Stark County Commodity Flow Study

Canton, Ohio

Updated 2019

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STARK COUNTY
COMMODITY FLOW STUDY

UPDATED 2019

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STARK COUNTY COMMODITY FLOW STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

Congress passed the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendment and Reauthorization Act (SARA), in 1986, which provides for the collection and availability of information regarding the use, storage, production, and release of hazardous chemicals to the public and emergency responders in local communities. Community right-to-know provisions provide education, information, and public access regarding chemical uses and releases into the environment respective to individual facilities. By doing so, states and communities, working with facilities, can improve chemical safety and protect public health and the environment.

In 1988, Ohio passed Senate Bill 367 Chapter 3750 that designated the Ohio State Emergency Response Commission (SERC) to act as the governing body over the Emergency Planning and Community Right-To-Know Act (EPCRA). The SERC consists of nine different state agencies that work with local emergency planning committees (LEPC) to represent each county/district for the state of Ohio (except for Montgomery and Greene counties that combine to have one LEPC). The EPCRA is indicative of the fact that Congress realizes the risk to communities posed by the use, storage, and transportation of hazardous materials. Ohio's implementation of the EPCRA indicates the state's realization of this risk as well.

As part of the implementation of the EPCRA, LEPCs should develop and implement comprehensive emergency response plans. LEPCs should thus conduct various hazard analyses and risk assessments, of which this commodity flow study is an example, to serve as the basis of those response plans. Stark County's LEPC and emergency management agency coordinated the completion of this study utilizing funding from the Public Utilities Commission of Ohio (PUCO). The 2019 version of this study is a follow-up to the initial project, which the county undertook in 2018. The initial project primarily consisted of field reconnaissance and collection of placard data observed along highway routes. The 2019 project utilized that data but added a deeper-level spatial analysis of the data.

The result is a document that provides emergency managers and responders in Stark County with information to advise efforts to mitigate, prepare for, respond to, and

recover from hazardous material incidents. These efforts may significantly minimize damage or harm to equipment, facilities, personnel, and to the community at large.

1.2 Description of the Planning Area

Stark County was established on January 1, 1809. It is in northeastern Ohio and has an estimated population of 375,586 (US Bureau of the Census, 2010). Stark County consists of 581 square miles of land area and 5.3 square miles of water. On average, Stark County experiences 39.58 inches of rainfall and 48 inches of snowfall annually (www.usclimatedata.com).

Stark County contains six cities: Alliance, Canal Fulton, Canton (which acts as county seat), Louisville, Massillon, and North Canton. Villages include Beach City, Brewster, East Canton, East Sparta, Hartville, Hills and Dales, Limaville, Magnolia, Minerva, Meyers Lake, Navarre, Waynesburg, and Wilmot. The county also contains several townships, including Bethlehem, Canton, Jackson, Lake, Lawrence, Lexington, Marlboro, Nimishillen, Osnaburg, Paris, Perry, Pike, Plain, Sandy, Sugar Creek, Tuscarawas, and Washington. Carroll, Columbiana, Holmes, Mahoning, Portage, Summit, Tuscarawas, and Wayne Counties border Stark County.

Several transportation routes traverse the area, including US Routes 30, 62, 250, and 621 and State Routes 21, 42, 44, 93, 172, 183, 212, 236, 241, 225, 619, 627, 800. Central Stark County also contains a large portion of Interstate 77, which passes through Canton near its downtown area. Railway transportation is also present in Stark County, with the following companies servicing clients in the area: CSX Transportation, Ohio Central Railroad, Inc., R.J. Corman Railroad Company/Cleveland Lines, LLC, and Wheeling & Lake Erie. Stark County contains pipelines for Columbia Gas Transmission, LLC, Dominion Energy Ohio, Ergon Terminaling, Inc., WMRE of Ohio-American, LLC, Marathon Pipeline, LLC, and Inland Corporation.

Figure 1.2.a

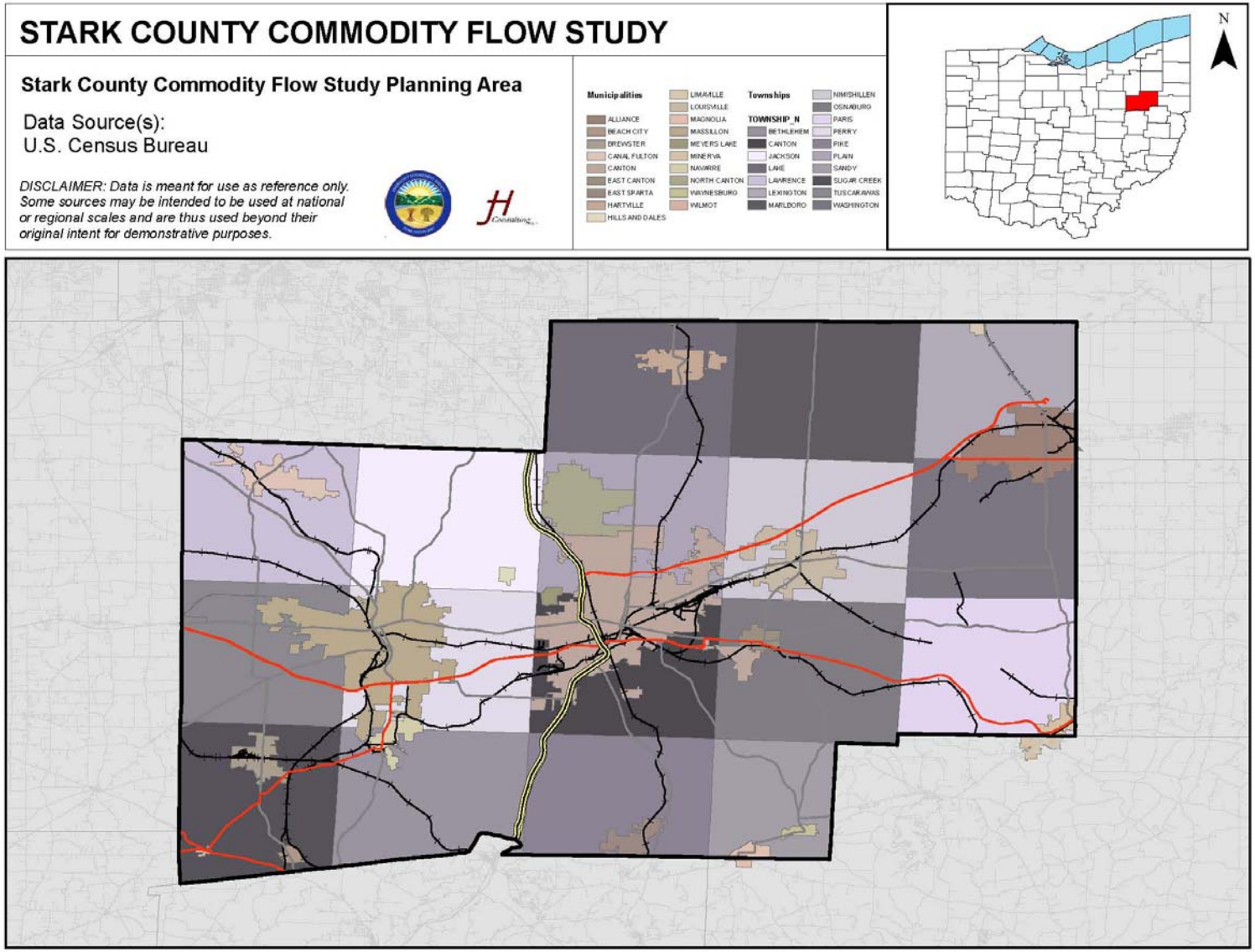
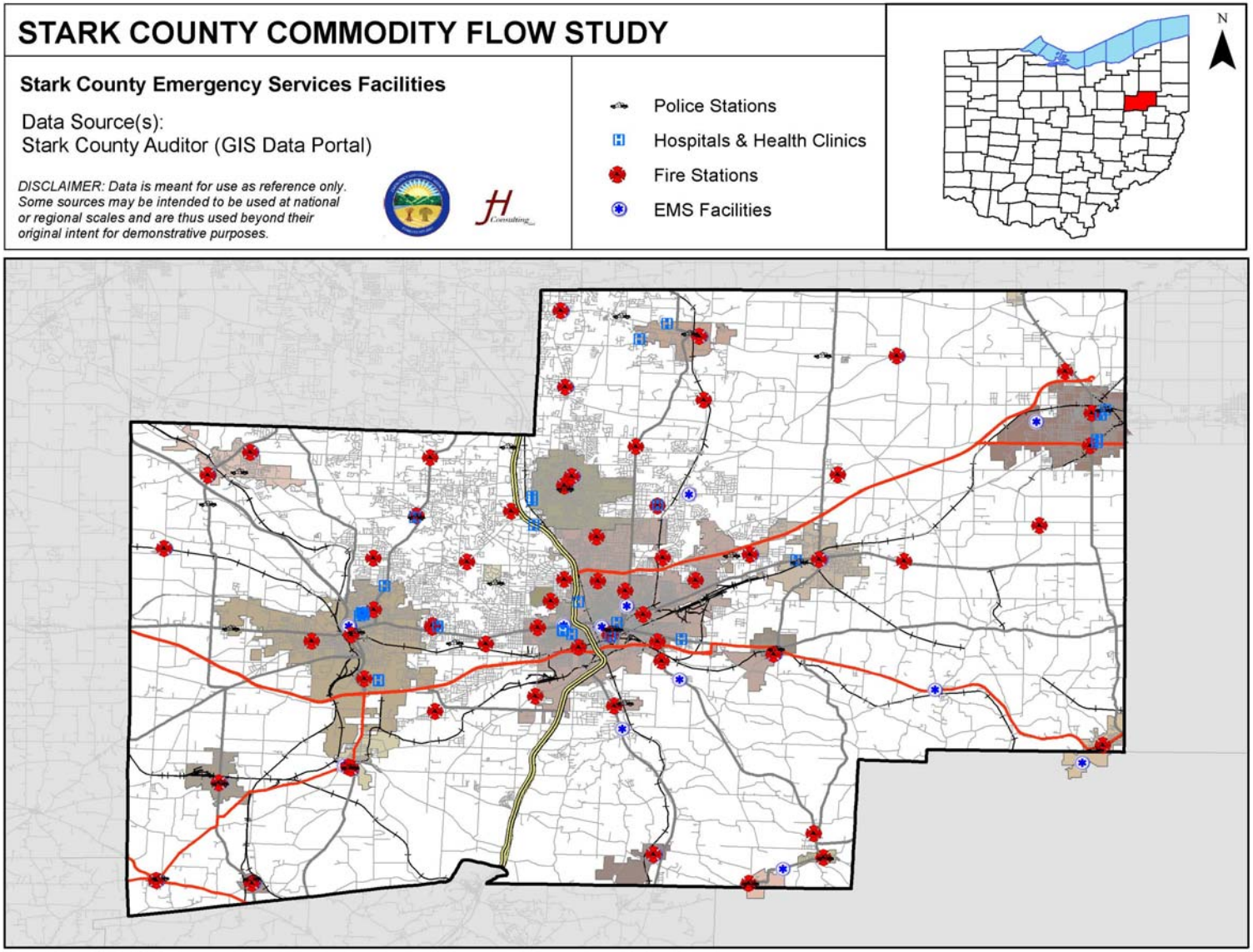

STARK COUNTY COMMODITY FLOW STUDY
Stark County Commodity Flow Study Planning Area
Data Source(s):
U.S. Census Bureau
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Municipalities
ALLIANCE
BEACH CITY
BREWSTER
CANAL FULTON
CANTON
EAST CANTON
EAST SPARTA
HARTVILLE
HILLS AND DALES
LIMAVILLE
LOUISVILLE
MAGNOLIA
MASSILLON
MEYERS LAKE
MINERVA
NAVARRE
NORTH CANTON
WAYNESBURG
WILMOT
Townships
TOWNSHIP_N
BETHLEHEM
CANTON
JACKSON
LAKE
LAWRENCE
LEXINGTON
MARLBORO
NIMISHILLEN
OSNABURG
PARIS
PERRY
PIKE
PLAIN
SANDY
SUGAR CREEK
TUSCARAWAS
WASHINGTON
N

Figure 1.2.b

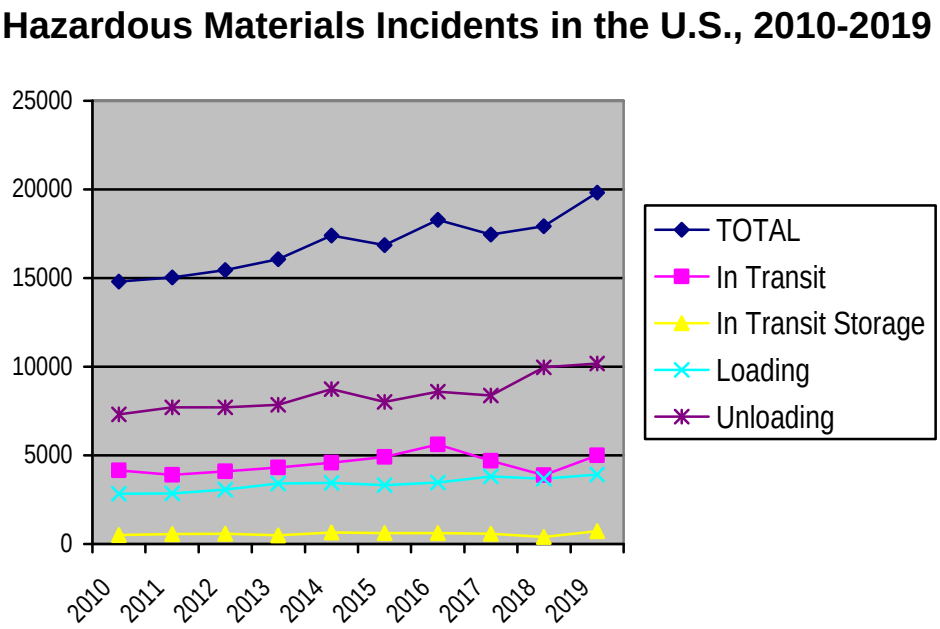

STARK COUNTY COMMODITY FLOW STUDY
Stark County Emergency Services Facilities
Data Source(s):
Stark County Auditor (GIS Data Portal)
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Police Stations
Hospitals & Health Clinics
Fire Stations
EMS Facilities
N

2.0 HIGHWAY ANALYSIS

2.1 Statistics

The annual number of hazardous material incidents during transport in the United States has increased since 2009, though since 2014, the number has oscillated. Figure 2.1.a shows the total hazardous material incidents in the U.S. for the period 2010-2019. The blue line with the diamond year indicators represents the total number of incidents. The sub-lines are all parts of that total, and they indicate the transport phase in which the incident occurred.

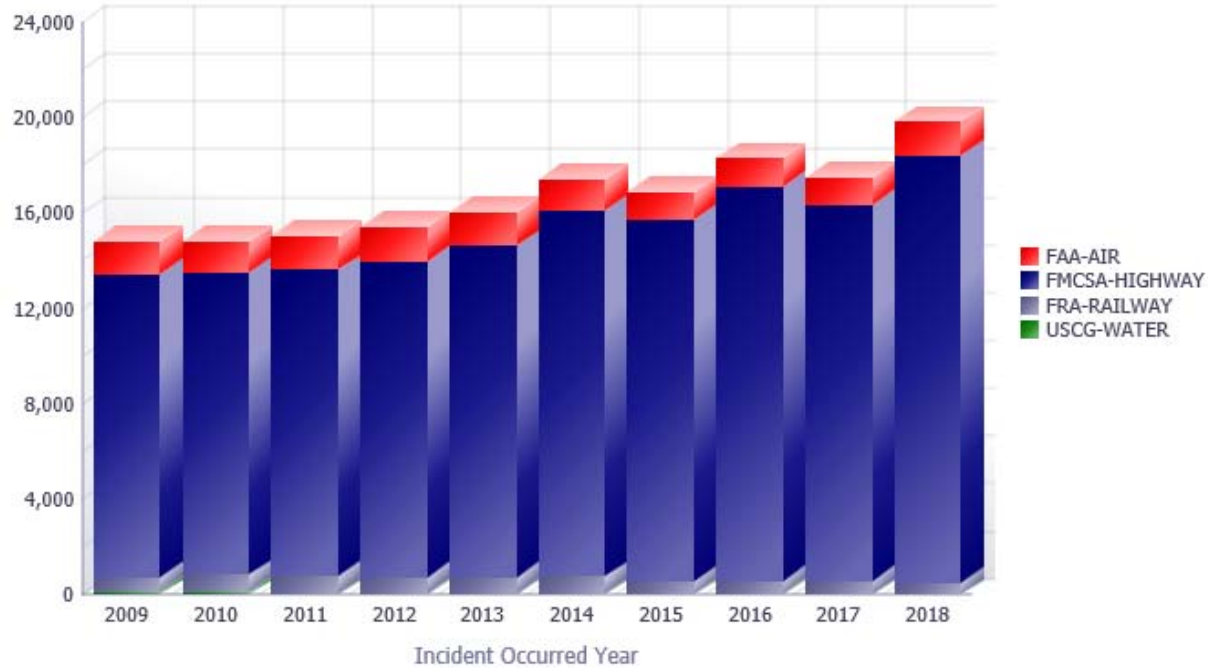
Figure 2.1.a



Per Figure 2.1.b, the U.S. Department of Transportation (DOT) has posited that a majority of hazardous material incidents in the United States occur on highways (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Figure 2.1.b

Hazardous Material Incidents by Mode



The DOT also maintains data on the causes of hazardous material incidents. According to the DOT, the causes of the highway incidents have been as follows (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Table 2.1.1

Cause of Hazardous Materials Incidents 2017-2019

Cause	2017	2018	2019	Total
Abrasion	95	148	160	403
Broken Component or Device	252	239	138	629
Cause Not reported	3,248	4,871	3,918	12,037
Commodity Polymerization	3	4	1	8
Commodity Self-Ignition	12	14	1	27
Conveyer or Material Handling Equipment Mishap	128	182	151	461
Corrosion – Exterior	27	21	30	78
Corrosion – Interior	41	43	41	125
Defective Component or Device	1,163	830	791	2,784
Deterioration or Aging	170	110	64	344
Dropped	1,682	1,846	1,645	5.173
Fire, Temperature, or Heat	33	17	10	60
Forklift Accident	1,763	1,713	1,254	4,730

Cause	2017	2018	2019	Total
Freezing	13	13	26	52
Human Error	1,490	1,768	2,455	5,713
Impact with Sharp or Protruding Object (e.g., Nails)	871	820	623	2,314
Improper Preparation for Transportation	1,201	1,789	1,505	4,495
Inadequate Accident Damage Protection	377	137	1	515
Inadequate Blocking and Bracing	1,174	300	315	1,789
Inadequate Maintenance	674	9	5	688
Inadequate Preparation for Transportation	56	1,322	737	2,115
Inadequate Procedures	6	457	440	903
Inadequate Training	2	16	19	37
Incompatible Product	12	6	4	22
Incorrectly Sized Component or Device	2,284	10	3	2,297
Loose Closure, Component, or Device	37	2,310	1,616	3,963
Misaligned Material, Component, or Device	37	40	19	96
Missing Component or Device	44	32	11	87
Over-Pressurized	64	88	69	221
Overfilled	63	86	62	211
Rollover Accident	89	83	54	226
Threads Worn or Cross Threaded	23	23	8	54
Too Much Weigh on Package	278	309	248	835
Valve Open	140	138	185	463
Vandalism	2	3	1	6
Vehicular Crash or Accident Damage	117	132	80	329
Water Damage	11	9	16	36

There are many types of hazardous materials transported via highways, each divided into “classes” denoted on the placards labeling shipments. Table 2.1.2 lists the hazardous material classes involved in 2017, 2018, and 2019 incidents (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Table 2.1.2

Hazmat Incidents by Class 2017-2019

Hazard Class		2017	2018	2019
1:Explosives	Highway	2	12	16
	Total	6	45	40
2: Flammable, Non-Flammable, & Poisonous Gases	Highway	37	475	452
	Total	143	868	815
3: Flammable Liquids	Highway	812	6,943	7,437
	Total	1,131	7,375	7,759
4: Other Ignitable Hazards	Highway	6	97	78
	Total	8	114	98
5: Oxidizers	Highway	82	959	1,205
	Total	86	984	1221
6: Poisonous & Infectious Materials	Highway	32	288	236
	Total	71	343	292

Hazard Class		2017	2018	2019
7: Radioactive Materials	Highway	0	2	4
	Total	1	11	7
8: Corrosive	Highway	523	5,127	5,401
	Total	600	5,287	5,538
9: Other Miscellaneous Hazardous	Highway	69	441	447
	Total	208	783	816

The DOT also maintains the results of the hazardous material incidents discussed above. Table 2.1.3 presents those results (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Table 2.1.3

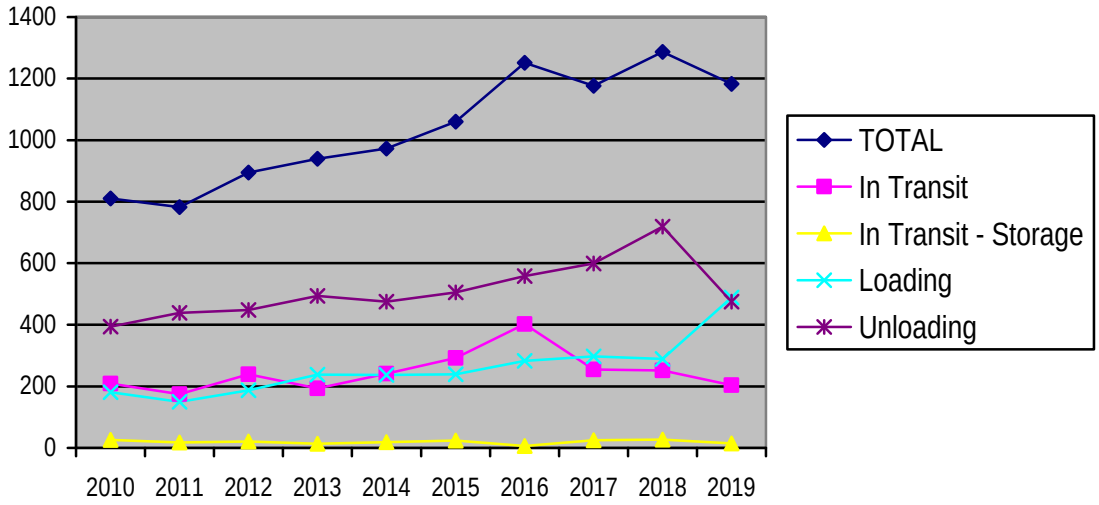
Hazmat Incidents Results 2017-2019

Result		2017	2018	2019
Environmental Damage	Highway	37	56	26
	Total	46	64	26
Explosion	Highway	10	12	5
	Total	13	14	5
Fire	Highway	58	64	48
	Total	99	105	81
Material Entered Waterway/Sewer	Highway	50	55	28
	Total	53	58	29
None	Highway	445	459	408
	Total	905	1,047	1,132
Spillage	Highway	15,155	17,333	16,123
	Total	16,224	18,446	17,055
Vapor (Gas) Dispersion	Highway	129	114	170
	Total	355	345	323

Additionally, PHMSA maintains data on hazardous material incidents by state. Figure 2.1.c depicts the incidents in Ohio, by mode, over the past 10 years.

Figure 2.1.c

Hazardous Material Incidents in Ohio, 2010-2019



Finally, relevant local-level statistics are available from PHMSA. The following incidents occurred in Stark County between 2010 and 2019.

Table 2.1.4

Hazmat Incidents in Stark County

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
3/31/2010	7:00 A.M.	Akron Canton Regional Airport	Corrosive Liquid, Basic, Inorganic, n.o.s. (UN 3266)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/11/2010	5:00 P.M.	8495 Port Jackson Ave. Canton	Corrosive Liquids, n.o.s. (UN 1760)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
4/10/2011	4:20 P.M.	Louisville	Gasoline (UN 1203)	During a delivery at Speedway store #9373 located on Brownsboro Rd, Louisville, KY, a transport hose come loose from the UST fitting while the transport was making a product drop of gasoline into the tank resulting in a spill to the ground. The driver shut off the truck valve to stop the flow, and notifications were initiated. Sorbent and boom were used to clean up the gasoline, and all spill material were drummed and removed from site by Evergreen.	Spillage
5/10/2011	10:00 A.M.	4850 Navarre Rd. SW, Canton	Fire Extinguishers Containing Compressed or Liquefied Gas (UN 1044)	Unloaded out of trailer, Pin came out of cylinder and leaked fire extinguisher powder.	Spillage
6/22/2011	7:00 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/24/2012	9:00 A.M.	4850 Navarre Rd. SW, Canton	Flammable Liquids, n.o.s. (UN 1993)	Package had no labels or markings that it contained any hazardous material inside. Glass container inside box was not packed in a way to prevent breakage of interior bottle.	Spillage
6/12/2012	7:00 A.M.	8495 Port Jackson North Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/22/2012	9:30 P.M.	4850 Navarre Rd. SW, Canton	Self-Reactive Solid Type D (UN 3226)	No report provided.	Spillage
7/24/2012	7:00 A.M.	8495 Port Jackson Canton	Corrosive Liquid, Basic, Inorganic, n.o.s. (UN 3266)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
8/9/2012	7:00 A.M.	8495 Port Jackson North Canton	Isopropyl Alcohol (UN 1219)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/15/2012	6:10 P.M.	East Canton, Minerva, and East Rochester	Fuel Oil (UN 1993)	The transporter was loaded at the Canton Refinery by a refinery operator. When the refinery operator closed the dome lid, he failed to remove the tab that allows the trailer to vent, which leaves a small gap between the dome lid and where it seats. The driver left the loading rack not knowing that the dome lid was not closed properly, which caused product to leak out on turns on highway.	Spillage
9/14/2012	2:45 A.M.	Interstate 77 Exit 101 Canton	Sodium Hydroxide, Solution (UN 1824)	Tractor tanker was struck by another vehicle while traveling through an intersection. The vehicle stuck the tanker resulting in the release of approximately one pint of material onto the roadway. An environmental contractor was dispatched to the site for cleanup. The roadway was neutralized, and absorbents were applied to the area. The waste was collected and containerized for disposal.	Spillage
12/20/2012	7:00 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
12/20/2012	7:00 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
1/11/2013	8:30 P.M.	Akron Canton Regional Airport	Isopropanol or Isopropyl Alcohol (UN 1219)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
3/13/2013	8:00 A.M.	1500 W. Main St., Louisville	Hydrofluoric Acid, >60% Strength (UN 1790)	Failure - File 365702 bolts connecting flange to bracket missing. Carrier offloading at Consignee and notices leak from flange. Approximately 1 quart spilled in containment area. Consignee used hose to wash down spill into recovery drain. Carrier took tanker for repair. Replaced 2 bolts and tightened. No further leaks. Carrier went back to Consignee to complete delivery.	Spillage
3/18/2013	7:00 A.M.	Akron Canton Regional Airport	Amines, Liquid, Corrosive, n.o.s. or Polyamines, liquid, Corrosive, n.o.s (UN 2735)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/7/2013	7:00 A.M.	Akron Canton Regional Airport	Isopropanol or Isopropyl Alcohol (UN 1219)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/29/2013	3:40 A.M.	1700 Shepard Church SW Canton	Fuel Oil (UN. 1993)	On June 29, 2013, an underground storage tank was overfilled resulting in the release of 25 gallons of diesel fuel to the asphalt and one storm drain. An environmental contractor was dispatched and applied absorbents to the impacted asphalt. Absorbent boom was applied to the impacted storm drain. The outfall of the storm drain system was thoroughly inspected, and no evidence of diesel fuel was detected. All contaminated material was containerized for transportation and disposal.	Spillage
7/10/2013	8:00 P.M.	Akron Canton Regional Airport	Corrosive Liquids, n.o.s. (UN 1760)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/21/2013	5:40 A.M.	4850 Navarre Rd. SW, Canton	Ethanol or Ethyl Alcohol (UN 1170)	Flammable liquid package discovered on straight line belt during preload hours of operation. Package was responded to by RMP Jeff Johnson. Closure of one-gallon container was loose in transit. There was no internal packaging.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
11/13/2013	7:00 A.M.	Akron Canton Regional Airport	Paint (UN 1263)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
3/6/2014	8:00 A.M.	1500 W. Main St., Louisville	Hydrofluoric Acid, >60 Strength (UN 1790)	Carrier noticed 2 teaspoons of product had leaked from seam underneath trailer after offloading of the product. The product spilled into Consignee's containment area, and they washed it down into their recovery drain. Trailer only leaked while it was pressurized. Once pressure was gone, so was the leak. Tanker will go for pressure test, and any repairs will be made. Event 40524	Spillage
4/16/2014	8:30 A.M.	Louisville	Hydrogen Peroxide, Aqueous Solutions (UN 2014)	Employee forked drum while loading.	Spillage
6/22/2014	11:30 P.M.	Marathon Refinery, Canton	Petroleum, Crude Oil (UN 1267)	While unloading driver noticed product dripping into the bucket. While tightening the valve, the hose popped off, and about 60 gallons spilled out. Some splashed on driver who went to the hospital and was treated and released.	Spillage
8/12/2014	5:30 A.M.	Akron Canton Regional Airport	Flammable Liquids, n.o.s. (UN 1993)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/16/2014	2:00 P.M.	Interstate 77, Exit 101 Canton	Hydrochloric Acid (UN 1789)	It was determined that the internal valve was not functioning properly in the compartment of a 407. A small amount of the material was found to be leaking from the belly valve of one of the three compartments of the tank. The material was trans loaded to a vac-tanker and returned to the original site for disposition.	Spillage
8/20/2014	3:45 P.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquid, Basic, Organic, n.o.s. (UN 3267)	Package was loaded on its side.	Spillage
1/13/2015	9:45 A.M.	1500 W. Main St. Louisville	Hydrofluoric Acid, <60% Strength (UN 1790)	The consignee's intake pipe-liner was frozen when carrier's driver began offloading product; the liner cracked inside the intake pipe. The release lasted less than 5 minutes and carrier's driver shut down the process as soon as he heard the noise from the pressure on the line. Consignee cleaned up the product that spilled in their containment area.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
1/20/2015	8:00 A.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquids, n.o.s. (UN 1760)	Package was found in unload. Package was leaking without any damage to outside carton.	Spillage
2/10/2015	8:00 A.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquids, n.o.s. (UN 1760)	Seam on inner plastic gallon container cracked due to improper packing for transport.	Spillage
3/6/2015	5:00 A.M.	8495 Port Jackson North Canton	Printing Ink, Flammable, or Printing Ink Related Material (UN 1210)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/3/2015	6:30 P.M.	Louisville	Hydrofluoric Acid, >60 Strength (UN 1790)	Carrier offloading, checked tank levels, smelled the hazardous product. Carrier hit the emergency shut off valve. Carrier found 2-3 oz. of product on top of trailer had leaked from the bolts which connect the tee valve for the emergency valve was loose. Carrier tightened the bolts and was able to complete offloading with no other issues. Carrier washed the trailer area off and washed down the consignee containment drain system. Carrier instructed to take trailer back to shipper for further inspection.	Spillage
5/2/2015	10:15 P.M.	Canton	Petroleum Crude Oil (UN 1267)	Carrier at consignee to offload, carrier removed the API valve cap on passenger side of trailer, and 3-5 gallons product sprayed out on carrier and cement which went down a drain (sump system). Carrier had all PPE gear on. Carrier was not injured and changed cloths. Carrier said the API valve was a new style which is different from driver side valve, carrier thought it was in the closed position. Consignee said no clean up required.	Spillage
2/27/2016	11:15 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
3/18/2016	3:00 P.M.	Akron Canton Regional Airport	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
4/6/2016	9:17 P.M.	8495 Port Jackson North Canton	Aerosols, Flammable (UN 1950)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
6/6/2016	6:00 A.M.	4850 Navarre Rd. SW, Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	Package was discovered in unload. There was no damage to the exterior packaging. However, the package was leaking. All contents leaked out.	Spillage
6/7/2016	9:01 P.M.	8495 Port Jackson North Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/23/2016	9:15 P.M.	8495 Port Jackson North Canton	Amines, Liquid, Corrosive, n.o.s. or Polymines, Liquid, Corrosive, n.o.s. (UN 2735)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
8/24/2016	8:33 A.M.	3500 21 St., SW Canton	Caustic Soda (UN 1824)	Driver failed to close internal valve causing pressure to build. When he disconnected hose product misted on lips. Was treated and released.	Spillage
9/21/2016	7:00 A.M.	8495 Port Jackson North Canton	Alcohols, n.o.s. (UN 1987)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
9/21/2016	8:21 P.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
12/21/2016	7:00 P.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/20/2017	5:00 P.M.	8495 Port Jackson NW., North Canton	Environmentally Hazardous Substances, Solid, n.o.s. (UN 3077)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
10/18/2017	8:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
1/12/2018	7:00 A.M.	8495 Port Jackson North Canton	Flammable Liquids, n.o.s. (UN 1993)	Package discovered at terminal appeared wet and leaking. Liquid started to bleach some of the stickers on the steel drum. When inspected found that lid of the drum was not completely sealed.	Spillage
1/12/2018	7:30 A.M.	8495 Port Jackson North Canton	Flammable Liquids, n.o.s. (UN 1993)	Package was found at terminal appeared wet when inspected found inner package containing one gallon of isopropanol that appeared to be leaking due to having a loose cap or broken seal.	Spillage
3/20/2018	6:00 A.M.	8495 Port Jackson North Canton	Sulfuric Acid, >51% Acid or greater (UN 1830)	Package discovered at terminal was missing shipping label and indication of recipient, appeared leaking. When inspected, found 1 x 5 mL glass bottle of 1:1 sulfuric acid to be completely crushed.	Spillage
4/19/2018	7:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	Package found at terminal wet. Upon inspection, I found Chem Trend Mold cleaner leaking from can. Can was heavily dented and appeared to have leakage from cap are due to slight puncture. New Comments: Package found at terminal wet. Upon inspection, I found Chem Trend Mold cleaner leaking from can. Can was heavily dented and appeared to have leakage from cap are due to slight puncture. Approximately half an ounce leaked from container.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
5/12/2018	7:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	Package found at terminal leaking contents. Upon inspection, I found Keim wood coating leaking due to bent lid. New Comments: I found approximately 4 ounces to have leaking from a 5 gallon can of wood coating.	Spillage
5/23/2018	8:00 A.M.	8495 Port Jackson North Canton	Paint (UN 1263)	Package found at terminal leaking contents. Upon inspection, I found Keim wood coating can leaking paint. New Comments: I found approximately 3 ounces to have leaked from a 5 gallon can of wood coating.	Spillage
7/11/2018	7:00 A.M.	8495 Port Jackson North Canton	Extracts, Flavoring, Liquid (UN 1197)	Upon arrival at the terminal found the plastic pail leaking from the broken cap. Someone had taped up the lid to help slow down the leaking, leaked onto another package.	Spillage
9/27/2018	8:00 A.M.	4719 Navarre Rd., SW Canton	Potassium Hydroxide, Solution (UN 1814)	Driver arrived at consignee, and while he was waiting to unload one of the compartments on the trailer started leaking from where the internal valve bolts up to the trailer. 2 gallons impacted the concrete, and the rest was contained in buckets by the driver and consignee.	Spillage
9/27/2018	9:30 A.M.	1600 Harmot Ave., Canton	Potassium Hydroxide, Solution (UN 1814)	On September 27, 2018, at 0939 ET, Schneider Bulk Carriers reported a tanker release to ERTS that occurred on September 27, 2018, at 0930 ET. It was reported that due to an internal valve failure, UN1814 Potassium Hydroxide released from a 1200-gallon tanker. The driver contained the release with plastic buckets until a response team could arrive. At 1235 ET, contractors arrived onsite and utilized the driver's diaphragm pump on the leaking valve to unload the tanker and transfer into Schneider's relief trailer onsite. Floor dry and neutralizer were used to clean the impacted asphalt. At 1330 ET, contractors indicated that 2-gallons released to a 45' x 10' area of the pavement. It was also stated that (2) 55-gallon poly drums, (2) 5-gallon, and (1) 1-gallon poly buckets of product was collected. At 1710 ET, contractors stated the transfer was complete. An estimated 60-gallons released in total but only approximately 2-gallons released to the pavement. Contractors utilized acidic degreaser to have a final pH reading of 7. Absorbents were worked into the asphalt and collected. At 1915 ET, contractors completed cleanup. The impacted asphalt was neutralized between 7-9 pH. A total of (3) 55-gallon poly drums of waste was generated. At 2000 ET, contractors departed site. All waste was staged onsite for Schneider personnel to manage and to be picked up at a later date.	Spillage

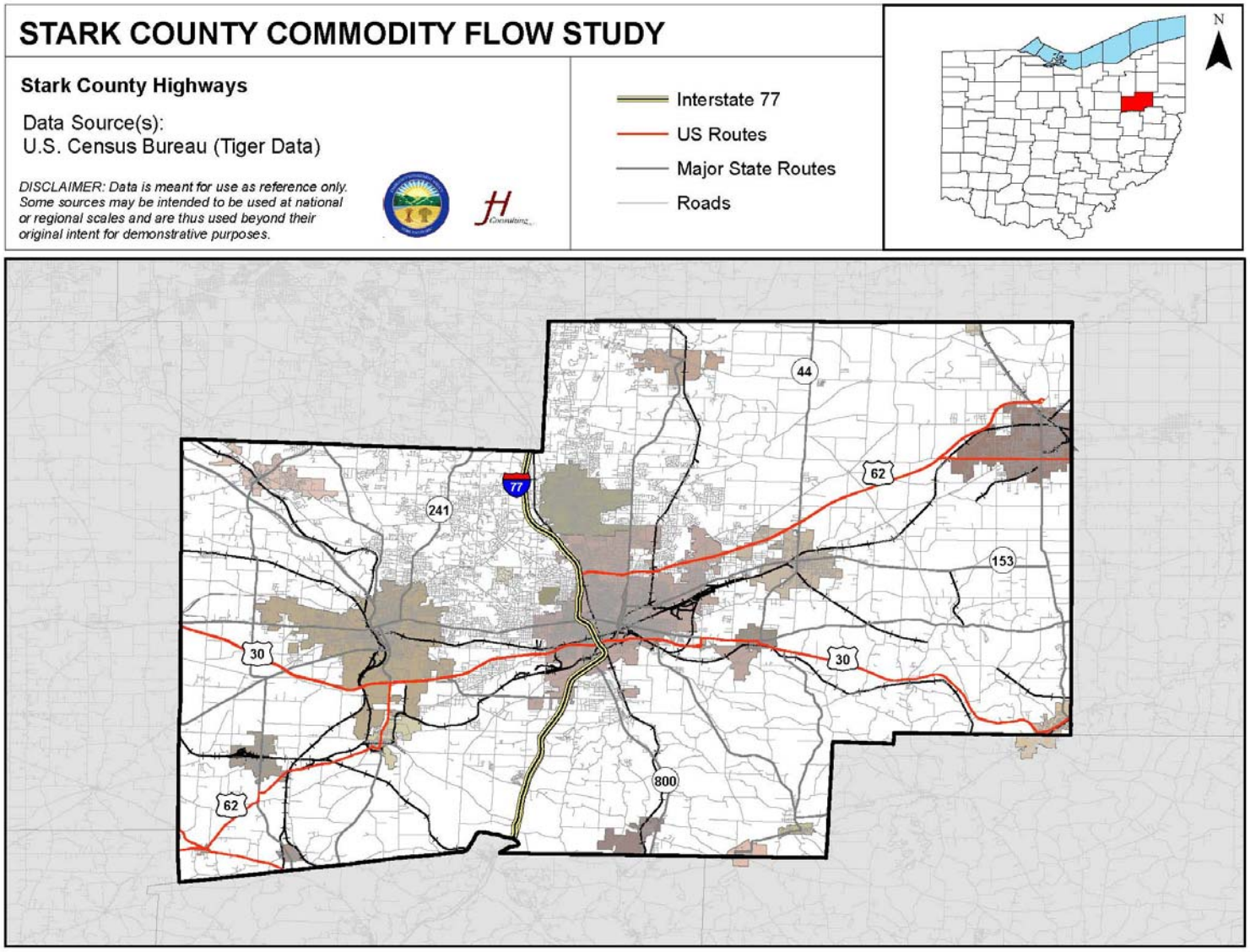
Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
10/27/2018	4:05 A.M.	8495 Port Jackson North Canton	Ethanol or Ethyl Alcohol or Ethanol Solutions or Ethyl Alcohol Solutions (UN 1170)	Upon arrival to the terminal, the package appeared to be wet. After further inspection, it was determined that due to a loose or broken cap, some of the content spilled out.	Spillage
1/30/2019	10:30 A.M.	8495 Port Jackson North Canton	Methanol (UN 1230)	Original comments: Package found at terminal leaking contents. Upon inspection, I found Methanol Container leaking due to broken seal. New Comments: After closer examination, it was determined that approximately 4 ounces had leaked out.	Spillage
2/5/2019	5:00 P.M.	2419 Gambrinus, Canton	Gasoline (UN 1203)	The trailer was loading, and the weld on the sump started leaking. There was a crack at the weld between the shell and the sump. It was not determined how the crack originated.	Spillage
3/19/2019	6:50 A.M.	8495 Port Jackson North Canton	Corrosive Liquid, Acidic, Inorganic, n.o.s. (UN 3264)	Upon arrival to the terminal, the plastic pail appeared to be leaking. After further inspection, it was determined that the cap was broken.	Spillage
4/16/2019	7:30 A.M.	8495 Port Jackson North Canton	Hydrogen Peroxide, Aqueous Solutions with more than 40% but not more than 60% Hydrogen Peroxide (UN 2014)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/26/2019	8:45 P.M.	8495 Port Jackson North Canton	Paint (UN 1263)	The package was dropped in handling. Examination of the inner container revealed a ruptured seam which allowed the contents to escape. The leakage was contained. The undamaged portion of the package was repacked for return to shipper.	Spillage
4/30/2019	7:45 P.M.	4850 Navarre Rd. SW, Canton	Isopropanol or Isopropyl Alcohol (UN 1219)	This package was on a TDP trailer. Upon opening the trailer, it was discovered that multiple hazardous boxes were on their side and had other packages stacked on them.	Spillage
5/24/2019	5:00 A.M.	3812 Cleveland Ave., Canton	Diesel Fuel (UN. 1993)	The North Canton Transfer, LLC driver was attempting to deliver diesel fuel into the customer's storage tank. In the course of doing so, it appears that the storage over-pressurized. This caused approximately 25 gallons of diesel fuel to be released. Sunpro Environmental responded to the scene and handled the remediation. No further environmental impact is anticipated.	Spillage

Date	Time	Location	Material Name and Identification Number	Description of Incident	Result
7/25/2019	4:40 A.M.	8495 Port Jackson North Canton	Corrosive Liquid, Basic, Inorganic, n.o.s. (UN 3266)	The package was unloaded with leakage noted on the box. Examination of the inner container revealed that the container(s) had loose cap(s) and leaked. The leakage was contained. The cap(s) were secured. The carton was wet but otherwise undamaged. The undamaged portion of the package was repacked for return to shipper.	Spillage

2.2 Methodology

Stark County contains a robust highway network, consisting of interstates, US routes, state routes, and local roadways. Figure 2.2.a depicts the major highways in Stark County.

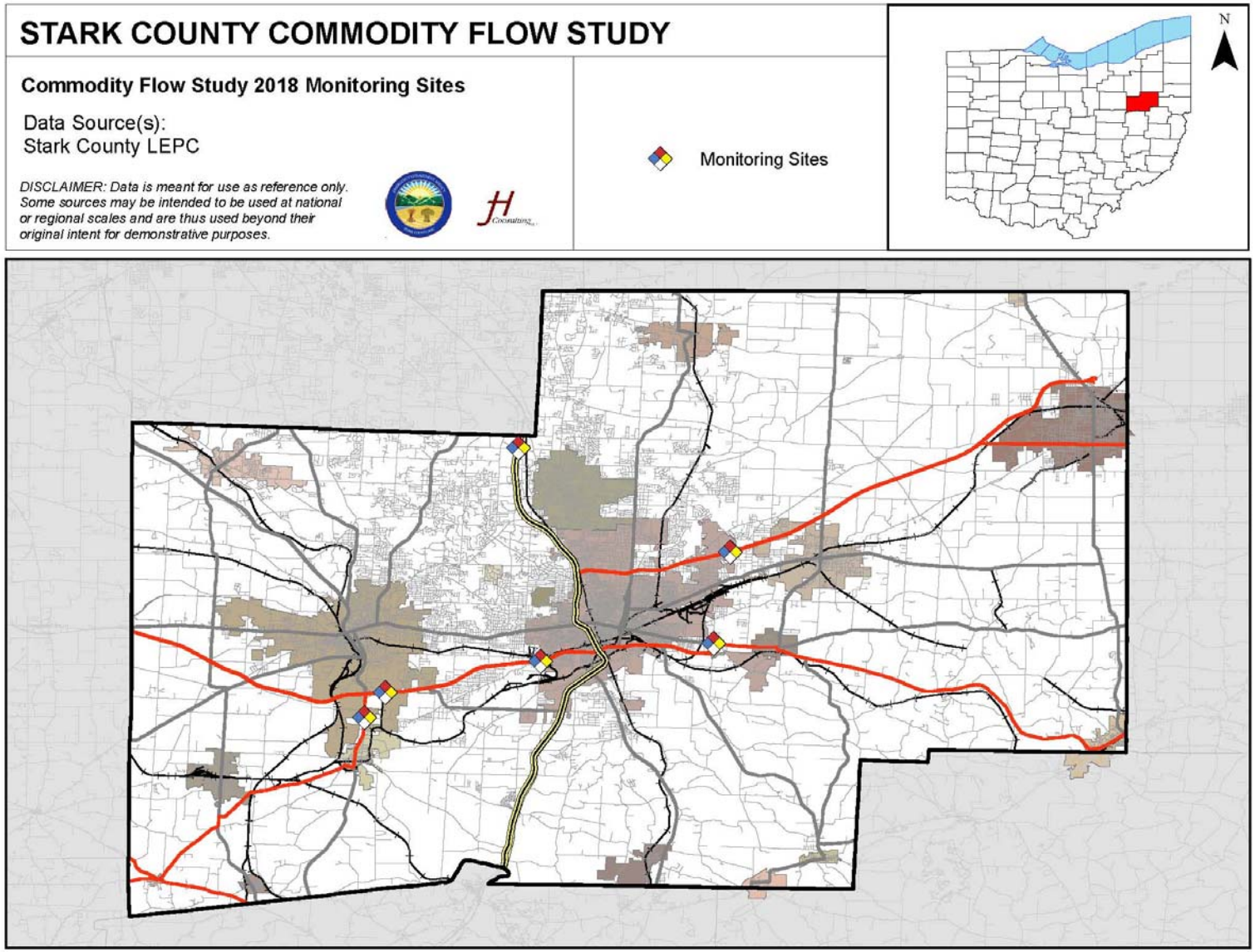
Figure 2.2.a


STARK COUNTY COMMODITY FLOW STUDY
Stark County Highways
Data Source(s):
U.S. Census Bureau (Tiger Data)
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Interstate 77
US Routes
Major State Routes
Roads
N
44
77
241
62
153
30
30
800
62

To complete the highway analysis, monitors established sites along the primary transportation routes and at key intersections throughout the planning area. For Stark County, monitors selected the following sites.

- U.S. Route 62
- Interstate 77 north of Exit 12
- U.S. Route 30
- State Route 21 at Speedway
- State Route 172 at US 30

Figure 2.2.b


STARK COUNTY COMMODITY FLOW STUDY
Commodity Flow Study 2018 Monitoring Sites
Data Source(s):
Stark County LEPC
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Monitoring Sites
N

A one-person crew staffed each observation point. This individual noted the UN numbers and the hazard classes of the placards passing through the site. The monitor manually counted the total truck traffic through the site to allow for real-time comparisons between hazmat-carrying and non-hazmat-carrying truck traffic. Planners also researched total traffic volume data (maintained by the Ohio Department of Transportation [ODOT]) for the planning area (ODOT, 2017). All monitoring and site profiling took place in 2018.

In 2019, planners took this data and dug deeper. The LEPC's consultant also conducted a spatial analysis utilizing the 2018 highway data and geographic information system (GIS) data from the Stark County Auditor. This spatial analysis seeks to identify the types of critical facilities and other community assets that could be impacted by a hazardous materials incident. Based on trends in the 2018 data, the LEPC developed and submitted a survey to fire service providers to gauge the availability of capabilities to respond to the materials identified by the 2018 highway monitoring.

2.3 Field Data (2018)

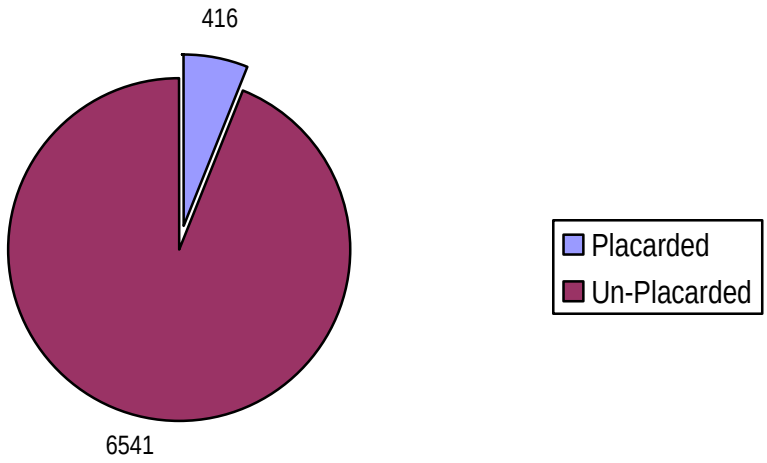
Monitors counted a total of 6,957 trucks during the observation periods. Of the total trucks, 416 (5.98%) bore placards and were thus carrying hazardous materials. Monitors recorded 381 trucks labeled with UN numbers bearing a total of 45 unique UNs. Monitors also observed eight placards, labeled generally with the name of a DOT hazard class. General placards included the following.

- Corrosive
- Dangerous When Wet
- Explosives
- Flammable Gas
- Flammable Liquid
- Miscellaneous
- Non-Flammable Gas
- Oxidizer

Below, planners considered trucks bearing general placards with the hazard class of the placard; thus, total figures per hazard class from this point include specifically-identified UN numbers and the general placards. Figure 2.3.a depicts the placarded and un-placarded truck traffic observed at monitoring points.

Figure 2.3.a

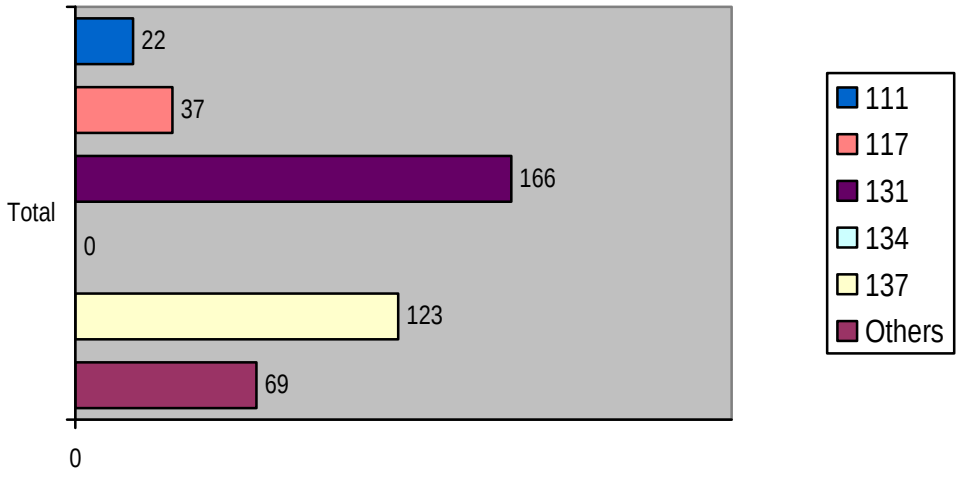
Placarded vs. Un-Placarded Truck Traffic



Monitors recorded placarded trucks by trailer type (e.g., mixed cargo, compressed liquefied gases, flammable liquids, etc.), per the latest edition of the U.S. DOT's *Emergency Response Guidebook* (2016, pp. 12-13). Monitors listed placarded trucks that did not fall into any of the trailer type categories (e.g., flatbed trucks) as "Other." The most observed type was Trailer Type 131, with 166 observed trucks, followed by Trailer Type 137, with 123 trucks, and "Other" with 69 observed trucks. See Appendix 3 for a graphic representation of each trailer type. Figure 2.3.b depicts the total placarded truck traffic counted by trailer type.

Figure 2.3.b

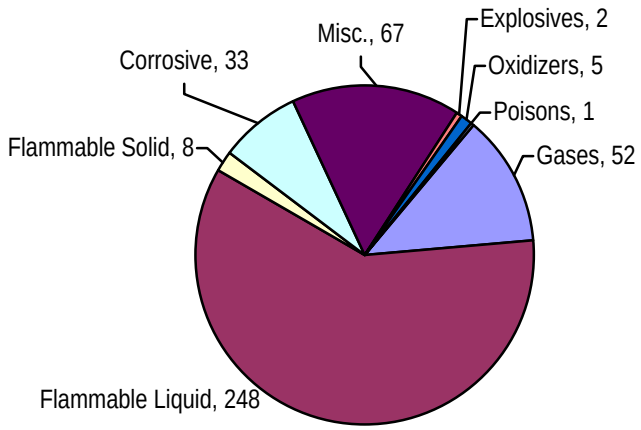
Placarded Trucks by Trailer Type



Approximately 5.98 of the 6,957 total trucks observed carried hazardous materials.

