



HAZARDOUS MATERIALS COMMODITIES FLOW STUDY FOR CITY OF MERCED, CALIFORNIA

City of Merced Fire Department

Tait Environmental Services, Inc.

June 2018

Primarily prepared and edited by

Tait Environmental Services, Inc.
In Cooperation with the
City of Merced Fire Department

The development of the 2018 Hazardous Materials Commodities Flow Study for the City of Merced was possible through the coordinated effort of the staff of the City of Merced Fire Department.

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Areas of Focus	2
1.2	Historical Background of the City of Merced	3
2.0	HIGHWAY HAZARDOUS MATERIALS COMMODITIES FLOW STUDY	4
2.1	Hazardous Commodities Placards	6
2.2	Hazardous Cargo Vehicles	10
2.3	Secondary Highways and Roadways	13
2.3.1	West Dickenson Ferry Road at South Thornton Road	14
2.3.2	Santa Fe Drive at Beachwood Drive	17
2.3.3	Highway 140 at Franklin Road	21
2.3.4	Highway 140 at North Arboleda Drive	24
2.3.5	Highway 59 at Rahilly Road	27
2.3.6	Highway 59 at West Bellevue Road	32
2.3.7	West Bellevue Road at G Street	37
2.3.8	Highway 99 at East Mission Avenue – Southbound Ramps	41
2.3.9	Highway 99 at East Mission Avenue – Northbound Ramps	45
2.3.10	Highway 99 at Franklin Road – Ramps	48
2.3.11	Secondary Highways and Roadways Summary	52
2.4	California State Highway 99	55
2.4.1	Highway 99 Southbound at the Atwater-Merced Expressway	56
2.4.2	Highway 99 Northbound at Franklin Road	61
2.4.3	Highway 99 Southbound at East Mission Avenue	66
2.4.4	Highway 99 Northbound at East Mission Avenue	72
2.4.5	Highway 99 Summary	77
2.5	Traffic Patterns	83
2.5.1	Total Truck Traffic Data	84
2.5.1	Hazardous Materials Truck Traffic Data	87

3.0	RAILROAD HAZARDOUS MATERIALS TRANSPORTATION	93
5.0	AGRICULTURAL CHEMICAL USE PATTERNS.....	99
6.0	PIPELINE DATA	101
7.0	PLANNING NEEDS ASSESSMENT	103
8.0	SUMMARY STATEMENT	107

APPENDICES

APPENDIX A	Highway Placard Survey Data Compilation Table
APPENDIX B	Alphabetical Commodity Listing
APPENDIX C	Total Truck Classification Data
APPENDIX D	Hazmat Truck Classification Data
APPENDIX E	Initial Isolation and Protective Action Distances
APPENDIX F	Restricted Railroad Data
Appendix G	Pipeline Data

1.0 Introduction

Tait Environmental Services, Inc. (Tait) in coordination with the City of Merced, Fire Department (MFD) is pleased to submit this 2018 Hazardous Materials Commodities Flow Study (Flow Study) for the City of Merced. Funding was provided by the U.S. Department of Transportation's Hazardous Materials Emergency Preparedness (HMEP) Grant administered by the California Office of Emergency Services (OES).

The purpose of the Flow Study was to identify the types and amounts of hazardous commodities transported through and adjacent to the specified geographic areas of the city of Merced, as well as the routes on which they are transported. Chemicals transported have been identified specifically or by hazard class, as well as the types of vehicles used to transport them and the routes they take in and out of the city. This Flow Study also includes a section on Planning Needs Assessment, which is based on the conclusions of the Flow Study outlined herein.

Conducting an analysis of commodity flows is an important step in assessing transportation-related hazardous materials risks. Upon completion of the MFD Flow Study, planners will have a better understanding of hazardous materials transportation patterns, and these data can be used to conduct planning and estimate risks facing the area. First responders can utilize this study as a guide to anticipate potential chemicals involved in a spill within specific areas of the city of Merced. This study can be used to assess total truck traffic, daily and seasonal variations in traffic, awareness and training of emergency personnel/first responders in the area, and frequently used transportation routes. The Planning Needs Assessment will cover the capabilities, deficiencies, and requirements of the MFD to respond to a potential hazardous materials release within the city limits. Information obtained from this Flow Study will be incorporated into a Community Risk Assessment for Hazardous Materials, which will be undertaken following the completion of the Flow Study.

1.1 Areas of Focus

This Flow Study was undertaken for the MFD and was focused on the various locations of potential hazardous materials transport within and adjacent to the city limits. The objective of the study was to identify the types and amounts of hazardous commodities transported through specific areas of the city as well as along California State Highway 99, which is a freeway that bisects the city in a north-south direction. Portions of Highway 99 travel through the downtown area of Merced.

Areas of focus included a highway hazardous materials placard survey, data concerning use and transport of agricultural chemicals throughout the city, and pipeline data from the National Pipeline Mapping Service website. The city of Merced sits on the main lines of both the Union Pacific (UP) and Burlington Northern Santa Fe railroads (BNSF). The two railroads currently transport hazardous chemicals through the city of Merced, and available railroad data are included in this report. Additional data normally restricted to first responders and other authorized personnel is appended to this report.

The Flow Study will also focus on the planning needs of the MFD to respond to a hazardous materials incident within the city limits. Areas of focus for the Planning Needs Assessment include:

- Capabilities, deficiencies, and requirements of the MFD with respect to equipment and training of emergency response personnel.
- Areas of the city that are more vulnerable to potential transportation-related hazardous materials incidents.
- Mutual aid agreements with other agencies that can assist the MFD in the event of a hazardous materials incident.

1.2 Historical Background of the City of Merced

The city of Merced was established in 1872, just a few years after the formation of Merced County in 1855. The city of Merced is located in the northern half of the San Joaquin Valley of California. The city is located approximately 110 miles southeast of San Francisco and 310 miles northwest of Los Angeles. The city of Merced is the county seat of Merced County. Merced County is bounded by Mariposa County to the east, Madera and Fresno Counties to the south, San Benito County to the west, and Stanislaus County to the north.

Today, the city of Merced has a total area of 23.23 square miles. According to the United States Census Bureau, the city of Merced has an estimated population of 83,743 (2014 estimate), and continues to expand. The University of California system's newest university, the University of California at Merced opened in 2005 and is located north of the city. The addition of the University has spurred another era of growth as the city moves into the twenty-first century. Although agriculture remains a mainstay in the city of Merced, technology is becoming a major force.

The City of Merced is also known as the "gateway to Yosemite", and access to Yosemite National Park is less than two hours away via California State Highway 140.

Major highways within the City of Merced include: California State Highway 99, California State Highway 59, and California State Highway 140.

2.0 Highway Hazardous Materials Commodities Flow Study

In April of 2018, information was gathered that identified the types and volumes of hazardous materials being transported on federal and state highways, as well as the major arterial roads within the City of Merced. The highway commodities flow study was undertaken on April 9, 10, 11, and 12, 2018. The locations of the placard study observation points reflected potential movement of hazardous materials into and out of the City of Merced. The survey points were undertaken at the following locations:

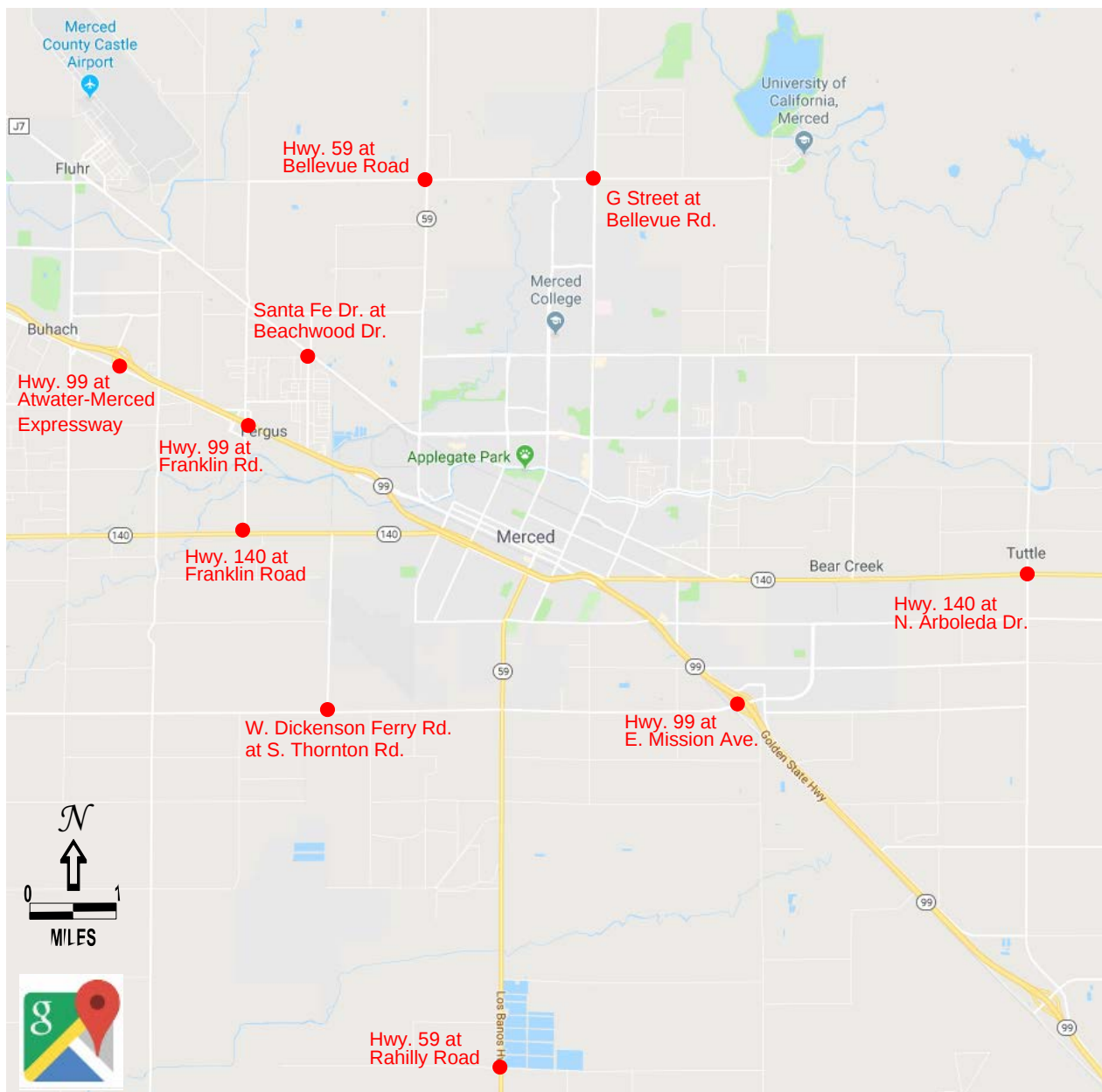
- West Dickenson Ferry Road at South Thornton Road
- Highway 99 Northbound (NB) at Franklin Road
- Highway 99 at Franklin Road - Ramps
- Highway 99 Southbound (SB) at the Atwater-Merced Expressway
- Santa Fe Drive at Beachwood Drive
- Highway 140 at Franklin Road
- Highway 99 at NB at East Mission Avenue
- Highway 99 at SB East Mission Avenue
- Highway 99 at East Mission Avenue (SB Ramps)
- Highway 99 at East Mission Avenue (NB Ramps)
- Highway 59 at Rahilly Road
- Highway 140 at North Arboleda Drive
- Highway 59 at West Bellevue Road
- West Bellevue Road at G Street

Details of the placard survey dates and times are as follows:

Survey Date	Survey Location	Survey Time
04/9/2018	W. Dickenson Ferry Rd. at S. Thornton Rd.	1:00 pm – 5:00 pm
04/10/2018	Hwy. 99 at Franklin Rd. (NB)	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/10/2018	Highway 99 at Franklin Rd. - Ramps	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/10/2018	Hwy. 99 at Atwater-Merced Expressway (SB)	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/10/2018	Santa Fe Drive at Beachwood Drive	8:00 am – 12:00 pm
04/10/2018	Hwy. 140 at Franklin Road	1:00 pm – 5:00 pm
04/11/2018	Hwy. 99 at E. Mission Ave. (NB)	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/11/2018	Hwy. 99 at E. Mission Ave. (SB)	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/11/2018	Hwy. 99 at E. Mission Ave. – SB Ramps	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/11/2018	Hwy. 99 at E. Mission Ave. – NB Ramps	9:00 am – 12:00 am, 1:00 pm – 4:00 pm
04/12/2018	Hwy. 59 at Rahilly Road	8:00 am – 12:00 pm
04/12/2018	Hwy. 140 at N. Arboleda Drive	8:00 am – 12:00 pm
04/12/2018	Hwy. 59 at W. Bellevue Road	8:00 am – 12:00 pm
04/12/2018	G Street at W. Bellevue Road	1:00 pm – 5:00 pm

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

The locations of the highway placard survey points are shown on the Merced City Map below.



Locations of the highway placard survey points are shown on maps contained within each of the individual placard survey descriptions in Sections 2.3 and 2.4 of this report. Each of the maps are overlain on Google Earth™ images contained within Google Maps.

2.1 Hazardous Commodities Placards

The following sections in this chapter detail the results of the City of Merced highway placard survey. Hazardous commodities were identified by reference to the 2016 Emergency Response Guide (ERG) which was published by the U.S. Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA). The following information was gathered concerning hazardous commodities flowing through each of the survey observation points and is detailed below:

- Duration and time of day of placard survey.
- Total number of trucks travelling through the survey observation point.
- Total number of hazardous placarded trucks travelling through the survey observation point.
- Individual hazardous commodities, including the placard number, were determined where applicable. The placard number is the 4-digit United Nations (UN) identification number for the specific hazardous commodity as stated in the ERG. In the list of hazardous materials in each section of the report, the placard number of each commodity is shown in parentheses [e.g. propane (1075)].
- Listing of vehicles containing multiple placards. For the purposes of this study, vehicles containing multiple placards are treated as one vehicle per placard with respect to the hazard classes and hazardous commodities (i.e. one vehicle with three placards will be treated as three separate vehicles).
- A pie chart showing the percentage of hazardous materials identified at each survey observation point, broken down by the U.S. Department of Transport Hazardous Materials Classification System (9 classes, including a designation for dangerous goods as outlined in the ERG). The hazard classes are as follows:
 - o Dangerous Goods
 - o Class 1: Explosives
 - o Class 2: Gases
 - o Class 3: Flammable/Combustible Liquids
 - o Class 4: Flammable Solids
 - o Class 5: Oxidizers and Organic Peroxides
 - o Class 6: Toxic Substances
 - o Class 7: Radioactive Materials
 - o Class 8: Corrosive Substances
 - o Class 9: Miscellaneous

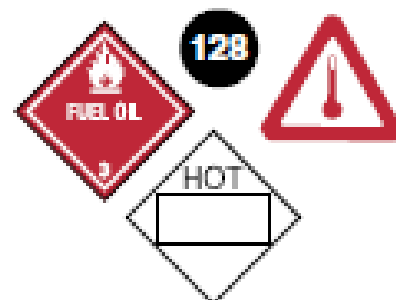
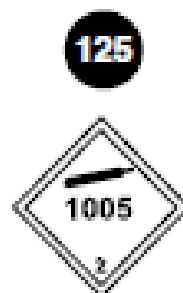
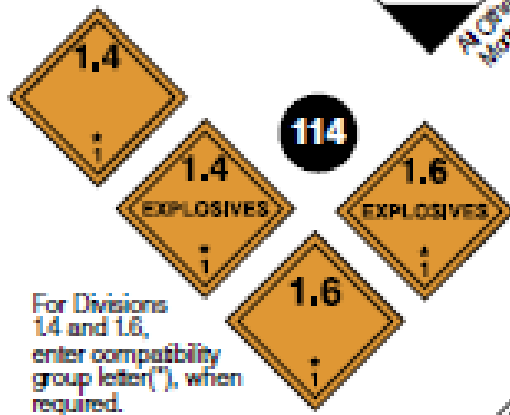
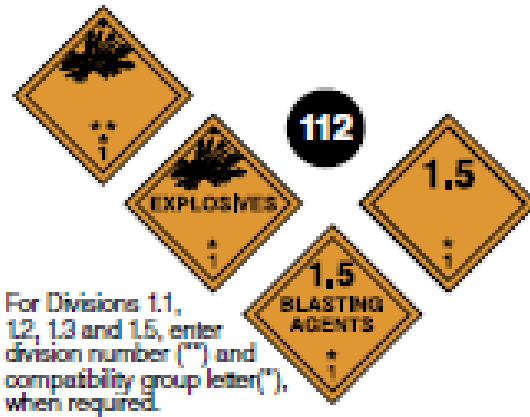
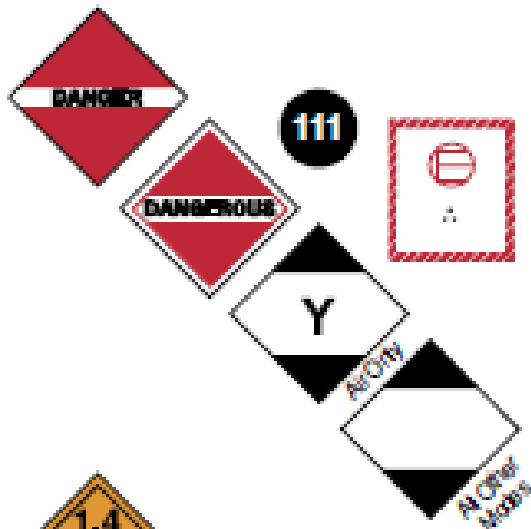
A pie chart showing the percentage hazardous commodities identified at each survey observation point, broken into 17 specific and general categories. These 17 categories are as follows:

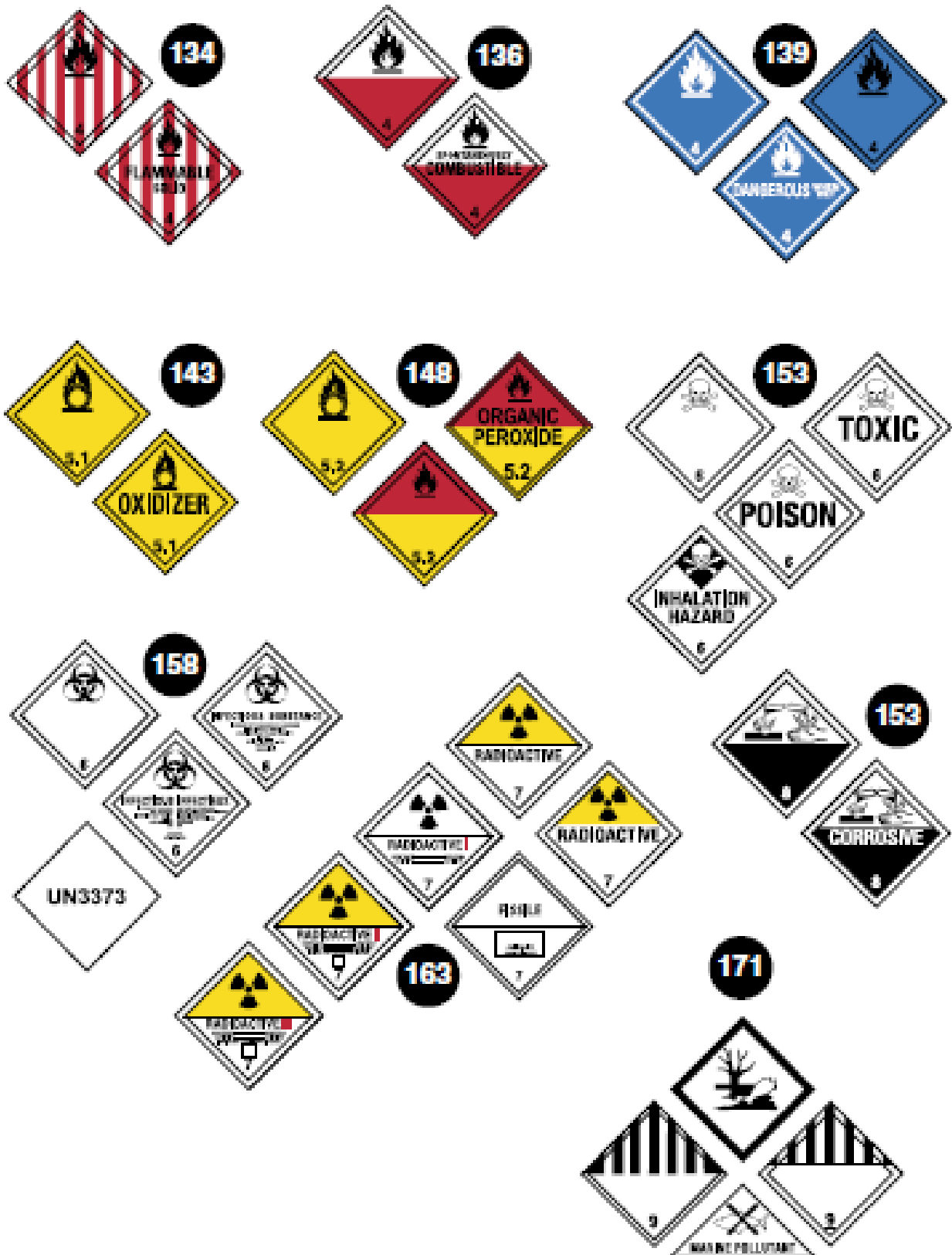
Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

- o Flammable Gas
 - o Non-Flammable Gas
 - o Propane
 - o Gasoline
 - o Diesel
 - o Aviation Fuel
 - o Elevated Temperature Liquid
 - o Flammable Liquid n.o.s.
 - o Flammable Solids n.o.s.
 - o Oxidizers/Oxygen
 - o Miscellaneous Acids
 - o Miscellaneous Bases
 - o Corrosive n.o.s.
 - o Hazardous Waste/Materials
 - o Poisons/Pesticides
 - o Explosives
 - o Dangerous n.o.s.
- Where the UN identification number was not present on the placard, a category of “not otherwise specified” (n.o.s.) has been made throughout this report, both on the charts and in the body of the report (e.g. corrosive n.o.s.). As defined in the ERG, the term n.o.s is used when the actual chemical name for the particular hazardous commodity is not listed in the regulations, and a generic name is used to describe it on the shipping papers. Under these circumstances the Hazard Class of the commodity was identified from the placard.
- The term “n.o.s.” may also be used as a general category under a specific placard number as defined in the ERG (e.g. 1287, Alcohols n.o.s.).

A compilation of the highway placard survey data is listed on the table contained in Appendix A. An alphabetical commodity list is available in Appendix B. Total truck counts and Hazmat truck counts are contained in Appendices C and D, respectively.

A visual listing of the highway placards, which was copied from the ERG, is shown on the following pages.





2.2 Hazardous Cargo Vehicles

Highway trucks were identified according to the DOT Road Trailer Identification Chart, which is contained within the ERG. The chart is shown below.

ROAD TRAILER IDENTIFICATION CHART*

WARNING: Road trailers may be jacketed, the cross-section may look different than shown and external ring stiffeners would be invisible.

NOTE: An emergency shut-off valve is commonly found at the front of the tank, near the driver door.

117 MC331, TC331, SCT331



- For liquefied compressed gases (e.g., LPG, ammonia)
- Rounded heads
- Design pressure between 100-500 psi**

117 MC338, TC338, SCT338, TC341, CGA341



- For refrigerated liquefied gases (cryogenic liquids)
- Similar to a "giant thermo-bottle"
- Fitting compartments located in a cabinet at the rear of the tank
- MAWP between 25-500 psi**

131 DOT406, TC406, SCT306, MC306, TC306



- For flammable liquids (e.g., gasoline, diesel)
- Elliptical cross-section
- Rollover protection at the top
- Bottom outlet valves
- MAWP between 3-15 psi**

112 TC423



- For emulsion and water-gel explosives
- Hopper-style configuration
- MAWP between 5-15 psi**

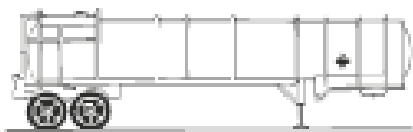
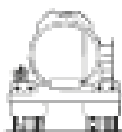
137 DOT407, TC407, SCT307, MC307, TC307



- For toxic, corrosive, and flammable liquids
- Circular cross-section
- May have external ring stiffeners
- MAWP of at least 25 psi**

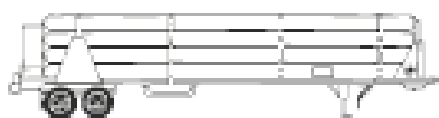
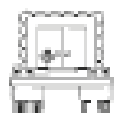
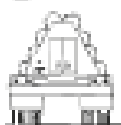
ROAD TRAILER IDENTIFICATION CHART*

137 DOT412, TC412, SCT312, MC312, TC312

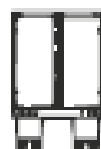


- Usually for corrosive liquids
- Circular cross-section
- External ring stiffeners
- Tank diameter is relatively small
- MAWP of at least 15 psi**

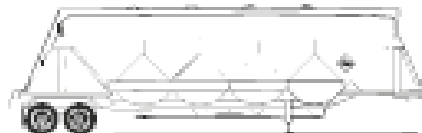
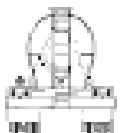
117 Compressed Gas/Tube Trailer



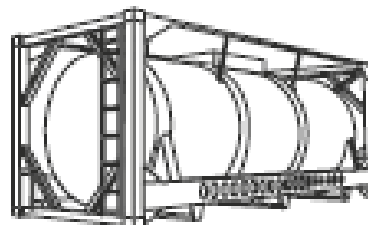
111 Mixed Cargo



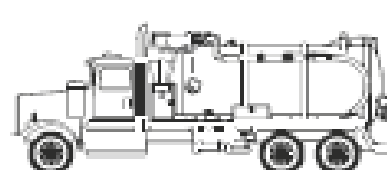
134 Dry Bulk Cargo Trailer



117 Intermodal Tank



137 Vacuum Tanker



In addition to the vehicles shown in the chart above, there are several other types of vehicles that can be used to transport hazardous materials. These vehicles include local delivery trucks, utility vehicles, and construction vehicles. Local delivery trucks is a generalized term used to cover vehicles that are variable in size, commonly are single-axle, and are not generally used for long-distance trucking like the semi-truck trailer mixed cargo vehicles shown above. Utility vehicles are variable primarily in design and configuration, and they are often outfitted for specific tasks. Construction vehicles vary in size and may consist of end dumps, concrete trucks, dump trucks, etc. Examples of these

vehicles are shown below. Trucks classified as “Other” vehicles may include, but not limited to, delivery vans, trailers pulled by pick-up trucks, or trash trucks.



Local Delivery Vehicle



Utility Vehicle



Construction Vehicle



Trash Vehicle (Other)



Delivery Van (Other)

2.3 Secondary Highways and Roadways

Placard Surveys were performed on secondary highways and roadways within and adjacent to the Merced city limits. These surveys were completed to determine patterns of transport of hazardous materials through different parts of the city. Observations were also made concerning the types of trucks passing through the survey areas. Also included in the secondary roads was the placard survey of the trucks exiting and entering Highway 99 at the southbound and northbound off-ramps and on-ramps at the observation point at Highway 99 and East Mission Avenue, and at the off-ramp and on-ramp at Highway 99 and Franklin Road. With the exception of the off-ramp and on-ramp surveys, each of which was a 6-hour survey that was coordinated with the Highway 99 surveys, the remaining surveys on the secondary highways and roadways were 4 hours in length.

A compilation of the highway placard survey data is listed on the table contained in Appendix A. An alphabetical commodity list is available in Appendix B. Total truck counts and hazmat truck counts, including the truck classifications are contained in Appendices C and D, respectively.

2.3.1 West Dickenson Ferry Road at South Thornton Road

One 4-hour placard survey was performed at the 3-way intersection of West Dickenson Ferry Road and South Thornton Road. This survey point is located southwest of the main portion of the City within the city limits, but is surrounded by County property.



The survey was completed on April 9, 2018 between 1:00 pm and 5:00 pm. A total truck count was completed, and 75 trucks moved through the intersection during the survey. Most of the trucks consisted of semi-truck trailers, including flat beds hauling equipment, local delivery vehicles, and utility vehicles. Many of the vehicles appeared to be related to agricultural usage.

Vehicle source and destination directions are generally equal in all three directions. No hazardous placards were observed on any of the vehicles during the duration of the survey. Photographs of the trucks travelling through the intersection are shown below.

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.





2.3.2 Santa Fe Drive at Beachwood Drive

One 4-hour placard survey was performed at the 4-way intersection of Santa Fe Drive and Beachwood Drive. This survey point is located northwest of the main portion of the City within County property. The Burlington Northern and Santa Fe Railroad tracks are located parallel to and along the southern side of Santa Fe Drive. Hazardous materials were noted on the trains, and they will be discussed below in Section 3.0 Railroad Hazardous Materials Transportation.



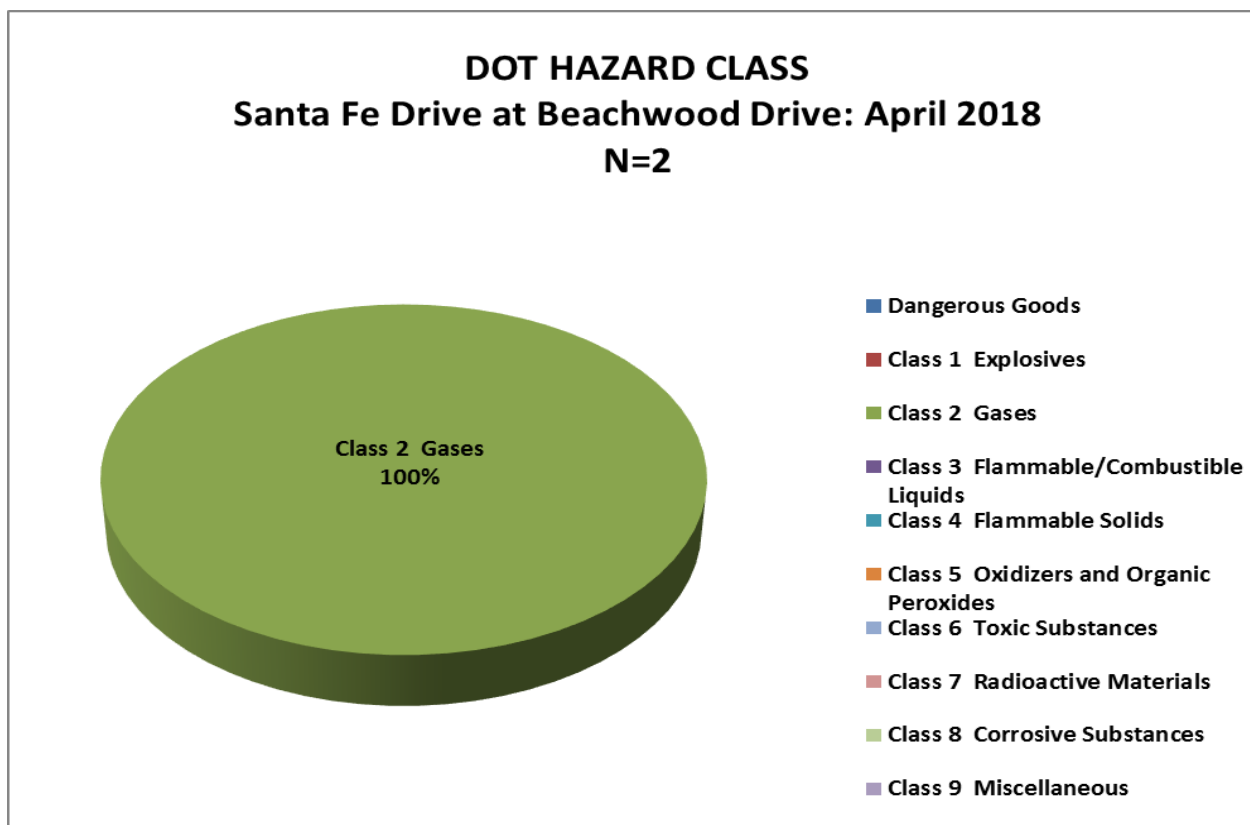
The survey was completed on April 10, 2018 between 8:00 am and 12:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

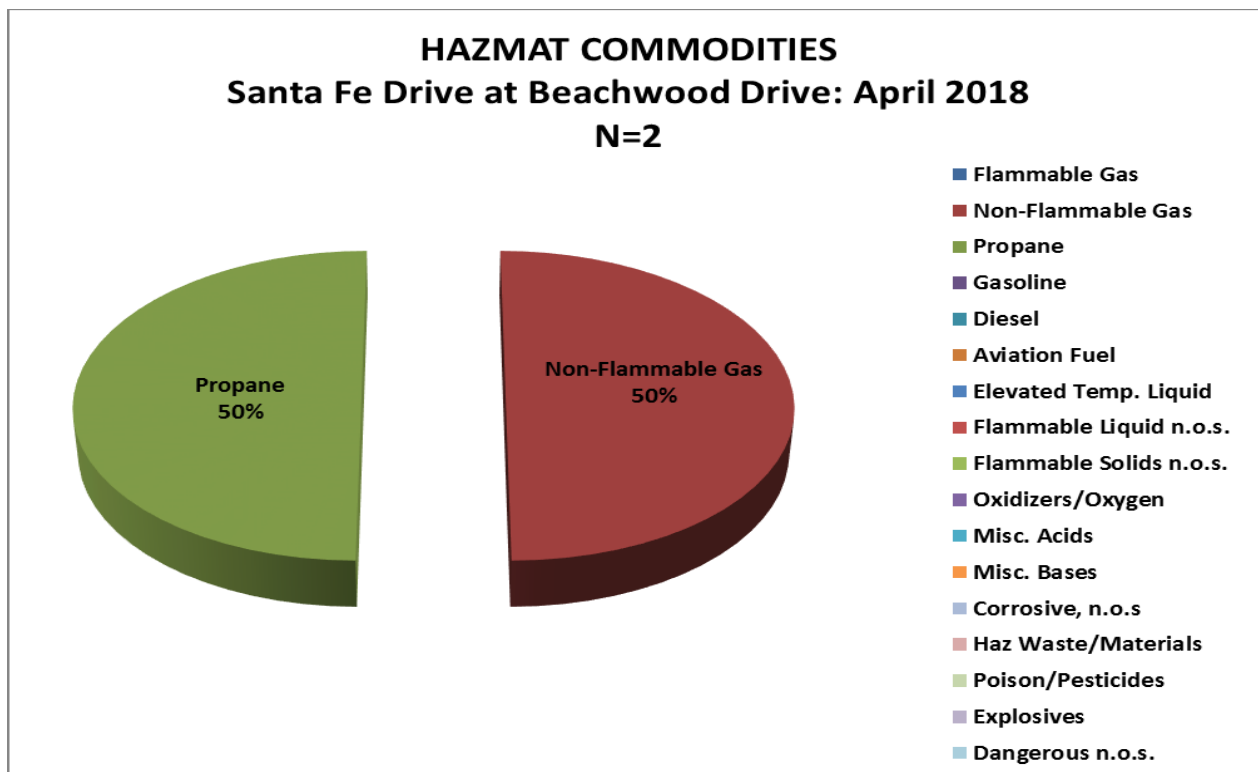
During the survey, a total of 133 trucks travelled through the intersection. Most of the truck traffic was directed along Santa Fe Drive in both directions. Most of the truck traffic consisted of semi-truck trailers, and construction-related vehicles, including concrete mixers, dry bulk cargo vehicles, and local delivery vehicles. Much of the construction-related traffic was related to the Builders Concrete facility on Beachwood Drive north of Santa Fe Drive. Very little truck traffic was observed on Beachwood Drive south of Santa Fe Drive, as this area is primarily residential.

Two vehicles were placarded, and 131 were not placarded. Hazardous materials included:

- Propane (1075): 1 truck (high-pressure tanker)
- Carbon Dioxide (2187): 1 truck (cryogenic tanker)

Both of these vehicles were travelling southbound along Santa Fe Drive through the intersection. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling through the intersection are shown below.





2.3.3 Highway 140 at Franklin Road

One 4-hour placard survey was performed at the 3-way intersection of California State Highway 140 and Franklin Road. This survey point is located west of the main portion of the City within County property.



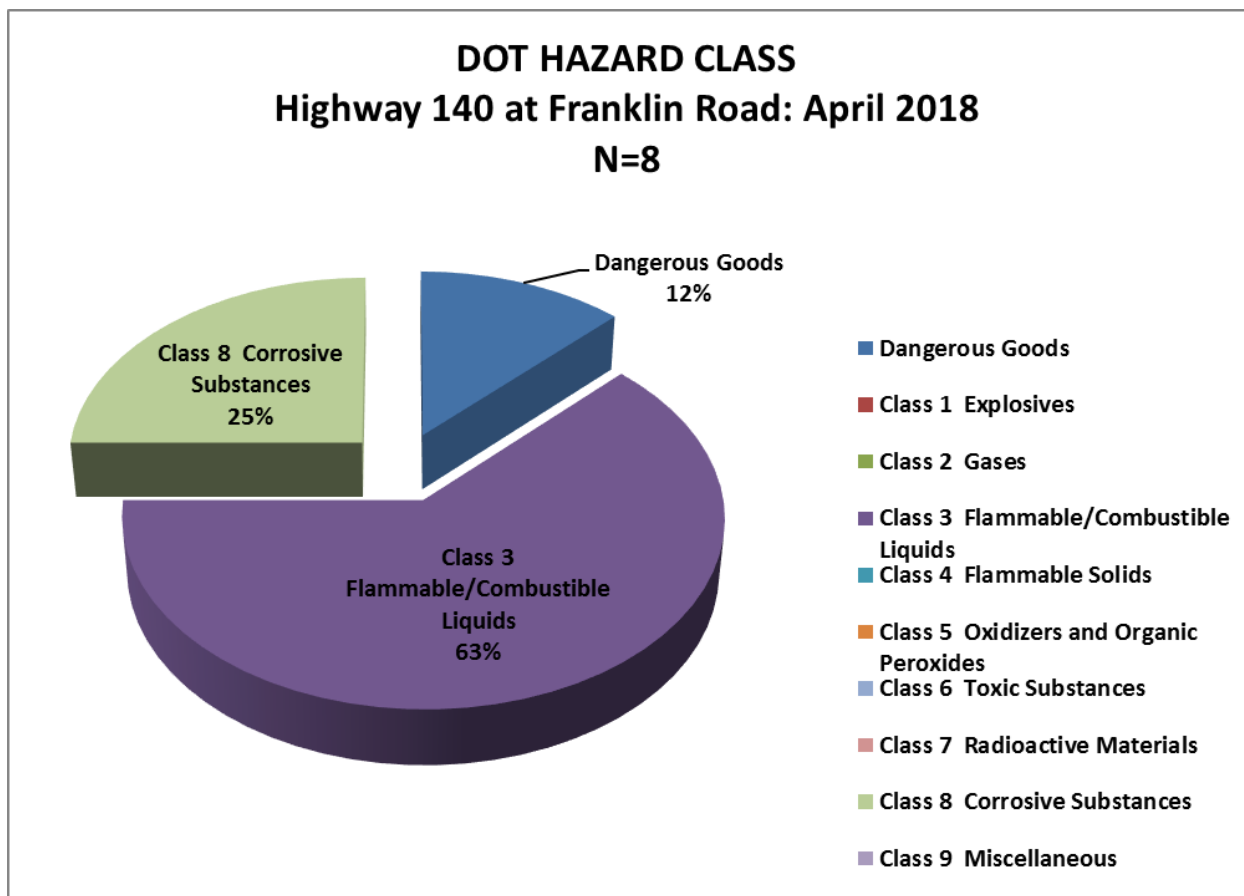
The survey was completed on April 10, 2018 between 1:00 pm and 5:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

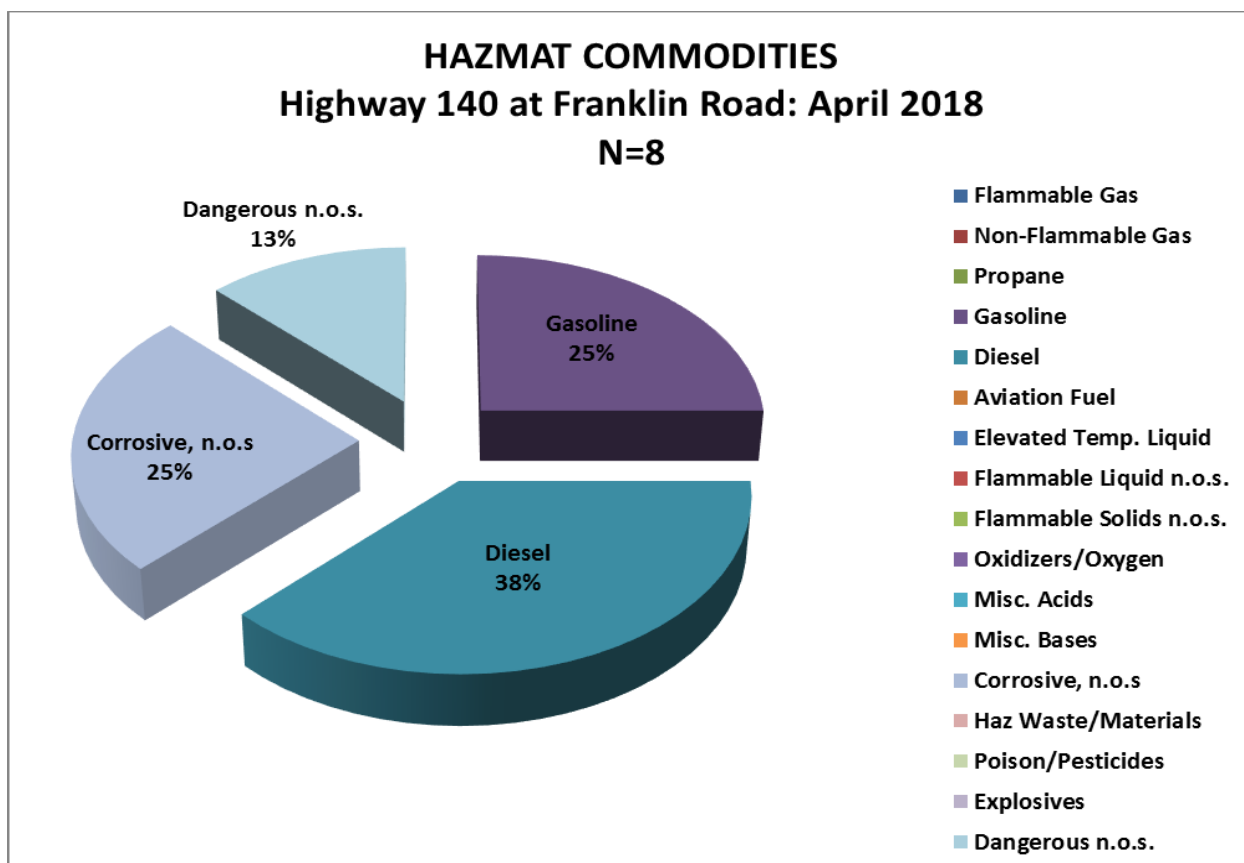
During the survey, a total of 99 trucks travelled through the intersection. More than 50% of the truck traffic was directed from west to east along Highway 140 through the intersection. Truck traffic was lighter travelling north and south along Franklin Road. Franklin Road intersects with Highway 99 north of the survey location. Most of the truck traffic consisted of semi-truck trailers, dry bulk cargo trucks, local delivery vehicles, construction vehicles, and utility vehicles.

Eight vehicles were placarded, and 91 were not placarded. Hazardous materials included:

- Gasoline (1203): 2 trucks (non-pressure fuel tankers)
 - o 1 truck eastbound on Highway 140 to northbound on Franklin Road
 - o 1 truck southbound on Franklin Road to eastbound on Highway 140
- Diesel (1993): 3 trucks (fuel tanks on pick-up beds)
 - o 2 trucks southbound on Franklin Road to westbound on Highway 140
 - o 1 truck eastbound on Highway 140 to northbound on Franklin Road
- Corrosive n.o.s: 2 trucks (semi-truck trailer and small flatbed truck)
 - o 2 trucks westbound on Highway 140
- Dangerous: 1 truck (semi-truck trailer)
 - o 1 truck westbound on Highway 140

The hazardous commodities observed at this survey location were primarily fuels. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.



