CABELL-WAYNE LEPC

2016 Commodity Flow Study

CABELL - WAYNE COMMODITY FLOW STUDY

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CABELL- WAYNE
COMMODITY FLOW STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendment and Reauthorization Act (SARA), was passed by Congress in 1986 and 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 1993, the West Virginia Legislature passed House Bill 2382 to implement the EPCRA in West Virginia. The State Emergency Response Commission (SERC) serves as the administrative body for the implementation of House Bill 2382 at the state level; the SERC works cooperatively with the Local Emergency Planning Committees (LEPCs) serving the counties of West Virginia. The EPCRA is indicative of the fact that Congress realizes the risk to communities posed by the use, storage, and transportation of hazardous materials. West Virginia'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. As part of the process of developing these plans, LEPCs conduct various hazard analyses and risk assessments, of which this commodity flow study is an example.

Utilizing funding from the West Virginia SERC, the Cabell – Wayne LEPC coordinated the completion of this flow study. A contractor, JH Consulting, LLC (JHC) of Buckhannon, West Virginia, was hired to facilitate all data collection and

analysis. In March 2016, JHC began contacting railway companies, the United States Army Corps of Engineers (USACE), and covered facilities. Field reconnaissance was conducted over a one week period, beginning August 7th, 2016. Following the collection of data, JHC completed final analysis and assimilated the results into report format. (NOTE: Detailed methodologies are provided in the discussions below.)

The intent of this study is to provide emergency managers and responders in Cabell & Wayne counties with information to more fully 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 Study Area

Cabell and Wayne Counties are located in southwestern West Virginia, along the Ohio River. The counties have a combined population of 137,815 as of the 2015 Census estimate (96,844 in Cabell, 40,971 in Wayne). The region borders two states, Kentucky and Ohio, with both borders being rivers. The Ohio River separates the region and Ohio, while the Big Sandy River separates Wayne County from Kentucky.

Cabell County is located just northeast of Wayne County and is the fourth most populous county in the state. The county seat of Cabell County is Huntington, the second largest city in the state. The Huntington metropolitan area was the largest in West Virginia as of the 2010 census, spanning seven counties in three states. There are two other municipalities in the county; the town of Milton and the village of Barboursville. The county covers 288 square miles, 281 of which is land and 7 is water. The county has a population density of 364/square mile.

Wayne County is the more southern of the two counties, and is the westernmost county in the state. The county seat of Wayne County is the town of Wayne. There are three other municipalities within the county; the city of Kenova and the towns of Ceredo and Fort Gay. Additionally, a portion of Huntington is located in the county, with the majority being in Cabell County. The county covers 512 square miles, of which 512 square miles are land and 6.1 square

miles are water. The county has a population density of 81/square mile.

The road transportation infrastructure of the region is comprised of numerous county and state roads, US Highways, and a major Interstate. In addition to these routes, the region sees significant rail and barge traffic. The Ohio River is a major transportation route for raw materials and agricultural products. Multiple rail lines cross the region, owned by both Norfolk-Southern and CSX Transportation.

Interstate 64 transverses the region east-west, running through the middle of Cabell County and the northwestern section of Wayne County before entering Kentucky. This route is the only major artery running between Charleston, WV and eastern Kentucky. Additionally, the region is served by US Highways 52 and 60. US 52 runs north/south through Wayne County, crossing the Ohio River in Huntington, while US 60 runs east-west through the region, generally parallel to Interstate 64, crossing the Big Sandy River into Kentucky in Kenova. The major state routes in the region that were monitored for this study are SR2, which runs north-south along most of the western border of West Virginia, SR10, which runs south from Huntington into southern West Virginia, and SR152, which follows the former path of US 52 through western Wayne County.

Of the routes comprising the transportation infrastructure, Interstate 64 is likely to be the most heavily travelled route, both for total traffic and number of hazardous materials transported. The maps below show the major roadway transportation routes in the counties, as well as the location of the rail lines operating in the counties.

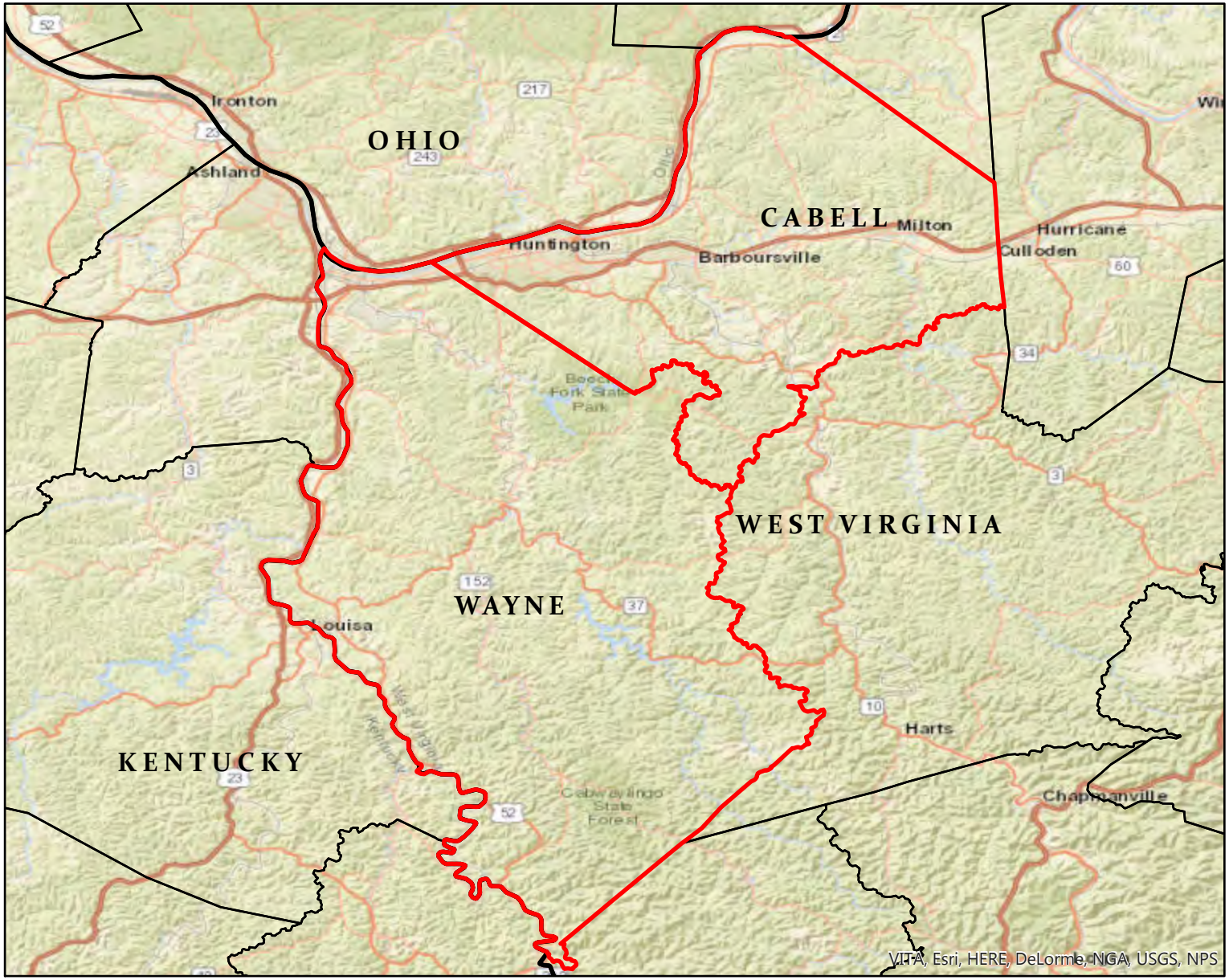
The topography of both counties can be considered steep to gently sloping. Both counties also contain “plains-like” areas along the Ohio and Big Sandy Rivers. Roadway access to some of the outlying communities can be difficult due to terrain. Most roadways are two lanes, with I64 consisting of four lanes. The US highways in the region have stretches of four lane traffic, but are more commonly two lane roads. Both counties do contain rural one lane roadways. The majority of the covered facilities in the study area are along the primary transportation routes.

The climate of the study area is variable with four (4) distinct seasons. The weather is influenced by air masses from both Canada and the Gulf of

Mexico. Additionally, extreme weather coming from the Atlantic Ocean can affect both counties. The average annual precipitation for the study area is 45.5" inches (Cabell – 48"; Wayne – 43"), including an average snowfall of 32-60". Average temperatures are as follows: January – 28.5°F, July – 71°F, Annual – 50 °F. The usual wind direction is from West-South-West.

