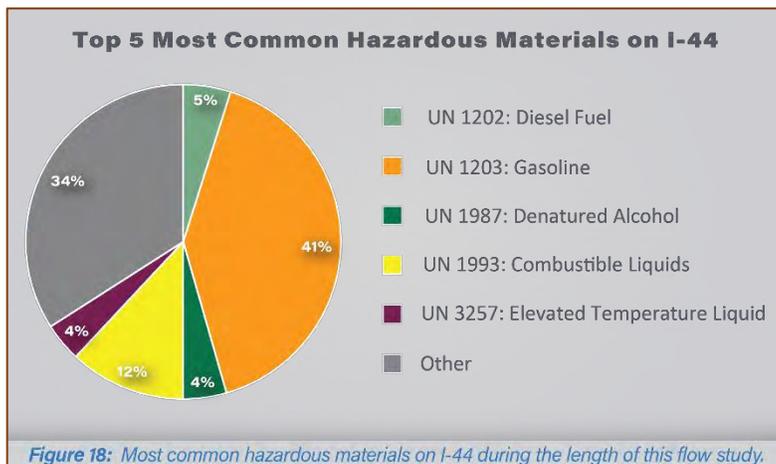
RISK ASSESSMENT

Considering the diversity of hazardous materials that are stored or in transit within the county it is necessary to conduct a risk assessment for mitigation and decision-making purposes. Where possible, for each major roadway studied during the observational period, buildings and other facilities are identified, along with the harm that could be done to the population in those areas. Supporting information for this section was gathered from the United States Census Bureau, the EPA EnviroMapper, MoDOT, and the data gathered through the roadway observation part of this study. In addition to exploring the impact hazardous materials on roadways can have, this section will also assess the risk of the other previous sections using information gathered from sources such as the Missouri Department of Natural Resources (MDNR), the National Pipeline Mapping System (NPMS), BNSF Railway Company, and the individual companies already mentioned in this study. Understanding the impact on the community in the event of an accident involving a hazardous material can help professionals develop plans and respond effectively.

ROADWAYS

Interstate 44 (I-44)

Interstate 44 is 633.8 miles long. Of that length, approximately 33 miles is within the boundaries of Greene County, Missouri. Of the highways observed during this study, I-44 saw the most traffic and the most diversity in the hazardous materials that traversed through the area. The highest amount of recorded traffic was after 12:00 pm. There were 39 different reported hazards and 226 total placards. 41% of the placards observed were gasoline (UN 1203) and combustible liquids (UN 1993), which accounted for 12% of the total placards.



These and the other chemicals identified throughout the study can be seen in **Figure 18**. In addition, during the observational period of this study, at least one placard of every class except for Class 7, radioactive materials, was reported along the I-44 corridor.



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I-44 bisects Greene County and is considered the north and south divider of the county. The U.S. Census for Greene County in 2010 stated that there is an average of 442 persons per square mile within the county, but that number increases to 2,052 people within the boundaries of Springfield. Within two miles of I-44, there are five schools ranging from elementary to high school, seven large churches, the Ozark Empire Fairgrounds, several retail and industrial businesses, and many residential homes. An accident at any point along I-44 could devastate many Greene County residents and travelers.

U.S. Highway 60 (James River Freeway)

U.S. 60, also known as James River Freeway within Greene County, is 2,655 miles long and approximately 28 miles are within the Springfield-Greene County area. U.S. Highway 60 bisects the lower third of Greene County. Most of the traffic took place before noon. Throughout the road study, 16 unique hazards, with a total of 107 placards were recorded on U.S. Highway 60. The most common hazardous material to traverse through the area was gasoline (UN 1203), responsible for 48% of the total observed placards. In addition, the other statistically relevant chemicals are in **Figure 19**.

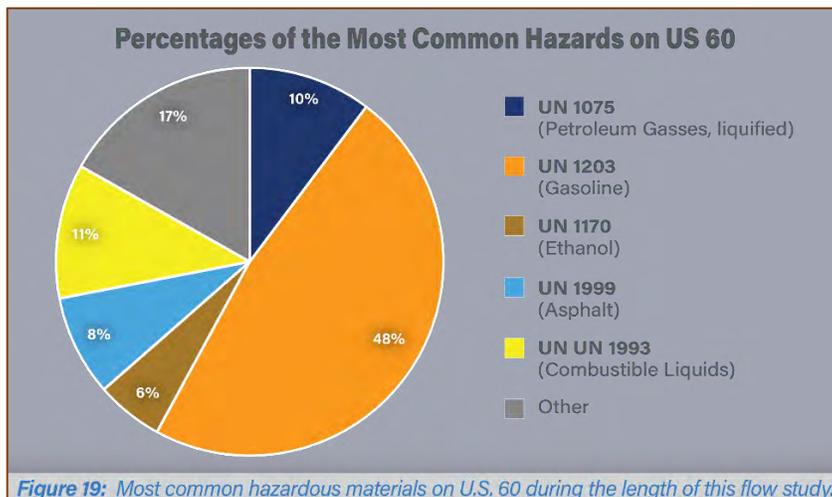


Figure 19: Most common hazardous materials on U.S. 60 during the length of this flow study.

Furthermore, the distribution of classification of chemicals and hazardous goods was not as diverse on U.S. Highway 60; the majority being Class 3, flammable and combustible liquids, with only a few from Class 1 explosives, Class 2 gases, and Class 8 corrosive substances.

U.S. Highway 60 shares the same average number of people as the rest of Greene County, with a higher density in Springfield. Within two miles of U.S. Highway 60, there are five schools, including two college campuses. Additionally, there are four large churches and several large shopping centers. Another area of interest in understanding the populations that could be in danger in the event of a hazardous material-related incident is one of Springfield's large medical campuses and several other medical complexes are located one to two miles from the highway. It should also be noted that U.S. Highway 60 is one of the many highways in the Greene County area built over the county's rivers, in this case, the James River, which is used at times to supplement the drinking water supply in the Springfield area.