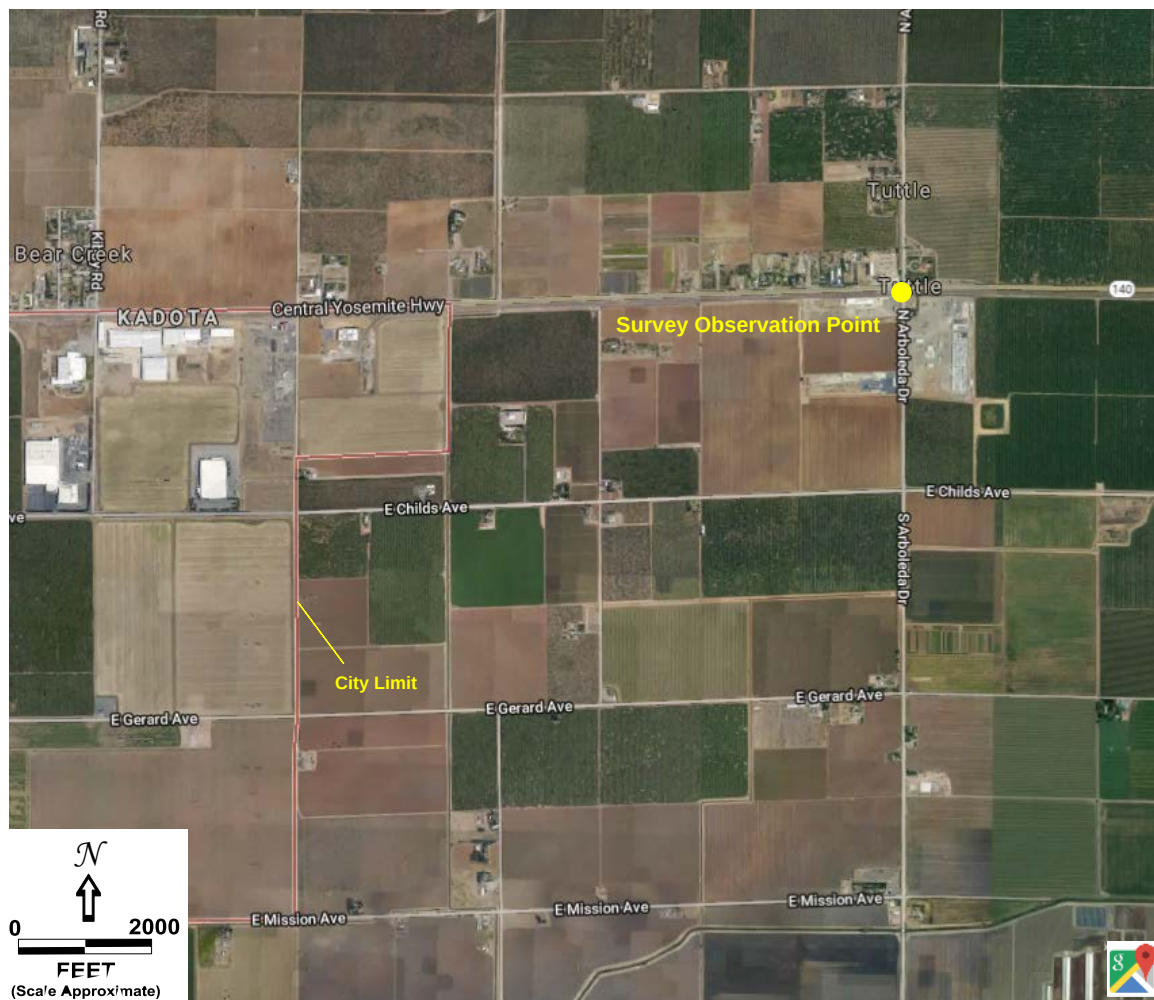


Photographs of the trucks travelling through the intersection are shown below.



2.3.4 Highway 140 at North Arboleda Drive

One 4-hour placard survey was performed at the 4-way intersection of California State Highway 140 and North Arboleda Drive. This survey point is located east of the main portion of the City within County property. The Burlington Northern and Santa Fe Railroad tracks are located parallel to and along the southern side of Highway 140. Hazardous materials were noted on the trains, and they will be discussed below in Section 3.0 Railroad Hazardous Materials Transportation



The survey was completed on April 12, 2018 between 8:00 am and 12:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

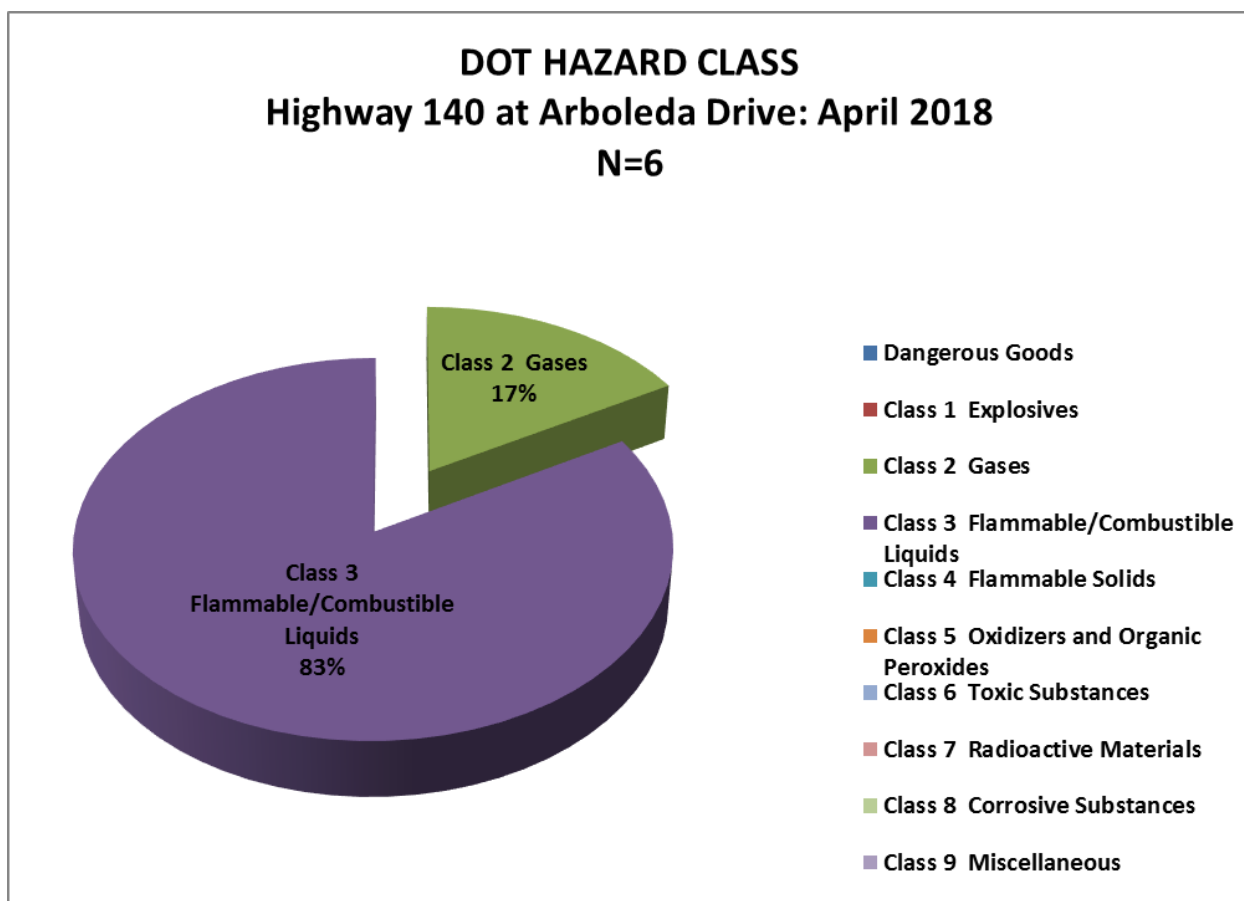
During the survey, a total of 113 trucks travelled through the intersection. More than 50% of the truck traffic was directed from west to east along Highway 140 through the intersection. Truck traffic was lightest travelling north and south along North Arboleda

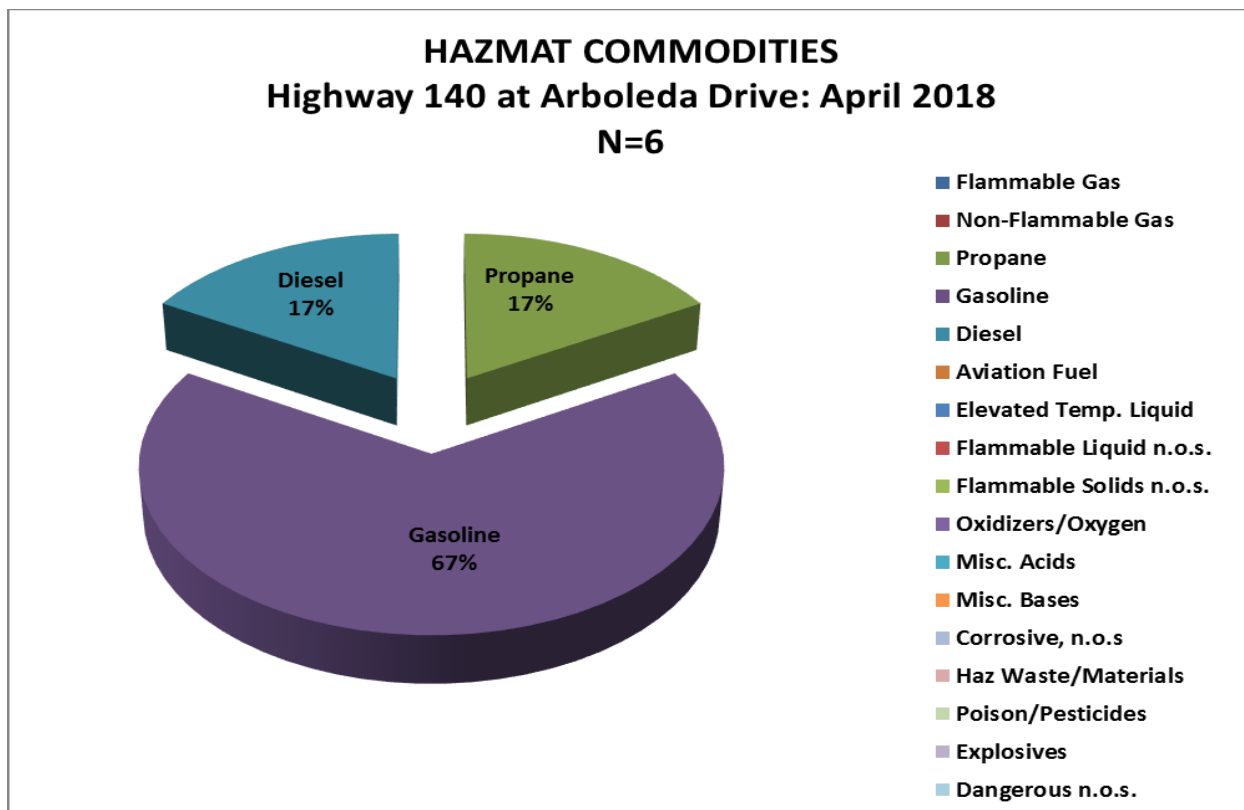
Drive. Most of the truck traffic consisted of semi-truck trailers, local delivery vehicles, construction vehicles, and tankers.

Six vehicles were placarded, and 107 were not placarded. Hazardous materials included:

- Propane (1075): 1 truck (high-pressure tanker)
 - o 1 truck eastbound on Highway 140 through the intersection
- Gasoline (1203): 4 trucks (non-pressure fuel tankers)
 - o 1 truck southbound on N. Arboleda Drive to westbound on Highway 140
 - o 1 truck southbound on N. Arboleda Drive through the intersection
 - o 2 trucks westbound on Highway 140 to northbound on N. Arboldea Drive
- Diesel (1993): 1 truck (non-pressure fuel tanker)
 - o 1 truck westbound on Highway 140 through the intersection

All of the hazardous placarded truck were fuel trucks. The four vehicles placarded with gasoline were observed travelling along North Arboleda Drive north of the survey intersection. North Arboleda Drive provides an access to the University of California at Merced to the north. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling through the intersection are shown below.



2.3.5 Highway 59 at Rahilly Road

One 4-hour placard survey was performed at the 4-way intersection of California State Highway 140 and Rahilly Road. Whitegate Drive is the continuation of Rahilly Road east of Highway 59. This survey point is located south of the main portion of the City within County property.



The survey was completed on April 12, 2018 between 8:00 am and 12:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

During the survey, a total of 443 trucks travelled through the intersection, and this intersection was the busiest survey location within the secondary roads and highways. Highway 59 is a major highway in this part of Merced County, and passes through an industrial area south of the City of Merced and north of the survey location.

More than 60% of the truck traffic was travelling northbound toward the city of Merced along Highway 59, and more than 25% of the truck traffic was travelling southbound along Highway 59 from the city. Most of the truck traffic consisted of semi-truck trailers, local delivery vehicles, and tankers.

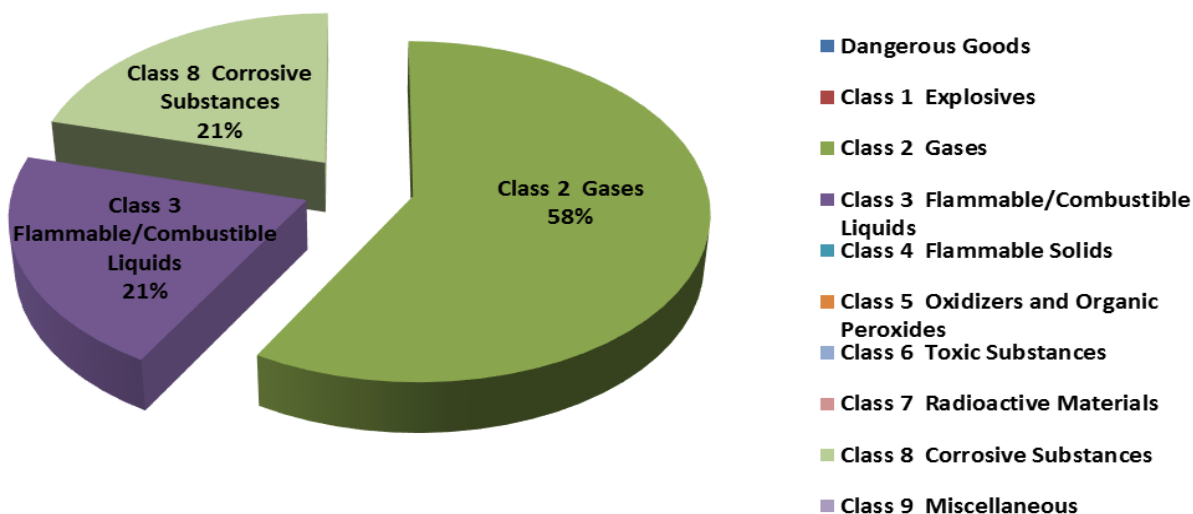
Twenty-four vehicles were placarded, and 419 were not placarded. Hazardous materials included:

- Flammable Gas: 1 truck (semi-truck trailer flatbed)
 - o 1 truck northbound on Highway 59 through the intersection
- Non-flammable gas: 2 trucks (semi-truck trailer flatbeds)
 - o 2 trucks northbound on Highway 59 through the intersection
- Propane (1075): 6 trucks (high pressure tankers)
 - o 2 trucks westbound on Rahilly Road to southbound on Highway 59
 - o 1 truck northbound on Highway 59 to westbound on Rahilly Road
 - o 1 truck southbound on Highway 59 to westbound on Rahilly Road
 - o 1 truck northbound on Highway 59 through the intersection
 - o 1 truck southbound on Highway 59 through the intersection
- Sulfur Hexafluoride (1080): 1 truck (corrosive tanker)
 - o 1 truck northbound on Highway 59 through the intersection
- Nitrogen, refrigerated liquid (1977): 4 trucks (cryogenic tanker/trailer)
 - o 1 truck northbound on Highway 59 to westbound on Rahilly Road
 - o 1 truck eastbound on Rahilly road to northbound on Highway 59
 - o 1 truck northbound on Highway 59 through the intersection
 - o 1 truck southbound on Highway 59 through the intersection
- Gasoline (1203): 3 trucks (non-pressure tankers)
 - o 2 trucks northbound on Highway 59 through the intersection
 - o 1 truck southbound on Highway 59 through the intersection
- Diesel (1993): 2 trucks (non-pressure tankers)
 - o 1 truck westbound on Whitegate Drive to northbound on Highway 59
 - o 1 truck northbound on Highway 59 through the intersection
- Corrosive n.o.s.: 1 truck (local delivery vehicle)
 - o 1 truck southbound on Highway to eastbound on Whitegate Drive
- Hypochlorite Solution (1791): 1 truck (corrosive tanker)
 - o 1 truck northbound on Highway 59 through the intersection
- Sodium Hydroxide Solution (1824): 1 truck (corrosive tanker)
 - o 1 truck northbound on Highway 59 through the intersection
- Sulfuric Acid (1830): 1 truck (corrosive tanker)
 - o 1 truck northbound on Highway 59 through the intersection
- Corrosive Solid, acidic, inorganic (3264): 1 truck (local delivery vehicle)
 - o 1 truck southbound on Highway 59 through the intersection

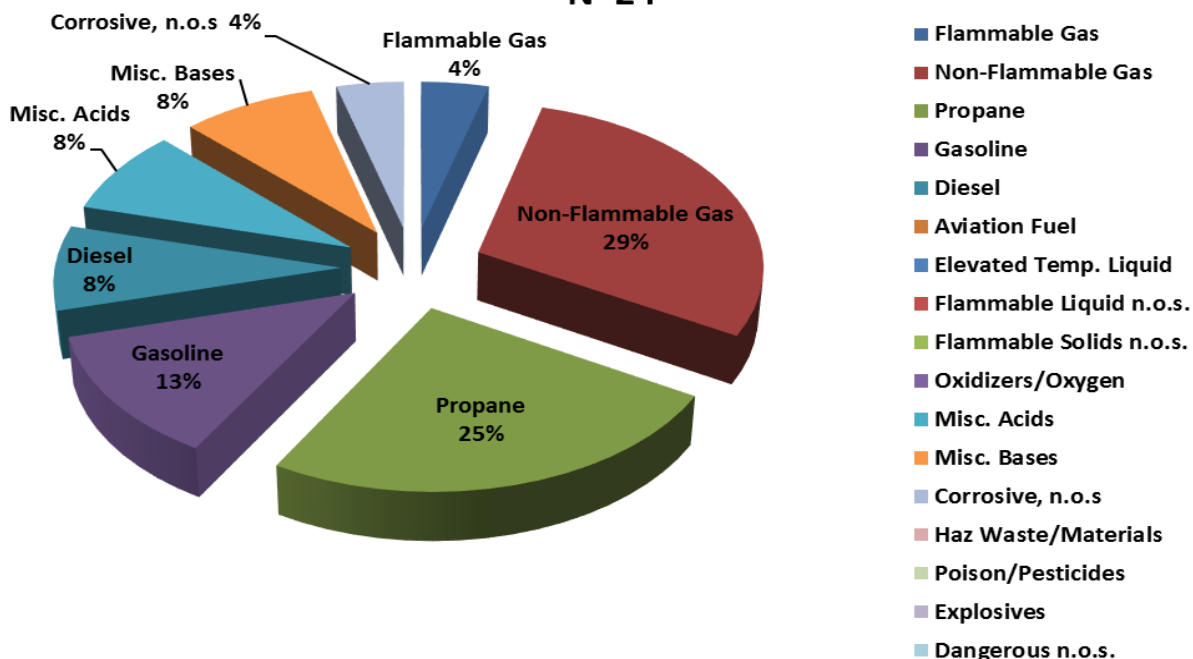
Unlike the other survey locations along the secondary highways and roadways, there is a significantly higher diversity of hazardous materials travelling through this observation point. Land use along Highway 59 just south of the City of Merced is primarily industrial and contains various industries such as chemical companies, compressed air facilities, and agricultural supply facilities.

The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.

DOT HAZARD CLASS
Highway 59 at Rahilly Road: April 2018
N=24



HAZMAT COMMODITIES
Highway 59 at Rahilly Road: April 2018
N=24



Photographs of the trucks travelling through the intersection are shown below.





2.3.6 Highway 59 at West Bellevue Road

One 4-hour placard survey was performed at the 4-way intersection of California State Highway 59 and West Bellevue Road. This survey point is located west of the main portion of the City within County property.



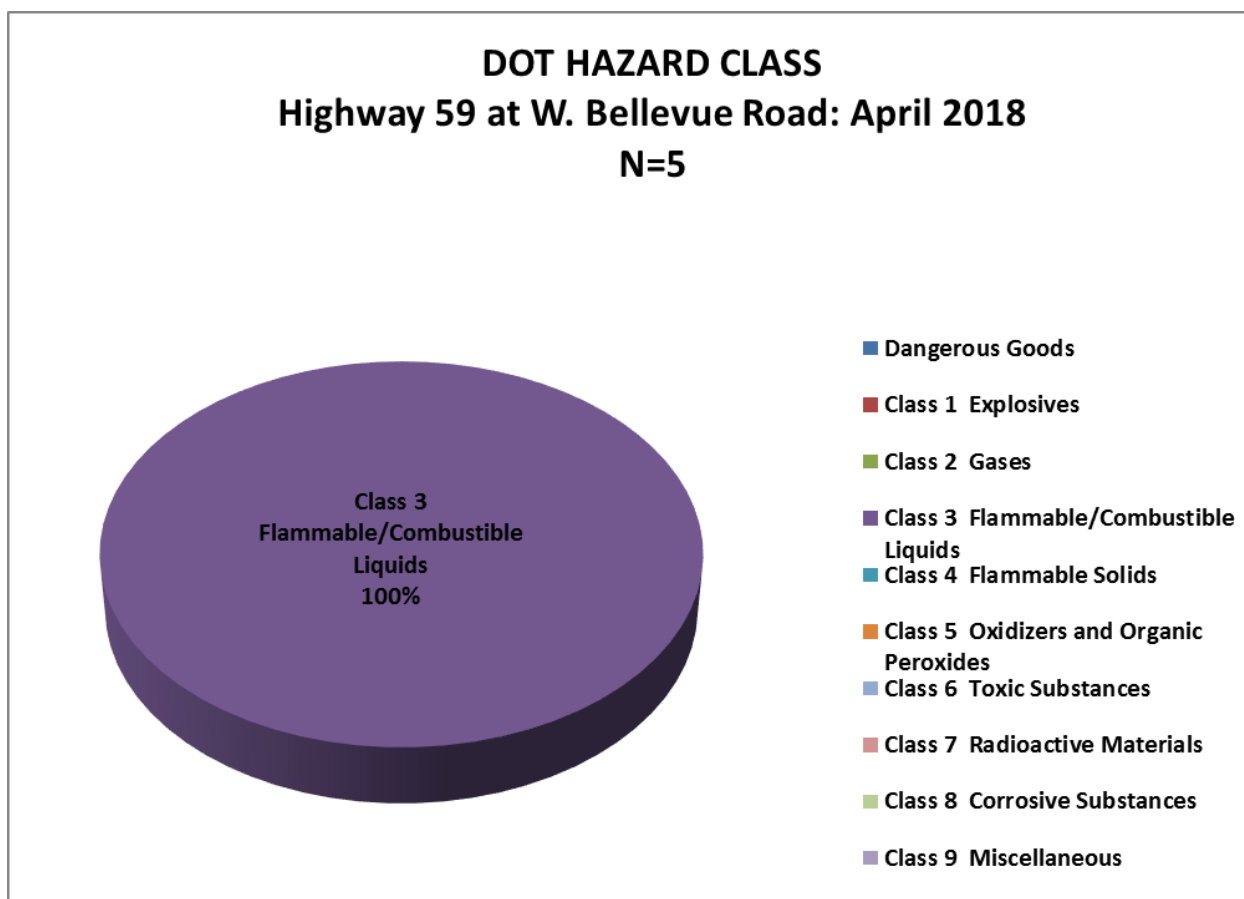
The survey was completed on April 12, 2018 between 8:00 am and 12:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

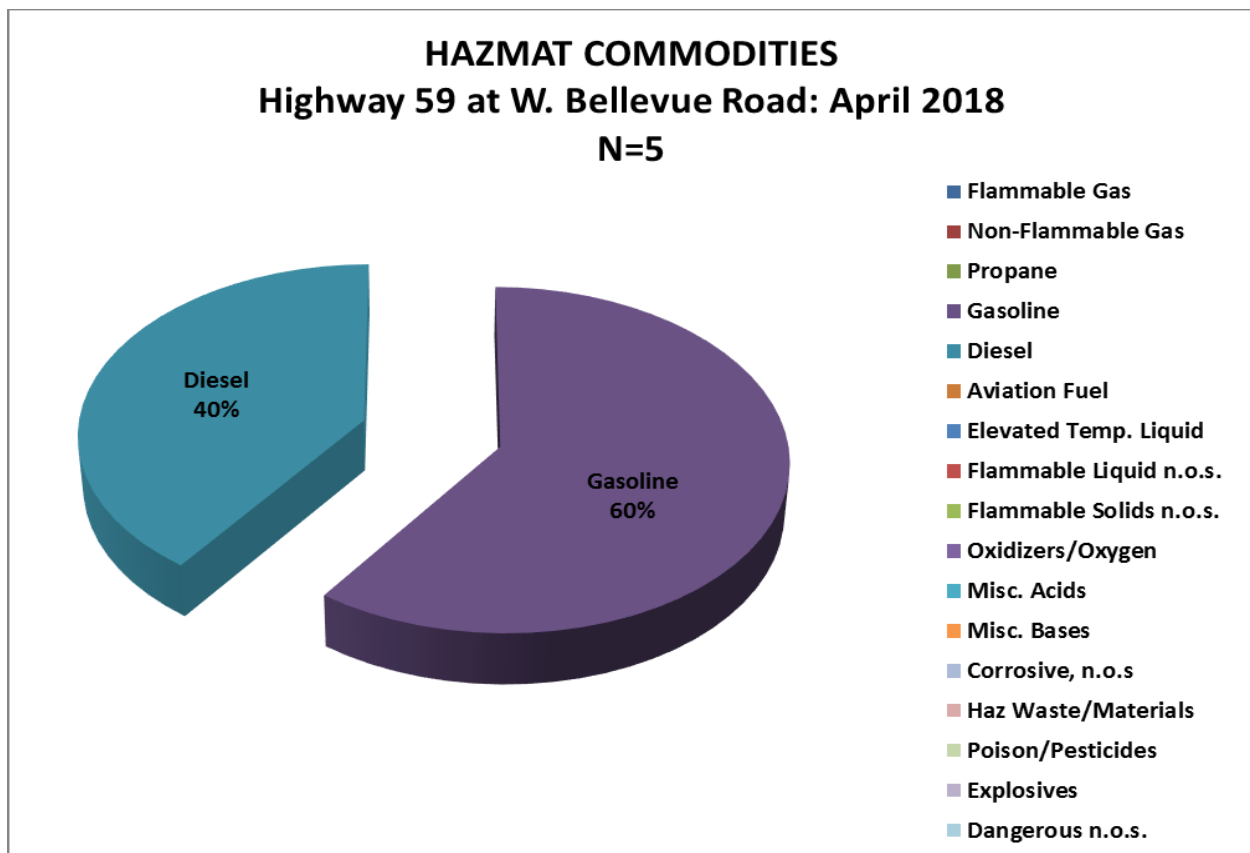
During the survey, a total of 295 trucks travelled through the intersection. More than 65% of the truck traffic was directed from north to south along Highway 59 through the intersection. Most of the truck traffic consisted of other vehicles, primarily trash trucks, construction vehicles, dry bulk cargo trucks, and utility vehicles. Most of the traffic, including the trash trucks, dry bulk cargo trucks, and construction vehicles appeared to be related to transportation to and from the Merced County Regional Waste Management facility north of the survey location along Highway 59. It was observed that many of the same vehicles were completing repeat north-south trips on Highway 59, ostensibly delivering materials to the landfill facility. Many of these vehicles were construction vehicles, and dry bulk cargo trucks.

Five vehicles were placarded, and 290 were not placarded. Hazardous materials included:

- Gasoline (1203): 3 trucks (non-pressure fuel tankers)
 - o 1 truck northbound on Highway 59 to eastbound on W. Bellevue Road
 - o 1 truck westbound on W. Bellevue Road to southbound on Highway 59
 - o 1 truck southbound on Highway 59 through the intersection
- Diesel (1993): 2 trucks (non-pressure fuel tankers)
 - o 1 truck northbound on Highway 59 to eastbound on W. Bellevue Road
 - o 1 truck westbound on W. Bellevue Road to southbound on Highway 59

The hazardous materials travelling through this observation location were fuel delivery trucks apparently on scheduled local delivery runs. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling through the intersection are shown below.





Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.



2.3.7 West Bellevue Road at G Street

One 4-hour placard survey was performed at the 4-way intersection of West and East Bellevue Road at G Street. This survey point is located north of the main portion of the City on the City boundary. The surrounding area is primarily residential or developing residential. East Bellevue Road is the main access to the University of California at Merced to the east.



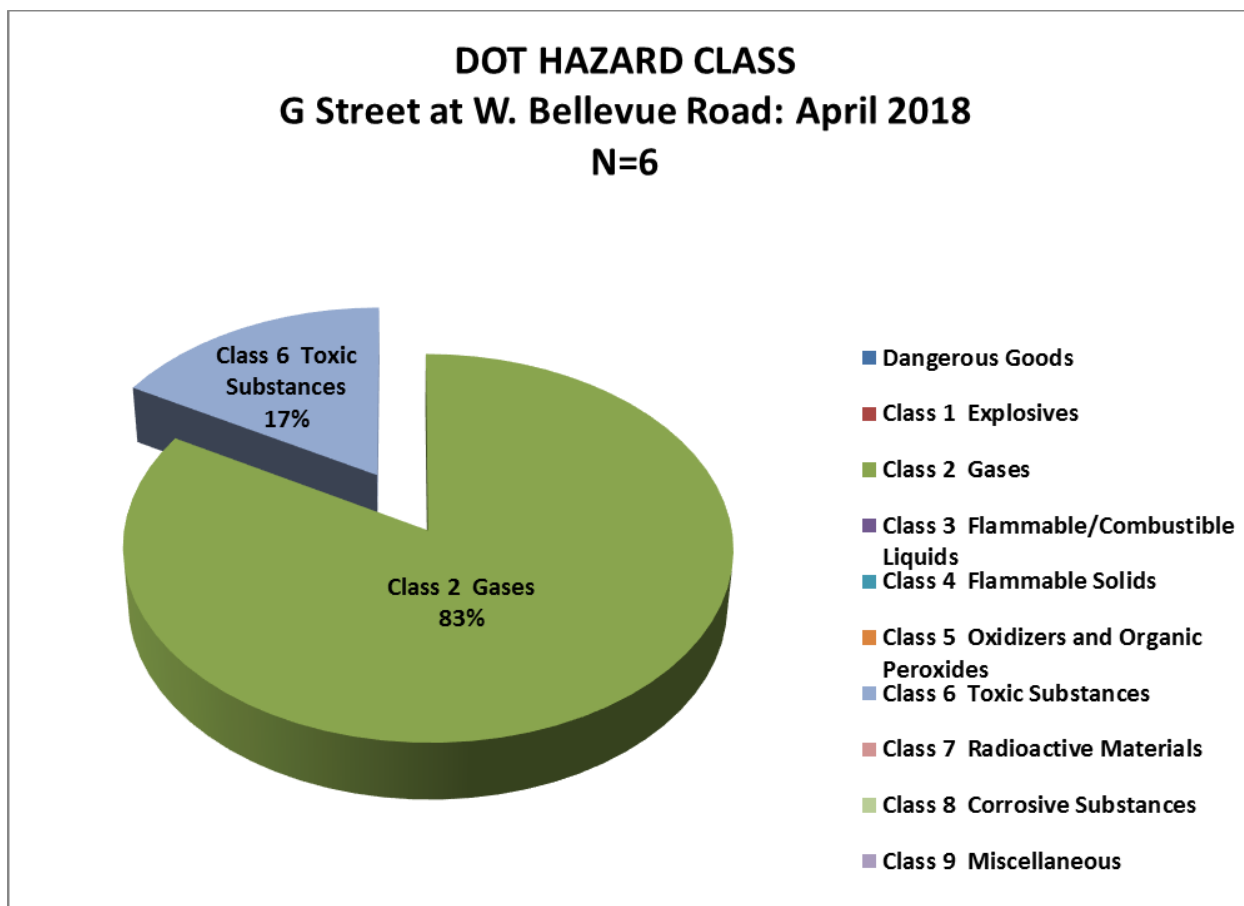
The survey was completed on April 12, 2018 between 1:00 pm and 5:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

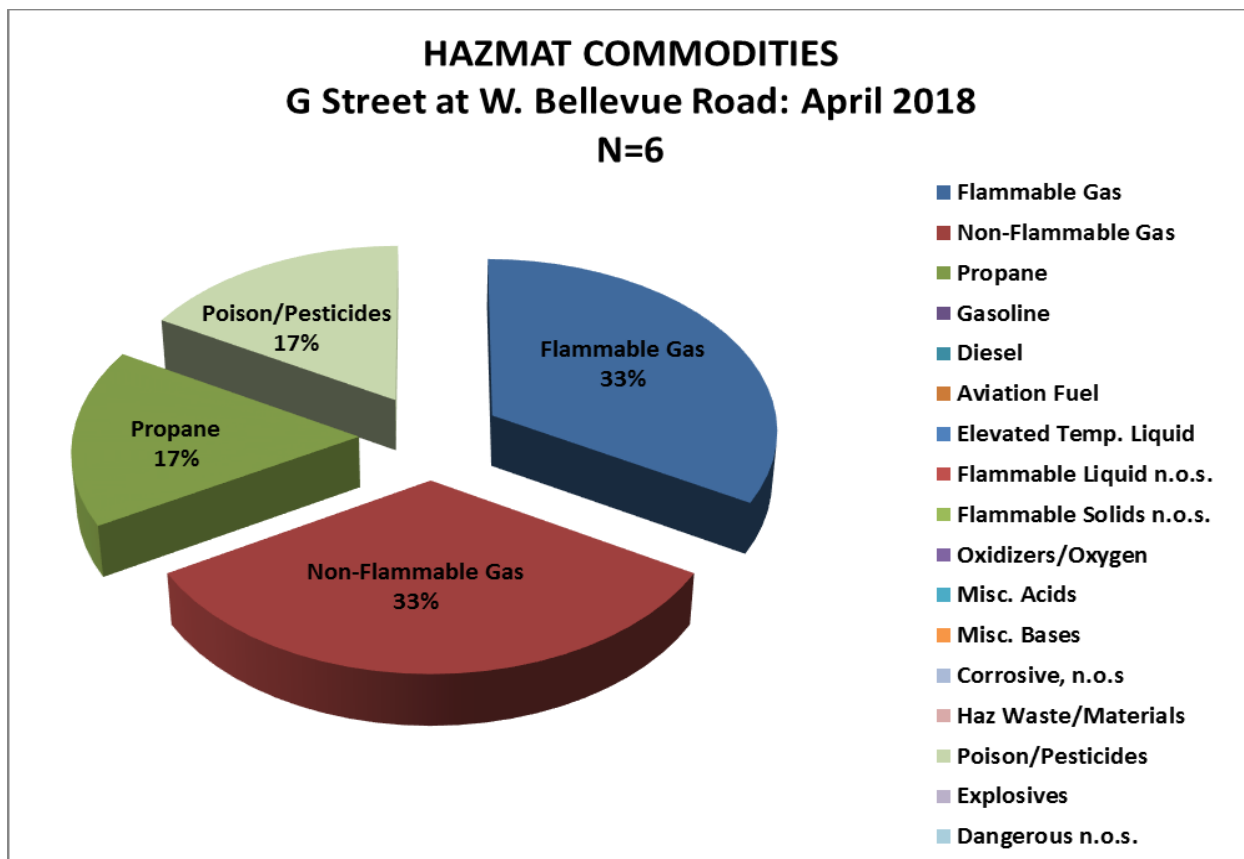
During the survey, a total of 78 trucks travelled through the intersection. Most of the truck traffic was travelling in both directions along West Bellevue Road and G Street south of the intersection. A lesser portion of truck traffic was observed between the University of California Merced to the east and the survey intersection. Minimal truck traffic was observed along G Street north of the survey intersection. Most of the truck traffic consisted of utility vehicles, construction vehicles, and local delivery vehicles.

Six vehicles were placarded, and 72 were not placarded. Hazardous materials included:

- Flammable Gas: 2 trucks (utility vehicle stake beds)
 - o 1 truck westbound on E. Bellevue Road to southbound on G Street
 - o 1 truck westbound on E. Bellevue Road through the intersection
- Non-Flammable Gas: 2 trucks (utility vehicle stake beds)
 - o 1 truck westbound on E. Bellevue Road to southbound on G Street
 - o 1 truck westbound on E. Bellevue Road through the intersection
- Propane (1075): 1 truck (high-pressure tanker)
 - o 1 truck southbound on G Street through the intersection
- Pesticide Liquid (2903): 1 truck (utility vehicle towing tank)
 - o 1 truck eastbound on W. Bellevue Road through the intersection

Hazardous materials transported through this intersection were primarily flammable and non-flammable gas canisters on stake beds originating from the direction of the University of California at Merced. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling through the intersection are shown below.



Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.



2.3.8 Highway 99 at East Mission Avenue – Southbound Ramps

One 6-hour placard survey was performed at the off-ramp and on-ramps to the southbound lane of Highway 99 at the interchange of Highway 99 and East Mission Avenue. This survey was performed in conjunction with freeway placard survey at this interchange, which is described in detail in Section 2.4 below. Traffic through this interchange was directed to and from the secondary roads in the city. The survey points are located along the southern boundary of the city limits.



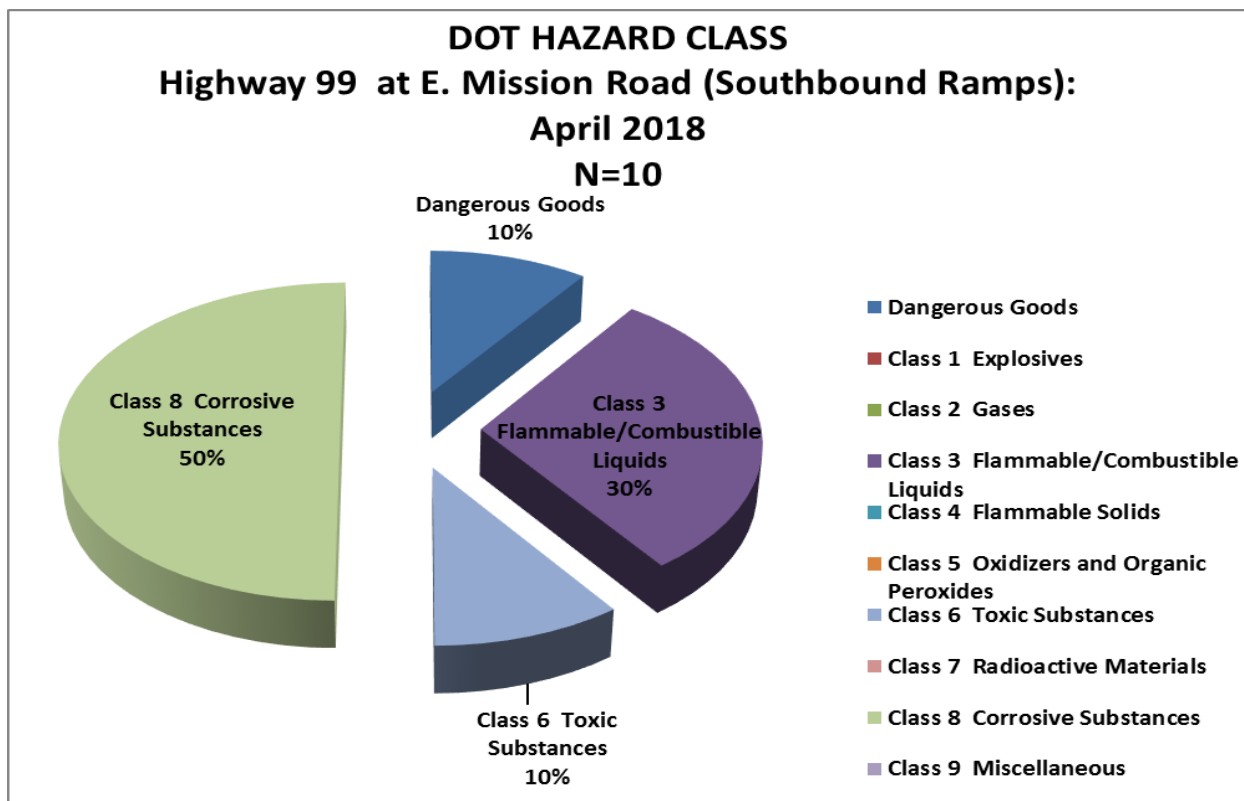
The survey was completed on April 11, 2018 between 9:00 am and 12:00 pm and between 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

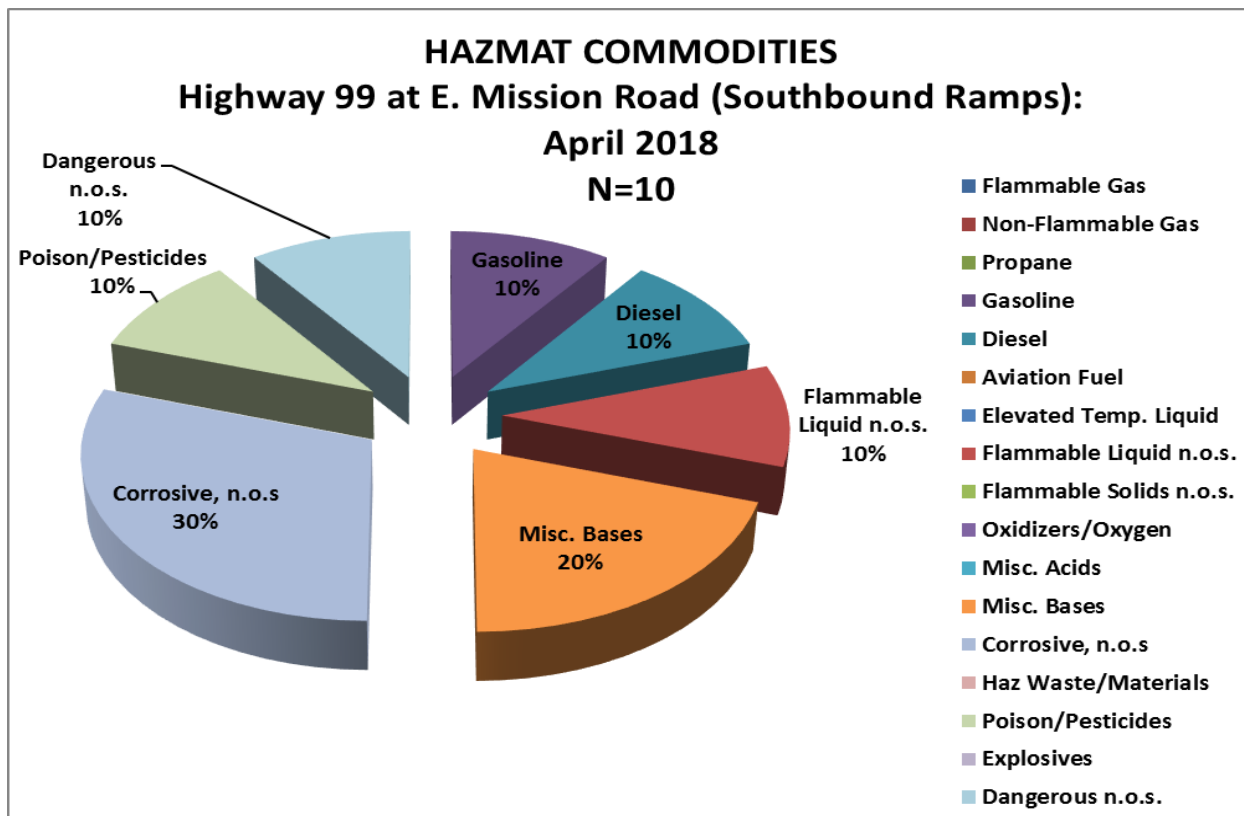
During the survey, a total of 258 trucks travelled through the intersection and on and off the southbound lanes of the freeway. Truck traffic was generally equally divided between trucks exiting and entering the freeway, and those vehicles travelling through the intersection along East Mission Avenue. Most of the truck traffic consisted of semi-truck trailers with lower numbers of tankers, construction vehicles, utility vehicles, and local delivery vehicles.