Cabell & Wayne Counties

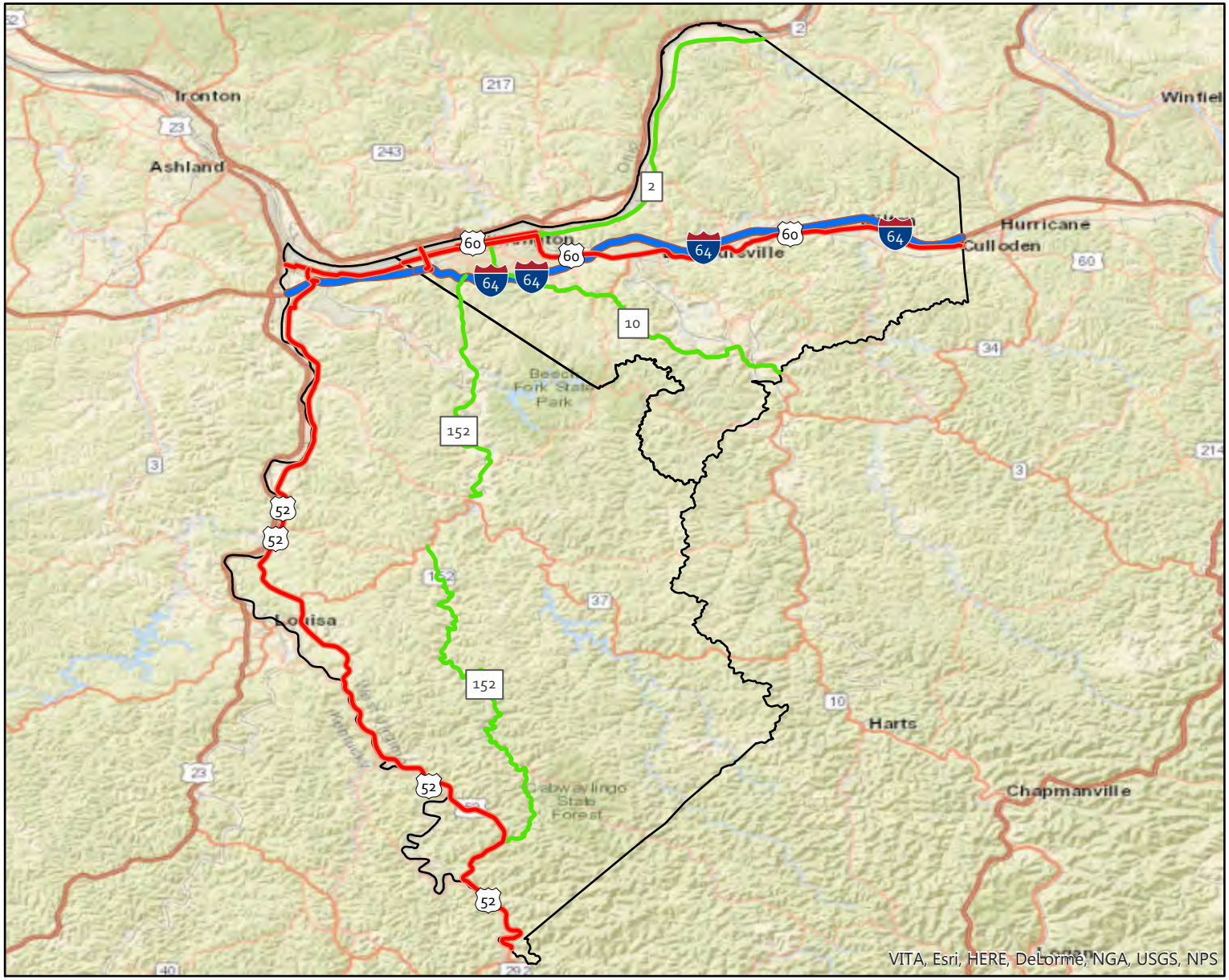
N



0 7.5 15 Miles

Cabell - Wayne Highways

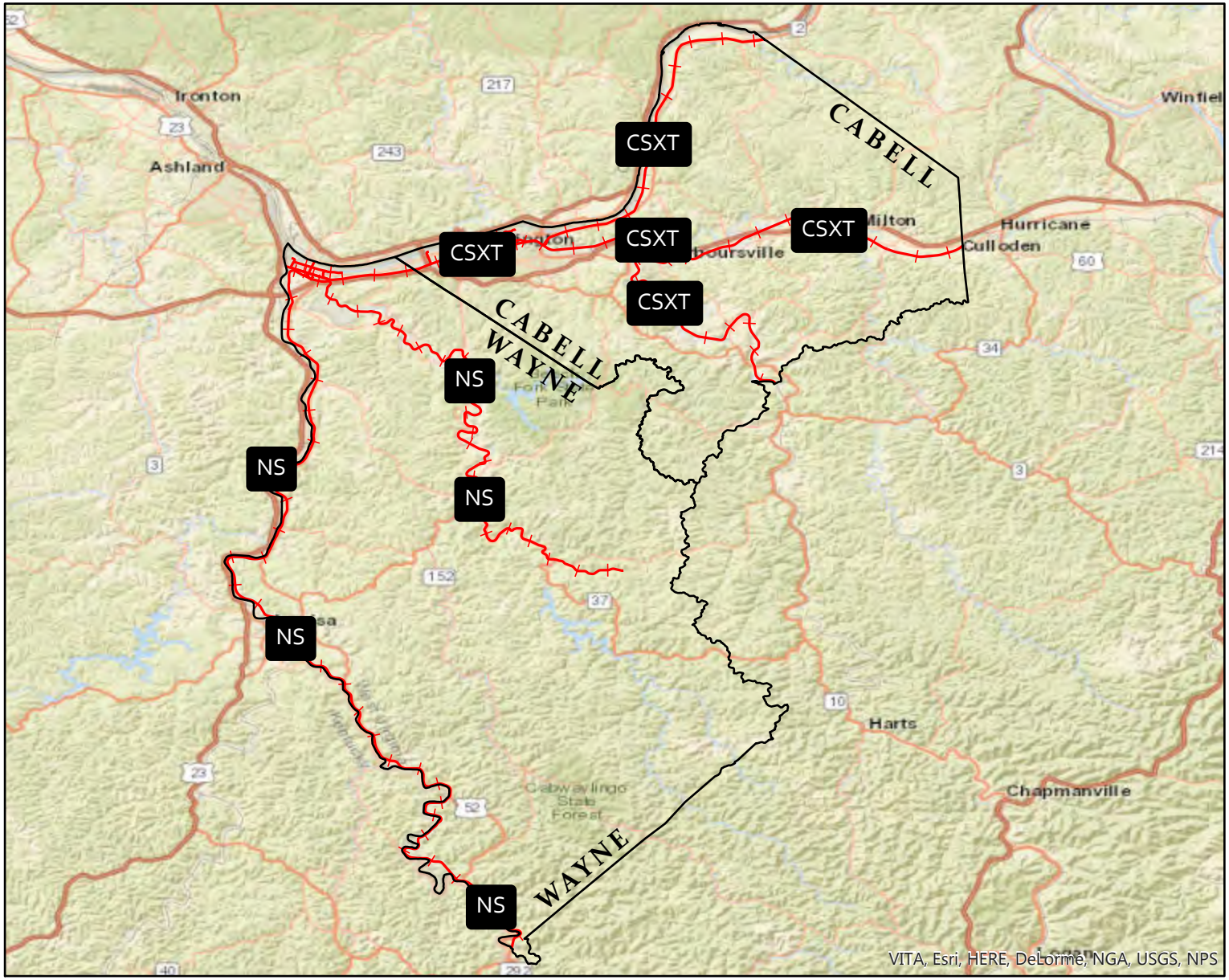
Study Area
State Routes
Interstate
US Routes



0 10 20 Miles

Cabell - Wayne Rail Lines

Study Area
Rail Lines

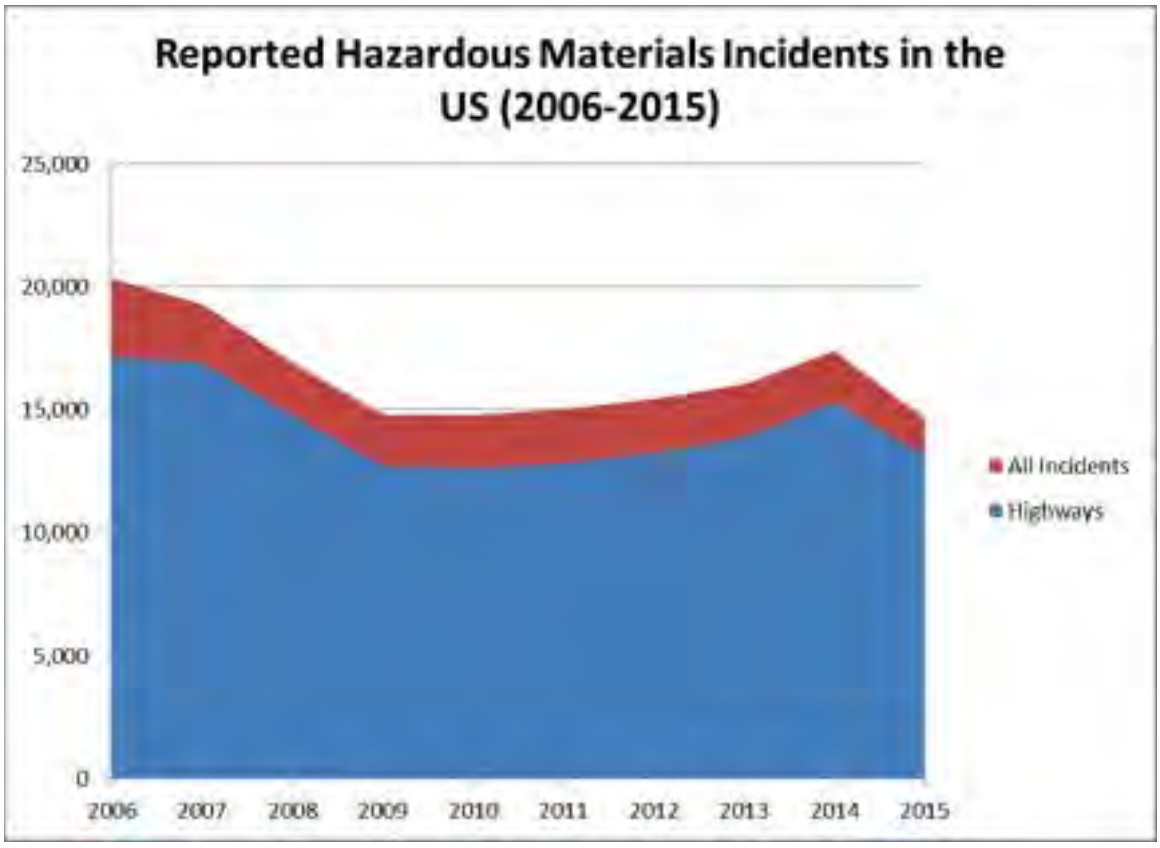


0 10 20 Miles

2.0 HIGHWAY ANALYSIS

2.1 National Statistics

Figure 2.1.a

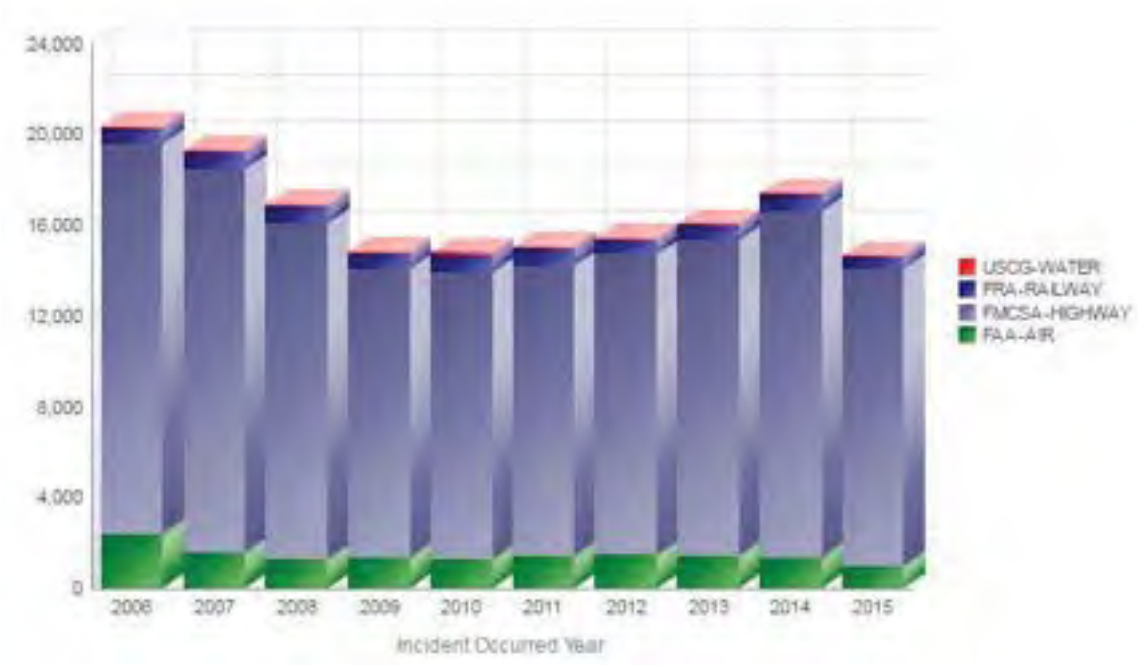


The annual number of reported hazardous material incidents during transport in the United States has varied slightly since 2005. The data represents a sharp decrease in incidents in 2001 and reports the highest annual number of incidents through the two (2)-year period as 2006-2007. Recently there an observable spike in incidents in 2014, followed by a significant decrease in 2015. Figure 2.1.a depicts the total number of reported hazardous material incidents in the United States between 2006 and 2015 (PHMSA, Office of Hazardous Materials Safety, 2016).