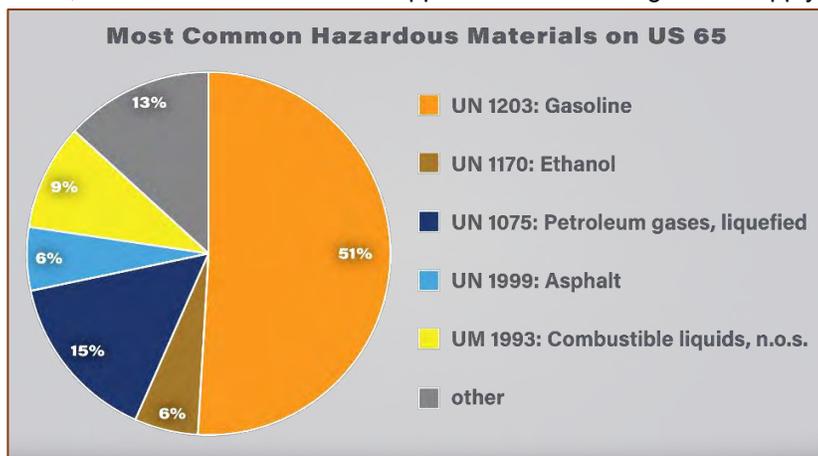


Figure 20: Most common hazardous materials on U.S. 65 during the length of this flow study.

U.S. Highway 65 (Schoolcraft Freeway)

U.S. Highway 65, also known as Schoolcraft Freeway, is located on the east side of Springfield and travels north and south through the county. U.S. Highway 65 is 966 miles long, 25 of which are within the boundaries of Greene County. Throughout this study, 10 unique hazards were identified, and a total of 53 placards were observed. The majority of which, 58%, were identified before noon. The most common material to travel through Greene County on U.S. Highway 65 was gasoline (UN 1203), which accounted for 51% of the total. The second most common hazardous material was UN 1075, which is the identifying number for any of the following chemicals; butane, butylene, isobutane, isobutylene, liquefied petroleum gas, propane, and propylene. UN 1075 accounted for 15% of the observed total. **Figure 20** shows the percentages of the other most common remaining chemicals. Additionally, the most common classification of hazardous materials was Class 3 (flammable or combustible liquids). Class 2 (gases) and Class 8 (corrosive substances) were also transported across U.S. Highway 65.



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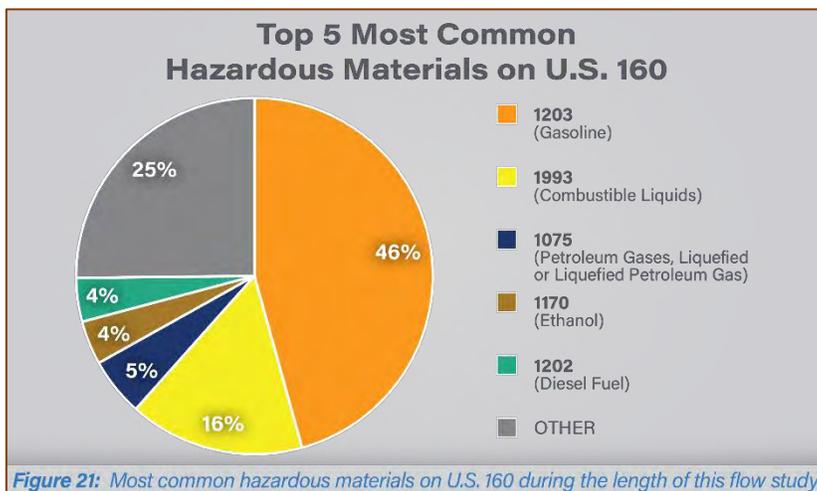
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Within two miles of U.S. Highway 65, several buildings would be a concern or a point of interest in the event of an accident involving hazardous materials. Some of these include the following: seven large churches, three schools, two nursing homes, and one large hospital. Additionally, the Springfield Underground is within range of U.S. Highway 65, as well as several industrial buildings and retailers. These buildings and several rivers within the Greene County area could be severely impacted in an emergency.

U.S. Route 160 (West Bypass)

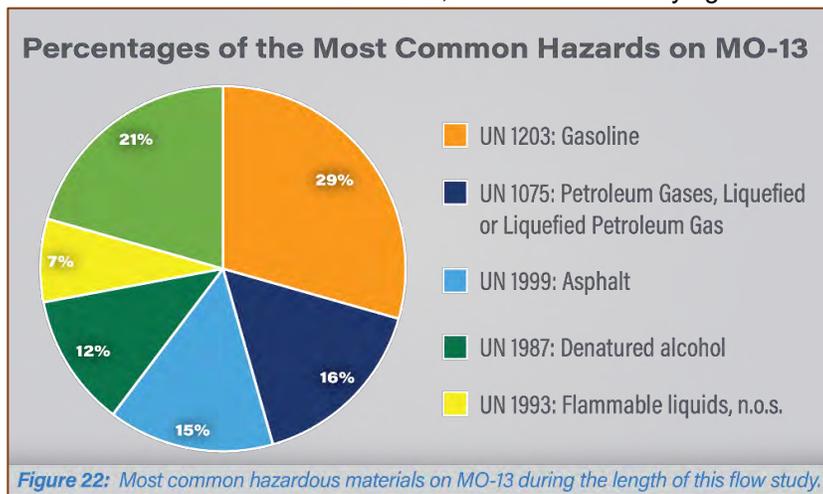
U.S. Route 160 (West Bypass) runs along the west side of the Springfield area and north and south through the county, much like U.S. Highway 65. It has major intersections with both I-44 and U.S. Highway 60, both of which were identified as points of interest within this study. Over the period of observation, there were 19 unique hazards identified, and a total of 151 placards recorded. The majority of these placards, 64%, were counted after noon. The most common material observed was gasoline (UN 1203). The second most common was UN 1993 which is described as combustible liquids, n.o.s. It accounted for 16% of the total. The remaining chemicals accounted for less than 15% of the total as shown in **Figure 21**.



U.S. Route 160 has many points of interest that would be a concern in the event of an accident. Within two miles of U.S. Route 160, there are three schools, eight large churches, and two senior living facilities. In addition, like much of the Greene County roadways, several industrial buildings and retailers are within one to two miles of the roadway.

Missouri Route 13 (Kansas Expressway)

Missouri Route 13 (MO 13), or Kansas Expressway, runs through the center of Greene County and Springfield. It is also a north-to-south highway and is 31 miles long within the boundaries of Greene County. Throughout this study, 14 unique hazards were identified, and a total of 68 placards were recorded. The most common hazardous material on MO 13 was gasoline (UN 1203), and it accounted for 29% of the total, which is less than the other observed roadways. The second most common material was UN 1075, which is the identifying number for any of the following chemicals: butane, butylene, isobutane, isobutylene, liquefied petroleum gas, propane, and propylene. UN 1075 represented 16% of the total. Additionally, UN 1999 and UN 1987 each made up 15% of the total. The remaining hazardous materials made up less than 10% of the total and are represented in **Figure 22**.