Ten vehicles were placarded, and 248 were not placarded. Hazardous materials included:

- Flammable Liquid: 1 truck (semi-truck trailer)
 - o 1 truck eastbound on East Mission Avenue through the intersection
- Gasoline (1203): 1 truck (utility vehicle hauling tank)
 - o 1 truck exiting freeway to eastbound along East Mission Avenue
- Diesel (1993): 1 truck (non-pressure tanker)
 - o 1 truck eastbound on East Mission Avenue through the intersection
- Pesticide Liquid (2903): 1 truck (non-pressure tanker)
 - o 1 truck eastbound on East Mission Avenue through the intersection
- Corrosive n.o.s.: 3 trucks (semi-truck trailers)
 - o 1 truck exiting freeway to eastbound along East Mission Avenue
 - o 1 truck exiting freeway to westbound along East Mission Avenue
 - o 1 truck eastbound on East Mission Avenue through the intersection
- Lithium Hydroxide (2680): 1 truck (corrosive tanker)
 - o 1 truck westbound on East Mission Avenue through the intersection
- Corrosive Liquid, basic, inorganic (3266): 1 truck (corrosive tanker)
 - o 1 truck exiting freeway to eastbound along East Mission Avenue
- Dangerous: 1 truck (semi-truck trailer)
 - o 1 truck eastbound on East Mission Avenue through the intersection

A variety of hazardous materials was travelling through this intersection without entering the freeway and could be considered local traffic. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling through the southbound ramps area are shown below.





2.3.9 Highway 99 at East Mission Avenue – Northbound Ramps

One 6-hour placard survey was performed at the off-ramp and on-ramp to the northbound lane of Highway 99 at the interchange of Highway 99 and East Mission Avenue. This survey was performed in conjunction with freeway placard survey at this interchange, which is described in detail in Section 2.4 below. Traffic through this interchange was directed to and from the secondary roads in the City. The survey points are located along the southern boundary of the city limits.



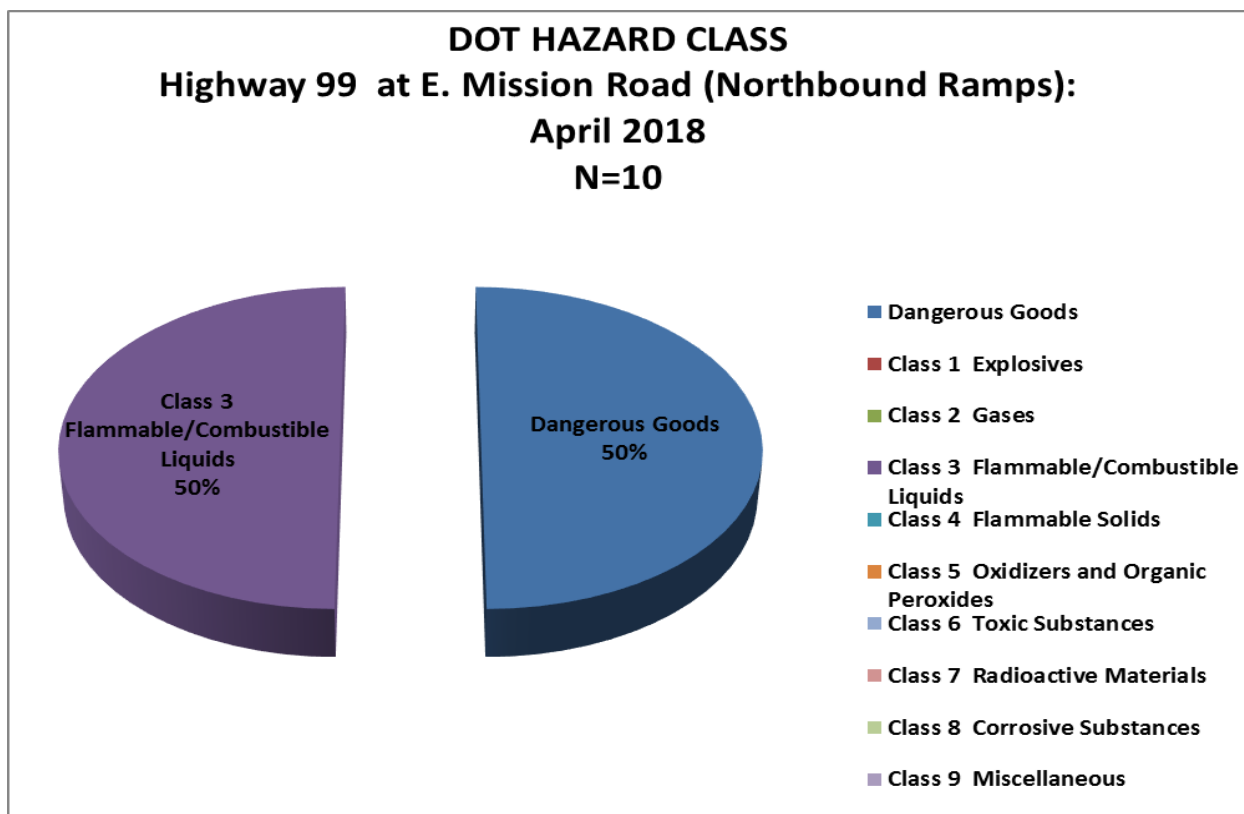
The survey was completed on April 11, 2018 between 9:00 am and 12:00 pm and from 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

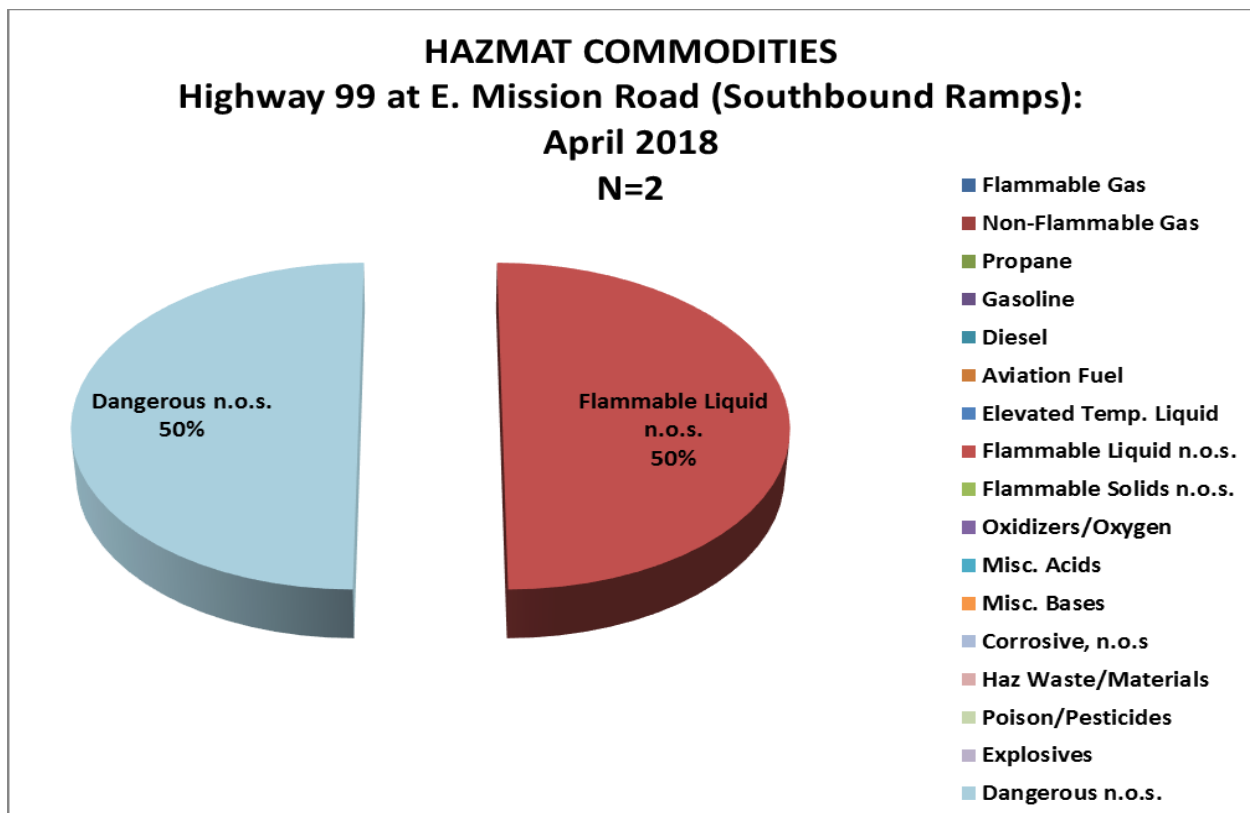
During the survey, a total of 65 trucks travelled through the intersection and on and off the southbound lanes of the freeway. Truck traffic was generally heavier on the on-ramp than the off-ramp. Most of the truck traffic consisted of semi-truck trailers with much lower numbers of tankers, utility vehicles, and local delivery vehicles.

Two vehicles were placarded, and 63 were not placarded. The hazardous materials were observed travelling on the on-ramp to northbound Highway 99. Hazardous materials included:

- Flammable Liquid: 1 truck (semi-truck trailer)
- Dangerous: 1 truck (semi-truck trailer)

The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





2.3.10 Highway 99 at Franklin Road – Ramps

One 6-hour placard survey was performed at the off-ramp and on-ramp at the interchange of Highway 99 and Franklin Road. This survey was performed in conjunction with freeway placard survey at this interchange, which is described in detail in Section 2.4 below. Although this survey point is located west of the city limits, traffic through this interchange may be directed to and from the secondary roads in the city.



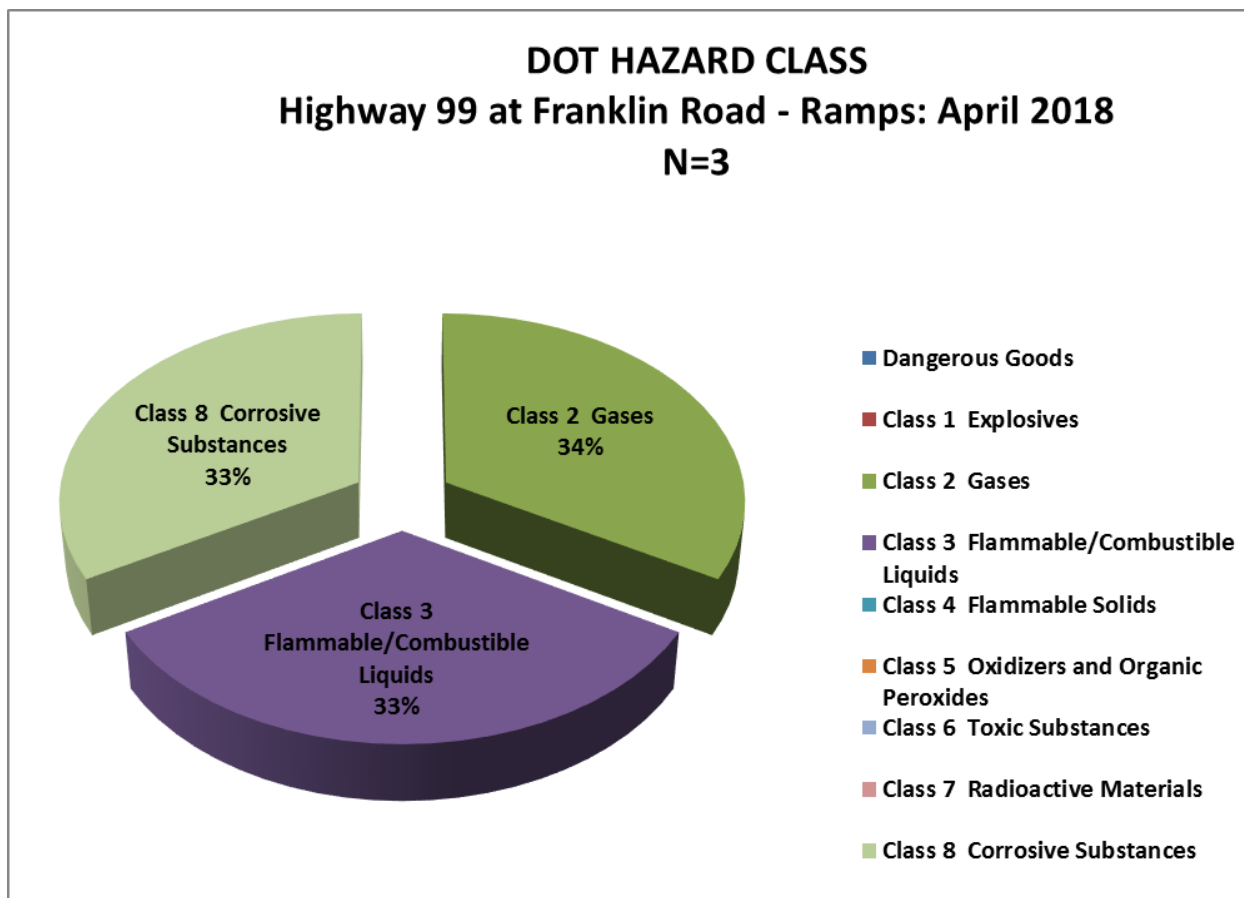
The survey was completed on April 11, 2018 between 9:00 am and 12:00 pm and between 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted. The source and destination of the vehicles were noted.

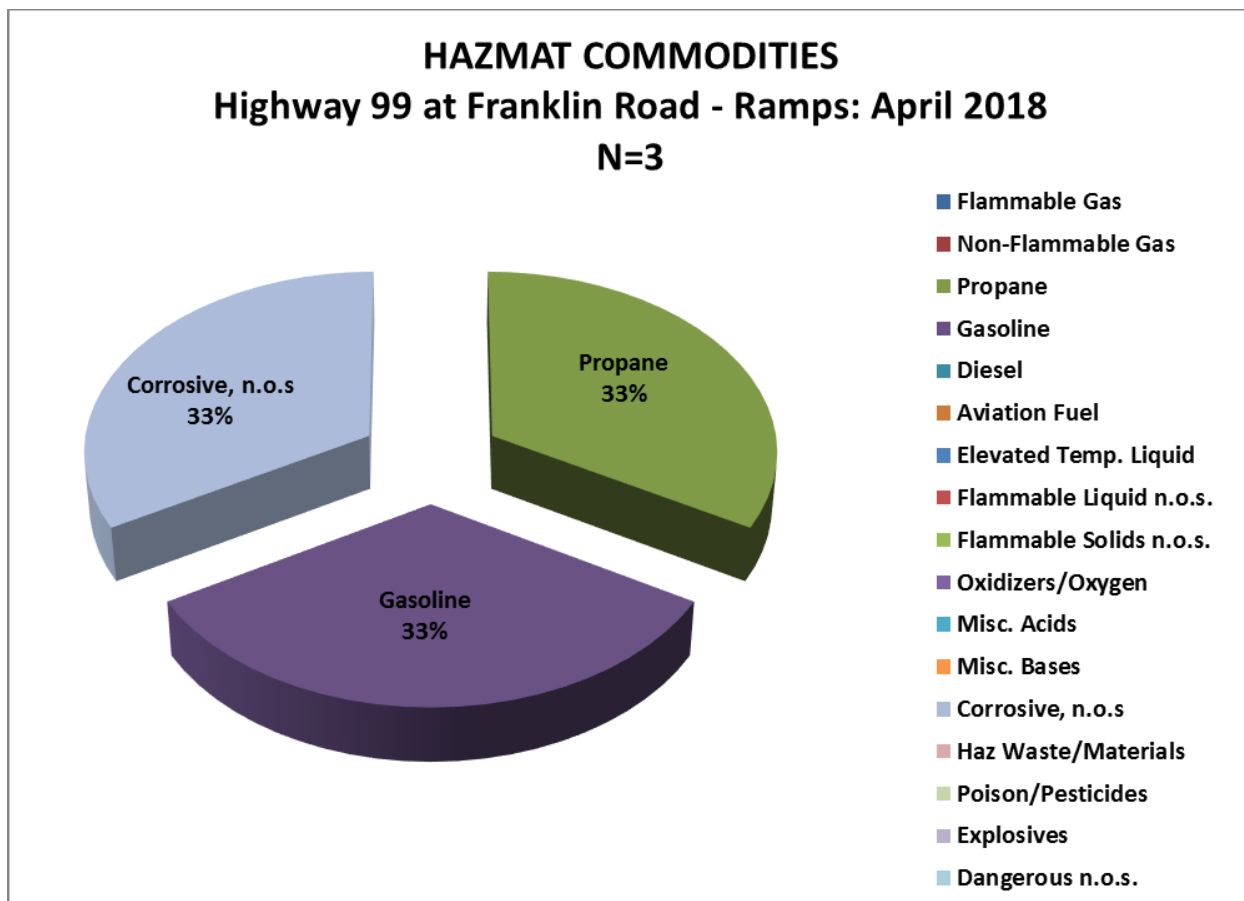
During the survey, a total of 83 trucks travelled through the intersection. Sixteen trucks entered the freeway via the on-ramp, and 67 trucks exited the highway via the off-ramp during the survey period. Most of the truck traffic consisted of semi-truck trailers, utility vehicles, and local delivery vehicles.

Three vehicles were placarded, and 80 were not placarded. All 3 placarded vehicles were observed exiting the freeway via the off-ramp. Hazardous materials included:

- Propane (1075): 1 truck (high pressure tanker)
- Gasoline (1203): 1 truck (non-pressure tanker)
- Corrosive: 1 truck (semi-truck trailer)

The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling through the intersection are shown below.



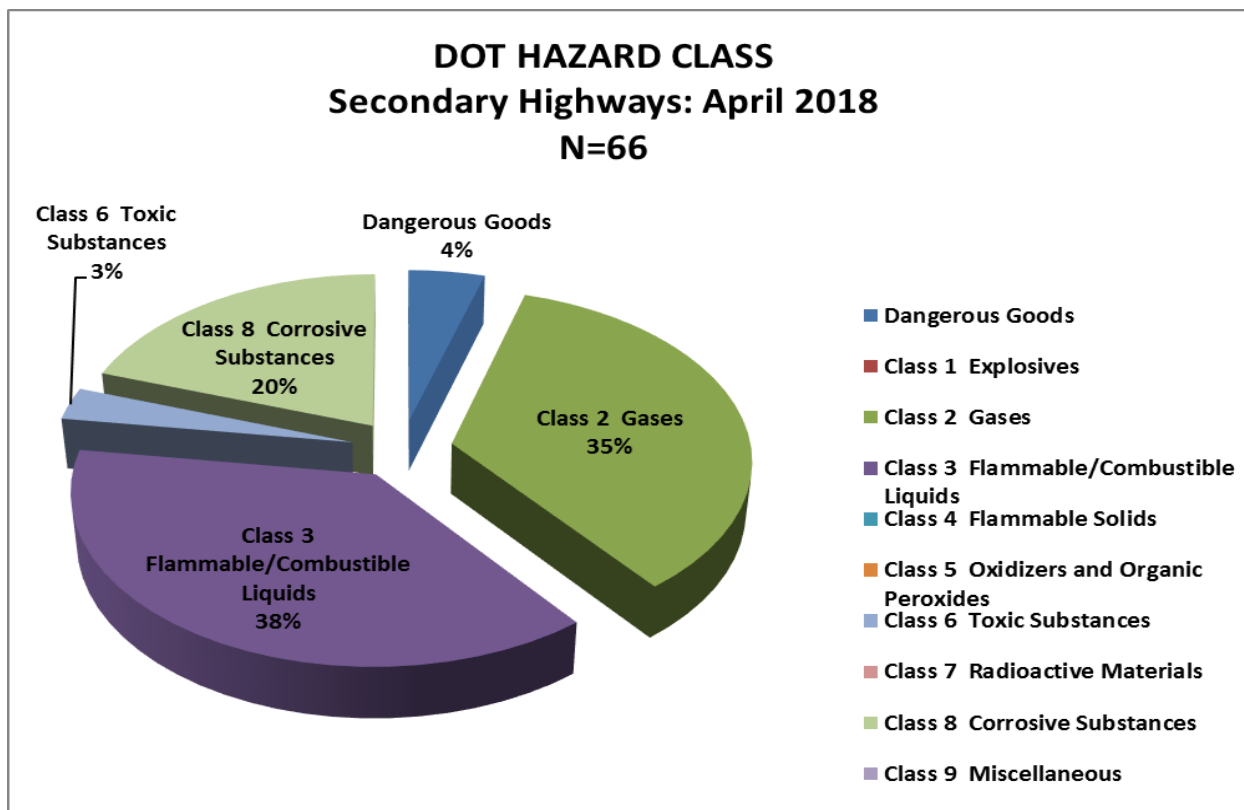
Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

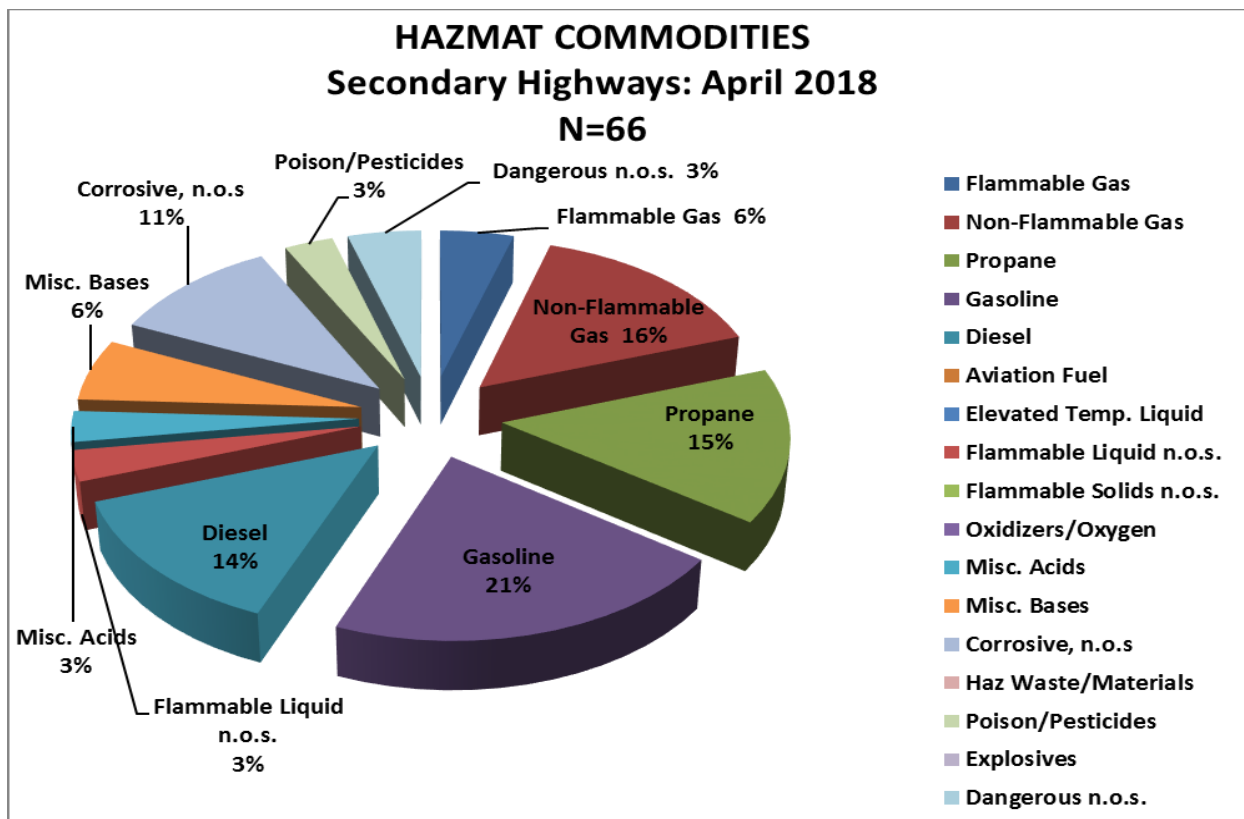


2.3.11 Secondary Highways and Roadways Summary

An evaluation of the hazardous materials transportation along the secondary highways and roadways in and immediately adjacent to the city of Merced, including traffic on and off the freeway ramps at the Highway 99 survey points is provided based on the information contained above in Sections 2.3.1 through 2.3.10. A total of 1,642 trucks travelled through these observation points during the survey, and 66 of the vehicles were placarded with hazardous materials.

A summary of the general categories of hazardous materials travelling along the secondary highways and roadways during the survey are shown in the charts below.





The data above for the secondary highways and roadways are summarized as follows:

- Trucks designated as transporting hazardous materials represented 4.1% of the total trucks travelling on the secondary highways and roadways.
- The total number of trucks travelling along the secondary highways and roadways consists of 1,642 vehicles, which represents 17% of the total truck traffic travelling through the city of Merced during the survey.
- The total number of trucks containing hazardous cargo travelling along the secondary highways and roadways consists of 66 vehicles, which represents 24% of the total hazardous cargo truck traffic travelling through the city of Merced during the survey.
- Transportation of hazardous materials in these areas tends to be dominated by fuel deliveries, and at some locations, fuels were the only hazardous commodity transported by tanker trucks.
- The on-ramps, off-ramps, and intersections near Highway 99 tend to have wider variety of hazardous materials travelling through these areas, including fuels, corrosive materials, and dangerous goods.

- Hazardous materials at West Bellevue Road and G Street consisted primarily of gases, some of which were originating in the direction of the University of California at Merced.
- Vehicles transporting pesticides, ostensibly for agricultural usage, were observed at some of the survey points.
- The observation point at Highway 59 and Rahilly Road contained the highest truck traffic as well as the most variety of hazardous materials relative to the other survey points on the secondary highways and roadways.
- Land use along Highway 59 just south of the City of Merced is primarily industrial and contains various industries such as chemical companies, compressed air facilities and agricultural supply facilities.
- Tanker trucks carrying hazardous chemicals other than fuels (i.e. corrosive materials, acidic and basic liquids) were observed along Highway 59 at Rahilly Road and at the Highway 99 interchanges.
- None of the hazardous materials observed being transported along the secondary highways and roadways during the survey are chemicals that would require action under the Initial Isolation and Protective Action Distances as described in the DOT Emergency Response Guidebook (ERG).

2.4 California State Highway 99

Placard Surveys were performed on the northbound and southbound freeway lanes at three locations along California Highway 99. Southbound traffic was surveyed Atwater-Merced Expressway interchange north of the city of Merced, and from the East Mission Avenue interchange at the southern boundary of the city. Northbound traffic was surveyed from the Franklin Road interchange north of the city, and from the East Mission Avenue interchange along the southern boundary of the city. These surveys were completed to determine patterns of transport of hazardous materials along the Highway 99 Freeway, which is routed through the center of the city. It was not possible to survey all of the interchanges within the city, and a survey of the freeway at the northern and southern boundaries of the city was completed. A compilation of the data obtained from all of the Highway 99 surveys are presented below in Section 2.4.5.

Each of the surveys was performed over a 6-hour period with survey times of 9:00 am to 12:00 pm and 1:00 pm to 4:00 pm.

2.4.1 Highway 99 Southbound at the Atwater-Merced Expressway

One 6-hour placard survey was performed at the southbound lanes on Highway 99 at the interchange of Highway 99 and the Atwater-Merced Expressway on April 10, 2018. The survey point is located northwest of the main portion of the city within the County property.



The survey was completed on April 11, 2018 between 9:00 am and 12:00 pm and between 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted.

During the survey, a total of 2,205 trucks travelled southbound on Highway 99 at this location. The percentages of truck types observed during this survey were as follows:

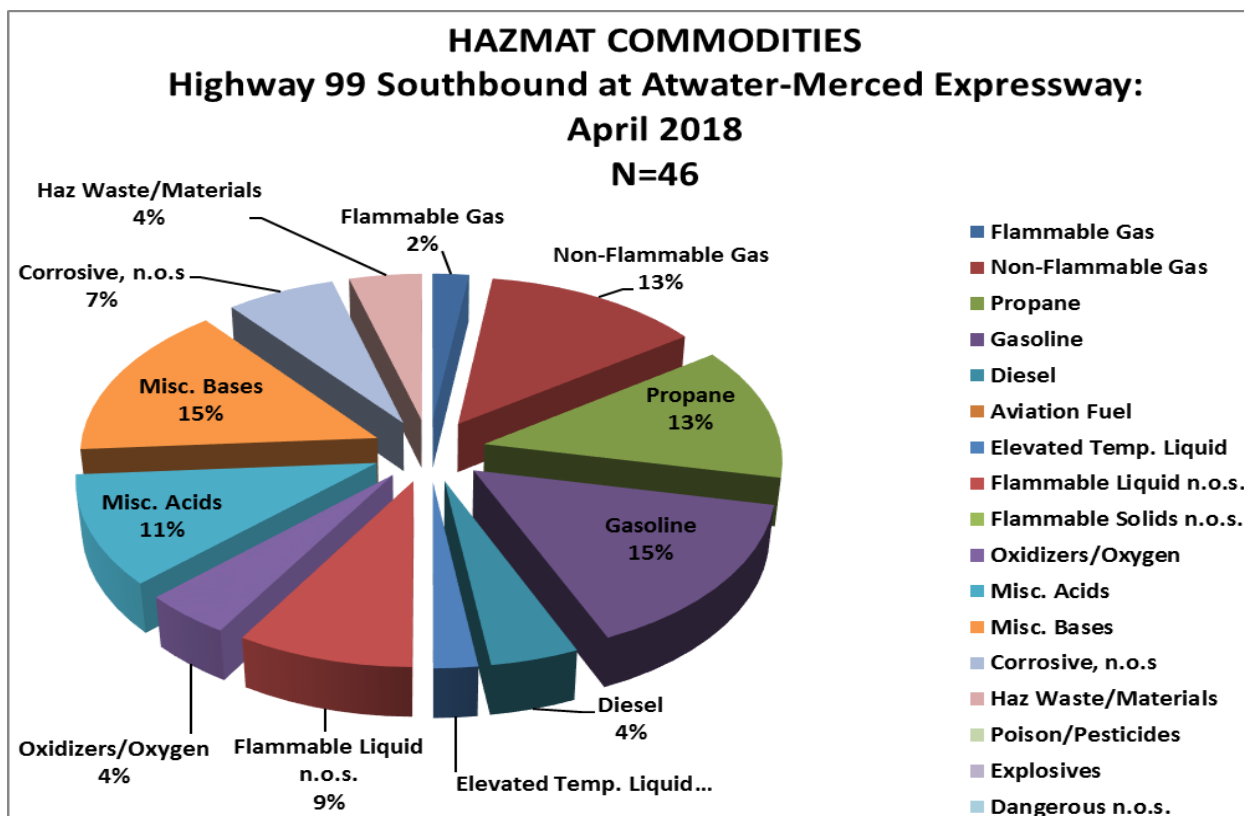
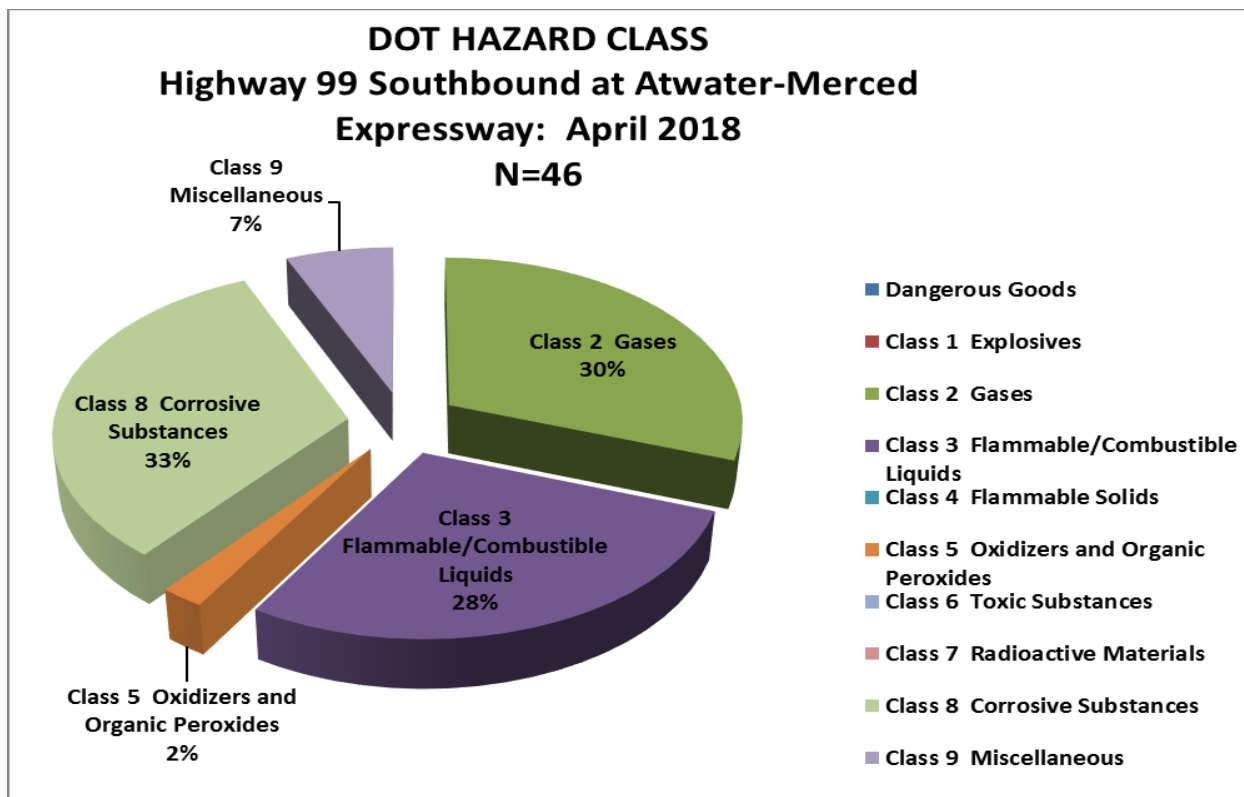
- 79% semi-truck trailers
- 9% tankers
- 7% local delivery vehicles
- 2% utility vehicles
- 2% dry bulk cargo vehicles
- 1% construction and other vehicles

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

Forty-six vehicles were placarded, and 2,159 were not placarded. Hazardous materials included:

UN ID NO.	COMMODITY	NO. OF TRUCKS
N/A	Flammable Gas	1
N/A	Non Flammable Gas	2
N/A	Oxygen	1
1046	Helium	1
1075	Propane	6
1951	Argon, refrigerated liquid	2
1977	Nitrogen, refrigerated liquid	1
1170	Ethanol, Ethyl Alcohol	2
1203	Gasoline	7
1987	Alcohols n.o.s.	1
1993	Diesel Fuel	2
2313	Picolines	1
2014	Hydrogen Peroxide	1
N/A	Corrosive	2
1791	Hypochlorite Solution	1
1824	Sodium Hydroxide Solution	3
1830	Sulfuric Acid with more than 51% acid	4
1903	Disinfectant, Corrosive, Liquid, n.o.s.	1
2031	Nitric Acid	1
3266	Corrosive Liquid, basic, inorganic, n.o.s.	3
3077	Environmentally Hazardous Substances, solid, n.o.s.	1
3082	Hazardous Waste Liquid, n.o.s.	1
3257	Elevated Temperature Liquid, n.o.s., at or above 100C, and below its flash point	1

The hazardous materials transported on Highway 99 southbound at the survey location are covered by 5 of the 10 hazard classes and 12 of the 17 commodity designations. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.



Photographs of the trucks travelling southbound past this survey point are shown below.





2.4.2 Highway 99 Northbound at Franklin Road

One 6-hour placard survey was performed northbound lanes of Highway 99 at the interchange of Highway 99 and Franklin Road on April 10, 2018. The survey point is located northwest of the main portion of the city within the County property.



The survey was completed on April 10, 2018 between 9:00 am and 12:00 pm and between 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted.

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

During the survey, a total of 1,840 trucks travelled northbound on Highway 99 at this location. The percentages of truck types observed during this survey were as follows:

- 73% semi-truck trailers
- 9% tankers
- 8% local delivery vehicles
- 6% utility vehicles
- 2% dry bulk cargo vehicles
- 2% construction and other vehicles

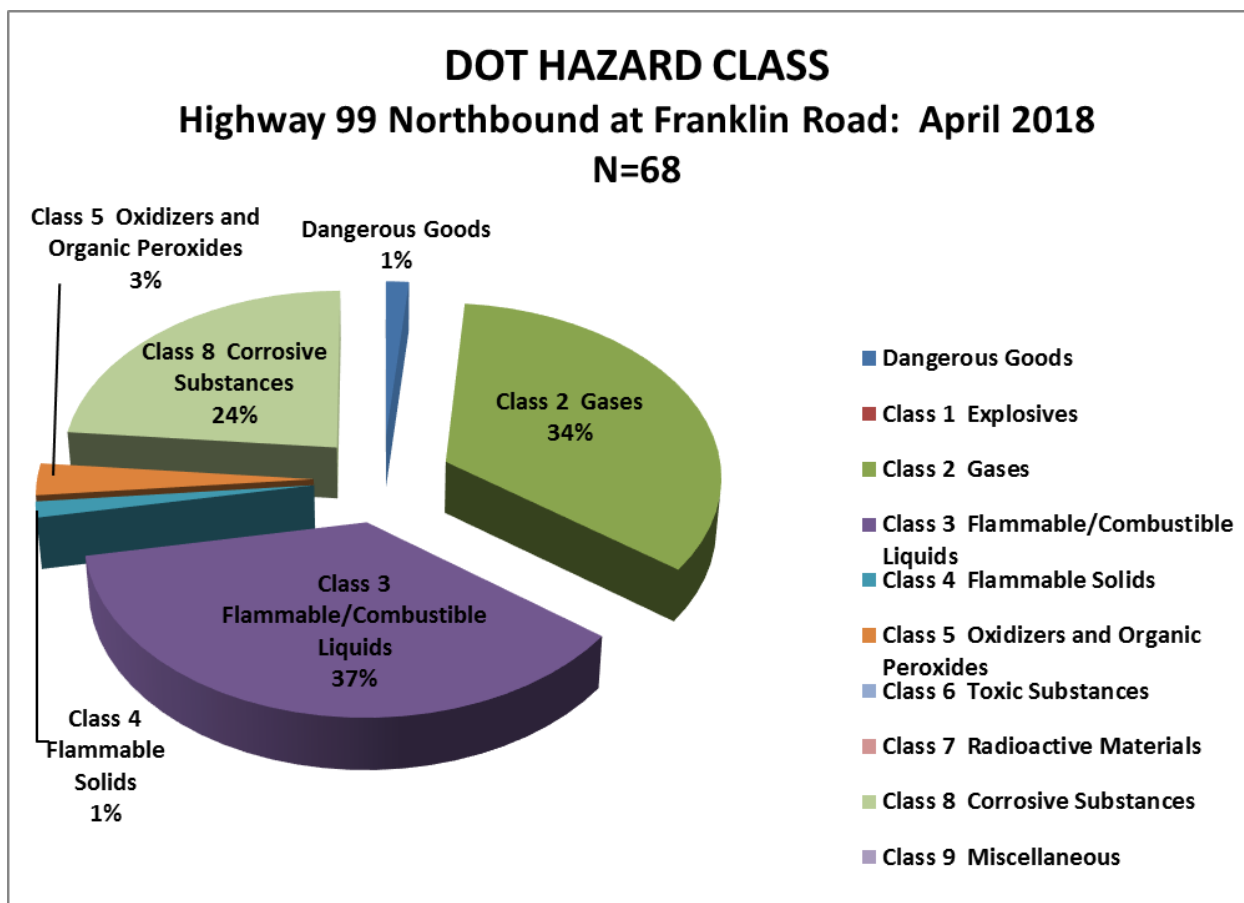
Sixty-eight vehicles were placarded, and 1,772 were not placarded. Hazardous materials included:

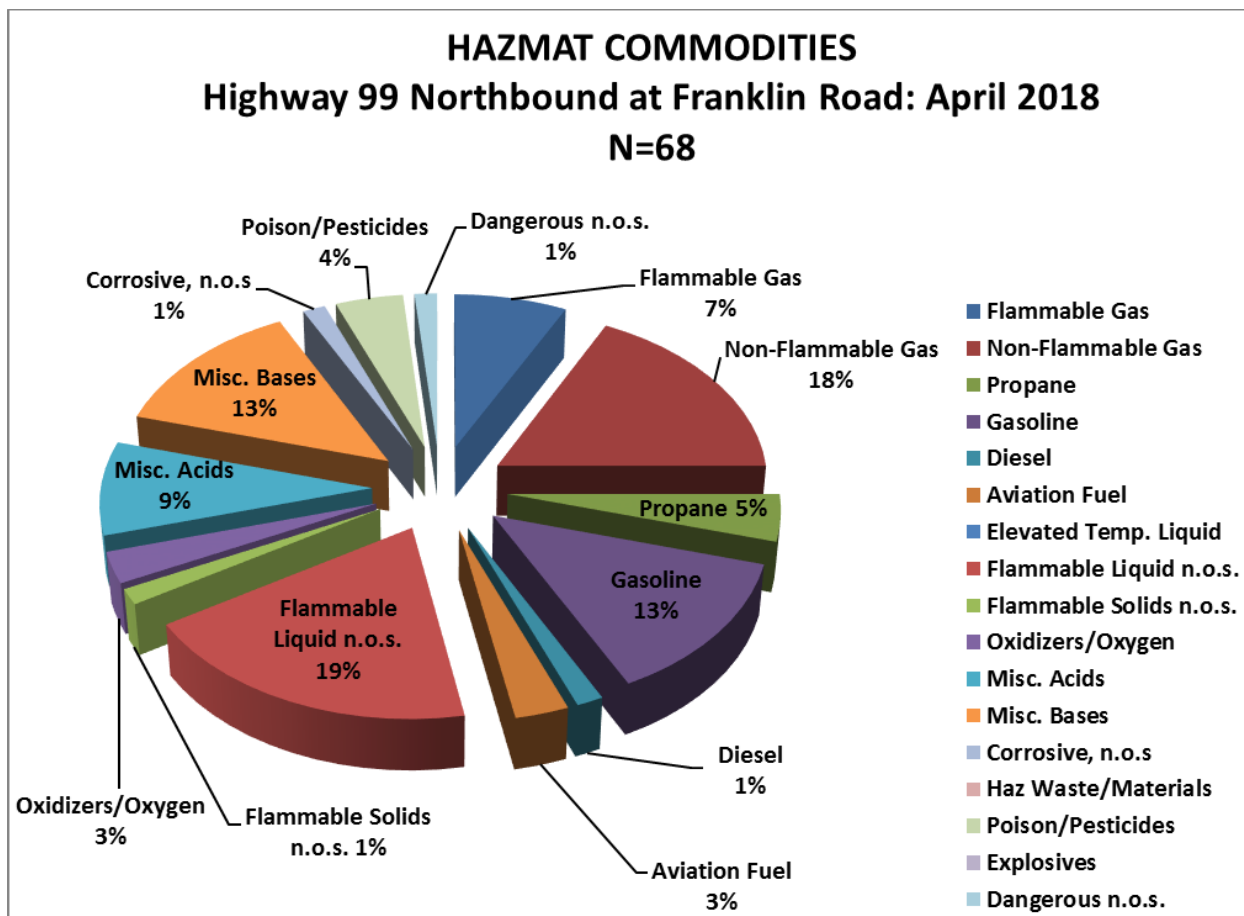
UN ID NO.	COMMODITY	NO. OF TRUCKS
N/A	Flammable Gas	4
N/A	Non Flammable Gas	5
N/A	Inhalation Hazard	3
1005	Ammonia, anhydrous	1
1049	Hydrogen, compressed	1
1075	Propane	3
1951	Argon, refrigerated liquid	1
1977	Nitrogen, refrigerated liquid	2
2187	Carbon Dioxide, refrigerated liquid	3
N/A	Flammable Liquid n.o.s.	3
1170	Ethanol, Ethyl Alcohol	4
1203	Gasoline	9
1914	Butyl Propionates	1
1264	Paraldehyde	1
1268	Petroleum Distillates, n.o.s	1
1863	Aviation Fuel	2
1921	Propyleneimine, stabilized	1
1987	Alcohols n.o.s.	1
1993	Diesel Fuel	1
1993	Compound, Tree Or Weed Killing Liquid (flammable)	1
N/A	Dangerous When Wet	1
2014	Hydrogen Peroxide	1
N/A	Oxidizer	1
N/A	Corrosive	1
1789	Hydrochloric Acid	1

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

1791	Hypochlorite Solution	3
1824	Sodium Hydroxide Solution	2
1830	Sulfuric Acid with more than 51% acid	4
2796	Sulfuric Acid with less than 51% acid, Battery Fluid	1
3262	Corrosive Solid, basic, inorganic, n.o.s.	1
3266	Corrosive Liquid, basic, inorganic, n.o.s.	3
N/A	Dangerous	1

The hazardous materials transported on Highway 99 northbound at the survey location are covered by 6 of the 10 hazard classes and 14 of the 17 commodity designations. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling northbound past this survey point are shown below.



Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.



2.4.3 Highway 99 Southbound at East Mission Avenue

One 6-hour placard survey was performed at the southbound lanes of Highway 99 at the interchange of Highway 99 and East Mission Avenue on April 11, 2018. The survey point is located along the southern boundary of the city limits.



The survey was completed on April 11, 2018 between 9:00 am and 12:00 pm and between 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted.

During the survey, a total of 2,335 trucks travelled southbound on Highway 99 at this location. The percentages of truck types observed during this survey were as follows:

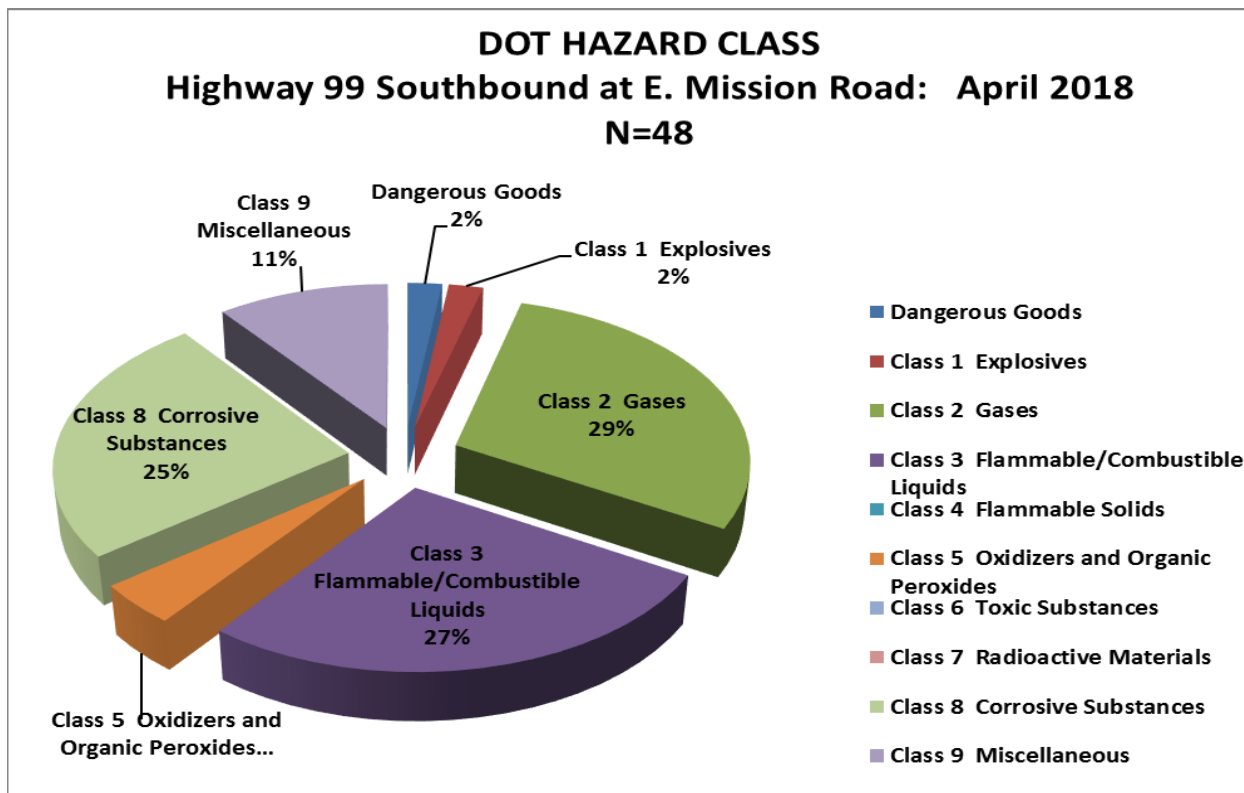
- 79% semi-truck trailers
- 8% tankers
- 5% local delivery vehicles
- 5% utility vehicles
- 2% dry bulk cargo vehicles
- 1% construction and other vehicles

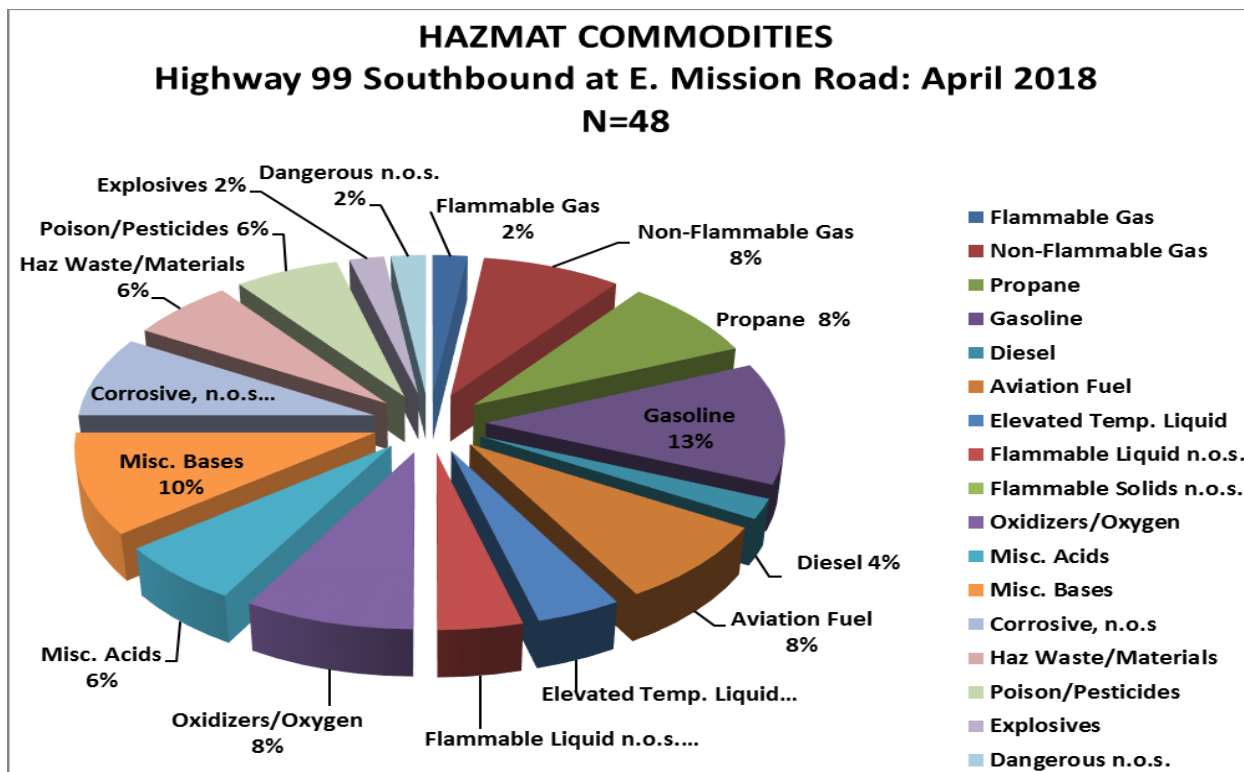
Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

Forty-eight vehicles were placarded, and 2,287 were not placarded. Hazardous materials included:

UN ID NO.	COMMODITY	NO. OF TRUCKS
N/A	Blasting Agents	1
N/A	Flammable Gas	1
N/A	Non Flammable Gas	1
N/A	Inhalation Hazard	2
1017	Chlorine	1
1072	Oxygen, compressed	1
1073	Oxygen, refrigerated liquid	1
1075	Propane	4
1977	Liquid Nitrogen	2
2187	Carbon Dioxide	1
1170	Ethanol, Ethyl Alcohol	1
1203	Gasoline	6
1268	Petroleum Distillates, n.o.s.	1
1863	Aviation Fuel	4
1993	Diesel Fuel	1
1486	Potassium Nitrate	1
2014	Hydrogen Peroxide	1
N/A	Corrosive	4
1791	Hypochlorite Solution	1
1824	Sodium Hydroxide Solution	2
1830	Sulfuric Acid with more than 51% acid	2
2672	Ammonium Hydroxide with more than 10% and not more than 35% ammonia	1
3264	Corrosive Solid, acidic, inorganic, n.o.s.	1
3266	Corrosive Liquid, basic, inorganic, n.o.s.	1
3077	Environmentally Hazardous Substances, solid, n.o.s.	2
3257	Elevated temperature liquid, n.o.s., at or above 100C, and below its flash point	2
3268	Airbag/Seatbelt Devices	1
N/A	Dangerous	1

The hazardous materials transported on Highway 99 southbound at the survey location are covered by 7 of the 10 hazard classes and 16 of the 17 commodity designations. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.





Photographs of the trucks travelling southbound past this survey point are shown below.



Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.



Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.



2.4.4 Highway 99 Northbound at East Mission Avenue

One 6-hour placard survey was performed on the northbound lanes of Highway 99 at the interchange of Highway 99 and East Mission Avenue on April 11, 2018. The survey points were located along the southern boundary of the city limits.



The survey was completed on April 11, 2018 between 9:00 am and 12:00 pm and between 1:00 pm and 4:00 pm. A total truck count was completed. The numbers and types of vehicles carrying hazardous materials through the survey location and the placard designation were also noted.

During the survey, a total of 1,689 trucks travelled northbound on Highway 99 at this location. The percentages of truck types observed during this survey were as follows:

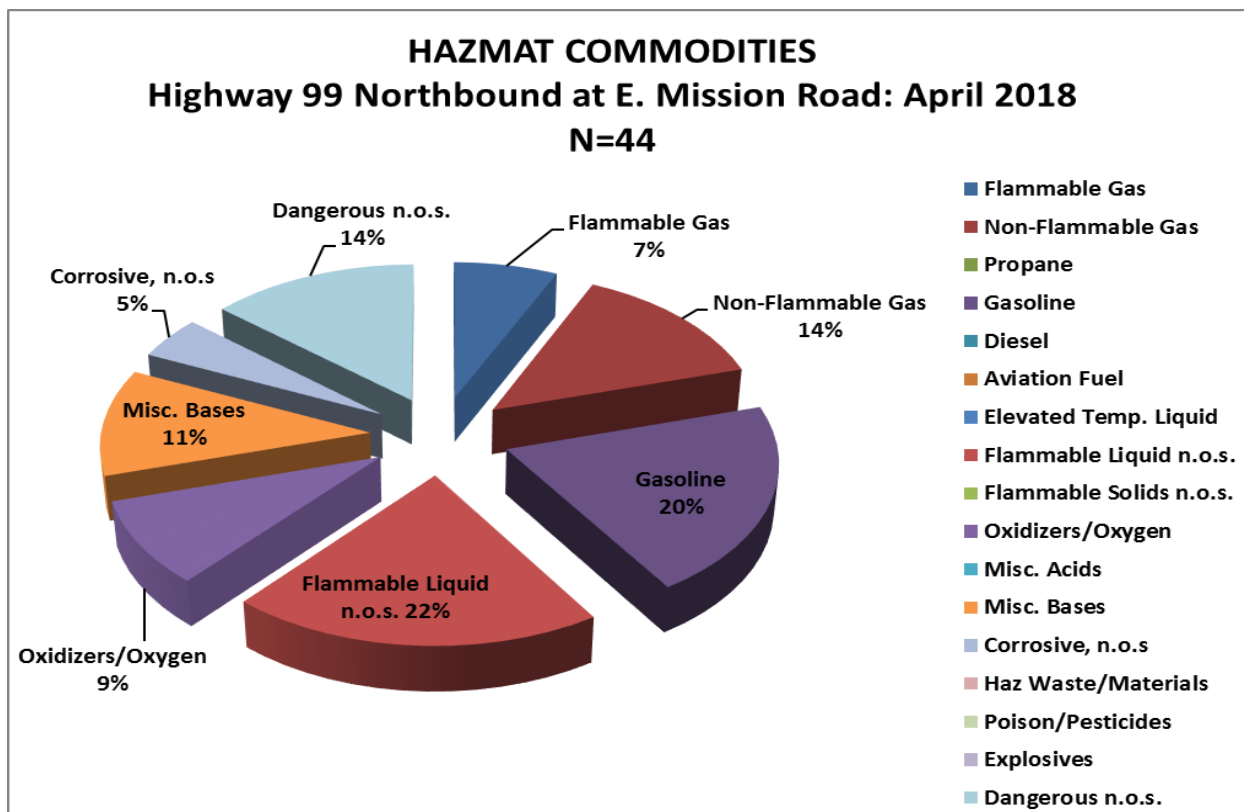
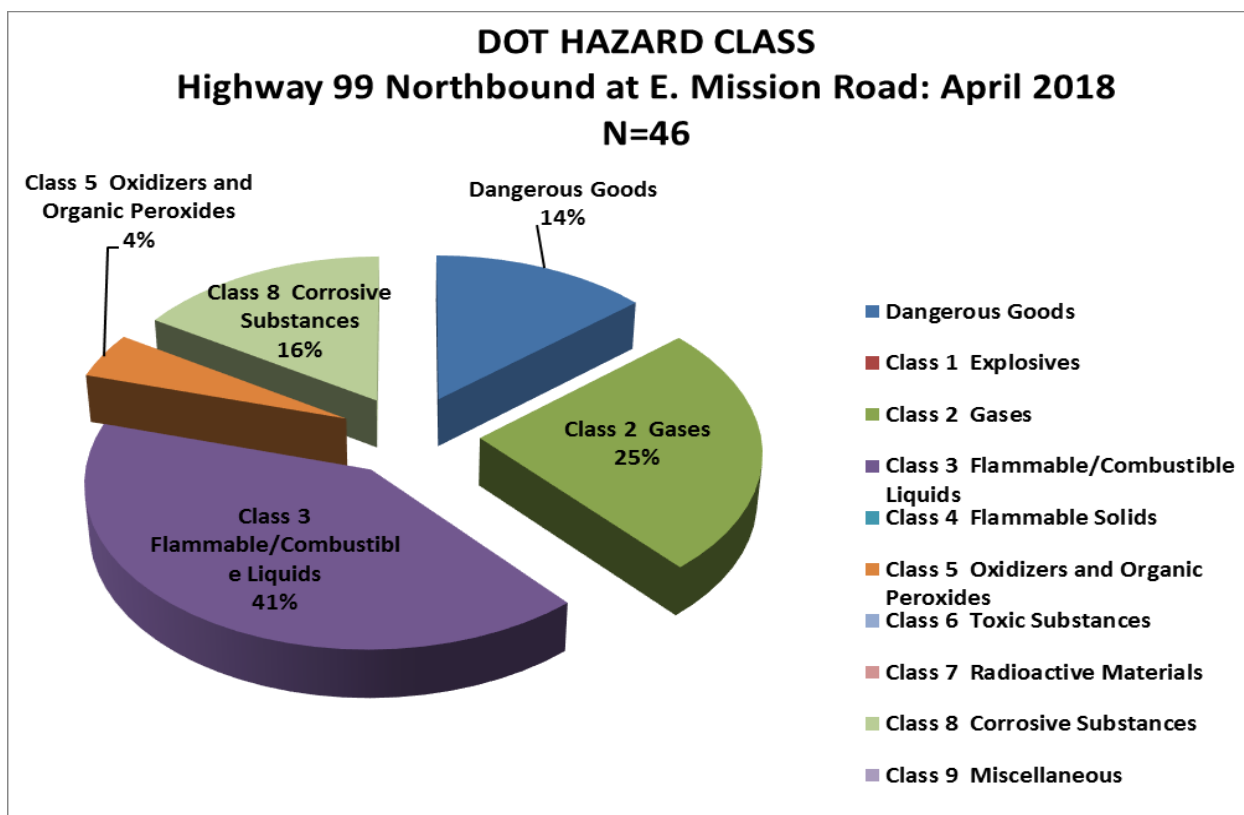
- 78% semi-truck trailers
- 11% tankers
- 5% local delivery vehicles
- <1% utility vehicles
- 2% dry bulk cargo vehicles
- 4% construction and other vehicles

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

Forty-four vehicles were placarded, and 1,645 were not placarded. Hazardous materials included:

UN ID NO.	COMMODITY	NO. OF TRUCKS
N/A	Flammable Gas	1
N/A	Oxygen	2
1012	Butylene	1
1013	Carbon Dioxide, compressed	1
1077	Propylene	1
1973	Chloropentafluoroethane/Chlorodifluoromethane, mixture	1
1977	Nitrogen, refrigerated liquid	4
N/A	Flammable Liquid n.o.s.	3
1170	Ethanol, Ethyl Alcohol	3
1203	Gasoline	9
1267	Petroleum Crude Oil	1
1268	Petroleum Distillates, n.o.s	1
2234	Chlorobenzotrifluorides	1
N/A	Oxidizer	1
N/A	Peroxides	1
N/A	Corrosive	2
1791	Hypochlorite Solution	2
2051	2-diethylaminoethanol	1
2672	Ammonium Hydroxide	1
3263	Corrosive Solid, basic, inorganic, n.o.s.	1
N/A	Dangerous	6

The hazardous materials transported on Highway 99 northbound at the survey location are covered by 5 of the 10 hazard classes and 8 of the 17 commodity designations. The general categories of hazardous materials travelling through this area during the survey are shown in the charts below.



Photographs of the trucks travelling northbound past this survey point are shown below.





2.4.5 Highway 99 Summary

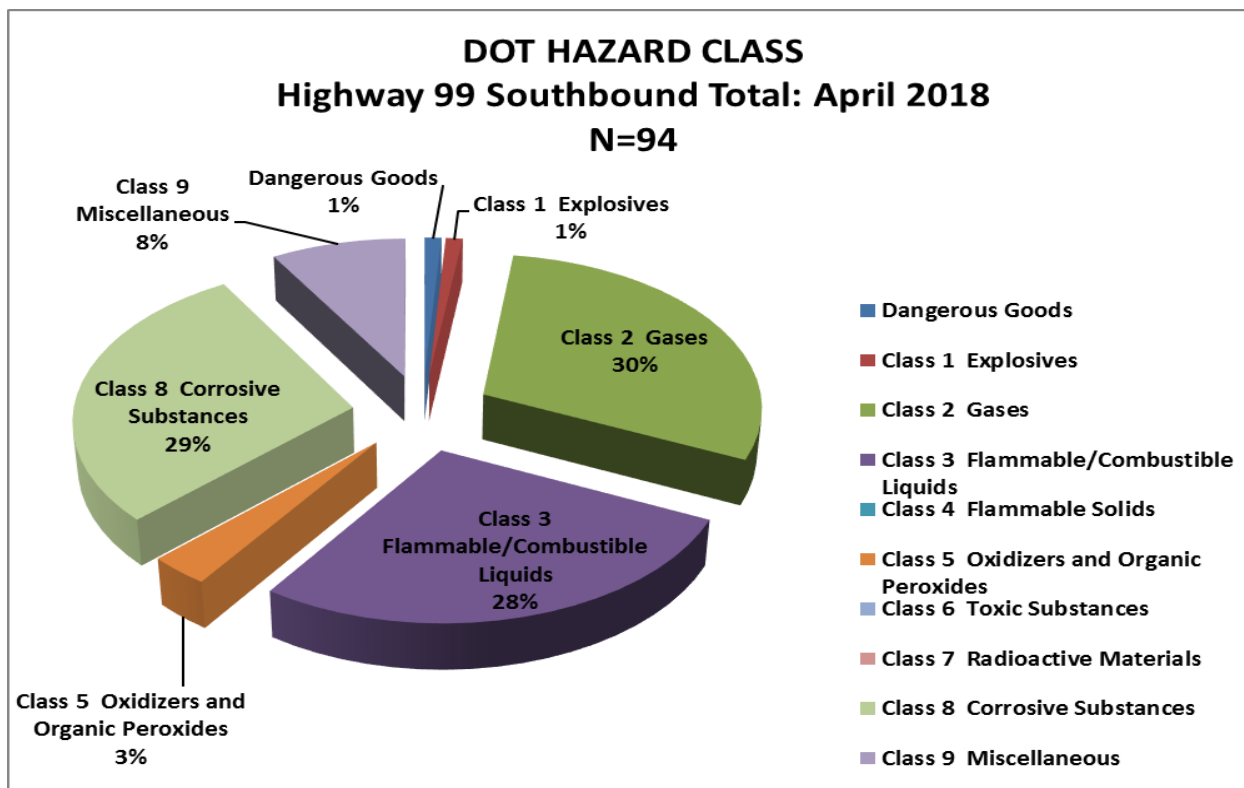
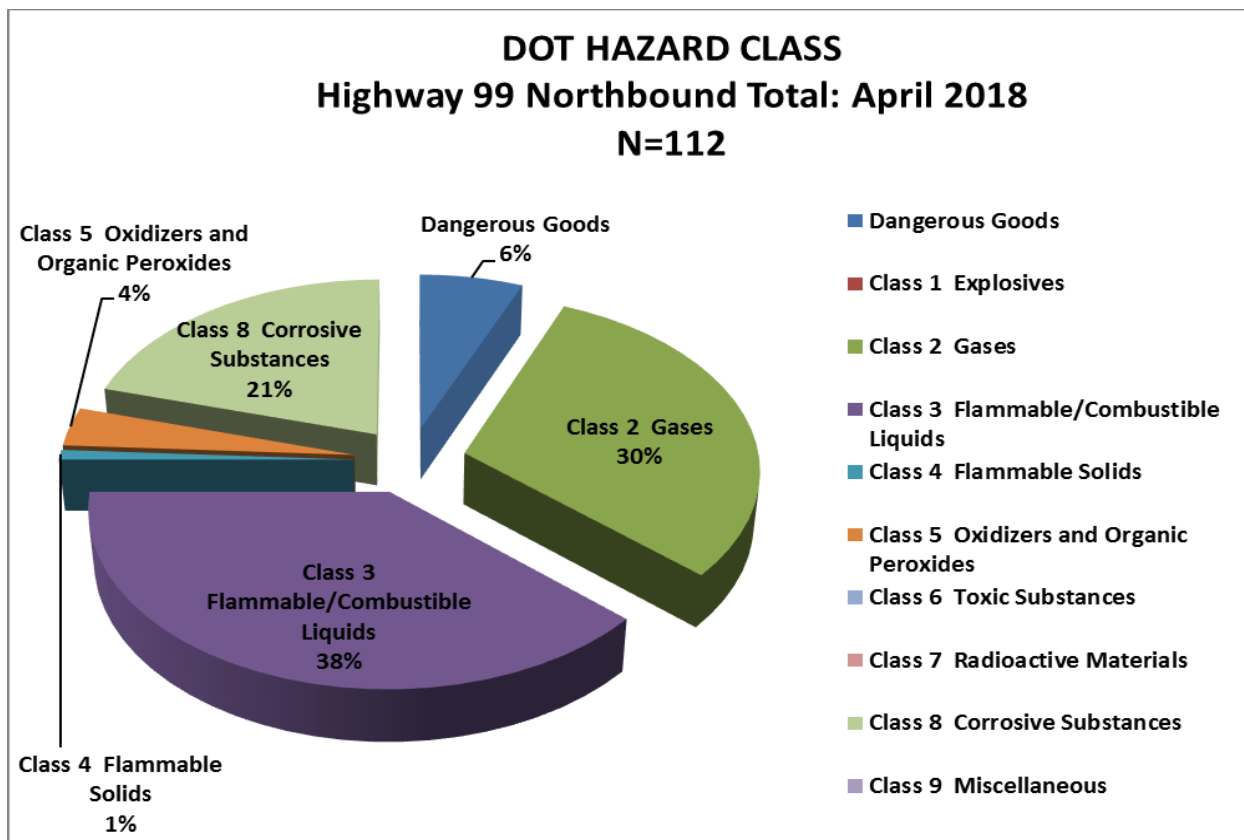
An evaluation of the hazardous materials transportation along Highway 99 running through the city of Merced is provided based on the information contained above in Sections 2.4.1 through 2.4.4. A total of 8,069 trucks travelled through these observation points during the survey, and 206 of the vehicles were placarded with hazardous materials. By utilizing the data contained from the surveys on both April 10 and April 11, 2018 a more comprehensive picture can be obtained concerning hazardous transportation along Highway 99 through the city of Merced.

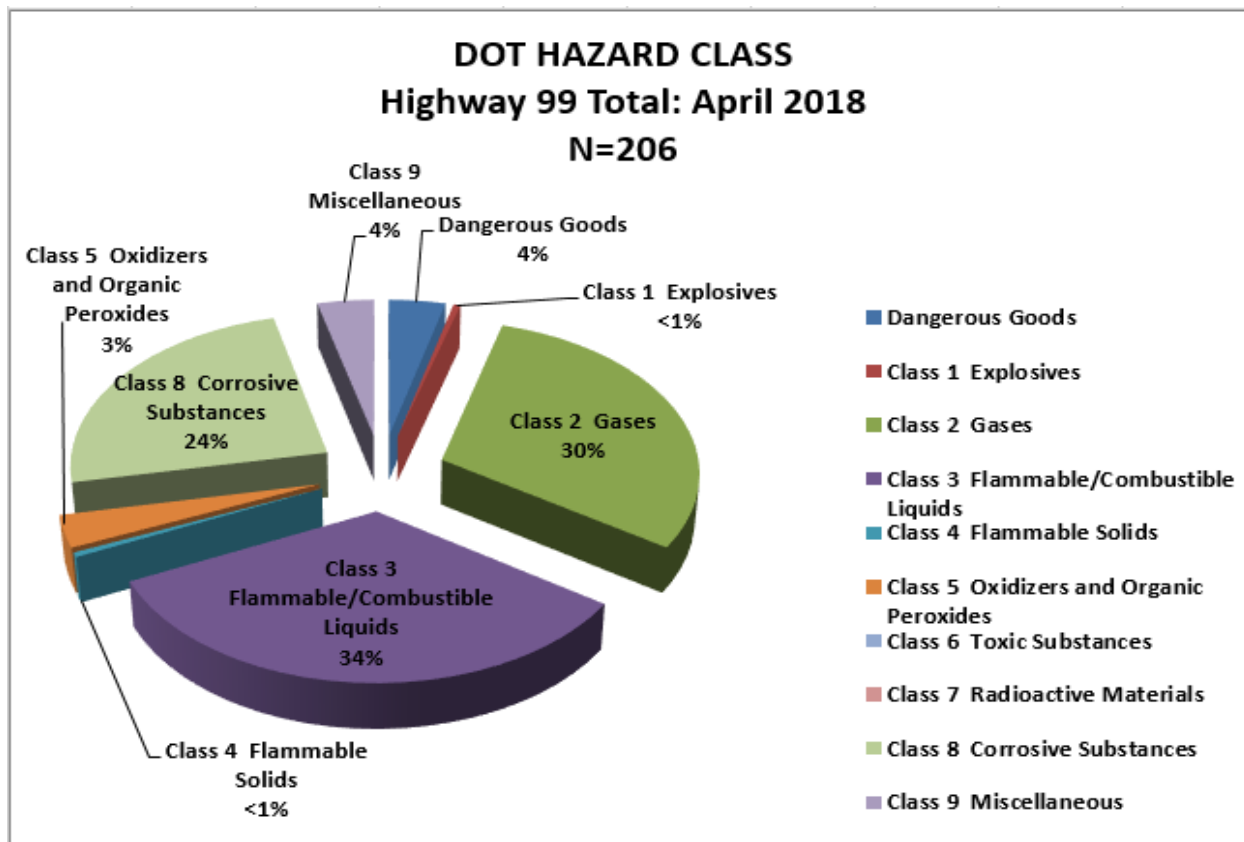
Observations of the hazardous materials transported on and off of Highway 99 at these survey points, as outlined above in Section 2.3, shows that about 5% of the hazardous cargo being transported along Highway 99 actually exited or entered the freeway at these interchanges onto the secondary highways and roadways. This information could be extrapolated to cover the intervening interchanges within the city of Merced between the survey points at the northern and southern ends of the city. The remaining 95% of the hazardous cargo travelling along Highway 99 is travelling through the city of Merced without exiting the freeway.

The hazardous materials transported on Highway 99 on April 10 and April 11, 2018 are covered by the following number of hazard classes:

- Northbound: 6 of 10 hazard classes
- Southbound: 7 of 10 hazard classes
- Total northbound and southbound: 8 of 10 hazard classes

The DOT hazard class categories of hazardous materials travelling along Highway 99 during the survey are shown in the charts below.

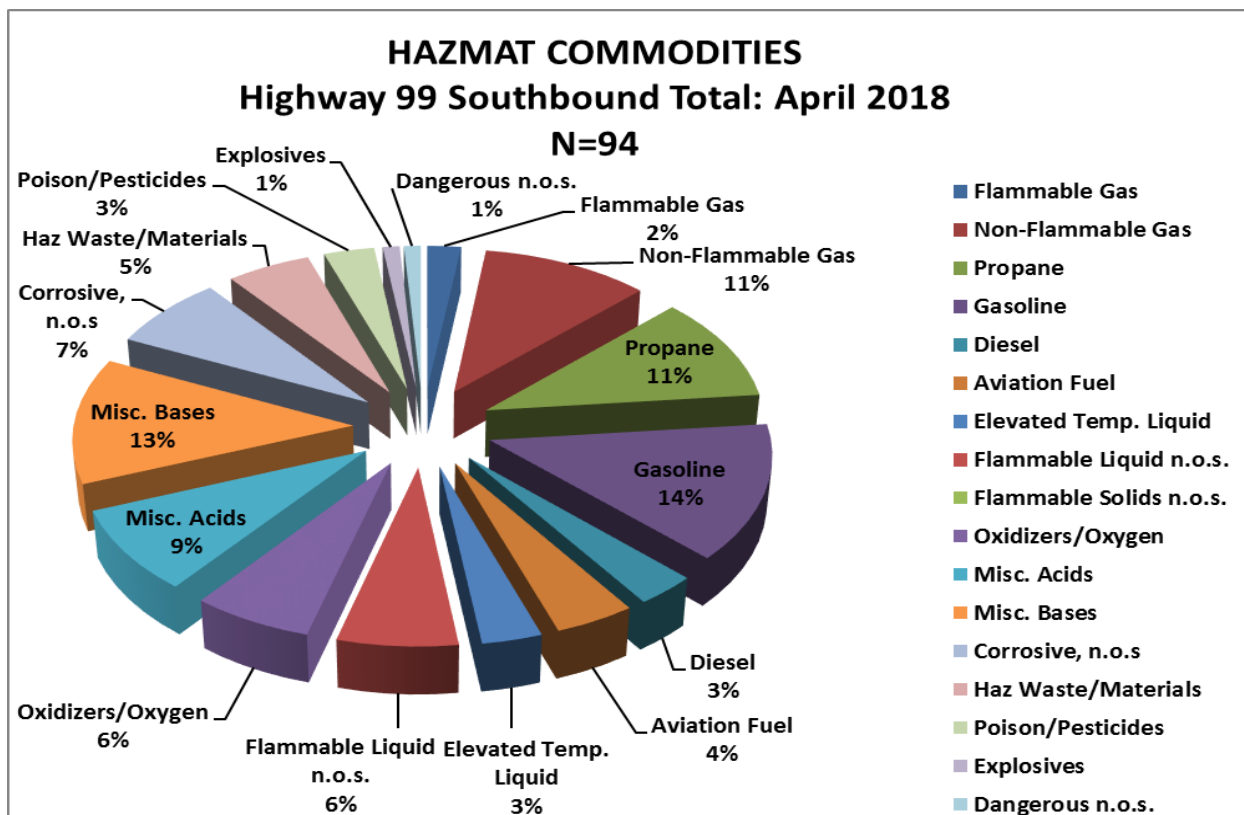
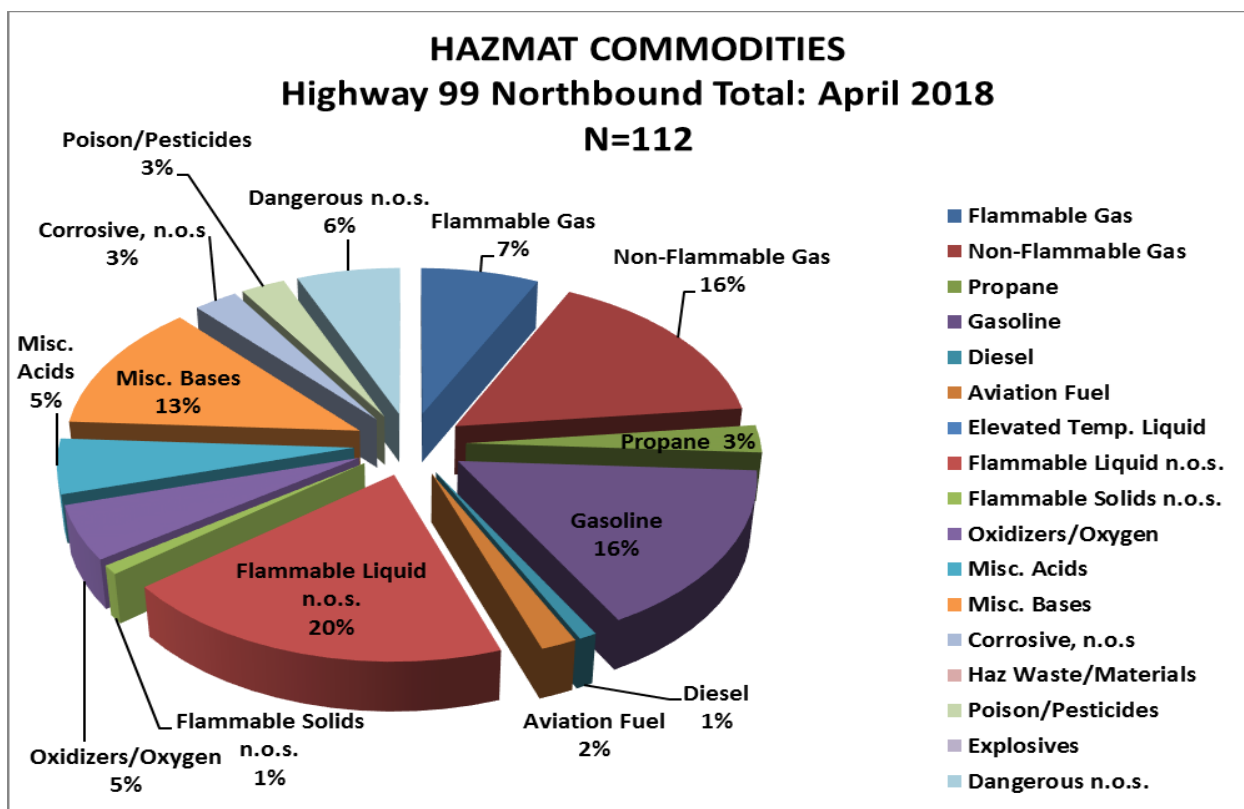


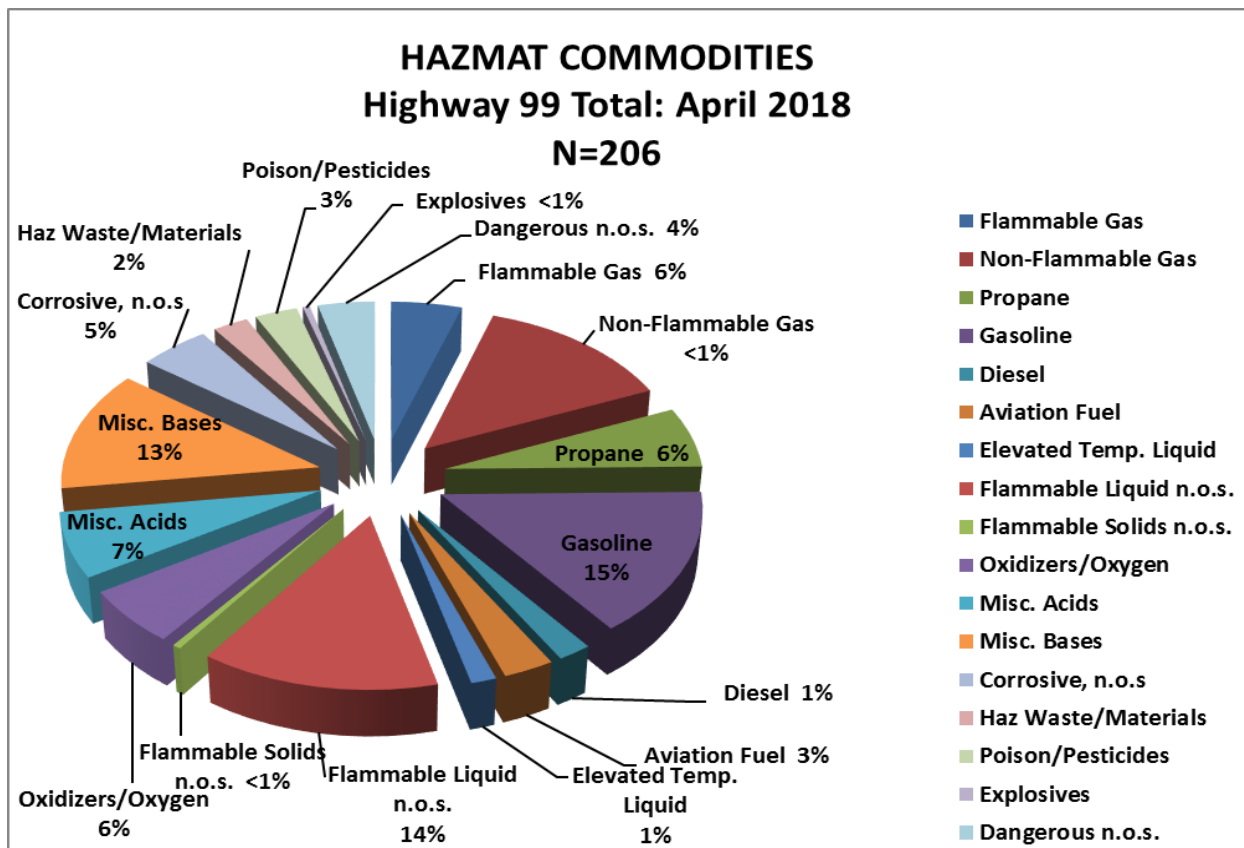


The hazardous materials transported on Highway 99 on April 10 and April 11, 2018 are covered by the following number of hazard commodity designations:

- Northbound: 14 of 17 hazard commodities
- Southbound: 16 of 17 hazard commodities
- Total northbound and southbound: 17 of 17 hazard commodities

The hazardous Commodities categories of hazardous materials travelling along Highway 99 during the survey are shown in the charts below.





The data above is summarized as follows:

- Trucks designated as transporting hazardous materials represented 2.6% of the total trucks travelling along Highway 99.
- 93% of the hazardous materials travelling along Highway 99 are passing through the city of Merced without exiting or entering the freeway.
- The total number of trucks travelling along Highway 99 consists of 8,069 vehicles, which represents 83% of the total truck traffic travelling through the city of Merced during the survey.
- The total number of trucks containing hazardous cargo travelling along the secondary highways and roadways consists of 206 vehicles, which represents 76% of the total hazardous cargo truck traffic travelling through the city of Merced during the survey.
- There were a higher number of trucks travelling southbound on Highway 99 (56%) than northbound (44%); however, there was more hazardous cargo observed travelling northbound on Highway 99 (58%) than southbound (42%).

- Total hazardous cargo traffic along Highway 99 covers 8 of the 10 hazard classes. Class 6 (Toxic Substances) and Class 7 (Radioactive Materials) were not observed travelling along Highway 99. However, Class 2.3 (Toxic Gases) were observed as hazardous cargo along Highway 99, and these are classified as poisons/pesticides under the hazardous commodities classification.
- Total hazardous cargo traffic along Highway 99 covers all 17 of the designated hazardous commodities.
- Hazardous cargo travelling along Highway 99 is significantly more varied and carried in more vehicles than hazardous cargo being transported along the secondary highways and roadways through the city of Merced.
- Two hazardous commodities observed being transported along Highway 99 are chemicals that would require action under the Initial Isolation and Protective Action Distances under the DOT Emergency Response Guidebook (ERG). On tanker of anhydrous ammonia (1015) was observed travelling northbound along Highway 99 on April 10, 2018, and one semi-truck trailer containing an unknown quantity of chlorine (1017) was observed travelling southbound along Highway on April 11, 2018. Copies of the guidelines for these chemicals from the ERG are contained in Appendix E.