Figure 2.3.c

Placarded Trucks by Hazard Class



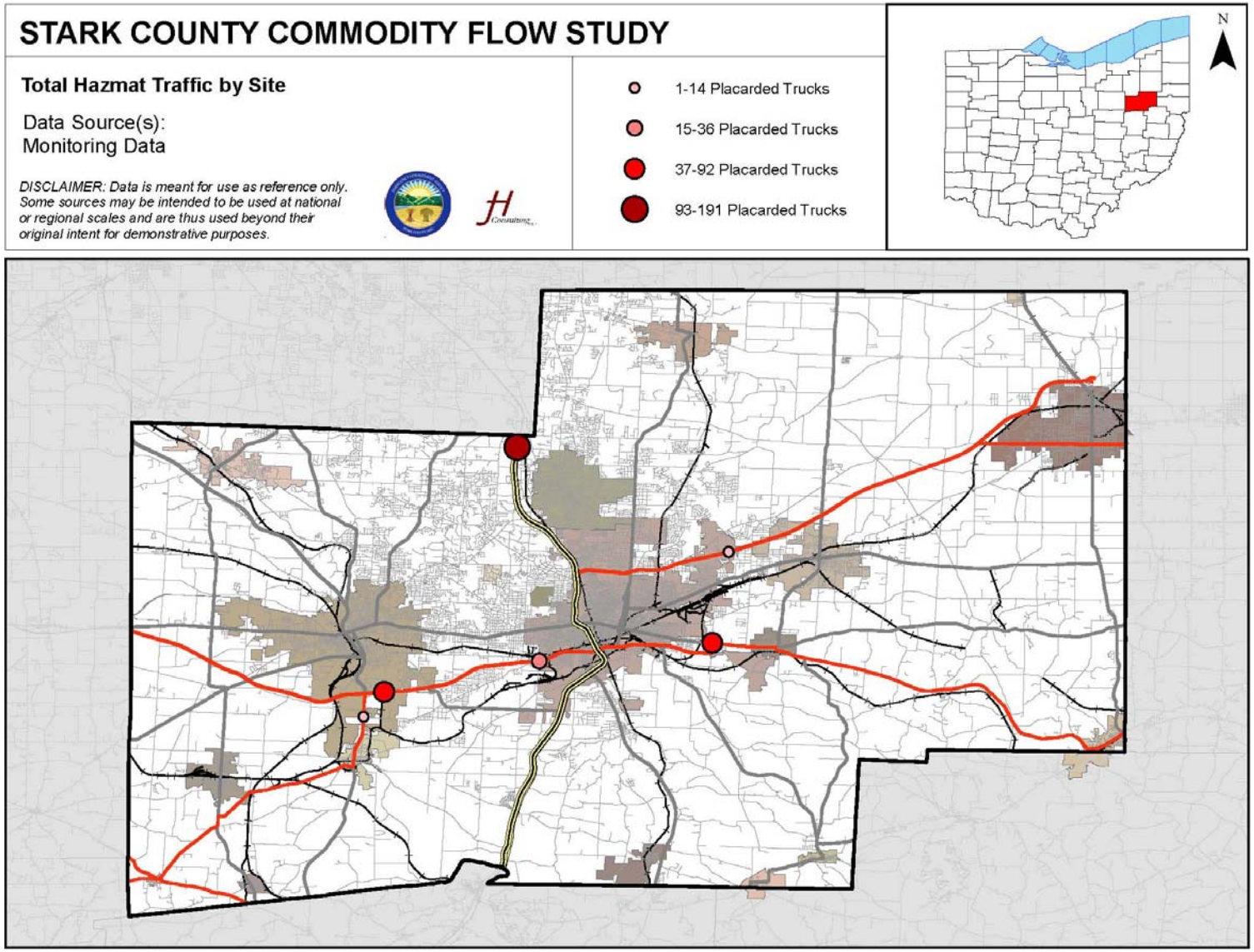
Approximately 59.62% of the total placarded vehicles recorded were carrying Class 3 (Flammable Liquids). Class 9 (Miscellaneous Hazardous Materials) were the second-most frequently-carried materials (16.11 %), followed by Class 2 (Gases, 12.50 %). Within Class 3, Gasoline (UN 1203) was the most frequent material, contributing 54.44% of all Class 3 placards sighted. Flammable Liquids (UN 1993) was the second-most cited material (comprising 20.97% of the Class 3 placards). Petroleum crude oil (UN 1267) comprised 9.27% of the recoded Class 3 materials. Other frequently-sighted materials include the following.

- **UN 3257 (Elevated Temperature Liquid, n.o.s., Class 9):** 51 observations for 20.56% of the total hazardous materials recorded.
- **UN 1073 (Oxygen, Refrigerated Liquid, Class 2):** 12 observations for 4.84% of the total hazardous materials recorded.
- **UN 1987 (Alcohols, n.o.s., Class 3):** 11 observations for 3.87 of the total hazardous materials recorded.

Three materials observed by the monitor did not have a corresponding chemical name for the UN number (i.e., 1047, 1254, and 1867). According to the U.S. Department of Transportation, those UN numbers are “no longer in use.” Data indicates that UN 1867 formerly represented “self-lighting cigarettes.” Monitors recorded all three UN numbers on Interstate 77, with one truck corresponding to each.

The following map (Figure 2.3.d) depicts the hazardous materials observed in this study, organized by monitoring site.

Figure 2.3.d


STARK COUNTY COMMODITY FLOW STUDY
Total Hazmat Traffic by Site
Data Source(s):
Monitoring Data
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
1-14 Placarded Trucks
15-36 Placarded Trucks
37-92 Placarded Trucks
93-191 Placarded Trucks
N

Figures 2.3.e and 2.3.f again depict the monitoring sites. Figure 2.3.a shows the most frequently-recorded hazard class at each site, while Figure 2.3.f identifies the most frequently-recorded material at each site.

Figure 2.3.e

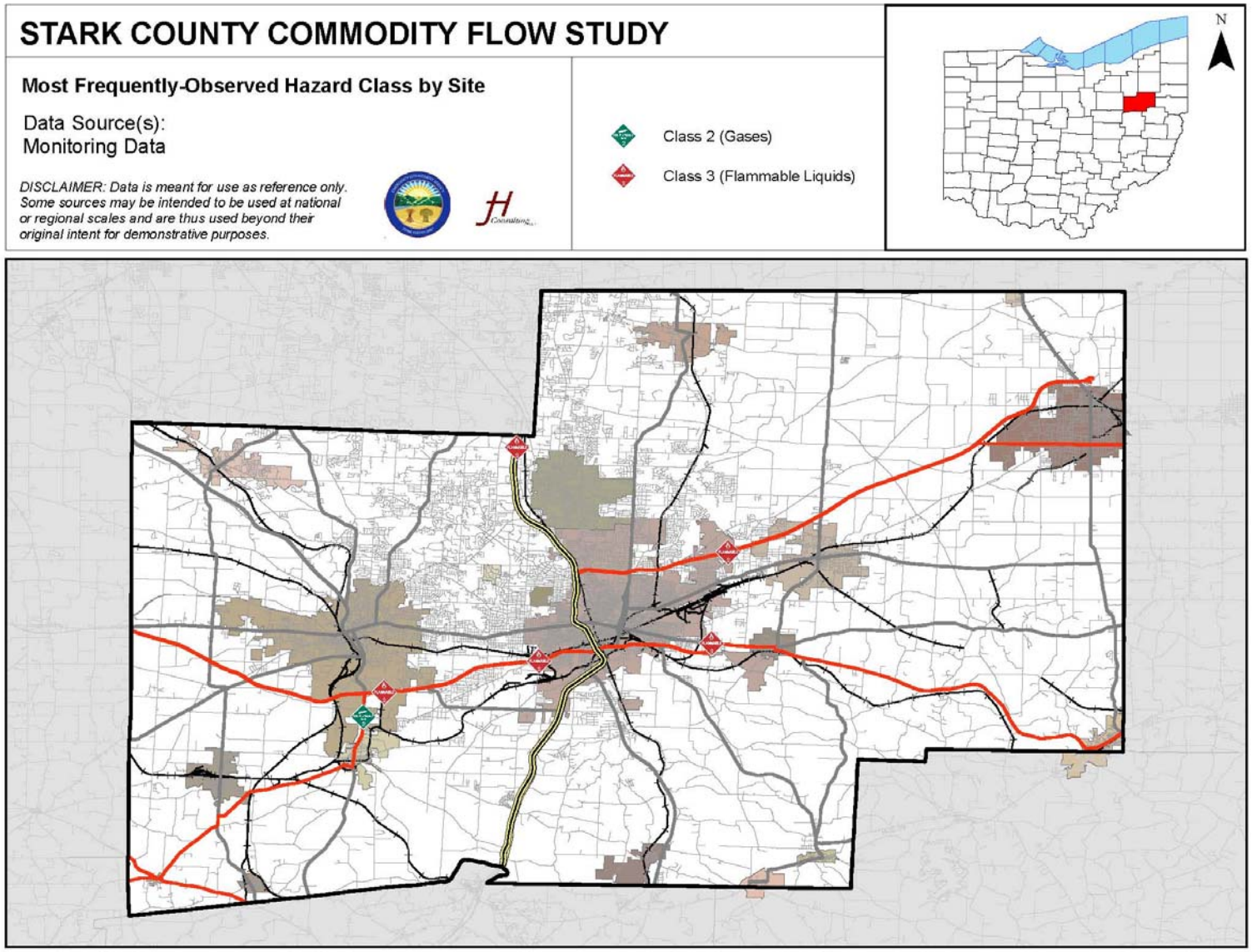
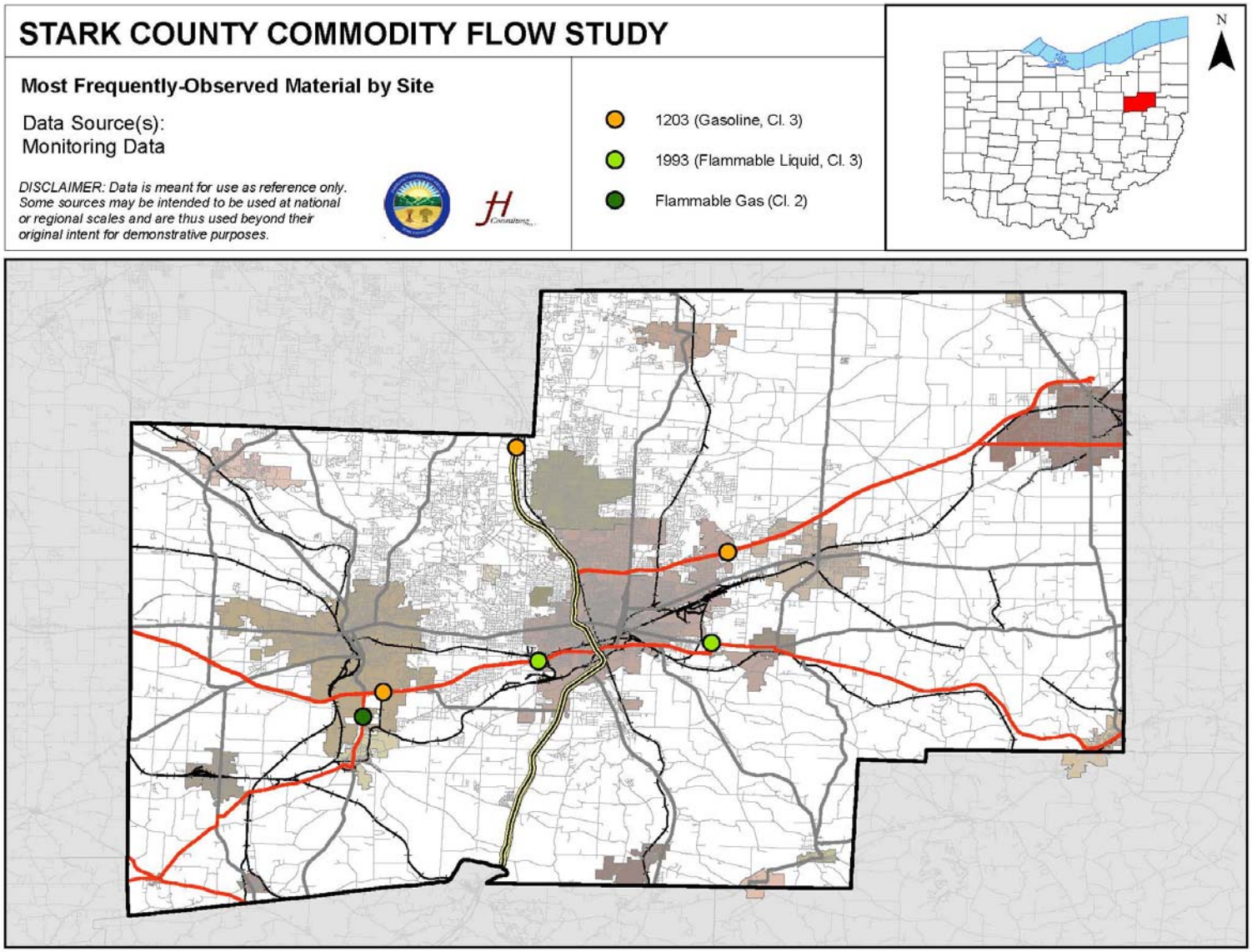

STARK COUNTY COMMODITY FLOW STUDY
Most Frequently-Observed Hazard Class by Site
Data Source(s):
Monitoring Data
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Class 2 (Gases)
Class 3 (Flammable Liquids)
N

Figure 2.3.f


STARK COUNTY COMMODITY FLOW STUDY
Most Frequently-Observed Material by Site
Data Source(s):
Monitoring Data
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
1203 (Gasoline, Cl. 3)
1993 (Flammable Liquid, Cl. 3)
Flammable Gas (Cl. 2)
N

Monitors recorded two materials at the observation points that appear on the U.S. Environmental Protection Agency's (EPA) list of "extremely hazardous substances" (EHS). Table 2.3.2 and Figure 2.3.d describe these materials and their relationship to the other hazards materials recorded in this study.

Table 2.3.1

Trucks Carrying EHS

Extremely Hazardous Substances (EHS)	Total Trucks
Benzotrichloride	1
Sulfuric Acid	2
TOTALS	3

Figure 2.3.g

EHS vs. Total Hazmat Traffic

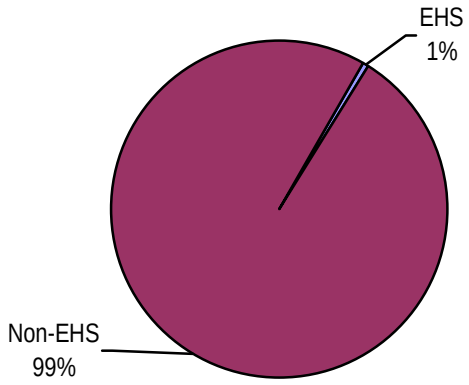
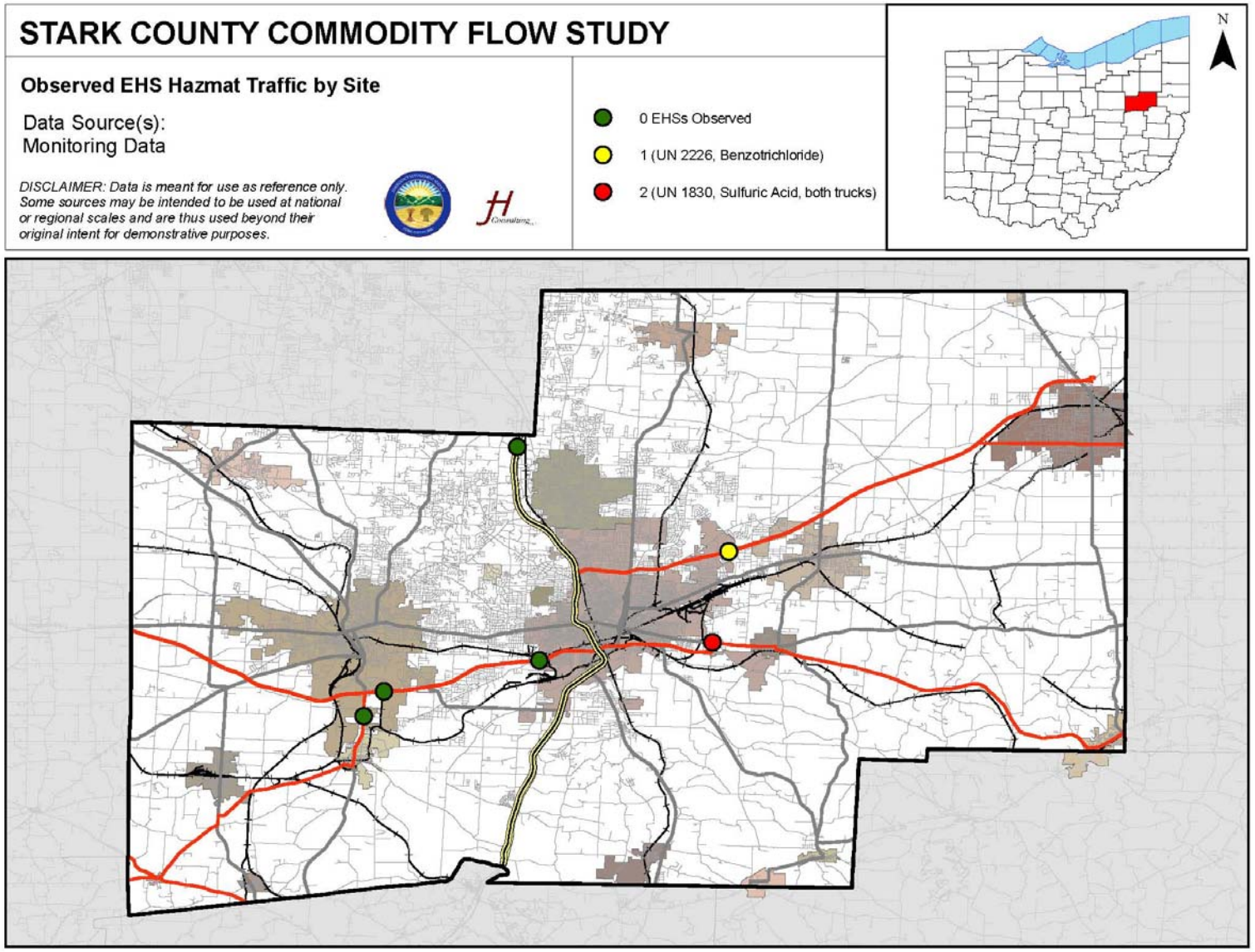


Figure 2.3.h shows the segments of the county to see the greatest number of EHS traffic.

Figure 2.3.h


STARK COUNTY COMMODITY FLOW STUDY
Observed EHS Hazmat Traffic by Site
Data Source(s):
Monitoring Data
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
0 EHSs Observed
1 (UN 2226, Benzotrichloride)
2 (UN 1830, Sulfuric Acid, both trucks)
N

2.4 Route-by-Route Analysis (2018)

This section presents data for the five different routes included in the study. It identifies:

- the breakdown of hazard classes,
- the top materials transported, and
- the extremely hazardous substances observed along each route.

This section also includes an estimation of the quantities of certain materials. As noted in Section 2.2 above, certain trailer types allow for generalized estimations of materials quantities in transit. Materials transported via Trailer Type 131 (Non-Pressure Liquid Tank) average a maximum capacity of 9,000 gallons. Materials in Trailer Type 137 (Low-Pressure Chemical or Corrosive Liquid Tanks) average a capacity of between 4,000 and 6,000 gallons. Highway transport versions of 117 trailers hold a maximum of 11,500 gallons of liquefied gases (i.e., gases liquefied by pressure). Each route analysis includes a table listing the estimated quantities.

Finally, this section includes a calculation of potential accidents with placarded loads based on route-specific data per a methodology from Transcaer[1]. Transcaer based its formula on several criteria, including:

- the number of placarded vehicles observed in the study area,
- the highway road miles within the study area, and
- the national hazardous material accident frequency rate.

The Transcaer formula estimates the likely number of accidents involving "placarded loads" on the highways in the study. Figures less than one would indicate the likely instance of years passing without accidents involving placarded loads. Further, an accident involving a placarded load may not involve a hazardous material release. Officials at the local level may consider mitigation measures for highways with higher estimated accidents, or they may seek to train response agencies with those routes in their first-due areas more fully on transportation-based hazardous materials

[1] The Transcaer formula is:

$$((((\alpha * \beta) / 1{,}000{,}000) * 0.608)/(\gamma/ 24 \text{ hrs. per Day})) * 365 \text{ Days per Year}$$

α: Route Miles in Study Area (i.e., Stark County)
β: Placarded Vehicles
γ: Survey Time on Route

emergencies.

INTERSTATE 77

Monitoring Location (with Latitude/Longitude)

- Interstate 77 turn around north of Exit 112 (40.899919, -81.430000)

Monitors observed a total of 2,399 trucks, 191 (7.96%) of which bore placards, along Interstate 77. The monitoring of Interstate 77 occurred over two four-hour periods, for a total of eight hours of monitoring.

Table 2.4.1

Observed Hazard Classes, Interstate 77

1	2	3	4	5	6	7	8	9
0 *0.0%*	22 *11.5%*	113 *59.2%*	4 *2.1%*	2 *1.0%*	1 *0.5%*	0 *0.0%*	18 *9.4%*	31 *16.2%*

Table 2.4.2

Top 10 Materials Observed, Interstate 77

Material	UN Number	Total	Avg. per Monitored Hour
Gasoline	1203	70	8.75
Elevated temperature, liquid, n.o.s.	3257	22	2.75
Flammable liquid, n.o.s.	1993	12	1.5
Petroleum crude oil	1267	10	1.25
Oxygen, refrigerated liquid	1073	8	1
Petroleum distillates, n.o.s.	1268	7	0.875
Hydrocarbons, liquid, n.o.s.	3295	5	0.625
Tied 8: LP gases	1075	4	0.5
Tied 8: Hydrochloric acid	1789	4	0.5
Tied 8: Hypochlorite solutions	1791	4	0.5

Table 2.4.3

Quantity Estimations by Trailer Type, Interstate 77

Trailer Type 131 Non-Pressure Liquid Tank (max. capacity 9,000 gal.)	Trailer Type 137 Low-Pressure Chemical or Corrosive Liquid Tank (avg. capacity between 4,000 & 6,000 gal.)	Trailer Type 117 High-Pressure Tank (max. 11.500 gal.)
• Gasoline • Petroleum distillates, n.o.s • Alcohol, n.o.s. • Flammable liquid, n.o.s. • Ethanol gasoline mixture	• Petroleum crude oil • Petroleum distillates, n.o.s. • Butyl acid phosphate • Ferrous chloride solution • Hydrochloric acid • Hypochlorite solution • Sodium hydroxide, solution • Alcohol, n.o.s. • Flammable liquid, n.o.s. • Hydrogen peroxide • Methyl chloroacetate • Ferric chloride solution • Environmentally hazardous substance, liquid, n.o.s • Self-reactive solid Type D • Elevated temperature liquid, n.o.s. • Corrosive liquid, acidic, organic, n.o.s. • Hydrocarbons, liquid, n.o.s.	• Ethylene oxide & CO_2 mixture • Oxygen, refrigerated liquid • LP gases • Ethyl alcohol • Gasoline • Argon, refrigerated liquid • Hydrogen, refrigerated liquid • Nitrogen, refrigerated liquid • Flammable liquids, n.o.s. • Carbon dioxide, refrigerated liquid • Isopropenylbenzene

Table 2.4.4

Estimated Annual Accidents Involving Placard Loads, I-77

Route	Approx. Miles in Stark County	Accidents with Placarded Loads per Year
Interstate 77	13.13	1.670

U.S. ROUTE 30

Monitoring Locations (with Latitude/Longitude)

- Turn-around area in median of US 30/US 62 (40.761597, -81.505175)
- Intersection of US 30 and SR 72 at Speedway (40.789313, -81.319911)

Monitors observed a total of 2,531 trucks, 164 (6.48%) of which bore placards, along US Route 30. The monitoring of U.S. occurred over two four-hour periods and two three-hour periods for a total of 14 hours of monitoring.

Table 2.4.5

Observed Hazard Classes, US Route 30

1	2	3	4	5	6	7	8	9
2 *1.2%*	18 *11.0%*	102 *62.2%*	1 *0.6%*	3 *1.8%*	0 *0.0%*	0 *0.0%*	7 *4.3%*	31 *18.9%*

Table 2.4.6

Top 10 Materials Observed, US Route 30

Material	UN Number	Total	Avg. per Monitored Hour
Gasoline	1203	53	3.78
Flammable liquids, n.o.s.	1993	28	2
Elevated temperature liquid, n.o.s.	3257	26	1.86
Alcohol, n.o.s.	1987	9	0.64
Petroleum crude oil	1267	7	0.5
Tied 6: Oxygen, refrigerated liquid	1073	3	0.214
Tied 6: Petroleum distillates, n.o.s.	1268	3	0.214
Tied 6: Nitrogen, refrigerated liquid	1977	3	0.214
Tied 9: Hydrofluoric acid	1790	2	0.143
Tied 9: Hypochlorite solutions	1791	2	0.143
Tied 9: Sulfuric acid	1830	2	0.143
Tied 9: Carbon dioxide	2187	2	0.143

Table 2.4.7

EHS Materials Observed, US Route 30

Material	UN Number	Total	Avg. per Monitored Hour
Sulfuric acid	1830	2	0.143

Table 2.4.8

Quantity Estimations by Trailer Type, US Route 30

Trailer Type 131 Non-Pressure Liquid Tank (max. capacity 9,000 gal.)	Trailer Type 137 Low-Pressure Chemical or Corrosive Liquid Tank (avg. capacity between 4,000 & 6,000 gal.)	Trailer Type 117 High-Pressure Tank (max. 11.500 gal.)
• Gasoline • Alcohol, n.o.s. • Flammable liquids, n.o.s. • Elevated temperature liquid, n.o.s.	• Oxygen, refrigerated liquid • Gasoline • Petroleum crude oil • Petroleum distillates, n.o.s. • Hydrofluoric acid • Hypochlorite solutions • Sulfuric acid • Alcohol, n.o.s. • Flammable liquids, n.o.s. • Carbon dioxide, refrigerated liquid • Sulfur, molten • Elevated temperature liquid, n.o.s • Hydrocarbons, liquid, n.o.s.	• Nitrogen, compressed • Oxygen, refrigerated liquid • Argon, refrigerated liquid • Nitrogen, refrigerated liquid • Flammable liquid, n.o.s. • Carbon dioxide, refrigerated liquid

Table 2.4.9

Estimated Annual Accidents Involving Placard Loads, US 30

Route	Approx. Miles in Stark County	Accidents with Placarded Loads per Year
US Route 30	32.69	2.288

U.S. ROUTE 62

Monitoring Locations (with Latitude/Longitude)

- US Route 62 median at interchange with US Route 30 (40.779182, -81.417536)
- US Route 62 median, west of Vertolli-Harmon Memorial Lane (40.840778, -81.310576)

Monitors observed a total of 1,298 trucks, 50 (3.85%) of which bore placards, along US Route 62. The monitoring of US Route 62 occurred over two four-hour periods, for a total of eight hours of monitoring.

Table 2.4.10

Observed Hazard Classes, US Route 62

1	2	3	4	5	6	7	8	9
0 *0.0%*	8 *16.0%*	30 *60.0%*	2 *4.0%*	0 *0.0%*	0 *0.0%*	0 *0.0%*	6 *12.0%*	4 *8.0%*

Table 2.4.11

Top Materials Observed, US Route 62

Material	UN Number	Total	Avg. per Monitored Hour
Gasoline	1203	11	1.375
Flammable liquids, n.o.s.	1993	10	1.25
Petroleum crude oil	1267	6	0.75
Nitrogen, refrigerated liquid	1977	4	0.50
Tied 5: Hydrochloric acid	1789	2	0.25
Tied 5: Carbon dioxide, refrigerated liquid	2187	2	0.25
Tied 5: Elevated temperature liquid, n.o.s.	3257	2	0.25

Table 2.4.12

EHS Materials Observed, US Route 62

Material	UN Number	Total	Avg. per Monitored Hour
Benzotrichloride	2226	1	0.125

Table 2.4.13

Quantity Estimations by Trailer Type, US Route 62

Trailer Type 131 Non-Pressure Liquid Tank (max. capacity 9,000 gal.)	Trailer Type 137 Low-Pressure Chemical or Corrosive Liquid Tank (avg. capacity between 4,000 & 6,000 gal.)	Trailer Type 117 High-Pressure Tank (max. 11.500 gal.)
• Gasoline • Petroleum crude oil • Hypochlorite solutions • Flammable liquid, n.o.s.	• Petroleum crude oil • Hydrochloric acid • Flammable liquid, n.o.s. • Elevated temperature liquid, n.o.s. • Hydrocarbons, liquid, n.o.s.	• Oxygen, refrigerated liquid • Nitrogen, refrigerated liquid

Table 2.4.14

Estimated Annual Accidents Involving Placard Loads, US 62

Route	Approx. Miles in Stark County	Accidents with Placarded Loads per Year
US Route 62	39.61	1.319

STATE ROUTE 21

Monitoring Location (with Latitude/Longitude)

- Intersection at Speedway (40.747467, -81.516675)

Monitors observed a total of 729 trucks, 11 (1.51%) of which bore placards, along State Route 21. The monitoring of State Route 21 occurred over one four-hour period and one three-hour period, for a total of 7 hours of monitoring.

Table 2.4.15

Observed Hazard Classes, State Route 21

1	2	3	4	5	6	7	8	9
0 *0.0%*	4 *36.36%*	3 *27.27%*	1 *9.09%*	0 *0.0%*	0 *0.0%*	0 *0.0%*	2 *18.18%*	1 *9.09%*

Table 2.4.16

Top Materials Observed, State Route 21

Material	UN Number	Total	Avg. per Monitored Hour
Flammable liquids, n.o.s.	1993	2	0.286
Tied 2: Gasoline	1203	1	0.143
Tied 2: Hydrochloric acid	1789	1	0.143
Tied 2: Elevated temperature liquid, n.o.s.	3257	1	0.143
Tied 2: Corrosive liquid, basic, inorganic, n.o.s.	3266	1	0.143

Table 2.4.17

Quantity Estimations by Trailer Type, State Route 21

Trailer Type 131 Non-Pressure Liquid Tank (max. capacity 9,000 gal.)	Trailer Type 137 Low-Pressure Chemical or Corrosive Liquid Tank (avg. capacity between 4,000 & 6,000 gal.)
• Gasoline	• Hydrochloric acid • Elevated temperature liquid, n.o.s. • Corrosive liquid, basic, inorganic, n.o.s.

Table 2.4.18

Estimated Annual Accidents Involving Placard Loads, SR 21

Route	Approx. Miles in Stark County	Accidents with Placarded Loads per Year
State Route 21	21.42	0.179

STATE ROUTE 172

Monitoring Location (with Latitude/Longitude)

- Intersection of US 30 and SR 72 at Speedway (40.789313, -81.319911)

Monitors observed a total of 899 trucks, 72 (8.01%) of which bore placards, along State Route 172. The monitoring of State Route 72 occurred over one four-hour and one three-hour periods, for a total of seven hours of monitoring.

Table 2.4.19

Observed Hazard Classes, State Route 172

1	2	3	4	5	6	7	8	9
2 *2.8%*	10 *13.9%*	34 *47.2%*	0 *0.0%*	2 *2.8%*	0 *0.0%*	0 *0.0%*	6 *8.3%*	18 *25.0%*

Table 2.4.20

Top Materials Observed, State Route 172

Material	UN Number	Total	Avg. per Monitored Hour
Tied 1: Flammable liquids, n.o.s.	1933	15	2.14
Tied 1: Elevated temperature liquid, n.o.s.	3257	15	2.14
Gasoline	1203	11	1.57
Oxygen, refrigerated liquid	1073	4	0.57
Tied 5: Petroleum crude oil	1267	3	0.43
Tied 5: Petroleum distillates, n.o.s.	1268	3	0.43
Tied 7: Hydrofluoric acid	1790	2	0.28
Tied 7: Sulfuric acid	1830	2	0.28

Table 2.4.21

EHS Materials Observed, State Route 172

Material	UN Number	Total	Avg. per Monitored Hour
Sulfuric Acid	1830	2	0.286

Table 2.4.22

Quantity Estimations by Trailer Type, State Route 172

Trailer Type 131 Non-Pressure Liquid Tank (max. capacity 9,000 gal.)	Trailer Type 137 Low-Pressure Chemical or Corrosive Liquid Tank (avg. capacity between 4,000 & 6,000 gal.)	Trailer Type 117 High-Pressure Tank (max. 11.500 gal.)
• Gasoline • Petroleum crude oil • Flammable liquid, n.o.s.	• Oxygen, refrigerated liquid • Gasoline • Petroleum distillates. n.o.s. • Hydrofluoric acid • Sulfuric acid • Alcohol, n.o.s. • Carbon dioxide, refrigerated liquid • Sulfur, molten • Elevated temperature liquid, n.o.s. • Hydrocarbons, liquid	• Oxygen, refrigerated liquid • Nitrogen, refrigerated liquid • Flammable liquid, n.o.s.

Table 2.4.23

Estimated Annual Accidents Involving Placard Loads, SR 172

Route	Approx. Miles in Stark County	Accidents with Placarded Loads per Year
State Route 172	29.95	1.641

2.5 Capability Assessment

Table 2.5.1 presents the top 10 materials identified by the highway analysis along with immediate evacuation areas, hazard class, and containment considerations.

Table 2.5.1

Top 10 Materials, Highway Analysis

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Gasoline	1203	135	I-77 SR 21 SR 172/US30 US 30 US 62 (both)	1000 Feet Downwind	½ Mile All Directions	Highly Flammable Very Low Flash Point	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate Ventilate the area Small Fire: • Dry chemical CO2, water spray or regular foam Large Fire: • Water spray, fog or regular foam • Do Not use straight streams • For massive fire, use unmanned hose holders or monitor nozzles. If not possible, withdraw from area and let fire burn

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Flammable Liquids, n.o.s.	1993	52	I-77 SR 21 SR 172/US30 US 30 US 62 (both)	1000 Feet Downwind	½ Mile All Directions	Highly Flammable Very Low Flash Point	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate Ventilate the area Small Fire: • Dry chemical CO2, water spray or regular foam Large Fire: • Water spray, fog or regular foam • Do Not use straight streams • For massive fire, use unmanned hose holders or monitor nozzles. If not possible, withdraw from area and let fire burn

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Elevated Temperature Liquid, n.o.s.	3257	51	I-77 SR 21 SR 172/US 30 US 30 US 62 (both)	1000 Feet Downwind	½ Mile All Directions	Highly Flammable Very Low Flash Point	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate Ventilate the area Small Fire: • Dry chemical CO2, water spray or regular foam Large Fire: • Water spray, fog or regular foam • Do Not use straight streams • For massive fire, use unmanned hose holders or monitor nozzles. If not possible, withdraw from area and let fire burn

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Petroleum Crude Oil	1267	23	I-77 SR 172/US 30 US 30 US 62 (both)	1000 Feet Downwind	½ Mile All Directions	Highly Flammable Very Low Flash Point	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate Ventilate the area Small Fire: • Dry chemical CO2, water spray or regular foam Large Fire: • Water spray, fog or regular foam • Do Not use straight streams • For massive fire, use unmanned hose holders or monitor nozzles. If not possible, withdraw from area and let fire burn

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Oxygen, Refrigerated Liquid	1073	12	I-77 SR 172/US 30 US 62 (both)	1/3 mile downwind	½ Mile All Directions	Containers may explode when heated Ruptured cylinders may rocket Many materials become brittle and are likely to break without warning when in contact with refrigerated or cryogenic liquids.	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate • Isolate area until gas has dispersed
Alcohols, n.o.s.	1987	11	I-77 SR 172/US 30 US 30	1000 Feet Downwind	½ Mile All Directions	Highly Flammable	All Leaks: • Use vapor suppressing foam • Absorb or cover with non-combustible material • Use non-sparking grounded tools Large Leaks: • Dike far ahead of spill • Water spray may reduce vapors

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Nitrogen, refrigerated liquid	1977	10	I-77 SR 172/US 30	330 Feet Downwind	½ Mile All Directions	Many materials become brittle and are likely to break without warning when in contact with refrigerated or cryogenic liquids.	All Leaks: • 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 • Prevent entry into waterways, sewers, basements, or confined spaces • Allow substance to evaporate • Ventilate area

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Petroleum distillates, n.o.s.	1268	10	I-77 SR 172/US 30	1000 Feet Downwind	½ Mile All Directions	Highly Flammable Very Low Flash Point	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate Ventilate the area Small Fire: • Dry chemical CO2, water spray or regular foam Large Fire: • Water spray, fog or regular foam • Do Not use straight streams • For massive fire, use unmanned hose holders or monitor nozzles. If not possible, withdraw from area and let fire burn

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Hydrocarbons, liquid, n.o.s.	3295	7	1-77 SR 172/US 30 US 62 North	1000 Feet Downwind	½ Mile All Directions	Highly Flammable Very Low Flash Point	All Leaks: • Do not direct water at spill or lead • Use water to reduce vapors, Avoid allowing water runoff to contact material • Prevent entry into waterways, sewers, basements, or confined areas • Allow substance to evaporate Ventilate the area Small Fire: • Dry chemical CO2, water spray or regular foam Large Fire: • Water spray, fog or regular foam • Do Not use straight streams • For massive fire, use unmanned hose holders or monitor nozzles. If not possible, withdraw from area and let fire burn

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Hypochlorite solutions	1791	7	I-77 SR 172/US 30 US 62 North	Initial: 150 Feet All Directions for Liquid Initial: 75 Feet All Directions for Solid Continue to increase isolation zone downwind as necessary	½ Mile All Directions	TOXIC: Inhalation, ingestion, or skin contact may cause severe injury or death	All Leaks: • Prevent entry into waterways, sewers, basements, or confined areas • DO NOT GET WATER INSIDE CONTAINER Small Fire: • Dry chemical, CO2, or water spray Large Fire: • Dry chemical, CO2, alcohol, resistant foam, or water spray • Dike fire-control water • Fight fire from maximum distance or use unmanned hose holders or monitor nozzles

Material Name	UN Number	Total Observations	Sites at Which Observed	Initial Evacuation Area (Large Spill)	Initial Evacuation Area (Fire)	Hazard	Containment
Hydrochloric acid	1789	7	I-77 SR 21 US 62 South	Initial: 150 Feet All Directions for Liquid Initial: 75 Feet All Directions for Solid Continue to increase isolation zone downwind as necessary	½ Mile All Directions	TOXIC: Inhalation, ingestion, or skin contact may cause severe injury or death	All Leaks: • Vapor-suppressing foam may reduce vapors • DO NOT GET WATER INSIDE CONTAINERS • Use water spray to reduce vapors or divert vapor cloud drift; Avoid allowing water runoff to contact material Small Leaks: • 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 Small Fire: • CO2, dry chemical, dry sand, alcohol-resistant foam Large Fires: • Water spray, fog, or alcohol-resistant foam • Do not use straight streams • Dike fire-control water for later disposal • Fight from maximum distance using unmanned hose holders or monitor nozzles.

There have been 65 reported hazmat incidents reported during transport via highway in Stark County between 2009 and 2019. All 65 of the incidents resulted in a release of a substance. None of the substances involved in a release appear on the EPA's extremely hazardous substance list. The substances documented in the incident reports include:

- Sodium hydroxide, solution (UN 1824),
- Hydrochloric acid (UN 1789)[2],
- Potassium hydroxide, solution (UN 1814),
- Petroleum crude oil (UN 1267)[2,]
- Corrosive liquid, basic, organic, n.o.s. (UN 3267),
- Corrosive liquid, acidic, inorganic, n.o.s. (UN 3264),
- Amines, liquid, corrosive, n.o.s. (UN 2735),
- Hydrofluoric acid, with more than 60 percent strength (UN 1790),
- Gasoline (UN 1203)[2],
- Petroleum gas (UN 1075),
- Fuel oil (UN 1993)[2],
- Paint (UN 1263),
- Corrosive Liquid, Basic, Inorganic (UN 3266),
- Corrosive Liquids, N.O.S. (UN 1760),
- Fire Extinguisher Containing Compressed or Liquefied Gas (UN 1044),
- Self-Reactive Solid Type D (UN 3226),
- Isopropyl Alcohol (UN 1219),
- Ethanol or Ethyl Alcohol (UN 1170),
- Hydrogen Peroxide, Aqueous Solutions (UN 2014),
- Printing Ink, Flammable, or Printing Ink Related Material (UN 1210),
- Aerosols, Flammable (UN 1950),
- Alcohols, n.o.s. (UN 1987),
- Environmentally Hazardous Substances, Solid, n.o.s. (UN 3077),
- Sulfuric Acid, >51% Acid or greater (UN 1830), and
- Extracts, Flavoring, Liquid (UN 1197).

[2] Substance listed on Top 10 materials transported list (Table 2.6.1).

The consultant created a hazardous material incident response capability survey that was distributed to fire departments with a primary response area in Stark County. Eight departments completed the survey answering questions about equipment, training, and planning. Of the eight department that participated, five ranked their ability to handle hazardous material incidents with their current equipment as fair, two ranked their ability as good, and on ranked their ability as excellent. All eight departments listed their neighboring departments' ability to respond to hazardous material incidents as fair.

All departments reported varying equipment that can be used to contain or mitigate small leaks or spills, including dikes, absorbent mats, booms, tarps, containment pools, etc. Each department also included personal protective equipment (PPE) to include self-contained breathing apparatus and structural firefighter's protective clothing (turnout gear). However, multiple materials transported via highway in Stark County, including several of the top ten transported materials, require a higher level of protection. Gasoline's (UN 1203) and Flammable Liquids, n.o.s.'s (UN 1993) orange pages both state "structural firefighters' protective clothing will only provide limited protection." Hydrochloric Acid's (UN 1789) and Hypochlorite Acid's (UN 1791) both state orange pages both state "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."

All eight agencies reported that they would serve as the initial responders with a responsibility to identify the material, contain the material, and evacuate as necessary. However, all eight departments stated they would transition into a support role when the Stark County Hazardous Materials Response Team arrived on scene.

2.6 Spatial Analysis

Lists and other data presentations are helpful, but spatial analysis can also assist preparedness efforts. This section attempts to present highway analysis data in such a way. Planners utilized the DOT's *Emergency Response Guidebook* (2016) to estimate the small- and large-spill initial isolation distances for each of the top 10 chemicals (by route) observed during the highway analysis. Table 2.6.1 presents the largest small- and large-spill isolation distances by route.

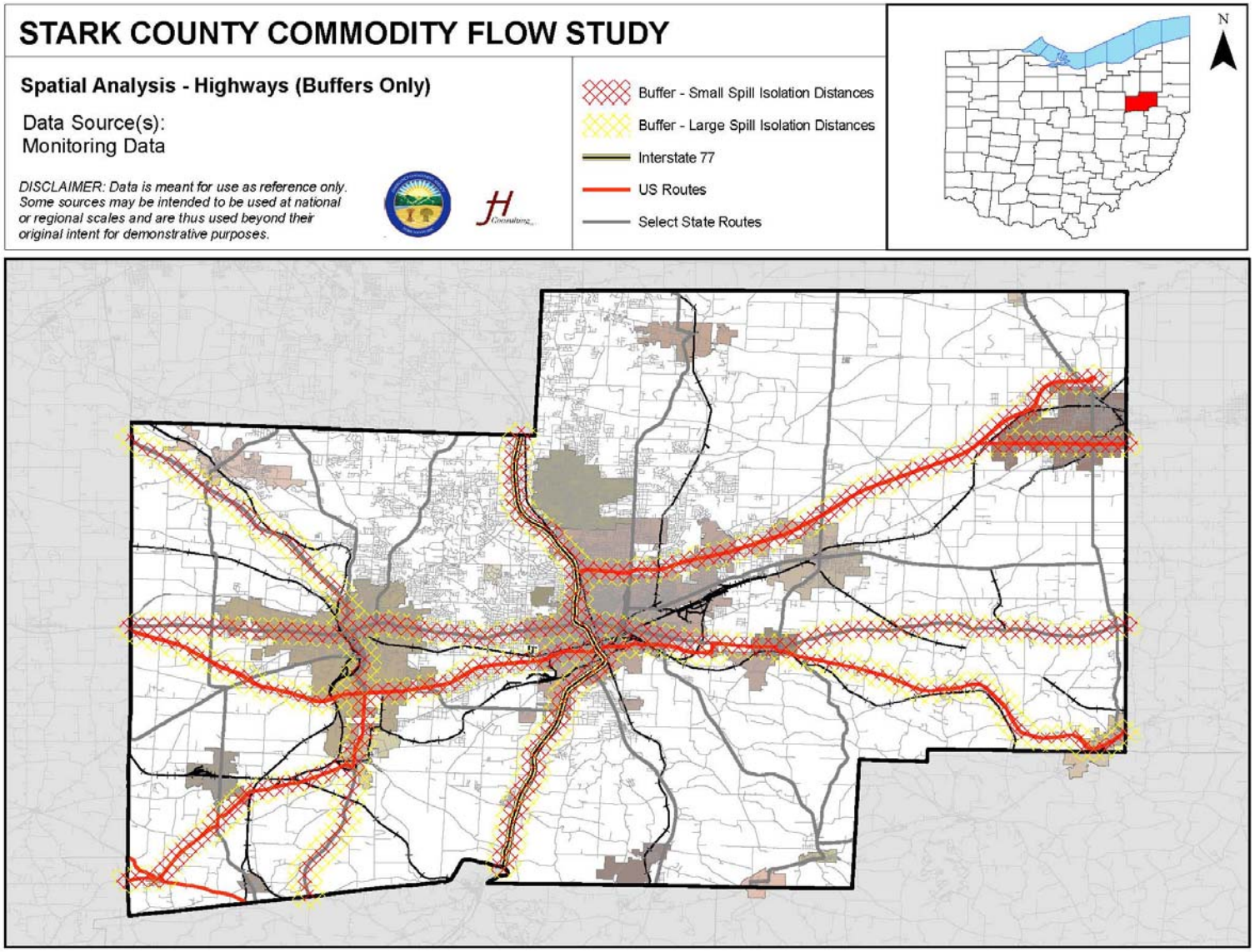
Table 2.6.1

Isolation Distances by Route

Route	Isolation Distance	
	Small Spill	*Large Spill*
State Route (SR) 21	1,000'	½ mile
SR 172	1,760'	½ mile
US Route 30	1,000'	½ mile
US Route 62	1,760'	½ mile
Interstate 77	1,760'	½ mile

This isolation distances can serve as a proxy for protection area buffers (i.e., areas for which public protective measures may be necessary should an incident involving a hazardous material occur). Figure 2.6.a shows the buffer areas for each monitored route.

Figure 2.6.a


STARK COUNTY COMMODITY FLOW STUDY
Spatial Analysis - Highways (Buffers Only)
Data Source(s):
Monitoring Data
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Buffer - Small Spill Isolation Distances
Buffer - Large Spill Isolation Distances
Interstate 77
US Routes
Select State Routes
N

Finally, Table 2.6.2 shows the community assets located in these buffer areas. These assets were taken from the *Stark County 2017 Multi-Jurisdictional Hazard Mitigation Plan* (Stark County EMA, 2017).

Table 2.6.2

Community Assets Located in Highway Large Spill (1/2 Mile) Isolation Distance Buffer (Countywide)

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Allen Elementary School		X			
Altercare of Alliance Center for Rehabilitation & Nursing		X			
Altercare of Navarre		X			
Ambulance Associates of Canton	X				
American Medical Response	X				
Arbors at Canton		X			
Aultman Hospital	X	X			
Barber-Whitticar House					X
Bartley Ambulance Service	X				
Baxter Elementary School		X			
Bel Air Senior Living Community		X			
Beldon Elementary School		X			
Bender's Restaurant Belmont Buffet					X
Bethany Nursing Home		X			
Bethlehem Township Fire Department	X				
Bordner House					X
Bowers Elementary School		X			
Brewster South Water Tower	X				
Canterbury Villa of Alliance		X			
Canton City Health Department	X				
Canton City SD	X				
Canton Police Department	X				
Canton Public Library					X
Canton Township Fire Department	X				
Canton Water Treatment Plant	X				
Cedar Elementary School		X			
Choices High School		X			
City National Bank Building					X
City of Canton Communication Center	X				
Claredon Elementary School		X			
Clearview Golf Club					X
Community Care Center		X			
Country Fair Station Post Office				X	
Country Lawn Center for Rehabilitation & Nursing		X			
Dewalt Building					X
Dueber Elementary School		X			
Dueber Station Post Office				X	
Eagles' Temple					X
Earley-Hartzell House					X

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Early Childhood Kindergarten Center		X			
East Canton Elementary School		X			
East Canton High School		X			
East Canton Middle School		X			
East Canton Police Department	X				
East Canton Post Office				X	
Edison Junior High School		X			
Emerson ES		X			
Fairfield Inn			X		
Fairless Elementary School		X			
Fairless High School		X			
Fairless Middle School		X			
Fife, Harry E., House					X
First Ladies National Historic Site					X
First Methodist Episcopal Church					X
First National Bank Building					X
First Reformed and First Lutheran Churches					X
Five Oaks					X
Frances Apartment Building					X
Franklin Elementary School		X			
French, Garnet B., House					X
Freshman Academy		X			
Genoa Elementary School		X			
Gorrell Elementary School		X			
Hampton Inn			X		
Harter Elementary School		X			
Hartford Middle School		X			
Hazen Middle School		X			
Hercules Motors Corporation Industrial Complex					X
Home Two Suites			X		
Hospitality House		X			
Hotel Courtland					X
House of Loreto		X			
Ideal Department Store Building					X
Inverness Park				X	
La Quinta			X		
Landmark Tavern					X
Lathrop Elementary School		X			
Lehman Middle School		X			
Lexington Township Volunteer Fire Department	X				
Liberty Elementary School		X			
Loew-Define Grocery Store and Home					X
Longfellow Middle School		X			
Lorin Andrews Middle School		X			
Mary Irene Day Elementary School		X			
Mason Elementary School		X			
Massillon Cemetery Building					X
Massillon City Health Department	X				

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Massillon City SD Administration BLD	X				
Massillon City Tiger Stadium				X	
Massillon Police Department	X				
Massillon Post Office				X	
Massillon Sewage Treatment Plant	X				
McGregor Elementary School		X			
McIntosh Oil and Gas Storage			X		
McKinley High School		X			
Meadow Wind Health Care Center	X	X			
Mellett-Canton Daily News Building					X
Mercy Medical Center	X	X			
Minerva Elder Care Center		X			
Minerva Fire Department	X				
Minerva High School		X			
Minerva Police Department	X				
Minerva Post Office				X	
Moffitt Heights Elementary School		X			
Navarre Elementary School		X			
Navarre Police Department	X				
Navarre Post Office				X	
Navarre Village Fire Department	X				
Navarre Water Treatment Plant	X				
NE Waterworks Post Office				X	
New Market Station Post Office				X	
Nimishillen Township Fire Department	X				
North Canton Water Treatment Plant	X				
Old McKinley High School					X
Onesto Hotel					X
Osnaburg Township Fire Department	X				
Palace Theater					X
Parkway Elementary School		X			
Perry High School		X			
Perry Township Fire Department	X				
Perry Township Police Department	X				
Pfeiffer Middle School		X			
Plain Township Fire Station Three	X				
Plain Township Fire Station Two	X				
Pleasant View School for Arts Middle School		X			
Prairie College Elementary School		X			
Purcell, Robert A. and Elizabeth H., House					X
Putman, Walter S., House					X
R.G. Drage Career Education Center		X			
Red Cross of Central Stark County	X				
Reedurban Elementary School		X			
Residence Inn			X		
Robert A. Taft Middle School		X			
Robertsville Fire Department	X				
Rochester Park Assisted Living		X			
Rockhill Elementary School		X			

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Rural Metro Ambulance Service	X				
Saint Joseph's Roman Catholic Church					X
SARTA Bus Terminal			X	X	
Saxton House					X
Schuffenecker, August Building					X
Smith Elementary School		X			
Souers Middle School		X			
St. Edward Hotel					X
St. John's Catholic Church					X
St. Joseph Care Center		X			
St. Mary's Catholic Church					X
St. Paul's Reformed Church					X
St. Peter Church					X
St. Timothy's Protestant Episcopal Church					X
Stahl--Hoagland House					X
Stark Ambulance Service	X				
Stark County Courthouse and Annex					X
Stark County Health Department	X				
Stark County Sheriff	X				
State Police Canton Patrol Post	X				
Staybridge Suites		X			
Summit Elementary School		X			
T.C. Knapp Elementary School		X			
Taft Elementary School		X			
The Venue mall			X		
Third Street Bridge					X
Timken, Henry H., Estate Barn					X
Trinity Lutheran Church					X
Village of East Canton	X				
Village of Navarre	X				
Washington High School		X			
Watson Elementary School		X			
Werner Inn					X
White Oak Convalescent Home		X			
William R Day Elementary School		X			
Wilmot Fire Department	X				
Wilmot Police Department	X				
Wilmot United Brethren Church					X
YMCA of Central Stark County				X	
York Elementary School		X			

To show more detail for each area monitored as part of this study, planners compiled spatial analysis for various scenarios at the monitoring sites. To complete the scenarios, the following apply.

- The basis of the scenarios is the top 10 materials observed during the highway analysis. Planners only included those materials from the top 10 list observed for

the individual monitoring sites.