Missouri Route 13 has many points of interest that would be a concern in the event of an accident such as the following; within two miles of MO 13, there are four schools, seven large churches, and two rehabilitation centers. In addition, several large apartment complexes, industrial buildings, and retailers could all be affected by an incident involving a hazardous material.



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RAILWAYS

BNSF Railway Company (BNSF) operates in the western two-thirds of the United States and is one of the largest operating rail companies within the country. They are comprised of nearly 400 different railways acquired during BNSF's 170-year history. During the twelve months of April 10, 2022, through April 10, 2023, approximately 39,431 railcars passed through the Springfield-Greene County area. The majority of this traffic moves westbound or eastbound through the county (**Figure 23**). With two small segments of track traveling south through the Springfield area. These train rails cross through busy city areas, where eight public schools, two college campuses, and one of Springfield's major hospital complexes are located. In addition to these locations, there are several residential neighborhoods located within the immediate areas of these railroads.

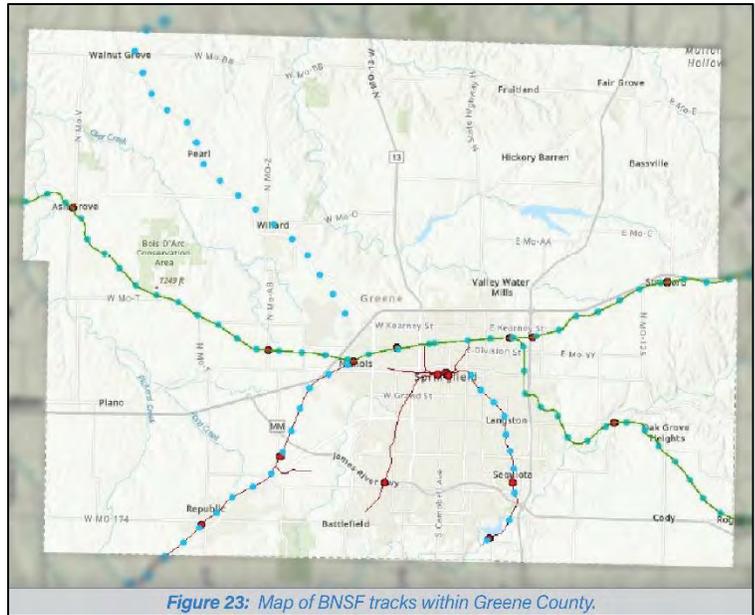


Figure 23: Map of BNSF tracks within Greene County.

An incident near these areas could be devastating and affect many people within the county. As previously stated, the United States Census Bureau stated that the Greene County area has an average of 443 persons per square mile within the county, but that number increases to 2,052 people within the limits of Springfield. BNSF Railway Company reports that they handle 1.6 million hazmat shipments annually nationwide. On average, only 0.00025 percent of these shipments are involved in accidents that release hazardous materials into the environment across the nation.

PIPELINES

Pipelines in the United States are required to be marked with signs as shown in **Figure 24**. Each one lists emergency contact information and states what type of material it is transporting. Before any large digging project or excavation, 811 should be called to ensure the location of pipelines is known, so that there is no incident with hazardous materials escaping into the environment. The National Pipeline Mapping System (NPMS) contains maps of large pipelines within the county and contact information on the pipelines that operate in the county. Further information can be requested, and links can be found within the viewer. According to the Department of Transportation and the Pipeline and Hazardous Materials Safety Administration, Missouri reported only six leaks of a hazardous materials pipeline, none of which ended in fatalities or injury. However, there were 633 reported incidents nationwide, with ten fatalities and 24 injuries. Pipeline incidents can environmentally be damaging to groundwater and drinking water sources, as well as to citizens that become exposed to the material or work on them during a disaster.

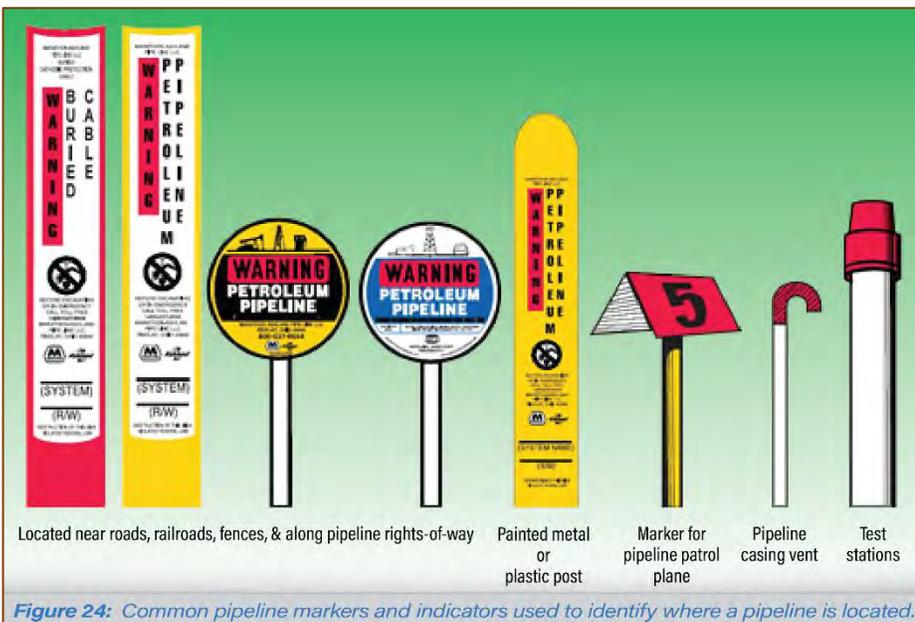


Figure 24: Common pipeline markers and indicators used to identify where a pipeline is located.



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AIRPORTS

The Springfield-Branson National Airport reported that it stored five materials on site. Those materials were as follows: aviation gasoline (UN 1863), diesel fuel #2 (UN 1202), Jet A Fuel or straight-run kerosene (UN 1863), unleaded gasoline (UN 1203), and propylene glycol which is an aircraft de-icer and has no UN number or DOT label required. These materials are used to maintain the airport, and they also have contract fuel shipments with Phillips 66.