The blue-colored area above represents the highway incidents that have occurred. Data such as this has led the United States Department of Transportation (USDOT) to posit that the majority of hazardous material incidents in the United States occur on roadways. Figure 2.1.b confirms this belief (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Figure 2.1.b

Hazardous Material Incidents 2006-2015



The USDOT also maintains data on the cause of hazardous material incidents. According to the USDOT, 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 2013-2015

Cause	2013	2014	2015	Total
Cause Not Reported	2,928	3,688	2,633	9,249
Loose Closure, Component, Or Device	1,947	1,866	1,783	5,596
Forklift Accident	1,456	1,826	1,556	4,838
Human Error	1,631	1,625	1,256	4,512
Dropped	1,301	1,490	1,323	4,114
Improper Preparation For Transportation	985	1,270	1,538	3,793
Inadequate Blocking And Bracing	1,685	1,022	568	3,275
Defective Component Or Device	812	969	1,016	2,797
Impact With Sharp Or Protruding Object (E.G., Nails)	800	987	895	2,682

Inadequate Preparation For Transportation	698	811	501	2,010
Too Much Weight On Package	315	311	315	941
Broken Component Or Device	260	338	204	802
Deterioration Or Aging	203	260	187	650
Valve Open	200	177	208	585
Vehicular Crash Or Accident Damage	162	158	125	445
Overfilled	143	121	81	345
Rollover Accident	127	114	87	328
Abrasion	90	99	60	249
Over-Pressurized	81	90	73	244
Inadequate Procedures	95	70	70	235
Conveyer Or Material Handling Equipment Mishap	57	65	53	175
Misaligned Material, Component, Or Device	56	52	56	164
Missing Component Or Device	48	59	52	159
Corrosion - Interior	45	25	34	104
Fire, Temperature, Or Heat	32	33	39	104
Freezing	32	33	23	88
Corrosion - Exterior	28	13	18	59
Inadequate Accident Damage Protection	12	33	12	57
Derailment	21	13	19	53
Threads Worn Or Cross Threaded	13	8	13	34
Inadequate Maintenance	16	7	10	33
Incorrectly Sized Component Or Device	9	11	5	25
Water Damage	8	7	7	22
Commodity Self-Ignition	11	7	2	20
Inadequate Training	7	5	3	15
Incompatible Product	1	5	9	15
Vandalism	6	3	1	10
Commodity Polymerization	2	2	0	4
Stub Sill Separation From Tank (Tank Cars)	0	0	1	1

There are many types of hazardous materials that are transported over roadways, each divided into "classes" that are denoted on the placards labeling shipments. Table 2.1.2 lists the hazardous material classes involved in the 2013, 2014, and 2015 incidents (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Table 2.1.2

Hazmat Incidents by Class 2013-2015

Hazard Class		2013	2014	2015
1: Explosives	Highway	5	12	17
	Total	35	45	35
2: Flammable, non-flammable, & poisonous gases	Highway	530	422	398
	Total	883	787	667
3: Flammable liquids	Highway	7,978	8,800	6,844
	Total	8,848	9,677	7,452
4: Other ignitable hazards	Highway	106	104	108
	Total	128	117	124
5: Oxidizers	Highway	758	817	927
	Total	789	839	947
6: Poisonous & infectious materials	Highway	247	288	217
	Total	366	380	309
7: Radioactive materials	Highway	5	10	7
	Total	12	17	10
8: Corrosives	Highway	3,869	4,399	4,390
	Total	4,129	4,681	4,606
9: Other miscellaneous hazards	Highway	339	411	437
	Total	746	775	684
Combustible Liquid	Highway	25	36	42
	Total	34	42	50
Other Regulated Material	Highway	36	23	38
	Total	137	101	65

The USDOT 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 2013-2015

Result		2013	2014	2015
Environmental Damage	Highway	69	60	64
	Total	83	75	83
Explosion	Highway	13	14	10
	Total	13	14	13
Fire	Highway	59	63	52
	Total	70	77	70
Material Entered Waterway/Sewer	Highway	59	67	57
	Total	63	68	63
None	Highway	245	251	357
	Total	752	867	752
Spillage	Highway	13,503	19,420	12,933
	Total	13,882	16,240	13,882
Vapor (Gas) Dispersion	Highway	146	145	116
	Total	314	346	314

2.2 Methodology

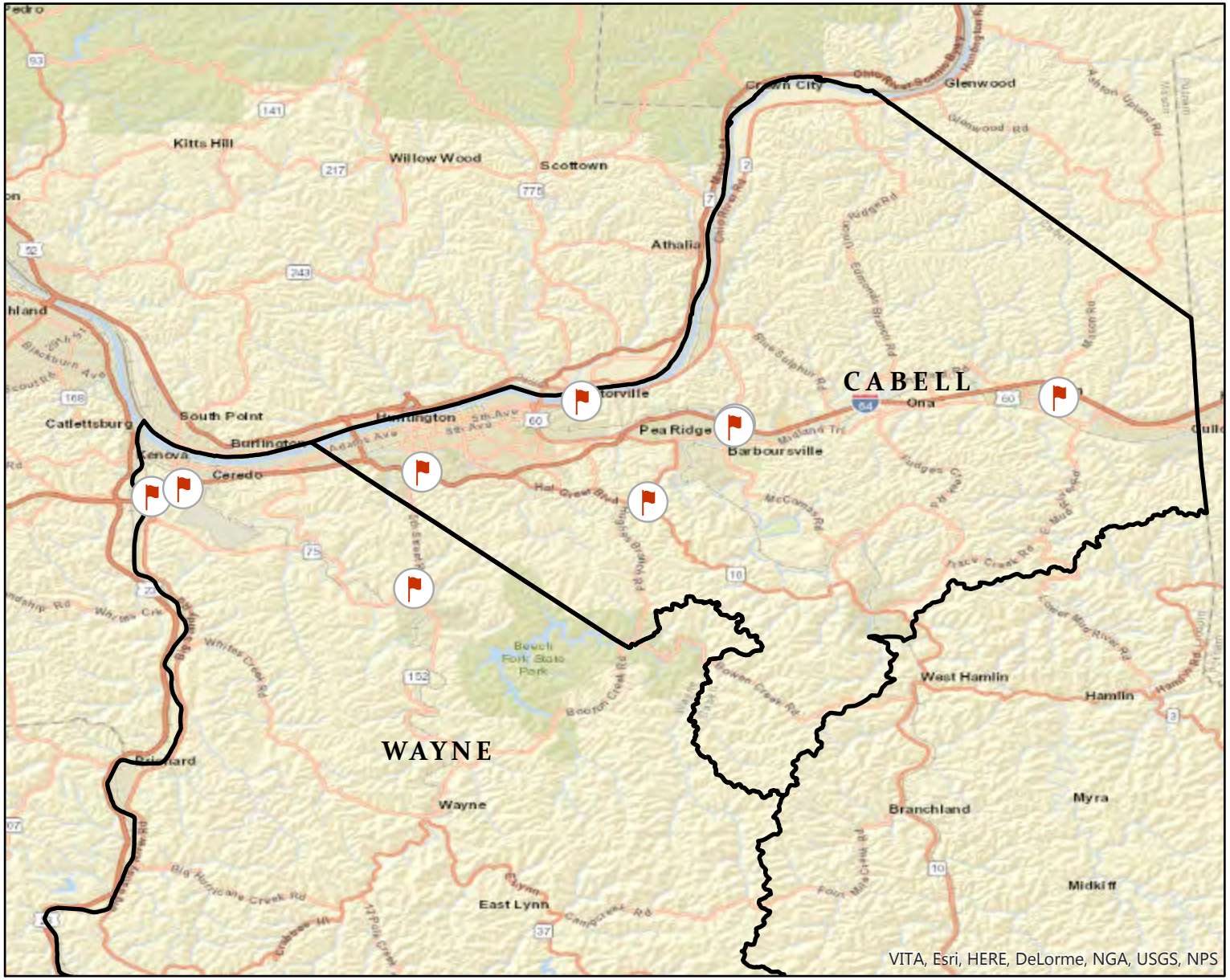
To complete the highway analysis, roadway monitoring sites were established along the primary transportation routes and at key intersections throughout the county. The following sites were monitored. (NOTE: Detailed data sheets for each of these sites are provided in Appendix 2.)

Y	X	Description	Site Visits	Total Hours
38.382842	-82.589847	I64 @ Kentucky State Line	3	11
38.420056	-82.289666	I64 @ SR 193 (North)	2	4
38.418704	-82.290285	I64 @ SR 193 (South)	2	4
38.433855	-82.123267	US 60 @ Milton	2	8
38.395503	-82.450736	SR 152 off of I64	1	4
38.431917	-82.368714	SR 2 North of Huntington	2	8
38.386955	-82.573588	US 52 Southeast of Kenova	2	8
38.335618	-82.454871	SR 152 / SR 75 Intersection	2	8
38.380042	-82.334617	SR 10 @ Melissa	1	4

Cabell - Wayne CFS Sites

Sites

Study Area



Each site was staffed by a one (1)-person crew. This individual noted the UN numbers and the hazard classes of placards at each site. The monitor also manually counted the total truck traffic through the site to allow for real-time comparisons between hazmat-carrying and non-hazmat-carrying truck traffic.

Additionally, total traffic volume data (maintained by the West Virginia Department of Transportation [WVDOT]) was also researched for the study area. This data will allow the planning committee to compare total traffic versus total hazmat traffic.

2.3 Field Data

2.3.1 Totals

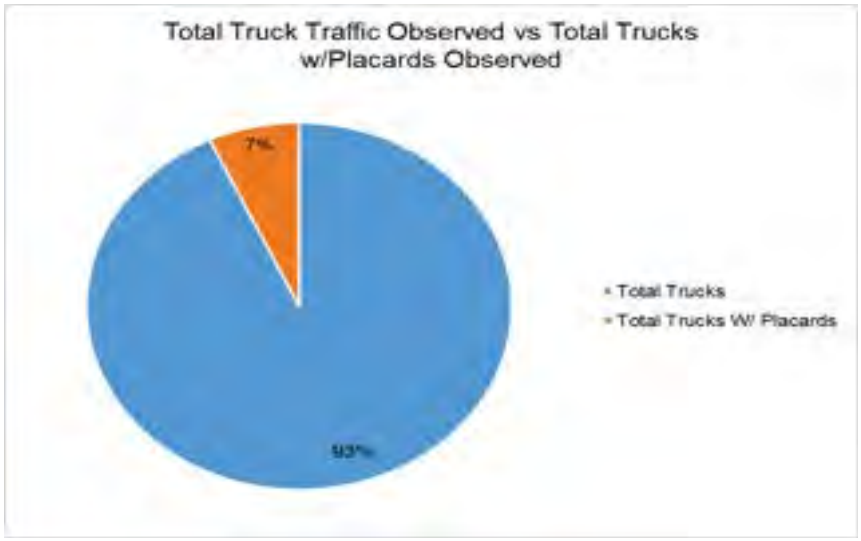
The monitoring sites were chosen because they are likely the most heavily traveled routes, especially by traffic passing through the county. These sites may also represent the most congested intersections in the county. Cabell-Wayne personnel assisted in the selection of sites, given their knowledge of facility locations, alternate routes (leading to and from facilities in neighboring counties, etc.).