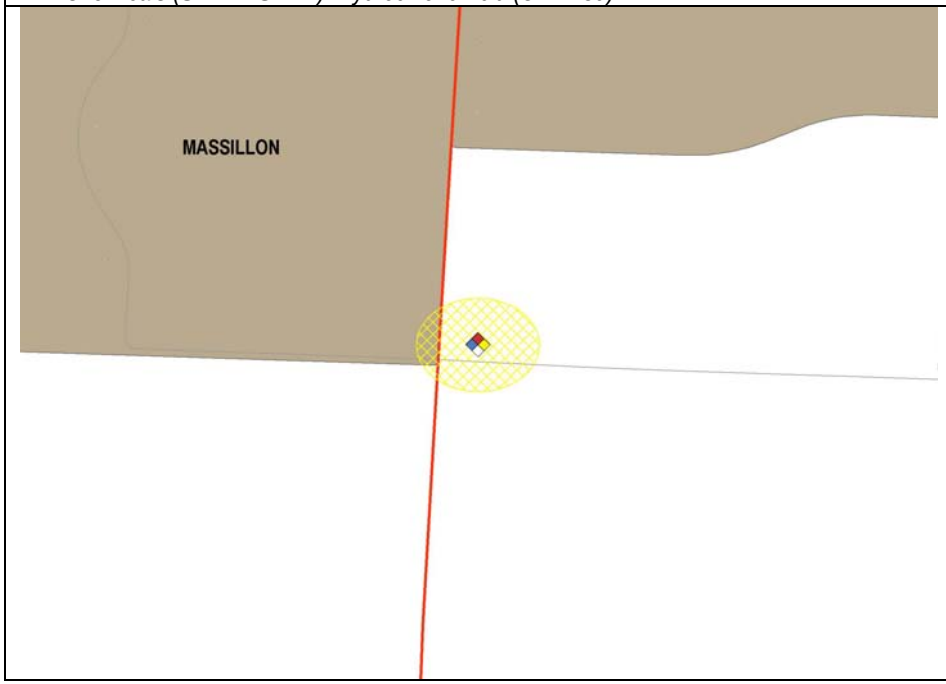
Table 2.6.3

Variable Calculations and Proxies

Variable	Calculation or Proxy
Percent Structures "Residential"	CALCULATION: 73.2% SOURCE: U.S. DHS HAZUS-MH (Flood Global Risk Report)
Percent Structures "Other"	CALCULATION: 26.8% SOURCE: U.S. DHS HAZUS-MH (Flood Global Risk Report)
Persons per Household	CALCULATION: 2.40 SOURCE: U.S. Census Bureau (2018 estimate)
Persons per Other Structure	PROXY: Stark County Employment / Total Employer Establishments (2017) CALCULATION: 144,180 / 8,162 = 17.66 SOURCE: U.S. Census Bureau
Total Structures Impacted	PROXY: Addresses SOURCE: GIS data per Stark County Auditor

- Planners referenced the U.S. Environmental Protection Agency's (EPA's) ALOHA plume modeling software for each of the top 10 materials. None of the top 10 materials appeared in the standard ALOHA materials list.

Scenario: State Route 21, 150' Isolation *Latitude/Longitude: 40.747467, -81.516675* *Chemicals (SMALL SPILL): Hydrochloric Acid (UN 1789)*	Monitored Hours: Seven Fire District(s): Massillon, Perry Township

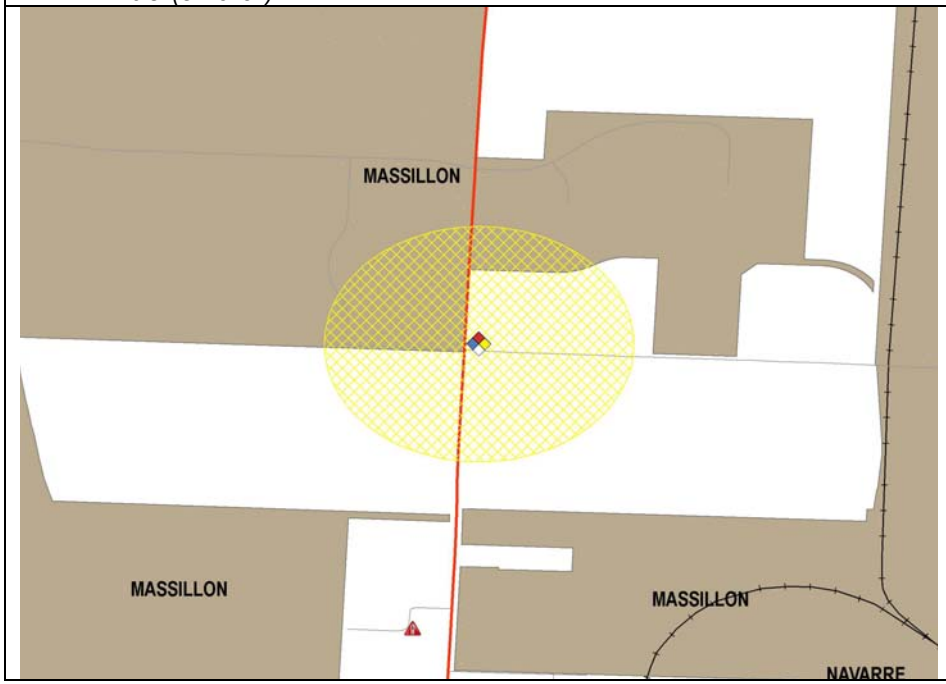


Total Structures: 2 Total Impacted Population: 20
Stormwater Inlets: 3

The following community assets lie within the impacted area of the scenario.

- Speedway 931 (Covered Facility)

Scenario: State Route 21, 1,000' Isolation *Latitude/Longitude: 40.747467, -81.516675* *Chemicals (SMALL SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257)*	Monitored Hours: Seven Fire District(s): Massillon, Perry Township



Total Structures: 32 Total Impacted Population: 208
Stormwater Inlets: 15

The following community assets lie within the impacted area of the scenario.

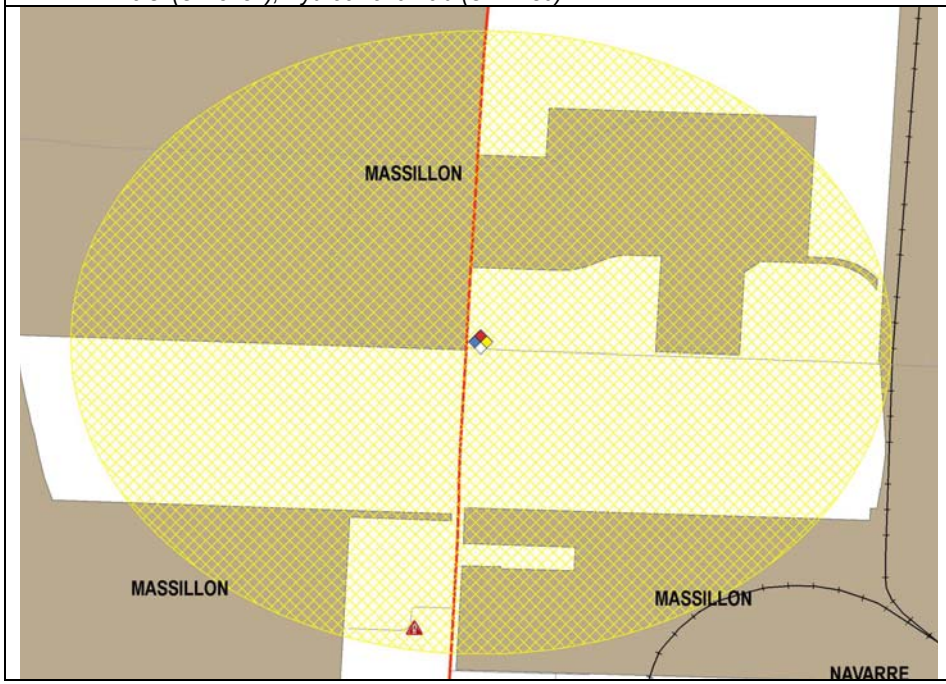
- Economy Auto Outlet (Covered Facility)
- Speedway 931 (Covered Facility)

Scenario: State Route 21, ½ mile Isolation

Latitude/Longitude: 40.747467, -81.516675

Chemicals (LARGE SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Hydrochloric Acid (UN 1789)

Monitored Hours: Seven
Fire District(s): Massillon, Perry Township

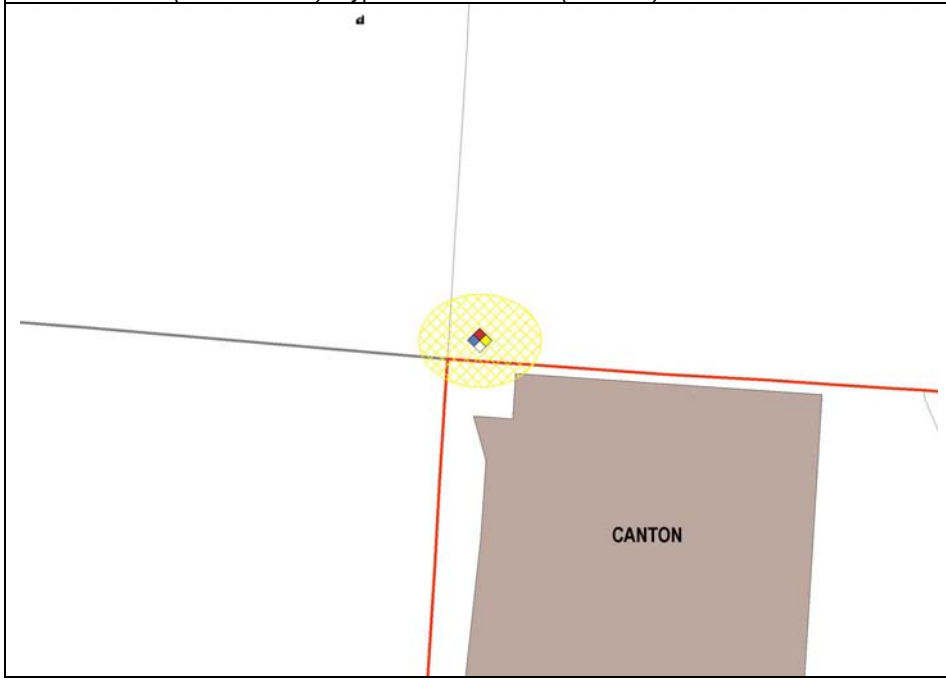


Total Structures: 77
Total Impacted Population: 500
Stormwater Inlets: 24

The following community assets lie within the impacted area of the scenario.

- Allied Corporation Plant #73 (Covered Facility)
- Economy Auto Outlet (Covered Facility)
- GDSI Specialty Dispersions, Inc. (Covered Facility)
- Grief Packaging (Covered Facility)
- Pepsi Beverage Company (Covered Facility)
- Speedway 931 (Covered Facility)

Scenario: State Route 172 and US Route 30, 150' Isolation *Latitude/Longitude: 40.789313, -81.319911* *Chemicals (SMALL SPILL): Hypochlorite Solutions (UN 1791)*	Monitored Hours: Seven Fire District: Canton Township

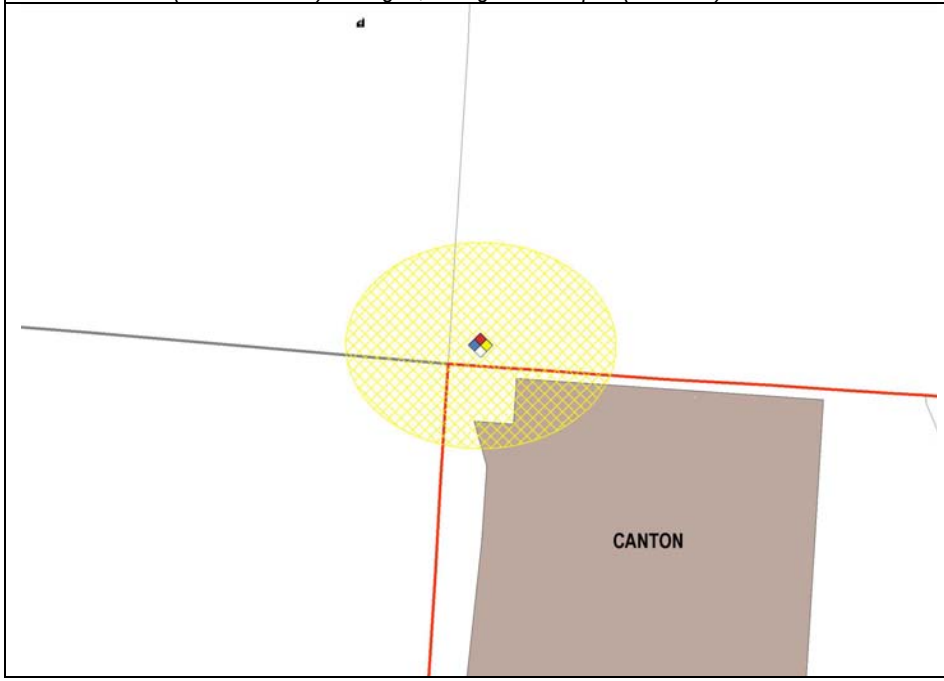


Total Structures: 1 Total Impacted Population: 2
Stormwater Inlets: 0

The following community assets lie within the impacted area of the scenario.

- Speedway 336 (Covered Facility)

Scenario: State Route 172 and US Route 30, 330' Isolation *Latitude/Longitude: 40.789313, -81.319911* *Chemicals (SMALL SPILL): Nitrogen, Refrigerated Liquid (UN 1977)*	Monitored Hours: Seven Fire District(s): Canton, Canton Township

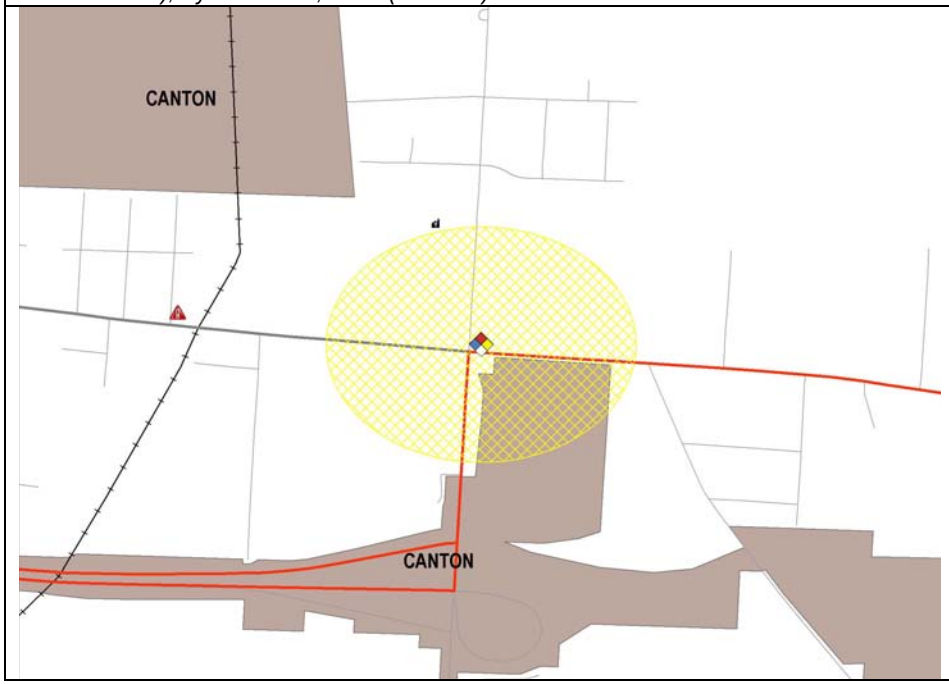


Total Structures: 5 Total Impacted Population: 20
Stormwater Inlets: 0

The following community assets lie within the impacted area of the scenario.

- Speedway 336 (Covered Facility)

Scenario: State Route 172 and US Route 30, 1,000' Isolation *Latitude/Longitude: 40.789313, -81.319911* *Chemicals (SMALL SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Alcohols, n.o.s. (UN 1987); Petroleum Distillates, n.o.s. (UN 1268); Hydrocarbons, n.o.s. (UN 3295)*	Monitored Hours: Seven Fire District(s): Canton, Canton Township

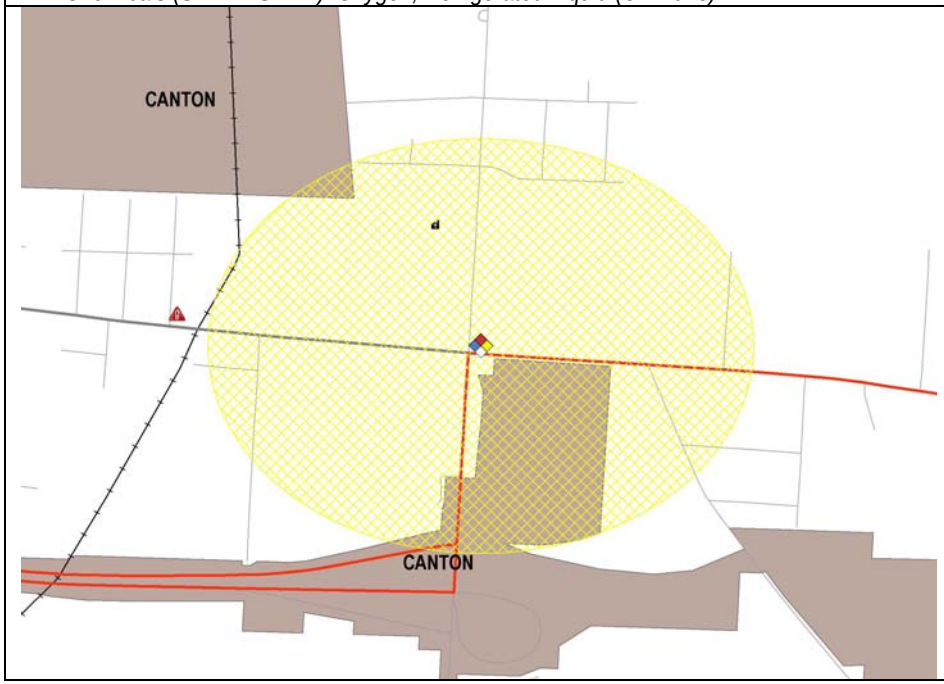


Total Structures: 20 Total Impacted Population: 130
Stormwater Inlets: 5

The following community assets lie within the impacted area of the scenario.

- Speedway 336 (Covered Facility)

Scenario: State Route 172 and US Route 30, 1,760' Isolation *Latitude/Longitude: 40.789313, -81.319911* *Chemicals (SMALL SPILL): Oxygen, Refrigerated Liquid (UN 1073)*	Monitored Hours: Seven Fire District(s): Canton, Canton Township



Total Structures: 98 Total Impacted Population: 636
Stormwater Inlets: 26

The following community assets lie within the impacted area of the scenario.

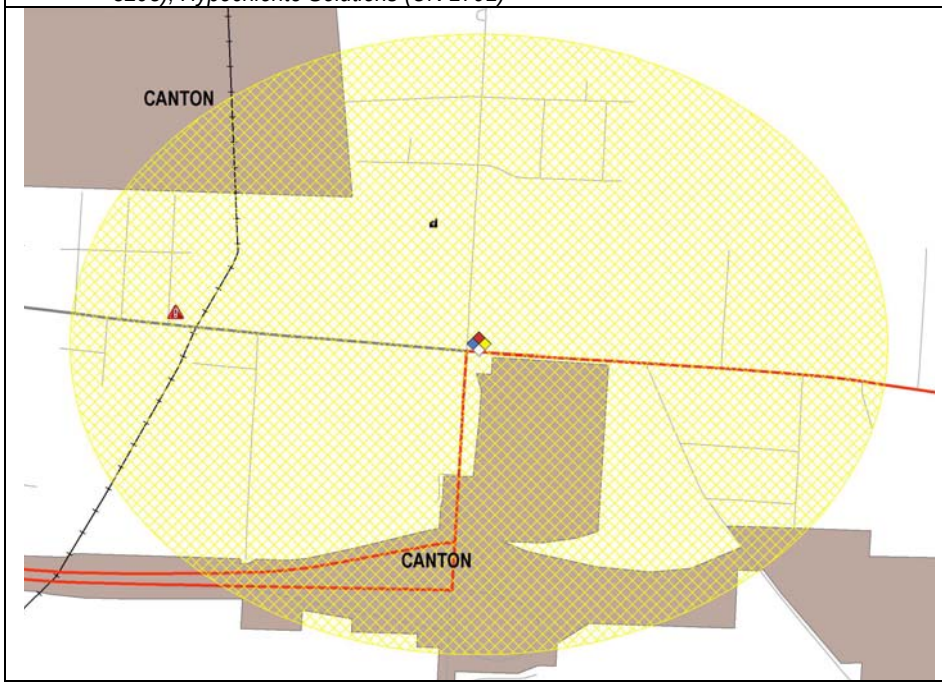
- Living Hope Church of Christ (Place of Worship)
- Speedway 336 (Covered Facility)

Scenario: State Route 172 and US Route 30, ½ mile Isolation

Latitude/Longitude: 40.789313, -81.319911

Chemicals (LARGE SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Oxygen, Refrigerated Liquid (UN 1073); Alcohols, n.o.s. (UN 1987); Nitrogen, Refrigerated Liquid (UN 1977); Petroleum Distillates, n.o.s. (UN 1268); Hydrocarbons, n.o.s. (UN 3295); Hypochlorite Solutions (UN 1791)

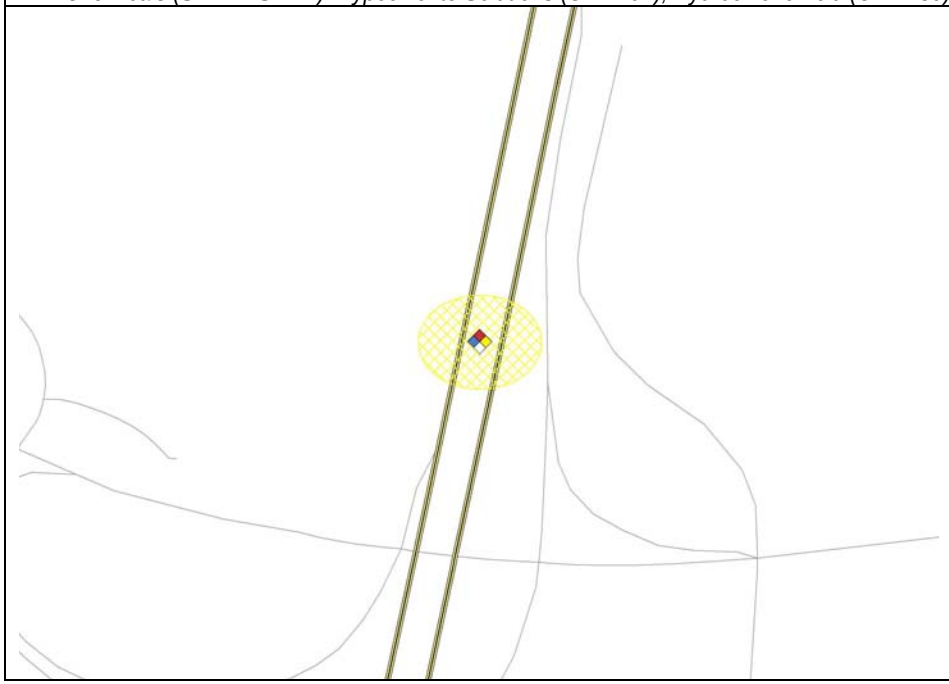
Monitored Hours: Seven
Fire District(s): Canton, Canton Township



Total Structures: 226
Total Impacted Population: 1,467
Stormwater Inlets: 80

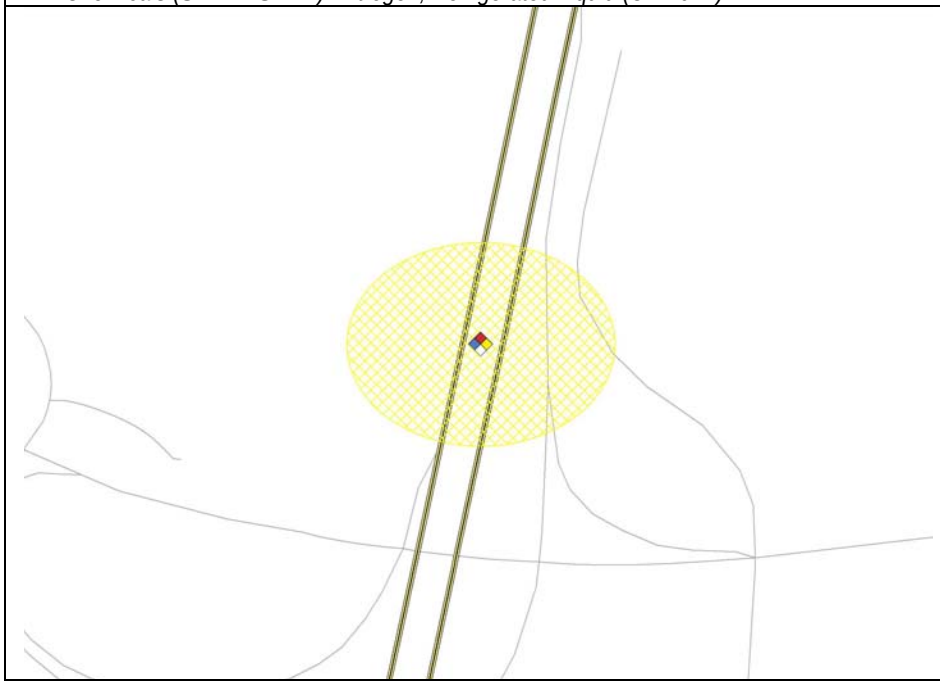
The following community assets lie within the impacted area of the scenario.

- Living Hope Church of Christ (Place of Worship)
- Speedway 336 (Covered Facility)

Scenario: Interstate 77, 150' Isolation *Latitude/Longitude: 40.899919, -81.430000* *Chemicals (SMALL SPILL): Hypochlorite Solutions (UN 1791); Hydrochloric Acid (UN 1789)*	Monitored Hours: Eight Fire District: Jackson Township
	Total Structures: 0 Total Impacted Population: 0 Stormwater Inlets: 0 No community assets lie within the impacted area of the scenario.

Scenario: Interstate 77, 330' Isolation
Latitude/Longitude: 40.899919, -81.430000
Chemicals (SMALL SPILL): Nitrogen, Refrigerated Liquid (UN 1977)

Monitored Hours: Eight
Fire District: Jackson Township



Total Structures: 0
Total Impacted Population: 0
Stormwater Inlets: 0

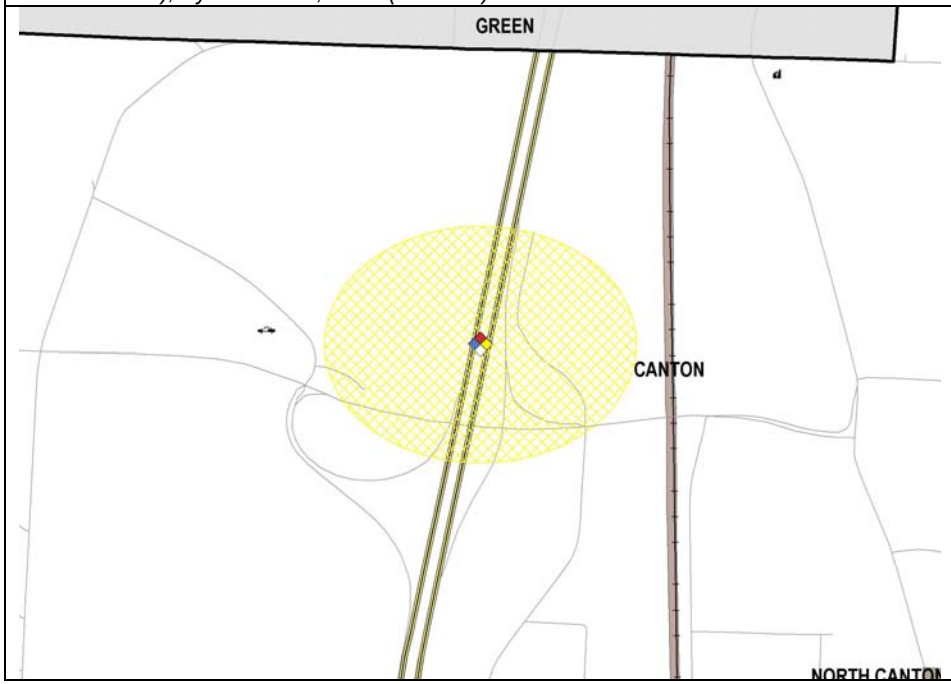
No community assets lie within the impacted area of the scenario.

Scenario: Interstate 77, 1,000' Isolation

Latitude/Longitude: 40.899919, -81.430000

Chemicals (SMALL SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Alcohols, n.o.s. (UN 1987); Petroleum Distillates, n.o.s. (UN 1268); Hydrocarbons, n.o.s. (UN 3295)

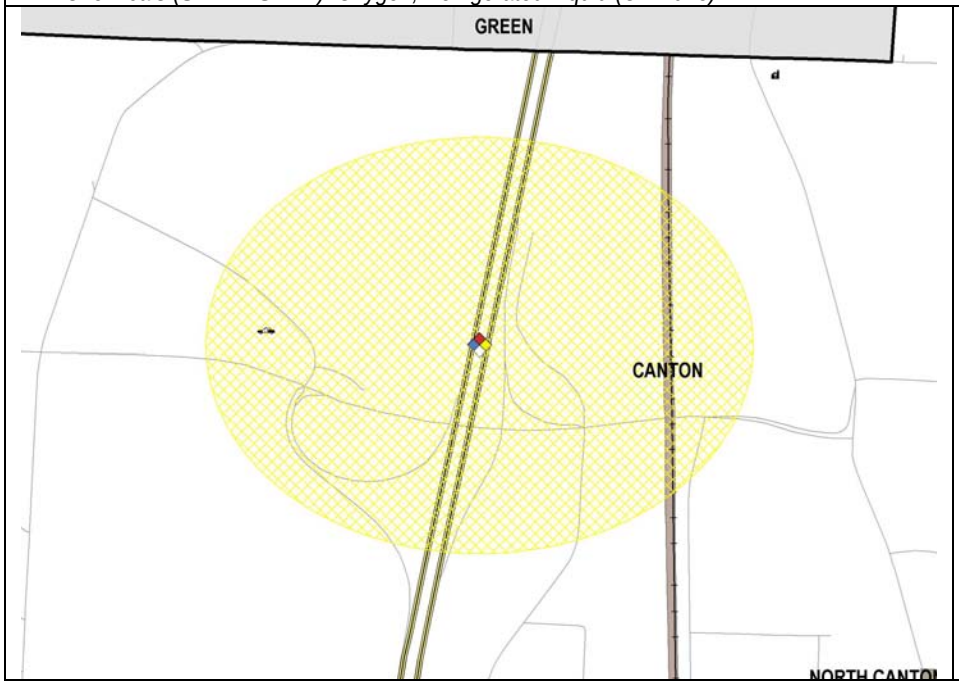
Monitored Hours: Eight
Fire District: Jackson Township



Total Structures: 4
Total Impacted Population: 26
Stormwater Inlets: 8

No community assets lie within the impacted area of the scenario.

Scenario: Interstate 77, 1,760' Isolation *Latitude/Longitude: 40.899919, -81.430000* *Chemicals (SMALL SPILL): Oxygen, Refrigerated Liquid (UN 1073)*	Monitored Hours: Eight Fire District(s): Canton, Jackson Township



Total Structures: 23 Total Impacted Population: 149
Stormwater Inlets: 36

The following community assets lie within the impacted area of the scenario.

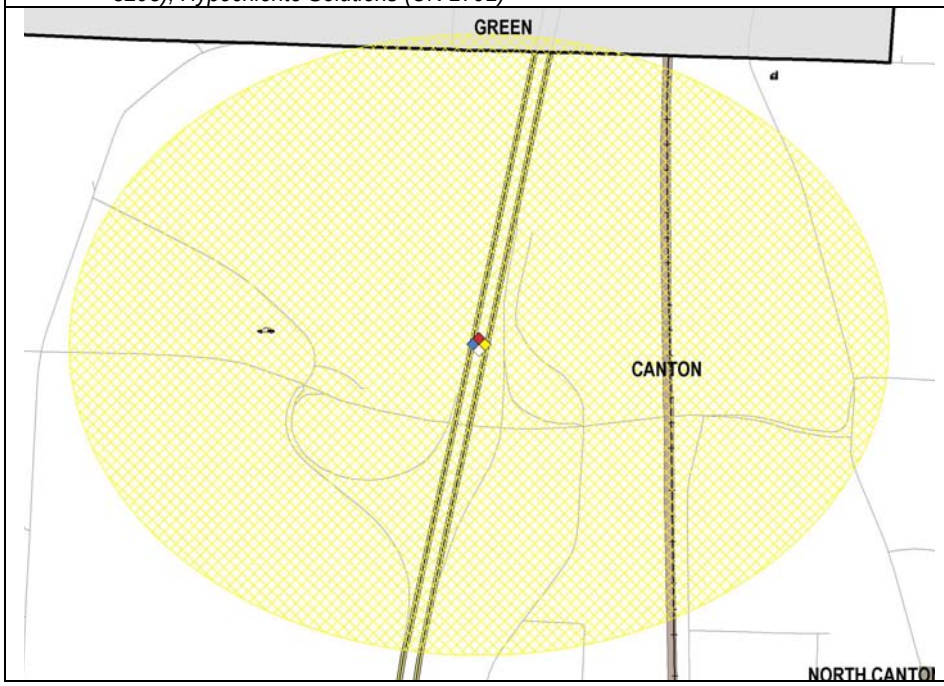
- Ohio State Highway Patrol, Canton (Law Enforcement)
- Performance Health, LLC (Covered Facility)

Scenario: Interstate 77, ½ mile Isolation

Latitude/Longitude: 40.899919, -81.430000

Chemicals (LARGE SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Oxygen, Refrigerated Liquid (UN 1073); Alcohols, n.o.s. (UN 1987); Nitrogen, Refrigerated Liquid (UN 1977); Petroleum Distillates, n.o.s. (UN 1268); Hydrocarbons, n.o.s. (UN 3295); Hypochlorite Solutions (UN 1791)

Monitored Hours: Eight
Fire District(s): Canton, Jackson Township



Total Structures: 94
Total Impacted Population: 610
Stormwater Inlets: 105

The following community assets lie within the impacted area of the scenario.

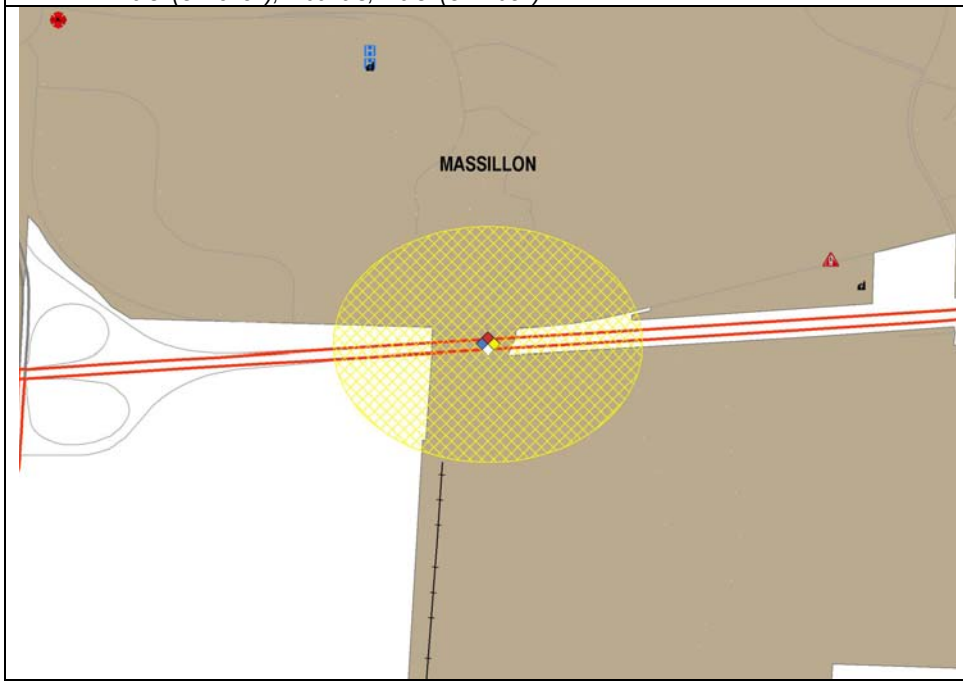
- Ohio State Highway Patrol, Canton (Law Enforcement)
- Performance Health, LLC (Covered Facility)
- Rentwear, Inc. (Covered Facility)
- Stolle Machinery (Covered Facility)
- TestAmerica Laboratories (Covered Facility)
- The Timken Company, World Headquarters (Covered Facility)

Scenario: US Route 30, 1,000' Isolation

Latitude/Longitude: 40.761597, -81.505175

Chemicals (SMALL SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Alcohols, n.o.s. (UN 1987)

Monitored Hours: Seven
Fire District(s): Massillon, Perry Township



Total Structures: 3
Total Impacted Population: 7
Stormwater Inlets: 0

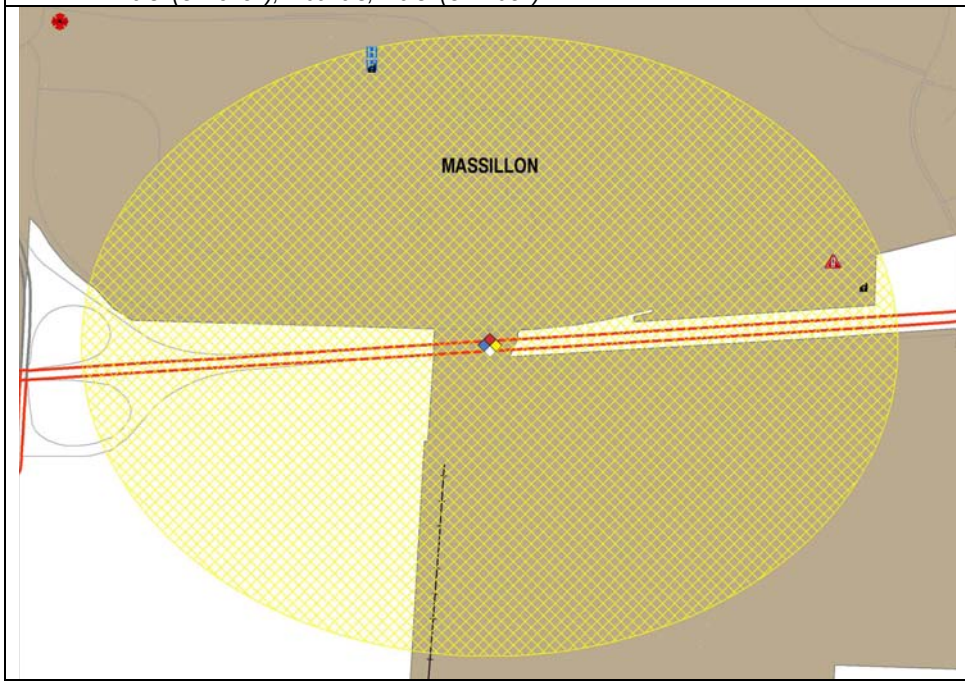
No community assets lie within the impacted area of the scenario.

Scenario: US Route 30, ½ mile Isolation

Latitude/Longitude: 40.761597, -81.505175

Chemicals (LARGE SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Alcohols, n.o.s. (UN 1987)

Monitored Hours: Seven
Fire District(s): Massillon, Perry Township

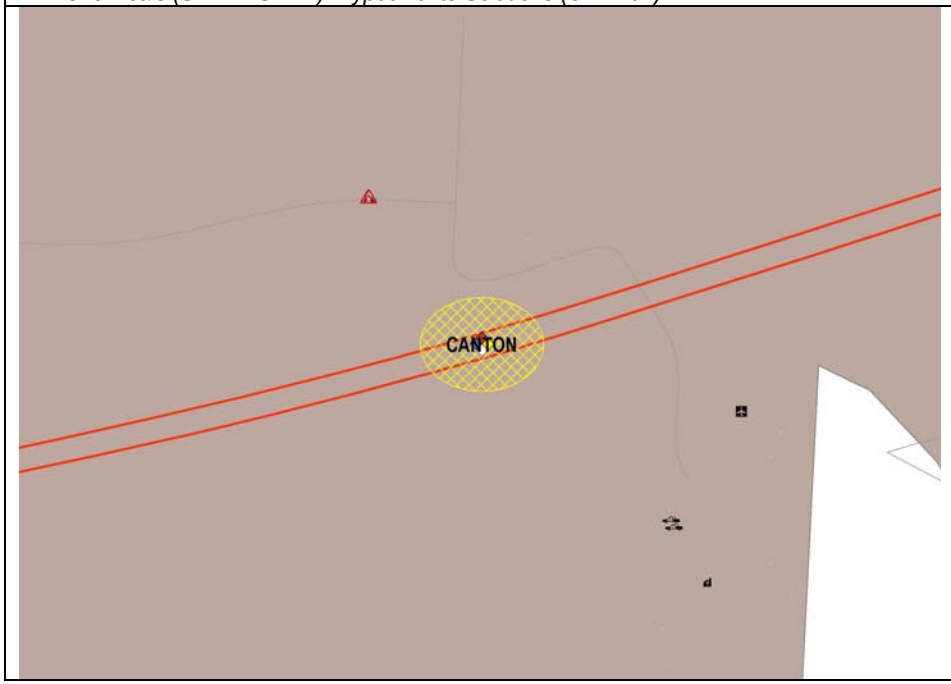


Total Structures: 21
Total Impacted Population: 136
Stormwater Inlets: 0

The following community assets lie within the impacted area of the scenario.

- Baker Hughes Petrolite, LLC (Covered Facility)
- BJ Services (Covered Facility)
- Heartland Behavioral Health (Healthcare Facility)
- Jehovah's Witnesses, East Massillon (Place of Worship)
- Massillon Psychiatric (Clinic)
- Sherwin-Williams, Massillon (Covered Facility)
- St. Dymphna National Shrine (Place of Worship)

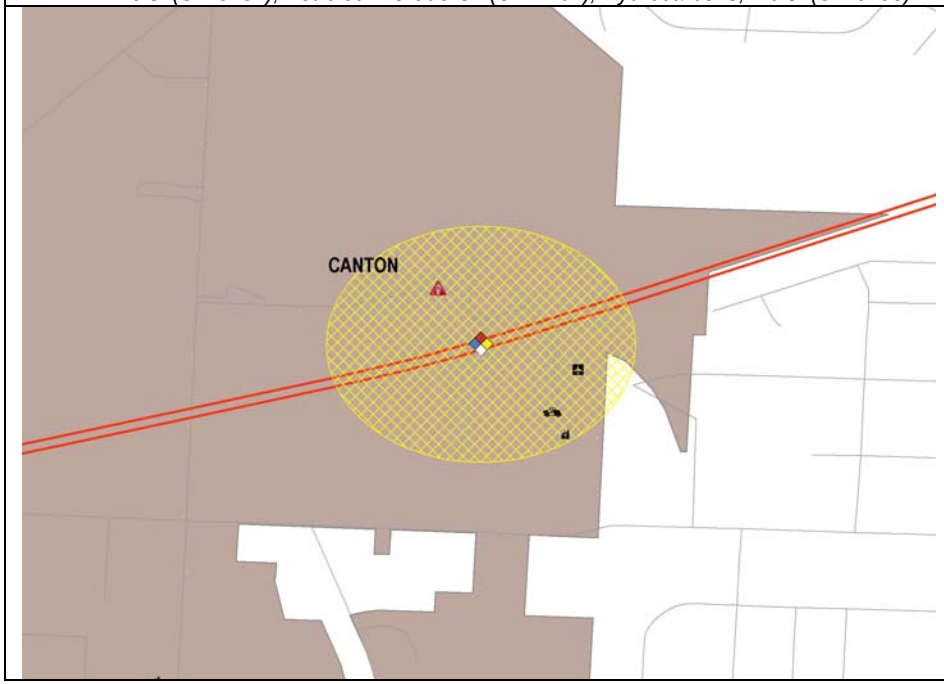
Scenario: US Route 62 North, 150' Isolation *Latitude/Longitude: 40.840778, -81.310576* *Chemicals (SMALL SPILL): Hypochlorite Solutions (UN 1791)*	Monitored Hours: Four Fire District: Canton



Total Structures: 0 Total Impacted Population: 0
Stormwater Inlets: 0

No community assets lie within the impacted area of the scenario.

Scenario: US Route 62 North, 1,000' Isolation *Latitude/Longitude: 40.840778, -81.310576* *Chemicals (SMALL SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Hydrocarbons, n.o.s. (UN 3295)*	Monitored Hours: Four Fire District(s): Canton, Plain Township, Nimishillen



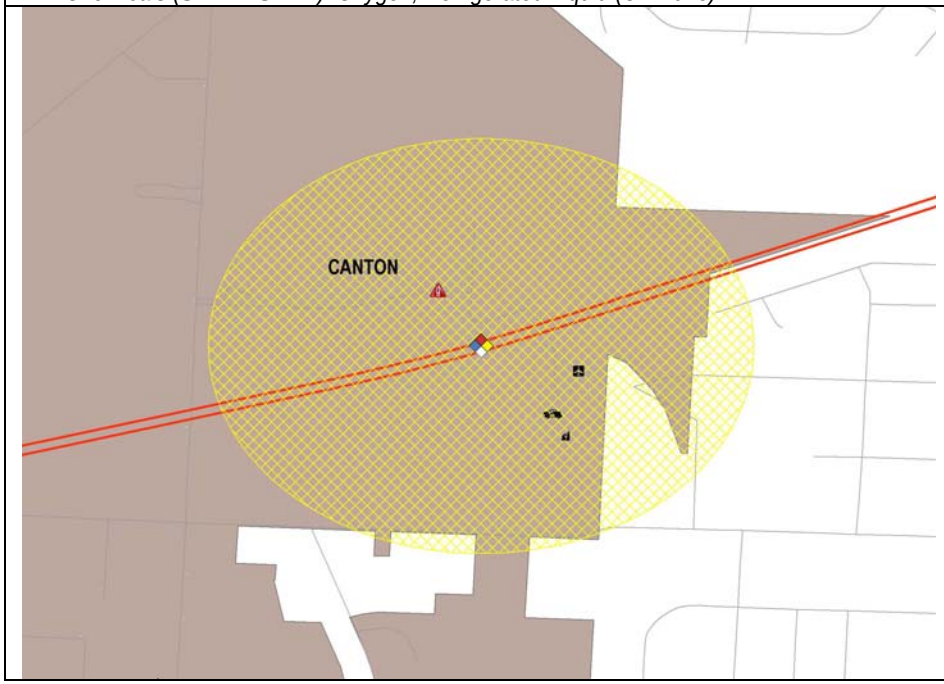
Total Structures: 7
Total Impacted Population: 45
Stormwater Inlets: 5

The following community assets lie within the impacted area of the scenario.

- Stark County Coroner's Office (Government Facility)
- Stark County Sheriff's Department (Law Enforcement)
- Stark Jail Ministry (Place of Worship)
- Stark Sheriff Helipad (Airfields & Helipads)

Scenario: US Route 62 North, 1,760' Isolation
Latitude/Longitude: 40.840778, -81.310576
Chemicals (SMALL SPILL): Oxygen, Refrigerated Liquid (UN 1073)

Monitored Hours: Four
Fire District(s): Canton, Plain Township, Nimishillen



Total Structures: 45
Total Impacted Population: 292
Stormwater Inlets: 17

The following community assets lie within the impacted area of the scenario.

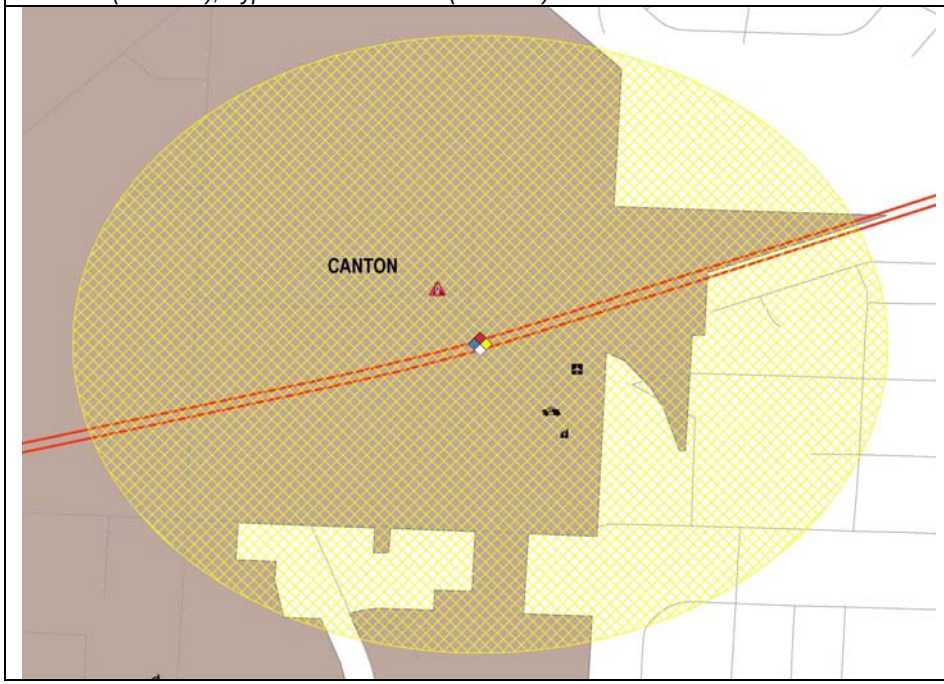
- Stark County Coroner's Office (Government Facility)
- Stark County Sheriff's Department (Law Enforcement)
- Stark Jail Ministry (Place of Worship)
- Stark Sheriff Helipad (Airfields & Helipads)

Scenario: US Route 62 North, ½ mile Isolation

Latitude/Longitude: 40.840778, -81.310576

Chemicals (LARGE SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Oxygen, Refrigerated Liquid (UN 1073); Hydrocarbons, n.o.s. (UN 3295); Hypochlorite Solutions (UN 1791)

Monitored Hours: Four
Fire District(s): Canton, Plain Township, Nimishillen

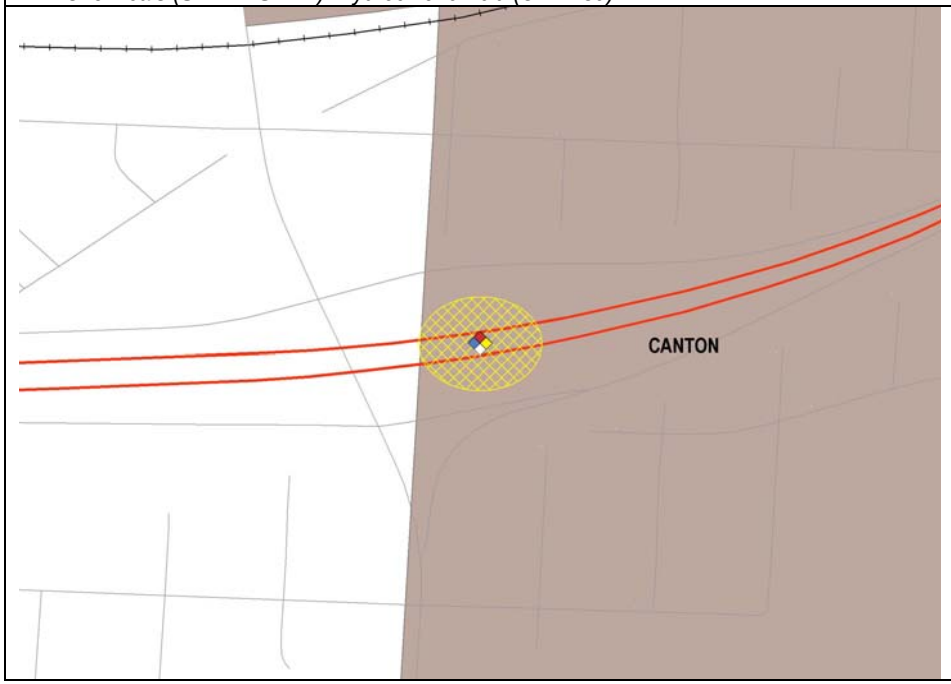


Total Structures: 247
Total Impacted Population: 1,603
Stormwater Inlets: 53

The following community assets lie within the impacted area of the scenario.

- Crown Castle 840379, Kirby Avenue (Covered Facility)
- Stark County Coroner's Office (Government Facility)
- Stark County Sheriff's Department (Law Enforcement)
- Stark Jail Ministry (Place of Worship)
- Stark Sheriff Helipad (Airfields & Helipads)

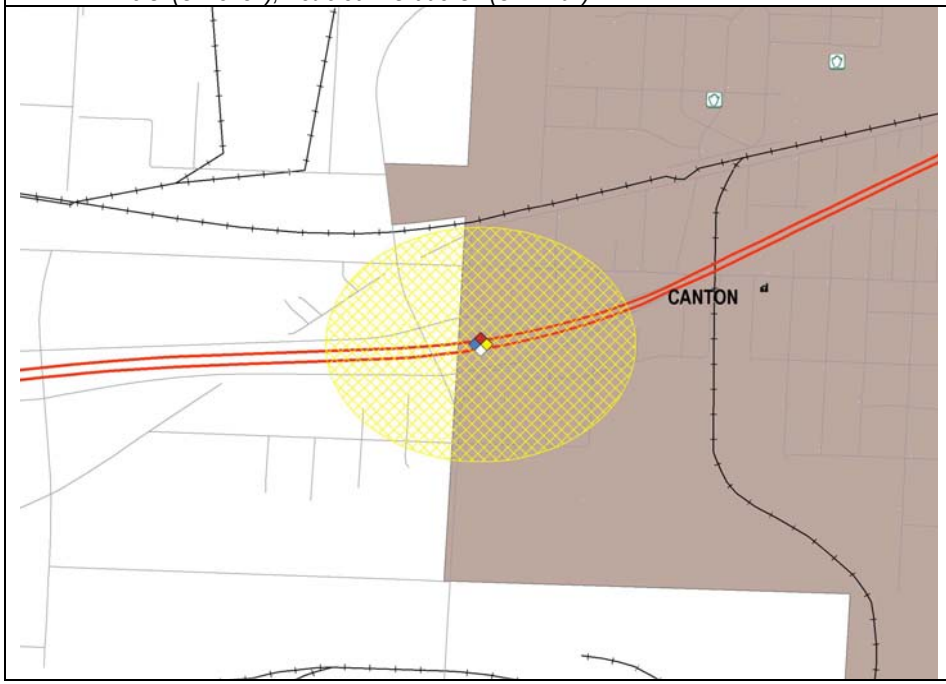
Scenario: US Route 62 South, 150' Isolation *Latitude/Longitude: 40.779182, -81.417536* *Chemicals (SMALL SPILL): Hydrochloric Acid (UN 1789)*	Monitored Hours: Four Fire District: Canton



Total Structures: 0 Total Impacted Population: 0
Stormwater Inlets: 0

No community assets lie within the impacted area of the scenario.