Planes in flight around the airport are inside Springfield-Greene County airspace, and contingency plans are in place for the possibility of an accident occurring within said area. The airport maintains a training cycle of three years, which consists of two years of tabletop exercises and then a full-scale practical exercise in the third year. This exercise includes a scenario played out at the airport and includes all surrounding emergency services such as police, fire, Emergency Medical Services (EMS), hospital staff, airport staff, the Springfield-Greene County Office of Emergency Management, Missouri Air National Guard (MOANG), partnering businesses, and many volunteer personnel.

NAVIGABLE AND LOCAL WATERWAYS

Springfield-Greene County consists of many small watersheds that ultimately feed into two large watersheds, the James River and the Sac River. The James River in Springfield is used for drinking water by City Utilities. Any accident, even private passenger cars, could cause adverse environmental and consumer impacts without proper plans to deal with the crisis effectively. An incident could be exacerbated if a truck carrying hazardous materials was to be involved. Over the course of this study, eight major roadway locations were examined for the transportation of hazardous materials over local waterways. The James River, according to the Missouri Department of Conservation, is approximately 99 miles long, starting in Webster County and ending in Table Rock Lake. The James River intersects with many of the major roadways that were studied, as it flows through the county including, U.S. Highway 65, U.S. Highway 60, and U.S. Route 160. The EPA states that a single pint of petroleum or a petroleum product can contaminate the surface area of an acre of water. A single gallon can contaminate a million gallons of water. These major roadways are built directly over the James River and other rivers that ultimately feed into the same watershed. These concerns are also seen at the Fellows Lake fuel storage. However, above-ground storage tanks are federally, and in most states, regulated to mitigate the chances of a hazardous material spilling into a local waterway and water reservoir. The boats allowed on the water are capped at 40 horsepower (hp) maximum to help lower the risk of crashes, however, accidents happen, and plans should be in place for all the above incidents.



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CONCLUSION

The Greene County LEPC conducted a Hazardous Materials Flow Study from March of 2023 through the end of July 2023. In this study, one of the largest areas of focus was the major roadways in Greene County, Missouri. This study is only a sample of the hazardous materials that traverse through the county. However, comparing this snapshot of data to the study from 2015, the contents of this study have shown a shift in traffic patterns. This shift shows diversity in where hazardous materials are being transported and the quantities of materials being transported. I-44 continues to have the most hazardous materials traffic. However, through the course of this study, I-44 saw 33% less than the study conducted in 2015. An increased level of hazardous materials was reported on the remaining roadways, including U.S. Route 160, U.S. Highway 60, and Missouri Route 13. The only decrease in traffic was reported on U.S. Highway 65; however, there are still areas of interest, as it does traverse through the densely populated areas of Greene County and over many of the local waterways.

Greene County roadways carried the following three chemicals in the highest amounts across all of the studied locations, UN 1203, defined as gasoline, UN 1993, defined as flammable or combustible liquids, and UN 1075, defined as petroleum gases, liquefied or liquefied petroleum gas. The most common classification on all the roadways continues to be Class 3, flammable and combustible liquids.

Regarding both the pipelines and the railroads within the county, the hazards that are transported are highly dependent on commercial demand across the areas they serve. Because of this, it could mean some of the materials in the area do not have a purpose within the county other than transportation. Despite that, understanding what and how much of something could be in an area at any given time can be helpful for those that would respond to an emergency and those that create response plans. Many of these companies have internal contingency plans in case of an incident involving materials they transport.

In addition to the identifiable companies that pose a hazard and are explored within this study, the EPA keeps a record of businesses not identified in this study, as well as private and public properties that have been identified as maintaining hazardous materials within the county. The EnviroMapper resource, previously mentioned, offers detailed records of various companies throughout the area and is a quick way to identify potential hazards. Additionally, the Emergency Response Guidebook linked on the next page offers information on how placarded hazards should be handled and what a safe distance is from spills and leaks.



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SUPPLEMENTAL INFORMATION AND LINKS

CAMEO Chemicals

- <https://cameochemicals.noaa.gov/>

Census Bureau

- <https://www.census.gov/quickfacts/fact/table/greencountymissouri,springfieldcitymissouri,lawrencecountymissouri,polkcountymissouri/PST045222>

City Utilities Website

- <https://www.cityutilities.net/>

Consumer Confidence Reports

- <https://dnrservices.mo.gov/ccr/index.html>

CU Water Report (2021)

- <https://www.cityutilities.net/wp-content/uploads/water-qualityreport.pdf>

Department of Natural Resources (MO DNR)

- <https://dnr.mo.gov/>

Department of Transportation, Pipeline and Hazardous Materials Safety Administration on Pipeline Incidents within the United States and Missouri

- <https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-incident-20-year-trends>

Emergency Response Book 2020

- <https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg>

EnviroMapper

- <https://enviro.epa.gov/enviro/em4ef.home>

EPA Consumer Confidence Report Rule Revisions

- <https://www.epa.gov/ccr/consumer-confidence-report-rule-revisions#:~:text=On%20March%2028%2C%202023%2C%20EPA,and%20businesses%20across%20the%20country>
- https://www.cdc.gov/healthywater/drinking/public/understanding_ccr.html

EPA How's my Water

- <https://mywaterway.epa.gov/>

EPA Study of Springfield-Greene County Waterways

- https://www.epa.gov/sites/default/files/2018-10/documents/estimating_users_of_water_resources_springfield-greene_county_data_collection_plan.pdf

Information on Transportation of Air Carrier Company Materials (COMAT) by Aircraft

- <https://www.federalregister.gov/documents/1996/12/13/96-31648/advisory-notice-transportation-of-air-carrier-company-materials-comat-by-aircraft>
- <https://www.faa.gov/sites/faa.gov/files/2022-03/COMAT%20Brochure%202022.pdf>

Marathon Pipeline

- <https://www.marathonpipeline.com/>

MO Waste Water Permits

- <https://www.epa.gov/npdes/npdes-permit-limits>
- <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/wastewater>



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MoDOT Traffic Flow

- <https://www.modot.org/traffic-volume-maps>

PIMMA Application

- <https://www.npms.phmsa.dot.gov/ApplyForPIMMAAccess.aspx>

SARA Title 3 Documents

- <https://www.govinfo.gov/content/pkg/USCODE-2011-title42/html/USCODE-2011-title42-chap116.htm>

Southern Star Central Gas Pipeline

- <https://southernstar.com/our-safety-culture/pipeline-safety/>

Springfield-Branson National Airport Data on Transportation

- <https://www.flyspringfield.com/data>

Watersheds Information

- <https://maps.springfieldmo.gov/GISviewer/> (select "watersheds" in the Layer list)