A total of 3,718 trucks were counted during the monitoring periods. Monitors reported 273 (4%) of the total number of trucks as being placarded and carrying hazardous materials. A total of 244 trucks labeled with UN numbers and a total of 38 different UNs were recorded. Eight additional placards, labeled generally with the name of the hazard class, were also sighted. In the analyses below, these trucks were counted as part of the hazard class of the placard. General placards included the following:

Placard	Total
Corrosive	11
Explosives	2
Flammable Liquids	1
Flammable Solids	5
Misc.	1
Gases	5
Oxidizer	2
Radioactive	2

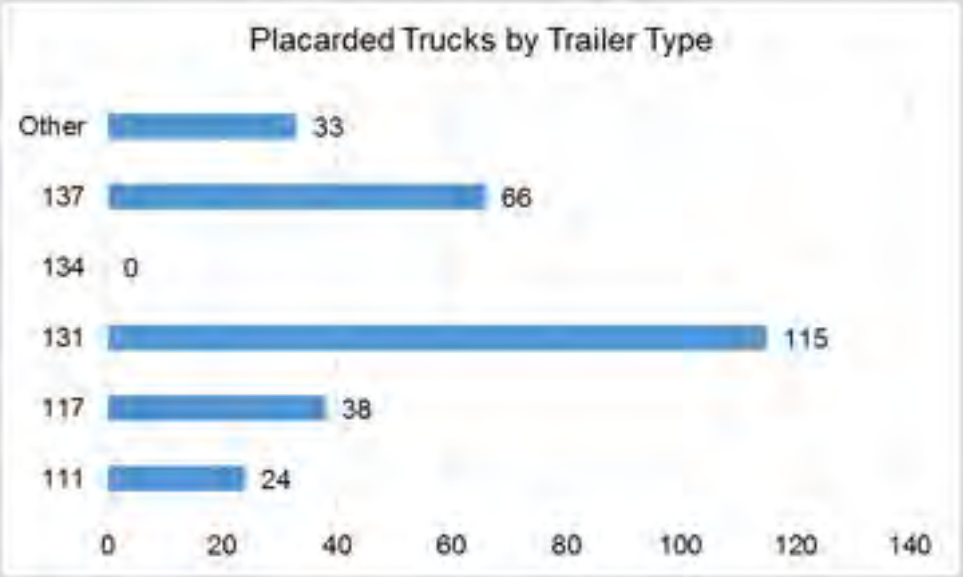
Figure 2.3.1.a depicts the placarded and un-placarded truck traffic observed at monitoring points.

Figure 2.3.1.a



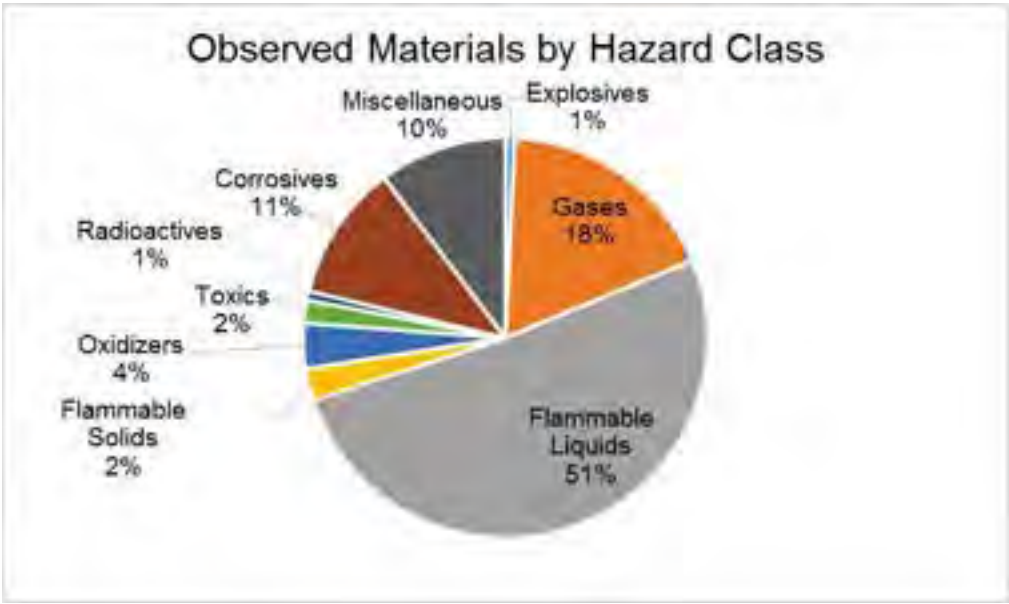
Placarded trucks were recorded by the trailer type they were pulling. Placarded trucks that did not fall into any of the trailer type categories (e.g., flatbed trucks) were considered “Other”. Trailer type 131 was the most prevalent trailer noted, followed by 137, and 117. Reference Appendix 3 for additional information on trailer types. Figure 2.3.1.b depicts the total placarded truck traffic counted by trailer type. (See Appendix 3 for a graphic representation of each trailer type.)

Figure 2.3.1.b



Approximately 7% of the 3,718 total trucks recorded were carrying hazardous materials.

Figure 2.3.1.c



Approximately 50.7% of the total placarded vehicles recorded were carrying Class 3 (Flammable Liquids). Class 2 (Gases) were the second-most frequently-carried materials (17.8%), followed by Class 8 (Corrosives, 10.9%). Table 2.3.1.1 shows the percentages of hazard classes.

Table 2.3.1.1

Placards by Hazard Class

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
2 *0.7%*	**49** *17.8%*	**140** *50.7%*	**7** *2.5%*	**10** *3.6%*	**5** *1.8%*	**2** *0.7%*	**30** *10.9%*	**28** *10.1%*

Within Class 3, Gasoline (UN 1203) was the most frequently-cited material, contributing 74.3% of all Class 3 placards sighted. Combustible Liquids (UN 1993) was the second-most cited material (comprising 12.1% of the Class 3 placards). Crude Oil (UN 1267) was the third most common, contributing 2.9%,

There were five materials sighted at the monitoring points that appear on the United States Environmental Protection Agency's (USEPA's) list of "Extremely Hazardous Substances" (EHSs).

Table 2.3.1.2

Trucks Carrying EHSs

EHS	*Total Trucks*
Ammonia, anhydrous	1
Hydrogen Peroxide	1
Sulfur Trioxide	5
Sulfuric Acid (U/N 2796)	2
Sulfuric Acid (U/N 1830)	1
TOTAL	10

Figure 2.3.1.d

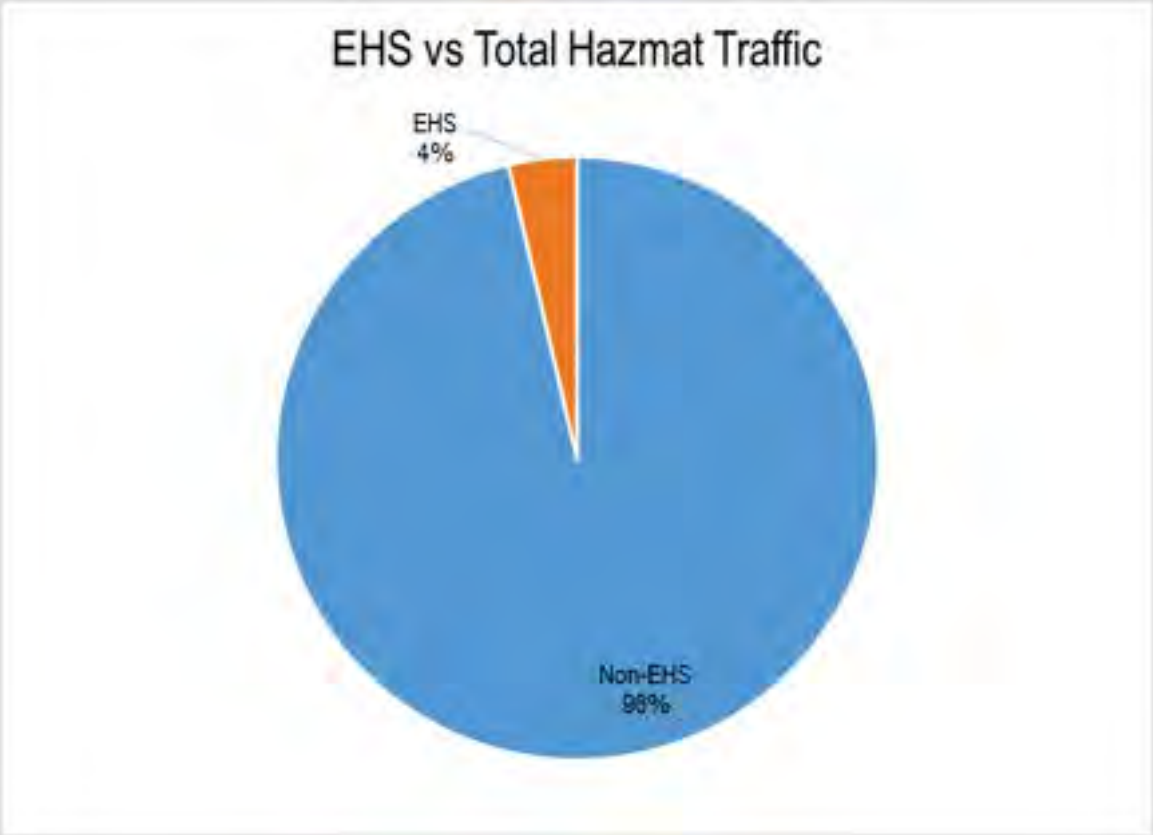


Figure 2.3.1.d depicts the EHS hazardous material traffic in relationship with the total hazardous material traffic.

2.3.2 Site Specific Data

Detailed information for each of the monitoring sites is located in Appendix 2.

2.4 Highway Risk Analysis

Transcaer provides a methodology to calculate the probability of a hazardous material transportation incident on roadways within the boundaries of a specific study area based upon a number of 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 following data can be used for planning purposes, but should always be compared to historical data.