Scenario: US Route 62 South, 1,000' Isolation *Latitude/Longitude: 40.779182, -81.417536* *Chemicals (SMALL SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267)*	Monitored Hours: Four Fire District(s): Canton, Canton Township



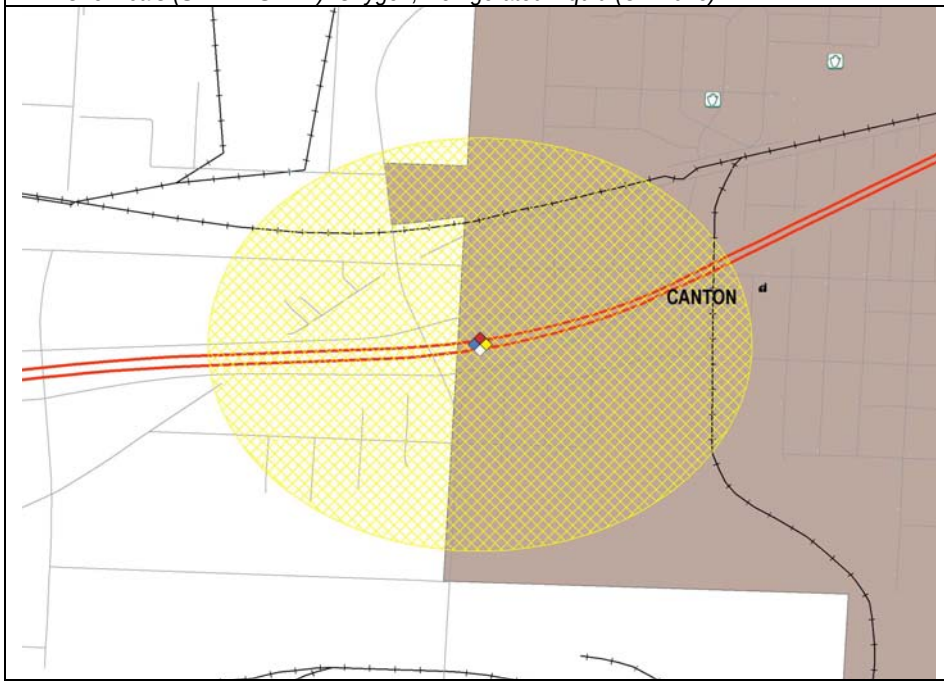
Total Structures: 73 Total Impacted Population: 474
Stormwater Inlets: 20

The following community assets lie within the impacted area of the scenario.

- Speedway 9400 (Covered Facility)

Scenario: US Route 62 South, 1,760' Isolation
Latitude/Longitude: 40.779182, -81.417536
Chemicals (SMALL SPILL): Oxygen, Refrigerated Liquid (UN 1073)

Monitored Hours: Four
Fire District(s): Canton, Canton Township



Total Structures: 171
Total Impacted Population: 1,110
Stormwater Inlets: 47

The following community assets lie within the impacted area of the scenario.

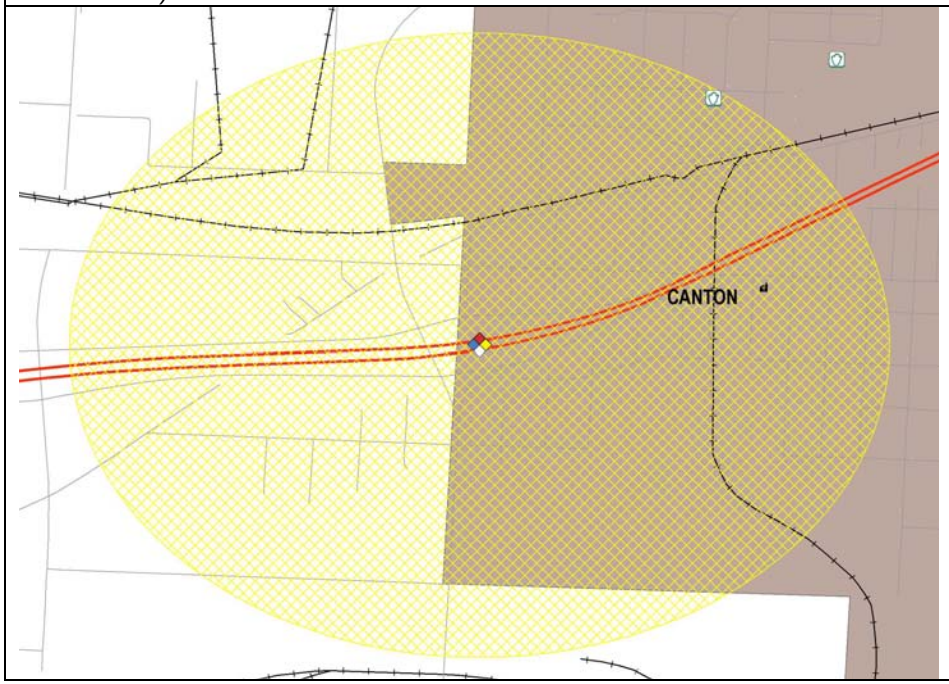
- Lustrous Metal Coatings, Inc. (Covered Facility)
- Speedway 9400 (Covered Facility)
- W.L. Logan Trucking Company (Covered Facility)

Scenario: US Route 62 South, ½ mile Isolation

Latitude/Longitude: 40.779182, -81.417536

Chemicals (LARGE SPILL): Gasoline (UN 1203); Flammable Liquids, n.o.s. (UN 1993); Elevated Temperature Liquids, n.o.s. (UN 3257); Petroleum Crude Oil (UN 1267); Oxygen, Refrigerated Liquid (UN 1073); Hydrochloric Acid (UN 1789)

Monitored Hours: Four
Fire District(s): Canton, Canton Township



Total Structures: 495
Stormwater Inlets: 68

Total Impacted Population: 3,212

The following community assets lie within the impacted area of the scenario.

- All Nations Tabernacle (Place of Worship)
- Canton Erectors, Inc. (Covered Facility)
- Frito-Lay, Inc. (Covered Facility)
- Lustrous Metal Coatings, Inc. (Covered Facility)
- Marathon Petroleum Company, LP, Ohio Refining Division (Covered Facility)
- Maryland Park (Parks & Recreation)
- Mast Trucking, Inc., Canton Yard (Covered Facility)
- Ohio Tar & Asphalt Division, Central Allied Enterprises, Inc. (Covered Facility)
- Speedway 9400 (Covered Facility)
- The Timken Company, Gambrinus Roller Plant (Covered Facility)
- Timken Steel Corp., Gambrinus Steel Plant (Covered Facility)
- W.L. Logan Trucking Company (Covered Facility)

2.7 Conclusions

Though conclusions based on one of many analysis can be misleading, for planning purposes, highway data suggested the following.

- National hazardous material incident trends *generally* predicted the hazardous materials seen locally.
  - Confirmations
    - Class 3 (Flammable Liquids) are involved in the most incidents nationally and were the most frequently recorded materials in the Stark County.
    - Class 2 (Gases), which includes non-flammable gases ranked third nationally in incidents and were the third-most frequently-recorded materials in Stark County.

  - **Deviation:** Class 8 (Corrosives) comprised the second-most incidents nationally, yet were observed fourth-most in Stark County.

- As expected, monitoring along Interstate 77 yielded the most varied data. I-77 is the route likely taken by shippers passing through Stark County.
- The location of covered facilities also influenced the types of materials noted during the highway analysis. For example, 13.9% of the placards at the US Route 62 (South) site, near the Marathon facility, were petroleum crude oil.
- Though the highway analysis identified trucks carrying all U.S. DOT hazard classes except Class 7 (Radioactive), Class 3 (Flammable Liquids) was by far the most-observed class. As such, responders are most likely to face highway-based hazardous materials incidents involving flammable liquids.

3.0 RAILWAY ANALYSIS

3.1 Statistics

Since the middle of the 19th century, railroads have been active players in the transport of large quantities of commodities because of their low cost and relative speed. As the transport of hazardous materials has increased on roadways, so too have railways seen an increase in their transport.

The Federal Railroad Administration (FRA) compiles statistics on the causes of train accidents. Table 3.2.1 illustrates the cause of train accidents from 2009 to 2018 (http://safetydata.fra.dot.gov/officeofsafety/default.aspx).

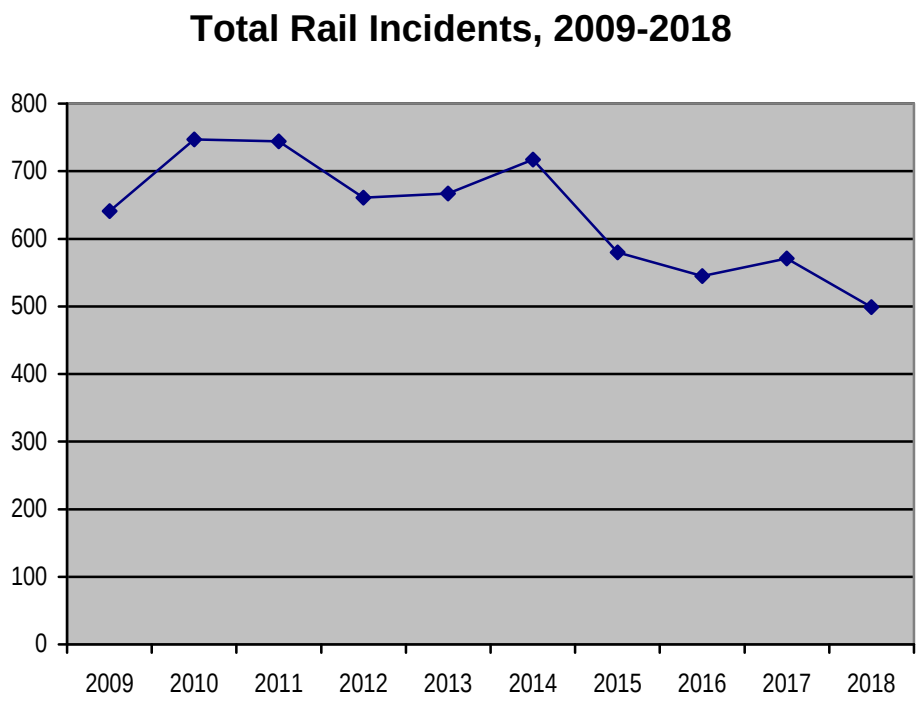
Table 3.1.1

Cause of Train Accidents 2009-2018

Cause	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Track, Roadbed, Structures	671	674	695	591	570	545	531	476	469	538
Signal & Communications	52	67	33	48	54	47	54	41	45	50
Mechanical or Electrical Failure	268	250	236	208	230	240	264	243	240	263
Human Factor	656	650	752	666	713	743	762	632	651	685
Miscellaneous Causes	265	261	316	252	286	309	320	242	488	533
TOTALS	1,912	1,902	2,032	1,765	1,853	1,884	1,931	1,634	1,893	2,069

The U.S. Department of Transportation (DOT) reports that the number of railroad accidents involving hazardous materials has steadily decreased. Figure 3.1.a depicts railway accident trends for the previous ten years. (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

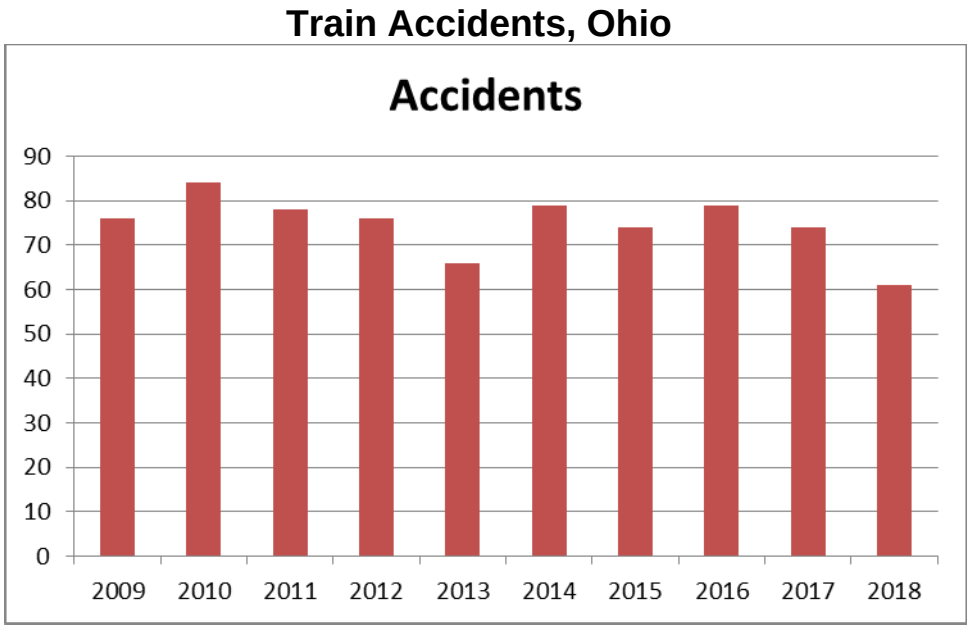
Figure 3.1.a



The number of rail hazardous material accidents, as can be seen, is low. 99.999% of rail shipments involving hazardous materials reach their destination without incident. Rail hazmat accident rates are down 94% since 1980, 62% since 2000, and 41% since 2008 (Association of American Railroads, https://www.aar.org/Pages/Railroads-Deliver-Hazardous-Materials-Safely.aspx.)

Figure 3.1.b depicts the total number of train accidents in Ohio during the period 2009 to 2018 (FRA, http://safetydata.fra.dot.gov/officeofsafety/publicsite/Query/stchart.aspx).

Figure 3.1.b



Further, according to the FRA, there have been a total of 174 railroad accidents/incidents in Stark County since 2009 (http://safetydata.fra.dot.gov/officeofsafety/publicsite/Query/tenyr2a.aspx). The most accidents occurred in 2011 with 22. Seven deaths occurred within the 10-year study.

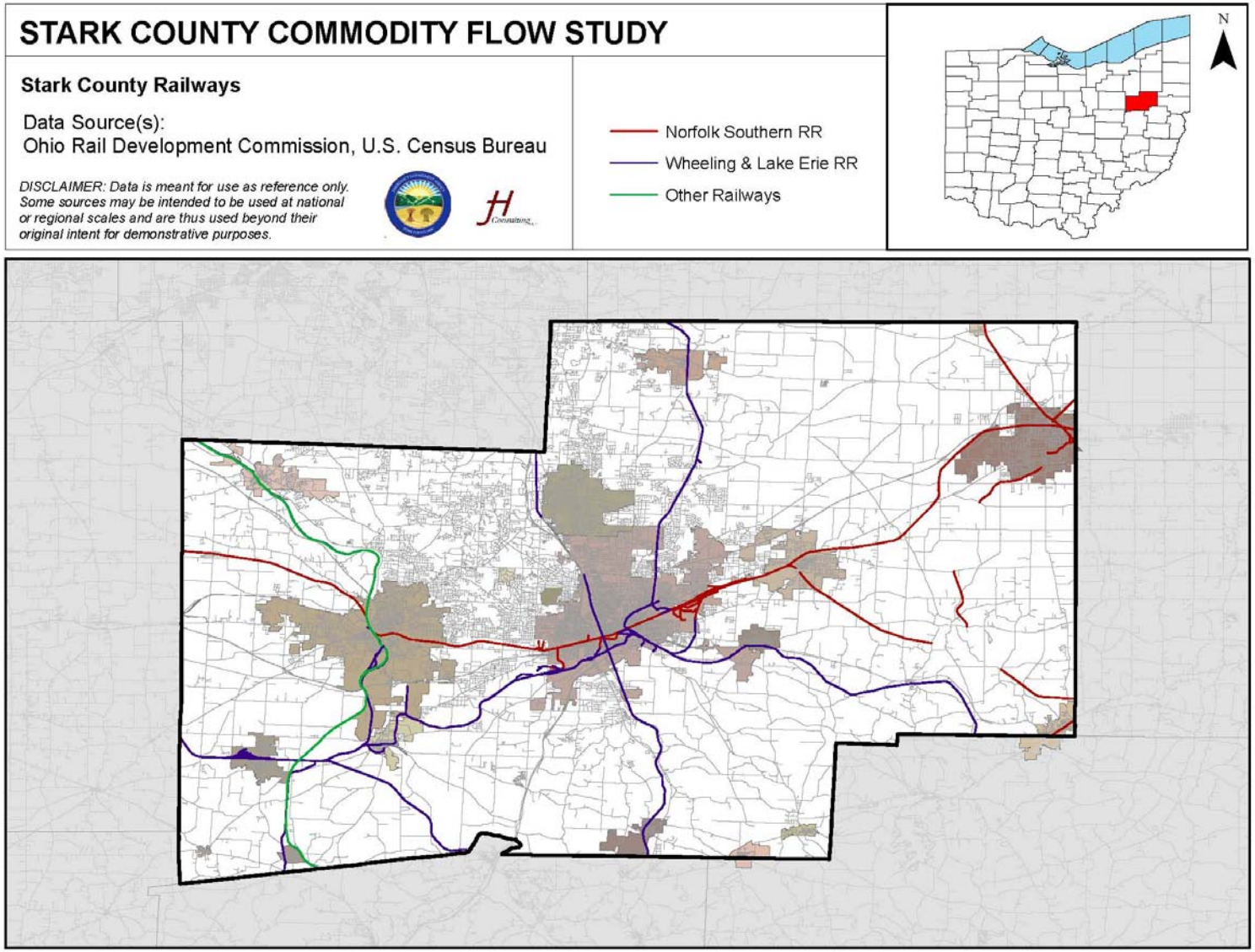
3.2 Methodology

Planners collected rail data primarily through coordination with the prominent rail companies operating in Stark County. The Stark County Emergency Management Agency officially contacted CSX Transportation, Norfolk Southern, and Wheeling & Lake Erie Railway representatives to gather commodity flow information.

3.3 Field Data

Four companies conduct commodity shipping by rail in Stark County: CSX Transportation, Genesee & Wyoming, Inc., Norfolk Southern Railroad, and Wheeling & Lake Erie Railway. Figure 3.3.a depicts rail lines in Stark County.

Figure 3.3.a


STARK COUNTY COMMODITY FLOW STUDY
Stark County Railways
Data Source(s):
Ohio Rail Development Commission, U.S. Census Bureau
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Norfolk Southern RR
Wheeling & Lake Erie RR
Other Railways
N

Norfolk Southern and Wheeling & Lake Erie provided statistics regarding hazardous material transport via rail in Stark County, which represents a 50.00% response rate. Table 3.3.1 through 3.3.7 are taken directly from the company submissions. Data in the tables represents the most current 12 month period provided by the shipper.

Table 3.3.1

Hazardous Materials Transported via Rail in Stark County – Norfolk Southern (Alliance)

Material	Hazard Class	UN Number	HMRC	Carloads
FAK-Hazardous Materials	FAK	N/A	4950150	86,265
Alcohols, N.O.S.	3	1987	4909152	38,131
Petroleum Crude Oil	3	1267	4910165	30,789
FAK-Hazardous Materials	FAK	N/A	4950130	30,336
Petroleum Crude Oil	3	1267	4910191	14,690
Combustible Liquid, N.O.S.	3	1993	4914109	5,024
Fuel Oil	3	1993	4914168	3,325
Petroleum Gases, Liquefied	2	1075	4905752	3,318
FAK-Hazardous Materials	FAK	N/A	4950110	3,078
Elevated Temperature Liquid	9	3257	4961605	2,721
Vinyl Chloride, Stabilize	2	1086	4905792	2,086
Propylene	2	1077	4905782	1,892
Propane	2	1075	4905421	1,560
Sulfuric Acid, Spent	8	1832	4930042	1,356
Ethanol	3	1170	4909159	1,250
Environmentally Hazardous. Liquid	9	3082	4960196	1,249
Environmentally Hazardous, solid	9	3077	4960133	1,206
Hydrocarbons, Liquid, N.O.S.	3	3295	4907439	1,155
Environmentally Hazardous, Liquid	9	3082	4960131	972
Sulfuric Acid	8	1830	4930040	925
Benzene	3	1114	4908110	908
Hazardous Waste, Solid, N	9	3077	4860102	855
Environmentally Hazardous	9	3077	4962125	824
Butane	2	1075	4905424	777
Hydrochloric Acid	8	1789	4930228	737
Petroleum Sour Crude Oil,	3	3494	4910599	602
Methyl Methacrylate Monomer	3	1247	4907250	583
Other Regulated Substance	9	3082	4966109	581
Butyl Acrylates, Stabilized	3	2348	4912215	574
Isobutane	2	1075	4905430	447
Butane	2	1075	4905423	430
Batteries, Wet, Filled Wi	8	2794	4936556	408
Phenol, Molten	6	2312	4921598	400
Cartridges For Weapons,	N/A	XX12	4903170	390
Carbon Dioxide, Refrigerated	2	2187	4904509	365
Methanol	3	1230	4909230	320
Battery Fluid, Acid	8	2796	4930216	307

Material	Hazard Class	UN Number	HMRC	Carloads
Combustible Liquid, N.O.S.	3	1993	4914108	294
Ferric Chloride, Solution	8	2582	4932342	268
Toluene	3	1294	4909305	254
Corrosive Liquid, Acidic,	8	3265	4931466	222
Acetone	3	1090	4908105	219
Sodium Hydroxide Solution	8	1824	4935240	213
Environmentally Hazardous, Liquid	9	3082	4960160	202
Xylenes	3	1307	4909348	195
Sodium Nitrate	5	1498	4918746	194
Fish Meal, Stabilized	9	2216	4945328	190
Fireworks	1	336	4903520	184
Waste Polychlorinated	9	3432	4845195	181
Styrene Monomer, Stabilized	3	2055	4907265	179
Ferrous Chloride, Solution	8	1760	4932329	172
Elevated Temperature Liquid	9	3257	4961615	171
Paint	3	1263	4910101	162
Polymeric Beads, Expandable	9	2211	4941144	145
Environmentally Hazardous, Liquid	9	3082	4960121	144
Butane	2	1075	4905789	141
Flammable Liquids, N.O.S.	3	1993	4907876	132
Ethylene Oxide	2	1040	4920353	130
Isopropanol	3	1219	4909205	120
Ethyl Acrylate, Stabilize	3	1917	4907215	117
Flammable Liquids, N.O.S.	3	1993	4910185	117
Benzyl Chloride	6	1738	4921209	116
Freight All Kinds, Hazard	FAK	N/A	4850150	115
Acrylamide Solution	6	3428	4925151	110
Ammonia, Anhydrous	2	1005	4920359	105
Diesel Fuel	3	1993	4914166	104
Pyridine	3	1282	4909277	103
Aerosols	2	1950	4905709	102
Hydrogen Peroxide, Aqueous	5	2014	4918775	99
Paint	3	1263	4910251	97
Environmentally Hazardous, Liquid	9	3082	4960186	94
Ammonia Solutions	8	2672	4935280	93
Environmentally Hazardous, Liquid	9	3082	4963330	91
Lighters	2	1057	4905726	90
Resin Solution	3	1866	4910280	90
Corrosive Liquids, N.O.S.	8	1760	4932330	87
Radioactive Material, Low	7	2912	4929105	85
Extracts, Flavoring, Liquid	3	1197	4910181	83
Petroleum Distillates, N.	3	1268	4914256	83
Corrosive Liquids, Toxic,	8	2922	4936015	82
Isobutylene	2	1055	4905748	81
1,1,1,2-Tetrafluoroethane	2	3159	4904304	79
Lithium Ion Batteries	9	3480	4966703	79
Elevated Temperature Liquid	9	3257	4961602	77
Lithium Ion Batteries Con	9	3481	4966704	76
Fluorosilicic Acid	8	1778	4930026	74
Environmentally Hazardous	9	3077	4961310	74
Radioactive Material,	7	2908	4929139	73

Material	Hazard Class	UN Number	HMRC	Carloads
Environmentally Hazardous	9	3077	4960104	72
Heptanes	3	1206	4909190	70
Ammonium Nitrate Based Fe	5	2067	4918310	70
Corrosive Liquids, N.O.S.	8	1760	4930201	69
Potassium Hydroxide, Solution	8	1814	4935230	69
1-Chloro-1,1-Difluoro- Et	2	2517	4905720	68
Tripropylene	3	2057	4909249	68
Isopropenylbenzene	3	2303	4912631	67
Elevated Temperature Liquid	3	3256	4912818	67
Sulfur, Molten	9	2448	4945770	65
Aerosols	2	1950	4904258	64
Environmentally Hazardous, Liquid	9	3082	4963705	62
Ethanolamine	8	2491	4935665	61
Flammable Liquids, N.O.S.	3	1993	4909219	60
Alcoholic Beverages	3	3065	4910102	60
1,1-Difluoroethane	2	1030	4905716	59
Organic Peroxide Type F,	5	3109	4918982	59
Environmentally Hazardous	9	3077	4963399	58
Methacrylic Acid, Stabilized	8	2531	4930251	57
Adhesives	3	1133	4912604	56
Chlorine	2	1017	4920523	56
Radioactive Material, Low	7	2912	4929133	55
Esters, N.O.S.	3	3272	4907614	53
Ethanol	3	1170	4909118	53
Vehicle, Flammable Liquid	9	3166	4941147	52
Adhesives	3	1133	4910109	51
Perfumery Products	3	1266	4910423	51
Safety Devices	9	3268	4966333	51
Chemical Under Pressure,	2	3500	4904900	49
Isobutane	2	1075	4905753	49
Corrosive Liquid, Basic,	8	3267	4935263	49
Butanols	3	1120	4909130	48
Isocyanates, Toxic, N.O.S	6	2206	4921428	48
Amines, Liquid, Corrosive	8	2735	4935601	48
Environmentally Hazardous	9	3077	4961317	47
Gasoline	3	1203	4908177	46
Environmentally Hazardous, Liquid	9	3082	4960114	46
Fireworks	1	336	4903525	45
Phosphorus Trichloride	6	1809	4921016	45
Waste Environmentally Hazardous	9	3077	4875543	43
Carbon Dioxide	2	1013	4904535	43
Coal Tar Distillates, Fla	3	1136	4912236	43
Persulphates, Inorganic,	5	3215	4918526	43
Cresols, Liquid	6	2076	4921706	43
Vinyl Acetate, Stabilized	3	1301	4907270	42
Compressed Gas, N.O.S.	2	1956	4904515	41
Ethanol And Gasoline Mixt	3	3475	4908170	40
Nitric Acid	8	2031	4930223	39
Combustible Liquid, N.O.S	3	1993	4915185	38
Propionaldehyde	3	1275	4908270	37
Radioactive Material, Low	7	3321	4929137	37

Material	Hazard Class	UN Number	HMRC	Carloads
Environmentally Hazardous, Liquid	9	3082	4960159	35
Petroleum Distillates, N.	3	1268	4910242	33
Vehicle, Flammable Gas Po	9	3166	4961166	33
Corrosive Liquid, Acidic,	8	3264	4931463	32
Maleic Anhydride	8	2215	4936330	32
Environmentally Hazardous, Liquid	9	3082	4960137	32
Environmentally Hazardous, Solid	9	3077	4960197	32
Environmentally Hazardous, Liquid	9	3082	4961630	31
N-Propanol	3	1274	4909267	30
Elevated Temperature	9	3257	4961629	30
Environmentally Hazardous, Liquid	9	3082	4966312	30
Octanes	3	1262	4908188	29
Sodium Hydroxide, Solid	8	1823	4935235	29
Gasoline	3	1203	4908178	28
1-Methoxy-2-Propanol	3	3092	4909313	28
Petroleum Distillates, N.	3	1268	4910256	28
Sodium Dithionite	4	1384	4916179	28
Bisulfites, Aqueous Solution	8	2693	4932376	28
Waste Environmentally Hazardous	9	3077	4860133	27
Chlorodifluoromethane	2	1018	4904552	27
Ethyl Acetate	3	1173	4909160	27
Ethyl Methyl Ketone	3	1193	4909243	27
Toluidines, Solid	6	3451	4921431	27
Sodium Hydroxide Solution	8	1824	4935206	27
Hazardous Waste, Solid, N	9	3077	4875648	26
Combustible Liquid, N.O.S	3	1993	4913250	26
Toluene Diisocyanate	6	2078	4921575	26
Acetic Acid, Glacial	8	2789	4931303	26
Waste Flammable Liquids,	3	1993	4810118	25
Fire Extinguishers	2	1044	4904820	25
Corrosive Solid, Basic, I	8	3262	4935254	25
Butyl Acetates	3	1123	4909128	24
Hydrogen Fluoride, Anhydrous	8	1052	4930024	24
Formaldehyde Solutions	8	2209	4932003	24
Liquefied Petroleum Gas	2	1075	4905419	23
Flammable Solids, Organic	4	1325	4917332	23
N-Methylaniline	6	2294	4925137	23
Hydrazine Aqueous Solution	8	2030	4935030	23
Corrosive Liquids, N.O.S.	8	1760	4936540	23
Propylene Oxide	3	1280	4906620	21
Elevated Temperature Liquid	9	3257	4961620	21
Alcohols, N.O.S.	3	1987	4909103	21
Alcohols, Flammable, Toxic	3	1986	4910431	21
Alcohols, N.O.S.	3	1987	4913128	21
Extracts, Flavoring, Liquid	3	1197	4914181	21
Naphthalene, Molten	4	2304	4917473	21
Hydrogen Peroxide, Aqueous	5	2984	4918689	21
Dichloromethane	6	1593	4925131	21
Lithium Metal Batteries C	9	3091	4941165	21
Polychlorinated Biphenyls	9	3432	4945195	21
Hazardous Waste, Solid, N	9	3077	4860134	20

Material	Hazard Class	UN Number	HMRC	Carloads
Phosphoric Acid Solution	8	1805	4930205	20
Environmentally Hazardous	9	3082	4960215	20
Environmentally Hazardous	9	3082	4966317	20
Flammable Liquids, Toxic,	3	1992	4907419	19
Pentane-2,4-Dione	3	2310	4910554	19
Chlorotoluidines, Solid	6	2239	4925165	19
Elevated Temperature Liquid	9	3257	4960101	19
Environmentally Hazardous	9	3082	4960187	19
Air, Compressed	2	1002	4904501	18
Ethanol And Gasoline Mixt	3	3475	4908179	18
Isobutanol	3	1212	4909124	18
Isopropanol	3	1219	4909227	18
Paint Related Material	3	1263	4910150	18
Potassium Nitrate	5	1486	4918737	18
Sulfuric Acid	8	1830	4930039	18
Ferric Chloride, Anhydrous	8	1773	4936331	18
Corrosive Solids, Toxic,	8	2923	4936353	18
Environmentally Hazardous, Liquid	9	3082	4960168	18
Environmentally Hazardous, Liquid	9	3082	4960206	18
Acetonitrile	3	1648	4909202	17
Combustible Liquid, N.O.S.	3	1993	4915407	17
Corrosive Liquid, Basic,	8	3267	4931259	17
Life-Saving Appliances, S	9	2990	4941146	17
Elevated Temperature Liquid	9	3257	4961614	17
Gasoline	3	1203	4908175	16
Vinyltoluenes, Stabilized	3	2618	4912275	16
Chlorobenzyl Chlorides, L	6	2235	4925160	16
Elevated Temperature Liquid	9	3257	4960147	16
Aerosols, Flammable, N.O.	2	1950	4905719	15
Flammable Liquids, N.O.S.	3	1993	4906993	15
Combustible Liquid, N.O.S.	3	1993	4915473	15
Solids Containing Flammable	4	3175	4917344	15
Ammonium Nitrate, Liquid	5	2426	4918774	15
Thionyl Chloride	8	1836	4930061	15
Dangerous Goods In Machin	9	3363	4963325	15
Articles, Pressurized Pneumatic	2	3164	4904305	14
Butane	2	1011	4905702	14
Flammable Liquids, Corrosive	3	2924	4907829	14
Methyl Acetate	3	1231	4908220	14
Printing Ink	3	1210	4910205	14
Ethanol	3	1170	4910240	14
Extracts, Aromatic, Liquid	3	1169	4910364	14
Combustible Liquid, N.O.S.	3	1993	4913246	14
Organometallic Substance,	4	3399	4916335	14
Nitrocellulose With Alcohol	4	2556	4917171	14
Formic Acid	8	1779	4931320	14
Corrosive Solid, Acidic,	8	3260	4931461	14
Alkyl Sulfonic Acids, Liquid	8	2586	4932309	14
Corrosive Liquid, Basic,	8	3266	4935258	14
Elevated Temperature Liquid	9	3257	4960156	14
Battery-Powered Vehicle	9	3171	4961601	14

Material	Hazard Class	UN Number	HMRC	Carloads
Pentanes	3	1265	4908255	14
Waste Flammable Liquids,	3	1993	4810560	13
Fireworks	1	336	4903526	13
Tetrahydrofuran	3	2056	4908290	13
Chlorobenzotrifluorides	3	2234	4912060	13
Combustible Liquid, N.O.S	3	1993	4915181	13
Hydrogen Peroxide And Per	5	3149	4918810	13
2-(2-Aminoethoxy) Ethanol	8	3055	4935605	13
Difluoromethane	2	3252	4905444	12
Flammable Liquids, N.O.S.	3	1993	4909182	12
Methanol	3	1230	4909231	12
Petroleum Distillates, N.	3	1268	4909382	12
Alcoholic Beverages	3	3065	4910103	12
Combustible Liquid, N.O.S.	3	1993	4913111	12
Combustible Liquid, N.O.S.	3	1993	4915276	12
Metal Catalyst, Wetted	4	1378	4916160	12
Potassium Permanganate	5	1490	4918740	12
Battery Fluid, Acid	8	2796	4930217	12
Phosphoric Acid Solution	8	1805	4930247	12
Formaldehyde Solutions	8	2209	4932059	12
Amines, Solid, Corrosive,	8	3259	4936219	12
Benzaldehyde	9	1990	4961604	12
Compressed Gas N.O.S.	2	1956	4904132	11
Hypochlorite Solutions	8	1791	4932378	11
Amines, Liquid, Corrosive	8	2734	4935211	11
Zinc Chloride, Anhydrous	8	2331	4935697	11
Elevated Temperature	9	3257	4961606	11
Aerosols	2	1950	4904312	11
Heptafluoropropane	2	3296	4904586	11
Petroleum Gases, Liquefied	2	1075	4905417	11
Methyl Isobutyl Ketone	3	1245	4909244	11
Combustible Liquid, N.O.S.	3	1993	4914009	11
Trichloroisocyanuric Acid	5	2468	4918448	11
Nitric Acid	8	2031	4930238	11
Sulfuric Acid	8	2796	4930239	11
Nitrogen, Compressed	2	1066	4904565	10
Coating Solution	3	1139	4910142	10
Tetraethyl Silicate	3	1292	4912066	10
Organic Peroxide Type C,	5	3103	4918976	10
Tetrachloroethylene	6	1897	4925202	10
Corrosive Liquid, Acidic,	8	3264	4932022	10
Corrosive Liquid, Basic,	8	3267	4932032	10
Ammonia Solutions	8	2672	4935234	10
Environmentally Hazardous, Liquid	9	3082	4960108	10
Environmentally Hazardous, Solid	9	3077	4960199	10

Table 3.3.2

Hazardous Materials Transported via Rail in Stark County – Norfolk Southern (Newman)

Material	Hazard Class	UN Number	HMRC	Carloads
Petroleum Crude Oil	3	1267	4910165	18,916
Alcohols, N.O.S.	3	1987	4909152	13,276
Petroleum Crude Oil	3	1267	4910191	7,268
Combustible Liquid, N.O.S.	3	1993	4914109	3,756
Elevated Temperature Liquid	9	3257	4961605	2,104
Vinyl Chloride, Stabilize	2	1086	4905792	1,313
Fuel Oil	N/A	1993	4914168	1,261
Petroleum Gases, Liquefied	2	1075	4905752	1,104
Hydrochloric Acid	8	1789	4930228	525
Ethanol	3	1170	4909159	471
Petroleum Sour Crude Oil,	3	3494	4910599	400
Methyl Methacrylate Monomer	3	1247	4907250	353
Other Regulated Substance	9	3082	4966109	328
Butyl Acrylates, Stabilized	3	2348	4912215	325
Hydrocarbons, Liquid, N.O	3	3295	4907439	314
Phenol, Molten	6	2312	4921598	310
Propane	2	1075	4905421	286
Propylene	2	1077	4905782	256
Butane	2	1075	4905424	232
Isobutane	2	1075	4905430	225
Hazardous Waste, Solid, N.O.S	9	3077	4860102	164
Combustible Liquid, N.O.S.	3	1993	4914108	140
Tripropylene	3	2057	4909249	138
FAK-Hazardous Materials	FAK	N/A	4950130	128
Ferric Chloride, Solution	8	2582	4932342	122
Environmentally Hazardous	9	3077	4962125	121
FAK-Hazardous Materials	FAK	N/A	4950150	116
Toluene	3	1294	4909305	113
Waste Environmentally Hazardous	9	3077	4875543	109
Butane	2	1075	4905789	100
Environmentally Hazardous, Liquid	9	3082	4960196	92
Xylenes	3	1307	4909348	84
Acrylamide Solution	6	3246	4925151	76
Isopropenylbenzene	3	2303	4912631	70
Acetone	3	1090	4908105	58
Ethyl Acrylate, Stabilize	3	1917	4907215	56
Petroleum Distillates, N.	3	1268	4914256	50
Environmentally Hazardous, Liquid	9	3082	4960186	50
Hydrogen Peroxide, Aqueous	5	2014	4918775	47
Ammonium Nitrate Based Fe	5	2067	4918310	44
Methanol	3	1230	4909230	42
1-Chloro-1,1-Difluoro- Et	2	2517	4905720	40
Elevated Temperature Liquid	9	3257	4961619	40
Heptanes	3	1206	4909190	39
Environmentally Hazardous, Liquid	9	3082	4963705	39
Methacrylic Acid, Stabilized	8	2531	4930251	35
Isopropanol	3	1219	4909205	34

Material	Hazard Class	UN Number	HMRC	Carloads
Sodium Hydroxide Solution	8	1824	4935240	34
Sulfur, Molten	9	2448	4945770	34
Environmentally Hazardous, Liquid	9	3082	4960160	33
Corrosive Liquids, N.O.S.	8	1760	4932330	32
Isobutylene	2	1055	4905748	31
Esters, N.O.S.	3	3272	4907614	30
Sulfuric Acid, Spent	8	1832	4930042	29
Environmentally Hazardous, Liquid	9	3082	4966317	29
1,1,1,2-Tetrafluoroethane	2	3159	4904304	28
Ammonia Solutions	8	2672	4935280	28
FAK-Hazardous Materials	FAK	N/A	4950110	28
Environmentally Hazardous	9	3082	4966312	26
Styrene Monomer, Stabilized	3	2055	4907265	25
1,1-Difluoroethane	2	1030	4905716	23
Propionaldehyde	3	1275	4908270	23
N-Propanol	3	1274	4909267	23
Combustible Liquid, N.O.S	3	1993	4915185	22
Cresols, Liquid	6	2076	4921706	22
Isobutane	2	1075	4905753	21
Elevated Temperature Liquid	9	3257	4961615	21
Benzene	3	1114	4908110	19
Alcoholic Beverages	3	3065	4910102	19
Ethanolamine	8	2491	4935665	19
Maleic Anhydride	8	2215	4936330	18
Nitric Acid	8	2031	4930223	17
Elevated Temperature Liquid	9	3257	4960101	17
Waste Polychlorinated	9	3432	4845195	16
Carbon Dioxide, Refrigerated	2	2187	4904509	16
Vinyl Acetate, Stabilized	3	1301	4907270	16
Toluene Diisocyanate	6	2078	4921575	16
Sulfuric Acid	8	1830	4930040	16
Environmentally Hazardous, Liquid	9	3082	4960121	16
Combustible Liquid, N.O.S	3	1993	4913250	14
Potassium Hydroxide, Solution	8	1814	4935230	14
Freight All Kinds, Hazard	FAK	N/A	4850150	13
Butanols	3	1120	4909130	12
Hazardous Waste, Solid, N	9	3077	4875648	11
Butyl Acetates	3	1123	4909128	11
Petroleum Distillates, N.	3	1268	4910256	11
Vinyltoluenes, Stabilized	3	2618	4912275	11
Corrosive Liquid, Basic,	8	3267	4931259	11
Acetic Acid, Glacial	8	2789	4931303	11
Ethyl Methyl Ketone	3	1193	4909243	10
Ammonium Nitrate, Liquid	5	2426	4918774	10
Dichloromethane	6	1593	4925131	10
Ferrous Chloride, Solution	8	1760	4932329	10

Table 3.3.3

Hazardous Materials Transported via Rail in Stark County – Wheeling & Lake Erie (Brewster to Canton through Hartville)

Material	Hazard Class	UN Number	HMRC	Carloads
Petroleum Crude Oil	3	1267	4910165	2,190
Petroleum gases	2	1075	4905752	1,713
Petroleum Crude Oil	3	1267	4910165	1,630
Elevated Temperature Liquid, N.O.S.	9	3257	4961605	1,454
Isobutene	2	1075	4905430	870
Elevated Temperature Liquid	9	3257	4961605	839
Petroleum Gases, Liquefied	2	1075	4905752	422
Butane	2	1075	4905424	313
Propane	2	1075	4905421	184
Butane	2	1075	4905423	135
Alcohol, N.O.S.	3	1987	4909152	129
Propane	2	1075	4905421	111
Propane	2	1075	4905791	86
Styrene Monomer	3	2055	490726	61
Ethanol	3	1170	4909159	43
Butadiene, Stabilized	2	1010	4905704	34
Alcohol, N.O.S.	3	1987	4909152	28
Hydrocarbons, Liquid	3	3295	4907439	21
Allyl Alcohol	6	1098	4921019	21
Combustible Liquid, N.O.S.	3	1993	4913204	17
Styrene Monomer	3	2055	4907265	15
Petroleum Distillates	3	1268	4909382	12

Table 3.3.4

Hazardous Materials Transported via Rail in Stark County – Wheeling & Lake Erie (Brewster to Mineral City through Canton, South Canton, and Navarre)

Material	Hazard Class	UN Number	HMRC	Carloads
Petroleum Oil	3	1267	4910165	466
Petroleum Oil	3	1267	4910165	95

Table 3.3.5

Hazardous Materials Transported via Rail in Stark County – Wheeling & Lake Erie (Brewster to Mingo Junction through Harmon)

Material	Hazard Class	UN Number	HMRC	Carloads
Radioactive Material, Excepted Package-Empty Package	7	2908	4929139	990
Propane	2	1075	4905421	187
Chlorine	2	1017	4920523	166
Butane	2	1075	4905424	155
Hydrocarbons, Liquid	3	3295	4907439	137
Chlorine	2	1017	4920523	135
Petroleum Liquefied Gases	2	1075	4905752	134
N/A	2	1075	4905424	117
Hydrocarbons, Liquid	3	3295	4907439	97
Petroleum, Crude Oil	3	1267	4910165	91
Radioactive Material, Low specific Activity	7	2912	4929133	60
Propane	2	1075	4905421	56
Isobutane	2	1075	4905430	40
Isobutane	2	1075	4905430	29
Petroleum Distillates	3	1268	4909382	11

Table 3.3.6

Hazardous Materials Transported via Rail in Stark County – Wheeling & Lake Erie (Brittain Yard Akron to Brewster through Hartville)

Material	Hazard Class	UN Number	HMRC	Carloads
Allyl Alcohol	6	1098	4921019	202
Styrene Monomer	3	2055	4907265	133
Butadienes, Stabilized	2	1010	4905704	90
Ethanol, Ethyl Alcohol	3	1170	4909159	86
Styrene Monomer	3	2055	4907265	57
Allyl Alcohol	6	1098	4921019	48
Butadienes Stabilized	2	1010	4905704	43
Ethanol. Ethyl Alcohol	3	1170	4909159	42
Combustible Liquid, N.O.S.	3	1993	4913204	37
Combustible Liquid, N.O.S.	2	1993	4913204	24
Fuel Oil	3	1993	4914168	10

Table 3.3.7

Hazardous Materials Transported via Rail in Stark County – Wheeling & Lake Erie (Jewett-Hanna to Brewster through Harmon)

Material	Hazard Class	UN Number	HMRC	Carloads
Propane	2	1075	4905421	19,030
Petroleum Gases, Liquefied	2	1075	4905752	6,482
Butane	2	1075	4905424	5,946
Isobutane	2	1075	4905430	2,284
Propane	2	1075	4905791	1,687
Petroleum Products, N.O.S.	3	1268	4909382	346
Butane	2	1075	4905423	238
Octanes	3	1262	4908188	72
Liquefied Petroleum Gas	2	1075	4905419	70
Liquefied Petroleum Gas	2	1075	4905437	59
Pentanes	3	1265	4908255	42
Petroleum Distillates	3	1268	4910256	28
Petroleum Gases, Liquefied	2	1075	4905711	22
Hydrocarbons, Liquid	3	3295	4907428	19
Butane	2	1075	4905789	16
Butane	2	1075	4905788	11
Isobutane	2	1075	4905753	10

The rail analysis yielded the following 186 unique hazardous materials.

- 1,1,1,2-Tetrafluoroethane
- 1,1-Difluoroethane
- 1-Chloro-1,1-Difluoro- Et
- 1-Methoxy-2-Propanol
- 2-(2-Aminoethoxy) Ethanol
- Acetic Acid, Glacial
- Acetone
- Acetonitrile
- Acrylamide Solution
- Adhesives
- Aerosols
- Air, Compressed
- Alcoholic Beverages
- Alcoholic Beverages
- Alcohols, Flammable, Toxic
- Hydrazine Aqueous Solution
- Hydrocarbons, Liquid, N.O.S.
- Hydrochloric Acid
- Hydrogen Fluoride, Anhydrous
- Hydrogen Peroxide
- Hydrogen Peroxide, Aqueous
- Hypochlorite Solutions
- Isobutane
- Isobutanol
- Isobutylene
- Isocyanates, Toxic, N.O.S
- Isopropanol
- Isopropenylbenzene
- Life-Saving Appliances, S
- Lighters

- Alcohols, N.O.S.
- Alkyl Sulfonic Acids, Liquid
- Allyl Alcohol
- Amines, Liquid, Corrosive
- Amines, Solid, Corrosive,
- Ammonia Solutions
- Ammonia, Anhydrous
- Ammonium Nitrate Based Fe
- Ammonium Nitrate, Liquid
- Articles, Pressurized Pne.
- Batteries, Wet, Filled Wi
- Battery Fluid, Acid
- Battery-Powered Vehicle
- Benzaldehyde
- Benzene
- Benzyl Chloride
- Bisulfites, Aqueous Solution
- Butadiene, Stabilized
- Butane
- Butanols
- Butyl Acetates
- Butyl Acrylates, Stabilized
- Carbon Dioxide
- Carbon Dioxide, Refrigerated
- Cartridges For Weapons,
- Chemical Under Pressure,
- Chlorine
- Chlorobenzotrifluorides
- Chlorobenzyl Chlorides
- Chlorodifluoromethane
- Chlorotoluidines, Solid
- Coal Tar Distillates, Flammable
- Lithium-Ion Batteries
- Lithium Metal Batteries C
- Maleic Anhydride
- Metal Catalyst, Wetted
- Methacrylic Acid, Stabilized
- Methanol
- Methyl Acetate
- Methyl Isobutyl Ketone
- Methyl Methacrylate Monom
- Naphthalene, Molten
- Nitric Acid
- Nitrocellulose With Alcohol
- Nitrogen, Compressed
- N-Methylaniline
- N-Propanol
- Octanes
- Organic Peroxide Type C,
- Organic Peroxide Type F,
- Organometallic Substance,
- Other Regulated Substance
- Paint
- Paint Related Material
- Pentane-2,4-Dione
- Pentanes
- Perfumery Products
- Persulphates, Inorganic,
- Petroleum Crude Oil
- Petroleum Distillates, N.O.S.
- Petroleum Gases, Liquefied
- Petroleum Sour Crude Oil,
- Phenol, Molten
- Phosphoric Acid Solution

- Coating Solution
- Combustible Liquid, N.O.S
- Compressed Gas N.O.S.
- Corrosive Liquid, Acidic,
- Corrosive Liquid, Basic,
- Corrosive Liquids, N.O.S.
- Corrosive Liquids, Toxic
- Corrosive Solid, Acidic
- Corrosive Solid, Basic
- Corrosive Solids, Toxic
- Cresols, Liquid
- Dangerous Goods In Machin
- Dichloromethane
- Diesel Fuel
- Difluoromethane
- Elevated Temperature Liquid, N.O.S.
- Environmentally Hazardous
- Esters, N.O.S.
- Ethanol
- Ethanol And Gasoline Mixt
- Ethanolamine
- Ethyl Acrylate, Stabilize
- Ethyl Methyl Ketone
- Ethylene Oxide
- Extracts, Aromatic, Liquid
- Extracts, Flavoring, Liquid
- Freight All Kinds (FAK)-Hazardous Materials
- Ferric Chloride, Anhydrous
- Ferric Chloride, Solution
- Phosphorus Trichloride
- Polychlorinated Biphenyls
- Polymeric Beads, Expandable
- Potassium Hydroxide, Solution
- Potassium Nitrate
- Potassium Permanganate
- Printing Ink
- Propane
- Propionaldehyde
- Propylene
- Propylene Oxide
- Pyridine
- Radioactive Material, Exc.
- Radioactive Material, Excepted Package-Empty Package
- Radioactive Material, Low
- Radioactive Material, Low specific Activity
- Resin Solution
- Safety Devices
- Sodium Dithionite
- Sodium Hydroxide Solution
- Sodium Hydroxide, Solid
- Sodium Nitrate
- Solids Containing Flammables
- Styrene Monomer
- Sulfur, Molten
- Sulfuric Acid
- Sulfuric Acid, Spent
- Tetrachloroethylene
- Tetraethyl Silicate

- Ferrous Chloride, Solution
- Fire Extinguishers
- Fireworks
- Fish Meal, Stabilized
- Flammable Liquids, Corrosive
- Flammable Liquids, N.O.S.
- Flammable Liquids, Toxic,
- Flammable Solids, Organic
- Fluorosilicic Acid
- Formaldehyde Solutions
- Formic Acid
- Freight All Kinds, Hazard
- Fuel Oil
- Gasoline
- Hazardous Waste, Solid, N
- Heptafluoropropane
- Heptanes
- Tetrahydrofuran
- Thionyl Chloride
- Toluene
- Toluene Diisocyanate
- Toluidines, Solid
- Trichloroisocyanuric Acid
- Tripropylene
- Vehicle, Flammable Gas
- Vehicle, Flammable Liquid
- Vinyl Acetate, Stabilized
- Vinyl Chloride, Stabilize
- Vinyltoluenes, Stabilized
- Waste Environmentally Hazardous
- Waste Flammable Liquids,
- Waste Polychlorinated Biphenyls
- Xylenes
- Zinc Chloride, Anhydrous

Railway is the only mode of transportation that listed substances in Class 7, Radioactive Materials.

As noted in the highway analysis, spatial analysis can be of assistance to emergency preparedness officials. Planners selected an isolation distance of ½ mile, based on the material lists provided by rail shippers. Figure 3.3.b shows a ½ mile buffer from the rail lines in the county; Table 3.3.8 identifies the assets (from the 2017 hazard mitigation plan update) that fall in those buffer areas.