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- Figure 2:** U.S. Department of Transportation classes and placards used to identify hazardous materials.
- Figure 3:** Table of Hazardous Materials Classifications.
- Figure 4:** Map of individual Greene County watersheds.
- Figure 5:** Comparison chart of 2015 and 2023 comparing the frequency of Hazardous Materials on each major roadway studied.
- Figure 6:** Observational data of placards recorded at the points of interest for this study.
- Figure 7:** UN Numbers observed during the 2023 study. UN Number definitions can be found at phmsa.dot.gov.
- Figure 8:** Vehicle types transporting hazardous materials in Greene County.
- Figure 9:** Greene County map of major roadways and their traffic density recorded by MODOT in 2022.
- Figure 10:** Hazard Classification percentages on BNSF railroad in 2022-2023.
- Figure 11:** Top UN Rail Commodities which traveled through Greene County during this study.
- Figure 12:** Map of the pipelines in the Greene County area found on the public viewer of NPMS.
- Figure 13:** Breakdown of what kind of materials are coming into Greene County through the airport in 2022.
- Figure 14:** Pie chart depicting the amount of traffic over each major waterway in 2022 as identified by a 2013 EPA study.
- Figure 15:** Comparison of traffic between 2013 and 2022.
- Figure 16:** Visual representation of the modes of transportation over local waterways.
- Figure 17:** Hazardous materials labeling system set by the National Fire Protection Association (NFPA).
- Figure 18:** Most common hazardous materials on I-44 during the length of this flow study.
- Figure 19:** Most common hazardous materials on U.S. 60 during the length of this flow study.
- Figure 20:** Most common hazardous materials on U.S. 65 during the length of this flow study.
- Figure 21:** Most common hazardous materials on U.S. 160 during the length of this flow study.
- Figure 22:** Most common hazardous materials on MO-13 during the length of this flow study.
- Figure 23:** Map of BNSF tracks within Greene County.
- Figure 24:** Common pipeline markers and indicators used to identify where a pipeline is located.



HAZARDOUS MATERIALS

2023 FLOW STUDY

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APPENDICES

Appendix A: Department of Transportation Guidelines on Understanding Hazardous Material Placards

Appendix B: Types of Railcars and Where Their Hazardous Materials Placards Are Commonly Found

Appendix C: Complete List of Hazardous Materials Recorded

Appendix D: Record Sheet and Complete Vehicle List

Appendix E: Pipeline Contacts for Questions Within Greene County

Appendix F: Federal Aviation Administration COMAT Details



HAZARDOUS MATERIALS

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APPENDIX A

DEPARTMENT OF TRANSPORTATION GUIDELINES ON UNDERSTANDING HAZARDOUS MATERIAL PLACARDS

General Guidelines on Use of Warning Labels and Placards

LABELS

See 49 CFR, Part 172, Subpart E, for complete labeling regulations

- Labeling is required for a hazardous material which meets one or more hazard class definitions, in accordance with column 6 of the §172.101 table
- Except as specified in §172.400(a), each person who offers for transportation or transports a hazardous material in any of the following packages or containment devices, shall label the package or containment device with labels specified for the material in the §172.101 table.
- Labels may be affixed to packages when not required by regulations, provided each label represents a hazard of the material contained in the package [§172.401].
- For labeling mixed or consolidated packages, see §172.404.
- The appropriate hazard class or division number must be displayed in the lower corner of a primary hazard label and a subsidiary hazard label [§172.402(b)].
- For classes 1, 2, 3, 4, 5, 6, and 8, text indicating a hazard (for example FLAMMABLE LIQUID) is NOT required on a primary or subsidiary label. The label must otherwise conform to Subpart E of Part 172 [§172.405].
- Labels must be printed on or affixed to the surface of the package near the proper shipping name marking [§172.406(a)(ii)].
- When primary and subsidiary hazard labels are required, they must be displayed next to each other. Placement conforms to this requirement if labels are within 150 mm (6 inches) of one another. [§172.406(c)].
- For a package containing a Division 6.1, Packing Group III material, the POISON label specified in §172.430 may be modified to display the text "PG III" instead of "POISON" or "TOXIC" below the mid line of the label. Also see §172.313(d).
- The ORGANIC PEROXIDE label [§172.427] indicates that organic peroxides are highly flammable. Use of the ORGANIC PEROXIDE label eliminates the need for a flammable liquid subsidiary label. The color of the border must be black and the color of the flame may be black or white.

PLACARDS

See 49 CFR, Part 172, Subpart F, for complete placarding regulations.

- Each person who offers for transportation or transports any hazardous material subject to the Hazardous Materials Regulations must comply with all applicable requirements of Subpart F [§172.500].
- Placards may be displayed for a hazardous material, even when not required, if the placarding otherwise conforms to the requirements of Subpart F of Part 172 [§172.502(c)].
- For other than Class 7 or the DANGEROUS placard, text indicating a hazard (for example, "FLAMMABLE") is not required. Text may be omitted from the OXYGEN placard only if the specific identification number is displayed on the placard [§172.519(b)(3)].
- For a placard corresponding to the primary or subsidiary hazard class of a material, the hazard class or division number must be displayed in the lower corner of the placard [§172.519(b)(4)].
- Except as otherwise provided, any bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of material listed in Table 1 must be placarded [§172.504].
- When the aggregate gross weight of all hazardous materials in non-bulk packages covered in Table 2 is less than 454 kg (1,001 lbs), no placard is required on a transport vehicle or freight container when transported by highway or rail [§172.504(c)].
- Notes: See §172.504(f)(10) for placarding Division 6.1, PG III materials.
- Placarded loads require registration with USDOT. See §107.601 for registration regulations.
- The new ORGANIC PEROXIDE placard became mandatory 1 January 2011 for transportation by rail, vessel, or aircraft and becomes mandatory 1 January 2014 for transportation by highway. The placard will enable transport workers to readily distinguish peroxides from oxidizers [§172.552].