As for a note on the risk analysis methodology, consider the following. All monitoring sites along a given route were combined to obtain the total placard vehicles and survey time along that route. Roadway miles in Cabell & Wayne Counties were taken from Census Tiger Data (2012). Further, the figures 1,000,000 and 0.608 were constants in the Transcear formula. Table 2.4.1 shows the results of the highway risk analysis. Section 2.4.1 below shows an example of the calculation, with results for each roadway below.

Table 2.4.1

Highway Risk Analysis Summary

Roadway Name	Miles in Cabell & Wayne Counties	Accidents with Placarded Loads per Year
Interstate 64	63.59	4.04
US Route 60	47.7	0.44
US Route 52	100.73	1.2
State Route 2	17.94	0.02
State Route 10	18.5	0.05
State Route 152	41.43	0.18
AVERAGES	48.32	.99

2.4.1 Interstate 64 (I64)

- A total of 63.59 miles of I64 passes through Cabell & Wayne counties.
- A total of 227 placarded vehicles were observed
- 63.59 miles x 227 placarded vehicles = 14434.93 miles traveled by placarded vehicles in the study area on I64.
- 14434.93 miles / 1,000,000 = 0.0144349 million miles
- 0.0144349 x 0.608 = 0.0087764 accidents with placarded loads
- 19 hours of survey time/24 hours = 0.791667
- (0.0087764 / 0.791667 hours) x 365 days = 4.04 estimated number of accidents with placarded loads per year

US60		US52		SR2	
Miles	47.7	Miles	100.73	Miles	17.94
Placards	14	Placards	18	Placards	2
CALC 1	667.8	CALC 1	1813.14	CALC 1	35.88
CALC 2	0.0006678	CALC 2	0.0018131	CALC 2	3.588E-05
CALC 3	0.000406	CALC 3	0.0011024	CALC 3	2.182E-05
Hours	8	Hours	8	Hours	8
CALC 4	0.3333333	CALC 4	0.3333333	CALC 4	0.3333333
Final	0.4445945	Final	1.2071161	Final	0.0238875

SR10		SR152	
Miles	18.5	Miles	41.43
Placards	2	Placards	10
CALC 1	37	CALC 1	414.3
CALC 2	0.000037	CALC 2	0.0004143
CALC 3	2.25E-05	CALC 3	0.0002519
Hours	4	Hours	12
CALC 4	0.1666667	CALC 4	0.5
Final	0.0492662	Final	0.1838829

2.5 Conclusions

The following conclusions can be made using the highway analysis data. Conclusions regarding the railway, waterway, and covered facilities analyses and the overall nature of the hazardous material risk in Cabell and Wayne Counties are presented elsewhere.

- National hazardous material incident trends *generally* predicted the hazardous materials that would be seen locally.
  - o Confirmations
    - Class 3 Flammables are involved in the most incidents nationally and were the most frequently recorded materials in the Name County.
    - Class 2, which includes non-flammable gases (including

refrigerated nitrogen) ranks third nationally in incidents and were frequently noted in Cabell and Wayne counties.

- Class 8 Corrosives were involved in the second most incidents nationally and noted frequently locally.

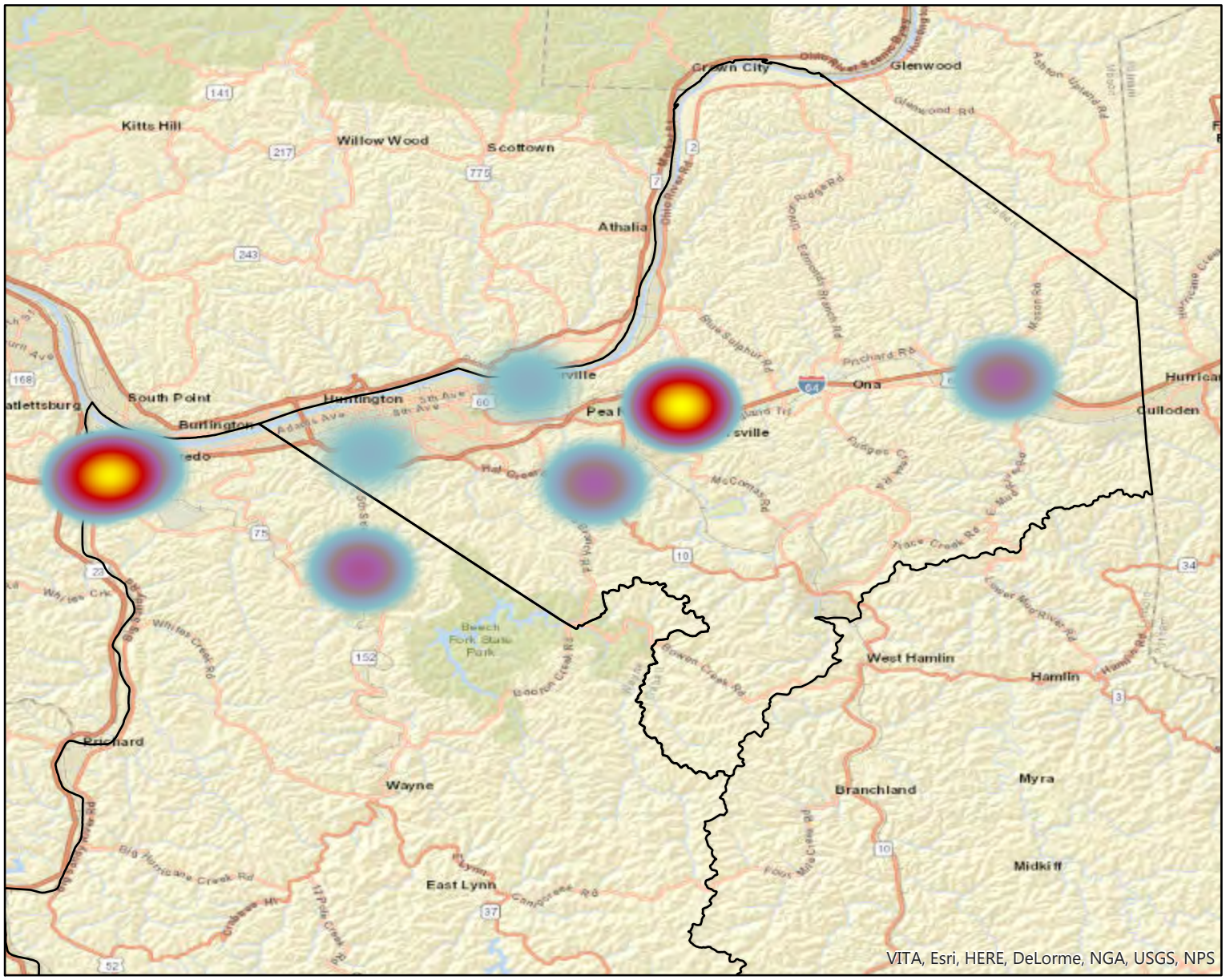
- **Deviation:** Class 2 and Class 8 were opposite in frequency locally than national statistics would predict.

- The types of materials observed at monitoring sites correlated highly with the materials reported by Tier 2 facilities in Cabell and Wayne counties.
- Gasoline (UN 1203) was the single-most recorded material in the study. Though a multitude of materials, representing every hazard class, were observed during the study, the highway analysis alone suggests that local responders should primarily prepare for incidents involving flammable liquids, gases, and corrosives.
- Commodity flow studies are significantly affected by the time of day, week, and even year in which they are conducted (i.e., monitoring the study area one week earlier or later could yield different results based on the shipping schedules and needs of covered facilities). To account for this fact and attempt to standardize data, highway data should be considered collectively with the other data presented below.

Cabell - Wayne Observed Hazmat Density

N

Percent
High Hazmat Percent
Low Hazmat Percent
Study Area



0 6.75 13.5 Miles

3.0 RAILWAY ANALYSIS

3.1 Methodology

Rail data was collected primarily through coordination with the prominent rail companies operating in Cabell & Wayne counties. Cabell and Wayne Counties officially contacted Norfolk-Southern and CSX Transportation representatives in an attempt to gather commodity flow information. Norfolk Southern was cooperative with the study efforts. An official request for commodity flow information was completed and submitted by the counties per Norfolk Southern and CSX protocols. Local data is presented in 3.3 below.

3.2 National and State 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 have 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 2006 to 2015 (http://safetydata.fra.dot.gov/officeofsafety/default.aspx).

Table 3.2.1

Cause of Train Accidents 2006-2015

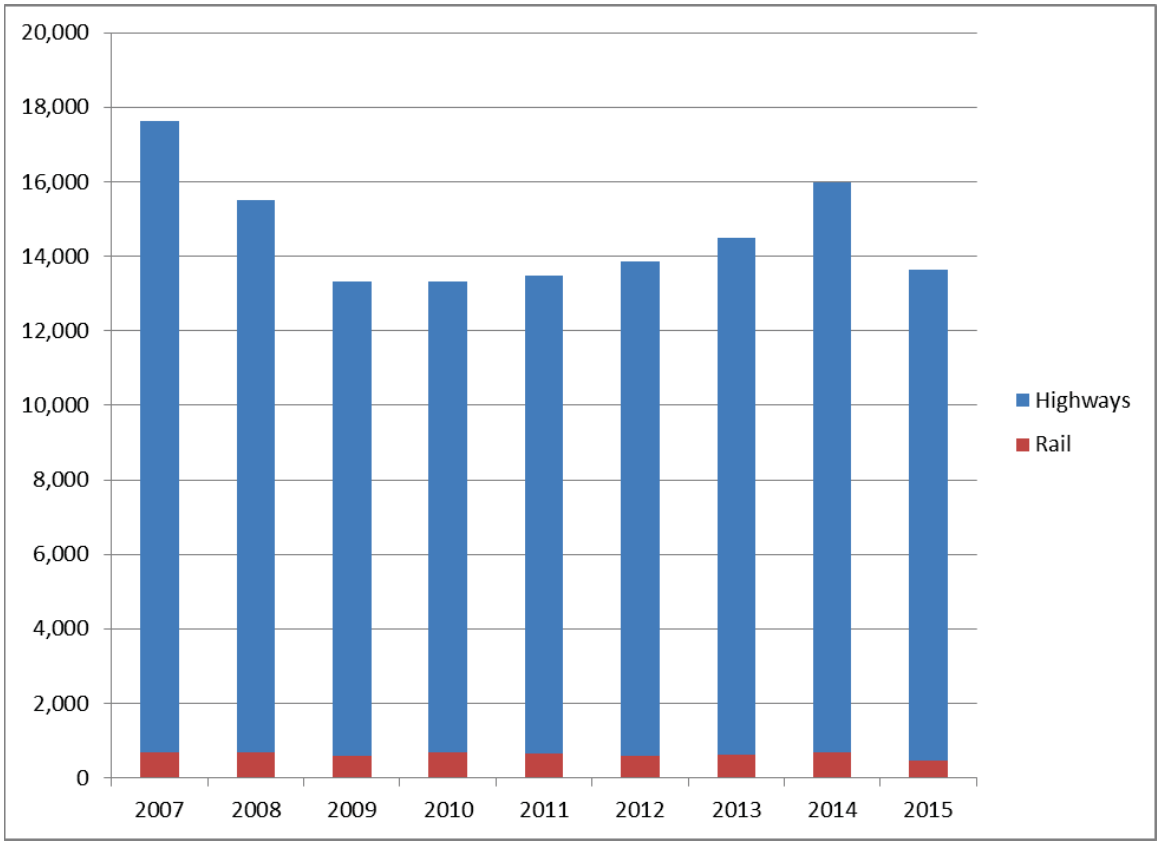
Cause	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Track, Roadbed, Structures	1,076	933	858	664	667	679	575	560	402	511
Signal & Communications	50	49	52	50	68	34	46	52	41	50
Mechanical or Electrical Failure	352	326	320	267	246	227	200	224	186	253
Human Factor	1,068	1047	909	652	647	725	654	681	553	731
Miscellaneous causes	454	339	339	269	271	331	425	474	254	311
Total	3,000	2,694	2,478	1,902	1,899	1,996	1,900	1,991	1,436	1,856

The United States Department of Transportation (USDOT) reports that the number of railroad accidents involving hazardous materials has steadily

decreased. Figure 3.2.a depicts a comparison between rail accidents and truck accidents involving hazardous materials (http://www.phmsa.dot.gov/hazmat/library/data-stats/incidents).