2.5 Traffic Patterns

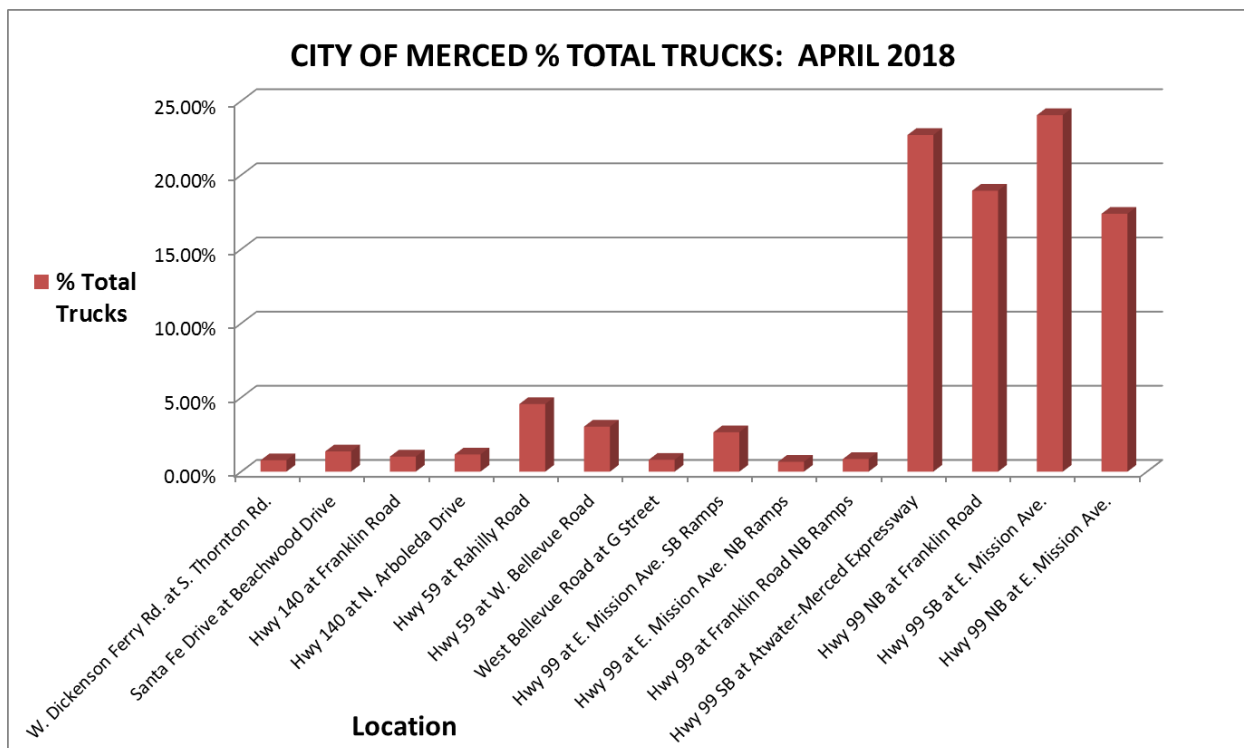
Total truck traffic patterns were determined from the survey data obtained from each of the highway placard survey observation points. These data are discussed in the following sections from both a total truck standpoint and a hazardous cargo standpoint.

2.5.1 Total Truck Traffic Data

Most of the truck traffic (83%) was observed along the Highway 99 corridor, with lesser amounts of traffic (17%) along the secondary highways and roadways within and adjacent to the city. Volume of traffic along Highway 99 is higher in the southbound direction than in the northbound direction.

Truck traffic is highest at the two Highway 59 survey points, as well as at the East Mission Avenue Ramps on the secondary highways and roadways. Most of the truck traffic at Highway 59 at West Bellevue Avenue is directed to and from the Merced County Regional Waste Management Facility north of the intersection. Highway 59 south of the city of Merced is along an industrial corridor.

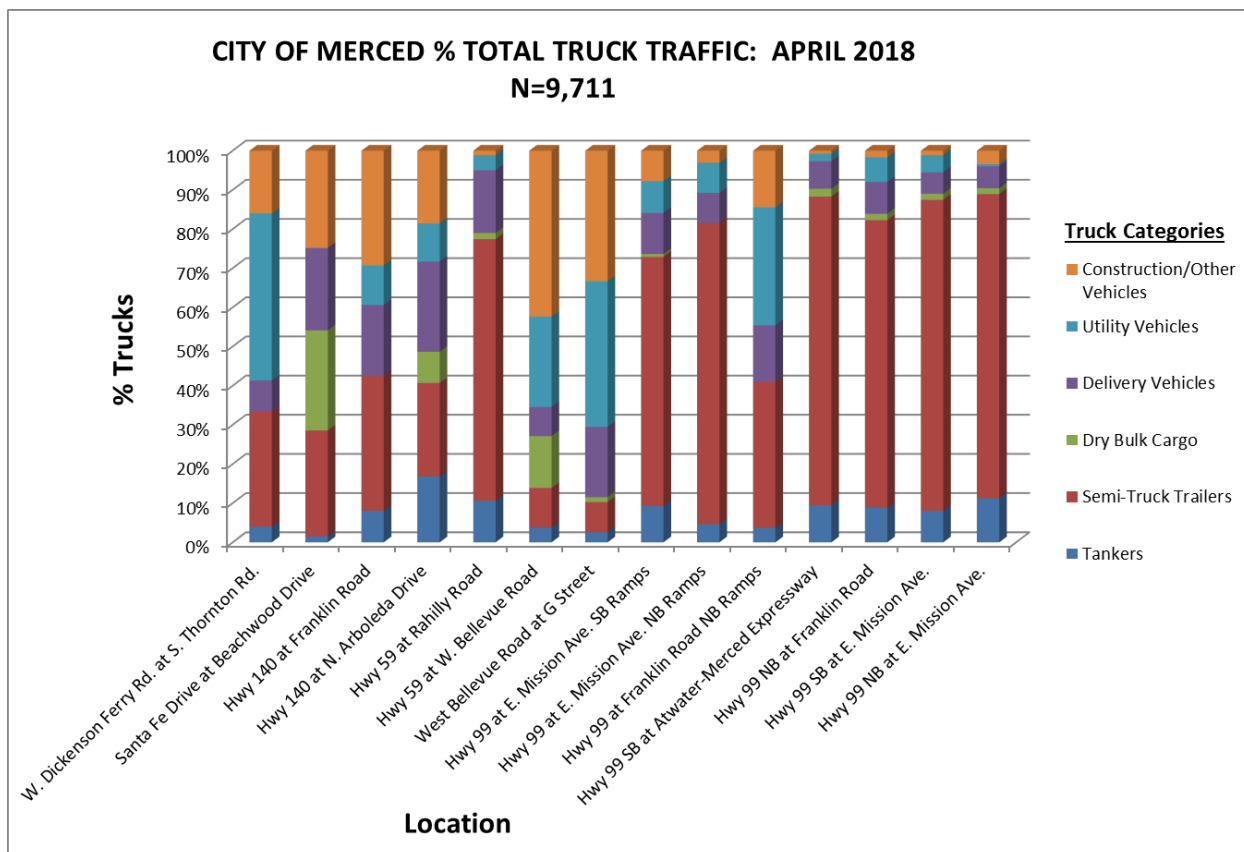
The volume of truck traffic discussed above is shown in the following chart.



Trucks were categorized as to the types of vehicles as discussed in Section 2.2. The truck type categories have been generalized as follows:

- Construction/Other Vehicles
- Dry Bulk Cargo Carriers
- Utility Vehicles
- Local Delivery Vehicles
- Semi-Truck Trailers
- Tankers (all types)

A plot of the percentage of the truck types as a function of the total truck traffic at each of the survey locations is shown in the chart below.

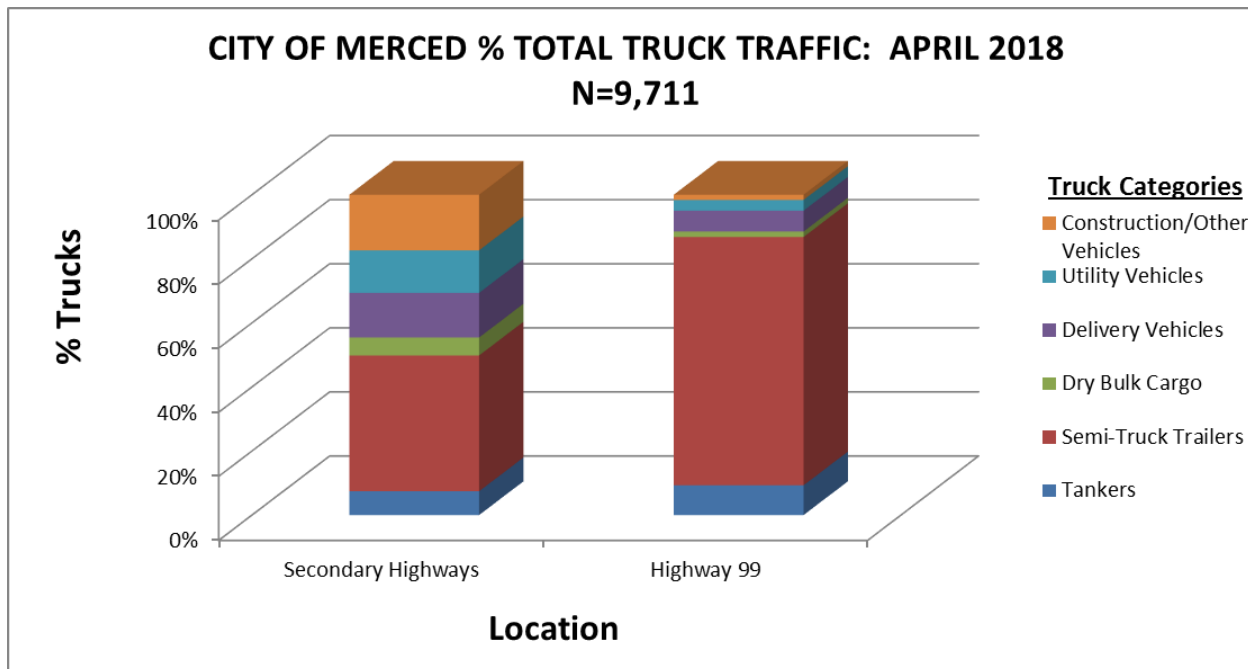


Total truck traffic as shown in the above chart can be summarized as follows:

- Truck traffic on Highway 99 and its associated on-ramps and off-ramps is dominated primarily by semi-truck trailers, local delivery vehicles, and utility vehicles.
- Dry bulk cargo vehicles were more often observed along secondary highways relative to the Highway 99.
- Construction and other vehicles were observed on all highways and roadways, but tend to be more frequently observed on the secondary highways and roadways.
- By contrast to Highway 99, semi-truck trailers were encountered as a lower percentage of the truck traffic along the secondary highways and roadways, although there is some variation in this trend.
- A significant portion of the truck traffic along Highway 59 south of the city (Highway 59 at Rahilly road), which is in an industrial area, consisted of semi-truck trailers.

- Tanker traffic was noted in all of the survey points; however, the tanker traffic travelling along the secondary highways and roadways was primarily fuel tankers containing gasoline and diesel. Tanker traffic along Highway 99 also contained a larger variety of liquid hazardous materials, generally corrosive materials.

The total truck information discussed above has been summarized, and a comparison of the truck traffic on Highway 99 compared to the secondary highways and roadways is shown in the following chart.

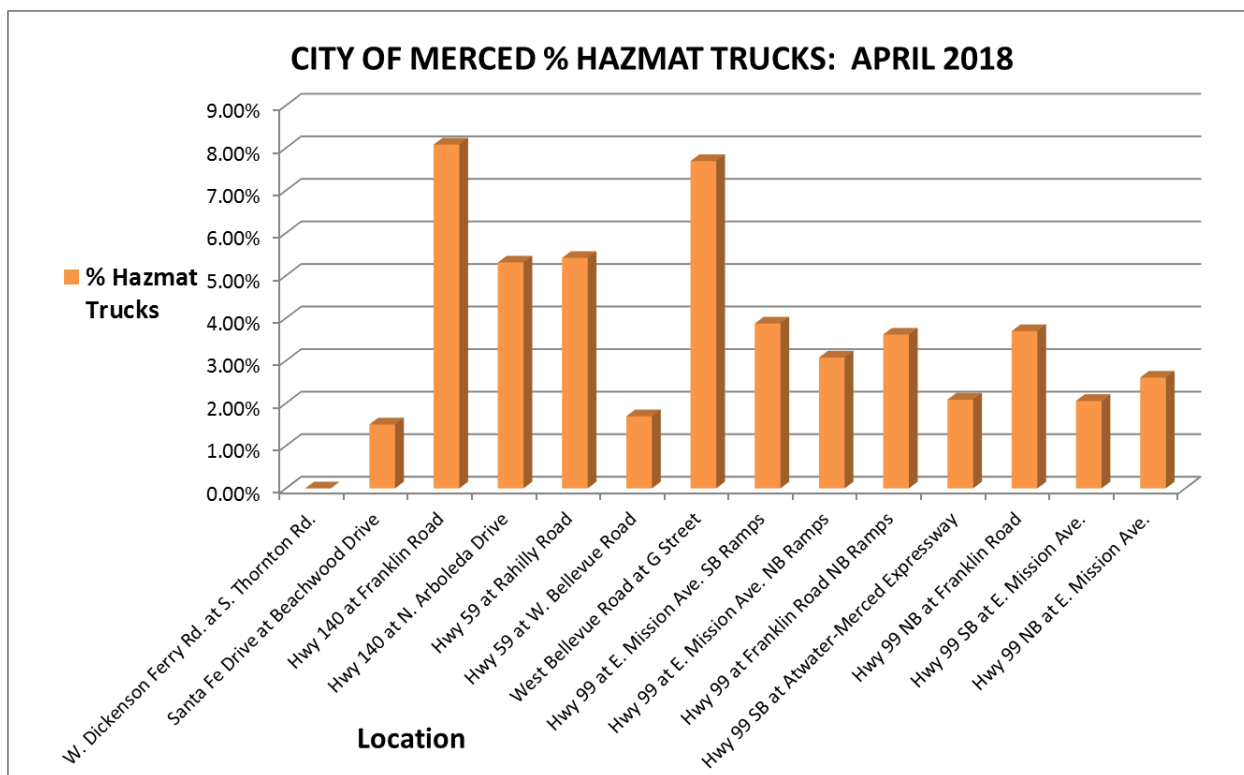


2.5.1 Hazardous Materials Truck Traffic Data

From a percentage standpoint of the total truck traffic, the movement of hazardous cargo through and adjacent to the city of Merced is higher along the secondary highways and roadways relative to the percentage movement of hazardous cargo along Highway 99. The overall number of trucks containing hazardous materials is lower along the secondary highways (66) relative to Highway 99 (206). The overall numbers, however, are dependent upon the time length of the surveys, and thus, the percentages are more realistic of the rate of hazardous cargo movement through the city.

Of the survey locations along the secondary highways and roadways, the highest percentage rate of truck traffic containing hazardous cargo was noted at Highway 59 and Rahilly Road, Highway 140 and Arboleda Drive, Highway 140 and Franklin Road, and at West Bellevue Road at G Street.

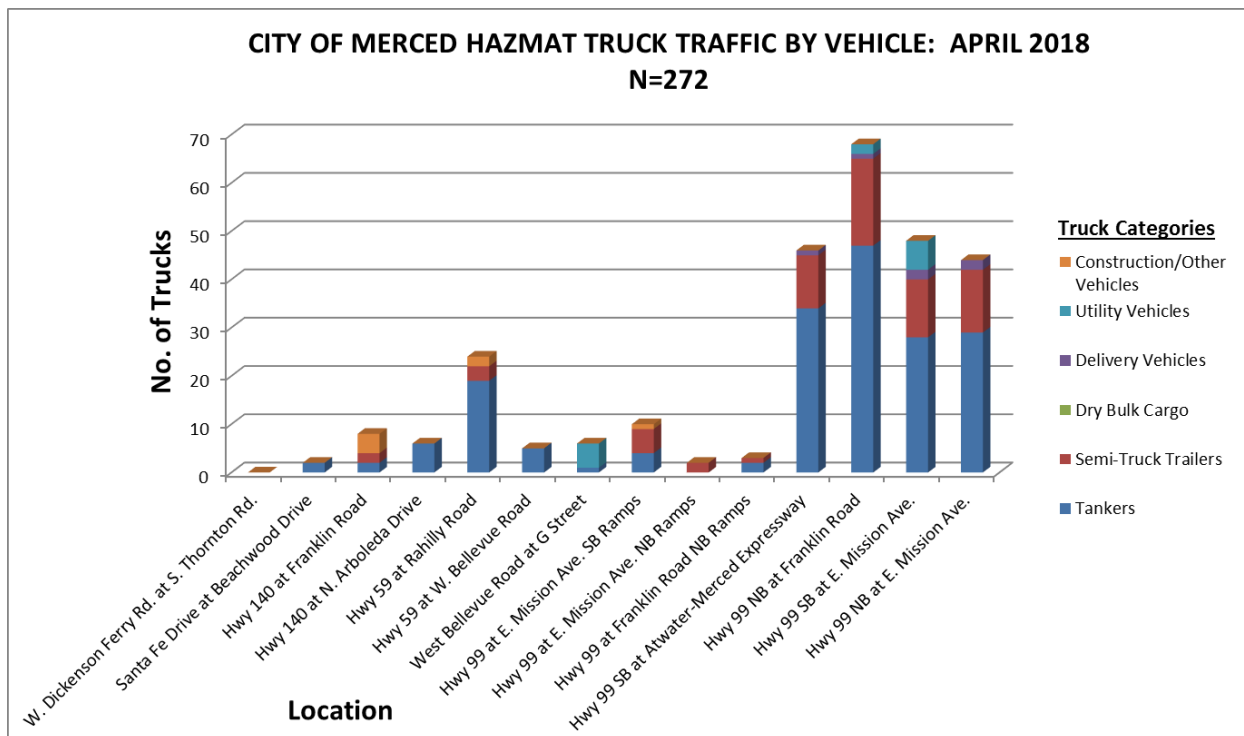
The movement of hazardous materials through the City of Merced as a percentage of the total truck traffic is shown in the following chart.

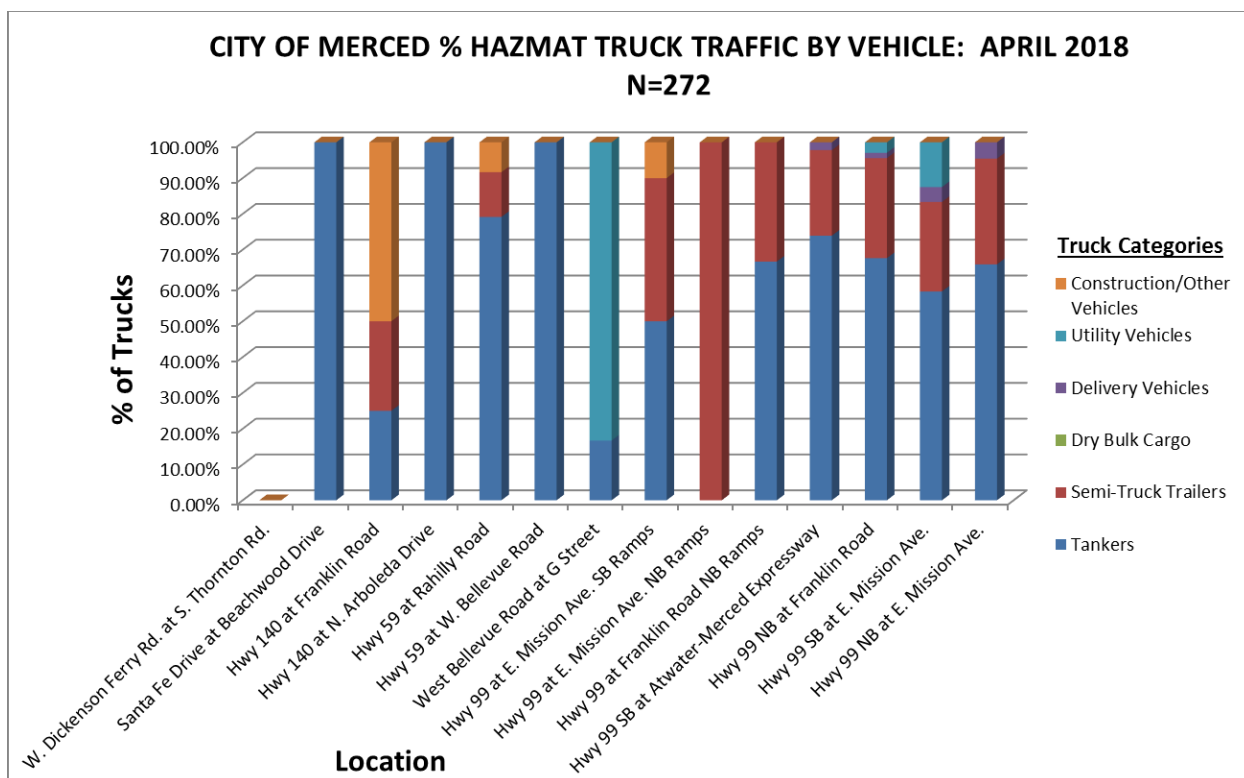


When the transport of hazardous cargo is viewed with respect to the truck type transporting the cargo, a significant pattern emerges. On Highway 99 tankers are the predominant mode of transport for hazardous materials, with transport in semi-truck trailers being the next most dominant mode of hazardous cargo transport. Mode of transport of hazardous materials on the secondary highways and roadways is more variable, depending upon the location, although tankers are most abundant. Tankers along the secondary highways and roadways tend to carry fuels and propane relative to tankers along Highway 99. Commonly the materials transported in the utility vehicles

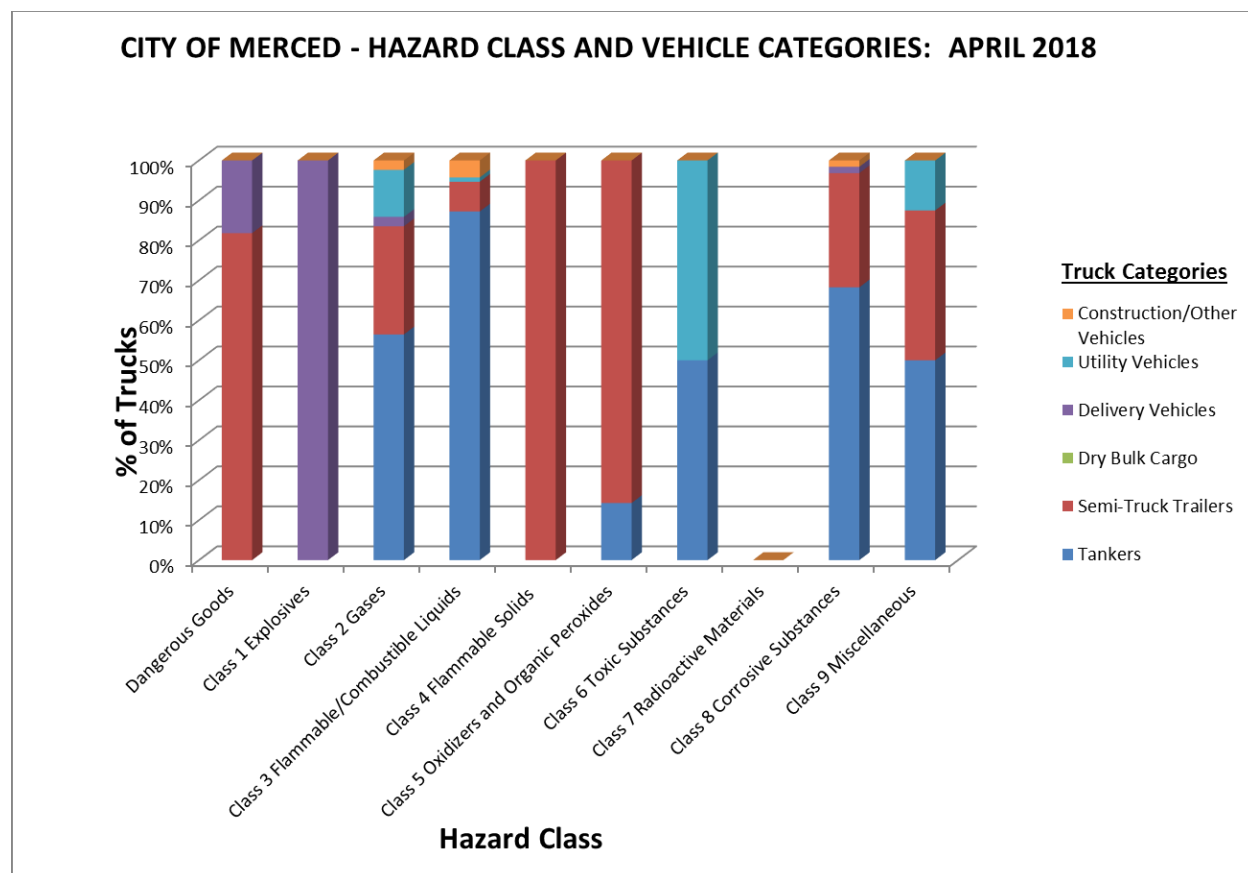
Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

consist of non-flammable and flammable gas canisters. Utility vehicles were the most common form of hazardous materials transport at West Bellevue Avenue and G Street. No hazardous materials were observed being transported in dry bulk cargo vehicles. These trends are shown on the charts below.





Hazardous materials transport by specific types of vehicles was also compared to the 10 hazard classes, as shown in the chart below.



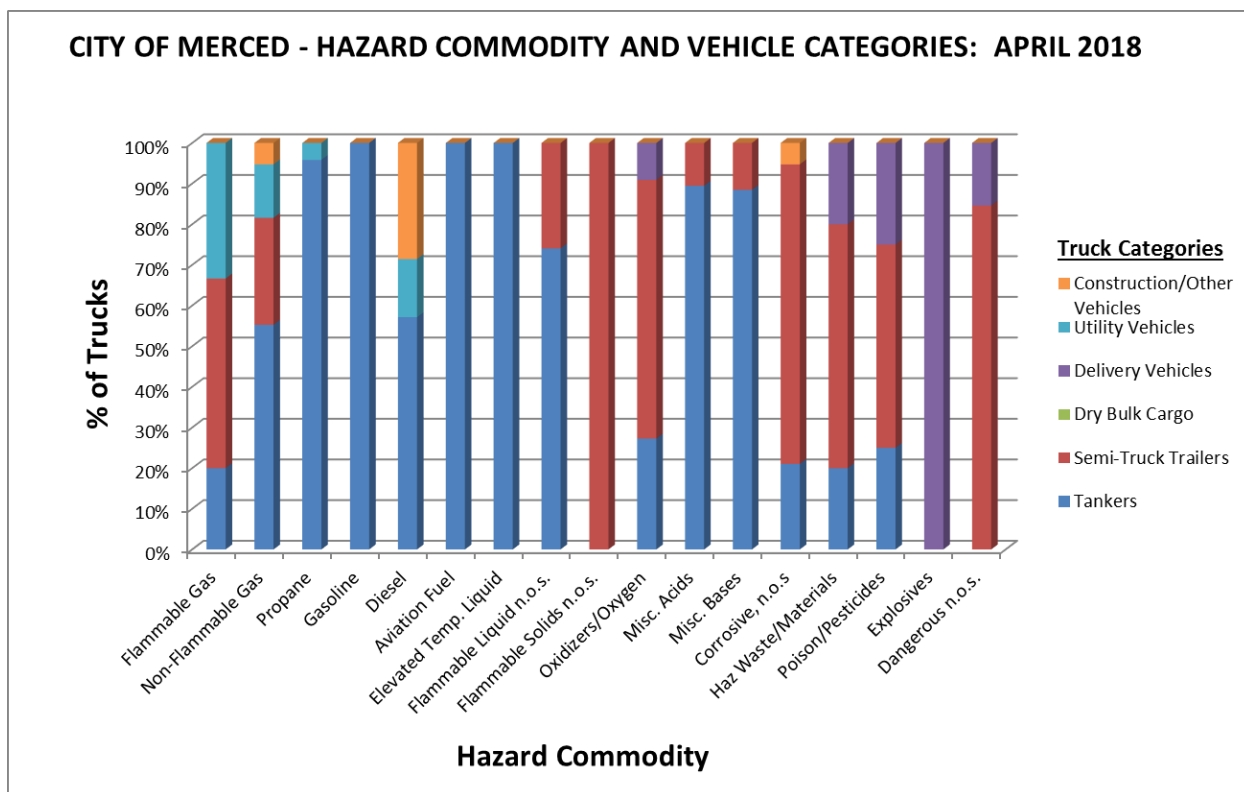
Data shown in the above chart covering the hazard class and the types of vehicles is summarized as follows:

- Dangerous Goods were transported in semi-truck trailers and local delivery vehicles.
- The single Class 1 Explosives truck was observed to be a local delivery vehicle.
- Class 2 Gases were transported in both tankers semi-truck trailers and utility vehicles. Generally, large quantities of gases were transported in high-pressure tankers (propane) or in cryogenic tankers (inert gases).
- Class 3 Flammable/Combustible liquids were overwhelmingly transported in tankers, although smaller quantities of Class 3 cargo were also transported in tanks on semi-truck trailers and construction vehicles.
- The single truck transporting Class 4 Flammable Solids was observed to be a semi-truck trailer.
- Class 5 Oxidizers and organic peroxides were primarily transported in semi-truck trailers, with some minor tanker transport.

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

- Class 6 Toxic Substances were transported in small volumes in containers carried by utility vehicles, or in larger volumes in tankers.
- Class 7 Radioactive Materials were not observed during the survey.
- Class 8 Corrosive Substances were transported primarily in tankers designed to hold corrosive materials. Smaller quantities of corrosive substances were transported via semi-truck trailers.
- Class 9 Miscellaneous Goods tended to have more heterogeneous physical characteristics than the other hazard classes, and transportation was divided among tankers, semi-truck trailers, and utility vehicles.

Hazardous materials transportation by specific types of vehicles was also compared to the 17 designated hazard commodities as shown in the chart below.



Data shown in the above chart covering the designated hazard commodities and the types of vehicles is summarized as follows:

- Flammable and non-flammable gases are transported in tankers, semi-truck trailers and utility vehicles. Often these materials are transported as canisters on non-tanker vehicles. Inert gases, such as nitrogen, argon, helium, and carbon dioxide, etc. are generally transported in cryogenic tankers, and this is reflected in

the chart above, which shows a higher percentage of tanker transport of non-flammable gases relative to flammable gases.

- Propane, gasoline, diesel, aviation fuel, elevated temperature liquid (which is usually characterized by hot asphalt), miscellaneous acids, and miscellaneous bases are transported primarily in tankers. Acids and bases are corrosive materials and are generally transported in smaller diameter corrosive liquid tankers with stabilizing steel rings. Propane is transported in high-pressure tankers and fuels are transported non-pressure tankers. Diesel fuel is also commonly transported in tanks on utility vehicles and construction vehicles, where it is used to fuel heavy equipment at various jobsites.
- The single observed shipment of flammable solids was observed being transported in a semi-truck trailer.
- Oxidizers and oxygen are generally transported in semi-truck trailers and local delivery vehicles, although larger quantities are transported in tankers, generally cryogenic tankers.
- Miscellaneous corrosive materials are generally transported in semi-truck trailers and in a lower numbers of tankers. Some of the corrosive placards were noted on automobile parts trucks, and are likely transporting batteries. Some of the corrosive materials may be solids, rather than liquids and transport in vehicles other than tankers would be appropriate.
- Hazardous waste/materials and pesticides were transported primarily in semi-truck trailers, with some transport in local delivery vehicles, and tankers.
- The single vehicle observed to be placarded with explosives was transported in a local delivery vehicle.
- Materials placarded as dangerous goods were transported in semi-truck trailers and local delivery vehicles.

3.0 Railroad Hazardous Materials Transportation

Railroad transportation within the City of Merced occurs along two major rail lines. The Union Pacific Railroad line runs adjacent to and parallel to Highway 99. The Burlington Northern and Santa Fe Railroad runs adjacent to and parallel to Highway 140 and Santa Fe Drive.

Information concerning the transportation of hazardous materials via rail is generally not available to the public. Its availability is restricted to first responders and other regulatory agencies that have a right to know. Detailed information concerning rail transport of hazardous materials is contained in Appendix F, which is restricted to individuals authorized to view the data.

General transportation of hazardous materials by rail in the United States and Canada is presented in the following document:

Association of American Railroads, Bureau of Explosives, August 2014, Annual Report of Non-Accident Releases of Hazardous Materials Transported by Rail. Available on line at <https://www.aar.org/Documents/NAR/2013%20Annual%20Leak%20Report%20FINAL%208-17-2014.pdf>.

This document contains valuable data of a general nature concerning rail transport of hazardous materials throughout the United States and Canada for 2013. Exhibit 34 of this document lists the top 25 Aggregated Hazardous Commodities by loaded originations in the U.S. and Canada in 2013 with their respect to their average Non-Accident Release Risk Index (NARRI) per Tank Car Non- Accident Release (NAR) Incident, and that list is shown below:

Exhibit 34
**Average NARRI per Tank Car NAR Incident for Top 25 Aggregated Hazardous Commodities,
by Loaded Originations, in the U.S. and Canada: 2013**

RANK	COMMODITY (DOT PROPER SHIPPING NAME)	NARs	Average NARRI per Incident
1	AMMONIA, ANHYDROUS	12	158
2	CHLORINE	3	102
3	PROPANE	3	97
4	SULFURIC ACID	11	95
5	PETROLEUM GASES, LIQUEFIED	31	95
6	BUTANE	1	90
7	STYRENE MONOMER, STABILIZED	2	90
8	PROPYLENE	2	90
9	HYDROCHLORIC ACID	19	89
10	HYDROCARBONS, LIQUID, N.O.S.	5	86
11	METHANOL	5	83
12	PETROLEUM CRUDE OIL	119	76
13	GASOLINE	8	74
14	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	17	71
15	FLAMMABLE LIQUIDS, N.O.S.	19	69
16	ALCOHOLS, N.O.S.	70	68
17	PETROLEUM DISTILLATES, N.O.S.	14	64
18	COMBUSTIBLE LIQUID, N.O.S.	8	63
19	SODIUM HYDROXIDE SOLUTION	11	61
20	SULFUR, MOLTEN	11	59
21	ELEVATED TEMPERATURE LIQUID, N.O.S.	10	58
22	PHOSPHORIC ACID SOLUTION	4	56
23	DIESEL FUEL	10	50
24	CARBON DIOXIDE, REFRIGERATED LIQUID	2	42
25	VINYL CHLORIDE, STABILIZED	0	—

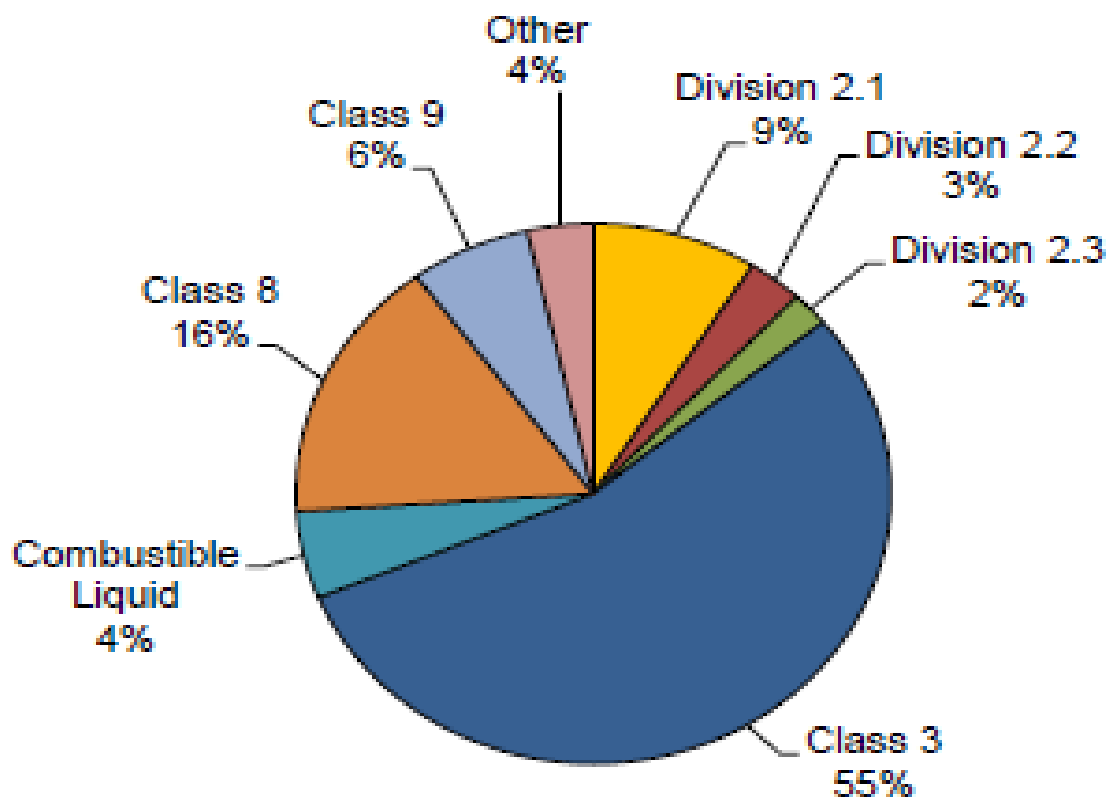
Note: Since 2007, the average NARRI is not reported for commodities that did not have a NAR or a reported NARRI score.

NAR in California for 2013 included: tank car (96), intermodal (18), and other (4) for a total of 96 releases incidents.

Exhibit 4 of this report shows the Tank Car NAR by Hazard Class, and this is shown below:

Exhibit 4

Tank Car Non-Accident Releases by Hazard Class, U.S. and Canada: 2013



The report lists the following information with respect to hazard class:

- Division 2.1: Flammable Gases
- Division 2.2: Non-Flammable Gases
- Division 2.3: Poison Gases
- Class 3: Flammable Liquid (would also include Combustible Liquid)
- Class 8: Corrosive Material
- Class 9: Miscellaneous
- Other: Includes other Hazard Classes

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

Railroad transportation within the City of Merced occurs along two major rail lines. The Union Pacific Railroad line runs adjacent to and parallel to Highway 99. The Burlington Northern and Santa Fe Railroad runs adjacent to and parallel to Highway 140 and Santa Fe Drive. The highway surveys at Santa Fe Drive and Beachwood Drive (Section 2.3.2) and Highway 140 and Arboleda Drive were completed adjacent to the Burlington Northern and Santa Fe Railroad tracks. Some observational information related to rail transport during the highway placard surveys is summarized below:

- Trains consisted of mixture of cars, including tank cars, box cars, container cars, and flatbed cars.
- All of the observed hazardous materials placards on the trains were on the tank cars.
- The hazardous materials placards observed on the tanker cars during the highway placard survey were as follows:
 - o Propane (1075)
 - o Flammable Liquid, poisonous (1992)
 - o Non-Flammable Gases
 - o Dangerous
 - o Sulfuric Acid (1830)
 - o Petroleum Crude Oil (1267)
 - o Nitric Acid (2031)

Photographs of some of the placarded train cars are shown below.

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.

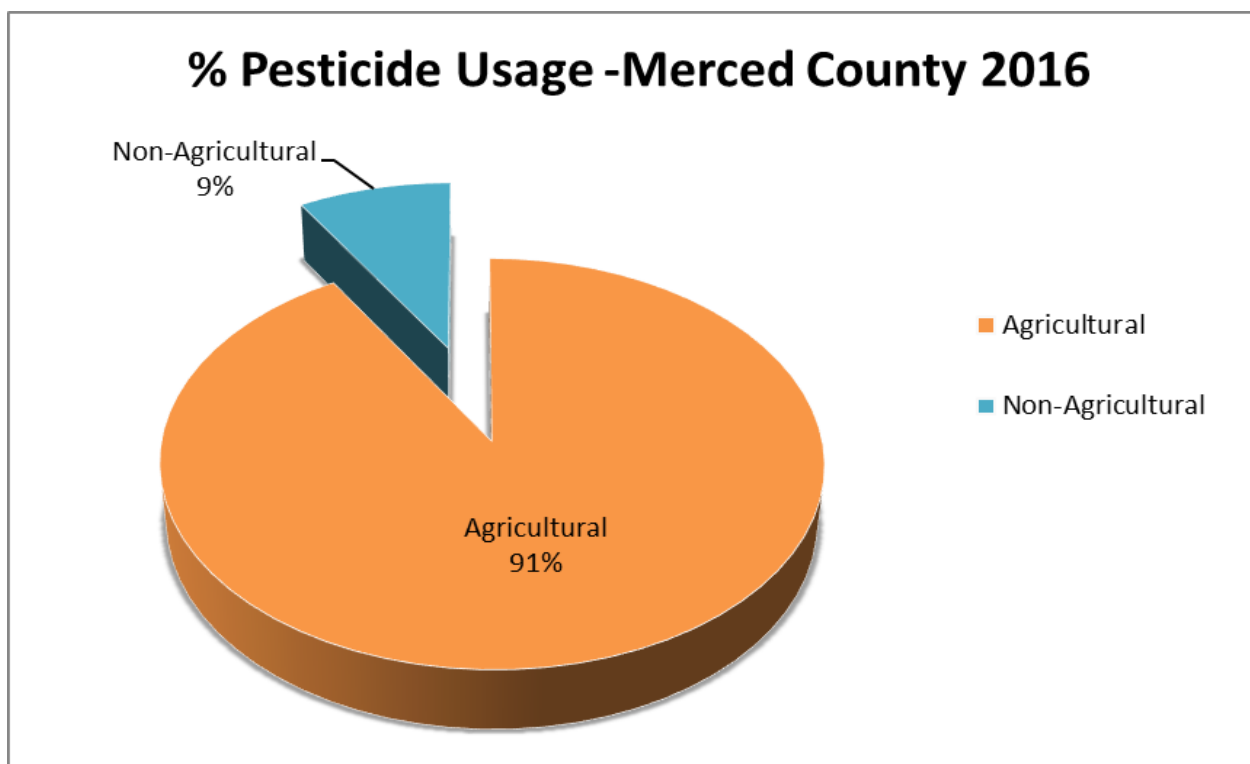




5.0 Agricultural Chemical Use Patterns

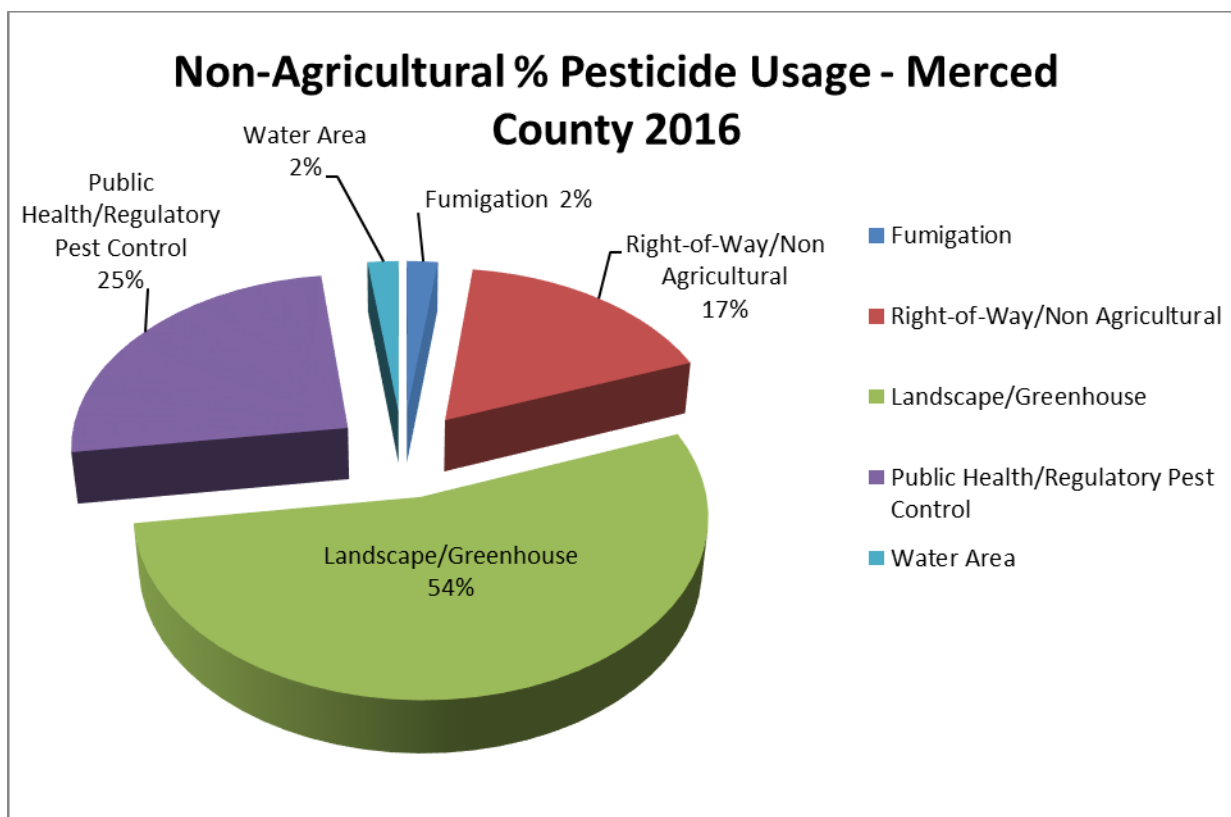
Sources of information for agricultural usage within Merced County were obtained from the State of California Department of Pesticide Regulation Pesticide Information Portal (CalPIP) (<http://calpip.cdpr.ca.gov/main.cfm>). According to the Summary of Pesticide Use Report Data 2016 (CalPIP), Merced County ranks 6th for pesticide usage within California. In 2016, 10,119,227 pounds of pesticides were used in the County.