HAZARDOUS MATERIALS 2023 FLOW STUDY

Local Emergency Planning Committee (LEPC)
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APPENDIX A (continued)

PLACARDING TABLES

[§172.504(c)]

TABLE 1

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name
1.1	EXPLOSIVES 1.1
1.2	EXPLOSIVES 1.2
1.3	EXPLOSIVES 1.3
2.3	POISON GAS
4.3	DANGEROUS WHEN WET
5.2 (Organic peroxide, Type B, liquid or solid, temperature controlled)	ORGANIC PEROXIDE
6.1 (Materials poisonous by inhalation (see §171.8))	POISON INHALATION HAZARD
7 (Radioactive Yellow III label only)	RADIOACTIVE ¹

¹RADIOACTIVE placards are also required for: All shipments of unpackaged LSA-I material or SCO-I; all shipments required by §§ 173.427, 173.441, and 173.457 of this subchapter to be operated under exclusive use; and all closed vehicles used in accordance with § 173.443(d).

TABLE 2

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name
1.4	EXPLOSIVES 1.4
1.5	EXPLOSIVES 1.5
1.6	EXPLOSIVES 1.6
2.1	FLAMMABLE GAS
2.2	NON-FLAMMABLE GAS
3	FLAMMABLE
Combustible Liquid	COMBUSTIBLE
4.1	FLAMMABLE SOLID
4.2	SPONTANEOUSLY COMBUSTIBLE
5.1	OXIDIZER
5.2 (Other than organic peroxide, Type B, liquid or solid, temperature controlled)	ORGANIC PEROXIDE
6.1 (other than material poisonous by inhalation)	POISON
6.2	NONE
8	CORROSIVE
9	CLASS 9 (see § 172.504(f)(9))
ORM-D	(None)



HAZARDOUS MATERIALS
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 Springfield-Greene County Office of Emergency Management



APPENDIX A *(continued)*

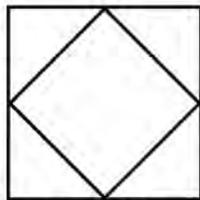
IDENTIFICATION NUMBER DISPLAYS



Appropriate placard must be used with orange panel

IDENTIFICATION NUMBER MARKINGS ON ORANGE PANELS OR APPROPRIATE PLACARDS MUST BE DISPLAYED ON: (1) Tank Cars, Cargo Tanks, Portable Tanks, and other Bulk Packaging; (2) Transport vehicles or freight containers containing 4,000 kg (8,820 lbs) in non-bulk packages of only a single hazardous material having the same proper shipping name and identification number loaded at one facility and transport vehicle contains no other material, hazardous or otherwise; and (3) transport vehicles or freight containers containing 1,000 kg (2,205 lbs) of non-bulk packages of materials poisonous by inhalation in Hazard Zone A or B.

See §§172.301(a)(3), 172.313(c), 172.326, 172.328, 172.330, and 172.331.



§172.527

Square white background required for placard for highway route controlled quantity radioactive material and for rail shipment of certain explosives and poisons, and for flammable gas in a DOT 113 tank car (§172.507 and §172.510).



U.S. Department of Transportation

**Pipeline and
 Hazardous Materials
 Safety Administration**

USDOT/PHMSA/OHMIT/PHH-50
 1200 New Jersey Avenue, SE
 Washington, D.C. 20590

Phone: (202) 366-4900
 Email: training@dot.gov

PHH50-0138-0413

APPENDIX B

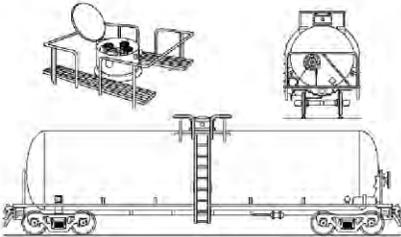
RAILCAR IDENTIFICATION CHART

CAUTION: Emergency response personnel must be aware that rail tank cars vary widely in construction, fittings, and purpose. Tank cars could transport products that may be solids, liquids, or gases. The products may be under pressure. It is essential that products be identified by consulting shipping papers or train consist or contacting dispatch centers before emergency response is initiated. The information stenciled on the sides or ends of tank cars, as illustrated below, may be used to identify the product utilizing:

- a. The commodity name shown;
- b. The other information shown, especially reporting marks and car number which, when supplied to a dispatch center, will facilitate the identification of the product.

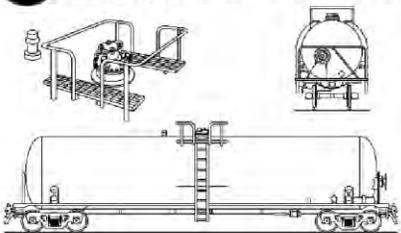
The recommended guides should be considered as last resort if the material cannot be identified by any other means.

117 Pressure tank car



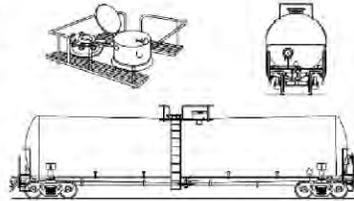
- For flammable, non-flammable, toxic and/or liquefied compressed gases
- Protective housing
- No bottom fittings
- Pressures usually above 40 psi

131 Non-pressure / low pressure tank car



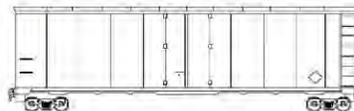
- Known as **general service tank car**
- For variety of hazardous and non-hazardous materials
- Fittings and valves normally visible at the top of the tank
- Some may have bottom outlet valve
- Pressures usually below 25 psi

128 Non-pressure / low pressure tank car (TC117, DOT117)



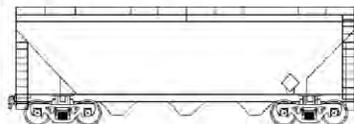
- For flammable liquids (e.g., petroleum crude oil, ethanol)
- Protective housing separate from manway
- Bottom outlet valve
- Pressures usually below 25 psi

111 Box car



- For general freight that carry bulk or non-bulk packages
- May transport hazardous materials/dangerous goods in small packages or "tote bins"
- Single or double sliding doors

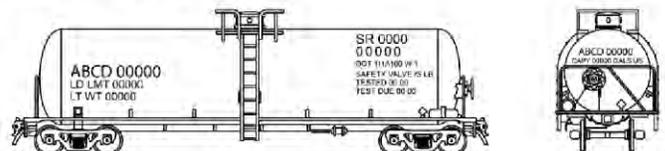
140 Hopper car



- For bulk commodities and bulk cargo (e.g., coal, ore, cement and solid granular materials)
- Bulk lading discharged by gravity through the hopper bottom doors when doors opened

COMMON MARKINGS ON RAIL CARS:

Reporting marks and car number, load limit (pounds or kilograms), empty weight of car, placard, tank qualification and pressure relief device information, car specification, and commodity name.