Figure 3.3.b

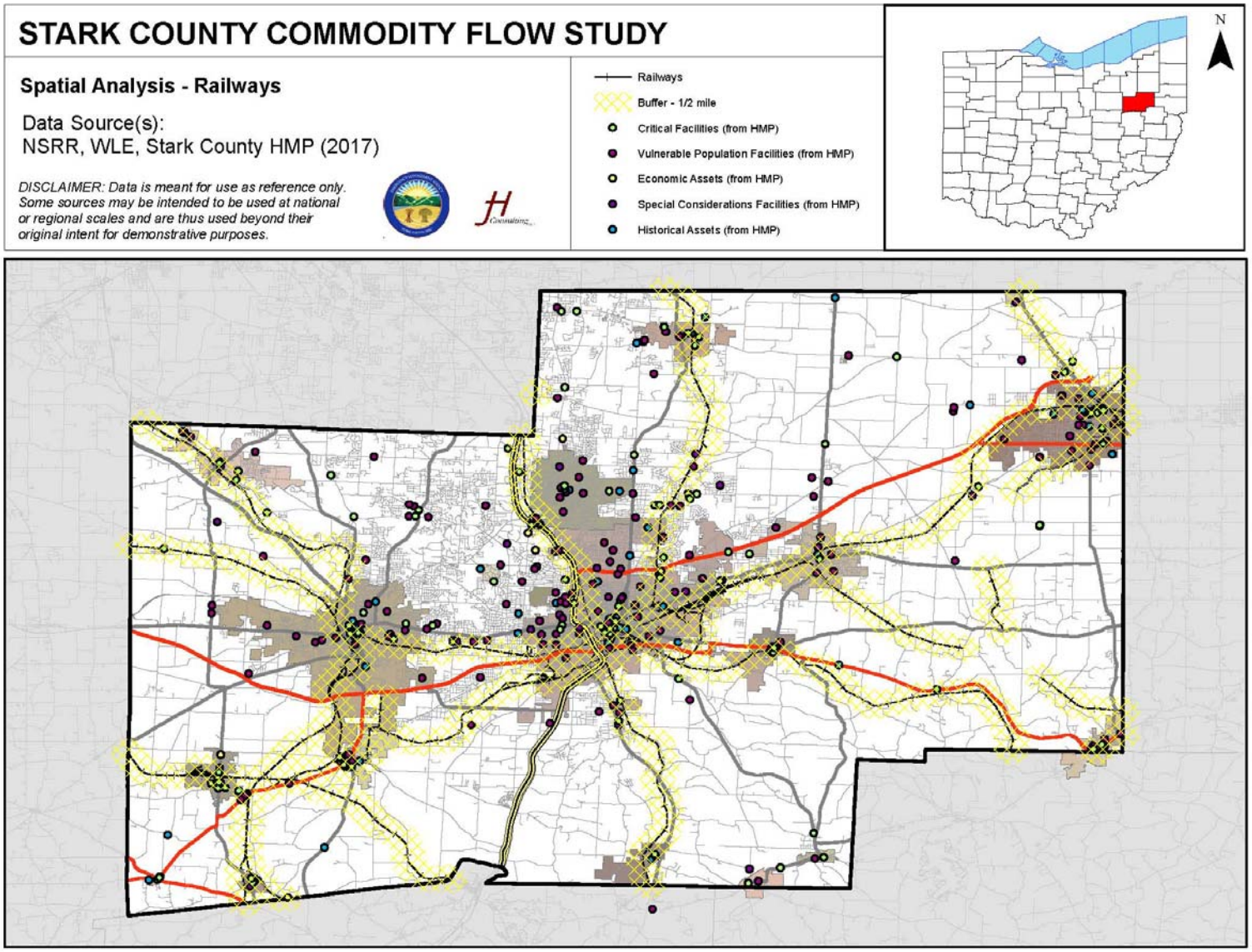

STARK COUNTY COMMODITY FLOW STUDY
Spatial Analysis - Railways
Data Source(s):
NSRR, WLE, Stark County HMP (2017)
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Railways
Buffer - 1/2 mile
Critical Facilities (from HMP)
Vulnerable Population Facilities (from HMP)
Economic Assets (from HMP)
Special Considerations Facilities (from HMP)
Historical Assets (from HMP)
N

Table 3.3.8

Community Assets Located within 1/2 Mile of Rail Lines (Countywide)

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Allen Elementary School		X			
Alliance Bank Building					X
Alliance City Health Department	X				
Alliance Community Hospital	X				
Alliance Fire Department	X				
Alliance Maintenance Building	X				
Alliance Middle School		X			
Alliance Police Department	X				
Alliance Wastewater Treatment Plant	X				
Altercare of Alliance Center for Rehabilitation & Nursing		X			
Altercare of Navarre		X			
American Aluminum			X		
American Medical Response	X				
American Red Cross of Western Stark County	X				
Amos McDannel Elementary School		X			
Barber-Whitticar House					X
Bartley Ambulance Service	X				
Baxter Elementary School		X			
Beach City Elementary School		X			
Beach City Fire Department	X				
Beach City Police Department	X				
Beach City Post Office				X	
Beach City Runway			X		
Bel Air Senior Living Community		X			
Beldon Elementary School		X			
Bender's Restaurant Belmont Buffet					X
Bethlehem Township Fire Department	X				
Brewster Cheese			X		
Brewster Electric Substation	X				
Brewster Electric Utility Buildings	X				
Brewster Fire/EMS Department	X				
Brewster North Water Tower	X				
Brewster Parke Senior Living		X			
Brewster Police Department	X				
Brewster Post Office				X	
Brewster Railroad YMCA / Wandle House					X
Brewster South Water Tower	X				
Brewster Village Hall	X				
Brewster Wastewater Treatment Plant	X				
Brewster Water Treatment Plant	X				
Canal Fulton Elementary School		X			
Canal Fulton Fire Department	X				
Canal Fulton Police Department	X				
Canal Fulton Post Office				X	

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Canal Fulton Waste Water Treatment Plant	X				
Canterbury Villa of Alliance		X			
Canton City Health Department	X				
Canton City SD	X				
Canton Health Care Center	X				
Canton Local SD	X				
Canton Police Department	X				
Canton Public Library					X
Canton Sewage Treatment Plant	X				
Canton South High School		X			
Canton Township Fire Department	X				
Canton Water Treatment Plant	X				
Charles L Warstler Elementary School		X			
Choices High School		X			
City National Bank Building					X
City of Canton Communication Center	X				
Clearview Golf Club					X
Community Care Center		X			
Country Lawn Center for Rehabilitation & Nursing		X			
Dewalt Building					X
Diamond Sports Facility				X	
Dobkins, John and Syd, House					X
Dueber Elementary School		X			
Dueber Station Post Office				X	
Eagles Building--Strand Theater					X
Eagles' Temple					X
Earley-Hartzell House					X
East Canton Elementary School		X			
East Canton High School		X			
East Canton Middle School		X			
East Canton Police Department	X				
East Canton Post Office				X	
East Sparta Elementary School		X			
East Sparta Volunteer Fire Department	X				
Emerson ES		X			
Fairfield Inn			X		
Fairless Elementary School		X			
Fairless High School		X			
Fairless Middle School		X			
Fairmont Elementary School		X			
Fife, Harry E., House					X
First Ladies National Historic Site					X
First Methodist Episcopal Church					X
First Methodist Episcopal Church of Alliance					X
First National Bank Building					X
First Reformed and First Lutheran Churches					X
Frances Apartment Building					X

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Freshman Academy		X			
Genoa Elementary School		X			
Gibbs ES		X			
Glamorgan Castle					X
Glenoak High School		X			
Group Home of Alliance		X			
Haines House					X
Hampton Inn			X		
Hartford Middle School		X			
Hartville Elementary School		X			
Hartville Fire Department	X				
Hartville Hotel					X
Hartville Police Department	X				
Hartville Sewage Treatment Plant	X				
Harvard Company--Weber Dental Manufacturing Company					X
Hazen Middle School		X			
Heartland Behavioral Healthcare		X			
Hercules Motors Corporation Industrial Complex					X
Home Two Suites			X		
Hotel Courtland					X
Ideal Department Store Building					X
La Quinta			X		
Lake Elementary School		X			
Landmark Tavern					X
Lathrop Elementary School		X			
Lawrence Township Police Department	X				
Lexington Township Volunteer Fire Department	X				
Liberty Elementary School		X			
Loew-Define Grocery Store and Home					X
Lohr Elementary School		X			
Lorin Andrews Middle School		X			
Louisville Child Care Center		X			
Louisville Elementary School		X			
Louisville Fire Department	X				
Louisville High School		X			
Louisville Middle School		X			
Louisville Police Department	X				
Louisville Post Office				X	
Louisville Water Treatment Plant	X				
Mary Irene Day Elementary School		X			
Massillon Cemetery Building					X
Massillon City Health Department	X				
Massillon City SD Administration BLD	X				
Massillon City SD Warehouse BLD	X				
Massillon City Tiger Stadium				X	
Massillon Police Department	X				
Massillon Post Office				X	
Massillon Sewage Treatment Plant	X				

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Maximo Post Office				X	
McGregor Elementary School		X			
McIntosh Oil and Gas Storage			X		
McKinley High School		X			
Mellett-Canton Daily News Building					X
Mercy Medical Center	X	X			
Mercy Stat Care	X	X			
Metalco			X		
Middlebranch Elementary School		X			
Middlebranch Middle School		X			
Minerva Elder Care Center		X			
Minerva Fire Department	X				
Minerva High School		X			
Minerva Police Department	X				
Minerva Post Office				X	
Morgan Elementary School		X			
Navarre Elementary School		X			
Navarre Police Department	X				
Navarre Post Office				X	
Navarre Village Fire Department	X				
Navarre Water Treatment Plant	X				
NE Waterworks Post Office				X	
New Market Station Post Office				X	
Norfolk Southern Rail Yard			X		
North Canton Water Treatment Plant	X				
North Industry Post Office				X	
North Lawrence Fire Department	X				
North Lincoln Elementary School		X			
Northside Elementary School		X			
Northwest High School		X			
Northwest Middle School		X			
Oakwood Middle School		X			
Old McKinley High School					X
Onesto Hotel					X
Osnaburg Township Fire Department	X				
Palace Theater					X
Perry High School		X			
Perry Township Police Department	X				
Pfeiffer Middle School		X			
Plain Township Fire Station One	X				
Plain Township Fire Station Three	X				
Plain Township Fire Station Two	X				
Plain Township Hall	X				
Plain Township Road Garage	X				
Ransom H Barr Elementary School		X			
Red Cross of Central Stark County	X				
Reedurban Elementary School		X			
Residence Inn			X		
Robert A. Taft Middle School		X			
Robertsville Fire Department	X				
Rochester Park Assisted Living		X			

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Rockhill Elementary School		X			
Rural Metro Ambulance Service	X				
Saint Joseph's Roman Catholic Church					X
Saxton House					X
Schuffenecker, August Building					X
Souers Middle School		X			
South Lincoln Elementary School		X			
St. Edward Hotel					X
St. John's Catholic Church					X
St. Louis Church					X
St. Mary's Catholic Church					X
St. Peter Church					X
St. Timothy's Protestant Episcopal Church					X
Stahl-Hoagland House					X
Stanton Middle School		X			
Stark Ambulance Service	X				
Stark County Courthouse and Annex					X
Stark County Health Department	X				
State Police Canton Patrol Post	X				
Staybridge Suites		X			
Stewart, Harry Bartlett, Property					X
Stone Belle Elementary School		X			
Summit Elementary School		X			
Taft Elementary School		X			
The Venue mall			X		
Town Pump of East Sparta, The					X
Trinity Lutheran Church					X
US Post Office				X	
Village of East Canton	X				
Village of Navarre	X				
Washington High School		X			
Washington Middle School		X			
Werner Inn					X
Wheeling & Lake Erie Railway			X		
William R Day Elementary School		X			
William S Stinson ES		X			
Worley Elementary School		X			
YMCA		X		X	
YMCA		X		X	
Youtz Elementary School				X	

The responder survey provides information regarding the area fire departments' capabilities to respond to railway based hazardous material incidents. As with the highway analysis, the basic turnout gear used for structural firefighting may not provide adequate protection when responding to a hazardous material spill or leak. The county hazardous materials response team should be contacted based on the identified

chemical(s) or size of the spill or leak.

3.4 Conclusions

Table 3.4.1 presents the top 10 materials identified by the railway analysis.

Table 3.4.1

Top 10 Materials – Railway Analysis

Material Name (and UN Number)	Total Cars	Total Shippers Reporting Material
FAK- Hazardous Materials (N/A)	120,066	1
Petroleum Crude Oil (UN 1267)	62,262	2
Alcohol, N.O.S. (UN 1987)	51,606	2
Propane (UN 1075)	23,181	2
Petroleum Gases (UN 1075)	13,072	2
Combustible Liquid, N.O.S. (UN 1993)	9,626	2
Butane (UN 1075)	8,495	2
Elevated Temperature Liquid (UN 3257)	7,639	2
Vinyl Chloride, Stabilized (UN 1086)	6,798	1
Fuel Oil (UN 1993)	4,596	2

Twenty-seven materials specifically reported in the railway analysis also appeared in the highway analysis.

- LP gases (UN 1075)
- Ethyl alcohol (UN 1170)
- Gasoline (UN 1203)
- Petroleum crude oil (UN 1267) †
- Petroleum distillates (UN 1268)
- Toluene (UN 1294)
- Ferrous chloride, solution (UN 1760)
- Hydrochloric acid (UN 1789)
- Hypochlorite solutions (UN 1791)
- Sodium hydroxide, solution (UN 1824)
- Sulfuric acid (UN 1830)
- Argon, refrigerated liquid (UN
- Asbestos (UN 2212)
- Isopropenylbenzene (UN 2303)
- Ferric chloride, solution (UN 2582)
- Environmentally hazardous substances, solid, n.o.s. (UN 3077)
- Environmentally hazardous substances, liquid, n.o.s. (UN 3082)
- Organic peroxide, type F, liquid (UN 3109)
- Elevated temperature liquid, n.o.s. (UN 3257)
- Corrosive liquid, acidic, organic, n.o.s. (UN 3265)
- Corrosive liquid, basic, inorganic,

1951)
- Alcohols, n.o.s. (UN 1987)
- Flammable liquids, n.o.s. (UN 1993)
- Hydrogen peroxide (UN 2014)
- Carbon dioxide, refrigerated liquid (UN 2187)

n.o.s. (UN 3266)
- Hydrocarbons, liquid, n.o.s. (UN 3295)
- Ethanol/gasoline mixture (UN 3475)

†*Also appeared in the pipeline analysis.*

Railway analysis data suggests the following conclusions.

- All materials listed in the 2019 railway analysis also appeared in the 2018 analysis.
- Based on the location of an incident, critical infrastructure and/or vulnerable populations may be affected.
- The railway analysis yielded this large number of unique hazardous materials, with only 50% of the active rail operators in Stark County reporting. The other two operators may contribute more unique materials for consideration.
- The railway analysis contributed significantly more unique hazardous materials to the study than did the highway, pipeline, or analysis. To some extent, this finding was intuitive, given rail's relative low cost and safety record. However, planners would expect additional overlap with the highway analysis.

4.0 PIPELINE ANALYSIS

4.1 Statistics

According to the U.S Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA), there are over 215,000 miles of hazardous liquid and carbon dioxide pipelines; over 300,000 miles of gas transmission pipelines; over 2,223,000 miles of gas distribution mains and services pipelines; and 152 LNG facilities, containing 228 LNG tanks, connected to gas transmission and distribution systems (2017).

A significant amount of data is available regarding incidents on pipeline systems. Table 4.2.1 shows a summary of all reported pipeline incidents over the period of 2008 through 2017. The following figures provide additional data on these incidents.

Table 4.1.1

Summary – All Reported Pipeline Incidents, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost Reported ($)
2008	660	8	56	$565,532,340
2009	627	13	64	$179,070,183
2010	586	22	108	$1,692,500,877
2011	588	13	55	$426,129,361
2012	571	12	57	$229,842,664
2013	618	9	44	$368,909,704
2014	706	19	95	$315,690,250
2015	712	11	48	$349,959,166
2016	633	16	87	$321,119,822
2017	650	20	35	$270,882,151
Total	6,351	143	649	$4,719,636,518
Most Recent 3 Year Avg.	665	16	57	$313,987,043

Figure 4.1.a

All Reported Pipeline Incidents: Count 1998-2017

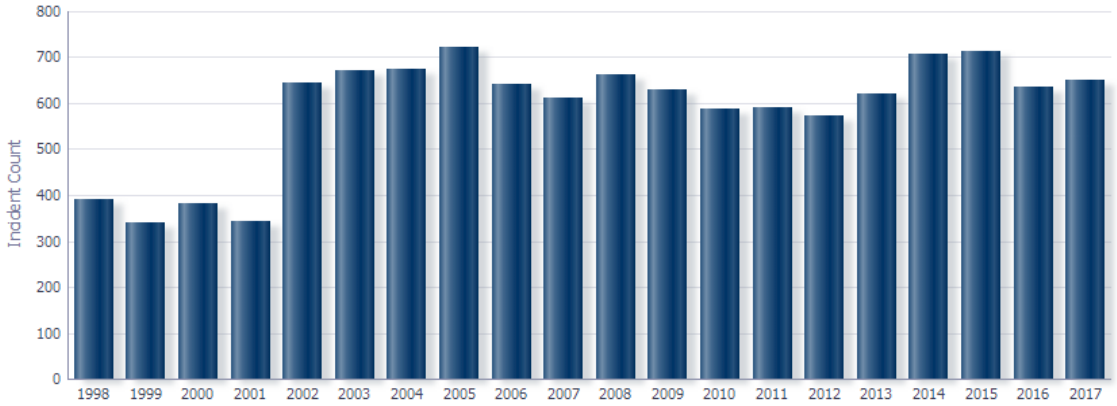


Figure 4.1.b

All Reported Pipeline Incidents: Fatalities 1998-2017

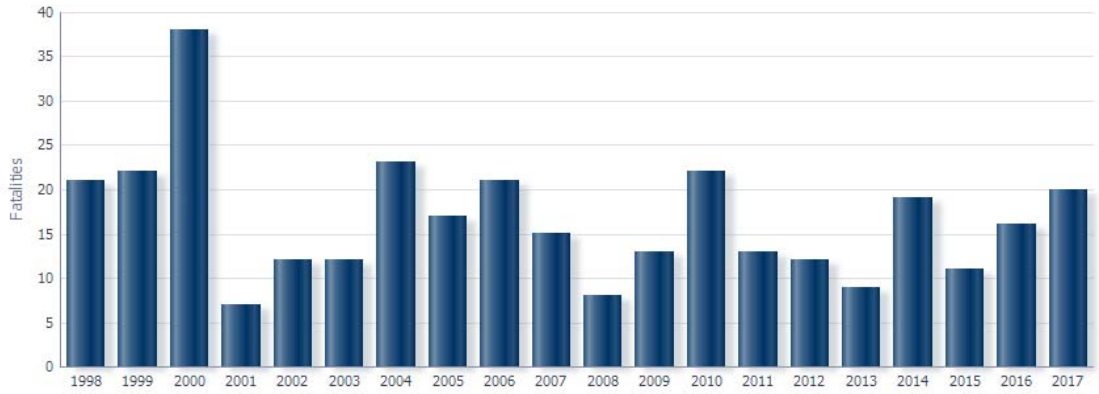
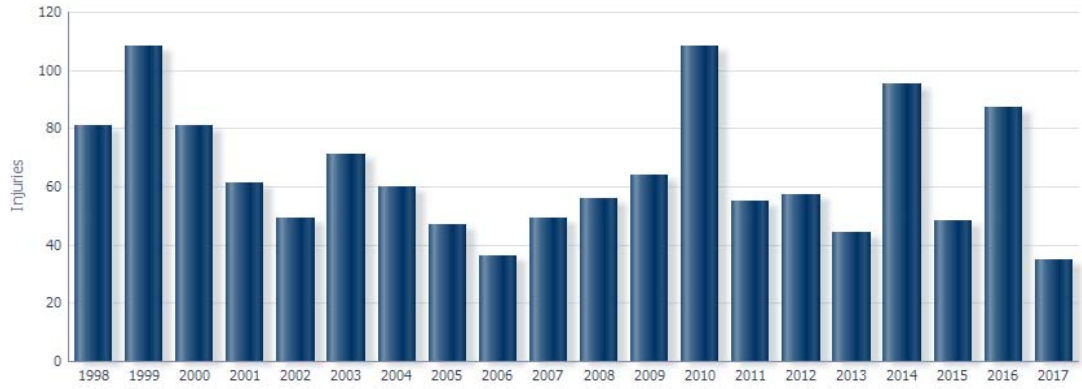


Figure 4.1.c

All Reported Pipeline Incidents: Injuries 1998-2017



Within these figures, PHMSA reports incidents within the hazardous liquid, gas transmission, gas gathering, and gas distribution subcategories. Tables 4.1.2 through 4.1.5 present these figures for the period 2008-2017 for onshore incidents only (PHMSA, 2017).

Table 4.1.2

Hazardous Liquid Pipeline Incidents, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost Reported ($)
2008	123	2	2	$165,260,978
2009	110	4	4	$79,971,490
2010	123	1	3	$1,202,890,666
2011	139	0	1	$297,680,975
2012	134	3	4	$152,726,471
2013	166	1	6	$291,099,972
2014	154	0	0	$135,305,833
2015	181	1	0	$259,641,566
2016	177	3	9	$205,135,519
2017	157	1	1	$147,154,891
Total	1,464	16	30	$2,936,868,361
Most Recent 3 Year Avg.	172	2	3	$203,977,325

Table 4.1.3

Gas Transmission Pipeline Incidents, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost Reported ($)
2008	73	0	5	$280,164,446
2009	73	0	11	$58,673,943
2010	79	10	61	$662,171,658
2011	84	0	1	$132,489,046
2012	62	0	7	$57,809,740
2013	71	0	2	$51,889,186
2014	77	1	1	$53,506,217
2015	79	6	16	$58,924,529
2016	56	3	3	$57,896,150
2017	66	3	3	$38,142,596
Total	720	23	110	$1,451,667,511
Most Recent 3 Year Avg.	67	4	7	$51,654,425

Table 4.1.4

Gas Gathering Pipeline Incidents, 2008-2017

Year	Number	Fatalities	Injuries	Total Cost Reported ($)
2008	16	0	0	$137,516,716
2009	12	0	0	$18,625,559
2010	7	0	0	$2,208,379
2011	6	0	0	$1,750,082
2012	7	0	0	$3,111,500
2013	6	0	0	$2,101,026
2014	9	0	0	$6,236,237
2015	3	0	0	$1,616,218
2016	2	0	0	$587,685
2017	7	0	0	$1,420,885
Total	75	0	0	$175,174,287
Most Recent 3 Year Avg.	4	0	0	$1,208,263

Table 4.1.5

Gas Distribution Pipeline Incidents, 2008-2017

Year	Number	Fatalities	Injuries	Total Cost Reported ($)
2008	67	6	47	$20,767,955
2009	80	9	47	$26,763,193
2010	55	8	39	$20,497,511
2011	56	11	48	$23,442,367
2012	52	7	43	$24,954,682
2013	60	7	34	$37,020,712
2014	60	18	92	$73,320,857
2015	66	2	32	$30,579,618
2016	74	10	74	$53,952,014
2017	63	4	29	$68,370,642
Total	633	82	485	$379,669,551
Most Recent 3 Year Avg.	68	5	45	$50,967,425

Pipeline mileage data for states is somewhat more detailed than it is nationwide. PHSMA reports a total of 116,529 miles of pipeline in Ohio (2017). Within those 116,529 miles:

- 4,725 miles are hazardous liquid pipelines;
- 10,119 miles are gas transmission lines;
- 1,184 miles are gas gathering lines; and
- 105,226 miles are gas distribution lines.

Similar classifications of incident data are available at the state level as presented above nationwide. Table 4.1.6 presents a summary of all pipeline incidents in

Ohio for the period 2008-2017 (PHMSA, 2017).

Table 4.1.6

Reported Pipeline Incidents in Ohio, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost As Reported ($)
2008	18	0	1	$6,963,493
2009	20	1	3	$9,705,604
2010	10	1	7	$2,478,224
2011	17	2	6	$8,347,104
2012	10	0	5	$24,576,321
2013	12	0	1	$1,815,230
2014	19	0	0	$12,050,123
2015	18	0	0	$10,919,199
2016	21	0	2	$6,007,417
2017	21	2	1	$3,630,773
Total	166	6	26	$86,493,488
Most Recent 3 Year Avg.	20	1	1	$6,852,463

Table 4.1.7

Hazardous Liquid Pipeline Incidents in Ohio, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost as Reported ($)	Barrels Spilled	Net Barrel Lost
2008	12	0	0	$4,619,238	498	2
2009	13	0	0	$7,694,944	2,424	808
2010	3	0	0	$1,117,092	15	1
2011	5	0	0	$793,795	163	20
2012	5	0	0	$20,506,205	1,974	1,222
2013	7	0	0	$166,080	4	1
2014	13	0	0	$10,116,901	470	14
2015	9	0	0	$287,216	109	5
2016	11	0	0	$2,755,217	420	25
2017	13	0	0	$2,323,439	277	30
Total	91	0	0	$50,380,127	6,354	2,128
Most Recent 3 Year Avg.	11	0	0	$1,788,624	269	20

Table 4.1.8

Gas Transmission Pipeline Incidents in Ohio, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost As Reported ($)
2008	2	0	0	$135,108
2009	3	0	1	$581,697
2010	1	0	0	$490,080
2011	6	0	0	$5,579,678
2012	2	0	4	$74,232
2013	1	0	0	$1,501,234
2014	3	0	0	$659,563
2015	5	0	0	$1,123,459
2016	5	0	0	$479,261
2017	2	1	0	$198,254
Total	30	1	5	$10,822,566
Most Recent 3 Year Avg.	4	0	0	$600,325

Table 4.1.9

Gas Gathering Pipeline Incidents in Ohio, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost
2008	0	0	0	$0
2009	0	0	0	$0
2010	0	0	0	$0
2011	0	0	0	$0
2012	0	0	0	$0
2013	0	0	0	$0
2014	0	0	0	$0
2015	0	0	0	$0
2016	0	0	0	$0
2017	0	0	0	$0
Total	0	0	0	$0
Most Recent 3 Year Avg.	0	0	0	$0

Table 4.1.10

Gas Distribution Pipeline Incidents in Ohio, 2008-2017

Year	Incidents	Fatalities	Injuries	Total Cost
2008	4	0	1	$2,209,147
2009	4	1	2	$1,428,963
2010	6	1	7	$871,052
2011	6	2	6	$1,973,631
2012	3	0	1	$3,995,884
2013	4	0	1	$147,916
2014	3	0	0	$1,273,659
2015	4	0	0	$9,508,524
2016	5	0	2	$2,772,939
2017	6	1	1	$1,109,080
Total	45	5	21	$25,290,795
Most Recent 3 Year Avg.	5	0	1	$4,463,514

Of the incidents presented in Tables 4.1.7 through 4.1.10, a total of 93 have been described by PHSMA as significant. Significant incidents are those reported incidents with the following specifically-defined consequences:

- A fatality or injury requiring in-patient hospitalization,
- $50,000 or more in total costs, measured in 1984 dollars,
- Highly volatile liquid releases of five barrels or more or “other liquid” release of 50 barrels or more, or
- Liquid releases resulting in an unintentional fire or explosion.

These 97 significant incidents resulted in a total of six fatalities, 26 injuries, and $90,067,675 in total costs reported (PHSMA, 2017). Of the 97 significant incidents, a total of 15 were also serious incidents. Serious incidents are a smaller subset where any fatality or in-patient hospitalization occurs.

4.2 Methodology

Pipeline data came from the National Pipeline Mapping System (https://www.npms.phmsa.dot.gov/). In some cases, when clarification was needed, the county’s consultant contacted pipeline operators directly. Section 4.3 below presents local data. The LEPC requested and received geographic information system (GIS) mapping data from PHMSA. This data enabled the spatial analysis included below.

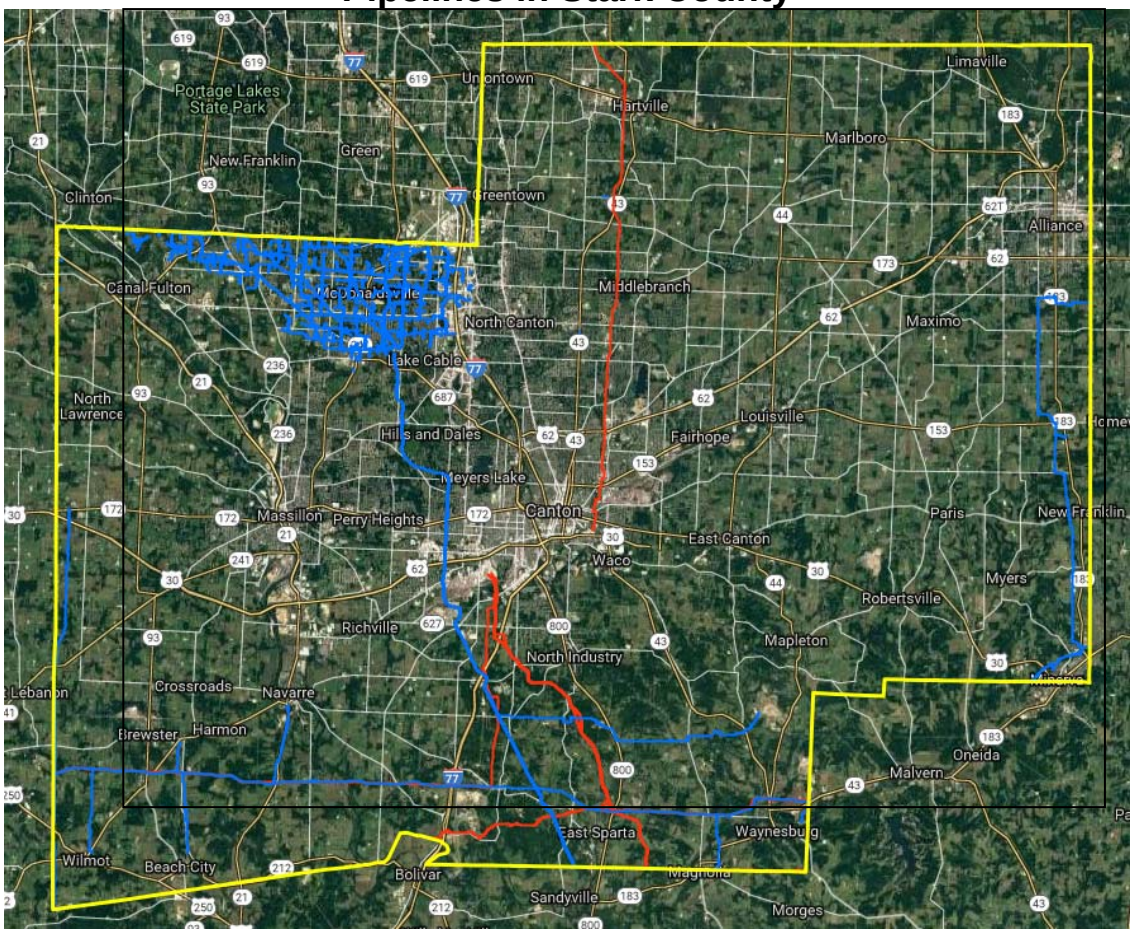
4.3 Field Data

PHMSA reports five accidents involving liquid pipelines in Stark County: 2009 (crude oil released), 2010 (refined petroleum products released), 2013 (refined petroleum products released), 2016 (petroleum products released), and 2017 (crude oil released) (PHMSA, 2017). PHMSA records report one incident involving a natural gas pipeline in 2017 (PHMSA, 2017).

Figure 4.3.a shows the transmission pipelines passing through and near Stark County (https://www.npms.phmsa.dot.gov/). Under 49 CFR § 192.3, a transmission line is: "a pipeline, other than a gathering line, that: (1) transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not down-stream from a distribution center; (2) operates at a hoop stress of 20 percent or more of SMYS; or (3) transports gas within a storage field."

Figure 4.3.a

Pipelines in Stark County



The blue graphics represent the “gas transmission pipelines” referenced above. They carry natural gas (UN 1971). Under §195.2, an HVL line carries a hazardous liquid which will form a vapor cloud when released to the atmosphere and which has a vapor pressure exceeding 276kPa (40psia) at 37.8° C (100° F). The red lines are hazardous liquid pipelines. The red line running from Canton through Hartville and north out of the county is the 5” Suffield to Canton (MOCA) line, operated by Inland Corporation. It is an active line carrying a non-HVL product. The red lines running through the south-central portion of the county are Marathon Petroleum HVL lines. They carry petroleum products (UN 1268), natural gas liquids (UN 1965), and crude oil (UN 1267). The lines running southeast toward the East Sparta area (and from East Sparta toward Bolivar) carry either petroleum products or natural gas liquids. The lines running due south and east toward the Brewster area carry crude oil.

Data from the National Pipeline Mapping System (NPMS) allows for brief spatial analysis in Stark County. Figure 4.3.b is a map showing the pipelines in Stark County by commodity carried.

Figure 4.3.b

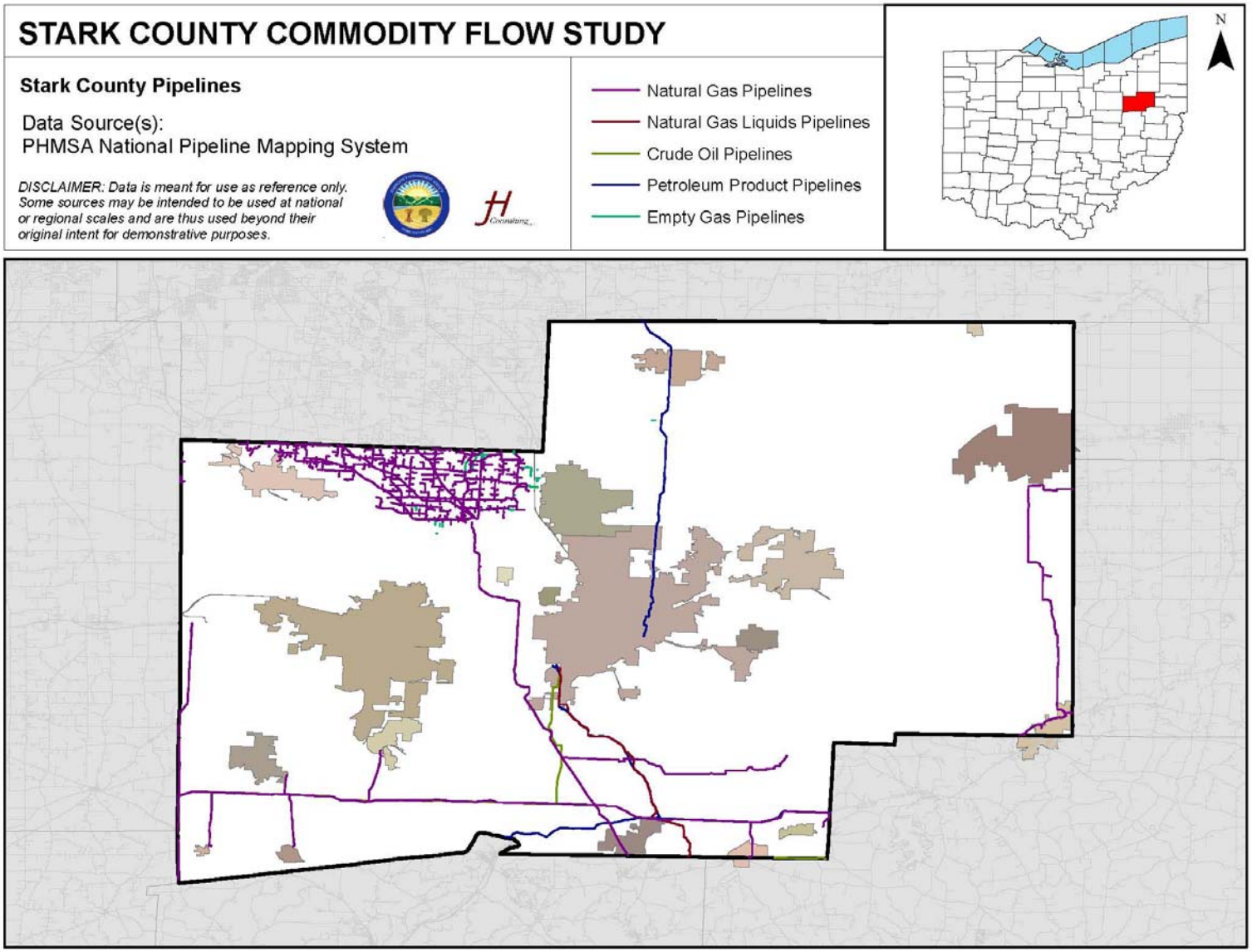

STARK COUNTY COMMODITY FLOW STUDY
Stark County Pipelines
Data Source(s):
PHMSA National Pipeline Mapping System
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Natural Gas Pipelines
Natural Gas Liquids Pipelines
Crude Oil Pipelines
Petroleum Product Pipelines
Empty Gas Pipelines
N

Figure 4.3.c is a high-level spatial analysis. This map shows the pipelines provided by the NPMS. The map includes two buffers from all pipelines: one at a ½ mile and another at one mile. Planners derived the distances from the isolation distances suggested by the latest edition of the U.S. DOT *Emergency Response Guidebook* (DOT, 2016) for the materials identified by the pipeline analysis, impacted by a fire.

Figure 4.3.c

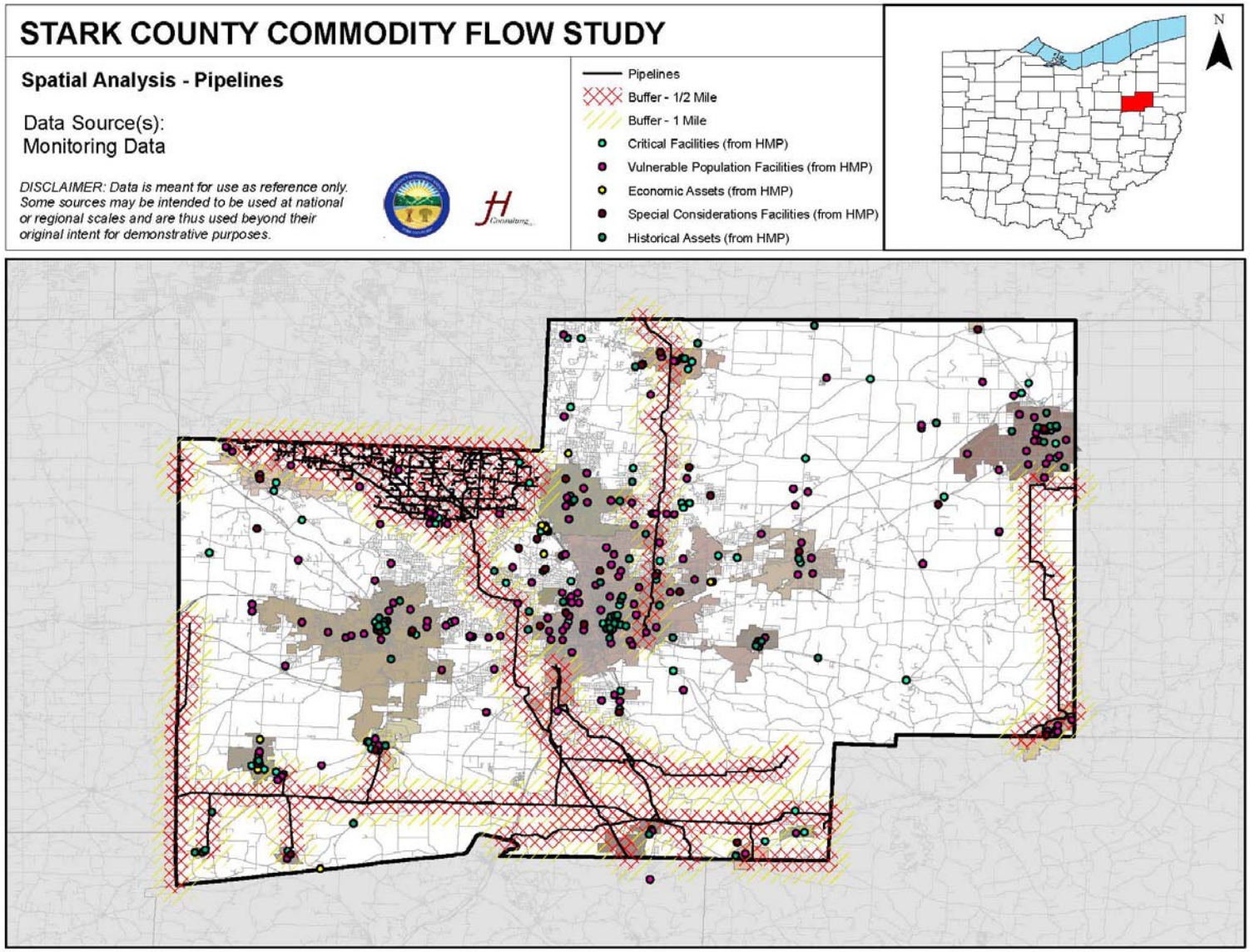

STARK COUNTY COMMODITY FLOW STUDY
Spatial Analysis - Pipelines
Data Source(s):
Monitoring Data
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Pipelines
Buffer - 1/2 Mile
Buffer - 1 Mile
Critical Facilities (from HMP)
Vulnerable Population Facilities (from HMP)
Economic Assets (from HMP)
Special Considerations Facilities (from HMP)
Historical Assets (from HMP)
N

Table 4.3.1 shows the community assets included in the ½-mile buffer area. These assets were taken from the *Stark County 2017 Multi-Jurisdictional Hazard Mitigation Plan* (Stark County EMA, 2017).

Table 4.3.1

Community Assets Located in ½-Mile Isolation Distance from Pipelines

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Alliance Middle School		X			
Altercare of Canton		X			
Bartley Ambulance Service	X				
Beach City Fire Department	X				
Beach City Police Department	X				
Beach City Post Office				X	
Beldon Elementary School		X			
Bethlehem Township Fire Department	X				
Brewster South Water Tower	X				
Canton Water Treatment Plant	X				
Chapel Hill Community		X			
Dobkins, John and Syd, House					X
East Sparta Elementary School		X			
East Sparta Volunteer Fire Department	X				
Fairless Elementary School		X			
Fairless High School		X			
Fairless Middle School		X			
Gaslite Villa Health Care	X	X			
Gaslite Villa Health Care	X	X			
Gentlebrook Senior Living		X			
Glenoak High School		X			
Hartford Middle School		X			
Hartville Elementary School		X			
Hartville Meadows		X			
Hartville Post Office				X	
Harvard Company-Weber Dental Manufacturing Company					X
Hazen Middle School		X			
Jackson High School		X			
Jackson Local Schools		X			
Jackson Memorial Middle School		X			
Jackson Township Fire Department	X				
Jackson Township Police Department	X				
Lake Cable Elementary School		X			
Lake Elementary School		X			
Loew-Define Grocery Store and Home					X
Magnolia Elementary School		X			
Massillon Fire Department	X				
McIntosh Oil and Gas Storage			X		
McKinley Health Care Center		X			
McKinley, William, Tomb					X

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Mercy Stat Care	X	X			
Mercy Stat Care	X	X			
Minerva Elder Care Center		X			
Minerva Fire Department	X				
Minerva High School		X			
Minerva Police Department	X				
Minerva Post Office				X	
Navarre Elementary School		X			
Navarre Police Department	X				
Navarre Post Office				X	
Navarre Village Fire Department	X				
NE Waterworks Post Office				X	
North Canton Water Treatment Plant	X				
Northwest High School		X			
Oakwood Middle School		X			
Plain Township Fire Station One	X				
Plain Township Fire Station Two	X				
Prairie College Elementary School		X			
Ransom H Barr Elementary School		X			
Sandy Township Fire Department	X				
Sauder Elementary School		X			
Serquet, Emanuel and Frederick, Farm					X
State Police Canton Patrol Post	X				
Strausser Elementary School		X			
Tri-County Emergency Medical Services	X				
Village of Navarre	X				
Washington Middle School		X			
Whipple Heights Elementary School		X			
William S Stinson ES		X			
Wilmot Fire Department	X				
Wilmot Police Department	X				
Wilmot United Brethren Church					X

4.4 Conclusions

Table 4.4.1 presents the materials identified by the pipeline analysis.

Table 4.4.1

Hazardous Materials – Pipeline Analysis

Material Name (and UN Number)	Companies Reporting	Reported Lines
Natural gas (UN 1971)	3	Numerous
Crude oil (UN 1267)	1	1
Natural gas liquids (UN 1965)	1	3
Petroleum products (UN 1268)	2	5

Pipeline analysis data suggests the following conclusions.

- The pipeline analysis contributed four unique hazardous materials to this study. Two of those materials (natural gas and natural gas liquids) only appeared in the pipeline analysis.

5.0 AIR ANALYSIS

5.1 Statistics

The Bureau of Transportation Statistics (BTS), a division of the United States Department of Transportation, tracks air cargo data in the U.S. Operators shipped approximately 10 million tons of cargo via air in the United States in 2015, nearly identical to figures from 2012. Of the 10 million tons, domestic shipments constituted 20%, while the remainder were imports or exports.

The US Department of Transportation's (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) – Office of Hazardous Material Safety maintains statistics on the number of hazardous materials incidents involving substances transported by air. The table below shows the number of incidents over the past ten years 2010 – 2019. The total number of incidents has increased, from 1,295 in 2010 to 1,468 in 2019 (though the data in the intervening years shows much variation). In 2019, 564 of the 1,468 incidents occurred while in transit, while 232 occurred during loading and 202 occurred during unloading.

Table 5.1.1

Air-Related Hazmat Incidents

Year	Incidents	Injuries	Damages
2010	1,295	2	$20,267
2011	1,401	7	$171,467
2012	1,460	20	$41,089
2013	1,441	12	$143,105
2014	1,327	15	$129,417
2015	1,130	20	$46,971
2016	1,203	9	$1,929,865
2017	1,161	2	$27,446
2018	1,431	8	$75,099
2019	1,468	6	$64,891

PHMSA also tracks these incidents based on the type of hazardous material. In 2019, Class 9 substances (miscellaneous substances) were the most-involved substance, being present in 341 incidents. The second most common substance were gases (Class 2), being involved in 293 incidents. Class 3 (flammable liquids) were the third most-involved hazardous substance (163 incidents in 2019).

Finally, PHMSA also tracks incidents by state. Table 5.1.2 presents the ten-year

incident data for Ohio.

Table 5.1.2

Air Hazmat Incident Data for Ohio, 2010-2019

Year	Incidents (Total)	Injuries (Hospitalized)	Injuries (Non-Hospitalized)	Fatalities	Damages
2010	20	0	0	0	$0
2011	27	0	0	0	$0
2012	33	0	1	0	$505
2013	29	0	0	0	$0
2014	26	0	0	0	$0
2015	10	0	0	0	$0
2016	9	0	0	0	$0
2017	14	0	0	0	$0
2018	20	0	0	0	$0
2019	15	0	0	0	$0

5.2 Methodology

The method used to collect data on the types and volumes of hazardous materials traveling over Stark County by air included representatives from JH Consulting, LLC contacting and requesting data from the following.

- Akron Canton Airport
- The Federal Aviation Administration (FAA)-Hazmat Group
- The Pipeline and Hazardous Materials Safety Administration (PHMSA)-Hazmat Information Center
- The Bureau of Transportation Statistics (BTS)

5.3 Field Data

Akron-Canton Airport officials indicated that there are no known hazardous commodities that are shipped from the airport. Officials did acknowledge that some materials could be shipped under the heading of “general aviation”; however, no extremely hazardous substances are known to be flown. Official reported that Castle Aviation is the sole freight transporter headquartered out of the airport. Attempts to contact Castle Aviation were not returned.

A review of Castle Aviation’s website provided information on the three type of planes used by the company for cargo transport. The largest plane has a maximum takeoff weight of 16,000 pounds with a range of 1,150 miles. The smaller two are both unpressurized cabins with the larger of the two able to transport up to 750 pounds of

cargo. There is no mention of the type of cargo transported on the webpage.

5.4 Conclusions

As per an interview with Akron-Canton Airport officials, there are minimal or no hazardous substances shipped from the airport.

6.0 COVERED FACILITIES ANALYSIS

6.1 Statistics

Hazardous materials incidents can occur during the transportation phase or at fixed facilities. While in-depth fixed facility considerations are not the focus of this study, it can be helpful to understand the nature of those events. Further, understanding the materials used and stored at local fixed facilities supports a baseline of knowledge about what types of materials may be involved in a transportation incident originating from or destined for those fixed facilities. Fixed facility incidents "occur in stationary structures (e.g., buildings) or through another form of transport within a stationary structure (e.g., a facility rail system for moving chemicals within a chemical manufacturing plant)" (NTSIP, 2014).

The National Toxic Substance Incidents Program (NTSIP) within the Centers for Disease Control and Prevention (CDC) collects information on acute hazardous chemical incidents. It produces a report with key findings regarding those releases. The 2013-2014 report noted 2,575 fixed facility incidents in the U.S in 2013-2014, accounting for 60.1% of all incidents reported (p. 9). Of these incidents:

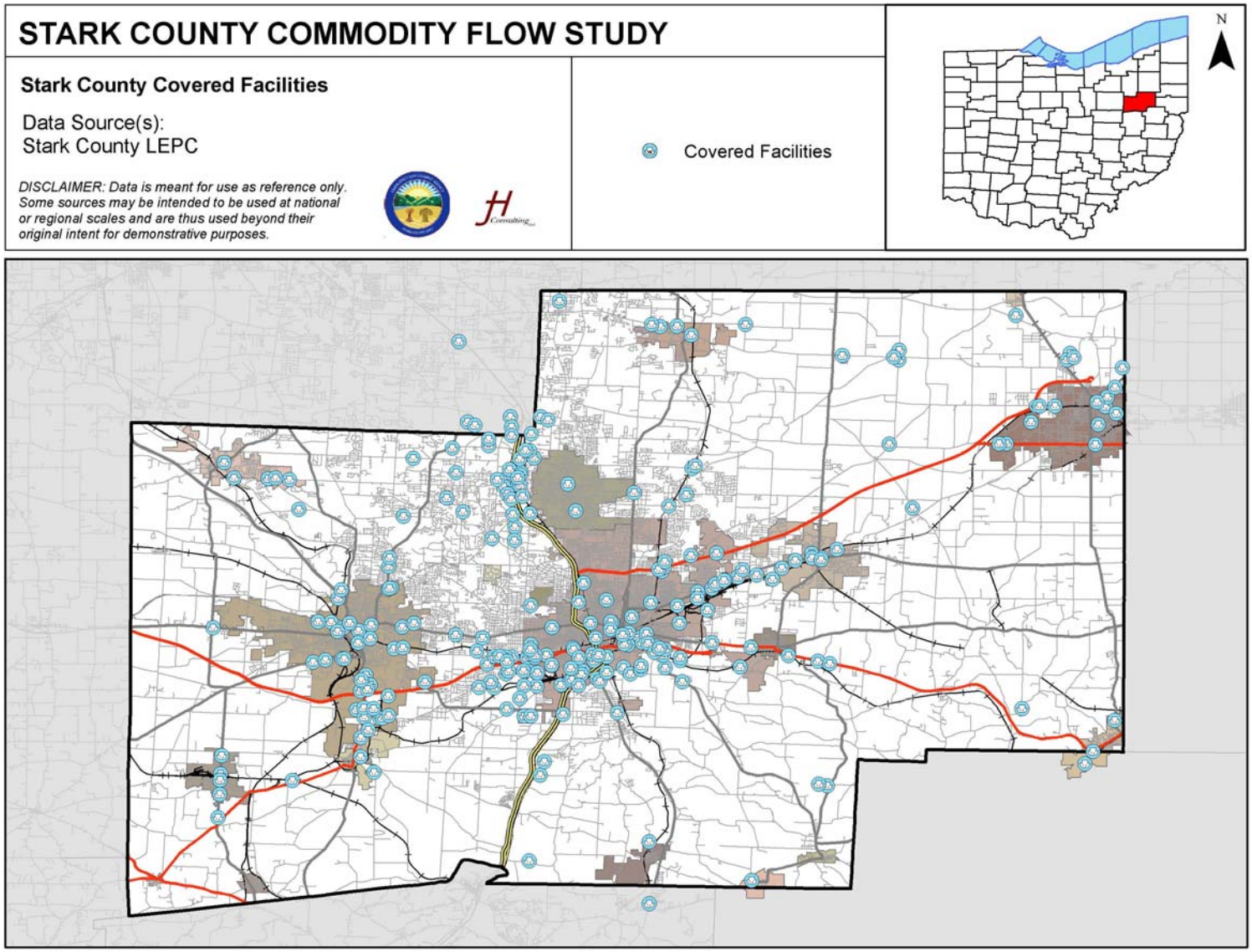
- 423 (23.9%) involved pipelines,
- 309 (17.5%) occurred in a material handling area,
- 221 (12.5%) occurred in a storage area above the ground, and
- 218 (12.3%) involved with ancillary process equipment.

The NTSIP considers incidents that occur while unloading a stationary vehicle or vessel as transportation-based, even those that occur on a fixed-facility property (https://epi.ncpublichealth.com/oee/docs/TransportationVsFixedFacilityDefinition.pdf). In the 2013-2014 report, NTSIP coded 772 transportation-based incidents as occurring while unloading a stationary vehicle or vessel.

6.2 Methodology

This analysis consists entirely of data submitted by covered facilities in Stark County to the local emergency planning committee (LEPC). The county's LEPC coordinator downloaded a table of materials and provided it to the consultant. Figure 6.2.a shows the facilities to which planners submitted a data request.

Figure 6.2.a


STARK COUNTY COMMODITY FLOW STUDY
Stark County Covered Facilities
Data Source(s):
Stark County LEPC
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Covered Facilities
N

This information both verifies and supplements data from the various field studies. It will allow the Stark County to determine which types of materials are present year-round and which materials are simply "passing through" to facilities in neighboring counties.

6.3 Field Data

Two hundred seventy two (272) facilities report the storage and use of hazardous materials to the LEPC. Thus, this analysis yielded a large number of materials for consideration. Table 6.3.1 lists the unique materials identified by the covered facilities analysis.