Based on the information contained in the 2016 Pesticide Use Report the major usage of pesticide chemicals within Merced County is primarily agricultural (91%). Non-agricultural usage made up 9% of the total pesticide usage within the County.



Non-agricultural usage of chemicals includes the following areas:

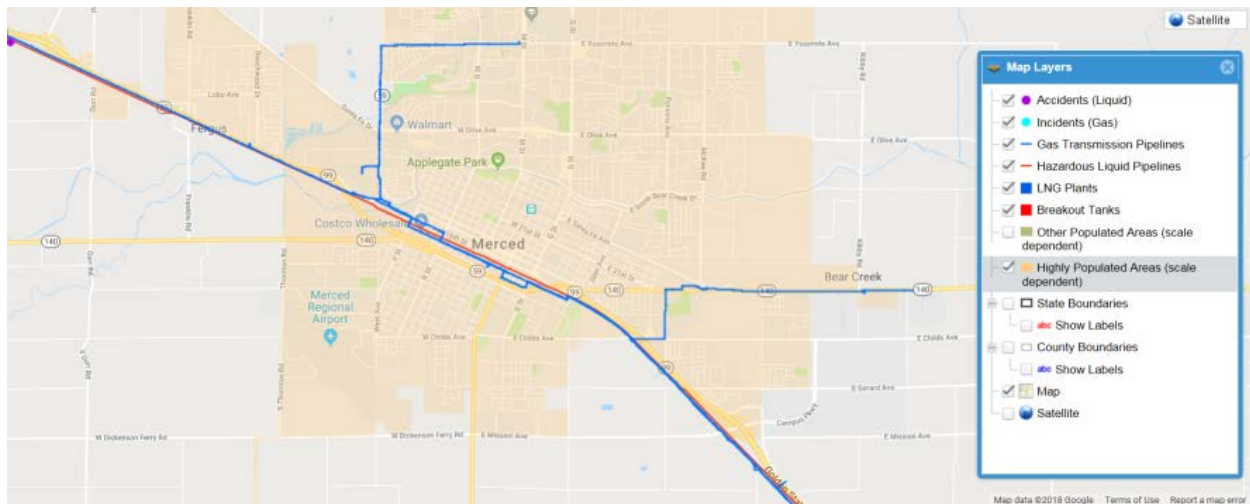
- Fumigation
- Right-of-Way/Non-agricultural
- Landscape/Greenhouse
- Public Health/Regulatory Pest Control
- Water Areas



The use and transportation of agricultural chemicals varies by location. In general, agricultural chemical transportation is from the vendor to the user, and this is usually completed by shipping small quantities of chemicals throughout the area, as necessary. Based on the highway placard survey, these materials appear to be transported in semi-truck trailers, local delivery vehicles, and tankers.

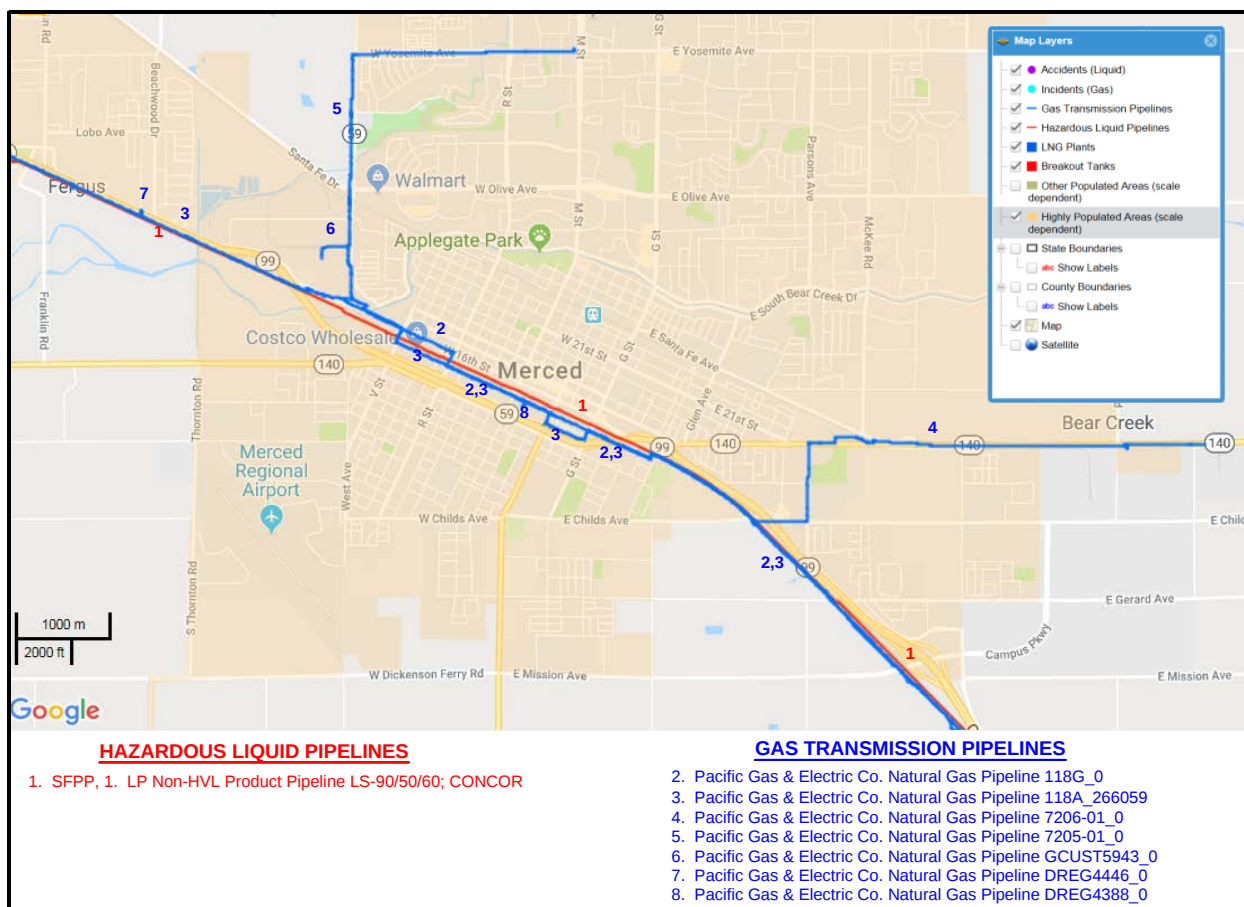
6.0 Pipeline Data

Information concerning underground pipelines in the City of Merced was obtained from the website of the National Pipeline Mapping System (NPMS) at <https://www.npms.phmsa.dot.gov/>. A map showing the pipeline locations for the City of Merced and surrounding area is shown below.



A detailed map showing the locations of the pipelines in the City of Merced is shown below. Numbers on the map refer to the individual pipelines, and this information is contained in Appendix G.

Hazardous Materials Commodities Flow Study
City of Merced Fire Department
June 2018
TAIT Environmental Services, Inc.



Kinder Morgan's Santa Fe Pipeline Partners (SFPP) operates a liquid non-Highly Volatile Liquid (non-HVL) liquid pipeline that runs parallel to Highway 99. The remainder of the pipelines running through the city of Merced are natural gas pipelines operated by Pacific Gas & Electric Company. The main gas line parallels Highway 99.

7.0 Planning Needs Assessment

The results of this Flow Study can be used to determine the hazardous materials transportation patterns through and adjacent to the city of Merced. As a first responder, the MFD can utilize the data from the Flow Study as a guide to anticipate potential chemicals involved in a spill in the specific areas of the city of Merced. Based on the results of this Flow Study a planning needs assessment to respond to a transportation-related hazardous materials incident has been developed. The planning needs assessment outlined below will be further defined during the completion of the Community Risk Assessment for Hazardous Materials which is currently being prepared for the MFD.

The planning needs assessment outlined below covers the flow of hazardous materials along the highways and roadways of the city of Merced. Due to the confidentiality of railroad data, the planning needs related to railroad transport of hazardous materials are not covered below; however, similar planning needs may apply to both the railroads and highways.

Hazardous Materials of Concern

Hazardous materials/chemicals of concern fall into two general categories: chemicals requiring isolation and protective action distances in the event of spill per the Emergency Response Guidebook (as shown in Appendix E); and chemicals that are commonly transported through the city, either on the secondary highways and roadways or along Highway 99.

In the first category listed above, anhydrous ammonia (UN ID #1005) was observed travelling northbound along Highway 99 through the City of Merced in a tanker, and chlorine gas (UN ID #1017) was observed travelling southbound along Highway 99 through the City of Merced in a semi-truck trailer. Conversations with the MFD indicated anhydrous ammonia is a common hazardous material transported through the survey area. In the second category listed above, the results of the Flow Study indicated that the most common hazardous chemicals transported through the City of Merced were fuels transported in non-pressure tankers, as well as various corrosive compounds transported in corrosive liquid tankers.

Based on this information, a major planning need would be to focus on the transportation of anhydrous ammonia as well as fuels and corrosive liquids, and the potential for a hazardous spill of any of these materials.

High Risk Locations

Several high-risk locations or risk control points are covered below which will allow the MFD to focus on rapid first response to a hazardous materials incident in these areas. High-risk areas are determined on the basis of various demographic factors that include, but are not limited to the following:

- Heavily travelled routes by commercial vehicles
- Industrial areas with high commercial traffic
- Residential areas near roadways where hazardous cargo is being transported

- Locations of vulnerable populations (e.g. homeless areas, other residents near the source of the incident)
- If the data are available, locations within the city that have had previous accidents or incidents by commercial vehicles, regardless of whether the incidents have involved hazardous materials.
- Utilization of modeling programs, such as ALOHA/CAMEO/MARPLOT to determine the areas of highest risk and subsequent vulnerable populations resulting from a potential spill.

Based on the results of the Flow Study, the following areas could be considered as high-risk areas:

- All areas adjacent to Highway 99 within the city boundaries, especially those areas with nearby residents or vulnerable populations. This area could be subject to a spill by any of the commodities outlined in this Flow study, and could be the site of an anhydrous ammonia spill that would result in evacuation of affected populations.
- Highway 59 industrial corridor south of the city. This area has potential for both fuel and corrosive liquid spills. Although this would not be an area necessarily requiring evacuation, based on the chemicals travelling through this area, there is a higher risk of an incident in this area.
- Other specific areas within the city deemed high-risk of a hazardous materials incident by the MFD.

Mutual Aid

MFD maintains an informal mutual aid agreement with the Merced County Fire Department (MCFD). In the event of a large hazardous materials incident, additional personnel may be drawn from Merced and Madera Counties. Response to a hazardous materials incident will be in accordance with the 2018 Merced County Area Plan Update. The MFD has outlined their goals and requirements/needs for response to a hazardous materials incident in the following paragraphs.

In the short term, the MFD should acquire a Hazardous Materials Specialist and maintain a sufficient number of response personnel to account for 4 personnel on each shift. This is the minimum number, along with 2 members from the MCFD Station 62 that will respond to an incident as the Hazardous Materials Response Unit (HM62). HM62 will be prepared to make the most basic of entries into a hazardous materials environment. This minimum of 6 personnel, properly trained and equipped, will be supported by regular staffing in the MFD to fill additional roles required such as; Incident Commander, Decon, Site Access Control, as well as Fire, EMS, and Law Enforcement functions. Merced County Environmental Health is also requested to oversee the identification and mitigation of hazardous materials spills. Environmental Health officials are also instrumental in completing the many required notifications mandated by state and federal regulation and in accordance with the 2018 Merced County Area Plan Update.

In the event that a hazardous materials incident requires entry to identify, plug/patch or otherwise stop the release of a hazardous substance, the 4 specialist trained members of the MFD that are on shift will be assembled. HM62 will be requested and arrive with the daily staffing of 2 specialist trained members. These 6 personnel will make up the minimum needed to fill required positions in the HazMat Group. A small spill or leak will require 6 personnel and a large spill or leak will require 10 or more personnel.

Although the MCFD attempts to maintain approximately 5 specialist trained personnel on duty any given day, that number is often not achieved. On most days, administrative staff is available to respond and many of those personnel have the required training; however, as noted above and as experience tells, it can take significant time to draw personnel from as far as Santa Nella and various fire stations in Madera County in order to have sufficient personnel to accomplish an entry. Acquiring MFD's own specialist trained personnel will affect the time elapsed on scene waiting to make entry. This higher level of service that the MFD can provide will also be a first step in eventually having the capability to handle most hazardous materials emergencies within the city using MFD personnel.

In the short term, MFD will continue to use a mutual-aid response model. This will ensure that the MFD will have 12 personnel; 4 per shift that supplement a joint HazMat team made up of members of the MFD and the MCFD. Equipment is owned and maintained by the MCFD.

Once the MFD has reached 12 personnel, it will train personnel to the Specialist level at 2 per year. These 2 additional personnel per year will maintain for losses due to attrition. The 2 additional personnel will also slowly grow the total number of HazMat team members. When the MFD has reached at least 18 members, 6 per shift, then MFD should seek additional recourses to acquire the equipment needed to handle hazardous material incidents. At that point the MFD would only need to rely on assistance from MCFD for major incidents.

Response Equipment

Any response to a hazardous materials incident will require that first responders are properly equipped to handle the incident. Currently the MFD relies upon mutual aid from the MCFD, as the MCFD has a Type 1 emergency response team and Hazmat 62 Equipment Inventory. This inventory is listed in the 2018 Merced County Area Plan Update. Any deficiencies in the equipment inventory with respect to first response to a hazardous materials incident should be identified and updated.

Training

Training for hazardous materials incidents is an essential part of first response. As noted above in the section on Mutual Aid training of specific hazardous response personnel should be kept current. Details on training are described in the 2018 Merced County Area Plan Update.

Based on the chemicals of concern and the areas of high risk for a hazardous materials spill, two types of exercises should be undertaken by response personnel. An initial table top exercise utilizing a realistic and local scenario should be undertaken to ensure that all responders are prepared for an actual incident. It is recommended that the anhydrous ammonia be used as the chemical of concern to allow for a realistic scenario.

Following completion of the table top exercise and using the results of the exercise, a field training exercise should be undertaken at one of the high-risk areas, as determined by the MFD. Both training exercises should be open to all potential first responders both within and outside of the MFD.

Planning Needs Summary

The following points summarize the planning needs with respect to a potential hazardous materials spill within the City of Merced:

- Utilize the results of the Flow Study to determine the chemicals of concern and the potential high-risk areas.
- Utilize accident/incident statistics, if available, to help define high-risk areas.
- Utilize computer modeling to determine the areas of vulnerable populations.
- Ensure that mutual aid agreements are in place to allow for additional outside assistance for the first response, if required.
- Work to assemble a HazMat response team to meet the needs of the MFD to respond to a hazardous materials incident.
- Ensure that MFD has access to proper equipment to allow first responders to adequately respond to an incident.
- Ensure that all responders are properly trained to respond to a hazardous materials incident, and that all response protocols are known.
- Initially hold a table-top training exercise to allow first responders to become familiar with the response protocols.
- Following the table-top exercise, perform an in-the-field training exercise under realistic scenarios based on the data in the Flow Study.

Using the information from this Flow Study, a Community Risk Assessment for Hazardous Materials will be prepared for the City of Merced MFD. Many of the points discussed above will be dependent upon or expanded based on the results of the Community Risk Assessment.

8.0 Summary Statement

The information outlined in Sections 2.0 through 7.0 of this report will be made available to emergency responders to increase awareness, mitigation, and response to hazardous materials emergencies. This study can also be used by local planning officials to demonstrate the risk mitigation potential and commodities involved in specific areas of the city of Merced. This study will allow for the understanding of flow patterns of hazardous materials through city, to analyze traffic patterns, better match planning programs to existing needs within communities, and reduce the potential for releasing incidents to occur.

The Planning Needs Assessment addresses the following areas for the MFD:

- Capabilities, deficiencies, and requirements of the MFD with respect to equipment and training of emergency response personnel.
- Areas of the city that are more vulnerable to potential transportation-related hazardous materials incidents.
- Mutual aid agreements with other agencies that can assist the MFD in the event of a hazardous materials incident.

Elements of the Planning Needs assessment will be further defined in the Community Risk Assessment for Hazardous Materials which is currently being prepared for the MFD.

APPENDICES

APPENDIX A

Highway Placard Survey Data Compilation Table

APPENDIX A: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE - CITY OF MERCED

		April 9-12, 2018		
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
West Dickenson Ferry Road at South Thornton Road				
	Subtotal Placarded Trucks			0
	Subtotal Trucks Not Placarded			75
	TOTAL TRUCKS			75
Santa Fe Drive at Beachwood Drive				
	2.1	1075	Propane	1
	2.2	2187	Carbon Dioxide	1
	Subtotal Placarded Trucks			2
	Subtotal Trucks Not Placarded			131
	TOTAL TRUCKS			133
Highway 140 at Franklin Road				
	3	1203	Gasoline	2
	3	1993	Diesel Fuel	3
	8	N/A	Corrosive	2
	N/A	N/A	Dangerous	1
	Subtotal Placarded Trucks			8
	Subtotal Trucks Not Placarded			91
	TOTAL TRUCKS			99
Highway 140 at North Arboleda Drive				
	2.1	1075	Propane	1
	3	1203	Gasoline	4
	3	1993	Diesel Fuel	1
	Subtotal Placarded Trucks			6
	Subtotal Trucks Not Placarded			107
	TOTAL TRUCKS			113
Highway 59 at Rahilly Road				
	2.1	N/A	Flammable Gas	1
	2.2	N/A	Non Flammable Gas	2
	2.1	1075	Propane	6
	2.2	1080	Sulfur Hexafluoride	1
	2.2	1977	Nitrogen, refrigerated liquid	4
	3	1203	Gasoline	3
	3	1993	Diesel Fuel	2
	8	N/A	Corrosive	1
	8	1791	Hypochlorite Solution	1
	8	1824	Sodium Hydroxide Solution	1
	8	1830	Sulfuric Acid with more than 51% acid	1
	8	3264	Corrosive Solid, acidic, inorganic, n.o.s.	1
	Subtotal Placarded Trucks			24
	Subtotal Trucks Not Placarded			419
	TOTAL TRUCKS			443

APPENDIX A: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE - CITY OF MERCED

	April 9-12, 2018			
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
Highway 59 at West Bellevue Road				
	3	1203	Gasoline	3
	3	1993	Diesel Fuel	2
	Subtotal Placarded Trucks			5
	Subtotal Trucks Not Placarded			290
	TOTAL TRUCKS			295
West Bellevue Road at G Street				
	2.1	N/A	Flammable Gas	2
	2.2	N/A	Non Flammable Gas	2
	2.1	1075	Propane	1
	6.1	2903	Pesticide, liquid, toxic, flammable, n.o.s.	1
	Subtotal Placarded Trucks			6
	Subtotal Trucks Not Placarded			72
	TOTAL TRUCKS			78
Highway 99 at East Mission Avenue - Southbound Ramps				
	3	N/A	Flammable Liquid n.o.s.	1
	3	1203	Gasoline	1
	3	1993	Diesel Fuel	1
	6.1	2903	Pesticide, liquid, toxic, flammable, n.o.s.	1
	8	N/A	Corrosive	3
	8	2680	Lithium Hydroxide	1
	8	3266	Corrosive Liquid, basic, inorganic, n.o.s.	1
	N/A	N/A	Dangerous	1
	Subtotal Placarded Trucks			10
	Subtotal Trucks Not Placarded			248
	TOTAL TRUCKS			258
Highway 99 at East Mission Avenue - Northbound Ramps				
	3	N/A	Flammable Liquid n.o.s.	1
	N/A	N/A	Dangerous	1
	Subtotal Placarded Trucks			2
	Subtotal Trucks Not Placarded			63
	TOTAL TRUCKS			65
Highway 99 at Franklin Road - Ramps				
	2.1	1075	Propane	1
	3	1203	Gasoline	1
	8	N/A	Corrosive	1
	Subtotal Placarded Trucks			3
	Subtotal Trucks Not Placarded			80
	TOTAL TRUCKS			83

APPENDIX A: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE - CITY OF MERCED

April 9-12, 2018				
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
Highway 99 Southbound at the Atwater Merced Expressway				
	2.1	N/A	Flammable Gas	1
	2.2	N/A	Non Flammable Gas	2
	2.1	N/A	Oxygen	1
	2.2	1046	Helium	1
	2.1	1075	Propane	6
	2.2	1951	Argon, refrigerated liquid	2
	2.2	1977	Nitrogen, refrigerated liquid	1
	3	1170	Ethanol, Ethyl Alcohol	2
	3	1203	Gasoline	7
	3	1987	Alcohols n.o.s.	1
	3	1993	Diesel Fuel	2
	3	2313	Picolines	1
	5.1	2014	Hydrogen Peroxide	1
	8	N/A	Corrosive	2
	8	1791	Hypochlorite Solution	1
	8	1824	Sodium Hydroxide Solution	3
	8	1830	Sulfuric Acid with more than 51% acid	4
	8	1903	Disinfectant, Corrosive, Liquid, n.o.s.	1
	8	2031	Nitric Acid	1
	8	3266	Corrosive Liquid, basic, inorganic, n.o.s.	3
	9	3077	Environmentally Hazardous Substances, solid, n.o.s.	1
	9	3082	Hazardous Waste Liquid, n.o.s.	1
	9	3257	Elevated Temperature Liquid, n.o.s., at or above 100C, and below its flash point	1
Subtotal Placarded Trucks				46
Subtotal Trucks Not Placarded				2159
TOTAL TRUCKS				2205

APPENDIX A: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE - CITY OF MERCED

	April 9-12, 2018			
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
Highway 99 Northbound at Franklin Road				
	2.1	N/A	Flammable Gas	4
	2.2	N/A	Non Flammable Gas	5
	2.3	N/A	Inhalation Hazard	3
	2.2	1005	Ammonia, anhydrous	1
	2.1	1049	Hydrogen, compressed	1
	2.1	1075	Propane	3
	2.2	1951	Argon, refrigerated liquid	1
	2.2	1977	Nitrogen, refrigerated liquid	2
	2.2	2187	Carbon Dioxide, refrigerated liquid	3
	3	N/A	Flammable Liquid n.o.s.	3
	3	1170	Ethanol, Ethyl Alcohol	4
	3	1203	Gasoline	9
	3	1914	Butyl Propionates	1
	3	1264	Paraldehyde	1
	3	1268	Petroleum Distillates, n.o.s	1
	3	1863	Aviation Fuel	2
	3	1921	Propyleneimine, stabilized	1
	3	1987	Alcohols n.o.s.	1
	3	1993	Diesel Fuel	1
	3	1993	Compound, Tree Or Weed Killing Liquid (flammable)	1
	4	N/A	Dangerous When Wet	1
	5.1	2014	Hydrogen Peroxide	1
	5.1	N/A	Oxidizer	1
	8	N/A	Corrosive	1
	8	1789	Hydrochloric Acid	1
	8	1791	Hypochlorite Solution	3
	8	1824	Sodium Hydroxide Solution	2
	8	1830	Sulfuric Acid with more than 51% acid	4
	8	2796	Sulfuric Acid with less than 51% acid, Battery Fluid	1
	8	3262	Corrosive Solid, basic, inorganic, n.o.s.	1
	8	3266	Corrosive Liquid, basic, inorganic, n.o.s.	3
	N/A	N/A	Dangerous	1
	Subtotal Placarded Trucks			68
	Subtotal Trucks Not Placarded			1772
	TOTAL TRUCKS			1840

APPENDIX A: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE - CITY OF MERCED

	April 9-12, 2018			
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
Highway 99 Southbound at East Mission Avenue				
	1.5	N/A	Blasting Agents	1
	2.1	N/A	Flammable Gas	1
	2.2	N/A	Non Flammable Gas	1
	2.3	N/A	Inhalation Hazard	2
	2.3	1017	Chlorine	1
	2.2	1072	Oxygen, compressed	1
	2.1	1073	Oxygen, refrigerated liquid	1
	2.1	1075	Propane	4
	2.2	1977	Liquid Nitrogen	2
	2.2	2187	Carbon Dioxide	1
	3	1170	Ethanol, Ethyl Alcohol	1
	3	1203	Gasoline	6
	3	1268	Petroleum Distillates, n.o.s.	1
	3	1863	Aviation Fuel	4
	3	1993	Diesel Fuel	1
	5.1	1486	Potassium Nitrate	1
	5.1	2014	Hydrogen Peroxide	1
	8	N/A	Corrosive	4
	8	1791	Hypochlorite Solution	1
	8	1824	Sodium Hydroxide Solution	2
	8	1830	Sulfuric Acid with more than 51% acid	2
	8	2672	Ammonium Hydroxide with more than 10% and not more than 35% ammonia	1
	8	3264	Corrosive Solid, acidic, inorganic, n.o.s.	1
	8	3266	Corrosive Liquid, basic, inorganic, n.o.s.	1
	9	3077	Environmentally Hazardous Substances, solid, n.o.s.	2
	9	3257	Elevated temperature liquid, n.o.s., at or above 100C, and below its flash point	2
	9	3268	Airbag/Seatbelt Devices	1
	N/A	N/A	Dangerous	1
	Subtotal Placarded Trucks			48
	Subtotal Trucks Not Placarded			2287
	TOTAL TRUCKS			2335

APPENDIX A: HIGHWAY PLACARD SURVEY DATA COMPILATION TABLE - CITY OF MERCED

April 9-12, 2018				
Survey Location	Placard Class	Placard No.	Common Name	No. of Trucks
Highway 99 Northbound at East Mission Avenue				
	2.1	N/A	Flammable Gas	1
	2.2	N/A	Oxygen	2
	2.1	1012	Butylene	1
	2.2	1013	Carbon Dioxide, compressed	1
	2.1	1077	Propylene	1
	2.2	1973	Chloropentafluoroethane/Chlorodifluoromethane, mixture	1
	2.2	1977	Nitrogen, refrigerated liquid	4
	3	N/A	Flammable Liquid n.o.s.	3
	3	1170	Ethanol, Ethyl Alcohol	3
	3	1203	Gasoline	9
	3	1267	Petroleum Crude Oil	1
	3	1268	Petroleum Distillates, n.o.s.	1
	3	2234	Chlorobenzotrifluorides	1
	5.1	N/A	Oxidizer	1
	5.2	N/A	Peroxides	1
	8	N/A	Corrosive	2
	8	1791	Hypochlorite Solution	2
	8	2051	2-diethylaminoethanol	1
	8	2672	Ammonium Hydroxide	1
	8	3263	Corrosive Solid, basic, organic, n.o.s.	1
	N/A	N/A	Dangerous	6
Subtotal Placarded Trucks				44
Subtotal Trucks Not Placarded				1645
TOTAL TRUCKS				1689
All Sites	Total Placarded Trucks			272
	Total Trucks Not Placarded			9439
	TOTAL TRUCKS			9711

APPENDIX B
Alphabetical Commodity Listing

APPENDIX B: ALPHABETICAL COMMODITY LISTING- CITY OF MERCED

APRIL 2018

Placard Class	Placard No.	Common Name
8	2051	2-diethylaminoethanol
9	3268	Airbag/Seatbelt Devices
3	1987	Alcohols n.o.s.
2.2	1005	Ammonia, anhydrous
8	2672	Ammonium Hydroxide
8	2672	Ammonium Hydroxide with more than 10% and not more than 35% ammonia
2.2	1951	Argon, refrigerated liquid
3	1863	Aviation Fuel
1.5	N/A	Blasting Agents
3	1914	Butyl Propionates
2.1	1012	Butylene
2.2	2187	Carbon Dioxide
2.2	1013	Carbon Dioxide, compressed
2.2	2187	Carbon Dioxide, refrigerated liquid
2.3	1017	Chlorine
3	2234	Chlorobenzotrifluorides
2.2	1973	Chloropentafluoroethane/Chlorodifluoromethane, mixture
3	1993	Compound, Tree Or Weed Killing Liquid (flammable)
8	N/A	Corrosive
8	3266	Corrosive Liquid, basic, inorganic, n.o.s.
8	3264	Corrosive Solid, acidic, inorganic, n.o.s.
N/A	N/A	Dangerous
4	N/A	Dangerous When Wet
3	1993	Diesel Fuel
8	1903	Disinfectant, Corrosive, Liquid, n.o.s.
9	3257	Elevated Temperature Liquid, n.o.s., at or above 100C, and below its flash point
9	3077	Environmentally Hazardous Substances, solid, n.o.s.
3	1170	Ethanol, Ethyl Alcohol
2.1	N/A	Flammable Gas
3	N/A	Flammable Liquid n.o.s.
3	1203	Gasoline
9	3082	Hazardous Waste Liquid, n.o.s.
2.2	1046	Helium
8	1789	Hydrochloric Acid
5.1	2014	Hydrogen Peroxide
2.1	1049	Hydrogen, compressed
8	1791	Hypochlorite Solution
2.3	N/A	Inhalation Hazard
2.2	1977	Liquid Nitrogen
8	2680	Lithium Hydroxide
8	2031	Nitric Acid
2.2	1977	Nitrogen, refrigerated liquid
2.2	N/A	Non Flammable Gas
5.1	N/A	Oxidizer
2.2	N/A	Oxygen
2.2	1072	Oxygen, compressed
2.1	1073	Oxygen, refrigerated liquid
3	1264	Paraldehyde
5.2	N/A	Peroxides
6.1	2903	Pesticide, liquid, toxic, flammable, n.o.s.
3	1267	Petroleum Crude Oil
3	1268	Petroleum Distillates, n.o.s.
3	2313	Picolines
5.1	1486	Potassium Nitrate
2.1	1075	Propane
2.1	1077	Propylene
3	1921	Propyleneimine, stabilized
8	1824	Sodium Hydroxide Solution
2.2	1080	Sulfur Hexafluoride
8	2796	Sulfuric Acid with less than 51% acid, Battery Fluid
8	1830	Sulfuric Acid with more than 51% acid

APPENDIX C
Total Truck Classification Data

APPENDIX C: TOTAL TRUCK CLASSIFICATION DATA - CITY OF MERCED

	OTHER	CONSTRUCTION VEHICLES	UTILITY VEHICLES	LOCAL DELIVERY VEHICLES	DRY BULK CARGO	SEMI- TRUCK TRAILER	TANKERS	TOTALS
SECONDARY ROADWAYS								
West Dickenson Ferry Road at South Thornton Road	7	5	32	6	0	22	3	75
Santa Fe Drive at Beachwood Drive	11	22	0	28	34	36	2	133
Highway 140 at Franklin Road	16	13	10	18	0	34	8	99
Highway 140 at North Arboleda Drive	4	17	11	26	9	27	19	113
Highway 59 at Rahilly Road	2	3	17	71	7	296	47	443
Highway 59 at West Bellevue Road	83	42	68	22	39	30	11	295
West Bellevue Road at G Street	8	18	29	14	1	6	2	78
Highway 99 at East Mission Avenue - Southbound Ramps	6	14	21	27	2	164	24	258
Highway 99 at East Mission Avenue - Northbound Ramps	2	0	5	5	0	50	3	65
Highway 99 at Franklin Road - Ramps	2	10	25	12	0	31	3	83
Subtotals	141	144	218	229	92	696	122	1642
CALIFORNIA STATE HIGHWAY 99								
Highway 99 Southbound at the Atwater-Merced Expressway	0	17	42	155	45	1737	209	2205
Highway 99 Northbound at Franklin Road	5	26	116	149	30	1352	162	1840
Highway 99 Southbound at East Mission Avenue	2	24	103	127	37	1854	188	2335
Highway 99 Northbound at East Mission Avenue	21	37	9	95	25	1312	190	1689
Subtotals	28	104	270	526	137	6255	749	8069
TOTALS	169	248	488	755	229	6951	871	9711

APPENDIX D
Hazmat Truck Classification Data

APPENDIX D: HAZMAT TRUCK CLASSIFICATION DATA - CITY OF MERCED

	OTHER	CONSTRUCTION VEHICLES	UTILITY VEHICLES	LOCAL DELIVERY VEHICLES	DRY BULK CARGO	SEMI- TRUCK TRAILER	TANKERS	TOTALS
SECONDARY ROADWAYS								
West Dickenson Ferry Road at South Thornton Road	0	0	0	0	0	0	0	0
Santa Fe Drive at Beachwood Drive	0	0	0	0	0	0	2	2
Highway 140 at Franklin Road	4	0	0	0	0	2	2	8
Highway 140 at North Arboleda Drive	0	0	0	0	0	0	6	6
Highway 59 at Rahilly Road	2	0	0	0	0	3	19	24
Highway 59 at West Bellevue Road	0	0	0	0	0	0	5	5
West Bellevue Road at G Street	0	0	5	0	0	0	1	6
Highway 99 at East Mission Avenue - Southbound Ramps	1	0	0	0	0	5	4	10
Highway 99 at East Mission Avenue - Northbound Ramps	0	0	0	0	0	2	0	2
Highway 99 at Franklin Road - Ramps	0	0	0	0	0	1	2	3
Subtotals	7	0	5	0	0	13	41	66
CALIFORNIA STATE HIGHWAY 99								
Highway 99 Southbound at the Atwater-Merced Expressway	0	0	0	1	0	11	34	46
Highway 99 Northbound at Franklin Road	0	0	2	1	0	18	47	68
Highway 99 Southbound at East Mission Avenue	0	0	6	2	0	12	28	48
Highway 99 Northbound at East Mission Avenue	0	0	0	2	0	13	29	44
Subtotals	0	0	8	6	0	54	138	206
TOTALS	7	0	13	6	0	67	179	272

APPENDIX E

Initial Isolation and Protective Action Distances

APPENDIX E: INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

ID No.	Guide	NAME OF MATERIAL	SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First ISOLATE in all Directions		Then PROTECT persons Downwind during		First ISOLATE in all Directions		Then PROTECT persons Downwind during	
					DAY	NIGHT			DAY	NIGHT
			Meters (Feet)	Kilometers (Miles)	Kilometers (Miles)	Kilometers (Miles)	Meters (Feet)	Kilometers (Miles)	Kilometers (Miles)	Kilometers (Miles)
1005	125	Ammonia, anhydrous	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		Refer to table 3			
1005	125	Anhydrous ammonia								
1008	125	Boron trifluoride	30 m (100 ft)	0.1 km (0.1 mi)	0.7 km (0.4 mi)		400 m (1250 ft)	2.2 km (1.4 mi)	4.8 km (3.0 mi)	
1008	125	Boron trifluoride, compressed								
1016	119	Carbon monoxide	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	1.2 km (0.7 mi)	4.4 km (2.8 mi)	
1016	119	Carbon monoxide, compressed								
1017	124	Chlorine	60 m (200 ft)	0.3 km (0.2 mi)	1.1 km (0.7 mi)		Refer to table 3			

TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR LARGE SPILLS FOR DIFFERENT QUANTITIES OF SIX COMMON TIH (PIH in the US) GASES

	First ISOLATE in all Directions		Then PROTECT persons Downwind during							
			DAY				NIGHT			
			Low wind (< 6 mph = < 10 km/h)	Moderate wind (6-12 mph = 10 - 20 km/h)	High wind (> 12 mph = > 20 km/h)	Low wind (< 6 mph = < 10 km/h)	Moderate wind (6-12 mph = 10 - 20 km/h)	High wind (> 12 mph = > 20 km/h)		
	Meters (Feet)	km (Miles)	km (Miles)	km (Miles)	km (Miles)	km (Miles)	km (Miles)	km (Miles)	km (Miles)	km (Miles)
TRANSPORT CONTAINER	UN1005 Ammonia, anhydrous: Large Spills									
Rail tank car	300 (1000)	1.7 (1.1)	1.3 (0.8)	1.0 (0.6)	4.3 (2.7)	2.3 (1.4)	1.3 (0.8)			
Highway tank truck or trailer	150 (500)	0.9 (0.6)	0.5 (0.3)	0.4 (0.3)	2.0 (1.3)	0.8 (0.5)	0.6 (0.4)			
Agricultural nurse tank	60 (200)	0.5 (0.3)	0.3 (0.2)	0.3 (0.2)	1.3 (0.8)	0.3 (0.2)	0.3 (0.2)			
Multiple small cylinders	30 (100)	0.3 (0.2)	0.2 (0.1)	0.1 (0.1)	0.7 (0.5)	0.3 (0.2)	0.2 (0.1)			
TRANSPORT CONTAINER	UN1017 Chlorine: Large Spills									
Rail tank car	1000 (3000)	9.9 (6.2)	6.4 (4.0)	5.1 (3.2)	11+ (7+)	9.0 (5.6)	6.7 (4.2)			
Highway tank truck or trailer	600 (2000)	5.8 (3.6)	3.4 (2.1)	2.9 (1.8)	6.7 (4.3)	5.0 (3.1)	4.1 (2.5)			
Multiple ton cylinders	300 (1000)	2.1 (1.3)	1.3 (0.8)	1.0 (0.6)	4.0 (2.5)	2.4 (1.5)	1.3 (0.8)			
Multiple small cylinders or single ton cylinder	150 (500)	1.5 (0.9)	0.8 (0.5)	0.5 (0.3)	2.9 (1.8)	1.3 (0.8)	0.6 (0.4)			

"+" means distance can be larger in certain atmospheric conditions

APPENDIX F
Restricted Railroad Data

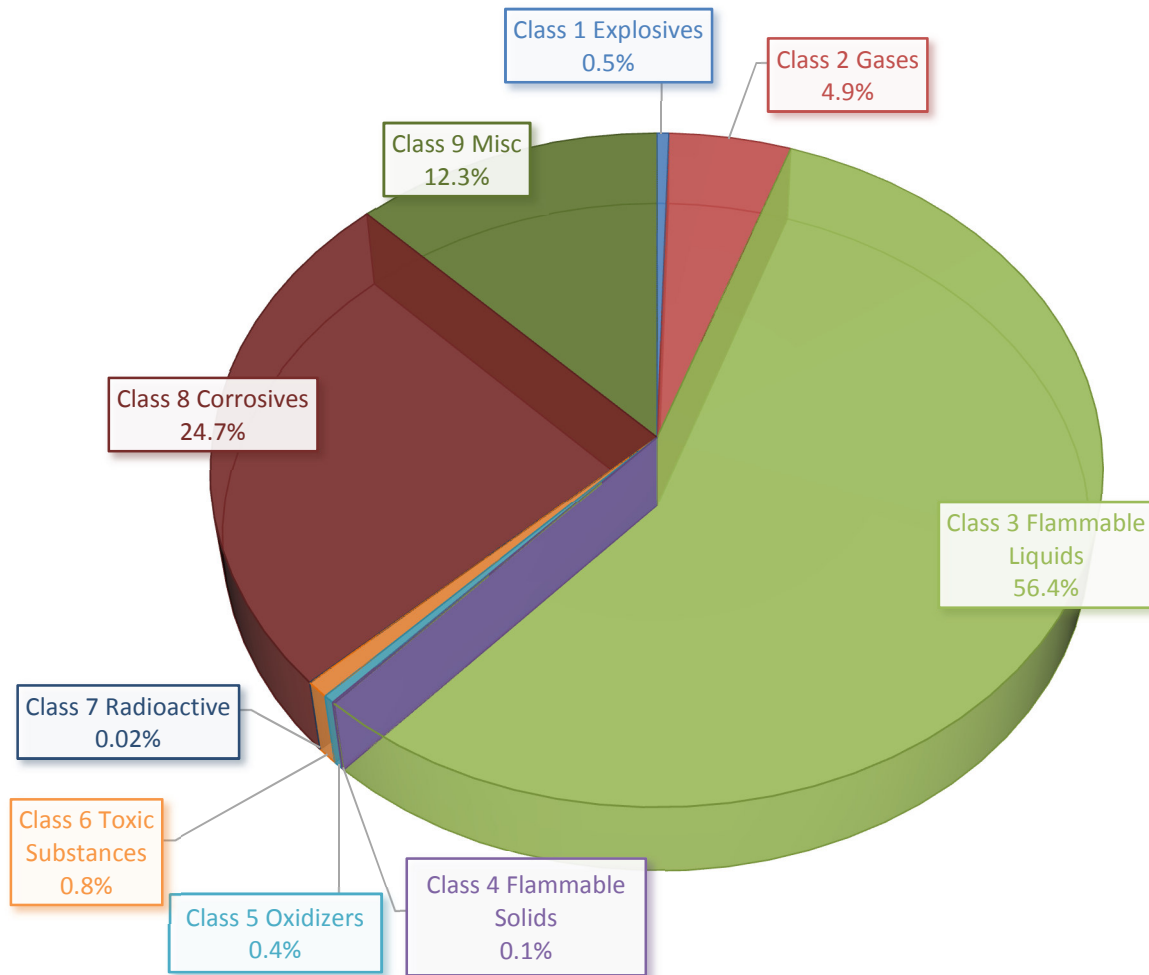
Under federal homeland security regulations, this data is considered sensitive security information and is **ONLY** to be shared with individuals having a “need to know” as defined by statute. Here, the information is being provided to government personnel with emergency response, planning and/or security-related responsibilities. Please distribute this information only to those people within your organization who have a direct “need to know” as defined by regulation.