Figure 3.2.a

Rail and Highway Hazmat Incidents 2007-2015



The number of rail hazardous material accidents, as can be seen, is low. In fact, 99.997% of rail shipments involving hazardous materials reach their destination without incident. Rail hazmat accident rates are down 94% since 1980 and 62% since 2000 (Association of American Railroads, https://www.aar.org/Pages/Railroads-Deliver-Hazardous-Materials-Safely.aspx.)

Further, according to the FRA, there have been a total of 123 railroad accidents/incidents in Cabell and Wayne counties since 2006 (http://safetydata.fra.dot.gov/officeofsafety/publicsite/Query/tenyr2a.aspx). The most accidents occurred in 2013, when eighteen were reported. Thirteen deaths occurred within the 10-year study.

3.3 Field Data

Norfolk Southern provided statistics regarding hazardous material transport via rail in Kenova, in Wayne County. Kenova is in the northwest corner of the county, bordering Ohio and Kentucky. According to mapping, the Norfolk Southern line crosses between Wayne County and Ohio. One facility that responded to the information request indicated that they receive hazardous materials by rail shipment. Table 3.3.1 is taken directly from the Norfolk Southern information.

Table 3.3.1

Hazardous Materials Transported by Norfolk Southern in Wayne County

Name	UN/NA	Total Cars
1,1,1,2-Tetrafluoroethane	UN3159	29
1,3-Dichloropropanol-2	UN2750	4
1-Methoxy-2-Propanol	UN3092	1
2-Bromo-2-Nitropropane-	UN3241	1
3-Diethylamino-	UN2684	1
Acetic Acid, Glacial	UN2789	17
Acetone	UN1090	18
Acetonitrile	UN1648	6
Acrylamide Solution	UN3426	4
Acrylonitrile, Stabilized	UN1093	56
Adhesives	UN1133	31
Aerosols	UN1950	109
Air, Compressed	UN1002	35
Alcoholic Beverages	UN3065	138
Alcohols, N.O.S.	UN1987	28673
Alkali Metal Amides	UN1390	6
Alkyl Sulfonic Acids,	UN2585	1
Alkyl Sulfonic Acids,	UN2586	46
Allyl Bromide	UN1099	2
Allyl Chloride	UN1100	16
Amines, Flammable,	UN2733	6
Amines, Liquid,	UN2735	142
Amines, Solid	UN3259	9
Ammonia Solutions	UN2672	31
Ammonia, Anhydrous	UN1005	210
Ammonium Nitrate	UN1942	77
Ammonium Nitrate	UN2426	7
Antimony Pentachloride,	UN1730	2

Articles, Pressurized	UN3164	3
Articles, Pyrotechnic	UN0432	3
Batteries, Wet, Filled	UN2794	47
Battery Fluid, Acid	UN2796	162
Battery-Powered Vehicle	UN3171	2
Benzaldehyde	UN1990	1
Benzene	UN1114	16
Benzonitrile	UN2224	2
Benzyl Chloride	UN1738	38
Benzyldimethylamine	UN2619	1
Bisulfites, Aqueous	UN2693	1
Bromotrifluoromethane	UN1009	1
Butadienes, Stabilized	UN1010	2
Butane	UN1075	7152
Butanols	UN1120	16
Butyl Acetates	UN1123	1
Cadmium Compounds	UN2570	1
Calcium Carbide	UN1402	1
Calcium Hypochlorite	UN2880	21
Carbon Dioxide	UN1013	7
Carbon Dioxide	UN2187	108
Cartridges For Weapons,	UN0012	29
Caustic Alkali Liquids,	UN1719	1
Chlorine	UN1017	13
Chloroacetic Acid,	UN1750	5
Chlorobenzene	UN1134	7
Chlorobenzotrifluorides	UN2234	1
Chlorobutanes	UN1127	2
Chlorodifluoromethane	UN1018	3
Chloroform	UN1888	2
Chromium Trioxide,	UN1463	5
Coating Solution	UN1139	2
Compressed Gas, N.O.S.	UN1956	24
Corrosive Liquid, Acidic,	UN3264	16
Corrosive Liquid, Acidic,	UN3265	85
Corrosive Liquid, Basic,	UN3266	7
Corrosive Liquid, Basic,	UN3267	35
Corrosive Liquids,	UN2920	19
Corrosive Liquids, N.O.S.	UN1760	33
Corrosive Liquids, Toxic,	UN2922	67
Corrosive Solid, Acidic,	UN3260	1
Corrosive Solid, Acidic,	UN3261	1
Corrosive Solid, Basic,	UN3262	22
Corrosive Solids, N.O.S.	UN1759	1
Corrosive Solids, Toxic,	UN2923	2
Cresylic Acid	UN2022	8
Cyanuric Chloride	UN2670	3
Cyclohexane	UN1145	1

Cyclohexanone	UN1915	10
Dangerous Goods In	UN3363	12
Diacetone Alcohol	UN1148	6
Dichloroanilines, Solid	UN3442	3
Dichloromethane	UN1593	2
Dicyclohexylamine	UN2565	4
Diethyl Ether	UN1155	1
Diethyl Sulphate	UN1594	22
Diethylthiophosphoryl	UN2751	21
Diisobutyl Ketone	UN1157	2
Dimethyl Disulfide	UN2381	4
Dimethyl Ether	UN1033	8
Dimethyl Sulfate	UN1595	6
Dimethylamine, Anhydrous	UN1032	14
Dimethylamine, Solution	UN1160	1
Disinfectants, Liquid,	UN1903	1
Disodium Trioxosilicate	UN3253	3
Elevated Temperature	UN3257	4265
Elevated Temperature,	UN3256	16
Engines, Internal	UN3166	607
Environmentally Hazardous	UN3077	309
Environmentally Hazardous	UN3082	965
Ethanol	UN1170	134
Ethanol And Gasoline	UN3475	29
Ethanolamine	UN2491	1
Ethyl Acetate	UN1173	23
Ethyl Acrylate,	UN1917	1
Ethyl Butyrate	UN1180	1
Ethyl Lactate	UN1192	3
Ethyl Methyl Ketone	UN1193	3
Ethylene Oxide	UN1040	123
Ethylenediamine	UN1604	39
Extracts, Flavoring,	UN1197	6
Fak-Hazardous Materials		23213
Ferric Chloride, Solution	UN2582	23
Ferrosilicon	UN1408	14
Ferrous Chloride,Solution	NA1760	17
Fire Extinguishers	UN1044	12
Fireworks	UN0336	3
Flammable Liquids,	UN1992	1
Flammable Liquids,	UN2924	2
Flammable Liquids, N.O.S.	UN1993	201
Flammable Solids,	UN1325	25
Fluorosilicic Acid	UN1778	27
Formaldehyde Solutions	UN1198	6
Fuel Cell Cartridges	UN3473	1
Fuel Oil	NA1993	380
Fusee	NA1325	1

Gasoline	UN1203	9
Hazardous Waste,	NA3077	6
Helium, Compressed	UN1046	4
Heptanes	UN1206	2
Hexafluoropropylene,	UN1858	3
Hexanes	UN1208	3
Hydrocarbons, Liquid,	UN3295	5
Hydrochloric Acid	UN1789	124
Hydrofluoric Acid	UN1790	1
Hydrogen Peroxide	UN3149	3
Hydrogen Peroxide	UN2014	10
Hypochlorite Solutions	UN1791	7
Iodine	UN3495	5
Isobutane	UN1969	3
Isobutanol	UN1212	1
Isobutyl Methacrylate,	UN2283	3
Isobutylene	UN1055	1
Isocyanates, Toxic,	UN3080	1
Isopropanol	UN1219	241
Isopropenylbenzene	UN2303	52
Life-Saving Appliances,	UN3072	2
Lighters	UN1057	48
Liquefied Gas, Flammable,	UN3161	12
Liquefied Gas, N.O.S.	UN3163	1
Lithium Ion Batteries	UN3481	8
Lithium Ion Batteries	UN3480	12
Lithium Metal Batteries	UN3090	3
Lithium Metal Batteries	UN3091	6
Maleic Anhydride	UN2215	180
Matches, Safety	UN1944	1
Mercury Contained In Manufactured Articles	UN3506	1
Metal Catalyst, Wetted	UN1378	5
Metal Powder,	UN3189	1
Methanol	UN1230	140
Methyl Acetate	UN1231	7
Methyl Isobutyl	UN2053	9
Methyl Isobutyl Ketone	UN1245	16
Methyl Methacrylate	UN1247	18
Methylamine, Anhydrous	UN1061	15
Methylamine, Aqueous	UN1235	1
Mixed Load - Ocs		6
Morpholine	UN2054	1
N,N-Dimethylaniline	UN2253	1
N,N-Dimethylformamide	UN2265	5
Naphthalene, Molten	UN2304	23
N-Butyl Methacrylate,	UN2227	2
Nitrates, Inorganic,	UN1477	5
Nitric Acid	UN2031	2