HAZARDOUS MATERIALS 2023 FLOW STUDY

Local Emergency Planning Committee (LEPC)
Springfield-Greene County Office of Emergency Management



APPENDIX C

COMPLETE LIST OF HAZARDOUS MATERIALS

UN # or Description	# of Placards	% of Total
2.1	1	0.14%
5.1	4	0.54%
1005	1	0.13%
1014	1	0.13%
1023	1	0.13%
1025	1	0.13%
1072	2	0.27%
1075	67	9.03%
1078	2	0.27%
1105	2	0.27%
1107	2	0.27%
1133	1	0.13%
1170	21	2.83%
1197	3	0.40%
1202	20	2.70%
1203	315	42.50%
1210	2	0.27%
1219	1	0.13%
1223	8	1.08%
1228	1	0.13%
1231	1	0.13%
1263	1	0.13%
1264	1	0.13%
1268	2	0.27%
1791	1	0.13%
1830	5	0.67%
1857	1	0.13%
1887	2	0.27%
1903	1	0.13%
1907	3	0.40%
1923	1	0.13%
1950	1	0.13%
1951	4	0.54%

UN # or Description	# of Placards	% of Total
1961	1	0.13%
1977	7	0.94%
1978	2	0.27%
1986	1	0.13%
1987	21	2.83%
1993	84	11.32%
1997	7	0.94%
1999	38	5.12%
2187	2	0.27%
2348	1	0.13%
2426	1	0.13%
2505	1	0.13%
2582	1	0.13%
3077	2	0.27%
3170	1	0.13%
3257	11	1.48%
3264	2	0.27%
3265	1	0.13%
3266	1	0.13%
3277	1	0.13%
3292	1	0.13%
3375	1	0.13%
3527	4	0.54%
1.4 Explosive	1	0.13%
1.5 Explosive	3	0.40%
Aragon Inert	2	0.27%
Corrosive	18	2.43%
Dangerous	8	1.08%
Dangerous When Wet	1	0.13%
Flammable	30	4.04%
Non-Flammable	1	0.13%
Non-Flammable Gas	1	0.13%
Oxygen	5	0.67%



HAZARDOUS MATERIALS 2023 FLOW STUDY

Local Emergency Planning Committee (LEPC)
Springfield-Greene County Office of Emergency Management



APPENDIX E

Pipeline operator contact information for the geographic area you specified:

Pipeline Operator ID & Name	Person to Contact	Entity to Contact	Contact Address	Phone / Fax / Email	Public Awareness URL
18584 SPRINGFIELD, CITY UTILITIES OF	Steve Squibb (Director – Natural Gas Operation)		301 East Central 1321 West Calhoun Springfield, MO 65801	Phone: (417) 831-8367 Fax: (417) 831-8545 Email: steve.squibb@cityutilities.net	http://www.cityutilities.net
22610 MAGELLAN PIPELINE COMPANY, LP	Bob Miller (Supervisor Real Estate Services)		One Williams Center OTC-8 Tulsa, OK 74172	Phone: (918) 574-7393 Fax: Email: bob.miller@magellanlp.com	
31711 SOUTHERN STAR CENTRAL GAS PIPELINE, INC	Jon Tabor (Leader, Integrity Management and PHMSA Compliance)		4700 State Route 56 Owensboro, KY 42301	Phone: (270) 852-4417 Fax: (270) 852-5016 Email: jon.tabor@southernstar.com	https://www.southernstar.com/safety/pipeline-safety
32074 SUMMIT NATURAL GAS OF MISSOURI	Rachel Smith (Regulatory Affairs Specialist II)		2 DeLorme Drive Yarmouth, ME 04096	Phone: (207) 781-1200 Fax: (720) 981-2129 Email: rasmith@summitutilities.com	
32147 MARATHON PIPELINE, LLC	--	MPL Landowner Relations and General Info	539 South Main Street Findlay, OH 45840	Phone: (855) 888-8056 Fax: Email: mplinfo@marathonpetroleum.com	http://www.marathonpipeline.com
4805 EXPLORER PIPELINE CO	Kevin Brown (Manager DOT)		P.O. Box 2650 Tulsa, OK 74101	Phone: (918) 893-5104 Fax: Email: kbrown@expl.com	



HAZARDOUS MATERIALS 2023 FLOW STUDY

Local Emergency Planning Committee (LEPC)
Springfield-Greene County Office of Emergency Management



APPENDIX F

Contact the
Federal Aviation Administration (FAA)
with any COMAT questions:

Federal Aviation Administration:

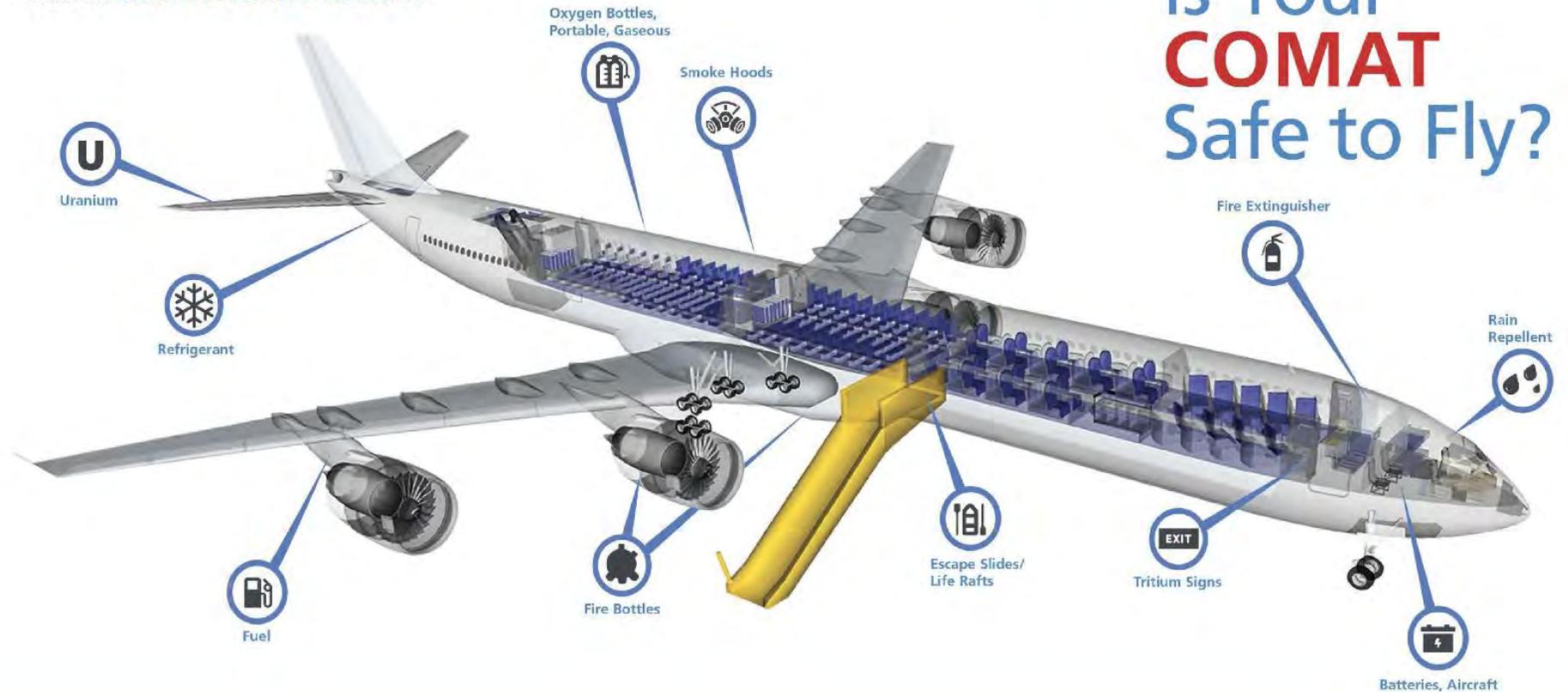
Email: hazmatinfo@faa.gov

Website: www.FAA.GOV/GO/OPERATESAFE

**HAZARDOUS MATERIAL(S)
ONBOARD AIRCRAFT**



Is Your COMAT Safe to Fly?





HAZARDOUS MATERIALS 2023 FLOW STUDY

Local Emergency Planning Committee (LEPC)
Springfield-Greene County Office of Emergency Management



APPENDIX F (continued)

HAZARDOUS MATERIALS ONBOARD AIRCRAFT

The following are examples of Hazardous Materials which **MUST** be declared properly as cargo:

- | | |
|--|---|
| <p>1 Batteries, Aircraft</p> <ul style="list-style-type: none"> Aircraft Batteries Lithium Batteries / Equipment Containing Lithium Batteries: APU Units, Defibrillators, ELTs, Crew EFBs, and Portable Card Readers <p>2 Aircraft Engines</p> <p>3 Escape Slides / Life Rafts</p> <ul style="list-style-type: none"> Life Raft Under Seat Life Vest First Aid Kit <p>4 Fire Bottles (APU, engines, lower cargo compartment, and lavatory waste containers)</p> <p>5 Fire Extinguisher (attendant stations, closets, galleys, etc.)</p> <ul style="list-style-type: none"> Cabin Fire Extinguisher Cargo Compartment Halon, Halon Fire Extinguisher Engine Fire Extinguisher and Explosive Squib <p>6 Fuel</p> <ul style="list-style-type: none"> Unpurged Fuel Control Unit <p>7 Uranium (depleted, counter-balance weights)</p> <ul style="list-style-type: none"> Depleted Uranium Control Balance | <p>8 Ordnance Devices (off-wing escape)</p> <p>9 Oxygen Bottles, Portable, Gaseous</p> <p>10 Oxygen Bottles, Crew System, Gaseous</p> <ul style="list-style-type: none"> Crew Oxygen Cylinder <p>11 Oxygen Bottles, Passenger System, Gaseous (standard)</p> <ul style="list-style-type: none"> Emergency Walk Around Oxygen Cylinder <p>12 Oxygen Generators (OPTIONAL: each PSU STANDARD: each attendant station and lavatory)</p> <ul style="list-style-type: none"> Chemical Oxygen Generator <p>13 Rain Repellent</p> <p>14 Refrigerant (located in each galley)</p> <ul style="list-style-type: none"> Parts Containing Residues of Hazardous Materials <p>15 Smoke Hoods</p> <p>16 Tritium Signs (aisle and emergency exit doors)</p> <ul style="list-style-type: none"> Radioactive Exit Sign |
|--|---|

ANSWER TO YOUR COMAT QUESTIONS

What is COMAT?

COMAT is the abbreviation for Air Carrier **CO**mpany **MA**terials. COMAT is an industry term developed and used by certificate holders to describe a wide array of company materials, parts, and consumable items. COMAT is often shipped to replace installed equipment, serviceable items, or items removed for servicing and repair. Many of these items which are required aboard an aircraft in accordance with the applicable airworthiness requirements and operating regulations are regulated as hazardous materials or dangerous goods when removed from the aircraft.

What Regulations Apply to the Transport of COMAT?

Some COMAT are subject to the requirements of the Hazardous Materials Regulations (HMR; 49 CFR parts 171-180) and/or the International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods (ICAO TI). The HMR/ICAO TI require proper classification, packaging, communication, handling, and storage of HAZMAT offered for transportation. The HMR/ICAO TI also require training for all HAZMAT employees.

Who May Transport COMAT?

An operator may only transport COMAT regulated under the HMR/ICAO TI if the operations specifications in 14 CFR 119.49 permit the operator to carry HAZMAT.

Do the Regulations Provide Any Exceptions for the Transport of COMAT?

Yes. The HMR/ICAO TI provide some exceptions for specific quantities and types of COMAT. See HMR, 49 CFR 175.8; and/or ICAO TI, Part 1, Chapter 2, Paragraph 2.2 COMAT document.

Examples of COMAT exceptions that provide partial HMR/ICAO TI relief:

- Packaging exceptions for items of replacement.
- Relaxed quantity limits for aircraft batteries.
- Operator furnished medical oxygen for passengers.

Examples of COMAT exceptions that provide full HMR/ICAO TI relief:

- Dry ice and Division 2.2 food-dispensing aerosols used for food/beverage services on aircraft.
- Certain items for sale or use by operator on a specific aircraft including, alcoholic beverages, colognes, electronic devices containing certain types and quantities of lithium batteries, or liquefied gas lighters with approved designs.
- A tire assembly with a serviceable tire.





**SPRINGFIELD-GREENE COUNTY
OFFICE OF EMERGENCY MANAGEMENT**

330 W. Scott Street
Springfield, MO 65802
417.869.6040

oem.greenecountymo.gov