BE ADVISED, numerous federal and state regulatory restrictions prohibit BNSF or those receiving this information from publicizing data on train volumes and routing. These include, but are not limited to the following:

Federal regulation prohibits sensitive security information relating to transportation shipments from being released. The SSI regulations are under three different federal agencies:

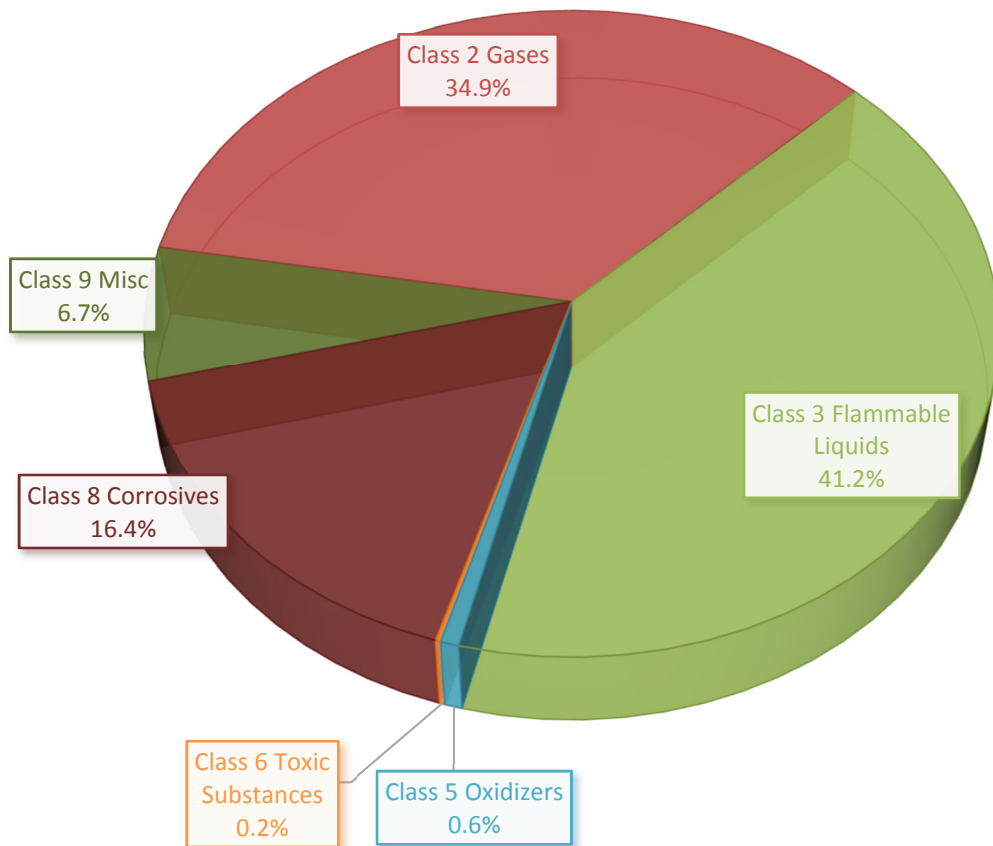
- Department of Transportation: 49 CFR Subtitle A (Part 15)
- Department of Homeland Security: 49 CFR Chapter XII (Part 1520)
- Pipeline and Hazardous Materials Safety Administration: 49 CFR Subtitle B Chapter I (Part 172.820)

UNION PACIFIC



DOT Hazard Class	Cars
Class 1 Explosives	123
Class 2 Gases	1301
Class 3 Flammable Liquids	15076
Class 4 Flammable Solids	19
Class 5 Oxidizers	99
Class 6 Toxic Substances	205
Class 7 Radioactive	5
Class 8 Corrosives	6608
Class 9 Misc.	3288
Total	26724

BNSF



DOT Hazard Class	Cars
Class 2 Gases	19443
Class 3 Flammable Liquids	22999
Class 5 Oxidizers	352
Class 6 Toxic Substances	102
Class 8 Corrosives	9135
Class 9 Misc.	3759
Total	55790

Raw Data from BNSF for most recent 12 month Period ending May 2018

UN/NA ID Number	ProperShippingName	DOT	Residue Car	Loaded Car	Residue IM	Loaded IM	Total Loaded
1993	WASTE FLAMMABLE LIQUIDS, N.O.S.	3	24	13	0	0	13
3077	HAZARDOUS WASTE, SOLID, N.O.S.	9	0	0	0	59	59
3077	HAZARDOUS WASTE, SOLID, N.O.S.	9	0	1	0	142	143
3082	HAZARDOUS WASTE, LIQUID,N.O.S.	9	13	12	0	0	12
1005	AMMONIA, ANHYDROUS	2.2	73	66	0	0	66
1951	ARGON, REFRIGERATED LIQUID	2.2	63	75	0	0	75
2187	CARBON DIOXIDE, REFRIGERATED LIQUID	2.2	119	112	0	0	112
1066	NITROGEN, COMPRESSED	2.2	1	0	0	0	0
1075	LIQUEFIED PETROLEUM GAS	2.1	16	18	0	0	18
1075	PROPANE	2.1	976	773	0	0	773
1075	BUTANE	2.1	203	238	0	0	238
1075	BUTANE	2.1	212	765	0	0	765
1075	BUTYLENE	2.1	2	5	0	0	5
1075	ISOBUTANE	2.1	15	16	0	0	16
1011	BUTANE	2.1	2	0	0	0	0
1075	PETROLEUM GASES, LIQUEFIED	2.1	7409	7107	0	0	7107
1075	ISOBUTANE	2.1	1	0	0	0	0
1077	PROPYLENE	2.1	11	2	0	0	2
1075	PROPYLENE	2.1	29	8	0	0	8
1075	BUTANE	2.1	37	174	0	0	174
1075	PROPANE	2.1	285	370	0	0	370
1247	METHYL METHACRYLATE MONOMER, STABILIZED	3	1	0	0	0	0
2055	STYRENE MONOMER, STABILIZED	3	786	660	0	0	660
1301	VINYL ACETATE, STABILIZED	3	17	0	0	0	0
3295	HYDROCARBONS, LIQUID, N.O.S.	3	58	59	0	0	59
3295	HYDROCARBONS, LIQUID, N.O.S.	3	28	10	0	0	10
3272	ESTERS, N.O.S.	3	0	1	0	0	1
1160	DIMETHYLAMINE, SOLUTION	3	1	0	0	0	0
1090	ACETONE	3	8	14	0	0	14
1114	BENZENE	3	1	0	0	0	0
1131	CARBON DISULFIDE	3	0	8	0	0	8
1145	CYCLOHEXANE	3	1	0	0	0	0
1203	GASOLINE	3	17	13	0	0	13
1203	GASOLINE	3	3	0	0	0	0
1203	GASOLINE	3	11	6	0	0	6
3475	ETHANOL AND GASOLINE MIXTURE	3	15	13	0	0	13
3475	ETHANOL AND GASOLINE MIXTURE	3	46	9	0	0	9
1262	OCTANES	3	33	33	0	0	33
1265	PENTANES	3	89	97	0	0	97
1987	ALCOHOLS, N.O.S.	3	18	15	0	0	15
1170	ETHANOL	3	0	0	0	2	2
1987	ALCOHOLS, N.O.S.	3	5663	7713	0	0	7713
1170	ETHANOL	3	0	3	0	0	3
2313	PICOLINES	3	0	0	0	2	2

2313	PICOLINES	3	0	0	2	0	0
1274	N-PROPANOL	3	3	2	0	0	2
1219	ISOPROPANOL	3	0	2	0	0	2
1220	ISOPROPYL ACETATE	3	5	5	0	0	5
1863	FUEL, AVIATION, TURBINE ENGINE		19	17	0	0	17
1993	FLAMMABLE LIQUIDS, N.O.S.	3	0	0	0	3	3
1230	METHANOL	3	110	115	0	0	115
1294	TOLUENE	3	15	17	0	0	17
1307	XYLENES	3	0	2	0	0	2
1268	PETROLEUM DISTILLATES, N.O.S.	3	14	2	0	0	2
1307	XYLENES	3	0	4	0	0	4
1170	ETHANOL	3	0	0	0	1	1
3065	ALCOHOLIC BEVERAGES	3	83	81	0	0	81
1267	PETROLEUM CRUDE OIL	3	2600	3493	0	0	3493
1993	FLAMMABLE LIQUIDS, N.O.S.	3	0	0	0	25	25
1993	FLAMMABLE LIQUIDS, N.O.S.	3	0	1	0	0	1
1267	PETROLEUM CRUDE OIL	3	8	0	0	0	0
1268	PETROLEUM DISTILLATES, N.O.S.	3	5	5	0	0	5
1268	PETROLEUM DISTILLATES, N.O.S.	3	83	89	0	0	89
1866	RESIN SOLUTION	3	31	6	0	0	6
1993	FLAMMABLE LIQUIDS, N.O.S.	3	39	30	0	0	30
1202	DIESEL FUEL	3	7	0	0	0	0
1202	DIESEL FUEL	3	9	0	0	0	0
2348	BUTYL ACRYLATES, STABILIZED	3	7	1	0	0	1
3295	HYDROCARBONS, LIQUID, N.O.S.	3	0	2	0	0	2
1993	FLAMMABLE LIQUIDS, N.O.S.	3	84	75	0	0	75
1993	DIESEL FUEL	3	4	3	0	0	3
1993	FUEL OIL	3	22	22	0	0	22
2850	PROPYLENE TETRAMER	3	73	85	0	0	85
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	0	0	1	4	4
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	2	4	0	0	4
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	0	0	1	0	0
1993	COMBUSTIBLE LIQUID, N.O.S.	CL	20	20	0	0	20
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	1	1	0	0	1
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	3	0	0	11	11
1202	GAS OIL	CL	46	0	0	0	0
1202	DIESEL FUEL	CL	31	0	0	0	0
1993	FUEL OIL	CL	20	0	0	0	0
1993	FUEL OIL	CL	24	0	0	0	0
1268	PETROLEUM DISTILLATES, N.O.S.	CL	11	7	0	0	7
1268	PETROLEUM DISTILLATES, N.O.S.	CL	0	3	0	0	3
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	0	0	0	3	3
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	1	0	0	0	0
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	0	0	1	0	0
1993	COMBUSTIBLE LIQUID, N.O.S.	CL	1	0	0	0	0
1993	COMBUSTIBLE LIQUID,N.O.S.	CL	18	19	47	37	56
3394	ORGANOMETALLIC SUBSTANCE LIQUID, PYROPHORIC, WATER-REACTIVE	4.2	0	0	0	2	2

3399	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE	4.3	0	0	0	1	1
2067	AMMONIUM NITRATE BASED FERTILIZER	5.1	4	0	0	0	0
1942	AMMONIUM NITRATE	5.1	65	68	0	0	68
2015	HYDROGEN PEROXIDE, STABILIZED	5.1	74	71	0	0	71
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTIONS	5.1	38	32	0	0	32
3109	ORGANIC PEROXIDE TYPE F, LIQUID	5.2	0	0	0	12	12
1079	SULFUR DIOXIDE	2.3	1	1	0	0	1
1017	CHLORINE	2.3	139	119	0	0	119
1199	FURALDEHYDES	6.1	0	0	0	9	9
2903	PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S.	6.1	0	1	0	0	1
2810	TOXIC LIQUID, ORGANIC, N.O.S.	6.1	9	0	0	0	0
3483	MOTOR FUEL ANTI-KNOCK MIXTURES, FLAMMABLE	6.1	3	3	0	0	3
2078	TOLUENE DIISOCYANATE	6.1	0	34	0	0	34
2312	PHENOL, MOLTEN	6.1	0	4	0	0	4
3422	POTASSIUM FLUORIDE, SOLUTION	6.1	25	23	0	0	23
1778	FLUOROSILICIC ACID	8	14	7	0	0	7
1830	SULFURIC ACID	8	2308	2324	0	0	2324
1832	SULFURIC ACID, SPENT	8	65	201	0	0	201
1760	CORROSIVE LIQUIDS, N.O.S.	8	0	0	0	1	1
2031	NITRIC ACID	8	92	99	0	0	99
1789	HYDROCHLORIC ACID	8	1025	1053	0	0	1053
1805	PHOSPHORIC ACID SOLUTION	8	89	62	0	0	62
2789	ACETIC ACID, GLACIAL	8	3	5	0	0	5
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	0	0	0	2	2
3145	ALKYLPHENOLS, LIQUID, N.O.S.	8	0	0	0	1	1
3463	PROPIONIC ACID	8	0	0	0	1	1
3264	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.	8	11	13	0	0	13
2209	FORMALDEHYDE SOLUTIONS	8	0	4	0	0	4
3265	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.	8	6	3	0	0	3
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	66	53	0	0	53
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	19	14	0	0	14
2586	ALKYL SULFONIC ACIDS, LIQUID	8	0	0	0	3	3
1760	FERROUS CHLORIDE,SOLUTION	8	2	11	0	0	11
2582	FERRIC CHLORIDE, SOLUTION	8	6	0	0	0	0
2693	BISULFITES, AQUEOUS SOLUTIONS, N.O.S.	8	102	99	0	0	99
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	15	16	0	0	16
1719	CAUSTIC ALKALI LIQUIDS, N.O.S.	8	0	0	0	1	1
1814	POTASSIUM HYDROXIDE, SOLUTION	8	5	23	0	0	23
1824	SODIUM HYDROXIDE SOLUTION	8	406	435	0	0	435
1824	SODIUM HYDROXIDE SOLUTION	8	1	0	0	0	0
3266	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.	8	0	0	0	1	1
2672	AMMONIA SOLUTIONS	8	73	85	0	0	85
3320	SODIUM BOROHYDRIDE AND SODIUM HYDROXIDE, SOLUTION	8	63	39	0	0	39
2735	AMINES, LIQUID, CORROSIVE, N.O.S.		0	0	15	17	17
2693	BISULFITES, AQUEOUS SOLUTION, N.O.S.	8	5	9	0	0	9
2491	ETHANOLAMINE	8	4	2	45	42	44

1760	CORROSIVE LIQUIDS, N.O.S.	8	7	7	0	0	7
2920	CORROSIVE LIQUIDS, FLAMMABLE, N.O.S.	8	6	3	0	0	3
1760	CORROSIVE LIQUIDS, N.O.S.	8	67	105	0	0	105
1760	CORROSIVE LIQUIDS, N.O.S.	8	0	1	0	0	1
2448	SULFUR, MOLTEN	9	1	0	0	0	0
0	FAK-HAZARDOUS MATERIALS	9	5	1	0	1	2
0	FAK-HAZARDOUS MATERIALS	9	3	0	2	33813	33813
0	FLAT CAR TRANSPORTING DAMAGED HAZARDOUS MATERIAL CAR		1	1	0	0	1
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	9	0	0	0	2	2
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	0	0	0	33	33
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	0	0	0	10	10
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	8	0	0	5	5
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	9	0	0	11	17	17
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	8	8	0	0	8
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	1	2	0	0	2
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	5	10	0	0	10
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	11	9	0	0	9
3082	OTHER REGULATED SUBSTANCES, LIQUID, N.O.S.	9	0	1	0	0	1
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	1	0	0	0	0
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	4	5	0	2	7
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	1276	1639	0	0	1639
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	15	14	0	0	14
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	3	0	0	0	0
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	0	1	0	0	1
3257	ELEVATED TEMPERATURE LIQUID, N.O.S.	9	197	178	0	0	178
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCES,SOLID,N.O.S.	9	0	20	0	0	20
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.	9	57	57	0	0	57
3082	OTHER REGULATED SUBSTANCES, LIQUID, N.O.S.	9	38	66	0	0	66
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	9	35	49	0	0	49
3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.	9	2	3	0	0	3

UNION PACIFIC RAILROAD HAZARDOUS MATERIALS COMMODITY FLOW							
MERCED, CA JAN 01, 2017 to DEC 31, 2017							
HazMat Response Code	HazMat Desc	Car Loads	Intermodal Loads	Residue Shmt Cnt	Total Loads	UN/NA Nbr	TIH Flag
4905421	PROPANE OR PETROLEUM GASES, LIQUEFIED OR LIQUEFIED PETROLEUM GAS OR PROPANE GAS, LIQUEFIED	4,923	35	4,271	4,958	UN1075	N
4999999	LOADED HAZWASTE CONTAINER ON FLAT CAR	1,504	0	3	1,504	99	N
4961605	ELEVATED TEMPERATURE LIQUID, N.O.S. OR ASPHALT (ASPHALTUM), BY-P RODUCT OR PETROLEUM, LIQU ID, OTHER THAN PAINT, STA IN OR VARNISH	888	0	107	888	UN3257	N
4920523	CHLORINE OR CHLORINE GAS, LIQUEFIED	848	0	864	848	UN1017	Y
4905752	PETROLEUM GASES, LIQUEFIED OR LIQUEFIED PETROLEUM GAS OR LIQUEFIED PETROLEUM GAS, NEC, COMPRESSED	770	0	913	770	UN1075	N
4905419	LIQUEFIED PETROLEUM GAS OR PETROLEUM GASES, LIQUEFIED CLASS 2.1 UN1075 PROPANE GAS, LIQUEFIED	487	0	395	487	UN1075	N
4930040	SULFURIC ACID OR SULPHURIC ACID OR SULPHURIC ACID OR OIL OF VITRIOL 93-100% CONCENTRA TION	327	5	367	332	UN1830	N
4930228	HYDROCHLORIC ACID OR HYDROCHLORIC ACID SOLUTION OR MURIATIC (HYDROCHLORIC) A CID	306	7	252	313	UN1789	N
4966333	SAFETY DEVICES OR SYSTEMS, AUTOMOBILE CRASH PROTECTION, GAS GENERATI NG TYPE, INFLATABLE RESTR AINTS	0	207	0	207	UN3268	N
4904535	CARBON DIOXIDE OR CARBON DIOXIDE GAS, LIQUEFIED OR CARBONIC ACID GAS	0	203	0	203	UN1013	N
4960196	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. OR ETHYLENE GLYCOL (ETHYLENE ALCOHOL OR GLYCOL)	188	0	178	188	UN3082	N
4910165	PETROLEUM CRUDE OIL OR PETROLEUM OIL OR SHALE OI L, CRUDE	183	0	94	183	UN1267	N
4905726	LIGHTERS OR LIGHTER REFILLS OR LIGHTERS, CIGAR, CIGARETTE OR PIPE, NEC	0	176	0	176	UN1057	N
4935206	SODIUM HYDROXIDE SOLUTION OR CAUSTIC SODA SOLUTION, SPENT (AN UNREFINED WASTE OBTAINED IN REFINING PETROLEUM OIL)	0	153	0	153	UN1824	N
4966703	LITHIUM ION BATTERIES OR CHEMICALS, NEC HAZARD CLA SS 9 MISCELLANEOUS HAZARD OUS MATERIALS	0	152	0	152	UN3480	N
4936392	HYPOCHLORITE SOLUTIONS OR CHLORINATED LIME, LIQUID (AQUEOUS SOLUTION) (CHLOR IDE OF LIME BLEACH, NEC, LIQUID, CHLORIDE OF LIME BLEACHING POWDER, LIQUID OR CALCIUM HYPOCHLORITE (CALCIUM OXYCHLORIDE), LIQ UID)	0	150	0	150	UN1791	N
4860130	HAZARDOUS WASTE, SOLID, N.O.S.	0	122	0	122	NA3077	N
4909205	ISOPROPANOL OR ISOPROPYL ALCOHOL OR ISOPROPANOL SOLUTION OR ISOPROPYL ALCOHOL SOLUTION OR PROPYL ALCOHOL (N-PROPYL ALCOHOL OR 1PROPANOL) OR ISOPROPYL ALCOHOL (DIMETH YLCARBINOL, IPA, ISOPROPA NOL, SECPROPYL ALCOHOL OR 2-PROPANOL) NOT FIT FOR HUMAN CO	5	113	6	118	UN1219	N
4935240	SODIUM HYDROXIDE SOLUTION OR SODIUM (SODA), CAUSTIC (S ODIUM HYDROXIDE), LIQUID LESS THAN OR EQUAL TO 55% CONCENTRATION	49	67	60	116	UN1824	N
4912186	DIESEL FUEL OR HEATING OIL, LIGHT OR PETROLEUM DISTILLATE FUEL OIL, DIESEL OIL OR GAS O IL, NOT SUITABLE FOR ILLU MINATING PURPOSES	94	0	111	94	UN1202	N
4966326	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. OR COPPER CONCENTRATES	93	0	18	93	UN3077	N
4912604	ADHESIVES OR ADHESIVES, NEC, ADHESIVE CEMENTS, NEC, ADHESIVE GLUES, NEC, OR ADHESIVE PASTES, NEC, OR RUBBER CEMENT	0	87	0	87	UN1133	N
4875549	HAZARDOUS WASTE, SOLID, N.O.S.	86	0	79	86	NA3077	N
4920359	AMMONIA, ANHYDROUS OR AMMONIA, ANHYDROUS	86	0	124	86	UN1005	Y
4904210	AMMONIA, ANHYDROUS OR ANHYDROUS AMMONIA OR AMMONIA, ANHYDROUS	76	0	79	76	UN1005	Y
4936540	CORROSIVE LIQUIDS, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	76	0	76	UN1760	N
4907270	VINYL ACETATE, STABILIZED OR VINYL ACETATE	74	0	0	74	UN1301	N
4910185	FLAMMABLE LIQUIDS, N.O.S. OR CHEMICALS, NEC HAZARD CLA SS 3 (FLAMMABLE AND COMBU STIBLE LIQUIDS	0	73	2	73	UN1993	N
4904509	CARBON DIOXIDE, REFRIGERATED LIQUID OR CARBON DIOXIDE GAS, LIQUE FIED OR CARBONIC ACID GAS	72	0	108	72	UN2187	N
4909230	METHANOL OR METHANOL SOLUTIONS OR METHANOL (METHYL OR WOOD ALCOHOL), LIQUID NOT FIT FOR HUMAN CONSUMPTION	39	32	51	71	UN1230	N

4910153	PAINT RELATED MATERIAL OR COMPOUNDS, PAINT, LACQUER, VARNISH, ADHESIVE, OR RUST PREVENTIVE PIPE LINE COATING INCREASING, REDUCING, REMOVING OR THINNING, NEC	0	70	0	70	UN1263	N
4910181	EXTRACTS, FLAVORING, LIQUID OR FLAVORING COMPOUNDS, NEC, LIQUID OR PASTE, FLAVORING EXTRACTS OR IMITATION FLAVORS, NEC, DRY	0	70	0	70	UN1197	N
4932329	FERROUS CHLORIDE, SOLUTION OR IRON CHLORIDE (IRON MURIA TE), OTHER THAN CRUDE, LIQUID	62	2	17	64	NA1760	N
4932342	FERRIC CHLORIDE, SOLUTION OR IRON CHLORIDE, CRUDE, LIQUID, NOT LESS THAN 50 PER CENT WATER	64	0	34	64	UN2582	N
4904515	COMPRESSED GAS, N.O.S. OR COMPRESSED GASES, NEC, OTHER THAN POISON	0	60	0	60	UN1956	N
4905423	BUTANE OR BUTANE GAS, LIQUEFIED	60	0	32	60	UN1075	N
4909159	ETHANOL OR ETHYL ALCOHOL OR ETHANOL SOLUTION OR ETHYL ALCOHOL SOLUTION OR ETHANOL SOLUTIONS OR ETHYL ALCOHOL SOLUTIONS OR ETHYL ALCOHOL (COLOGNE SPIRITS, ETHANOL, ETHYL HYDROXIDE, FERMENTATION ALCOHOL, GRAIN ALCOHOL OR SPIRITS OF WINE) NOT FIT FOR	0	59	0	59	UN1170	N
4920508	SULFUR DIOXIDE OR SULPHUR DIOXIDE OR SULPHUR DIOXIDE (SULPHUROUS ACID ANHYDRIDE)	58	0	57	58	UN1079	Y
4930223	NITRIC ACID OR NITRIC ACID	11	47	9	58	UN2031	N
4935258	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	57	0	57	UN3266	N
4908188	OCTANES OR PETROLEUM CONDENSATE	55	1	55	56	UN1262	N
4921598	PHENOL, MOLTEN OR CARBOLIC ACID (PHENOL)	56	0	46	56	UN2312	N
4910251	PAINT OR PAINTS, STAINS OR VARNISHES, NEC, BRONZING LIQUIDS, LACQUERS OR SHELLACS, LIQUID OR PASTE	0	53	0	53	UN1263	N
4910280	RESIN SOLUTION OR COMPOUNDS, RESIN, NOT COMMERCIALY SUITABLE FOR EXTRUDING OR MOLDING PURPOSES, IN FLAKE, LIQUID, LUMP, POWDER OR SOLID MASS FORM, RESIN CONTENT NOT EXCEEDING 50 PERCENT BY WEIGHT	0	53	0	53	UN1866	N
4950130	FAK-HAZARDOUS MATERIALS OR FREIGHT FORWARDER TRAFFIC	0	51	8	51	99	N
4909215	FUEL, AVIATION, TURBINE ENGINE OR JET FUEL	50	0	43	50	UN1863	N
4931463	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	25	24	25	49	UN3264	N
4966325	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. OR COPPER CONCENTRATES	47	0	705	47	UN3077	N
4935601	AMINES, LIQUID, CORROSIVE, N.O.S. OR POLYAMINES, LIQUID, CORROSIVE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	3	42	2	45	UN2735	N
4904503	ARGON, REFRIGERATED LIQUID OR ARGON GAS, LIQUID, OTHER THAN COMPRESSED	44	0	5	44	UN1951	N
4931309	FORMIC ACID OR FORMIC ACID	0	44	0	44	UN3412	N
4961619	ELEVATED TEMPERATURE LIQUID, N.O.S. OR ASPHALT (ASPHALTUM), BY-PRODUCT OR PETROLEUM, LIQUID, OTHER THAN PAINT, STAIN OR VARNISH	44	0	10	44	UN3257	N
4912215	BUTYL ACRYLATES, STABILIZED OR ACRYLATES, BUTYL, ETHYLHEXYL, HYDROXYETHYL, HYDROXYPROPYL OR ISOBUTYL	42	0	0	42	UN2348	N
4930216	BATTERY FLUID, ACID OR SULFURIC ACID OR SULPHURIC ACID OR SULFURIC ACID SOLUTION OR SULPHURIC ACID SOLUTION OR ELECTROLYTE ACID, CONTAINING NOT TO EXCEED 47 PERCENT SULPHURIC ACID	0	42	0	42	UN2796	N
4935230	POTASSIUM HYDROXIDE, SOLUTION OR POTASSIUM HYDROXIDE (CAUSTIC POTASSIUM)	3	37	6	40	UN1814	N
4909103	ALCOHOLS, N.O.S. OR ALCOHOLS, NEC, OTHER THAN ALCOHOLIC LIQUORS NOT FIT FOR HUMAN CONSUMPTION	0	38	0	38	UN1987	N
4918795	CALCIUM HYPOCHLORITE, HYDRATED OR CALCIUM HYPOCHLORITE, HYDRATED MIXTURES OR LIME, CHLORINATED (CHLORIDE OF LIME), DRY, (CHLORIDE OF LIME BLEACH, NEC, DRY, CHLORIDE OF LIME BLEACHING POWDER, NEC, DRY, OR CALCIUM HYPOCHLORITE (CALCIUM OXYCHLORIDE)	0	38	0	38	UN2880	N
4966109	OTHER REGULATED SUBSTANCES, LIQUID, N.O.S. OR METHYLENE DIPHENYL DIISOCYANATE	38	0	125	38	NA3082	N
4932378	HYPOCHLORITE SOLUTIONS OR SODIUM HYPOCHLORITE SOLUTION	0	37	0	37	UN1791	N
4936556	BATTERIES, WET, FILLED WITH ACID OR STORAGE BATTERIES, ELECTRIC, ASSEMBLED, NEC	0	35	1	35	UN2794	N

4941205	CONSUMER COMMODITY OR CHEMICALS, NEC HAZARD CLASS 9 MISCELLANEOUS HAZARDOUS MATERIALS	0	35	0	35	ID8000	N
4904820	FIRE EXTINGUISHERS OR FIRE EXTINGUISHERS, CHEMICAL, HAND OR STATIONARY, METAL, OTHER THAN WHEELED	0	31	0	31	UN1044	N
4905791	PROPANE OR PROPANE GAS, LIQUEFIED	30	0	48	30	UN1075	N
4908175	GASOLINE OR MOTOR SPIRIT OR PETROL OR GASOLINE, NEC	19	9	21	28	UN1203	N
4908105	ACETONE OR ACETONE SOLUTION OR ACETONE, NEC, SYNTHETIC, VIZ. ACETONE (DIMETHYLKET ONE, KETOPROPANE, PYROACE TIC ETHER, OR 2-PROPANONE)	0	27	0	27	UN1090	N
4910282	RESIN SOLUTION OR PLASTICS, RESINS OR GUMS, NEC, LIQUID	26	0	9	26	UN1866	N
4966704	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT OR LITHIUM ION BATTERIES PACKED WITH EQUIPMENT OR CHEMICALS, NEC HAZARD CLA SS 9 MISCELLANEOUS HAZARD OUS MATERIALS	0	26	0	26	UN3481	N
4910205	PRINTING INK OR PRINTING INK RELATED MATERIAL OR INK, PRINTING, NEC, OR BRUSH OR STENCIL MARKING INK	0	25	0	25	UN1210	N
4905709	AEROSOLS OR COMPRESSED GASES, NEC, OTHER THAN POISON	0	24	0	24	UN1950	N
4960131	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. OR CHEMICALS, NEC HAZARD CLA SS 9 MISCELLANEOUS HAZARD OUS MATERIALS	1	23	3	24	UN3082	N
4931466	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	23	0	23	UN3265	N
4904304	1,1,1,2-TETRAFLUOROETHANE OR REFRIGERANT GAS R134A OR COMPRESSED GASES, NEC, OTHER THAN POISON	0	22	0	22	UN3159	N
		22	0	0	22		
4907265	STYRENE MONOMER, STABILIZED OR STYRENE, LIQUID	21	0	17	21	UN2055	N
4918982	ORGANIC PEROXIDE TYPE F, LIQUID OR CHEMICALS, NEC HAZARD CLA SS 5.2 ORGANIC PEROXIDES	0	21	0	21	UN3109	N
4921235	TOXIC SOLID, INORGANIC, N.O.S. OR POISONOUS SOLID, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	21	0	21	UN3288	N
4932028	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR SLUDGE, ACID OR ALKALI, CONTAINING NOT LESS THAN 75 PERCENT WATER (AN UNREFINED LIQUID WASTE OBTAINED AS A RESIDUE OF THE METAL FINISHING INDUSTRY)	0	21	0	21	UN3264	N
4966701	LITHIUM METAL BATTERIES OR LITHIUM BATTERY OR BATTERIES OR CELLS, ELECT RIC, STORAGE, LEAD ACID G EL OR STARVED ELECTROLYTE TYPE	0	21	0	21	UN3090	N
4907439	HYDROCARBONS, LIQUID, N.O.S. OR GASOLINE, NATURAL (CASINGHEAD), SUITABLE ONLY FOR BLENDING, MIXING OR REFINING	20	0	26	20	UN3295	N
4910102	ALCOHOLIC BEVERAGES OR ALCOHOL, IN BOND (FREE OF INTERNAL REVENUE TAX), OTHER THAN DENATURED ALCOHOL OR METHANOL	20	0	17	20	UN3065	N
4860133	WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	19	0	0	19	UN3077	N
4904501	AIR, COMPRESSED OR AIR, COMPRESSED	0	18	0	18	UN1002	N
4904565	NITROGEN, COMPRESSED OR NITROGEN GAS, COMPRESSED	0	18	0	18	UN1066	N
4931461	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	18	0	18	UN3260	N
4904584	LIQUEFIED GAS, N.O.S. OR COMPRESSED GASES, NEC, OTHER THAN POISON	0	17	0	17	UN3163	N
4930246	NITRIC ACID OR NITRIC ACID SOLUTION OR NITRIC ACID	0	17	0	17	UN2031	N
4905782	PROPYLENE OR PROPYLENE, NOT ODORIZED OR PROPYLENE	1	15	2	16	UN1077	N
4931497	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR IRON SULPHATE (FERRIC SULPHATE), OTHER THAN DRY (FERRIC SULPHATE SOLUTION)	16	0	17	16	UN3264	N
4903190	PRIMERS, CAP TYPE OR PRIMERS, SMALL ARMS	0	15	0	15	UN0044	N
4909305	TOLUENE OR TOLUENE SOLUTIONS OR TOLUENE (TOLUOL OR METHYL BENZENE) (METHYL- BENZOL OR PHENYLMETHANE)	0	15	0	15	UN1294	N
4903480	CARTRIDGES, POWER DEVICE OR LOW EXPLOSIVES, NEC, OR B LACK POWDER	0	13	0	13	UN0323	N
4909190	HEPTANES OR HEPTANES SOLUTIONS OR HEPTANE	0	13	0	13	UN1206	N
4910242	PETROLEUM DISTILLATES, N.O.S. OR PETROLEUM PRODUCTS, N.O.S. OR PETROLEUM DISTILLATE FUEL OIL, DIESEL OIL OR GAS OIL, NOT SUITABLE FOR ILLUMINATING PURPOSES	2	11	0	13	UN1268	N

4918448	TRICHLOROISOCYANURIC ACID, DRY OR TRICHLORO-S-TRIAZINETRION E (TRICHLOROISOCYANURIC ACID)	0	13	0	13	UN2468	N
4930248	PHOSPHORIC ACID SOLUTION OR PHOSPHORIC ACID	0	13	0	13	UN1805	N
4950110	FAK-HAZARDOUS MATERIALS OR ACIDS, CHEMICALS AND OTHER ARTICLES, IN MIXED LOADS	0	13	4	13	99	N
4935280	AMMONIA SOLUTIONS OR AMMONIUM HYDROXIDE OR AQUA AMMONIA, NEC	11	1	12	12	UN2672	N
4960604	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. OR UREA FORMALDEHYDE CONCENTRATE	12	0	14	12	UN3082	N
4835240	WASTE SODIUM HYDROXIDE SOLUTION	11	0	13	11	UN1824	N
4908177	GASOLINE OR MOTOR SPIRIT OR PETROL OR GASOLINES, BLENDED, CONSISTING OF MOTOR FUELS CONTAINING 50 PERCENT OR MORE OF GASOLINES	11	0	10	11	UN1203	N
4908183	HEXANES OR HEXANE	0	11	0	11	UN1208	N
4935235	SODIUM HYDROXIDE, SOLID OR SODIUM (SODA), CAUSTIC (SODIUM HYDROXIDE), OTHER THAN LIQUID	0	11	0	11	UN1823	N
4960133	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 9 MISCELLANEOUS HAZARDOUS MATERIALS	0	11	1	11	UN3077	N
4903520	FIREWORKS OR FIREWORKS OR PYROTECHNICS, NEC	0	10	0	10	UN0336	N
4904350	OXYGEN, COMPRESSED OR OXYGEN GAS, COMPRESSED	0	10	0	10	UN1072	N
4910142	COATING SOLUTION OR PIPE LINE COATING, CONDENSATION, CORROSION, ELECTROLYSIS, MOISTURE OR RUST PREVENTIVE, ASPHALTUM, COAL TAR OR PITCH BASE, OTHER THAN ASPHALTUM OR COAL TAR PAINT OR VARNISH	0	10	0	10	UN1139	N
4918761	OXIDIZING SOLID, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 5.1 OXIDIZING MATERIALS	0	10	0	10	UN1479	N
4935263	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	10	0	10	UN3267	N
4903114	SIGNALS, SMOKE OR FIREWORKS OR PYROTECHNICS, NEC	0	9	1	9	UN0507	N
4904305	ARTICLES, PRESSURIZED PNEUMATIC OR ARTICLES, PRESSURIZED HYDRAULIC OR SHOCK ABSORBERS, NEC, MACHINE	0	9	0	9	UN3164	N
4905706	BUTANE OR BUTANE GAS, LIQUEFIED	0	9	0	9	UN1011	N
4907250	METHYL METHACRYLATE MONOMER, STABILIZED OR METHYL METHACRYLATE MONOMER	5	4	1	9	UN1247	N
4914108	COMBUSTIBLE LIQUID, N.O.S. OR ACRYLATES, BUTYL, ETHYLHEXYL, HYDROXYETHYL, HYDROXYPROPYL OR ISOBUTYL	9	0	0	9	NA1993	N
4921449	NICOTINE OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	8	0	8	UN1654	N
4930026	FLUOROSILICIC ACID OR HYDROFLUOROSILICIC ACID	0	8	0	8	UN1778	N
4935665	ETHANOLAMINE OR ETHANOLAMINE SOLUTIONS OR DIETHANOLAMINE, MONO-ETHANOLAMINE, TRIETHANOLAMINE OR ETHANOLAMINE STILL BOTTOM MIXTURES	4	4	22	8	UN2491	N
4936015	CORROSIVE LIQUIDS, TOXIC, N.O.S. OR CORROSIVE LIQUIDS, POISON, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	8	0	8	UN2922	N
4904258	AEROSOLS OR COMPRESSED GASES, NEC, OTHER THAN POISON	0	7	0	7	UN1950	N
4918473	OXIDIZING SOLID, N.O.S. OR FERTILIZING COMPOUNDS (MANUFACTURED FERTILIZERS), NEC, DRY, OR PLANT FOOD, DRY	0	7	0	7	UN1479	N
4930221	CORROSIVE LIQUIDS, N.O.S. OR WASTE LIQUOR, CONSISTING OF NOT LESS THAN 50 PERCENT BY WEIGHT OF WATER, RESULTING FROM SULPHATE OR SODA PULPING PROCESS	0	7	0	7	UN1760	N
4931303	ACETIC ACID, GLACIAL OR ACETIC ACID SOLUTION OR ACETIC ACID, GLACIAL OR LIQUID	0	7	0	7	UN2789	N
4936535	PAINT OR COMPOUNDS, PAINT, LACQUER, VARNISH, ADHESIVE, OR RUST PREVENTIVE PIPE LINE COATING INCREASING, REDUCING, REMOVING OR THINNING, NEC	0	7	0	7	UN3066	N
4936561	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S. OR DEODORANTS, NEC, OTHER THAN CONTAINED IN OR IN THE FORM OF DECORATIONS, NOVELTIES OR ORNAMENTS, OR DISINFECTANTS, NEC, OTHER THAN MEDICINAL AND OTHER THAN TOILET PREPARATIONS	0	7	0	7	UN1903	N
4936588	PAINT RELATED MATERIAL OR PAINTS, STAINS OR VARNISHES, NEC, BRONZING LIQUIDS, LACQUERS OR SHELLACS, LIQUID OR PASTE	0	7	0	7	UN3066	N
4905747	ISOBUTANE OR ISOBUTANE GAS, LIQUEFIED	0	6	0	6	UN1969	N
4910101	PAINT OR ALUMINUM PAINT	0	6	0	6	UN1263	N

4917403	SULFUR, MOLTEN OR SULPHUR, MOLTEN OR SULPHUR, LIQUID OR MOLTEN	6	0	21	6	UN2448	N
4918546	OXIDIZING SOLID, CORROSIVE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 5.1 OXIDIZING MATERIALS	0	6	0	6	UN3085	N
4925275	TOXIC LIQUIDS, ORGANIC, N.O.S. OR POISONOUS LIQUIDS, ORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	6	0	6	UN2810	N
4930247	PHOSPHORIC ACID SOLUTION OR PHOSPHATIC FERTILIZER SOLUTION, CONTAINING NOT MORE THAN 77 PERCENT OF PHOSPHORIC ANHYDRIDE BY WEIGHT	6	0	1	6	UN1805	N
4932007	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR CHEMICAL WASTE, NEC, LIQUID	0	6	0	6	UN3266	N
4935211	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. OR POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	6	0	6	UN2734	N
4935225	POTASSIUM HYDROXIDE, SOLID OR POTASSIUM HYDROXIDE (CAUSTIC POTASSIUM)	0	6	0	6	UN1813	N
4935647	SODIUM HYDROXIDE SOLUTION OR RUBBER ACCELERATORS OR SOFTENERS, OTHER THAN PETROLEUM, NEC	0	6	0	6	UN1824	N
4903528	FIREWORKS OR FIREWORKS OR PYROTECHNICS, NEC	0	5	0	5	UN0337	N
4908290	TETRAHYDROFURAN OR TETRAHYDROFURAN	0	5	0	5	UN2056	N
4912066	TETRAETHYL SILICATE OR ETHYL SILICATE	0	5	0	5	UN1292	N
4914154	PAINT RELATED MATERIAL OR PAINT RELATED MATERIALS, NEC	0	5	0	5	UN1263	N
4916437	SODIUM BOROHYDRIDE OR SODIUM BOROHYDRIDE	0	5	0	5	UN1426	N
4917368	SMOKELESS POWDER FOR SMALL ARMS OR PROPELLANT EXPLOSIVES, CLASS B OR C, VIZ. SMOKELESS POWDER FOR CANNON OR SMALL ARMS, OR SOLID FUEL FOR MISSILES, ROCKETS OR OTHER DEVICES	0	5	0	5	NA3178	N
4929133	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) OR RADIOACTIVE MATERIALS, ARTICLES OR ISOTOPES, NEC	5	0	0	5	UN2912	N
4932021	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	5	0	5	UN3266	N
4935220	CAUSTIC ALKALI LIQUIDS, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	5	0	5	UN1719	N
4935244	POTASSIUM HYDROXIDE, SOLUTION OR SODIUM (SODA), CAUSTIC (SODIUM HYDROXIDE) AND POTASSIUM (POTASH), CAUSTIC, MIXED, IN SOLUTION	0	5	0	5	UN1814	N
4936601	CORROSIVE LIQUIDS, FLAMMABLE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	5	0	5	UN2920	N
4941146	LIFE-SAVING APPLIANCES, SELF INFLATING OR LIFE PRESERVERS OR LIFE VESTS, PNEUMATIC, RUBBERIZED CLOTH, COMPLETELY DEFLATED, WITH OR WITHOUT EQUIPMENT FOR INFLATION OR REPAIR	0	5	0	5	UN2990	N
4904312	AEROSOLS OR AEROSOL	0	4	0	4	UN1950	N
4904570	REFRIGERANT GASES, N.O.S. OR DISPERSANT GASES, N.O.S. OR REFRIGERANTS, NEC, GAS OR LIQUID, NONFLAMMABLE	0	4	0	4	UN1078	N
4907829	FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 3 (FLAMMABLE AND COMBUSTIBLE LIQUIDS)	0	4	0	4	UN2924	N
4909202	ACETONITRILE OR ACETONITRILE (METHYL CYANIDE)	0	4	0	4	UN1648	N
4912254	PAINT RELATED MATERIAL OR PAINT RELATED MATERIALS, NEC	0	4	0	4	UN1263	N
4914251	PAINT OR PAINTS, STAINS OR VARNISHES, NEC, BRONZING LIQUIDS, LACQUERS OR SHELLACS, LIQUID OR PASTE	0	4	0	4	UN1263	N
4916335	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE OR CHEMICALS, NEC HAZARD CLASS 4.3 SPONTANEOUSLY COMBUSTIBLE MATERIALS	0	4	0	4	UN3399	N
4918775	HYDROGEN PEROXIDE, AQUEOUS SOLUTIONS OR HYDROGEN PEROXIDE (HYDROGEN DIOXIDE)	1	3	0	4	UN2014	N
4925131	DICHLOROMETHANE OR METHYLENE CHLORIDE (DICHLOROMETHANE OR METHYLENE BICHLORIDE)	0	4	0	4	UN1593	N
4932023	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR ACIDS, INORGANIC, NEC, LIQUID	0	4	0	4	UN3264	N
4932052	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR FUNGICIDES, AGRICULTURAL, NEC, LIQUID	0	4	0	4	UN3266	N
4935273	SODIUM HYDROXIDE SOLUTION OR SODIUM HYDROXIDE AND SODIUM BOROHYDRIDE SOLUTION	0	4	0	4	UN1824	N
4935652	SODIUM HYDROXIDE SOLUTION OR SODIUM ACETATE, CRUDE	0	4	0	4	UN1824	N