Table 6.3.1

Unique Materials – Covered Facilities Analysis

Materials (by Trade Name)	
#2 Diesel Fuel	Lustran ABS 348
#2 Heating Oil	Magnesium (Including Alloys)
#4 Heating Oil	Magnesium Silicate Hydrate (Talc)
(Resin Gard) Water Softner Pellets	Manganese
1,2,4-Trimethylbenzene	Manganese dioxide
1-Butanol	Marathon Petroleum Alkylate
1-Chloro-4-(Trifluoromethyl)benzene	Marathon Petroleum Asphalt
1-Propylene	Marathon Petroleum Butane - All Grades
2,6-Di-T-Butyl-P-Cresol (Turbine Oil)	Marathon Petroleum Carbon Black Feedstock
2-Pentanon, 4-Methyl-	Marathon Petroleum Crude Oil
4-Cast De-Icer	Marathon Petroleum Denatured Alcohol
561 Silicone Liquid	Marathon Petroleum Ethane Propane Mix
80% n-propyl alcohol 20% n-propyl acetate blend	Marathon Petroleum Fuel Oil
87 E Gasoline	Marathon Petroleum Gasoline
87 Octane Gasoline	Marathon Petroleum Gasoline - All Grades
89 E Gasoline	Marathon Petroleum Hydrogen Sulfide
90 Regular Gasoline	Marathon Petroleum Iso-Butane
A-1120 Water Treatment	Marathon Petroleum K-1 Kerosene
AB 20X NFC	Marathon Petroleum Kerosene, Sour
Acetic Acid	Marathon Petroleum Molten Sulfur
Acetone	Marathon Petroleum Naphtha, Catalytic Reformed Full Range
Acetylene, dissolved	Marathon Petroleum Naphtha, Straight Run Heavy
Acidsil Z Solution	Marathon Petroleum Naphtha, Straight Run Light
ACIFOAM Acidic foam cleaner-descaler	Marathon Petroleum No. 1 Ultra Low Sulfur Diesel
Additive	Marathon Petroleum No. 2 Ultra Low Sulfur Diesel
Adv. Chem Protectit 196	Marathon Petroleum No.2 ULSD
Advantage Plus 6445 Deposit Inhibitor	Marathon Petroleum Propane - All Grades
Aer-O-Foam XL-3C6 Fluoroprotein Foam Concentrate	Marathon Petroleum Propylene - All Grades
aerosol paints	Marathon petroleum transmix
Air	Marathon Petroleum Wholesale Gasoline Additive Blend

Materials (by Trade Name)	
Air, Compressed	Marathon petroleum, natural gasoline
Aliphatic Petroleum Distillates	Masonry Cement
Alpet D2	Mega San
Alumina	Mehtyl isoamyl ketone
Alumina Oxide	MEK Peroxide
Alumina Trihydrate	Metal Alloys
Aluminate Silicate (Kaolin Clays)	Methanol
Aluminium	Methanol alcohol
Aluminum	Methyl acetate
Aluminum Alloy Dross	Methyl alcohol
Aluminum Alloy Molten	Methyl ethyl ketone
Aluminum chloride	Methyl ethyl ketone peroxide
Aluminum fluoride	Methyl Ethyl Ketone peroxide 35%
Aluminum Metal Powder	Methyl n-amyl ketone
Aluminum molten	Methyl propyl ketone
Aluminum Oxide Abrasive Compound	Michem Dispersions 91525
Aluminum Sulfate	Michem Emulsion 17525
Aluminum sulfate, solution	Michem Emulsion 67235
Aluminum Vanadium Master Alloy	Michem Emulsion 89235
Alumnum sulfate	Michem Emulsion E32535
ammonia	Microcool 114-VL (Cutting Fluid)
Ammonia (Anhydrous)	MIN# E17C3
Ammonia (ASN)	MIN# J96Y0
Ammonia, anhydrous	MIN# K09C9
Ammonio	MIN# U16L3
Amorphous Fumed Silica	Mineral Oil (Petroleum Distillates)
Amorphous Siliceous (Perlite)	Mineral Seal Oil (Kensol 61H)
Anderol 755	Minrol-Si Lining
Anhydrous Aluminum Silicate	Mixed Metal Product
Anhydrous Ammonia, Refrigeration Grade	Mobile Delvac 1300 Super 15W/40
Anthracite Coal	Mold Powder
Anti-Foamer MB-02BF	Molsiv Adsorbents 13X HP 8X12
Antifreeze	Molsiv Adsorbents 4A-DG 1/16
Anti-Freeze	Molten Zinc
Antifreeze (ethylene glycol)	Molybdenum Metal
Antiscalant Ca/Fe-100	Molybdenum Oxide
Argon	Molybdenum Trioxide
Argon , refrigerated liquid	Motion
Argon / carbon dioxide compressed	Motor Oil
Argon, refrigerated liquid	MPA No. 168 FP0168
Aromatic Petroleum Distillates	MPA-170
AS-3030	MPC Biosludge waste
ASCA-1	MPC Catalytic Cracker Feedstock
Asphalt	MPC Catalytic Cycle Oil
Asphalt Binder	MPC Condensate, fuel gas
Asphalt Cement	MPC Condensate, Vacuum Tower
Austin Liquid Bleach 5.25%	MPC Crude Condensate
Automated red BXL	MPC Distillate, Catalytic Cracked Heavy
B-2300 Water Treatment	MPC Distillate, Catalytic Cracked Intermediate
BA-90	MPC Distillate, Crude Oil
Bapolene EVA 1122	MPC Distillate, Full Range Hydrodesulfurized
Bapolene HDPE 2035	MPC Distillate, Heavy Paraffinic

Materials (by Trade Name)	
Bapolene LLDPE 122B	MPC Distillate, Straight Run Heavy
Bapolene PP 5094NA	MPC Distillates, crude oil
Barite	MPC Gas Oil, Hydrotreated Vacuum
Barium carbonate	MPC Gas Oil, Vacuum Heavy
Barium Sulfate	MPC Gas, Acid Scrubber
BASF Naphthamax III	MPC Gas, Alkylation Olefin Feed
Batteries - Lead-Acid Batteries	MPC Gas, Amine System Feed
Batteries wet filled lead / acid	MPC Gas, Cat Cracked Absorber
Batteries, wet, filled with acid	MPC Gas, Cat Cracked Debutanizer Bottoms
Battery	MPC Gas, Cat Cracked Fractionator Sour
Battery Acid	MPC Gas, Cat Cracked Propylene Rich
Battery fluid, acid, with battery	MPC Gas, Cat Cracked Splitter Bottoms
Bayport LLDPE L425	MPC Gas, Cat Cracked Splitter Overhead
Bayport MDPE HL323	MPC Gas, Desulfurizer Naphtha Separator/Stripper
Benefit Phosphate-free liquid chlorinated cleaner	MPC Gas, Distillation Off
Bentonite	MPC Gas, Fuel Sour
Bentonite Clay	MPC Gas, Fuel Sweetened
Benzoic acid, C9-11-branched alkyl esters	MPC Gas, Gasoline Fractionator Stabilizer Off
Bio diesel	MPC Gas, Hydrogen Rich C1-C5 Sour
BIOC11139A	MPC Gas, Hydrogen Rich Sour
BIOC12031A	MPC Gas, Hydrotreater Deisohexanizer Overheads
Biosperse 3001 Microbiocide	MPC Gas, Hydrotreater Stripper Sour
Biosperse 550 Microbiocide	MPC Gas, Reformate H2 Rich HP-FD
Bisphenol A	MPC Gas, Reformate Recycle H2 Rich
Bisphenol A-Epichlorohydrin Polymer	MPC Gas, Reformate Stabilizer Light Ends W/H2
Blastox	MPC Gas, Reformate Stabilizer Overhead
Bleach	MPC Gas, Regenerator Off
Blended Phosphate Solution	MPC Gas, Scot Tail
Blue Melt-A-Way Ice Melter	MPC Gasoline, Straight Run
body filler	MPC HF Acid/Alkylation By-Products
Bonderite 181x Makeup	MPC Lean Methyldiethanolamine
Bonderite 181x Replenishing	MPC Middle Distillate, Sour
Bonderite 300x Makeup	MPC Naphtha, Catalytic Cracked Light
Bonderite 300x Replenisher	MPC Naphtha, Catalytic Reformed Light
Boron	MPC Naphtha, Full Range Sour
BPR 29564W Demulsifier	MPC Naphtha, Hydrotreated Heavy
BPR 81100 Neutralizer	MPC Naphtha, Hydrotreated Light
BPR 81150 Neutralizer	MPC Naphtha, Straight Run Full Range
BPR 81200 Corrosion inhibito	MPC Naphtha, Sweetened
BPR 81230 Corrosion Inhibitor	MPC NO. 2 Ultra Low Sulfur diesel
BPR 81300 Corrosion inhibitor	MPC Oily Sludge
Braskem F008F	MPC Oily Water
Brine / produced water	MPC Residual Fuel Oil
Brine water, minor oil component	MPC Residuum, Atmospheric Tower
Brinewater superfine	MPC Rich Methyldiethanolamine
Brinewater superfine	MPC Slop Oil, Dewatered
Bubreak 4469 Defoamer	MPC Slop Oil, Waste Water Skimmer
Butadiene homopolymer	MPC Sour Water Stripper Gas
Butane	MPC Sour Water, Refinery
Butyl propionate	MPC Spent Caustic, Sodium Hydroxide
Calcium Aluminate	MPC Waste Water, Terminal
Calcium Carbonate	Mulcoa (Calcined Kaolin Bauxite)

Materials (by Trade Name)	
Calcium Chloride	Multi-Grade Motor Oil
Calcium dioxide	N,N-Dimethylaniline
Calcium Hydroxide	Nalco 61067
Calcium hypochlorite	Nalco 61755 Coagulant/Flocculant
Calcium oxide	NALCO® X17B3
Carbon	Naphtha, petroleum, hydrotreated light
Carbon Black	n-butyl acetate
Carbon compounds	Nepheline Syenite
Carbon dioxide	Neutralizer 18L
Carbon dioxide, compressed	Nickel
Carbon dioxide, refrigerated liquid	Nickel Plating Solution (Nickel Metal, Nickel Chloride, Nickel Sulfate, Boric Acid)
Carbon Monoxide	Nitrating acid, mixture, (with > 50% nitric acid)
Casting Powders	Nitric Acid
Caustic	Nitric acid (conc 80% or greater)
Caustic Cleaning Solution (Sodium Hydroxide, Sodium Metasilicate)	Nitric acid, [<70%)
Caustic Potash Liquid (All Grades)	Nitrocellulose
Caustic Potash, Caustic Potash Flake, Caustic Potash Walnut, Caustic Potash 90%, Caustic Potash Briquettes 90%	Nitrogen
Caustic soda	Nitrogen, [Refrigerated Liquid]
Caustic Soda 25%	Nitrogen, hydrogen compressed
Caustic Soda Liquid (All Grades)	Nitrogen, liquid
Caustic soda liquor >=2% - <=50%	Nitrogen, refrigerated liquid
Caustic Soda Solution	Nitrovanadium
CD-32	N-Methyldiethanolamine (MDEA)
Cellulose (Paper)	No. 2 Diesel Fuel
Cement Class H	Nonflammable Gas Mixture: Hydrogen/Nitrogen/Oxygen
Centera Catalyst DC-2618	Nonstick Acidic detergent descaler
Centera Catalyst DN-3651	Normal Propyl Alcohol
Centrificote	Novaset Coreactant 6020
Ceramic Powder	Novel 5040 Polymer
Chelated Caustic MG FP001100	Novel Predator 1130
Chemrez	Novo Mac Plus 60X
Chevron Soluble Oil B, T1, T2	NXC AF-10
Chlorine	Off Road Diesel
Chloro Clean No. 269 FP026900	Oil Dri (Absorbent)
Chromic acid	Oil, Petroleum, N.O.S.
Chromic acid, solid	Oil, Petroleum, NOS
Chromic VI acid	Oils, Insulating and Dielectric
Chromium	Oils, Miscellaneous, Lubricating
Chromium Plating Solution (Chromic Acid)	Oils, Miscellaneous: Transformer
Chromium Trioxide	On Road Diesel
CIP Acid	Oxofoam NP Phosphate-free liquid chlorinated cleaner
Citgo EP 220 Oil	Oxygen
Class A Cement	Oxygen, compressed
Clay	Oxygen, refrigerate liquid
Clean Flow Silica Sand	Oxygen, refrigerated liquid
Clean Flow Silica Sand	Pacemaker T32 Oil
Cleaning and Gas-Freeing Buffer - ETI 995	Paint hardner (polyisocyanate solvent blend)

Materials (by Trade Name)	
CLR-204 5X8 Adsorbent	Paint Resins (Various types)
CM500LN	Paint/Primer
Coal	PAO3079 Parafin Inhibitor
Coal Slag	Paraquat
Comminac AW 46 (Cutting Oil)	Pennz supress D
Construction Aggregate	Pentane
Copper	Permanite Resin
Copper Plating Solution (Copper Cyanide)	Permanna
Corrshield NT4201	Peroyacetic acid
Cream Hardener	Petrieum crude oil
Criterion 234 Catalyst	Petroleum Aspahlt LPA
Criterion DC-2118 Catalyst	Petroleum Coke
Criterion DC-2318 Regenerated Presulfided Catalyst	Petroleum crude oil
Criterion Sentry MaxTrap [Ni,V] VGO Presulfided Catalyst	Petroleum Distilates (Oil and Lubricants)
Criterion Sentry OptiTrap[macroRing]ss CATALYST	Petroleum Distillate
Crude Oil	Petroleum Distillate (Lube & Hydraulic Oil)
Crystalline Quartz Sand	Petroleum Distillates/Mineral Spirits (Solvent 142)
Crystalline Silica	Petroleum hydrocarbon
CS1000SI	Petroleum Lubricants (Pump & Gear Oils)
Cutback Asphalt MC-3000	Petroleum Naptha (Solvent)
Cutback Asphalt MC-70	Petroleum Oils
Cutback Asphalt MC-800	Petroleum Products N.O.S.
Daco Floor Finish	Phenol, 4-methyl-, reaction products with dicyclopentadiene and isobutylene
Deisel Fuel ULSD 2	Phenolic Resin - Liquid
Detergents	Phenolic Resin - Powder
Diala Oil AX (Transformer fluid)	Phillips 66
Dibenzoyl peroxide	Phosphoric acid
DIDP Phthalate	Phosphoric Acid (10% solution)
Diesel	Phosphoric Acid Solution
Diesel Additive	Phosphorus
Diesel Fuel	Plasma Furnace Mixed Waste
Diesel fuel	Polyamide Based Resin
Diesel Fuel (No. 2)	polyamide resin (epoxy hardners)
Diesel Fuel #2	Polyaspartic Ester
Diesel fuel #2 low sulfur	Polychlorinated Biphenals
Diesel Fuel No. 2	Polyethylene glycol
Diesel Fuel Oil	Polypropylene wax
Diesel Fuel/No 2 Fuel Oil	Portland Cement
Diesel Low Sulfer (LSD)	Potassium Chloride
Diesel oil (light)	Potassium Hydroxide
Diesel Oil, Medium	Potassium hydroxide, solution
Diethylene Glycol	Potassiun Permanganate
Diisobutyl ketone	Powdered Refractory
Dimethyl ether	PP
Disodium hexafluorsilicate	PP CO Impact
Distillates (petroleum), catalytic reformer fractionator residue, intermediate-boiling	PP-1500
Divosan Hypochlorite	PPG 114S Silk Screen Varnish
Divosan® Plus (US)	PPG 5085421 "C" Enamel Polyester
Dolo Lime	PPG IL-30 WI 2004877 Gold

Materials (by Trade Name)	
Dolomite	PPG White Base CT WO 3853025 Mod Acrylic
Dossolite	PPG WI 5085320 Gold Enamel Polyester BPANI
DR-10-15	Praestol K 260 FL FLOCCULANT
Drewcor 2130 Corrosion Inhibitor	Pretroleum crude oil
Drewsperse 739 Antifoulant	Pretzel Coat FCC Kosher
Dry Chemical Fire Extinguishers	Produced Fluids
Dry Fertilizer: 0-0-60/62 Gran Potash	Propane
Dry Fertilizer: 20-10-10	Propane
Dry Fertilizer: 25-0-0	Propane, liquified petroleum gas
Dry Fertilizer: 25-0-3	Propylene Glycol
Dry Fertilizer: 25-0-5	Propylene glycol monomethyl ether acetate
Dry skims (zinc oxide and zinc)	PS-40 Unreduced Reforming Catalyst
Dubois Altrox L	Puraspec clear perform 2
Dubois Neutraguard	PVC Cement
Duraplus 2	QTRX2
Duraplus 3	Quartz
Dyed Diesel	Quench Oil
EB Condensate Nonhazardous	Quench Oils
E-Cryl 3600	QuikTurn
Electrographite	R-3
Emulsified Asphalt	Rapidur B 2.5 Ultra
Emulsified Asphalt Tack	Rapidur C 4-083
Emulsified Asphalt Trackless Tack	RE31439FMW
Emulsified Asphalt CRS-2	RE31653SCW Scale Inhibitor
Epoxy resin	RE31824PAO - Paraffin Inhibitor
Ethanol	RE31824UPAO Paraffin Inhibitor
Ethene Homopolymer	Red-Kote Gas Tank Liner
Ethene, chloro-, homopolymer	Refbond
Ethlene Gycol	Refcohol 1010B
Ethoxylated Alcohols	Refractory
Ethyl 3-ethoxypropanoate	Refram 85 Mix
Ethyl acetate	Refrigerated Liquid Nitrogen
Ethyl alcohol	Regular Gasoline
Ethylbenzene	Resin Tech CGS, Cation Exchange Resin
Ethylen glycol/water mixture	Rhodasurf ON 877
Ethylene glycol	Rock Salt
Ethylene glycol monobutyl ether acetate	Rust Preventative 20
Ethylene glycols	S-5 Propietary surfactant
Ethylene Vinyl Acetate Copolymer	Salt
ETI 929 Water-Based Circulation Surfactant	Salt, Sodium Chloride A5
Express	sand
Exthermic Sideboards and Lids	Sand (Whole Grain)
Fatsolve	Sand and Gravel
FE-200L	Sawdust
Ferric Chloride	Scrap Metal
Ferric Chloride Solution	SCW8234 Scale Inhibitor
Ferro Aluminum Alloy	Sentry InterLayer[CoMo] Catalyst
Ferro Aluminum Slag	Sentry MaxTrap[Ni, V] VGO Catalyst
Ferro Chrome	Severly hydrotreated, hydroisomerized synthetic isoalkane
Ferro Chromium	SF-77 Degreaser
Ferro Chromium Alloy	Silica

Materials (by Trade Name)	
Ferro Manganese	Silica Sand
Ferro Molybdenum	Silicomanganese
Ferro Silicon	Silicon Dioxide (Silica)
Ferro Titanium Alloy Powder	Slag
Ferro Vanadium	Slag Cement
Ferro-Boron	Slow Release Fertilizer: 16-0-4 50% Sulfur Coded Urea (SCU)
FerroSilicon	Sludge
Ferro-Titanium Slag	Soda Ash
Ferrous Chloride	sodium (C14-16) olefin sulfonate
Ferrous Chloride, solution	Sodium Bisulfite solution (38%)
Ferrous Sulfate Heptahydrate	Sodium Carbonate
Fertilizer with Herbicide	Sodium Carbonate, Anhydrous
Fertilizer with Herbicide: 22-0-5 .25 Dmsn-AND	Sodium Cyanide
Fertilizer with Inceticide: 21-0-3 .20 Merit -AND	Sodium hydroxide
First Impression Floor Finish	Sodium Hydroxide (Caustic Soda)
Flammable paints	Sodium hydroxide liquid
Flex-Fuel (Gasahol)	Sodium Hydroxide pellets
Flex-Fuel (Gasohol)	Sodium hydroxide solution
FLO MXC pipeline booster	Sodium Hydroxide, Pellets
Floor Absorbent - CN	Sodium hypochlorite
Fluoride Precipitator - ETI 949	Sodium hypochlorite 12% solution
Fluorspar	Sodium hypochlorite solution
Fly Ash	Sodium Metasilicate
Flyash	Sodium Nitrite Mixture
Fork Lift Batteries - Lead	sodium silicate glass powder
Forklift Batteries - Lead	Sodium sulfate
Forklift Batteries - Sulfuric Acid	Sodium Sulfide Solution (Caustic)
Formaldehyde	Sodium sulfite
Formcoat 2B replenisher	SOLENIS 11-760
Formlube 1	Solvent naphtha, petroleum, light aromatic
FORSA PAO104 Paraffin Dispersant	Specialty Steel
FR3 Transformer Oil (Vegetable Oil)	Spectrum Ecopearl
Freiclean 56	Spent Hydrochloric Acid
Freiclean 75	SSS Purple Flame Ice Melter
Fuel additive	Steel Shot
Fuel oil #2	Stoddard solvent
Fuel Oil, (Diesel)	Structure
Fuel oils	Styrene
G-5	Styrene (GEL-COAT)
G-8 Granular Floor Treatment Compound	Styrene (RESIN)
Galaxy 2075	Sulfa Treat
Garnet GMA 80	Sulfix 9260 H2S Scavenger
Gas	Sulfix 9610 Scavenger
Gasflux	Sulfur
Gasoline	Sulfur compounds
Gasoline Additive	Sulfur Diesel
Gasoline blending stocks: reformates	Sulfuric / Lead Acid Batteries
Gasoline Fuel	Sulfuric acid
Gasoline, Regular Unleaded	Sulfuric acid (77-100%)
Gasoline: Automotive (<4.23G lead/gal)	Sulfuric acid & water
Gasolines: Automotive (<4.23G lead/gal)	Sulfuric Acid (50%)

Materials (by Trade Name)	
GE Betz DeposiTrol BL5400	Sulfuric acid (93.2%)
GE Betz FloGard MS6201	Sulfuric acid (in batteries)
GE Betz GenGard GN7210	Sulfuric Acid (in Lead Batteries)
GE Betz GenGard GN8020	Sulfuric acid 66 BE
GE Betz KlarAid PC1192	Sulfuric acid 66 degree Be
Generic Oils	Sulfuric acid in batteries
Glycerin	Sulfuric Acid Pickle Liquor
Graphite	Sulfuric Acid, 77 to 100%
Grease	Sulfuric acid, aqueous
Greenlite-45-L Plus	Sulphuric acid
Grinding Wheels	Super Soxgetter II
Gunning Material	Superfine Inhibited Transformer Oil and/or Used Transformer Oil
Gypsum A-10	Talc
HDPE	Tea
Helium	Thermbond Concrete Series 602-G
Helium / Argon / Co2 / Compressed	ThinFrac™ MP I
Hematite	Ti Alloy Torching Slag - Sand Mixture
Hexamethylene diisocyanate homopolymer	Titanium
Hexane	Titanium (sponge,chips, briquettes containing sponge and chips)
HFA Scale Remover - ETI 987	Titanium Alloy Turnings, Briquettes, Sponge
HiTEC 4142M Fuel Additive	Titanium dioxide
Hot Top Compound/Liners	TK-10
HR 544	TK-431
HRK 658	TK-554
Hubercarb Q325 (limestone)	TK-557
Hydrated Lime	TK-561 BRIM
Hydrated Lyme	TK-576 BRIM
Hydraulic Oil	TK-709
Hydraulic Oil AWG8	TLC-W3 - Rock Salt
Hydraulic Oils	Tolad 249 Fuel additive
Hydrochloric Acid	Tolad 3005 Fuel additive
Hydrochloric acid & water	Tolad 3032 Additive
Hydrochloric acid (10% to 36% solution by volume)	Tolad 3512 Fuel Additive
Hydrochloric Acid 20 Degree Baume	Tolad 3920 Antioxidant
Hydrochloric Acid Liquid 20be	Tolad 9702 additive
Hydrochloric Acid Solution, 2N	Toluene
HydroCover TripleStart	Top Cat 6510
Hydrofluoric Acid 49%	Transformer Oil
Hydrofluoric acide, soultion (<50%)	Transmix
Hydrofluorosilicic acid	TransOgrind EXP (Grinding Fluid)
Hydrofluorrosilicic acid (25% OR LESS)	Tributoxyethyl phosphate
Hydrogen fluoride (100 %)	Trichloretheylene
Hydrogen peroxide (35% TO 52% by weight)	Triethylene Glycol
Hydrogen Sulfide (0.00001%-0.9999%) in Nitrogen	TRS-3001
Hydrogen, refrigerated liquid	TSA Acid Sanitizer
Hydrous Alumina Silicate	Tundish Powder
Hydroxysan Plus ID FP049006	UCARSOL HS Solvent 101
Industrial Cleaner	Ucarsol HS Solvent 104
INEOS HDPE B53-35H-100	UCARSOL LE Solvent 700
INEOS HDPE T50-4400	Ultimet 21 Plus Floor Finish

Materials (by Trade Name)	
INEOS PP H35G-00	Ultra LFA, No. 176 FP0176
Ink	Ultra Low Sulfur Diesel
Ink, Printer's, Flammable	Ultra Low Sulfur Diesel Fuel
Intercool VP-100 50/50 (Ethylene Gylcol)	Unisol Liquid Red B50
Iron chromite	Unisol Liquid Red BK-50
Isobutyl acetate	Universal Plus C6 3%/6% Alcohol Resistant Aqueous Film Forming Foam Concentrate (AR-AFFF)
Isonel 51 Varnish	Unleaded Gasoline
Isophorone diisocyanate	Unleaded Gasoline with Ethanol
Isophoronediisocyanate, Homopolymer	Unsaturated Fatty Acid
Isopropyl alcohol	Urea
Jet A with PFA 56 MB	Urea (diesel exhuast fluid)
Journal Oil	Used Cooking Oil
Kerosene	Used Mineral Based Insulating Oil > 50 ppm PCB
Klaraid	Used Mineral Oil
Kyanite	Used Oil
Ladle Cover	Used Oil & Recyclable Die Lube
Lead	Used Oil and Grease
Lead acid batteries	Valspar 20S02EN White Acrylic Ext Body
Lead Acid Batteries (Sulfuric Acid)	Valspar 20S67WE.1265 I/S Alum BPAN
Lead Acid Battery	Valspar 31S09AC.1161
Lead Acid Battery Wet	Valspar 31S38AA
Lead Oxide	Valspar O/S Clear WO 90x066F
Lead, Metallic	Valspar WV 31S38AA.1161 O/S Clear Non-Epoxy
Lead-Acid Batteries	Vanadium
Lead-Acid Battery	Various Petroleum Distillates
Light Hydrocarbons	Various Petroleum Distillates (Used Oil)
Lime	Varnish Pedigree 433-75 VTC
Lime Slurry - Calcium Hydroxide	Vinyl acrylic polymer emulsion
Lime Solution	VM&P Naphtha (Solvent naphtha, petroleum, light aliphatic)
Liquid Argon	Waste Ink/n-propyl alcohol/n-propyl acetate mixture
Liquid Asphalt	Waste Motor Oil
Liquid Bril Tak VC85	Waste Oil
Liquid Calcium Chloride	Waste Oils and Grease
Liquid Carbon Dioxide	Water Based Paint
Liquid Fertilizer: 17-2-3	Water Glycol
Liquid Fertilizer: 17-2-5	Water Glycol Hydraulic Fluid
Liquid nitrogen	Water Reducible Alkyd Dip Enamel
Liquid Oxygen	Waxes: Paraffin
Liquified petroleum gas	Xeric 7020 Heavy Oil Demulsifier
LLDPE	Xeric 7021 Heavy Oil Demulsifier
LLDPE Roto Granular	xylene
Low Dense cement	Xylene (Mixed Isomers)
Low Temp Draw Salt W/O	Zinc
Lube Oil & Grease	Zinc ammonium chloride
Lubricanting Base Oil (Petroleum)	Zinc compounds
lubricants and oils	Zinc Free Deisel Engine Oil
Lubrication oil	Zyme-Flow UN657

Of the materials in Table 6.3.1, the facilities listed the following materials as

"extremely hazardous substances" (EHS). Several appear on the Environmental Protection Agencies while others are listed by trade name and may contain an EHS in them.

- Acetic Acid
- Aluminum Fluoride
- Ammonia
- Battery Acid
- BPR Neutralizer
- Bubreak4469 Defoamer
- Caustic Soda
- Chlorine
- CIP Acid
- Corn Starch
- Criterion DC-2318 Regenerated Presulfide Catalyst
- Cumyl Hydroperoxid
- Divosan Plus
- Ethylene Glycol
- Fatsolve
- Ferric Chloride
- Formaldehyde
- Freiclean 75
- Hydrochloric Acid
- Hydrofluoric Acid
- Hydrofluorosilicic Acid
- Hydrogen Fluoride
- Hydrogen Sulfide
- Hydroxan Plas ID
- Isophorone Disocyanate
- Karaid
- Lead
- Lead Acid Battery
- Liquid Nitrogen
- MPC Gas, Amine System Feed
- MCP Gas, Cat Cracked Fractionator Sour
- MCP Gas, Fuel Sour
- MPC Gas, Hydrogen Rich C1-C5 Sour
- MPC Gas, Rich Sour
- MPC Gas, Hydrotreater Deisohexanizer Overheads
- MPC Gas, Hydrotreater Stripper Sour
- MPC Gas, Scot Tail
- MPC HF Acid/Alkylation By-Products
- MPC Lean Methyldiethanolamine
- MPC Middle Distillate, Sour
- MPC Naptha, Full Range Sour
- MPC Residual Fuel Oil
- MPC Residuum, Atmospheric Tower
- MPC Rich Methyldiethanolamine
- MPC Sour Water Stripper Gas
- Nitrating Acid, Mixture, (With >50% Nitric Acid)
- Nitric Acid
- Nitric Acid (Conc 80% or greater)
- Nitric Acid (<70%)
- Nonstick Acidic detergent descaler
- Paraquat
- Peroxyacetic Acid
- Phenolic Resin
- Phosphoric Acid
- Phosphorus
- PPG 1145 Silk Screen Varnish

- Marathon Petroleum Crude Oil
- Marathon Petroleum Fuel Oil
- Marathon Petroleum Hydrogen Sulfide
- Marathon Petroleum Kerosene, Sour
- Marathon Petroleum Molten – Sulfur
- Marathon Petroleum Proylene – All Grades
- Mega San
- Methanol
- MPA No. 268
- MPC Catalytic Cracker Feedstock
- MPC Crude Condensate
- MPC Gas, Acid Scrubber
- PPG 5085421 "C" Enamel Polyester BPANI
- Sodium Cyanide
- Sodium Hypochlorite
- Sodium Metasilicate
- Solenis 11-760
- Sulfuric Acid
- Tolad 3005 Fuel Additive
- TSA Acid Sanitizer
- Ultra LFA, No. 176
- Valspar 31509AC.1161
- Valspar 31S38AA
- Valspar O/S Clear WO 90x066F
- Valspar WV 31S38AA.1161 O/S Clear Non-Epoxy
- Water Based Paint

Covered facilities report use and storage of generally-named (i.e., non-trade named) materials from seven of the nine U.S. Department of Transportation hazard classes. Table 6.3.2 summarizes the reported materials by U.S. DOT hazard class.

Table 6.3.2

Hazardous Materials by Class – Covered Facilities Analysis

Hazard Class	Reported Materials	
1: Explosives	N/A	
2: Flammable, Non-Flammable, & Poisonous Gases	1-Propylene Acetylene Argon Argon, Refrigerated Liquid Butane Carbon Dioxide Carbon Monoxide Chlorine Crude Oil Diesel Diesel Fuel Dimethyl Ether	Ethyl 3-Ethoxypropionate Helium Hydrogen Sulfide Methanol N-Butyl Acetate Nitrogen Nitrogen, Refrigerated Liquid Normal Propyl Alcohol Oxygen Pentane Propane

Hazard Class	Reported Materials	
3: Flammable Liquids	1-Butanol 2-Pentanon 4-Methyl Acetone Asphalt Bisphemol A Carbon Black Diisobutyl Ketone Ethanol Ethyl Acetate Ethybenzene Gasoline Hexane Isobutyl Acetate	Isopropyl Alcohol Kerosene Methyl Acetate Methyl Ethyl Ketone Methyl N-Amyl Ketone Methyl Propyl Ketone Petroleum Crude Oil Petroleum Distillates Petroleum Oil Styrene Toluene Xylene
4: Other Ignitable Hazards	1,2,4-Trimethylbenzene Magnesium Aluminum Metal Powder Molybdenum Metal	Sodium Sulfide TEA Zinc
5: Oxidizers	Calcium Dioxide Calcium Hypochlorite Chlorine Chromic Acid Chromium Trioxide Dibenzoyl Peroxide	Hydrogen Peroxide Methyl Ethyl Ketone Peroxide Nitrating Acid Nitric Acid Potassium Permanganate Sodium Nitrite
6: Poisonous & Infectious Materials	Ammonia Ammonia Anhydrous Barium Carbonate Barium Sulfate Barite Chromic Acid Copper Plating Solution (Copper Cyanide Disodium Hexafluorosilicate	Isophorone Diisocyanate Molybdenum Oxide Molybdenum Trioxide N,N-Dimethylaniline Nitric Acid Sodium Cyanide Trichloroethylene Vanadium
7: Radioactive Materials	N/A	
8: Corrosive	1-Chloro-4-(Trifluoromethyl)benzene Acetic Acid Aluminum Chloride Aluminum Sulfate, Solution Battery Fluid, Acid Battery Fluid, Alkali Bisphonel Acid Bleach Calcium Oxide Caustic Potash, Liquid Caustic Soda Chlorine Chromic Acid Chromium Ferric Chloride Ferrous Chloride	Hydrochloric Acid Hydrofluoric Acid Hydrofuorosilicic Acid Hydrofluorosilicic Acid (25% or less) Nitrating Acid Nitric Acid Paint/Primer Potassium Hydroxide Sodium Bisulfite Solution Sodium Hydroxide Sodium Hypochlorite Sodium Metasilicate Sodium Silicate Glass Powder Sulfuric Acid Zinc Ammonium Chloride
9: Other Miscellaneous Hazardous	Aluminum Molten Formaldehyde Sulfur	

Figure 6.3.a is a high-level spatial analysis. This map shows the facilities reporting to the LEPC along with two buffers from each: one at a 330’ and another at 1,500’. Planners derived the distances from the isolation distances suggested for the many of the reported materials by the latest edition of the U.S. DOT *Emergency Response Guidebook* (DOT, 2016).

Figure 6.3.a

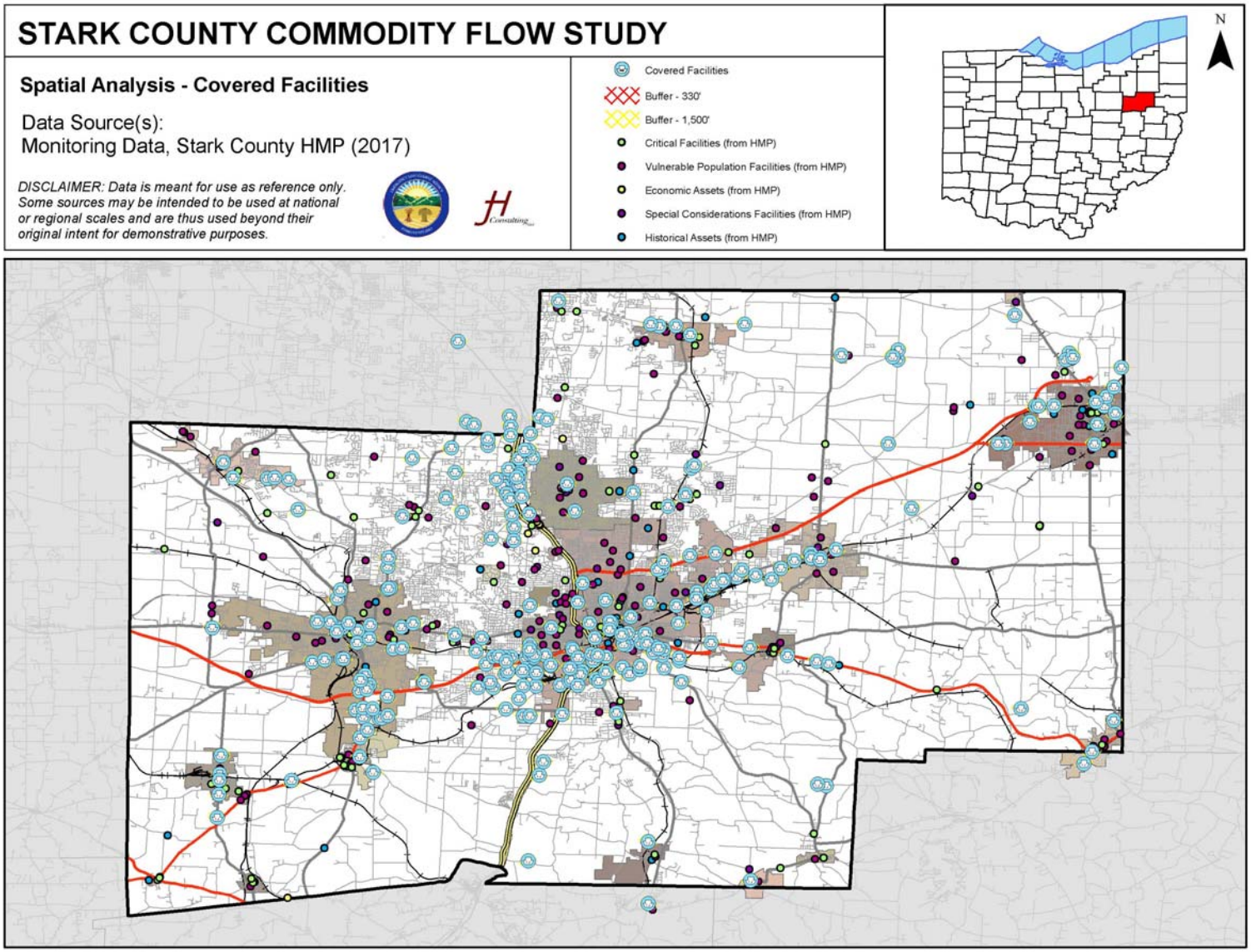

STARK COUNTY COMMODITY FLOW STUDY
Spatial Analysis - Covered Facilities
Data Source(s):
Monitoring Data, Stark County HMP (2017)
DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.
Covered Facilities
Buffer - 330'
Buffer - 1,500'
Critical Facilities (from HMP)
Vulnerable Population Facilities (from HMP)
Economic Assets (from HMP)
Special Considerations Facilities (from HMP)
Historical Assets (from HMP)
N

Table 6.3.3 shows the community assets included in the 1,500' buffer area. These assets were taken from the *Stark County 2017 Multi-Jurisdictional Hazard Mitigation Plan* (Stark County EMA, 2017).

Table 6.3.3

Community Assets Located in 1,500' Isolation Distance from Facilities

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Alliance Bank Building					X
Alliance City Health Department	X				
Alliance Maintenance Building	X				
Alliance Police Department	X				
Alliance Wastewater Treatment Plant	X				
American Aluminum			X		
American Medical Response	X				
Amos McDannel Elementary School		X			
Barbara F. Schreiber Elementary School		X			
Barber-Whitticar House					X
Bartley Ambulance Service	X				
Bel Air Senior Living Community		X			
Bender's Restaurant Belmont Buffet					X
Brewster Cheese			X		
Brewster Fire/EMS Department	X				
Brewster North Water Tower	X				
Brewster Parke Senior Living		X			
Brewster Police Department	X				
Brewster Post Office				X	
Brewster Railroad YMCA / Wandle House					X
Brewster Village Hall	X				
Brewster Wastewater Treatment Plant	X				
Canal Fulton Elementary School		X			
Canal Fulton Fire Department	X				
Canal Fulton Post Office				X	
Canterbury Villa of Alliance		X			
Canton City Health Department	X				
Canton City SD	X				
Canton Police Department	X				
Canton Public Library					X
Canton South High School		X			
Canton Township Fire Department	X				
Canton Water Treatment Plant	X				
City National Bank Building					X
City of Canton Communication Center	X				
City of North Canton	X				
Community Care Center		X			
Country Lawn Center for Rehabilitation & Nursing		X			

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
Dewalt Building					X
Eagles Building-Strand Theater					X
Eagles' Temple					X
Elson Magnolia Flour Mill					X
Emergency Medical Transport	X				
Emerson ES		X			
Fife, Harry E., House					X
First Ladies National Historic Site					X
First Methodist Episcopal Church					X
First Methodist Episcopal Church					X
First National Bank Building					X
First Reformed and First Lutheran Churches					X
Five Oaks					X
Frances Apartment Building					X
Freshman Academy		X			
Genoa Elementary School		X			
Glamorgan Castle					X
Hartford Middle School		X			
Hartville Fire Department	X				
Hartville Hotel					X
Hartville Police Department	X				
Hartville Post Office				X	
Hazen Middle School		X			
Hoover Company Historic District					X
Hotel Courtland					X
Ideal Department Store Building					X
Jackson Belden Post Office				X	
Jackson High School		X			
Jackson Local Schools		X			
Lake Elementary School		X			
Landmark Tavern					X
Lathrop Elementary School		X			
Lawrence Township Police Department	X				
Loew-Define Grocery Store and Home					X
Longfellow Middle School		X			
Lorin Andrews Middle School		X			
Louisville Elementary School		X			
Louisville Fire Department	X				
Louisville Police Department	X				
Louisville Water Treatment Plant	X				
Magnolia Elementary School		X			
Magnolia Volunteer Fire Department	X				
Marlboro Elementary School		X			
Marlboro Volunteer Fire Department	X				
Mary L. Evans Kindergarten		X			
Massillon City Health Department	X				
Massillon City SD Administration BLD	X				
Massillon Post Office				X	
Massillon Sewage Treatment Plant	X				
McIntosh Oil and Gas Storage			X		

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
McKinley Health Care Center		X			
Meadow Wind Health Care Center	X	X			
Mellett-Canton Daily News Building					X
Mercy Medical Center	X	X			
Mercy Stat Care	X	X			
Metalco			X		
Middlebranch Elementary School		X			
Middlebranch Middle School		X			
Minerva Police Department	X				
Minerva Post Office				X	
NE Waterworks Post Office				X	
New Market Station Post Office				X	
Norfolk Southern Rail Yard			X		
North Canton EMS	X				
North Canton Fire Department	X				
North Canton Police Department	X				
North Canton Water Treatment Plant	X				
Oakwood Middle School		X			
Old McKinley High School					X
Onesto Hotel					X
Palace Theater					X
Plain Township Fire Station Two	X				
Plain Township Hall	X				
Plain Township Road Garage	X				
Pleasant View School for Arts Middle School		X			
Portage Collab Montessori School		X			
R.G. Drage Career Education Center		X			
Red Cross of Central Stark County	X				
Reedurban Elementary School		X			
Rural Metro Ambulance Service	X				
Saint Joseph's Roman Catholic Church					X
Sandy Valley High School		X			
Schuffenecker, August Building					X
Shearers Foods, Inc.			X		
St. Edward Hotel					X
St. John's Catholic Church					X
St. Louis Church					X
St. Mary's Catholic Church					X
St. Peter Church					X
St. Timothy's Protestant Episcopal Church					X
Stark Ambulance Service	X				
Stark County Courthouse and Annex					X
The Venue Mall			X		
Tri-County Emergency Medical Services	X				
Trinity Lutheran Church					X
Uniontown Elementary School		X			
Washington Middle School		X			
Wheeling & Lake Erie Railway			X		

Asset Name	Critical Facility	Vulnerable Population	Economic Asset	Special Consideration	Historical
York Elementary School		X			

6.4 Conclusions

Table 6.4.1 presents the top 10 materials identified by the covered facilities analysis.

Table 6.4.1

Top 10 Materials – Covered Facilities Analysis

Material Name	UN Number	Total Reports
Crude Oil	1267	158
Sulfuric Acid	1830	74
Diesel	1993	60
Kerosene	1993	24
Lead	N/A	21
Ammonia	1005	18
Lead Acid Batteries	N/A	18
Nitrogen	1977	18
Argon	1951	15
Oxygen	1072	15
Sodium Hydroxide	1824	15

The covered facilities analysis yielded the conclusions.

- The covered facilities analysis contributed the largest number of unique materials to the study.
- All of the reported materials were listed in the highway and/or rail analysis.

7.0 CONCLUSION AND RECOMMENDATIONS

7.1 Conclusions

The following conclusions summarize the transport, use, and storage of hazardous materials in Stark County.

- This commodity flow study reflects a total of 223 different specifically-named materials.
  - Sixteen materials (7.14%) appeared only in the highway analysis.
  - Two hundred five materials (91.97%) appeared only in the railway analysis.
  - Two materials (0.89%) appeared only in the pipeline analysis.

- This study identified 14 “extremely hazardous substances” (EHS) that require extraordinary planning and response considerations/.

  In addition to those materials above, the study included a total of nine other placards during the highway analysis that did not have a UN number.
  - Corrosive
  - Dangerous
  - Explosives
  - Flammable gas
  - Flammable liquid
  - Flammable solid
  - Miscellaneous
  - Non-flammable gas
  - Oxidizer

7.2 Recommendations

7.2.1 Continue to update this flow study on a regular basis.

Though its composition has changed, Stark County has seen a steady industrial presence in recent years, as has much of the surrounding region. The amounts and types of hazardous materials utilized and stored may fluctuate as industry changes. For this document to remain an accurate, viable basis for hazardous material planning and training efforts, it should reflect these continual changes. The document should be updated every three to five years. Local officials may also decide to update the content of the material in this report (based on data that may become available). The 2019 update serves as an example.

7.2.2 Consider additional site-specific scenario analyses upon collection of future data.

There is value in studying the same highway monitoring sites at similar times in the future. Data collection in such a manner will enable trend analysis. However, local officials may consider other strategically-selected intersections or areas for monitoring. If other areas are monitored, consider conducting similar scenario analyses as included in Section 2.0 above. Site-specific analyses may contribute to greater agency-specific preparedness for the first-due responders serving those sites.

7.2.3 Conduct an in-depth hazardous material vulnerability assessment based on covered facilities and the areas surrounding them.

This study presents a brief list of materials used and stored at the covered facilities that report to the Stark County Emergency Management Agency. By design, this study only lists the materials that are present in Stark County. A detailed vulnerability assessment would characterize not only the material presence but also material quantities, at-risk populations, potential protective measures, etc. A detailed vulnerability assessment would be a companion to this document.

7.2.4 Ensure that responders receive training in response to incidents involving flammable liquid, gas, and corrosive products.

In general, these types of materials are the frequently-transported products in the county (as part of Classes 2, 3, and 8). As such, they are the hazardous materials most likely to be involved in an incident. Responders should seek training to prepare themselves for such an incident properly.

7.2.5 Ensure that responders receive training in the response involving 14 EHSs reported in the study.

While there may be several other types of EHS transported through the Stark County, these 14 materials were documented during the study.

7.2.6 Design emergency exercises that include the materials recorded in this study.

Earlier recommendations in this report call for the need to properly train local responders. A significant aspect of this preparedness is designing realistic exercises involving the materials they are likely to encounter. Training efforts are misspent if

involving materials that responders are highly unlikely to see in a local incident.

7.2.7 Encourage CSX Transportation, Norfolk Southern, and Wheeling Lake Erie Railway representatives to participate in emergency exercises.

Due to the presence of rail transport in Stark County, Rail Companies could be a critical component of a hazardous material response. As such, Rail Companies participation in exercises would greatly benefit the coordination that would need to occur between them and local responders during an actual incident.

7.2.8 Coordinate with officials that may ship commodities via air.

The airport manager at the Akron-Canton Airport reported minimal hazardous materials shipments from the airport, though Castle Aviation may ship small quantities of some materials. Castle Aviation officials were unable to participate in this project. Consider coordinating with the Summit County LEPC to see if Castle Aviation is active with that planning body, and if so, share information accordingly. If not, consider inviting Castle Aviation to a future Stark County LEPC meeting.

7.2.9 Encourage covered facilities that use/store extremely hazardous substances to participate in emergency exercises.

Any facility that actively participates in emergency exercises enhances the overall preparedness in the study area. However, those facilities with EHS materials should be particularly encouraged to participate due to the EPA designation of the materials they use/store.

APPENDIX 1

HAZARDOUS MATERIALS IN STARK COUNTY

This appendix contains a complete list of all of the hazardous materials identified in Stark County, regardless of phase.

Table A1.1

Materials List (w/ Known Corresponding UN Number)

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Articles, Pyrotechnic	0014		X			
Environmentally Hazardous	0036		X			
Articles, Pyrotechnic	0055		X			
Cases, Cartridge, Empty W	0323		X			
Flammable Liquids, N.O.S.	0335		X			
Fish Meal, Stabilized	0336		X			
Waste Flammable Liquids,	0336		X			
Cartridges, Power Device	0337		X			
Cartridges For Weapons, B	0366		X			
Flammable Liquids, N.O.S.	0431		X			
Fireworks	0432		X			
Detonators For Ammunition	0454		X			
Acetylene, dissolved	1001					X
Environmentally Hazardous	1002		X			
Acrylamide Solution	1005		X			
Igniters	1005		X			
Compressed Gas, Flammable	1006		X			
Oxygen, Compressed	1009		X			
Butadiene, Stabilized	1010		X			
Articles, Pressurized Pne	1011		X			
Carbon dioxide, compressed	1013					X
Environmentally Hazardous Waste	1013		X			
Carbon Monoxide	1016					X
Adhesives	1017		X			
Alcohols, N.O.S.	1017		X			
Chlorine	1017		X			X
Ethyl Methyl Ketone	1018		X			
Waste Environmentally Hazardous	1018		X			
Liquefied Gas, N.O.S.	1028		X			
Alcoholic Beverages	1030		X			
FAK-Hazardous Materials	1030		X			
Liquefied Petroleum Gas	1032		X			
Dimethyl ether	1033					X
Liquefied Gas, Flammable,	1035		X			
Trimethylamine, Anhydrous	1037		X			
Elevated Temperature Liquid	1040		X			
Flammable Liquids, N.O.S.	1040		X			
Ethylene oxide & CO2 mix.	1041	X				