Nitriles, Solid, Toxic,	UN3439	7
Nitrocellulose With	UN2556	13
Nitrogen, Compressed	UN1066	5
Organic Peroxide Type F,	UN3109	1
Organometallic Substance,	UN3399	23
Organophosphorus	UN2783	25
Oxidizing Liquid, N.O.S.	UN3139	2
Oxidizing Solid,	UN3085	1
Oxidizing Solid, N.O.S.	UN1479	3
Oxidizing Solid, Toxic,	UN3087	1
Oxygen, Compressed	UN1072	2
Paint	UN1263	64
Paint Related Material	UN3470	1
Pentamethylheptane	UN2286	2
Pentanes	UN1265	1
Pentanols	UN1105	1
Perchloric Acid	UN1873	2
Perfumery Products	UN1266	134
Permanganates,	UN3214	2
Pesticides, Solid,	UN2588	2
Petroleum Crude Oil	UN1267	48
Petroleum Distillates,	UN1268	54
Phenol, Molten	UN2312	63
Phosphoric Acid Solution	UN1805	353
Phosphorus Trichloride	UN1809	28
Picolines	UN2313	15
Piperidine	UN2401	18
Polychlorinated	UN3432	1
Polymeric Beads,	UN2211	4
Potassium Chlorate	UN1485	1
Potassium Hydroxide,	UN1814	44
Potassium Permanganate	UN1490	47
Printing Ink	UN1210	6
Propylene	UN1077	306
Propylene Tetramer	UN2850	14
Pyridine	UN1282	14
Radioactive Material,	UN2916	3
Receptacles, Small,	UN2037	6
Refrigerating Machines	UN2857	1
Resin Solution	UN1866	63
Safety Devices	UN3268	25
Selenates	UN2630	9
Self-Heating Solid,	UN3088	3
Self-Heating Solid,	UN3190	4
Self-Reactive Solid Type	UN3224	2
Self-Reactive Solid Type	UN3226	2
Silver Nitrate	UN1493	1
Smokeless Powder For	NA3178	4

Sodium Borohydride	UN1426	24
Sodium Carbonate	UN3378	2
Sodium Chlorate	UN1495	218
Sodium Chloroacetate	UN2659	3
Sodium Fluorosilicate	UN2674	6
Sodium Hydroxide Solution	UN1824	91
Sodium Hydroxide, Solid	UN1823	5
Sodium Methylate	UN1289	4
Sodium Methylate	UN1431	1
Solids Containing Flammable Liquids	UN3175	3
Strontium Nitrate	UN1507	1
Styrene Monomer,	UN2055	54
Sulfur Dioxide	UN1079	4
Sulfur, Molten	NA2448	1590
Sulfur, Molten	UN2448	602
Sulfuric Acid	UN1830	339
Sulfuric Acid, Fuming	UN1831	2
Tetrachloroethylene	UN1897	1
Thionyl Chloride	UN1836	2
Toluene	UN1294	45
Toluene Diisocyanate	UN2078	2
Toxic By Inhalation	UN3390	7
Toxic Liquid, Corrosive,	UN3289	1
Toxic Liquid, Inorganic,	UN3287	2
Toxic Liquids, Corrosive,	UN2927	1
Toxic Liquids, Flammable,	UN2929	15
Toxic Liquids, Organic,	UN2810	11
Toxic Solid, Inorganic,	UN3288	2
Toxic Solids, Flammable,	UN2930	1
Toxic Solids, Organic,	UN2811	9
Trichlorosilane	UN1295	1
Trifluoroacetic Acid	UN2699	3
Trimethylamine, Anhydrous	UN1083	2
Trimethylchlorosilane	UN1298	1
Trinitrophenol, Wetted	UN1344	1
Tripropylene	UN2057	6
Valeryl Chloride	UN2502	1
Vinyl Chloride,	UN1086	1
Vinylpyridines,	UN3073	60
Vinyltoluenes, Stabilized	UN2618	3
Water-Reactive Solid,	UN3132	4
Water-Reactive Solid,	UN3133	1
Xylenes	UN1307	2

*NOTE: ***Chemical Name*** Denotes Extremely Hazard Substance (EHS) materials

Twenty-five materials specifically listed by the railway analysis were also

noted by the highway analysis:

Name	UN/NA
ACETONE	UN1090
ALCOHOLS, N.O.S.	UN1987
AMMONIA, ANHYDROUS	UN1005
AMMONIUM NITRATE	UN2426
CARBON DIOXIDE	UN2187
CORROSIVE LIQUIDS, N.O.S.	UN1760
DIISOBUTYL KETONE	UN1157
DIMETHYLAMINE, ANHYDROUS	UN1032
DIMETHYLAMINE, SOLUTION	UN1160
ELEVATED TEMPERATURE	UN3257
ELEVATED TEMPERATURE	UN3256
ENVIRONMENTALLY HAZARDOUS	UN3082
ETHANOL	UN1170
FLAMMABLE LIQUIDS, N.O.S.	UN1993
FUEL OIL	NA1993
GASOLINE	UN1203
HAZARDOUS WASTE,	NA3077
HYDROGEN PEROXIDE	UN2014
HYPOCHLORITE SOLUTIONS	UN1791
MALEIC ANHYDRIDE	UN2215
PETROLEUM CRUDE OIL	UN1267
PETROLEUM DISTILLATES,	UN1268
RESIN SOLUTION	UN1866
SODIUM HYDROXIDE SOLUTION	UN1824
SULFURIC ACID	UN1830

3.4 Conclusions

The following conclusions can be made using the railway analysis data. Conclusions regarding the waterway and covered facilities analyses and the overall nature of the hazardous material risk in Cabell and Wayne counties are presented elsewhere.

- Due to the low probability of rail accidents involving hazardous materials and the past track record of very few hazmat rail accidents, Cabell and Wayne Counties is much more likely to experience a hazardous material event due to a roadway accident rather than to a rail accident.
- A large number of materials (237) were reported in the railway analysis that did not appear in the highway analysis. While the likelihood of an incidents involving rail is much lower, it is likely that if such an incident

were to occur, it would involve a material not found in highway incidents.

- Twenty-two different EHS materials were noted in the railway analysis.
- Hazardous material transport via rail can be generally predicted by the types of materials reported by covered facilities as well as those observed in transit along roadways.

4.0 WATERWAY ANALYSIS

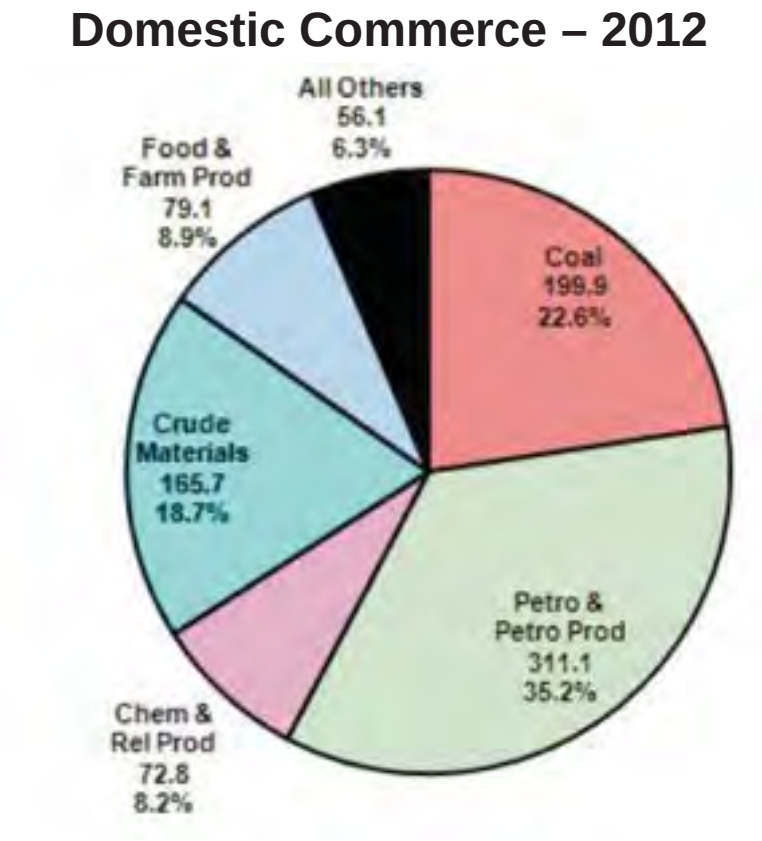
4.1 Methodology

Data provided by the United States Army Corps of Engineers (USACE) was used to determine the type of commodity and amount that is transported along the Ohio River, and to determine how much tonnage passes through he John C. Boyd Locks and Dam, which is located north of the study area along the Ohio River.

4.2 National and State Statistics

Nationally, waterway transport is the least-used means of commodity transport. Consequently, the number of reported accidents (and by inference, hazmat incidents) on waterways is low. Despite the relative lesser usage, several types of commodities are shipped via waterways. Figure 4.2.a illustrates the commodity groups transported nationally by barge in 2012.

Figure 4.2.a
Source: USACE "*Waterborne Commerce of the United States – 2012*"



Cabell and Wayne Counties border navigable portions of two rivers, the Ohio, which forms the northern border of Wayne County and the wester/northwestern border of Cabell County, and the Big Sandy River, which forms the western border of Wayne County. Coal is the most-frequently transported commodity by water. Table 4.2.1 depicts the commodities moved by water to, from, and within West Virginia in 2013.

Table 4.2.1

West Virginia 2013 River Traffic

Commodities Moved To, From, and Within the State

(Amount shipped in thousands of tons; values in millions of dollars)

Commodity	Shipped	Received	Within	Total	Value
Coal	29,660.1	6,579.0	10,619.6	46,876.7	$2,954
Petroleum	4,579.2	855.9	1,477.6	6,912.7	$6,421
Crude Petroleum	**	**	**	650.5	$391
Aggregates	817.0	5,390.6	65.4	6,273.0	$52
Grains	0.0	0.0	0.0	0.0	$0
Chemicals	**	774.6	**	852.7	$642
Ores/Minerals	18.2	789.7	0.0	207.9	$70
Iron/Steel	87.3	331.0	0.0	418.3	$169
Others	0.0	453.2	0.0	453.2	$96
Total	35,161.8	15,174.0	12,162.6	62,645.0	$10,795

** Insufficient barge operators to release this tonnage – included in “Other Commodities”

Source: U.S. Army Corps of Engineers Waterborne Commerce Statistics

4.3 Field Data

The USACE provided the information in Table 4.3.1. The local data represents, in tons, the amount of commodity flowing along the Ohio River from Pittsburgh to the mouth of the river (981 miles). At the Robert C. Bryd Lock and Dam, it was reported that total tonnage passed through the lock was 9,156,812 tons in 2012.

According to 59 News (CBS59) coal shipments through the Robert C. Byrd lock and dam was down by an average of 16% in July of 2016, reportedly due to declines in the coal basins along the Kanawha and Big Sandy Rivers (2016). Numbers for the Big Sandy River show that coal transport along the river, a tributary of the Ohio, has fallen nearly three quarters over the last decade (State Journal, 2016). According to the State Journal, coal movements at the Robert C. Byrd Lock and Dam have fallen from 42.05 million tons in 2005 to 15.8

million tons in 2015. Additionally, shipments of petroleum and petroleum products at the facility were down 9% from 2015, but remained higher than shipments in 2014.