4936574	BATTERIES, WET, NON-SPILLABLE OR BATTERIES OR CELLS, ELECTRIC, STORAGE, LEAD ACID OR STARVED ELECTROLYTE TYPE	0	4	0	4	UN2800	N
4960116	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. OR RADIATOR DRAININGS (ANTI-FREEZE), SUITABLE ONLY FOR RECYCLING	4	0	15	4	UN3082	N
4961606	ELEVATED TEMPERATURE LIQUID, N.O.S. OR OIL, PETROLEUM, NEC	4	0	2	4	UN3257	N
4899999	LOADED HAZWASTE CONTAINER ON FLAT CAR	3	0	0	3	99	N
4904898	REFRIGERANT GAS R407C OR REFRIGERANTS, NEC, GAS OR LIQUID, NONFLAMMABLE	0	3	0	3	UN3340	N
4905712	ETHYL CHLORIDE CLASS 2.1 UN1037 ETHYL CHLORIDE	0	3	0	3	UN1037	N
4905716	1,1-DIFLUOROETHANE OR REFRIGERANT GAS R152A OR FLUOROETHANE GASES, FLAMMABLE, VIZ. DIFLUOROETHANE OR DIFLUOROMONOCHLOROETHANE (CHLORODIFLUOROETHANE OR DIFLUOROCHLOROETHANE)	0	3	0	3	UN1030	N
4905867	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S. OR CHEMICALS, NEC	0	3	1	3	UN3501	N
4908255	PENTANES OR PETROLEUM ISOPENTANE OR PENTANE	0	3	0	3	UN1265	N
4914166	DIESEL FUEL OR PETROLEUM RESIDUAL FUEL OIL OR DIESEL OIL	3	0	2	3	NA1993	N
4916306	WATER-REACTIVE LIQUID, CORROSIVE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 4.3 SPONTANEOUSLY COMBUSTIBLE MATERIALS	0	3	0	3	UN3129	N
4918715	CALCIUM HYPOCHLORITE, DRY OR CALCIUM HYPOCHLORITE MIXTURES DRY OR LIME, CHLORINATED (CHLORIDE OF LIME), DRY, (CHLORIDE OF LIME BLEACH, NEC, DRY, CHLORIDE OF LIME BLEACHING POWDER, NEC, DRY, OR CALCIUM HYPOCHLORITE (CALCIUM OXYCHLORIDE), DRY)	0	3	0	3	UN1748	N
4918769	SODIUM CARBONATE PEROXYHYDRATE OR SODIUM PERCARBONATE	0	3	0	3	UN3378	N
4921005	EPICHLOROHYDRIN OR EPICHLOROHYDRIN OR GLYCEROL-DICHLOROHYDRIN	3	0	5	3	UN2023	N
4925223	POTASSIUM FLUORIDE, SOLUTION OR POTASSIUM FLUORIDE OR POTASSIUM FLUORIDE	3	0	3	3	UN3422	N
4930205	PHOSPHORIC ACID SOLUTION OR PHOSPHORIC ACID, DEFUORINATED	0	3	0	3	UN1805	N
4930229	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	3	0	3	UN3265	N
4930238	NITRIC ACID OR NITRIC ACID	0	3	0	3	UN2031	N
4931486	ALKYLPHENOLS, LIQUID, N.O.S. OR PHENOL, ALKYL	0	3	0	3	UN3145	N
4932022	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR ACIDS, INORGANIC, NEC, LIQUID	0	3	0	3	UN3264	N
4935251	SODIUM HYDROXIDE SOLUTION OR BLACK LIQUOR, FROM KRAFT PULPING PROCESS	0	3	0	3	UN1824	N
4935254	CORROSIVE SOLID, BASIC, INORGANIC, N.O.S. OR ZIRCONIUM SULFATE, BASIC	0	3	0	3	UN3262	N
4935655	SODIUM HYDROXIDE SOLUTION OR SODIUM ACETATE, OTHER THAN CRUDE	0	3	0	3	UN1824	N
4936545	CORROSIVE SOLIDS, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	3	0	3	UN1759	N
4963325	DANGEROUS GOODS IN MACHINERY OR DANGEROUS GOODS IN APPARATUS OR CHEMICALS, NEC HAZARD CLASS 9 MISCELLANEOUS HAZARDOUS MATERIALS	0	3	0	3	UN3363	N
4903249	ARTICLES, PYROTECHNIC OR LOW EXPLOSIVES, NEC, OR BLACK POWDER	0	2	0	2	UN0432	N
4904340	NITROUS OXIDE OR NITROUS OXIDE	0	2	0	2	UN1070	N
4904895	REFRIGERANT GAS R404A OR REFRIGERANTS, NEC, GAS OR LIQUID, NONFLAMMABLE	0	2	0	2	UN3337	N
4904896	REFRIGERANT GAS R407A OR REFRIGERANTS, NEC, GAS OR LIQUID, NONFLAMMABLE	0	2	0	2	UN3338	N
4904900	CHEMICAL UNDER PRESSURE, N.O.S. OR CHEMICALS, NEC	0	2	0	2	UN3500	N
4905710	COMPRESSED GAS, FLAMMABLE, N.O.S. OR COMPRESSED GASES, NEC, OTHER THAN POISON	0	2	0	2	UN1954	N
4907419	FLAMMABLE LIQUIDS, TOXIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 3 (FLAMMABLE AND COMBUSTIBLE LIQUIDS)	0	2	0	2	UN1992	N
4909155	DIOXANE OR DIETHYLENE OXIDE (1, 4-DIOXANE, DIETHYLENE ETHER, 1, 4-DIETHYLENE DIOXIDE OR DIOXYETHYLENE ETHER)	0	2	0	2	UN1165	N
4909185	HEXALDEHYDE OR HEXALDEHYDE, NORMAL	0	2	0	2	UN1207	N
4909348	XYLENES OR XYLENE (DIMETHYLBENZENE OR XYLOL), OTHER THAN SOLUTION	0	2	0	2	UN1307	N
4909382	PETROLEUM DISTILLATES, N.O.S. OR PETROLEUM PRODUCTS, N.O.S. OR OIL, PETROLEUM, NEC	2	0	11	2	UN1268	N

4910111	ALCOHOLS, N.O.S. OR ALCOHOLS, FATTY OR CYCLIC , ETHOXYLATED	0	2	0	2	UN1987	N
4910176	PAINT OR ENAMEL, OTHER THAN WATCH DIAL	0	2	0	2	UN1263	N
4910238	POLYESTER RESIN KITS OR POLYESTER RESIN KITS LIQUID BASE MATERIAL OR COMPOUNDS, RESIN, NOT COMMERCIALLY SUITABLE FOR EXTRUDING OR MOLDING PURPOSES, IN FLAKE, LIQUID, LUMP, POWDER OR SOLID MASS FORM, RESIN CONTENT NOT EXCEEDING 50 PERCENT BY WEIGHT	0	2	0	2	UN3269	N
4910287	ADHESIVES OR ROOFING CEMENT, NEC	0	2	0	2	UN1133	N
4912618	FUEL OIL OR FUEL OIL, NO. 4	2	0	4	2	NA1993	N
4912860	ALCOHOLS, N.O.S. OR PROPYL ALCOHOL (N-PROPYL ALCOHOL OR 1-PROPANOL) OR ISOPROPYL ALCOHOL (DIMETHYL-CARBINOL, IPA, ISOPROPANOL, SEC-PROPYL ALCOHOL OR 2-PROPANOL) NOT FIT FOR HUMAN CONSUMPTION	0	2	0	2	UN1987	N
4913333	COMBUSTIBLE LIQUID, N.O.S. OR DIESEL, RENEWABLE HYDROCARBON	2	0	1	2	NA1993	N
4914146	ETHANOL OR ETHANOL SOLUTIONS OR ETHYL ALCOHOL OR ETHYL ALCOHOL SOLUTIONS OR ETHYL ALCOHOL (COLOGNE SPIRITS, ETHANOL, ETHYL HYDROXIDE, FERMENTATION ALCOHOL, GRAIN ALCOHOL OR SPIRITS OF WINE) NOT FIT FOR HUMAN CONSUMPTION	0	2	0	2	UN1170	N
4916430	WATER-REACTIVE SOLID, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 4.3 SPONTANEOUSLY COMBUSTIBLE MATERIALS	0	2	0	2	UN2813	N
4917344	SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 4.1 FLAMMABLE SOLIDS	0	2	0	2	UN3175	N
4917384	METAL POWDERS, FLAMMABLE, N.O.S. OR METAL OR METAL ALLOY SCRAP, NEC, NOT IRRADIATED NOR REQUIRING PROTECTIVE SHIELDING	0	2	0	2	UN3089	N
4918311	AMMONIUM NITRATE OR AMMONIUM NITRATE FERTILIZER, DRY	2	0	17	2	UN1942	N
4918506	CHROMIUM TRIOXIDE, ANHYDROUS OR CHROMIC ACID	0	2	0	2	UN1463	N
4918732	NITRATES, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 5.1 OXIDIZING MATERIALS	0	2	0	2	UN1477	N
4918979	ORGANIC PEROXIDE TYPE D, SOLID OR CHEMICALS, NEC HAZARD CLASS 5.2 ORGANIC PEROXIDES	0	2	0	2	UN3106	N
4918983	ORGANIC PEROXIDE TYPE F, SOLID OR CHEMICALS, NEC HAZARD CLASS 5.2 ORGANIC PEROXIDES	0	2	0	2	UN3110	N
4925225	CHLOROFORM OR CHLOROFORM (TRICHLOROMETHANE), NEC, OTHER THAN TECHNICAL GRADE	0	2	0	2	UN1888	N
4930042	SULFURIC ACID, SPENT OR SULPHURIC ACID, SPENT OR ACID, SULPHURIC, SPENT	2	0	2	2	UN1832	N
4932009	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	2	0	2	UN3266	N
4932026	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR ALUMINUM CHLORIDE, LIQUID	0	2	0	2	UN3264	N
4932031	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR SLUDGE, ACID OR ALKALI, CONTAINING NOT LESS THAN 75 PERCENT WATER (AN UNREFINED LIQUID WASTE OBTAINED AS A RESIDUE OF THE METAL FINISHING INDUSTRY)	0	2	0	2	UN3266	N
4932032	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. OR SLUDGE, ACID OR ALKALI, CONTAINING NOT LESS THAN 75 PERCENT WATER (AN UNREFINED LIQUID WASTE OBTAINED AS A RESIDUE OF THE METAL FINISHING INDUSTRY)	0	2	0	2	UN3267	N
4932033	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR ACID SLUDGE (AN UNREFINED WASTE OBTAINED IN REFINING PETROLEUM OIL)	0	2	0	2	UN3265	N
4932050	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR DIBASIC SODIUM PHOSPHATE, DISODIUM ORTHOPHOSPHATE OR PHOSPHATE OR HYDROSODIUM PHOSPHATE, OR TRIBASIC SODIUM PHOSPHATE, TRISODIUM ORTHOPHOSPHATE OR PHOSPHATE OR TERTIARY SODIUM PHOSPHATE	0	2	0	2	UN3266	N
4932058	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR ACIDS, INORGANIC, NEC, LIQUID	0	2	0	2	UN3264	N
4932309	ALKYL SULFONIC ACIDS, LIQUID OR ARYL SULFONIC ACIDS, LIQUID OR ALKYL SULFONIC ACID	0	2	0	2	UN2586	N
4935260	SODIUM ALUMINATE, SOLUTION OR SODIUM ALUMINATE	0	2	0	2	UN1819	N
4935624	ISOPHORONEDIAMINE OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	2	0	2	UN2289	N
4935697	ZINC CHLORIDE, ANHYDROUS OR ZINC CHLORIDE, LIQUID	0	2	0	2	UN2331	N
4936360	CHLORITE SOLUTION OR SODIUM SALTS, NEC	0	2	0	2	UN1908	N

4936515	COMPOUNDS, CLEANING LIQUID OR COMPOUNDS, CLEANING, SCOURING OR WASHING, NEC, LIQUID	0	2	0	2	NA1760	N
4936560	BATTERIES, WET, FILLED WITH ALKALI OR STORAGE BATTERIES, ELECTRIC, ASSEMBLED, NEC	0	2	0	2	UN2795	N
4941165	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT OR LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT OR LITHIUM BATTERIES, CONTAINED IN EQUIPMENT OR LITHIUM BATTERIES, PACKED WITH EQUIPMENT OR BATTERIES, ELECTRIC, NEC	0	2	0	2	UN3091	N
4810560	WASTE FLAMMABLE LIQUIDS, N.O.S.	1	0	7	1	UN1993	N
4860107	HAZARDOUS WASTE, SOLID, N.O.S.	1	0	1	1	NA3077	N
4903102	PROPELLANT, SOLID OR PROPELLANT EXPLOSIVES, CLASS B OR C, VIZ. SMOKELESS POWDER FOR CANNON OR SMALL ARMS, OR SOLID FUEL FOR MISSILES, ROCKETS OR OTHER DEVICES	0	1	0	1	UN0501	N
4903113	POWDER, SMOKELESS OR PROPELLANT EXPLOSIVES, CLASS B OR C, VIZ. SMOKELESS POWDER FOR CANNON OR SMALL ARMS, OR SOLID FUEL FOR MISSILES, ROCKETS OR OTHER DEVICES	0	1	0	1	UN0509	N
4903305	CARTRIDGES, POWER DEVICE OR LOW EXPLOSIVES, NEC, OR BLACK POWDER	0	1	0	1	UN0276	N
4903392	DETONATORS, ELECTRIC OR EXPLOSIVE DETONATING OR SAFETY CORD OR FUSE	0	1	0	1	UN0456	N
4904502	ARGON OR ARGON GAS, COMPRESSED	0	1	0	1	UN1006	N
4904552	CHLORODIFLUOROMETHANE OR REFRIGERANT GAS R22 OR FLUOROMETHANE GASES, NONFLAMMABLE, VIZ. DICHLORODIFLUOROMETHANE (DIFLUORODICHLOROMETHANE), DICHLOROMONOFUOROMETHANE (DICHLOROFLUOROMETHANE OR FLUORODICHLOROMETHANE), MONOCHLORODIFLUOROMETHANE (CHLORODI	0	1	0	1	UN1018	N
4904575	SULFUR HEXAFLUORIDE OR SULPHUR HEXAFLUORIDE OR SULFUR HEXAFLUORIDE	0	1	0	1	UN1080	N
4905417	PETROLEUM GASES, LIQUEFIED OR LIQUEFIED PETROLEUM GAS OR BUTADIENE FROM PETROLEUM, INHIBITED	0	1	0	1	UN1075	N
4905725	DIMETHYL ETHER OR DIMETHYL ETHER (METHYL OR WOOD ETHERS OR METHYL OXIDE)	0	1	0	1	UN1033	N
4905763	LIQUEFIED GAS, FLAMMABLE, N.O.S. (TECHNICAL NAME. CLASS 2.1 UN3161	0	1	0	1	UN3161	N
4905781	PROPANE OR PROPANE GAS, LIQUEFIED	0	1	0	1	UN1978	N
4905789	BUTANE OR BUTANE GAS, LIQUEFIED	1	0	1	1	UN1075	N
4907030	NITROMETHANE OR NITROMETHANE	0	1	0	1	UN1261	N
4907877	TRIETHYLAMINE OR ETHYLAMINES, VIZ. DIETHYLAMINE, MONOETHYLAMINE OR TRIETHYLAMINE	0	1	0	1	UN1296	N
4908115	CHLOROBUTANES OR CHLORIDE, BUTYL (NORMAL)	0	1	0	1	UN1127	N
4908156	DIETHYL ETHER OR ETHYL ETHER OR ETHYL ETHER, OTHER THAN ANESTHESIA GRADE (ETHER, DIETHYL OR SULFURIC ETHER, OR DIETHYL OR ETHYL OXIDE)	0	1	0	1	UN1155	N
4909130	BUTANOLS OR BUTYL ALCOHOLS, VIZ. N-BUTYL ALCOHOL (BUTYRIC ALCOHOL OR 1-BUTANOL), SEC-BUTYL ALCOHOL (METHYL-ETHYL CARBINOL OR 2-BUTANOL) OR TERT-BUTYL ALCOHOL (TRI-METHYL-CARBINOL OR 2-METHYL-2-PROPANOL) NOT FIT FOR HUMAN CONSUMPTION	0	1	0	1	UN1120	N
4909161	ETHYL BORATE OR ETHYL BORATE	0	1	0	1	UN1176	N
4909207	ISOBUTYL ACETATE OR ISOBUTYL ACETATE	0	1	0	1	UN1213	N
4909219	FLAMMABLE LIQUIDS, N.O.S. OR GLYCOL ETHERS, NEC	0	1	0	1	UN1993	N
4909243	ETHYL METHYL KETONE OR METHYL ETHYL KETONE OR METHYL BUTYL KETONE, METHYL ETHYL KETONE, METHYL ISOBUTYL KETONE, METHYLPROPYL KETONE, ETHYL AMYL KETONE OR MESITYL OXIDE	0	1	0	1	UN1193	N
4909267	N-PROPANOL OR PROPYL ALCOHOL, NORMAL OR PROPYL ALCOHOL (N-PROPYL ALCOHOL OR 1-PROPANOL) OR ISOPROPYL ALCOHOL (DIMETHYL CARBINOL, IPA, ISOPROPANOL, SEC-PROPYL ALCOHOL OR 2-PROPANOL) NOT FIT FOR HUMAN CONSUMPTION	0	1	0	1	UN1274	N
4909313	1-METHOXY-2-PROPANOL OR PROPYLENE GLYCOL MONOMETHYL ETHER	0	1	0	1	UN3092	N
4910109	ADHESIVES OR BOX TOE GUMS	0	1	0	1	UN1133	N
4910179	KETONES, LIQUID, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 3 (FLAMMABLE AND COMBUSTIBLE LIQUIDS)	0	1	0	1	UN1224	N
4910265	PAINT RELATED MATERIAL OR SOLVENTS, ADHESIVE, GUM, LACQUER, PAINT, OTHER THAN SPRAY PAINT, PLASTIC, RESIN OR VARNISH	0	1	0	1	UN1263	N

4910364	EXTRACTS, AROMATIC, LIQUID OR FLAVORING COMPOUNDS, NEC, LIQUID OR PASTE, FLAVORING EXTRACTS OR IMITATION FLAVORS, NEC, DRY	0	1	0	1	UN1169	N
4912044	FORMALDEHYDE SOLUTIONS, FLAMMABLE OR FORMALDEHYDE, LIQUID OR CONCENTRATE	0	1	0	1	UN1198	N
4912124	EXTRACTS, AROMATIC, LIQUID OR EXTRACTS, AROMATIC, LIQUID	0	1	0	1	UN1169	N
4912210	DIESEL FUEL OR GAS OIL OR HEATING OIL LIGHT OR PETROLEUM DISTILLATE FUEL OIL, DIESEL OIL OR GAS OIL, NOT SUITABLE FOR ILLUMINATING PURPOSES	1	0	0	1	UN1202	N
4912244	PINE OIL OR PINE OIL	0	1	0	1	UN1272	N
4912818	ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S. OR BENZOIC ACID	1	0	2	1	UN3256	N
4914181	EXTRACTS, FLAVORING, LIQUID OR FLAVORING COMPOUNDS, NEC, LIQUID OR PASTE, FLAVORING EXTRACTS OR IMITATION FLAVORS, NEC, DRY	0	1	0	1	UN1197	N
4914216	BUTYL ACRYLATE, STABILIZED OR ACRYLATES, BUTYL, ETHYLHEXYL, HYDROXYETHYL, HYDROXYPROPYL OR ISOBUTYL	1	0	0	1	UN2348	N
4914247	PETROLEUM DISTILLATES, N.O.S. OR PETROLEUM PRODUCTS, N.O.S. OR OIL, PETROLEUM, NEC	1	0	1	1	UN1268	N
4914256	PETROLEUM DISTILLATES, N.O.S. OR PETROLEUM PRODUCTS, N.O.S. OR PETROLEUM NAPHTHA, NAPHTHA A DISTILLATE OR NAPHTHA SOLVENTS	1	0	0	1	UN1268	N
4916726	TRINITROCHLOROBENZENE (PICRYL CHLORIDE), WETTED OR CHEMICALS, NEC HAZARD CLASS 4.1 FLAMMABLE SOLIDS	0	1	0	1	UN3365	N
4917101	TRINITROPHENOL, WETTED OR PICRIC ACID, WETTED OR CHEMICALS, NEC HAZARD CLASS 4.1 FLAMMABLE SOLIDS	0	1	0	1	UN1344	N
4917336	MATCHES, STRIKE ANYWHERE OR MATCHES	0	1	0	1	UN1331	N
4917343	FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S. OR FLAMMABLE SOLID, POISON, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 4.1 FLAMMABLE SOLIDS	0	1	0	1	UN3179	N
4917356	MATCHES, SAFETY OR MATCHES	0	1	0	1	UN1944	N
4917464	HEXAMETHYLENETETRAMINE OR CHEMICALS, NEC HAZARD CLASS 4.1 FLAMMABLE SOLIDS	0	1	0	1	UN1328	N
4918519	PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 5.1 OXIDIZING MATERIALS	0	1	0	1	UN3214	N
4918523	PERCHLORIC ACID OR ACIDS, INORGANIC, NEC, LIQUID	0	1	0	1	UN1873	N
4918531	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 5.1 OXIDIZING MATERIALS	0	1	0	1	UN3219	N
4918724	DICHLOROISOCYANURIC ACID, DRY OR DICHLOROISOCYANURIC ACID SALTS OR DICHLOROISOCYANURIC ACID	0	1	0	1	UN2465	N
4918737	POTASSIUM NITRATE OR POTASSIUM NITRATE (SALTPETER), OTHER THAN CRUDE	0	1	0	1	UN1486	N
4918746	SODIUM NITRATE OR SODIUM (SODA) NITRATE (CHILE SALTPETER, CALICHE OR SODA NITER)	0	1	0	1	UN1498	N
4918748	SODIUM PERSULFATE OR SODIUM PERSULPHATE OR SODIUM SALTS, NEC	0	1	0	1	UN1505	N
4918810	HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE, STABILIZED OR CHEMICALS, NEC HAZARD CLASS 5.1 OXIDIZING MATERIALS	0	1	0	1	UN3149	N
4921025	TOXIC LIQUID, INORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	1	0	1	UN3287	N
4921210	PHENOL SOLUTIONS OR CARBOLIC ACID (PHENOL)	0	1	0	1	UN2821	N
4921476	TOXIC SOLIDS, ORGANIC, N.O.S. OR POISONOUS SOLIDS, ORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	1	0	1	UN2811	N
4923226	POTASSIUM CYANIDE, SOLID OR POTASSIUM CYANIDE	0	1	0	1	UN1680	N
4923350	SELENATES OR SELENITES OR SODIUM SALTS, NEC	0	1	0	1	UN2630	N
4925276	TOXIC SOLIDS, ORGANIC, N.O.S. OR POISONOUS SOLIDS, ORGANIC, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	1	0	1	UN2811	N
4925324	PYRETHROID PESTICIDE, LIQUID, TOXIC OR CHEMICALS, NEC HAZARD CLASS 6.1 POISONOUS MATERIALS	0	1	0	1	UN3352	N
4930017	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR WASTE ETCHANT SOLUTION, SUITABLE ONLY FOR RECLAMATION OF METALLIC CONTENT	0	1	0	1	UN3264	N
4930022	HYDROFLUORIC ACID OR HYDROFLUORIC ACID SOLUTION OR HYDROFLUORIC ACID	0	1	0	1	UN1790	N
4930201	CORROSIVE LIQUIDS, N.O.S. OR ACIDS, INORGANIC, NEC, LIQUID	0	1	0	1	UN1760	N
4930211	CORROSIVE LIQUIDS, N.O.S. OR ACIDS, INORGANIC, NEC, LIQUID	0	1	0	1	UN1760	N

4930252	CORROSIVE LIQUIDS, N.O.S. OR SLUDGE, ACID OR ALKALI, CONTAINING NOT LESS THAN 75 PERCENT WATER (AN UNREFINED LIQUID WASTE OBTAINED AS A RESIDUE OF THE METAL FINISHING INDUSTRY)	0	1	0	1	UN1760	N
4930253	CORROSIVE LIQUIDS, N.O.S. OR ACID SLUDGE (AN UNREFINED WASTE OBTAINED IN REFINING PETROLEUM OIL)	0	1	0	1	UN1760	N
4931310	ALKYL SULFONIC ACIDS, LIQUID OR ARYL SULFONIC ACIDS, LIQUID OR ARYLSULPHONIC ACIDS, LIQUID OR ALKYLSULPHONIC ACIDS, LIQUID OR ADDITIVES, FUEL OIL, GASOLINE, OR LUBRICATING OIL, CONTAINING LESS THAN 50 PERCENT BY WEIGHT OF PETROLEUM	0	1	0	1	UN2586	N
4931401	ACETIC ACID SOLUTION OR ACETIC ACID, GLACIAL OR LIQUID	0	1	0	1	UN2790	N
4931446	CORROSIVE LIQUIDS, N.O.S. OR ADDITIVES, FUEL OIL, GASOLINE, OR LUBRICATING OIL, CONTAINING LESS THAN 50 PERCENT BY WEIGHT OF PETROLEUM	0	1	0	1	UN1760	N
4931492	2-DIMETHYLAMINOETHANOL OR DIMETHYLAMINOETHANOL OR DIMETHYLETHANOLAMINE	0	1	0	1	UN2051	N
4931499	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR PETROLEUM ALKYLATE DETERG ENT INTERMEDIATE	0	1	0	1	UN3265	N
4931702	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR PETROLEUM ALKYLATE DETERGENT INTERMEDIATE	0	1	0	1	UN3265	N
4932025	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. OR ACIDS, INORGANIC, NEC, LIQUID	0	1	0	1	UN3264	N
4932035	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR ACID, NEC, LIQUID, ORGANIC	0	1	0	1	UN3265	N
4932045	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR ACID, LACTIC (ALPHAHYDROXYPROPIONIC) (MILK)	0	1	0	1	UN3265	N
4932055	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR WEED KILLING ACIDS, LIQUID	0	1	0	1	UN3265	N
4932059	FORMALDEHYDE SOLUTIONS OR FORMALDEHYDE, LIQUID OR C ONCENTRATE	0	1	0	1	UN2209	N
4932303	AMMONIUM HYDROGENDIFLUORIDE, SOLID OR AMMONIUM BIFLUORIDE	0	1	0	1	UN1727	N
4932374	SULFAMIC ACID OR SULPHAMIC ACID	0	1	0	1	UN2967	N
4932391	TRIFLUOROACETIC ACID OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	1	0	1	UN2699	N
4935245	SODIUM HYDROXIDE SOLUTION OR SODIUM (SODA), CAUSTIC (SODIUM HYDROXIDE) AND POTASSIUM (POTASH), CAUSTIC, MIXED, IN SOLUTION	0	1	0	1	UN1824	N
4935264	SODIUM HYDROXIDE SOLUTION OR CAUSTIC SODA, LIQUID, GREATER THAN 55% CONCENTRATION	0	1	0	1	UN1824	N
4935609	BISULFITES, AQUEOUS SOLUTION, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	1	0	1	UN2693	N
4935680	TETRAMETHYLAMMONIUM HYDROXIDE OR CHEMICALS, NEC HAZARD CLA SS 8 CORROSIVE MATERIALS	0	1	0	1	UN1835	N
4936218	DISODIUM TRIOXOSILICATE OR DISODIUM TRIOXOSILICATE MIXTURE OR CHEMICALS, NEC HAZARD CLA SS 8 CORROSIVE MATERIALS	0	1	0	1	UN3253	N
4936353	CORROSIVE SOLIDS, TOXIC, N.O.S. OR CORROSIVE SOLIDS, POISON, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 8 CORROSIVE MATERIALS	0	1	0	1	UN2923	N
4936552	CORROSIVE SOLIDS, N.O.S. OR TOILET PREPARATIONS, NEC, OR DEPILETORY, NEC	0	1	0	1	UN1759	N
4936576	CORROSIVE LIQUIDS, N.O.S. OR TECHNICAL OR INTERMEDIATE CHEMICALS USED IN THE PRODUCTION OF HERBICIDES, INSECTICIDES, FUNGICIDES OR NEMATOCIDES	0	1	0	1	UN1760	N
4945770	SULFUR, MOLTEN OR SULPHUR, MOLTEN OR SULPHUR, LIQUID OR MOLTEN	1	0	11	1	NA2448	N
4950150	FAK-HAZARDOUS MATERIALS OR FREIGHT ALL KINDS, (FAK) OR ALL FREIGHT RATE SHIPMENTS, NEC, OR TRAILER-ON FLATCAR SHIPMENTS, COMMERCIAL (EXCEPT IDENTIFIED BY COMMODITIES, THEN CODE BY COMMODITY)	0	1	3	1	99	N
4960159	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. OR ADDITIVES, FUEL OIL, GASOLINE, OR LUBRICATING OIL, CONTAINING LESS THAN 50 PERCENT BY WEIGHT OF PETROLEUM	1	0	0	1	UN3082	N
4960168	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. OR WELL PACKING FLUID, NEC	0	1	0	1	UN3082	N
4961601	BATTERY-POWERED VEHICLE OR BATTERY-POWERED EQUIPMENT OR BATTERIES, ELECTRIC, NEC	0	1	0	1	UN3171	N
4961604	BENZALDEHYDE OR BENZALDEHYDE	0	1	0	1	UN1990	N
4813103	WASTE COMBUSTIBLE LIQUID, N.O.S.	0	0	1	0	NA1993	N
4835263	WASTE CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.	0	0	3	0	UN3267	N

4836556	WASTE BATTERY, WET, FILLED WITH ACID	0	0	4	0	UN2794	N
4875648	HAZARDOUS WASTE, SOLID, N.O.S.	0	0	6	0	NA3077	N
4905424	BUTANE OR PETROLEUM GASES, LIQUEFIED OR LIQUEFIED PETROLEUM GAS OR LIQUEFIED PETROLEUM GAS (BUTANE), NOT ODORIZED OR BUTANE GAS, LIQUEFIED	0	0	12	0	UN1075	N
4907421	FLAMMABLE LIQUIDS, TOXIC, CORROSIVE, N.O.S. OR FLAMMABLE LIQUIDS, POISON, CORROSIVE, N.O.S. OR CHEMICALS, NEC HAZARD CLASS 3 (FLAMMABLE AND COMBUSTIBLE LIQUIDS)	0	0	1	0	UN3286	N
4907428	HYDROCARBONS, LIQUID, N.O.S. OR OIL, PETROLEUM, NEC	0	0	3	0	UN3295	N
4909152	ALCOHOLS, N.O.S. OR ETHYL ALCOHOL, ANHYDROUS, DENATURED IN PART WITH PETROLEUM PRODUCTS AND/OR CHEMICALS, PETROLEUM PRODUCTS AND/OR CHEMICALS NOT TO EXCEED FIVE PERCENT NOT FIT FOR HUMAN CONSUMPTION	0	0	7	0	UN1987	N
4910221	RESIN SOLUTION OR COMPOUNDS, RESIN, NOT COMMERCIALY SUITABLE FOR EXTRUDING OR MOLDING PURPOSES, IN FLAKE, LIQUID, LUMP, POWDER OR SOLID MASS FORM, RESIN CONTENT NOT EXCEEDING 50 PERCENT BY WEIGHT	0	0	1	0	UN1866	N
4912301	FLAMMABLE LIQUIDS, N.O.S. OR GASOLINE PRESERVATIVE, NEC, LIQUID	0	0	1	0	UN1993	N
4914110	GAS OIL OR PETROLEUM DISTILLATE FUEL OIL, DIESEL OIL OR GAS OIL, NOT SUITABLE FOR ILLUMINATING PURPOSES	0	0	2	0	UN1202	N
4914164	FUEL OIL OR PETROLEUM DISTILLATE FUEL OIL, DIESEL OIL OR GAS OIL, NOT SUITABLE FOR ILLUMINATING PURPOSES	0	0	1	0	NA1993	N
4914172	COMBUSTIBLE LIQUID, N.O.S. OR PETROLEUM ROAD OIL OR CARBON BLACK OIL	0	0	1	0	NA1993	N
4915380	COMBUSTIBLE LIQUID, N.O.S. OR OCTYL ALCOHOL (2-ETHYLHEXANOL, OR 2ETHYLHEXYL ALCOHOL), ISOCTYL ALCOHOL, PRIMARY NORMAL OCTYL ALCOHOL (ALCOHOL C-8, CAPRYL ALCOHOL, CAPRYLIC ALCOHOL, HEPTYL CARBINOL, OCTOIC ALCOHOL, OCTYLIC ALCOHOL OR 1-OCTANOL) OR	0	0	1	0	NA1993	N
4932037	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. OR FATTY ACIDS OF COCONUT, CORN, COTTONSEED, PEANUT OR SOYBEAN OIL, INEDIBLE	0	0	1	0	UN3265	N
4932060	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. OR METAM SODIUM	0	0	2	0	UN3266	N
4936653	CORROSIVE LIQUIDS, N.O.S. OR SODIUM SULFIDE SOLUTIONS, SPENT, CONTAINING SODIUM HYDROXIDE	0	0	2	0	UN1760	N
4960203	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. OR COAL TAR CREOSOTE (CREOSOTE OR DEAD OIL) OR DISTILLATE OR SOLUTION, COAL TAR AND COAL TAR CREOSOTE (CREOSOTE OR DEAD OIL)	0	0	1	0	UN3082	N
4960210	OTHER REGULATED SUBSTANCES, LIQUID, N.O.S. OR COAL TAR OIL, CRUDE, NEC	0	0	1	0	NA3082	N
4963389	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. OR ZINC BORATE, DRY	0	0	1	0	UN3077	N

APPENDIX G
Pipeline Data

1. SFPP, LP Non-HVL Product Pipeline LS-90/50/60; CONCOR

18092	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	18092
OPERATOR NAME	SFPP, LP
SYSTEM NAME	SFPP_NORTH
SUBSYSTEM NAME	LS-90/50/60; CONCORD - FRESNO 12"
PIPELINE ID	LS-90/50/60; CONCOR*
MILES	39.87
COMMODITY CATEGORY	Non-HVL Product
COMMODITY DESCRIPTION	NON HVL PRODUCT
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	12/01/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	BAYANEH
LAST NAME	NIKPOUR
TITLE	PROJECT MGR-ENGINEERING I
ENTITY	
PHONE	(714) 560-4918
EMAIL	bayaneh_nikpour@kindermorgan.com
ADDRESS	1100 Town and Country Road Suite 700
CITY	Orange
STATE	CA
ZIP	92868

2. Pacific Gas & Electric Co. Natural Gas Pipeline 118G_0

15007 ▼

Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	118G
SUBSYSTEM NAME	
PIPELINE ID	118G_0
MILES	6.21
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

3. Pacific Gas & Electric Co. Natural Gas Pipeline 118A_266059

15007 ▼	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	118A
SUBSYSTEM NAME	
PIPELINE ID	118A_266059
MILES	27.31
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

4. Pacific Gas & Electric Co. Natural Gas Pipeline 7206-01_0

15007 ▼	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	7206-01
SUBSYSTEM NAME	
PIPELINE ID	7206-01_0
MILES	3.39
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

5. Pacific Gas & Electric Co. Natural Gas Pipeline 7205-01_0

15007 ▼	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	7205-01
SUBSYSTEM NAME	
PIPELINE ID	7205-01_0
MILES	3.06
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

6. Pacific Gas & Electric Co. Natural Gas Pipeline GCUST5943_0

15007 ▼	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	GCUST5943
SUBSYSTEM NAME	
PIPELINE ID	GCUST5943_0
MILES	0.23
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

7. Pacific Gas & Electric Co. Natural Gas Pipeline DREG4446_0

15007 ▼	
Attribute	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	DREG4446
SUBSYSTEM NAME	
PIPELINE ID	DREG4446_0
MILES	0.04
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

8. Pacific Gas & Electric Co. Natural Gas Pipeline DREG4388_0

15007 ▼	
Attribute ▼	Value
- Category: PIPELINE ATTRIBUTES	
OPERATOR ID	15007
OPERATOR NAME	PACIFIC GAS & ELECTRIC CO
SYSTEM NAME	DREG4388
SUBSYSTEM NAME	
PIPELINE ID	DREG4388_0
MILES	0.06
COMMODITY CATEGORY	Natural Gas
COMMODITY DESCRIPTION	NATURAL GAS
INTERSTATE DESIGNATION	N
PIPELINE STATUS CODE	Active (filled)
REVISION DATE	03/15/2017
FRP SEQUENCE NUMBER	
- Category: GENERAL CONTACT	
FIRST NAME	
LAST NAME	
TITLE	
ENTITY	PG&E Customer Service
PHONE	(888) 743-7431
EMAIL	PipelineRequests@pge.com
ADDRESS	1850 Gateway Blvd. Mail Stop 6053E
CITY	Concord
STATE	CA
ZIP	94520

APPENDIX H
Assessment Needs Matrix and Data

APPENDIX E: ASSESSMENT NEEDS MATRIX - CITY OF MERCED FIRE DEPARTMENT

Parameters	Anhydrous Ammonia (1005)	Chlorine (1017)	Fuels (Class 3)	Corrosive Materials (Class 8)
Isolation Required	Yes (See Appendix E)	Yes (See Appendix E)	No	No
ERG Emergency Response Section Orange Section Page Numbers (See Appendix H)	125	124	128	137, 154
Protective Clothing	SCBA	SCBA	SCBA	SCBA
	Chemical Protective	Chemical Protective	Chemical and Fire Protective	Chemical Protective
	Fully Encapsulating Suit	Fully Encapsulating Suit		Fully Encapsulating Suit
Level of Protection	Level A	Level A	Level A, B, C	Level A, B, C
Equipment Required	Liquid Containment Materials	Testing Equipment	Liquid Containment Materials	Liquid Containment Materials
	Water Source	Sampling Equipment	Water Source	Water Source (Chemical Dependent)
	Testing Equipment	FIRESCOPE	Non-Combustible Absorbents	Non-Combustible Absorbents
	Sampling Equipment		Testing Equipment	Testing Equipment
	FIRESCOPE		Sampling Equipment	Sampling Equipment
			FIRESCOPE	FIRESCOPE
Hazmat Team Level	Type 2	Type 2	Type 2 or Type 3	Type 2 or Type 3
	5 Team Members	5 Team Members	3 Team Members (Type 3)	3 Team Members (Type 3)
			5 Team Members (Type 2)	5 Team Members (Type 2)
Personnel Required	HAZMAT Specialists	HAZMAT Specialists	HAZMAT Technicians (Type 3)	HAZMAT Technicians (Type 3)
	HAZMAT Specialist 5	HAZMAT Specialist 5	HAZMAT Specialists (Type 2)	HAZMAT Specialists (Type 2)
	Ref: CCR Title 19, Section 2520	Ref: CCR Title 19, Section 2520	HAZMAT Specialist 5	HAZMAT Specialist 5
			Ref: CCR Title 19, Section 2520	Ref: CCR Title 19, Section 2520

GUIDE GASES - TOXIC AND/OR CORROSIVE - OXIDIZING

124

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled or absorbed through skin.**
- Fire will produce irritating, corrosive and/or toxic gases.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Substance does not burn but will support combustion.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- These are strong oxidizers and will react vigorously or explosively with many materials including fuels.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Some will react violently with air, moist air and/or water.
- Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See **Table 1 - Initial Isolation and Protective Action Distances.**

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

EMERGENCY RESPONSE

FIRE

Small Fire

CAUTION: These materials do not burn but will support combustion. Some will react violently with water.

- Contain fire and let burn. If fire must be fought, water spray or fog is recommended.
- **Water only; no dry chemical, CO₂ or Halon®.**
- Do not get water inside containers.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.
- Ventilate the area.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Clothing frozen to the skin should be thawed before being removed.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim calm and warm.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled, ingested or absorbed through skin.**
- Vapors are extremely irritating and corrosive.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Some of these materials may react violently with water.
- Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.
- For UN1005: Anhydrous ammonia, at high concentrations in confined spaces, presents a flammability risk if a source of ignition is introduced.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See **Table 1 - Initial Isolation and Protective Action Distances** for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical or CO₂.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Do not get water inside containers.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Isolate area until gas has dispersed.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- **In case of contact with Hydrogen fluoride, anhydrous (UN1052), flush with large amounts of water.** For skin contact, if calcium gluconate gel is available, rinse 5 minutes, then apply gel. Otherwise, continue rinsing until medical treatment is available. For eyes, flush with water or a saline solution for 15 minutes.
- Keep victim calm and warm.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.

POTENTIAL HAZARDS

HEALTH

- CORROSIVE and/or TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Fire will produce irritating, corrosive and/or toxic gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Contact with molten substance may cause severe burns to skin and eyes.
- Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

- **EXCEPT FOR ACETIC ANHYDRIDE (UN1715), THAT IS FLAMMABLE**, some of these materials may burn, but none ignite readily.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Substance will react with water (some violently), releasing corrosive and/or toxic gases and runoff.
- Flammable/toxic gases may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.).
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.
- Substance may be transported in a molten form.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See **Table 1 - Initial Isolation and Protective Action Distances** for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

EMERGENCY RESPONSE

FIRE

- When material is not involved in fire, do not use water on material itself.

Small Fire

- Dry chemical or CO₂.
- Move containers from fire area if you can do it without risk.

Large Fire

- Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only.

Fire involving Tanks or Car/Trailer Loads

- Cool containers with flooding quantities of water until well after fire is out.
- Do not get water inside containers.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean, non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Removal of solidified molten material from skin requires medical assistance.
- Keep victim calm and warm.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

POTENTIAL HAZARDS

HEALTH

- **TOXIC**; inhalation, ingestion or skin contact with material may cause severe injury or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.).
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated.
- For electric vehicles or equipment, GUIDE 147 (lithium ion batteries) or GUIDE 138 (sodium batteries) should also be consulted.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See **Table 1 - Initial Isolation and Protective Action Distances** for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO₂ or water spray.

Large Fire

- Dry chemical, CO₂, alcohol-resistant foam or water spray.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.

Fire Involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim calm and warm.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

APPENDIX G

(From the FIREScope Hazardous Materials Standardized Equipment List)

Hazardous Materials Company Types and Minimum Standards

This chart is also part of the Field Operations Guide (FOG)

Components	Type 1	Type 2	Type 3
Field Testing	Known Chemicals	Known Chemicals	Known Chemicals
	Unknown Chemicals	Unknown Chemicals	
	WMD Chem / Bio		
Air Monitoring	Combustible Gas Oxygen Carbon Monoxide Hydrogen Sulfide	Combustible Gas Oxygen Carbon Monoxide Hydrogen Sulfide	Combustible Gas Oxygen Carbon Monoxide Hydrogen Sulfide
	Specialty Gases Hydrocarbon Liquid Vapors	Specialty Gases Hydrocarbon Liquid Vapors	
	WMD Chem / Bio		
Sampling: Capturing Labeling Evidence Collection	Known Chemicals	Known Chemicals	Known Chemicals
	Unknown Chemicals	Unknown Chemicals	
	WMD Chem / Bio		
Radiation Monitoring and Detection	Gamma	Gamma	Gamma
	Beta	Beta	Beta
	Alpha; Radionuclide		
Chemical Protective Clothing: Ensembles	Liquid-Splash Protective	Liquid-Splash Protective	Liquid-Splash Protective
	Vapor Protective	Vapor Protective	
	Flash Fire Vapor Protective	Flash Fire Vapor Protective	
	WMD Chem / Bio Vapor Protective		
	WMD Chem / Bio Liquid Splash Protective		
Chemical Protective Clothing: Gloves - Boots	NFPA Compliant Replacement	NFPA Compliant Replacement	NFPA Compliant Replacement
	Hi-Temp. Protective Gloves Cryogenic Protective Gloves	Hi-Temp. Protective Gloves Cryogenic Protective Gloves	

Components	Type 1	Type 2	Type 3
Technical Reference	Printed and Electronic	Printed and Electronic	Printed and Electronic
	Plume Air Modeling, Map Overlays	Plume Air Modeling, Map Overlays	
	WMD Chem / Bio Sources		
Special Capabilities	Heat Sensing	Heat Sensing	
	Night Vision	Night Vision	
	Digital Photo	Digital Photo	
	Digital Video		
Intervention	Diking, Damming, Absorption	Diking, Damming, Absorption	Diking, Damming, Absorption
	Liquid, Solid Leak Intervention	Liquid, Solid Leak Intervention	Liquid, Solid Leak Intervention
	Vapor Leak Intervention	Vapor Leak Intervention	
	Neutralization, Plugging, Patching	Neutralization, Plugging, Patching	
	WMD Chem / Bio Spill Containment		
Decontamination	Known Chemicals	Known Chemicals	Known Chemicals
	Unknown Chemicals	Unknown Chemicals	
	WMD Chem / Bio		
Communications	In-Suit	In-Suit	In-Suit
	Cell Phone	Cell Phone	Cell Phone
	Wireless Fax, Copy, Web Access	Wireless Fax, Copy, Web Access	
Respiratory Protection	SCBA	SCBA	SCBA
	Umbilical Air Support (Changed to Optional 2006)		
	APR or PAPR, WMD Chem / Bio Compliant		
Personnel Training & Staffing	Haz Mat Specialist ② WMD Chem / Bio ③ 7 ④	Haz Mat Specialist ② 5 ④	Haz Mat Technician ① 5 ④

- ① All company personnel must meet the hazardous materials training requirements for Technician in CCR Title 19, Section 2520
- ② All company personnel must meet the hazardous materials training requirements for Specialist in CCR Title 19, Section 2520
- ③ All company personnel must meet the training requirements for Hazardous Materials/Weapons of Mass Destruction: Terrorism for Technician/Specialist. Training shall be, at a minimum, meet or be equivalent to the requirements found in Title 19 CCR 2520(ff).
- ④ One company member trained to minimum level of Assistant Safety Officer Hazmat (ICS-HM-222-5) and shall meet or be equivalent to the requirements found in Title 19 CCR 2520(r).