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Waste Flammable Liquids,	1044		X			
Argon	1046		X			X
Helium	1046					X
*No longer in use	1047	X				
Nitrogen Trifluoride	1049		X			
Butyl Acetates	1052		X			
Potassium Nitrate	1052		X			
Corrosive Liquids, Toxic,	1055		X			
Environmentally Hazardous	1055		X			
Refrigerant Gases, N.O.S.	1056		X			
Environmentally Hazardous	1057		X			
Helium, Refrigerated	1065		X			
Liquefied Gas, N.O.S.	1066		X			
Neon, Compressed	1066		X			
Nitrogen	1066					X
Nitrogen, compressed	1066	X				
Nitrogen, hydrogen compressed	1066					X
Sulfuric Acid	1066		X			
Liquefied Gas, N.O.S.	1072		X			
Oxygen, Compressed	1072		X			X
Oxygen, ref. liquid	1073	X				X
Butane	1075		X			X
Butyl Acrylates, Stabilized	1075		X			
Chemical Under Pressure,	1075		X			
Corrosive Liquid, Basic,	1075		X			
Difluoromethane	1075		X			
Environmentally Hazardous	1075		X			
Formaldehyde Solutions	1075		X			
Fuel Oil	1075		X			
Heptafluoropropane	1075		X			
Isobutane	1075		X			
Liquefied Petroleum Gas	1075		X			
Liquefied petroleum gas	1075					X
LP gases	1075	X				
N-Propanol	1075		X			
Petroleum Gases, Liquefied	1075		X			
Propane	1075		X			X
Propylene	1075		X			
Refrigerant Gas R404A	1075		X			
Refrigerating Machines	1075		X			
Tetrafluoromethane	1075		X			
Toluene	1075		X			X
1-Propylene	1077		X			X
Vinyl Chloride, Stabilize	1077		X			
Chlorodifluorobromo- Meth	1078		X			
Organic Peroxide Type C,	1079		X			
Environmentally Hazardous	1080		X			
Krypton, Compressed	1083		X			
Elevated Temperature Liquid	1086		X			
Vinyl Chloride, Stabilize	1086		X			
Acrylamide Solution	1090		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Corrosive Liquid, Acidic,	1090		X			
Allyl Alcohol	1098		X			
Isobutanol	1098		X			
Organic Peroxide Type D,	1098		X			
Flammable Liquids, N.O.S.	1104		X			
Safety Devices	1104		X			
Elevated Temperature Liquid	1105		X			
Hexanes	1105		X			
Methyl n-amyl ketone	1110					X
Cresols, Liquid	1114		X			
Sulfuric Acid	1114		X			
1-Butanol	1120					X
Corrosive Liquid, Basic,	1120		X			
Environmentally Hazardous	1120		X			
Esters, N.O.S.	1120		X			
Corrosive Solid, Basic, I	1123		X			
Liquefied Petroleum Gas	1123		X			
n-butyl acetate	1123					X
Potassium Hydroxide, Solution	1123		X			X
Flammable Liquids, Corrosive	1127		X			
Terpene Hydrocarbons, N.O	1130		X			
Flammable Liquids, N.O.S.	1131		X			
1,2-Dimethoxyethane	1133		X			
Ethanol	1133		X			
Flammable Liquids, N.O.S.	1133		X			
Methacrylic Acid, Stabilized	1133		X			
Petroleum Distillates, N.	1133		X			
Polyester Resin Kits	1133		X			
Propylene Tetramer	1133		X			
Vehicle, Flammable Liquid	1133		X			
Lithium Metal Batteries	1134		X			
Nitrogen, Compressed	1139		X			
Chlorobutanes	1145		X			
Diethyl Ether	1149		X			
Sulfur Hexafluoride	1150		X			
Ethyl Chloride	1155		X			
Diisobutyl ketone	1157		X			
Environmentally Hazardous	1157		X			
Resin Solution	1157		X			
Flammable Liquid, N.O.S.	1161		X			
Carbon Dioxide	1163		X			
Alcohols, N.O.S.	1166		X			
Camphor Oil	1169		X			
Ethanol	1169		X			
Butanols	1170		X			
Esters, N.O.S.	1170		X			
Ethanol, Ethyl Alcohol	1170	X	X			X
Picolines	1170		X			
Printing Ink	1170		X			
Sulfuric Acid, Spent	1170		X			
Xylenes	1170		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Adhesives	1171		X			
Chlorodifluoromethane	1173		X			
Elevated Temperature Liquid	1173		X			
Dioxolane	1175		X			
Ethyl Butyrate	1176		X			
Alcohols, N.O.S.	1180		X			
Ethyl Borate	1184		X			
Isobutyl Methacrylate, St	1191		X			
Diisobutyl Ketone	1192		X			
Ethyl Acetate	1193		X			
Methyl ethyl ketone	1193					X
Petroleum Distillates, N.	1193		X			
Alcohols, N.O.S.	1197		X			
Organic Peroxide Type E,	1199		X			
Combustible Liquid, N.O.S	1203		X			
Elevated Temperature Liquid	1203		X			
Environmentally Hazardous	1203		X			
Environmentally Hazardous	1203		X			
Gasoline	1203	X				X
Sodium Hydroxide pellets	1203					X
Sodium Hydroxide, Solid	1203		X			
1-Chloro-1,1-Difluoro- Et	1206		X			
Environmentally Hazardous	1206		X			
Environmentally Hazardous	1208		X			
Hexane	1208					X
Alcohols, N.O.S.	1210		X			
Ink, Printer's, Flammable	1210					X
Methyl Acetate	1210		X			X
Environmentally Hazardous	1212		X			
Ethanol And Gasoline Mixt	1212		X			
Isobutyl acetate	1213	X				
Environmentally Hazardous	1219		X			
Ethylene Oxide	1219		X			
Flammable Liquids, N.O.S.	1219		X			
Fuel, Aviation, Turbine E	1219		X			
Isobutanol	1219		X			
Isopropyl alcohol	1219					X
Kerosene	1223					X
Adhesives	1230		X			
Butyl Methyl Ether	1230		X			
Carbon Dioxide, Refrigerated	1230		X			
Compressed Gas, Flammable	1230		X			
Flammable Liquids, N.O.S.	1230		X			
Hydrogen Peroxide, Aqueous	1230		X			
Life-Saving Appliances, N	1230		X			
Methyl alcohol	1230					X
Environmentally Hazardous	1231		X			
Flammable Liquids, Corrosive	1231		X			
Gasoline	1245		X			
Petroleum Gases, Liquefied	1245		X			
Methyl Methacrylate Monomer	1247		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Petroleum Sour Crude Oil,	1247		X			
Methyl propyl ketone	1249					X
*No longer in use	1254	X				
Environmentally Hazardous	1262		X			
Octanes	1262		X			
Alcohols, N.O.S.	1263		X			
Elevated Temperature Liquid	1263		X			
Ethanol	1263		X			
Flammable Liquids, N.O.S.	1263		X			
Hydrogen Peroxide, Aqueous	1263		X			
Isopropanol	1263		X			
Metal Powders, Flammable,	1263		X			
Methyl Cyclohexane	1263		X			
Tinctures, Medicinal	1263		X			
Xylenes	1263		X			
Acrylic Acid, Stabilized	1265		X			
Battery-Powered Vehicle	1265		X			
Pentanes	1265		X			
Adhesives	1266		X			
Resin Solution	1266		X			
Crude Oil	1267			X		
FAK-Hazardous Materials	1267		X			
Oil, Petroleum, N.O.S.	1267					
Petroleum crude oil	1267	X	X			X
1-Methoxy-2-Propanol	1268		X			
Acetone	1268		X			X
Environmentally Hazardous	1268		X			
Extracts, Flavoring, Liquid	1268		X			
Freight All Kinds, Hazard	1268		X			
Methanol	1268		X			
Other Regulated Substance	1268		X			
Petroleum Distillates	1268	X	X			X
Petroleum Products	1268		X	X		X
Allyl Glycidyl Ether	1272		X			
Environmentally Hazardous	1274		X			
Styrene Monomer, Stabilized	1274		X			
Combustible Liquid, N.O.S	1275		X			
Environmentally Hazardous	1275		X			
Methanol	1276		X			
Corrosive Liquids, N.O.S.	1280		X			
Flammable Liquids, N.O.S.	1280		X			
Diesel	1282		X			X
Coating Solution	1292		X			
Flammable Liquids, N.O.S.	1293		X			
Dimethyl Carbonate	1294		X			
Environmentally Hazardous	1294		X			
Ferric Chloride, Solution	1294		X			
Toluene	1294	X				
Cresols, Liquid	1301		X			
Elevated Temperature Liquid	1301		X			
Freight All Kinds, Hazard	1302		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Carbamate Pesticides, Sol	1304		X			
Aerosols, Flammable, N.O.	1307		X			
Alcohols, N.O.S.	1307		X			
Butane	1307		X			
Environmentally Hazardous	1307		X			
Methanol	1307		X			
Methanol alcohol	1307					X
Oxidizing Solid, Toxic, N	1307		X			
Water-Reactive Solid, N.O	1309		X			
Azodicarbonamide	1325		X			
Combustible Liquid, N.O.S.	1325		X			
Environmentally Hazardous	1325		X			
Liquefied Petroleum Gas	1325		X			
Camphor	1328		X			
Calcium	1334		X			
Organometallic Substance	1340		X			
Matches Safety	1350		X			
Hematite	1376					X
Combustible Liquid, N.O.S.	1378		X			
Petroleum Distillates, N.	1384		X			
Aluminum	1396					X
Aluminum Metal Powder	1396					X
Alcohols, N.O.S.	1401		X			
Diisobutyl Ketone	1402		X			
Phosphorus Pentasulphide	1402		X			
Organometallic Substance	1405		X			
Combustible Liquid, N.O.S.	1408		X			
Calcium Silicide	1415		X			
Permanganates, Inorganic,	1444		X			
Calcium dioxide	1457					X
Oxidizing Liquid, N.O.S.	1457		X			
Chromic acid, solid	1463					X
Chromium Trioxide	1463					X
Naphthalene, Crude	1463		X			
Calcium Peroxide	1475		X			
Magnesium Perchlorate	1476		X			
Paint	1477		X			
Ammonium Nitrate	1479		X			
Oxidizing solid, n.o.s.	1479	X				
Strontium Nitrate	1479		X			
Flammable Liquids,	1486		X			
Paint Related Material	1486		X			
Paint hardener (polyisocyanate solvent blend)	1489					X
Metal Catalyst, Wetted	1490		X			
Magnesium Peroxide	1494		X			
Magnesium	1495		X			
xylene	1498		X			X
Oxidizing Solid, Corrosive	1500		X			
Sodium Bromate	1505		X			
Sodium Persulfate	1507		X			
Ammonium Persulfate	1509		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Barite	1564					X
Barium carbonate	1564					X
Barium Sulfate	1564					X
Potassium Cyanide, Solid	1564		X			
Copper Plating Solution (Copper Cyanide)	1587					X
Corrosive Liquid, Basic,	1593		X			
Hydrogen Peroxide, Aqueous	1593		X			
Toxic Solid, Inorganic, N	1594		X			
Sodium Hydroxide, Solid	1604		X			
Environmentally Hazardous	1648		X			
Cresols, Solid	1680		X			
Pyrethroid Pesticide, Liquid	1687		X			
Sodium Cyanide	1689					X
1-Bromo-3-Chloropropane	1690		X			
Elevated Temperature Liquid	1715		X			
Phosphoric Acid Solution	1715		X			
Butyl acid phosphate	1718	X				
Zinc Chloride, Solution	1718		X			
Caustic	1719					X
Caustic alkali liq., n.o.s.	1719	X	X			
Corrosive Liquids, N.O.S.	1719		X			
Aluminum chloride	1726					X
Corrosive Liquid, Basic,	1727		X			
Acrylic Acid, Stabilized	1736		X			
Butane	1738		X			
Flammable Liquids, N.O.S.	1738		X			
Flammable Liquids, N.O.S.	1751		X			
Chromic acid	1755					X
Chromium	1755					X
Chromium Plating Solution (Chromic Acid)	1755					X
Corrosive Liquids, N.O.S.	1759		X			
2-Diethylaminoethanol	1760		X			
Acetic Acid, Glacial	1760		X			
Alkyl Sulfonic Acids, Sol	1760		X			
Aluminum Chloride, Solution	1760		X			
Ammonium Nitrate Based Fe	1760		X			
Butyl Acid Phosphate	1760		X			
Chlorite Solution	1760		X			
Compounds, Cleaning Liquid	1760		X			
Corrosive Liquid, Basic,	1760		X			
Corrosive Liquids, Flammable	1760		X			
Di-N-Butylamine	1760		X			
Disodium Trioxosilicate	1760		X			
Ferrous Chloride, solution	1760	X				X
Hexamethylenediamine, Sol	1760		X			
Hydrazine Aqueous Solution	1760		X			
Hydrobromic Acid	1760		X			
Magnesium	1760		X			X
Organophosphorus Pesticide	1760		X			
Paint	1760		X			
Radioactive Material, Sur	1760		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Resin Solution	1760		X			
Solids Containing Corrosive	1760		X			
Styrene Monomer, Stabilized	1760		X			
Sulfur, Molten	1760		X			
Sulfuric Acid	1773		X			X
Ethylene Oxide	1778		X			
Lithium Ion Batteries Con	1778		X			
Nitrocellulose With Alcohol	1779		X			
Corrosive Liquids, Flammable	1780		X			
Compounds, Cleaning, Liquid	1788		X			
Butane	1789		X			
Hydrochloric acid	1789	X	X			X
Hydrofluoric acid	1790	X				X
Toxic Solids, Organic, N.	1790		X			
Battery Fluid, Acid	1791		X			
Bleach	1791					X
Compressed Gas, N.O.S.	1791		X			
Disodium Trioxosilicate	1791		X			
Hypochlorite solutions	1791	X				
Sodium hypochlorite	1791					X
Battery Fluid, Acid	1805		X			
Cresols, Solid	1805		X			
Hazardous Waste, Solid, N	1805		X			
Nitric Acid	1805		X			
Phosphoric acid	1805					X
Radioactive Material, Sur	1805		X			
Toxic Liquid, Inorganic,	1805		X			
Combustible Liquid, N.O.S.	1809		X			
Fireworks	1809		X			
Amines, Liquid, Corrosive	1811		X			
Sulfamic Acid	1813		X			
Corrosive Liquids, N.O.S.	1814		X			
Phosphoric Acid Solution	1814		X			X
Sulfuric Acid	1814		X			
Zinc Chloride, Solution	1814		X			
Octanes	1823		X			
Sodium Hydroxide Solution	1823		X			
Acetone	1824		X			
Caustic soda	1824					X
Methacrylic Acid, Stabilized	1824		X			
Potassium Hydroxide, Solution	1824		X			
Sodium Hydrosulfide	1824		X			
Sodium hydroxide, sol.	1824	X				
Toluidines, Solid	1824		X			
Triethylenetetramine	1824		X			
Carbon Dioxide, Refrigerated	1830		X			
Environmentally Hazardous	1830		X			
Potassium Nitrate	1830		X			
Sulfuric / Lead Acid Batteries	1830					X
Sulfuric acid	1830	X				
Isobutylene	1832		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Sodium Borohydride And So	1835		X			
Ammonium Nitrate, Liquid	1836		X			
Ammonium Hydrogen Difluor	1840		X			
Paint Related Material	1840		X			
Chlorosilanes, Corrosive,	1849		X			
Xylenes	1863		X			
Adhesives	1866		X			
Lighters	1866		X			
Paint	1866		X			X
Pentamethylheptane	1866		X			
**No longer in use	1867	X				
Ferrosilicon	1869		X			X
Resin Solution	1869		X			
Chromium Trioxide, Anhydrous	1873		X			
Organic Peroxide Type C,	1897		X			
Batteries, Wet, Filled Wi	1903		X			
Corrosive Liquids, N.O.S.	1908		X			
Calcium oxide	1910					X
Lime	1910					X
Butyl propionate	1914					X
Carbon Dioxide	1915		X			
Ethyl Lactate	1915		X			
Isopropanol	1917		X			
Isopropenylbenzene	1917		X			
Amines, Liquid, Corrosive	1940		X			
Flammable Solids, Organic	1942		X			
Propylene Tetramer	1942		X			
Aluminum Powder, Coated	1944		X			
Compressed Gas, Flammable	1950		X			
Elevated Temperature Liqu	1950		X			
Pyridine	1950		X			
Receptacles, Small, Conta	1950		X			
Sulfur, molten	1950	X				
Argon , refrigerated liquid	1951	X				X
Batteries, Wet, Filled Wi	1954		X			
Compressed Gas, N.O.S.	1954		X			
Environmentally Hazardous	1954		X			
Benzaldehyde	1956		X			
Liquefied Gas, N.O.S.	1956		X			
Nitrogen, Compressed	1956		X			
Octafluorocyclobutane	1956		X			
Vinyl Acetate, Stabilized	1956		X			
Ethane	1957		X			
Octafluoropropane	1963		X			
Natural Gas Liquids	1965			X		
Hydrogen, ref. liquid	1966	X				X
Natural Gas	1971			X		
Bromotrifluoromethane	1974		X			
Dichlorodifluoromethane	1976		X			
Nitrogen, liquid	1977	X				X
Liquefied Gas, Flammable,	1978		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Piperidine	1982		X			
Compressed Gas, N.O.S.	1984		X			
Alcohols, N.O.S.	1986		X			
Alcohol, N.O.S.	1987	X	X			
Ammonium Nitrate, Liquid	1987		X			
Carbon Disulfide	1987		X			
Cyclohexane	1987		X			
Cyclopentanone	1987		X			
Elevated Temperature Liquid	1987		X			
Flammable Liquids, N.O.S.	1987		X			
Isopropanol	1987		X			
N,N-Dimethylformamide	1987		X			
Paint	1987		X			
Paint Related Material	1987		X			
Waste Flammable Liquids,	1987		X			
Amines, Solid, Corrosive,	1990		X			
Amyl Acetates	1992		X			
Environmentally Hazardous	1992		X			
Flammable Liquids, N.O.S.	1992		X			
1,1-Difluoroethane	1993		X			
1,2,4-Trimethylbenzene	1993					X
1,2-Dichloroethylene	1993		X			
Acetic Acid, Glacial	1993		X			
Acetic Anhydride	1993		X			
Acetonitrile	1993		X			
Adhesives	1993		X			
Aerosols, Flammable, N.O.	1993		X			
Alcoholic Beverages	1993		X			
Alcohols, N.O.S.	1993		X			
Amines, Flammable, Corrosive	1993		X			
Ammonia, Anhydrous	1993		X			
Amyl Acetates	1993		X			
Anisole	1993		X			
Battery Fluid, Acid	1993		X			
Butane	1993		X			
Carbon	1993					X
Carbon Black	1993					X
Chlorobenzotrifluorides	1993		X			
Combustible Liquid, N.O.S.	1993		X			
Cyclohexanone	1993		X			
Dibutyl Ethers	1993		X			
Dichloromethane	1993		X			
Diesel Fuel Oil	1993					X
Difluoromethane	1993		X			
Elevated Temperature Liquid	1993		X			
Environmentally Hazardous	1993		X			
Ethanolamine	1993		X			
Ethyl Acrylate, Stabilize	1993		X			
Ethylbenzene	1993		X			X
Ethylene Dichloride	1993		X			
Extracts, Aromatic, Liquid	1993		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Flammable liquids, n.o.s.	1993	X				
Flammable Liquids, N.O.S.	1993		X			
Fuel Oil	1993		X			
Hazardous Waste, Solid, N	1993		X			
Hydrocarbons, Liquid,	1993		X			
Hydrogen, Compressed	1993		X			
Liquefied Petroleum Gas	1993		X			
Methyl Isobutyl Ketone	1993		X			
Nitrating acid, mixture, (with > 50% nitric acid)	1993					X
Nitric Acid	1993		X			
N-Propyl Acetate	1993		X			
Paint Related Material	1993		X			
Paint Resins (Various types)	1993					X
Pentanes	1993		X			
Pentanols	1993		X			
Perfumery Products	1993		X			
Petroleum Crude Oil	1993		X			
Petroleum Distillates, N.	1993		X			
Petroleum Gases, Liquefie	1993		X			
Pine Oil	1993		X			
Potassium Hydrogendifluor	1993		X			
Tetrahydrofuran	1993		X			
Toluene Diisocyanate	1993		X			
Waste Environmentally Haz	1993		X			
Waste Flammable Solids, O	1993		X			
Xylenes	1993		X			
Asphalt	1999					X
Asphalt Cement	1999					X
Aerosols	2014		X			
Hydrogen peroxide	2014	X				X
Petroleum Distillates, N.	2014		X			
N-Methylaniline	2030		X			
Benzene	2031		X			
Ethanol	2031					X
Ethanol And Gasoline Mixt	2031		X			
Pyrethroid Pesticide, Sol	2031		X			
Trichloroisocyanuric Acid	2031		X			
Aerosols	2037		X			
Compressed Gas, N.O.S.	2037		X			
Hexafluoroethane	2037		X			
Ethanol And Gasoline Mixt	2045		X			
Ammonia Solutions	2055		X			
Styrene	2055		X			X
Waste Polychlorinated Bip	2055		X			
Environmentally Hazardous	2056		X			
Fireworks	2056		X			
Isobutyraldehyde	2056		X			
1-Chloro-1,1-Difluoro- Et	2057		X			
Tripropylene	2057		X			
Environmentally Hazardous	2067		X			
Heptanes	2067		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Toxic Solids, Organic, N.	2074		X			
Persulphates, Inorganic,	2076		X			
Propionaldehyde	2076		X			
Combustible Liquid, N.O.S	2078		X			
Waste Polychlorinated Bip	2078		X			
Benzyl Chloride	2079		X			
Corrosive Solid, Basic, I	2079		X			
Carbon dioxide, refrigerated liquid	2187	X				X
Cartridges For Weapons, I	2187		X			
Nitric Acid	2187		X			X
Compressed Gas, Oxidizing	2193		X			
Butanols	2206		X			
Ferrous Chloride,Solution	2209		X			
Hydrogen Fluoride, Anhydr	2209		X			
Phosphoric Acid Solution	2209		X			
Paint	2211		X			
Asbestos	2212	X				
Corrosive Liquid, Acidic,	2215		X			
Elevated Temperature Liqu	2215		X			
Sodium Nitrate	2216		X			
Furfuryl Alcohol	2218		X			
Propylene Oxide	2218		X			
Ethylen glycol/water mixture	2219					X
Ethylene Glycol	2219		X			X
Adhesives	2222		X			
Benzotrichloride	2226	X				
1-Chloro-4-(Trifluoromethyl)benzene	2234		X			X
Tetrahydrofuran	2234		X			
Vinyltoluenes, Stabilized	2235		X			
Pentane-2,4-Dione	2239		X			
Flammable Liquids, N.O.S.	2245		X			
Caustic Alkali Liquids, N	2248		X			
Paint	2252		X			
N,N-Dimethylaniline	2253					X
N-Aminoethylpiperazine	2259		X			
Butyl Acetates	2265		X			
Combustible Liquid,N.O.S.	2265		X			
Propane	2277		X			
Isophorone Diisocyanate	2279		X			
Isophorone diisocyanate	2279					X
Dicyclohexylamine	2280		X			
Phosphoric Acid, Solution	2280		X			
Adhesives	2283		X			
Pentanols	2286		X			
Toxic Solids, Organic, N.	2290		X			
2-Pentanon, 4-Methyl-	2293					X
Flammable Solids, Organic	2294		X			
Methyl Chloroacetate	2295	X				
Methanol	2296		X			
Isopropenylbenzene	2303	X				
Tripropylene	2303		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Xylenes	2303		X			
Extracts, Flavoring, Liqu	2304		X			
Flammable Liquids, Toxic,	2310		X			
Batteries, Wet, Filled Wi	2312		X			
Phenol, Molten	2312		X			
Chlorobenzene	2313		X			
Ethanol	2319		X			
Amines, Liquid, Corrosive	2331		X			
Butyl Acrylates, Stabiliz	2348		X			
Other Regulated Substance	2348		X			
Flammable Liquids, N.O.S.	2350		X			
Acetic Anhydride	2357		X			
Pyrethroid Pesticide, Liq	2401		X			
Liquefied Gas, N.O.S.	2424		X			
Solids Containing Flammab	2426		X			
Vinyltoluenes, Stabilized	2426		X			
Elevated Temperature Liqu	2448		X			
Isopropanol	2448		X			
Toluene	2448		X			
Environmentally Hazardous	2451		X			
Oxidizing Solid, N.O.S.	2465		X			
Combustible Liquid,N.O.S.	2468		X			
Environmentally Hazardous	2491		X			
Isobutane	2491		X			
Ammonium Nitrate Based Fe	2517		X			
Potassium Hydroxide	2517		X			X
Environmentally Hazardous	2531		X			
Heptanes	2531		X			
Metal Catalyst, Dry	2546		X			
Organometallic Substance,	2556		X			
Lithium Hydroxide	2565		X			
Compounds,Cleaning Liquid	2581		X			
Ammonium Hydrogendifluori	2582		X			
Combustible Liquid,N.O.S.	2582		X			
FAK-Hazardous Materials	2582		X			
Ferric chloride, sol.	2582	X				
Corrosive Solids, Oxidizi	2585		X			
Corrosive Liquid, Basic,	2586		X			
Corrosive Solid, Acidic,	2586		X			
Hydrogen Fluoride, Anhydr	2586		X			
Acrylamide, Solid	2588		X			
Butanols	2618		X			
Gasoline	2618		X			
Pyrethroid Pesticide, Sol	2659		X			
Corrosive Liquid, Basic,	2672		X			
Environmentally Hazardous	2672		X			
Ethylenediamine	2680		X			
Pesticides, Solid, Toxic,	2686		X			
Hexachlorobutadiene	2688		X			
Ethanol And Gasoline Mixt	2693		X			
Sodium Dithionite	2693		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Corrosive Liquid, Acidic,	2699		X			
Sulfur, Molten	2717		X			
Oxidizing Solid, N.O.S.	2725		X			
Flammable Liquids, Corros	2733		X			
Corrosive Liquids, N.O.S.	2734		X			
Hypochlorite Solutions	2734		X			
Chlorine	2735		X			
Corrosive Liquids, N.O.S.	2735		X			
Ferric Chloride Solution	2735		X			X
Isocyanates, Toxic, N.O.S	2735		X			
Thioglycolic Acid	2735		X			
Ferric Chloride	2738					X
Combustible Liquid,N.O.S.	2748		X			
Organometallic Compound,	2749		X			
Diethyl Sulphate	2757		X			
Toxic, Liquids, Organic,	2757		X			
Pesticides, Liquid,	2783		X			
Selenium Compound, Solid,	2783		X			
Butyl Acetates	2789		X			
Toluene Diisocyanate	2789		X			
Hydrofluoric Acid	2790		X			
Acetic Acid	2794		X			X
Batteries wet filled lead / acid	2794					X
Butane	2794		X			
Hypochlorite Solutions	2795		X			
Corrosive Solid, Basic, O	2796		X			
Methanol	2796		X			X
Nitric Acid	2796		X			
Phosphorus Trichloride	2796		X			
Potassium Permanganate	2796		X			X
Dichloroanilines, Solid	2810		X			
Toxic Liquid, Inorganic,	2810		X			
Organotin Pesticides, Liq	2811		X			
Sodium Azide	2811		X			
Sodium Chloroacetate	2811		X			
Sodium Nitrite	2811		X			X
Lithium	2813		X			
Sodium sulfite	2815		X			X
Corrosive Solid, Acidic,	2817		X			
Toxic Liquid, Corrosive,	2821		X			
Extracts, Aromatic, Liqui	2850		X			
Methyl Acetate	2850		X			
Trifluoromethane	2857		X			
Chloroacetic Acid, Solid	2862		X			
Corrosive Solid, Basic,	2865		X			
Sodium Fluoride, Solid	2871		X			
Petroleum Distillates, N.	2874		X			
Sodium Carbonate	2874					X
Sodium Carbonate Peroxyhy	2874		X			X
Nickel Nitrate	2880		X			
Combustible Liquid,N.O.S.	2881		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Nickel	2881					X
Toxic, Liquids, Organic,	2902		X			
Environmentally Hazardous	2908		X			
Radioactive Material, Excepted Package-Empty Package	2908		X			
Organophosphorus Pesticid	2910		X			
Radioactive Material, Low	2910		X			
Chlorine	2912		X			
Corrosive Liquids, N.O.S.	2912		X			
Radioactive Material, Low specific Activity	2912		X			
Ammonium Nitrate	2913		X			
Radioactive Material, Exc	2913		X			
Corrosive Liquids, N.O.S.	2920		X			
Disinfectants, Liquid, Co	2920		X			
Paint Related Material	2920		X			
Petroleum Distillates, N.	2922		X			
Phosphoric Acid, Solid	2922		X			
Corrosive Liquids, N.O.S.	2923		X			
Ferric Chloride, Anhydrou	2923		X			
Bisphenol A	2924					X
Butane	2924		X			
Esters, N.O.S.	2924		X			
Receptacles, Small, Conta	2924		X			
Furaldehydes	2927		X			
Toxic Liquid, Inorganic,	2929		X			
Hydroxylamine Sulfate	2949		X			
Sulfur	2956		X			X
Sulfur compounds	2956					X
Sulfur Diesel	2956					X
Petroleum Gases, Liquefie	2967		X			
Naphthalene, Molten	2984		X			
Sodium Hydroxide Solution	2987		X			
2-Ethylhexyl	2990		X			
Corrosive Liquid, Basic,	2990		X			
Diethylenetriamine	3006		X			
Vanadium Pentoxide	3019		X			
Hydrogen Peroxide And Per	3055		X			
Flammable Liquids, N.O.S.	3065		X			
Petroleum Distillates, N.	3065		X			
Corrosive Liquids, N.O.S.	3066		X			
Corrosive Solids, N.O.S.	3066		X			
Environmentally Hazardous	3072		X			
Amines, Liquid, Corrosive	3077		X			
Batteries, Nickel-Metal H	3077		X			
Benzene	3077		X			
Bisulfites, Aqueous Solut	3077		X			
Combustible Liquid, N.O.S	3077		X			
Corrosive Liquids, N.O.S.	3077		X			
Cyclohexylamine	3077		X			
Elevated Temperature	3077		X			
Env. haz. substance, solid, n.o.s.	3077	X	X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
FAK-Hazardous Materials	3077		X			
Ferric Chloride, Solution	3077		X			
Fluorosilicic Acid	3077		X			
Formaldehyde	3077					X
Hazardous Waste, Solid, N	3077		X			
Life-Saving Appliances, S	3077		X			
Lithium Metal Batteries	3077		X			
Organic Peroxide Type F,	3077		X			
Other Regulated Substance	3077		X			
Paint	3077		X			
Phosphorus Trichloride	3077		X			
Polychlorinated Biphenyls	3077		X			
Potassium Hydroxide,Solid	3077		X			
Radioactive Material, Exc	3077		X			
Sodium Hydroxide Solution	3077		X			
Isophoronediisocyanate, Homopolymer	3080					X
1,1,1,2-Tetrafluoroethane	3082		X			
1-Methoxy-2-Propanol	3082		X			
Aerosols	3082		X			
Allyl Alcohol	3082		X			
Amines, Liquid, Corrosive	3082		X			
Ammonia Solutions	3082		X			
Chemical Kits	3082		X			
Combustible Liquid,N.O.S.	3082		X			
Corrosive Liquid, Acidic,	3082		X			
Corrosive Solids, Toxic,	3082		X			
Elevated Temperature Liqu	3082		X			
Environmentally Hazardous	3082		X			
Esters, N.O.S.	3082		X			
Ethanol	3082		X			
Ethoxylated Alcohols	3082					X
Ethyl Acrylate, Stabilize	3082		X			
Flammable Liquids, N.O.S.	3082		X			
Furfuryl Alcohol	3082		X			
Gasoline	3082		X			
Hazardous Waste,	3082		X			
Hydrocarbons, Liquid, N.O	3082		X			
Maleic Anhydride	3082		X			
Methyl Methacrylate Monom	3082		X			
Other Regulated Substance	3082		X			
Paint	3082		X			
Phosphoric Acid Solution	3082		X			
Polymeric Beads, Expandab	3082		X			
Radioactive Material, Low	3082		X			
Sodium hydroxide	3082		X			X
Tetrahydrofuran	3082		X			
Vinyl Acetate, Stabilized	3082		X			
Waste Environmentally Haz	3082		X			
Corrosive Solids, Toxic,	3084		X			
Oxidizing Liquid, N.O.S.	3085		X			
Strontium Peroxide	3087		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Combustible Liquid,N.O.S.	3088		X			
Calcium Carbide	3089		X			
Manganese	3089					X
Environmentally Hazardous	3090		X			
Alkyl Sulfonic Acids, Liq	3091		X			
Dichloromethane	3091		X			
Bisulfites, Aqueous Solut	3092		X			
Gasoline	3092		X			
Tetraethyl Silicate	3103		X			
Dibenzoyl peroxide	3104					X
Dichloroisocyanuric Acid,	3104		X			
Hexamethylenetetramine	3105		X			
Methyl ethyl ketone peroxide	3105					X
Sodium Chlorate	3106		X			
Calcium hypochlorite	3107		X			X
Organic Peroxide Type E,	3108		X			
1,1-Difluoroethane	3109		X			
Organic peroxide type F, liq.	3109	X				
5-Tert-Butyl-2,4,6- Trini	3139		X			
Elevated Temperature Liqu	3139		X			
Calcium Carbide	3145		X			
Combustible Liquid, N.O.S	3149		X			
Printing Ink	3156		X			
Isobutylene	3159		X			
Sulfuric Acid, Spent	3159		X			
Dimethylamine, Anhydrous	3161		X			
Refrigerant Gas R407C	3161		X			
Ammonia, Anhydrous	3163		X			X
Environmentally Hazardous	3163		X			
Fireworks	3163		X			
Receptacles, Small, Conta	3163		X			
Dangerous Goods In Machin	3164		X			
Ethanol	3166		X			
Petroleum Distillates, N.	3166		X			
Aluminum Alloy Dross	3170					X
Elevated Temperature Liqu	3171		X			
Combustible Liquid,N.O.S.	3175		X			
Self-Heating Solid, Organ	3190		X			
Titanium Powder, Dry	3190		X			
Self-Heating Solid, Inorg	3192		X			
N,N-Dimethylformamide	3206		X			
Fusee	3214		X			
Coal Tar Distillates, Fla	3215		X			
Self-reactive solid type C	3224	X				
Self-reactive solid type D	3226	X				
Polymerizing Substance, L	3242		X			
Sodium Hydroxide Solution	3244		X			
2-(2-Aminoethoxy) Ethanol	3252		X			
Environmentally Hazardous	3252		X			
Corrosive Liquid, Basic,	3253		X			
Tetramethylammonium Hydro	3253		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Self-Heating S0Lid, Corro	3255		X			
Cyclohexanone	3256		X			
Elevated Temperature Liqu	3256		X			
Flammable Liquids, N.O.S.	3256		X			
Isopropenylbenzene	3256		X			
Alkylphenols, Liquid, N.O	3257		X			
Chemical Kits	3257		X			
Chlorobenzyl Chlorides, L	3257		X			
Chlorodifluoromethane	3257		X			
Chlorotoluidines, Solid	3257		X			
Combustible Liquid, N.O.S	3257		X			
Corrosive Liquid, Basic,	3257		X			
Diethylenetriamine	3257		X			
Elevated temp. liq., n.o.s.	3257	X				
Elevated Temperature Liquid	3257		X			
Environmentally Hazardous	3257		X			
Ethanolamine	3257		X			
FAK-Hazardous Materials	3257		X			
Ferrous Chloride,Solution	3257		X			
Flammable Liquids, N.O.S.	3257		X			
Formaldehyde Solutions	3257		X			
Life-Saving Appliances, S	3257		X			
Lithium Ion Batteries	3257		X			
Methanol	3257		X			
N-Propanol	3257		X			
Pentane	3257		X			X
Propylene Oxide	3257		X			
Toxic Liquid, Inorganic,	3257		X			
Zinc Chloride, Anhydrous	3257		X			
Formaldehyde Solutions	3259		X			
Corrosive Liquid, Acidic,	3260		X			
Formic Acid	3260		X			
Alkyl Sulfonic Acids, Liq	3261		X			
Battery Fluid, Acid	3262		X			
Fire Extinguishers	3262		X			
Amines, Liquid, Corrosive	3263		X			
Corrosive Liquid, Acidic,	3263		X			
Aluminum sulfate, solution	3264					X
Amines, Liquid, Corrosive	3264		X			
Benzoyl Chloride	3264		X			
Corrosive Liquid, Acidic,	3264		X			
Corrosive Liquid, Basic,	3264		X			
Corrosive Liquids, N.O.S.	3264		X			
Corrosive Solid, Acidic,	3264		X			
Phosphoric Acid, Solution	3264		X			
Tetrachloroethylene	3264		X			
Vehicle, Flammable Gas Po	3264		X			
Combustible Liquid,N.O.S.	3265		X			
Corrosive liq., acidic, organic, n.o.s.	3265	X	X			
Corrosive Liquid, Basic,	3265		X			
Corrosive Liquids, N.O.S.	3265		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Toluene	3265		X			
Alkyl Sulfonic Acids, Liq	3266		X			
Corrosive liq., basic, inorganic, n.o.s.	3266	X	X			
Corrosive Liquid, Basic,	3266		X			
Combustible Liquid,N.O.S.	3267		X			
Corrosive Liquid, Acidic,	3267		X			
Corrosive Liquid, Toxic,	3267		X			
Corrosive Liquids, N.O.S.	3267		X			
Hazardous Waste, Solid, N	3267		X			
Isobutane	3267		X			
Methyl Isobutyl Ketone	3267		X			
Trifluoroacetic Acid	3267		X			
Environmentally Hazardous	3268		X			
Paint Related Material	3269		X			
Combustible Liquid,N.O.S.	3272		X			
Corrosive Liquids, N.O.S.	3272		X			
Radioactive Material, Low	3272		X			
Vinyl Isobutyl Ether, Sta	3272		X			
Barium Compounds, N.O.S.	3283		X			
Antimony Powder	3287		X			
Carbamate Pesticides, Sol	3287		X			
Ethyl Acetate	3287		X			X
Organic Peroxide Type D,	3287		X			
Molybdenum Trioxide	3288					X
Nickel Plating Solution (Nickel Metal, Nickel Chloride, Nickel Sulfate, Boric Acid)	3288					X
Phenol Solutions	3288		X			
Environmentally Hazardous	3295		X			
Hydrocarbons, liq., n.o.s.	3295	X	X			
Octyl Aldehydes	3295		X			
Vinyl Ethyl Ether,	3295		X			
Aerosols	3296		X			
Environmentally Hazardous	3316		X			
Corrosive Liquid, Acidic,	3320		X			
Proper Shipping Name	3321		X			
Helium, Compressed	3337		X			
Nitrogen, Compressed	3340		X			
Perchloric Acid	3349		X			
Toxic Solids, Organic, N.	3349		X			
2-Ethylhexyl Chloroformat	3352		X			
Chlorotoluidines, Liquid	3352		X			
Thionyl Chloride	3363		X			
Nitrates, Inorganic, N.O.	3378		X			
Alkali Metal Alcoholates,	3394		X			
Self-Heating Solid, Inorg	3394		X			
Combustible Liquid,N.O.S.	3399		X			
Environmentally Hazardous	3426		X			
Freight All Kinds, Hazard	3426		X			
Sulfur Dioxide	3429		X			
Fireworks	3432		X			
Hypochlorite Solutions	3432		X			

Hazardous Materials	UN Number	Mode				
		Highway	Rail	Pipeline	Air	Facility
Lithium Metal Batteries C	3432		X			
Maleic Anhydride	3432		X			
Allyl Alcohol	3442		X			
Ethyl Methyl Ketone	3451		X			
Corrosive Liquid, Acidic,	3453		X			
Combustible Liquid,N.O.S.	3455		X			
Methanol	3455		X			
Toxic Liquids, Flammable,	3467		X			
Air, Compressed	3475		X			X
Environmentally Hazardous	3475		X			
Ethanol/gasoline mixture	3475	X				
Flammable Liquids, N.O.S.	3475		X			
1,1,1,2-Tetrafluoroethane	3480		X			
Elevated Temperature Liqu	3481		X			
Hydrochloric Acid	3494		X			
Petroleum Sour Crude Oil,	3494		X			
Environmentally Hazardous	3496		X			
Safety Devices	3500		X			
Deuterium, Compressed	3501		X			
Tert-Butyl Hypochlorite	3532		X			
Aluminum Alloy Molten	9260		X			
Aluminum molten	9260		X			
Propane	18302		X			

***** EHS Materials

Table A1.2

Materials List (w/ Unknown Corresponding UN Number)

Hazardous Materials	Mode				
	Highway	Rail	Pipeline	Air	Facility
Freight All Kinds (FAK)-Hazardous materials		X			

Table A1.3

General Placards Observed

Placard	Definition	Mode
		Highway (All)
Corrosive	Toxic; inhalation, ingestion, or skin contact may cause severe injury or death.	X
Dangerous	Produce flammable and toxic gases upon contact with water OR may explode from heat, shock, friction, or contamination.	X
Explosives	Explosives without a significant blast hazard.	X
Flammable Liquid	Highly flammable; easily ignited by sparks or flame.	X
Flammable	Highly flammable; easily ignited by heat, sparks, or flame; may form explosive mixtures with air.	X
Flammable Solid	Highly flammable; easily ignited by sparks or flame.	X
Miscellaneous	Generic placard representing Hazard Class 9.	X
Non-Flammable Gas	Vapors may cause dizziness or asphyxiation without warning; vapors are heavier than air and likely to spread along the ground.	X
Oxidizer	May explode from friction, heat, or irritation; will accelerate burning when involved in a fire.	X

APPENDIX 2

HIGHWAY MONITORING SITE DATA

This appendix contains detailed information regarding the monitoring sites observed as part of the 2018 Stark County Commodity Flow Study.

- Interstate 77
- State Route (SR) 21 (near Navarre)
- SR 172 and US Route 30 Intersection
- US Route 30 (south of Massillon)
- US Route 62 (North)
- US Route 62 (South)

Where applicable, the site profiles below contain the most recent Ohio Department of Transportation (ODOT) traffic count information (2018) for that highway. The figure presented represents the total traffic through that site in an average 24-hour period. For comparison, planners mathematically estimated the hazardous material figures for each site for 24-hour intervals and then presented an estimated percentage of traffic carrying hazardous materials through a site in an average 24-hour period.

Date: May 21, 2018

Time: 11:00 a.m. **Interval:** 4 hours

US Route 62 (South)

Monitor: Traffic east/west on 62

Weather: 68F, sunny

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	*Totals*	*% of Total*
111	5	0.5%
117	4	0.4%
131	10	1.1%
134	0	0.0%
137	8	0.9%
Other	8	0.9%

UN No.	*Class*	*Name*	*Total*	*% of All Placards*
1073	2	Oxygen, ref. liquid	1	2.8%
1075	2	LP gases	1	2.8%
1203	3	Gasoline	6	16.7%
1267	3	Petroleum crude oil	5	13.9%
1789	8	Hydrochloric acid	2	5.6%
1977	2	Nitrogen, ref. liquid	4	11.1%
1993	3	Flammable liquids, n.o.s.	9	25.0%
2187	2	Carbon dioxide, ref. liquid	1	2.8%
3077	9	Env. haz. substance, solid, n.o.s.	1	2.8%
3257	9	Elevated temp. liq., n.o.s.	1	2.8%

General Placards	*Totals*	*% of All Placards*
Corrosive	2	5.6%
Dang When Wet	2	5.6%
Flamm Liquid	1	2.8%

Site Summary Data

Total Haz-Mat:	36
Unique Placards (#):	13
Total Truck Traffic:	927
% w/ Placard:	3.9%
ODOT Count:	43660
24 hr-Trucks Calc:	5562
24-hr Haz Calc:	216
Est Haz per hr:	9
% Haz per 24-hr:	0.5%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	7	19.4%
3-Flamm. Liquids:	21	58.3%
4-Flamm. Solids:	2	5.6%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	4	11.1%
9-Miscellaneous:	2	5.6%

Date: May 21, 2018

Time: 4:00 p.m. **Interval:** 4 hours

Interstate 77

Monitor: Traffic north/south on 77

Weather: 81F, sunny

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	Totals	% of Total
111	7	0.8%
117	9	1.0%
131	46	5.0%
134	0	0.0%
137	16	1.8%
Other	9	1.0%

Site Summary Data

Total Haz-Mat:	80
Unique Placards (#):	26
Total Truck Traffic:	912
% w/ Placard:	8.8%
ODOT Count:	85990
24 hr-Trucks Calc:	5472
24-hr Haz Calc:	480
Est Haz per hr:	20
% Haz per 24-hr:	0.6%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	11	13.8%
3-Flamm. Liquids:	54	67.5%
4-Flamm. Solids:	3	3.8%
5-Oxidizers:	1	1.3%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	4	5.0%
9-Miscellaneous:	7	8.8%

UN No.	Class	Name	Total	% of All Placards
1073	2	Oxygen, ref. liquid	2	2.5%
1075	2	LP gases	2	2.5%
1170	3	Ethyl alcohol	1	1.3%
1203	3	Gasoline	34	42.5%
1254	9	*No longer in use	1	1.3%
1267	3	Petroleum crude oil	5	6.3%
1268	3	Petroleum distillates, n.o.s.	3	3.8%
1789	8	Hydrochloric acid	2	2.5%
1951	2	Argon, ref. liquid	1	1.3%
1977	2	Nitrogen, ref. liquid	3	3.8%
1987	3	Alcohols, n.o.s.	1	1.3%
1993	3	Flammable liquids, n.o.s.	3	3.8%
2014	5	Hydrogen peroxide	1	1.3%
2187	2	Carbon dioxide, ref. liquid	1	1.3%
2303	3	Isopropenylbenzene	1	1.3%
3082	9	Env. haz. substance, liq., n.o.s.	1	1.3%
3224	4	Self-reactive solid type C	1	1.3%
3257	9	Elevated temp. liq., n.o.s.	4	5.0%
3295	3	Hydrocarbons, liq., n.o.s.	3	3.8%
3475	3	Ethanol/gasoline mixture	1	1.3%

* According to the U.S. DOT, UN 1254 is no longer in use.

General Placards	Totals	% of All Placards
Corrosive	2	2.5%
Dangerous	1	1.3%
Dang When Wet	2	2.5%
Flamm Gas	1	1.3%
Flamm Liquid	2	2.5%
Non-Flamm Gas	1	1.3%

Date: May 22, 2018

Time: 6:00 a.m. ***Interval:*** 4 hours

Interstate 77

Monitor: Traffic north/south on 77

Weather: 65F, cloudy and wet

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	*Totals*	*% of Total*
111	6	0.4%
117	10	0.7%
131	38	2.6%
134	0	0.0%
137	43	2.9%
Other	14	0.9%

Site Summary Data	
Total Haz-Mat:	111
Unique Placards (#):	29
Total Truck Traffic:	1487
% w/ Placard:	7.5%
ODOT Count:	85990
24 hr-Trucks Calc:	8922
24-hr Haz Calc:	666
Est Haz per hr:	28
% Haz per 24-hr:	0.8%

Hazard Classes		
1-Explosives:	0	0.0%
2-Gases:	11	9.9%
3-Flamm. Liquids:	59	53.2%
4-Flamm. Solids:	1	0.9%
5-Oxidizers:	1	0.9%
6-Toxics:	1	0.9%
7-Radioactives:	0	0.0%
8-Corrosives:	14	12.6%
9-Miscellaneous:	24	21.6%

UN No.	*Class*	*Name*	*Total*	*% of All Placards*
1041	2	Ethylene oxide & CO2 mix.	1	0.9%
1047	2	*No longer in use	1	0.9%
1073	2	Oxygen, ref. liquid	6	5.4%
1075	2	LP gases	2	1.8%
1203	3	Gasoline	36	32.4%
1267	3	Petroleum crude oil	5	4.5%
1268	3	Petroleum distillates, n.o.s.	4	3.6%
1294	3	Toluene	1	0.9%
1718	8	Butyl acid phosphate	1	0.9%
1719	8	Caustic alkali liq., n.o.s.	1	0.9%
1760	8	Ferrous chloride, sol.	1	0.9%
1789	8	Hydrochloric acid	2	1.8%
1791	8	Hypochlorite solutions	4	3.6%
1824	8	Sodium hydroxide, sol.	2	1.8%
1867	3	**No longer in use	1	0.9%
1966	2	Hydrogen, ref. liquid	1	0.9%
1987	3	Alcohols, n.o.s.	1	0.9%
1993	3	Flammable liquids, n.o.s.	9	8.1%
2014	5	Hydrogen peroxide	1	0.9%
2212	9	Asbestos	1	0.9%
2295	6	Methyl Chloroacetate	1	0.9%
2582	8	Ferric chloride, sol.	1	0.9%
3077	9	Env. haz. substance, solid, n.o.s.	2	1.8%
3082	9	Env. haz. substance, liquid, n.o.s.	1	0.9%
3226	4	Self-reactive solid type D	1	0.9%
3257	9	Elevated temp. liq., n.o.s.	18	16.2%
3265	8	Corrosive liq., acidic, organic, n.o.s.	2	1.8%
3295	3	Hydrocarbons, liq., n.o.s.	2	1.8%

General Placards	*Totals*	*% of All Placards*
Miscellaneous	2	1.8%

* According to the U.S. DOT, UN 1047 is no longer in use.

** According to the U.S. DOT, UN 1867 is no longer in use. It was formerly used to identify self-lighting cigarettes.

Date: May 22, 2018

Time: 11:00 a.m. **Interval:** 3 hours

US Route 30 (south of Massillon)

Monitor: Traffic east/west on 30

Weather: 70F, cloudy

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	Totals	% of Total
111	0	0.0%
117	3	0.4%
131	14	1.7%
134	0	0.0%
137	15	1.8%
Other	5	0.6%

UN No.	Class	Name	Total	% of All Placards
1203	3	Gasoline	11	29.7%
1213	3	Isobutyl acetate	1	2.7%
1267	3	Petroleum crude oil	1	2.7%
1791	8	Hypochlorite solutions	1	2.7%
1951	2	Argon, ref. liquid	2	5.4%
1977	2	Nitrogen, ref. liquid	1	2.7%
1987	3	Alcohols, n.o.s.	5	13.5%
1993	3	Flammable liquids, n.o.s.	8	21.6%
3257	9	Elevated temp. liq., n.o.s.	7	18.9%

General Placards	Totals	% of All Placards

Site Summary Data

Total Haz-Mat:	37
Unique Placards (#):	9
Total Truck Traffic:	818
% w/ Placard:	4.5%
ODOT Count:	31027
24 hr-Trucks Calc:	6544
24-hr Haz Calc:	296
Est Haz per hr:	12
% Haz per 24-hr:	1.0%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	3	8.1%
3-Flamm. Liquids:	26	70.3%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	1	2.7%
9-Miscellaneous:	7	18.9%

Date: May 22, 2018

Time: 3:00 p.m. **Interval:** 4 hours

State Route 21 (near Navarre)

Monitor: Traffic north/south on 21

Weather: 78F, cloudy

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	Totals	% of Total
111	0	0.0%
117	0	0.0%
131	0	0.0%
134	0	0.0%
137	1	0.3%
Other	1	0.3%

UN No.	Class	Name	Total	% of All Placards
1789	8	Hydrochloric acid	1	50.0%
1993	3	Flammable liquids, n.o.s.	1	50.0%

General Placards	Totals	% of All Placards

Site Summary Data

Total Haz-Mat:	2
Unique Placards (#):	2
Total Truck Traffic:	364
% w/ Placard:	0.5%
ODOT Count:	18630
24 hr-Trucks Calc:	2184
24-hr Haz Calc:	12
Est Haz per hr:	1
% Haz per 24-hr:	0.1%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	0	0.0%
3-Flamm. Liquids:	1	50.0%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	1	50.0%
9-Miscellaneous:	0	0.0%

Date: May 23, 2018

Time: 6:00 a.m. ***Interval:*** 4 hours

US Route 62 (North)

Monitor: Traffic east/west on 62

Weather: 59F, cloudy

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	*Totals*	*% of Total*
111	2	0.5%
117	0	0.0%
131	4	1.1%
134	0	0.0%
137	4	1.1%
Other	4	1.1%

UN No.	*Class*	*Name*	*Total*	*% of All Placards*
1203	3	Gasoline	5	35.7%
1267	3	Petroleum crude oil	1	7.1%
1791	8	Hypochlorite solutions	1	7.1%
1993	3	Flammable liquids, n.o.s.	1	7.1%
2187	2	Carbon dioxide, ref. liquid	1	7.1%
2226	8	Benzotrichloride	1	7.1%
3257	9	Elevated temp. liq., n.o.s.	1	7.1%
3295	3	Hydrocarbons, liq., n.o.s.	1	7.1%

General Placards	*Totals*	*% of All Placards*
Flamm Liquid	1	7.1%
Miscellaneous	1	7.1%

Site Summary Data

Total Haz-Mat:	14
Unique Placards (#):	10
Total Truck Traffic:	371
% w/ Placard:	3.8%
ODOT Count:	28360
24 hr-Trucks Calc:	2226
24-hr Haz Calc:	84
Est Haz per hr:	4
% Haz per 24-hr:	0.3%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	1	7.1%
3-Flamm. Liquids:	9	64.3%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	2	14.3%
9-Miscellaneous:	2	14.3%

Date: May 23, 2018

Time: 11:00 a.m. **Interval:** 3 hours

State Route 172 and US Route 30

Monitor: Traffic in all directions, both routes

Weather: 61F, cloudy

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	Totals	% of Total
111	0	0.0%
117	1	0.3%
131	12	3.1%
134	0	0.0%
137	9	2.3%
Other	5	1.3%

UN No.	Class	Name	Total	% of All Placards
1073	2	Oxygen, ref. liquid	1	3.4%
1075	2	LP gases	1	3.4%
1203	3	Gasoline	7	24.1%
1790	8	Hydrofluoric acid	1	3.4%
1830	8	Sulfuric acid	2	6.9%
1987	3	Alcohols, n.o.s.	1	3.4%
1993	3	Flammable liquids, n.o.s.	6	20.7%
3257	9	Elevated temp. liq., n.o.s.	6	20.7%

General Placards	Totals	% of All Placards
Corrosive	1	3.4%
Flamm Gas	1	3.4%
Non-Flamm Gas	1	3.4%
Oxidizer	1	3.4%

Site Summary Data

Total Haz-Mat:	29
Unique Placards (#):	12
Total Truck Traffic:	383
% w/ Placard:	7.6%
ODOT Count:	9953
24 hr-Trucks Calc:	3064
24-hr Haz Calc:	232
Est Haz per hr:	10
% Haz per 24-hr:	2.3%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	4	13.8%
3-Flamm. Liquids:	14	48.3%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	1	3.4%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	4	13.8%
9-Miscellaneous:	6	20.7%

Date: May 23, 2018

Time: 3:00 p.m. **Interval:** 4 hours

US Route 30 (south of Massillon)

Monitor: Traffic east/west on 30

Weather: 69F, sunny

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	Totals	% of Total
111	1	0.1%
117	6	0.7%
131	35	4.3%
134	0	0.0%
137	7	0.9%
Other	6	0.7%

Site Summary Data

Total Haz-Mat:	55
Unique Placards (#):	11
Total Truck Traffic:	814
% w/ Placard:	6.8%
ODOT Count:	31027
24 hr-Trucks Calc:	4884
24-hr Haz Calc:	330
Est Haz per hr:	14
% Haz per 24-hr:	1.1%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	5	9.1%
3-Flamm. Liquids:	42	76.4%
4-Flamm. Solids:	1	1.8%
5-Oxidizers:	1	1.8%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	0	0.0%
9-Miscellaneous:	6	10.9%

UN No.	Class	Name	Total	% of All Placards
1203	3	Gasoline	31	56.4%
1267	3	Petroleum crude oil	3	5.5%
1951	2	Argon, ref. liquid	2	3.6%
1977	2	Nitrogen, ref. liquid	2	3.6%
1987	3	Alcohols, n.o.s.	3	5.5%
1993	3	Flammable liquids, n.o.s.	5	9.1%
2187	2	Carbon dioxide, ref. liquid	1	1.8%
3109	5	Organic peroxide type F, liq.	1	1.8%
3257	9	Elevated temp. liq., n.o.s.	4	7.3%

General Placards	Totals	% of All Placards
Dang When Wet	1	1.8%
Miscellaneous	2	3.6%

Date: May 24, 2018

Time: 8:00 a.m. **Interval:** 3 hours

State Route 21 (near Navarre)

Monitor: Traffic north/south on 21

Weather: 55F, sunny

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	*Totals*	*% of Total*
111	1	0.3%
117	0	0.0%
131	1	0.3%
134	0	0.0%
137	2	0.5%
Other	3	0.8%

UN No.	*Class*	*Name*	*Total*	*% of All Placards*
1203	3	Gasoline	1	11.1%
1993	3	Flammable liquids, n.o.s.	1	11.1%
3257	9	Elevated temp. liq., n.o.s.	1	11.1%
3266	8	Corrosive liq., basic, inorganic, n.o.s.	1	11.1%

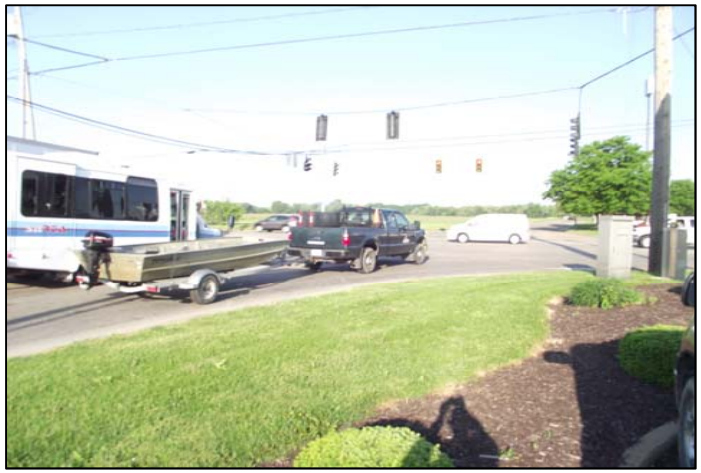
General Placards	*Totals*	*% of All Placards*
Dang When Wet	1	11.1%
Flamm Gas	2	22.2%
Non-Flamm Gas	2	22.2%

Site Summary Data

Total Haz-Mat:	9
Unique Placards (#):	7
Total Truck Traffic:	365
% w/ Placard:	2.5%
ODOT Count:	18630
24 hr-Trucks Calc:	2920
24-hr Haz Calc:	72
Est Haz per hr:	3
% Haz per 24-hr:	0.4%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	4	44.4%
3-Flamm. Liquids:	2	22.2%
4-Flamm. Solids:	1	11.1%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	1	11.1%
9-Miscellaneous:	1	11.1%



Date: May 24, 2018

Time: 12:00 p.m. **Interval:** 4 hours

State Route 172 and US Route 30

Monitor: Traffic all directions, both routes

Weather: 74F, sunny

Special Considerations: N/A

Trucks Carrying Haz-Mat

Trucks may have multiple placards

Trailer Type	Totals	% of Total
111	0	0.0%
117	4	0.8%
131	6	1.2%
134	0	0.0%
137	18	3.5%
Other	14	2.7%

Site Summary Data

Total Haz-Mat:	43
Unique Placards (#):	18
Total Truck Traffic:	516
% w/ Placard:	8.3%
ODOT Count:	9953
24 hr-Trucks Calc:	3096
24-hr Haz Calc:	258
Est Haz per hr:	11
% Haz per 24-hr:	2.6%

Hazard Classes

1-Explosives:	2	4.7%
2-Gases:	6	14.0%
3-Flamm. Liquids:	20	46.5%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	1	2.3%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	2	4.7%
9-Miscellaneous:	12	27.9%

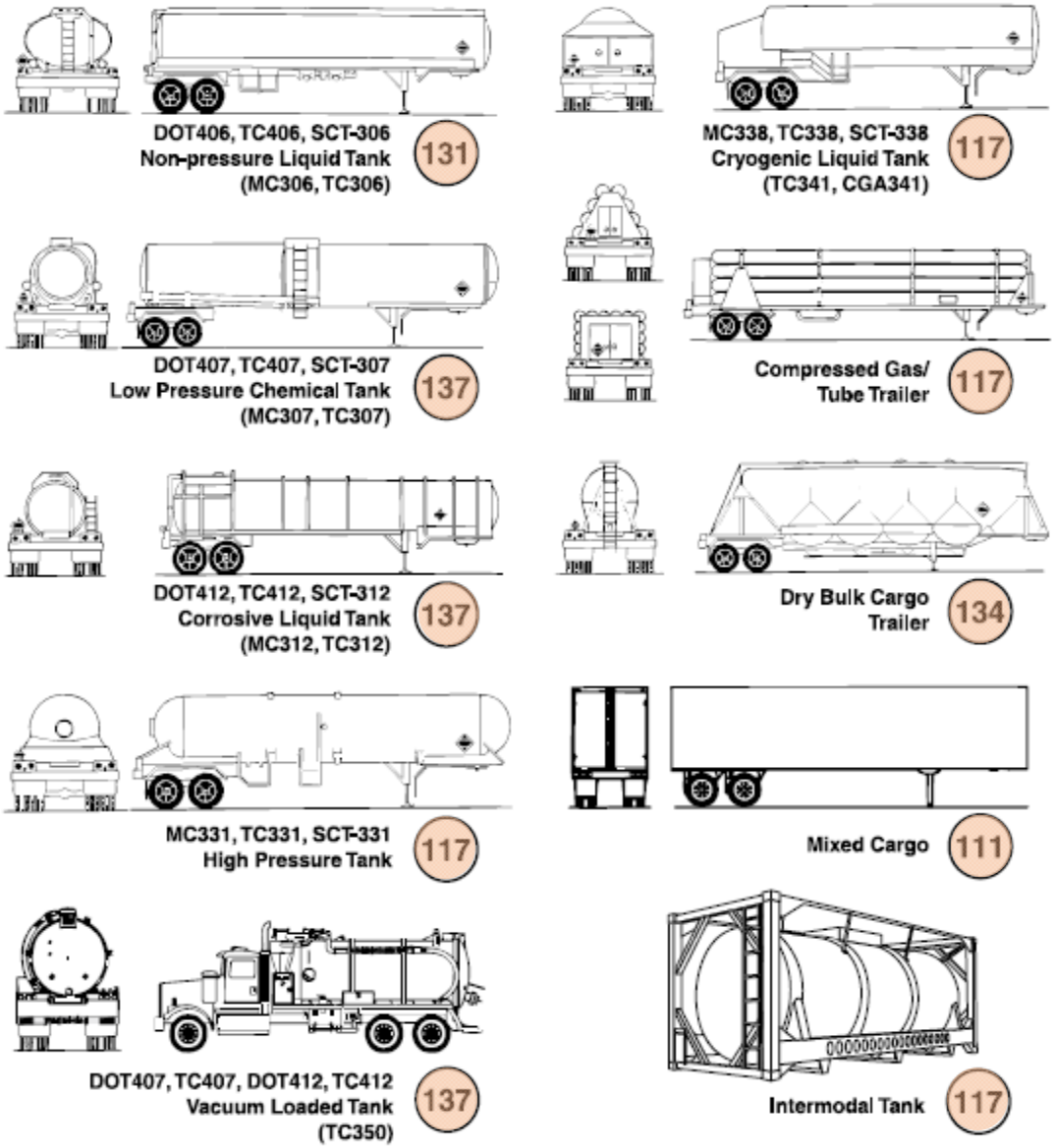
UN No.	Class	Name	Total	% of All Placards
1066	2	Nitrogen, compressed	1	2.3%
1073	2	Oxygen, ref. liquid	2	4.7%
1203	3	Gasoline	4	9.3%
1267	3	Petroleum crude oil	3	7.0%
1268	3	Petroleum distillates, n.o.s.	3	7.0%
1479	5	Oxidizing solid, n.o.s.	1	2.3%
1790	8	Hydrofluoric acid	1	2.3%
1791	8	Hypochlorite solutions	1	2.3%
1993	3	Flammable liquids, n.o.s.	9	20.9%
2187	2	Carbon dioxide, ref. liquid	1	2.3%
2448	9	Sulfur, molten	1	2.3%
3077	9	Env. haz. substance, solid, n.o.s.	1	2.3%
3257	9	Elevated temp. liq., n.o.s.	9	20.9%
3295	3	Hydrocarbons, liq., n.o.s.	1	2.3%

General Placards	Totals	% of All Placards
Explosives	2	4.7%
Flamm Gas	1	2.3%
Miscellaneous	1	2.3%
Non-Flamm Gas	1	2.3%

APPENDIX 3

TRAILER TYPE REFERENCE SHEET

This appendix contains the reference sheet used for determining trailer types during highway field reconnaissance.



APPENDIX 4
RAILWAY DATA REQUESTS

This appendix contains copies of data requests submitted to CSX Transportation, Norfolk Southern Railway Company, and Wheeling and Lake Erie Railway as part of this project.

REQUEST FOR HAZARDOUS MATERIALS DENSITY STUDY

Organization Requesting Density Study: Stark County LEPC

Contact Person: David Schmidt

Phone Number: 330-451-3907

Email Address: deschmidt@starkcountyohio.gov

Mailing Address: 4500 Atlantic Blvd. SE (LL)
(Street Address)
Canton, OH 44705
(City, State, Zip)

Geographical Description of Area for study: Stark County, Ohio

2019 data, as available

By signing below I acknowledge and agree to the terms set forth by CSX Transportation, Inc. for use and dissemination of the information contained within the CSXT Hazardous Materials Density Study. I affirm that the information provided by CSXT in this report will be used solely for and by bonafide emergency planning and response organizations for the expressed purpose of emergency and contingency planning. This information will not be distributed publicly in whole or in part without the expressed written permission of CSX Transportation, Inc.

(Signature of person requesting density study)

Return Completed Form to: CSXT, Director-Hazardous Material Systems
500 Water Street
J-275
Jacksonville, FL 32202 or **Fax 904-245-2867**

For CSXT Use Only

Director, Hazardous Material Systems Approval: ___Yes___ NO Date: _____

Crisis Communication Manager:

Date Request Received: _____

Date Report Generated: _____

Date Report Sent: _____

REQUEST FOR HAZARDOUS MATERIALS COMMODITY FLOW INFORMATION

Organization Requesting Information: Stark County Local Emergency Planning Committee

Contact Person: David E. Schmidt, LEPC Coordinator, Stark County EMA

Phone Number: (330) 451-3907

E-Mail Address: deschmidt@starkcountyohio.gov

Mailing Address: 4500 Atlantic Boulevard, NE (Lower Level)
(Street Address)

Canton, OH 44705
(City, State, Zip)

Geographical Description of Area for Study: Stark County, Ohio (2019 data as available)

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

(Signature of person requesting commodity flow information)

Return Completed Form to:	Norfolk Southern Railway Company Attn: R. Scott Deutsch Regional Manager, Hazardous Materials 425 Holiday Drive Pittsburgh, PA 15220

(For NSRC Use Only)

Initials of person responsible for approval: _____ YES _____ NO Date: _____

Hazardous Materials Service Support:

Date Request Received: _____
Time Period Covered: _____
Date Report Sent: _____
Report sent via: ☐ E-Mail ☐ U.S. Mail

October 14, 2019

Mr. John Vergis, Environmental Officer
Wheeling and Lake Erie Railway
100 East First Street
Brewster, OH 44613

Re: Request for Commodity Flow Information

Dear Mr. Vergis:

Please accept this letter as a formal request for commodity flow information for the Wheeling and Lake Erie Railway line through Stark County. We are interested in 2019 data (as it is available).

Stark County received a grant from the SERC to update its 2018 commodity flow study. You may remember a similar request from our office last year. You provided data for the following lines.

- Brewster to Canton through Hartville
- Brewster to Canton through Navarre
- Jewett through Harman to Brewster
- Mingo Junction through Harman to Brewster
- Mineral City through Canton South to Canton, Brewster

We would appreciate any information you could provide regarding the commodities that are transported on your lines in Stark County to support our updating efforts.

This project is an important component of our on-going hazardous materials emergency planning. We will use the information presented by the report to refine hazmat response plans and guide the development of training programs and exercise scenarios (to ensure that our responders are prepared to face the types of materials that are present in our county). The information provided by Wheeling and Lake Erie Railway will be used solely for emergency and contingency planning.

Thank you for your attention to this matter. Should you have any questions or comments, feel free to contact me at (330) 451-3907 or by email at deschmidt@starkcountyohio.gov.

Respectfully submitted,

David E. Schmidt
LEPC Coordinator

APPENDIX 5

AIR ANALYSIS INTERVIEW GUIDE

This appendix contains a copy of the interview guide used for discussion with the Akron-Canton Airport.

JH CONSULTING LLC

INTERVIEW GUIDE (AIR)

STARK COUNTY
COMMODITY FLOW STUDY

29 EAST MAIN STREET,
SUITE 1
BUCKHANNON, WV 26201

INTERVIEW GUIDE

STARK COUNTY COMMODITY FLOW STUDY

INTRODUCTION: REASON FOR INTERVIEW

Good morning/afternoon, [INSERT NAME OF RESPONDENT]. My name is Jeff Harvey, and I'm calling for our [INSERT TIME] interview. Is now still a convenient time for you to talk? [WAIT FOR RESPONSE. IF "YES" CONTINUE. IF "NO" RESCHEDULE]

You may recall that I am conducting this interview for JH Consulting on behalf of the Stark County Local Emergency Planning Committee. We are doing some research about commodity shipments via air in, through and around Stark County, Ohio.

The ultimate goal is to provide risk and vulnerability information to emergency response agencies throughout Stark County. That is why I am interviewing you today. In your capacity as [INSERT RESPONDENT JOB TITLE/FUNCTION], I am hoping that you can give us the benefit of your experience in [INSERT NAME OF AREA/AREAS] to help us better understand the frequency and quantities of hazardous material shipments, temporal data affecting shipping schedules, the capabilities of your agency to respond to emergencies, etc.

Please note that this document, while not confidential, will be for official use only. You are not obligated to share anything that would be considered proprietary or need to be kept confidential. If you do mention something that is confidential during the course of our discussion, please let me know and suggest an appropriate way of addressing the topic in our report.

The interview should take about 30 minutes. Do you have any questions before we begin? [ANSWER QUESTIONS].

Great. Let's get started.

INTERVIEW

1. First, let me verify some basic information. Your name is [INSERT NAME] and you are the [INSERT JOB TITLE] for [INSERT LOCATION]. Your contact information is:
   [INSERT PHONE NUMBER]
   [INSERT EMAIL ADDRESS]

   Is that information correct? [MAKE ANY NECESSARY CHANGES]

2. Would you briefly describe your job responsibilities?[PROBE TO SEE AREAS OF HIS SPECIFIC RESPONSIBILITIES REGARDING COMMODITY FLOW AND/OR EMERGENCY RESPONSE]

   And how long have you been in this position?

3. What hazardous materials were shipped via air from your facility in the past 12 months?

   a. [PROBE FOR ESTIMATED QUANTITES] Within the breakdown of those materials, can you say which were shipped more frequently? Generally, what would you say is the percent breakdown of each of these materials?

   b. [PROBE FOR CLARIFICATIONS ON QUANTITIES] Can you tell me anything about specific quantities? For example, what is the average quantity of materials within a shipment? Are shipments mixed (i.e., multiple hazmats in a single container)? If so, what are the criteria for mixed containers?

4. What types of containers are utilized to transport hazardous materials? [CRATES, SPECIFIC PLANES, SPECIAL PACKAGING, ETC.]

   a. What are the basic specifications associated with those types of containers? [LENGTH, WEIGHT LOADED/UNLOADED, CAPACITY, ETC.]

   b. How are they labeled? [PLACARD ONLY, ETC.]

   c. What are the safety features associated with those containers?

   d. What is the other important information that can be gleaned from these types of containers with which responders should be familiar?

5. Would you say that there is variance with respect to the times of the month or times of year that hazardous materials are shipped?

   a. [IF YES] What contributes to this fluctuation?

   b. [IF YES] Is this fluctuation a steady phenomenon or do you expect it to change in the future? If so, what types of changes do you expect?

6. What other long-term trends do you foresee with respect to the shipment of hazardous materials in total? Do you expect these trends for Stark County as well? Why or why not?

7. What types of risks associated with air transport of hazardous materials would you recommend Stark County responders prepare for?

8. Has your organization experienced any type of hazardous material accident in Stark County?

   a. [IF YES] What type of accident was it/were they?

b. [IF YES] Do you know what the cause of the accident(s) was/were?

c. [IF YES] Were you able to work well with local responders?

d. [IF YES] In what ways could local responders better prepare to more effectively assist your response?

9. In what other ways can [INSERT COMPANY NAME] assist preparedness efforts related to commodity shipments by air? [PROBE AS NECESSARY FOR DETAILS]

10. Would you like to add any other information?

CLOSING

[INSERT NAME OF RESPONDENT], thank you so much for your time – I really appreciate you talking to me and giving us the benefit of your expertise. If I have any questions when I am writing up this interview, may I contact you for clarification? [WAIT FOR RESPONSE AND THEN THANK]. Would you prefer that I email or phone you?

Is there anything else you would like to add in conclusion before we end our discussion? [WAIT FOR RESPONSE] Thank you again and have a great day.

APPENDIX 6
CAPABILITY SURVEY RESULTS

This appendix contains summary data downloaded from the Survey Monkey platform. The data consists of capability information provided by emergency services providers in Stark County.

Q1 Company Name and Station Number:

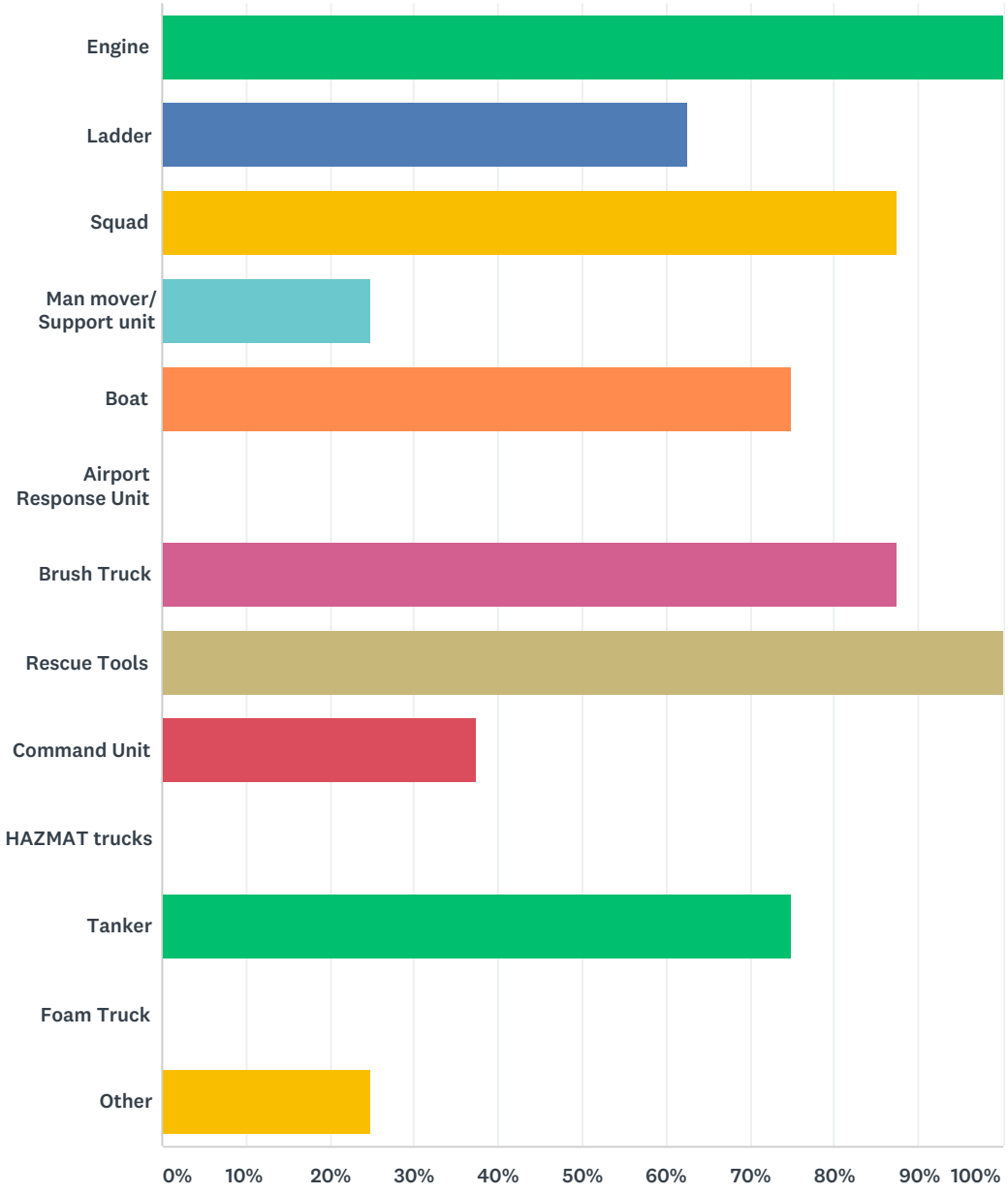
Answered: 8 Skipped: 0

Q2 How many members on your response team

Answered: 8 Skipped: 0

Q3 What type of apparatus does your company maintain?

Answered: 8 Skipped: 0

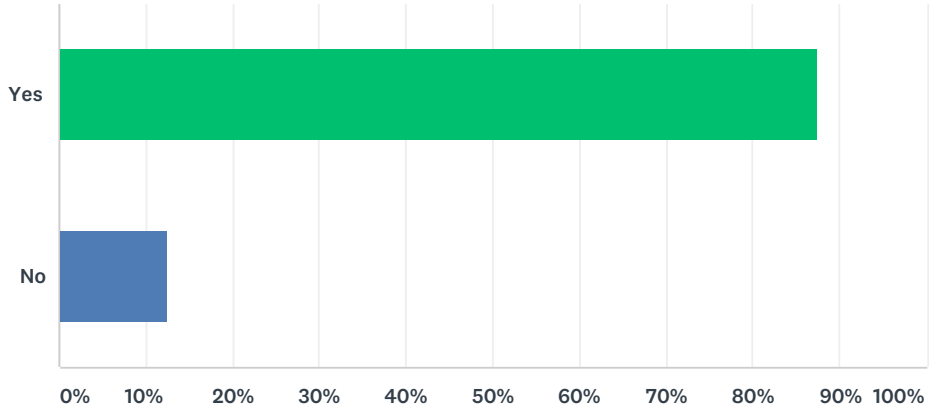


ANSWER CHOICES	RESPONSES	
Engine	100.00%	8
Ladder	62.50%	5
Squad	87.50%	7
Man mover/ Support unit	25.00%	2
Boat	75.00%	6
Airport Response Unit	0.00%	0

Brush Truck	87.50%	7
Rescue Tools	100.00%	8
Command Unit	37.50%	3
HAZMAT trucks	0.00%	0
Tanker	75.00%	6
Foam Truck	0.00%	0
Other	25.00%	2
Total Respondents: 8		

Q4 Are all emergency vehicles equipped with a current Emergency Response Guide?

Answered: 8 Skipped: 0



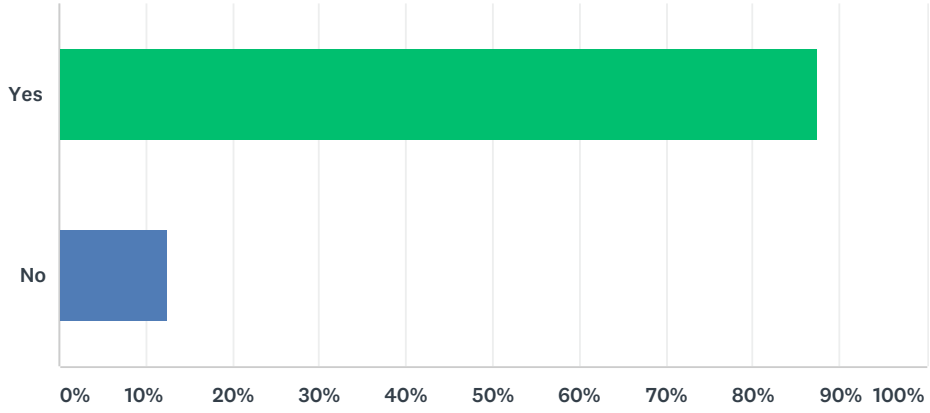
ANSWER CHOICES	RESPONSES	
Yes	87.50%	7
No	12.50%	1
TOTAL		8

Q5 Please list any other specialty resources your company maintains that you feel may be relevant to transportation-based HAZMAT incidents:

Answered: 5 Skipped: 3

Q6 Does your department maintain a written HAZMAT plan or policy?

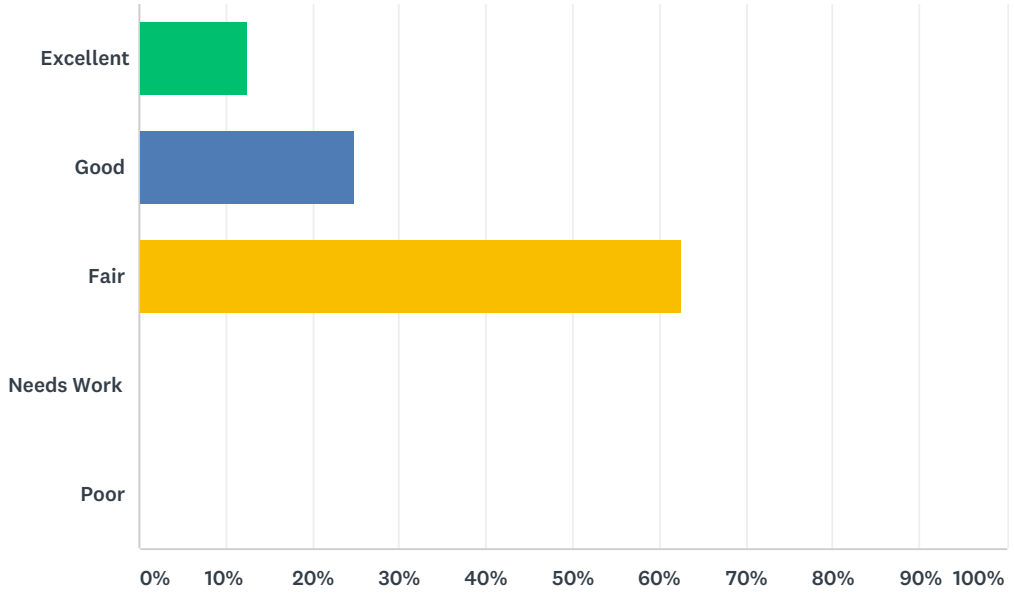
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	87.50%	7
No	12.50%	1
TOTAL		8

Q7 Rank how capable you feel the equipment on-hand is in a HAZMAT situation:

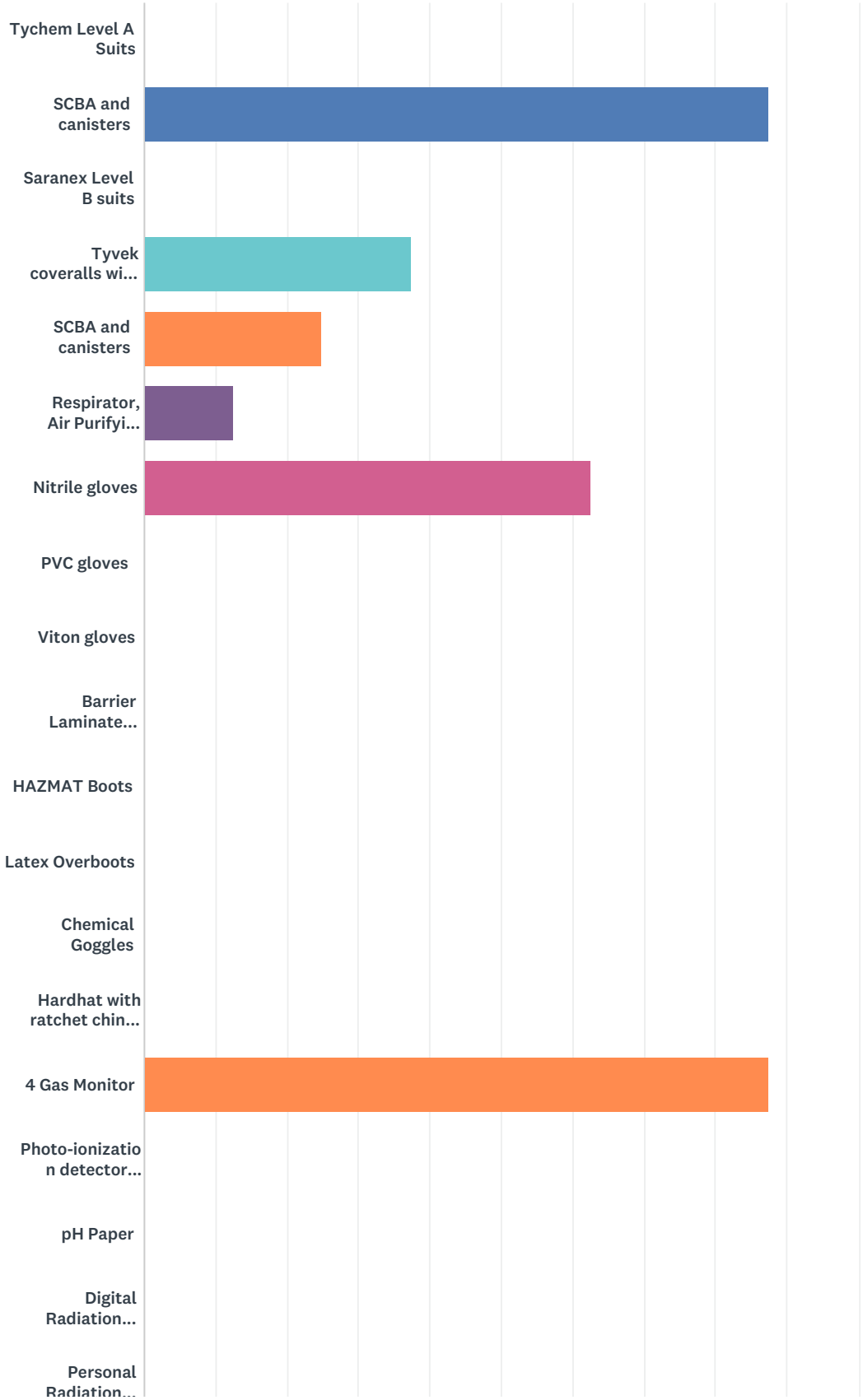
Answered: 8 Skipped: 0

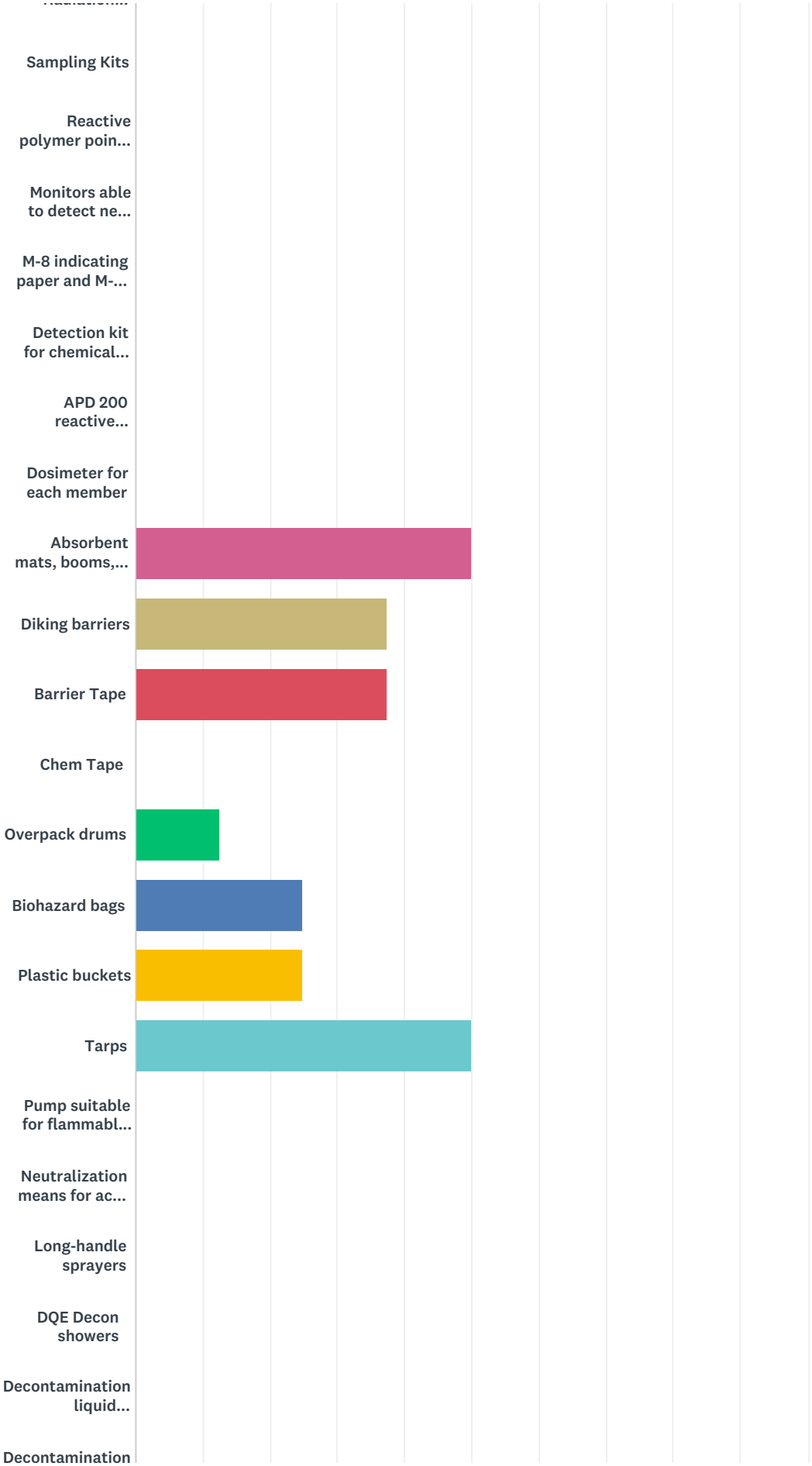


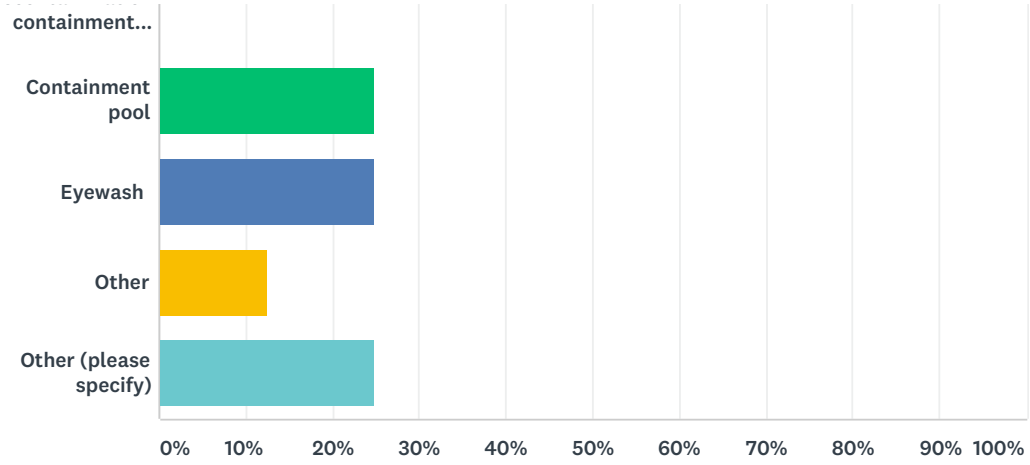
ANSWER CHOICES	RESPONSES	
Excellent	12.50%	1
Good	25.00%	2
Fair	62.50%	5
Needs Work	0.00%	0
Poor	0.00%	0
TOTAL		8

Q8 Please check off any of the HAZMAT equipment you have on-hand:

Answered: 8 Skipped: 0




Sampling Kits
Reactive polymer poin...
Monitors able to detect ne...
M-8 indicating paper and M-...
Detection kit for chemical...
APD 200 reactive...
Dosimeter for each member
Absorbent mats, booms,...
Diking barriers
Barrier Tape
Chem Tape
Overpack drums
Biohazard bags
Plastic buckets
Tarps
Pump suitable for flammabl...
Neutralization means for ac...
Long-handle sprayers
DQE Decon showers
Decontamination liquid...
Decontamination



ANSWER CHOICES	RESPONSES	
Tychem Level A Suits	0.00%	0
SCBA and canisters	87.50%	7
Saranex Level B suits	0.00%	0
Tyvek coveralls with zipper	37.50%	3
SCBA and canisters	25.00%	2
Respirator, Air Purifying, Full-Face, Tight-Fitting	12.50%	1
Nitrile gloves	62.50%	5
PVC gloves	0.00%	0
Viton gloves	0.00%	0
Barrier Laminate gloves, Silver Shield	0.00%	0
HAZMAT Boots	0.00%	0
Latex Overboots	0.00%	0
Chemical Goggles	0.00%	0
Hardhat with ratchet chin strap	0.00%	0
4 Gas Monitor	87.50%	7
Photo-ionization detector (PID)	0.00%	0
pH Paper	0.00%	0
Digital Radiation detector (alpha/beta; alpha/gamma)	0.00%	0
Personal Radiation Detector with alarm (gamma and neutron)	0.00%	0
Sampling Kits	0.00%	0
Reactive polymer point chemical agent detector	0.00%	0
Monitors able to detect nerve agents, mustard or lewisite blister agents, choking/vomiting agents, and incapacitating agents	0.00%	0
M-8 indicating paper and M-9 indicating tape for chemical warfare agents	0.00%	0
Detection kit for chemical agents	0.00%	0

APD 200 reactive polymer point chemical agent detector	0.00%	0
Dosimeter for each member	0.00%	0
Absorbent mats, booms, or powders	50.00%	4
Diking barriers	37.50%	3
Barrier Tape	37.50%	3
Chem Tape	0.00%	0
Overpack drums	12.50%	1
Biohazard bags	25.00%	2
Plastic buckets	25.00%	2
Tarps	50.00%	4
Pump suitable for flammable liquids	0.00%	0
Neutralization means for acids and bases	0.00%	0
Long-handle sprayers	0.00%	0
DQE Decon showers	0.00%	0
Decontamination liquid containment unit	0.00%	0
Decontamination containment unit	0.00%	0
Containment pool	25.00%	2
Eyewash	25.00%	2
Other	12.50%	1
Other (please specify)	25.00%	2
Total Respondents: 8		

Q9 How many crew members are trained in NIMS?

Answered: 8 Skipped: 0

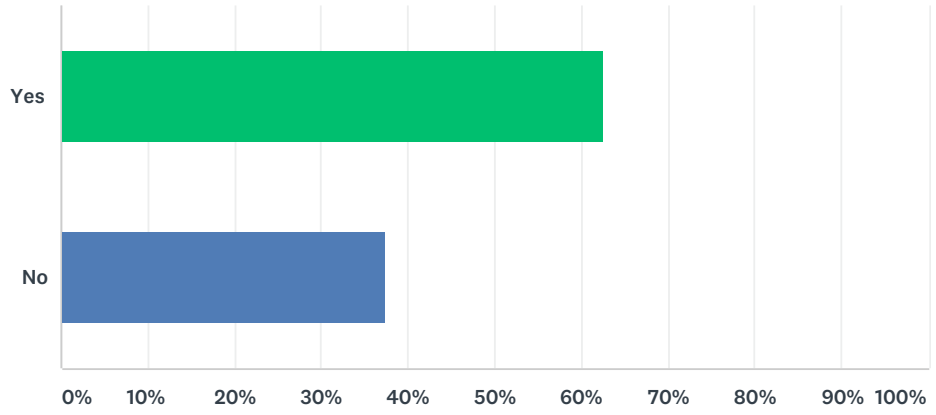
Q10 How many of your firefighters have each level of HAZMAT training? Only list the highest level of training. (If a firefighter has an operation level do not add them to the awareness level)

Answered: 8 Skipped: 0

ANSWER CHOICES	RESPONSES	
Awareness	50.00%	4
Operations	87.50%	7
Technician	75.00%	6
Specialist	12.50%	1

Q11 Does your agency provide annual HAZMAT training?

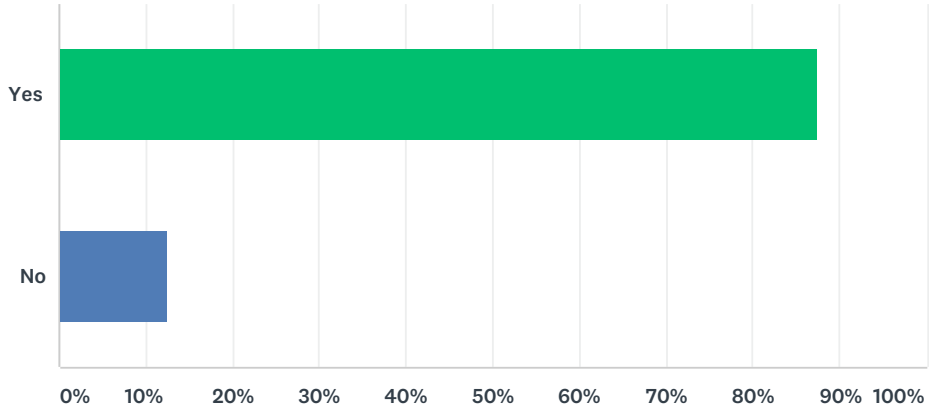
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	62.50%	5
No	37.50%	3
TOTAL		8

Q12 Does your agency provide Respiratory Training and Medical Evaluation?

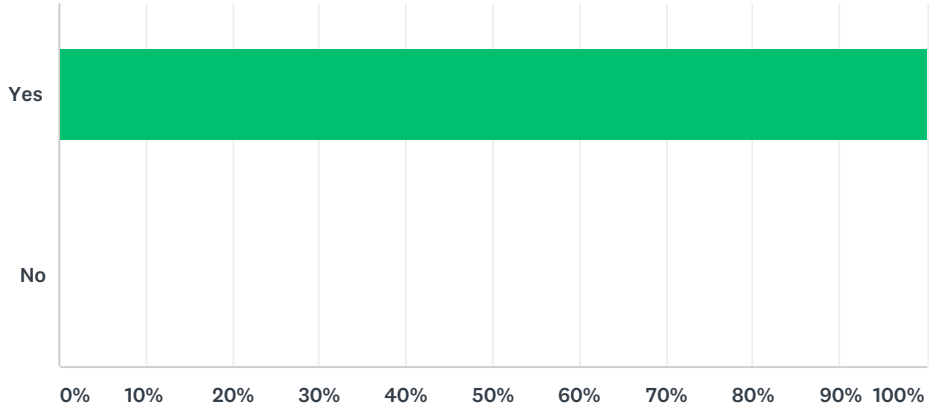
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	87.50%	7
No	12.50%	1
TOTAL		8

Q13 Do you provide annual respiratory fit testing?

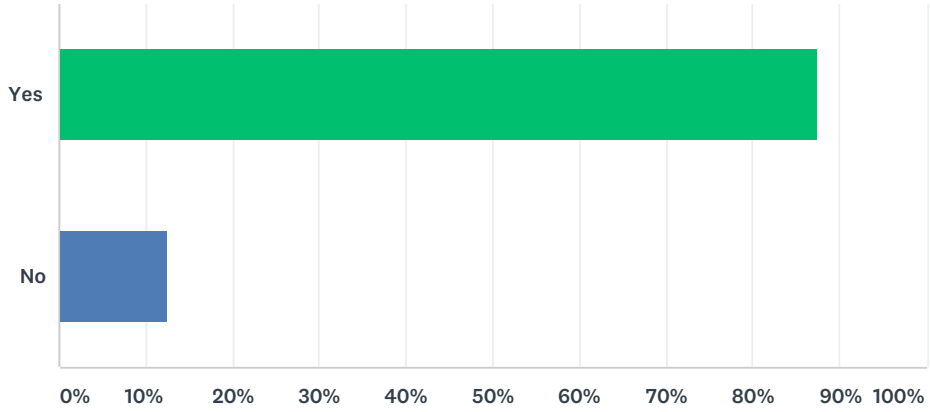
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	8
No	0.00%	0
TOTAL		8

Q14 Is your company the primary response agency in any municipal emergency operation plans?

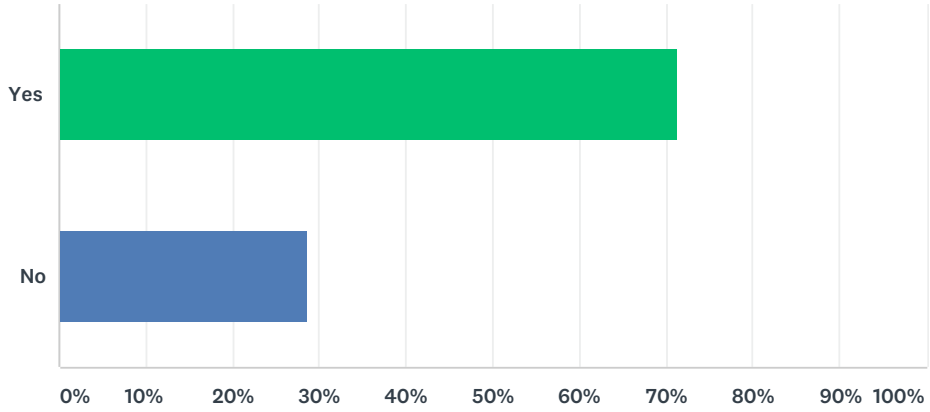
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	87.50%	7
No	12.50%	1
TOTAL		8

Q15 If listed as the primary response agency in a municipal emergency operations plan, was your company included in the planning process?

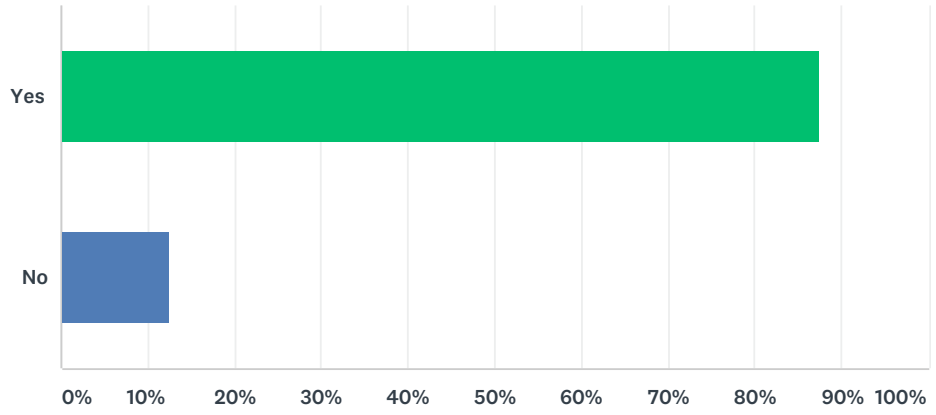
Answered: 7 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	71.43%	5
No	28.57%	2
TOTAL		7

Q16 Is your company part of a county-wide fire association?

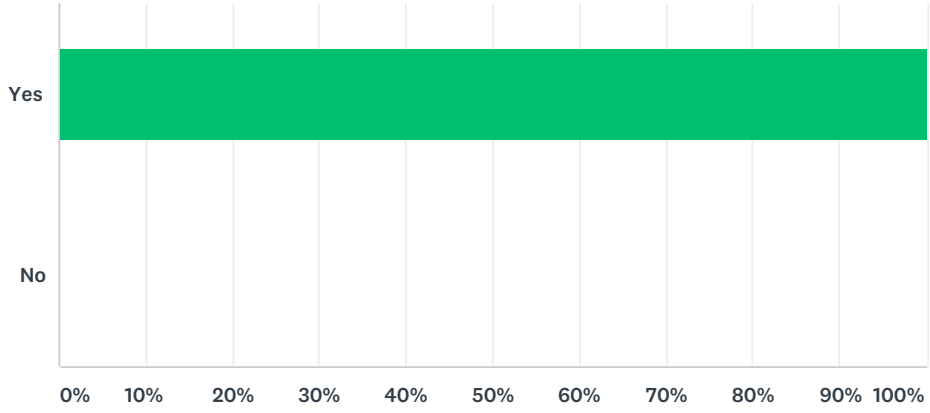
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	87.50%	7
No	12.50%	1
TOTAL		8

Q17 Are you familiar with the county emergency operations plan?

Answered: 8 Skipped: 0



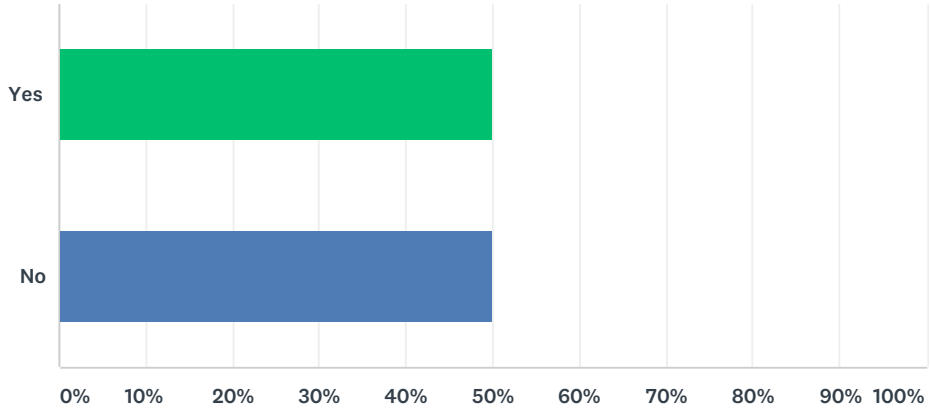
ANSWER CHOICES	RESPONSES	
Yes	100.00%	8
No	0.00%	0
TOTAL		8

Q18 How is the fire service represented at an activated county emergency operations center during an emergency?

Answered: 7 Skipped: 1

Q19 Have you held or participated in a risk and vulnerability assessment for your first-due jurisdictions?

Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	50.00%	4
No	50.00%	4
TOTAL		8

Q20 What is your agency’s perceived or planned role during a HAZMAT emergency?

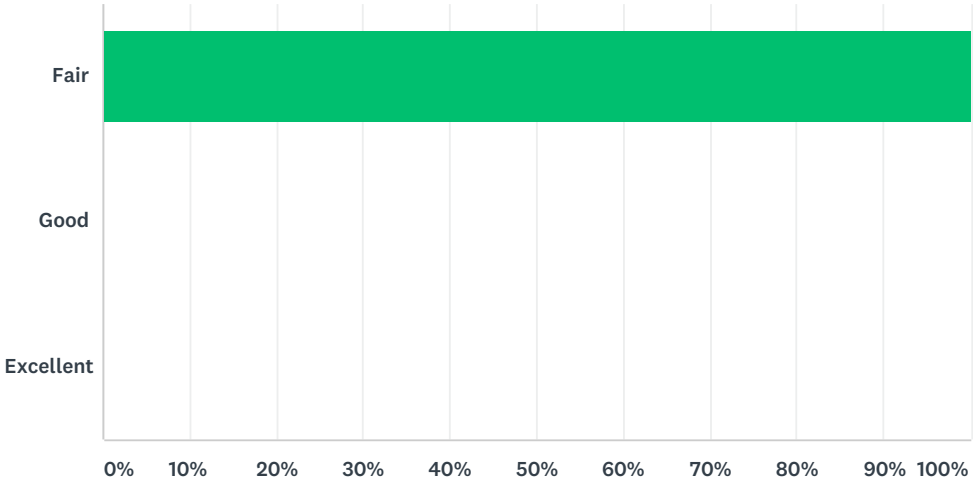
Answered: 7 Skipped: 1

Q21 List any other response teams that may assist in an emergency HAZMAT situation (Denote presence of former Memorandum of Understanding):

Answered: 6 Skipped: 2

Q22 How capable do you feel that neighboring fire departments are to responding to HAZMAT situations?

Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Fair	100.00%	8
Good	0.00%	0
Excellent	0.00%	0
TOTAL		8

Q23 What type of state support do you typically utilize?

Answered: 5 Skipped: 3

Q24 What types of support would you request from regional/external teams in the event of a HAZMAT incident?

Answered: 5 Skipped: 3

Q25 What types of support would you request from shippers or rail carriers in the event of a HAZMAT incident?

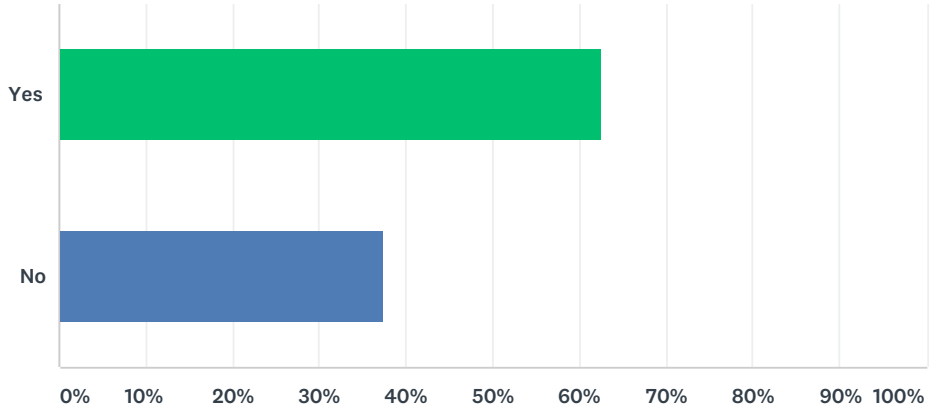
Answered: 5 Skipped: 3

Q26 What type of federal support would you envision utilizing?

Answered: 5 Skipped: 3

Q27 Do you have after-action reports/improvement plans from incidents or exercises?

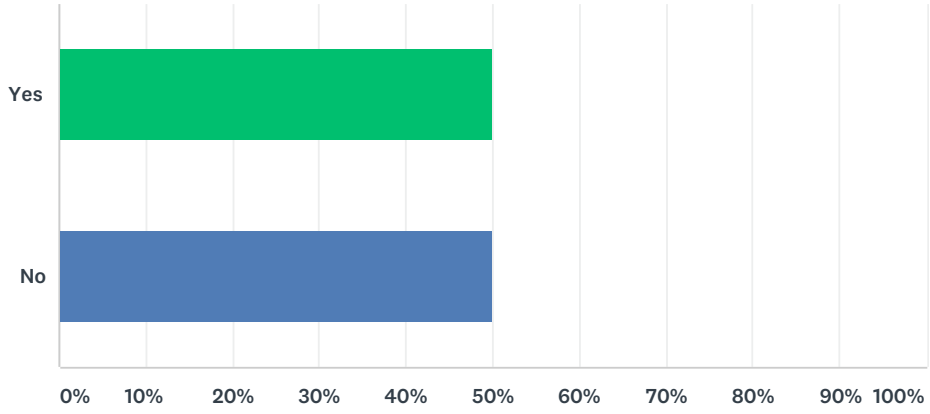
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	62.50%	5
No	37.50%	3
TOTAL		8

Q28 Do you feel your company has made progress in addressing these items?

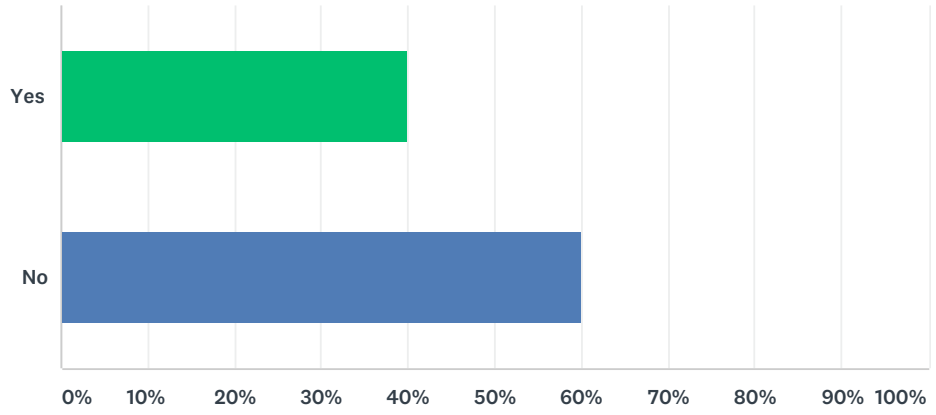
Answered: 8 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	50.00%	4
No	50.00%	4
TOTAL		8

Q29 If yes, would you be willing to provide copies of the AAR/IPs?

Answered: 5 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	40.00%	2
No	60.00%	3
TOTAL		5

Q30 Thank you for your time. Please feel free to leave any additional comments or questions you may have:

Answered: 0 Skipped: 8

APPENDIX 7
GLOSSARY

This appendix is a glossary of key terms and a list of acronyms used throughout the report. Definitions presented in this appendix may differ slightly from the common definitions of the terms; these definitions correspond to how the term is used (and its meaning) as part of the study.

LIST OF TERMS

Commodity Flow Study: A study to identify the types of hazardous materials transported on a variety of transportation systems (e.g., highway, railway, waterway, airway, pipeline, or at covered facilities).

Covered Facility: A facility that reports to a Local Emergency Planning Committee as part of Tier II reporting requirements under Title III of the Superfund Amendment and Reauthorization Act of 1986.

Covered Facility Analysis: An analysis of the hazardous materials used and stored by covered facilities. The analysis includes an identification of shipping routes, quantities shipped, and frequency of shipments.

Emergency: Any incident, whether natural or human-caused, that requires responsive action to protect life or property. Under the Robert T. Stafford Act, an “emergency” is an incident for which federal assistance is needed to supplement state and local efforts and capabilities to save lives and to protect property.

Extremely Hazardous Substance: A hazardous material recognized by the United States Environmental Protection Agency as having extremely toxic properties and thus necessitates additional safety measures during handling and transport.

Hazard Class: A system utilized by the United States Department of Transportation to classify the type of hazardous material in transport. There are nine (9) hazard classes: Explosives (Class 1), Gases (Class 2), Flammable Liquids (Class 3), Flammable Solids (Class 4), Oxidizers (Class 5), Toxics (Class 6), Radioactive (Class 7), Corrosives (Class 8), and Miscellaneous (Class 9).

Hazardous Material: A material that is (or can be) harmful to human health and the environment.

Highway Analysis: An analysis of hazardous materials transported along roadways in a

study area. The analysis is usually completed by visually monitoring select sites along the roadways and recording the hazardous materials that pass through the site. An analysis can also be conducted remotely through the use of waybills, shipping company reporting, etc.

Incident: An occurrence, natural or human-caused, that requires a response to protect life or property.

Placard: A sign or notice for display in a public place. For this document, the sign is the diamond or rectangular-shaped card attached to a truck and trailer labeling hazardous material shipments.

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers a notification by facilities to the State Emergency Response Commission that such facilities are subject to emergency planning requirements under SARA Title III.

LIST OF ACRONYMS

DOT	United States Department of Transportation
EHS	Extremely Hazardous Substance
EPCRA	Emergency Planning & Community Right-to-Know Act
FRA	Federal Railroad Administration
JHC	JH Consulting, LLC
LEPC	Local Emergency Planning Committee
ODOT	Ohio Department of Transportation
OH	Ohio
SARA	Superfund Amendment and Reauthorization Act
SERC	State Emergency Response Commission
TPQ	Threshold Planning Quantity
WWTP	Wastewater Treatment Plant