Table 4.3.1

Waterborne Commerce – 2015
Ohio River

Commodity Code	Commodity	Short Tons Through
ALL	All commodities	30,656,867
11-12	Coal	5,361,964
1200	Coal coke	345,419
2100	Crude petroleum	459,535
2211	Gasoline	91,855
2330	Distillate fuel oil	478,714
2340	Residual fuel oil	204,963
2350	Lube oil & greases	25,978
2410	Petro, jelly & waxes	9,831
2429	Naptha & solvents	19,837
2430	Asphalt, tar & pitch	567,147
2540	Petroleum coke	945,807
2640	Hydrocarbon & petrol gases, liquefied and gaseous	14,070
2990	Petro, products NEC	1,160
3110	Nitrogenous fertilizer	307,656
3120	Phosphatic fertilizer	1,615
3130	Potassic fertilizer	93,131
3190	Fertilizer & mixes NEC	154,449
3221	Acyclic hydrocarbons	6,838
3212	Benzene & toluene	28,769
3219	Other hydrocarbons	509,593
3220	Alcohols	356,459
3230	Carboxylic acids	270,856
3240	Nitrogen func. comp.	86,806
3260	Organic comp. NEC	258,811
3273	*Ammonia*	89,979
3274	Sodium hydroxide	366,107
3275	Inorganic elements, oxides, & halogen salts	111,673
3276	Metallic salts	20,952
3279	Inorganic chemicals, NEC	38,516
3292	Starches, gluten, glue	1,850
4110	Rubber & gums	28,963
4161	Wood chips	172,190
4225	Pulp & waste paper	57,295
4310	Building stone	40,693
4322	Limestone	6,650,121
4323	Gymsum	7,846
4327	Phosphate rock	24,797
4331	Sand & gravel	820,796
4335	Waterway improvement materials	1,862,152

Commodity Code	Commodity	Short Tons Through
4410	Iron ore	483,572
4420	Iron & steel scrap	288,363
4650	Aluminum ore	462,987
4670	Manganese ore	29,744
4690	Non-ferrous ores NEC	80,303
4782	Clay & refract materials	15,349
4860	Slag	358,146
4900	Non-metal minerals, NEC	1,866,347
5210	Lime	17,372
5220	Cement & concrete	574,559
5240	Glass & glass products	3,259
5290	Miscellaneous mineral products	1,567
5312	Pig iron	960,427
5315	Ferro alloys	109,952
5320	I & S primary forms	306,603
5330	I & S plates and sheets	334,522
5360	I & S bars and shapes	210,221
5370	I & S pipe and tube	74,737
5390	Primary I & S NEC	282,641
5422	Aluminum	77,741
5480	Fabricated metal products	88,067
6241	Wheat	758,650
6344	Corn	1,152,273
6443	Barley & rye	6,757
6522	Soybeans	1,189,944
6590	Oilseeds NEC	207,263
6653	Vegetable oils	73,920
6747	Grain mill products	1,616
6782	Animal feed, prep.	43,460
6856	Bananas & plantains	3,200
6899	Farm products NEC	1,600
7110	Machinery (not electric)	35,790
7210	Vehicles & parts	3,988
7900	Manufactured products NEC	2,450

4.4 Conclusions

The following conclusions can be made using the waterway analysis data. Conclusions regarding the covered facilities analyses and the overall nature of the hazardous material risk in Cabell and Wayne counties are presented elsewhere.

- Due to the low probability of waterway accidents involving hazardous materials and the past track record of very few hazmat waterway accidents, Cabell and Wayne counties are much more likely to

experience a hazardous material event due to a roadway accident rather than to a waterway accident.

- Coal is the most frequently-transported material by water through Cabell and Wayne counties, though there has been a significant decrease in recent years.
- Ammonia is the only material transported via river near Cabell and Wayne counties that is considered by the USEPA as an EHS.
- Local planners and responders should develop a sound relationship with the USACE as a means of supplementing capabilities for responding to a hazardous material incident on the Ohio and Big Sandy Rives,

5.0 COVERED FACILITIES ANALYSIS

5.1 Methodology

In addition to the highway, railway, and waterway analyses, a general "information request" was distributed to the Superfund Amendments and Reauthorization Act (SARA) reporting facilities throughout Cabell and Wayne counties. Each facility was sent a form that requested a list of the chemicals used or stored, the mode of transportation used to transport the chemicals to the facility, the frequency and volumes of shipments, and storage locations at each facility.

This information was collected to both verify and supplement data from the various field studies. It will allow Cabell and Wayne counties to determine which types of materials are present year-round and which materials are simply "passing through" to facilities in neighboring counties.

5.2 Field Data

Eight facilities responded to the information request. Questionnaires were submitted to a total of fifty-four facilities (for a response rate of 14.8%). Materials listed for the eight facilities participating in the information request in 5.2.1 are taken from their response.

Table 5.2.1

Covered Facilities with Materials

Facility	*Material(s)*	*Frequency of Shipments*					*Incident at Facility*
		Daily	*Weekly*	*Bi-Weekly*	*Monthly*	*Other*	*Yes/No*
Fuchs Lubricants Co.	**Diesel Fuel** **Container Type:** N/A **Route Utilized:** Route unknown				X		**NO**
DAWSON – THOMPSON OIL CO. INC.	**Diesel Fuel** **Container Type:** Bulk/ Tank Wagon **Route Utilized:** I-64 to US Rt 52N to Adams Ave to 16th Street W to Washington Ave to 18th St W to Virginia Ave		X				**NO**
	Gasoline **Container Type:** Bulk/ Tank Wagon **Route Utilized:** I-64 to US Rt 52N to Adams Ave to 16th Street W to Washington Ave to 18th St W to Virginia Ave		X				**NO**
Ferrell Gas	**Propane** **Container Type:** Cylinders (Bulk Tanks & trucks) **Route Utilized:** All local routes in surrounding area I-64	X					**NO**
Alcon Surgical Inc.	**Ethylene Oxide** **Container Type:** (2) 400lbs tank **Route Utilized:** US Route 2 to Vision Lane				X		**NO**
	Acetone **Container Type:** (2) 330 gallon tank **Route Utilized:** US Route 2 to Kyle Lane				X		**NO**
	Liquid Nitrogen **Container Type:** 1,950 gallon tank truck **Route Utilized:** US Route 2 to Vision Lane				X		**NO**
	Acetone Waste **Container Type:** (5) 55 gallon drums **Route Utilized:** Goes to Cincinnati				X		**NO**
Flint Group	**Aniline** **Container Type: N/A** **Route Utilized:** CSX Railway via Russell, KY yard					2/ Month	**No**

Facility	*Material(s)*	*Frequency of Shipments*					*Incident at Facility*
		Daily	*Weekly*	*Bi-Weekly*	*Monthly*	*Other*	*Yes/No*
	Caustic (50% Sodium Hydroxide) **Container Type:** N/A **Route Utilized:** From Natrium, WV via I-77S to I-64 W or WV-2S (rarely); CSX Railway via Russell, KY yard					5/Month	
	Sulfuric Acid (98%) **Container Type: N/A** **Route Utilized:** From Wurtand, KY via US 23 to US 52; CSX Railway via Russell, KY yard (rarely)					4/week	
	Formaldehyde (35%) **Container Type: N/A** **Route Utilized:** From Columbus, OH via US 23S to US 35S to WV 2S					2/Month	
	Glacial Acetic Acid **Container Type: N/A** **Route Utilized:** From Cincinnati, Oh via I-75S to I-64 E					Quarterly	
	Hydrochloric Acid (<37%) **Container Type: N/A** **Route Utilized:** From Institute, WV I-64W					2/Week	
Engines, INC. – Huntington	**Diesel Fuel** **Container Type: Bulk tank** **Route Utilized:I-64 to 193N to Route 2 (Ohio River Rd), left 1 block to Kyle Lane**					Quarterly	**No**
Engines, Inc. - Milton	**Oxygen** **Container Type: Bulk tank** **Route Utilized:I-64 to 60W to Electric Road**					Every 2 months	**No**
	Diesel Fuel **Container Type: Bulk tank** **Route Utilized: I-64 to 60W to Electric Road**					Quarterly	
Huntington Plating, Inc.	***Sulfuric Acid*** **Container Type: 55 gal poly drum 750 lbs** **Route Utilized:** I-64 to Madison to 7th Street West to Monroe Ave					Yearly	**No**
	Sulfuric Acid 16 **Container Type:** 55 gal poly drum 12,000 lbs ***(If we have to make up a new tank)** **Route Utilized:** I-64 to Madison to 7th Street West to Monroe Ave					3-4 years	

Facility	Material(s)	Frequency of Shipments					Incident at Facility
		Daily	Weekly	Bi-Weekly	Monthly	Other	Yes/No
	Sulfuric Acid 10% Solution **Container Type:** Tanker truck ****(If we would have to make up a tank old solution would be sent to waste facility in Canton OH.)** **Route Utilized:** Monroe Ave to Madison to I-64 to I-77 to Canton OH					3-4 Years	
	Potassium Cyanide **Container Type:** 110 lb Drum (I purchase this maybe one a year) **Route Utilized:** I-64 to Madison to 7th St West to Monroe Ave					Yearly	

* Note: ***Chemical Name*** Denotes "Extremely Hazardous Substances"

5.3 Conclusions

The following conclusions can be determined following the covered facilities analysis.

- The covered facilities analysis revealed four additional hazardous materials that could potentially be transported via highway, railway, or waterway in Cabell and Wayne counties.
- The covered facilities analysis yielded one additional EHS materials that necessitate additional planning: Potassium Cyanide.
- The other three (3) analyses could not fully depict the number of materials reported by the covered facilities analysis. Given the frequency of shipment information provided by five covered facilities, it becomes clear that shipments of some materials could only be observed if field reconnaissance was completed for months or even up to a year. As such, it can be assumed that emergency responders should plan and prepare for hazardous material incidents from any hazard class.
- The following materials (that have a corresponding UN number) were noted in the covered facilities analysis, but none of the other three (3) analyses.

UN	Material
2789	Glacial Acetic Acid
1680	Potassium Cyanide
1547	Aniline

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The following are conclusions that can be drawn regarding the transport, use, and storage of hazardous materials in Cabell and Wayne counties.

- A total of 314 different specifically-named materials are reflected in this commodity flow study.
    - 11 materials (3.5%) were identified only by the highway analysis.
    - 236 materials (75 %) were identified only by the railway analysis.
    - 63 materials (20 %) were identified only by the waterway analysis.
    - 4 materials (1.3%) were identified only by the covered facility analysis.
    - Twenty-four "Extremely Hazardous Substances" that require extraordinary planning and response considerations were recorded (as part of the total 314).

- In addition to those 314 materials above, a total of 29 other placards were recorded during the highway analysis that did not have a UN number:

Placard	Total
Explosives	2
Gases	5
Flammable Liquids	1
Flammable Solids	5
Oxidizers	2
Toxics	2
Corrosives	11
Miscellaneous	1

- As mentioned, approximately 3.5% of the specific materials sighted along

roadways were not reported by any other analysis completed as part of this study. Therefore, it can be assumed that some of these materials simply "pass through" Cabell and Wayne counties and are bound for destinations in neighboring or other nearby counties. For this bulleted item, it is sufficient to realize that local responders may encounter incidents involving materials not used or stored in the region.

- Based on data collected, hazardous material transport is overwhelmingly confined to Interstate 64 through Cabell and Wayne counties.
- Any one type of analysis would not be sufficient to characterize the entire hazardous material risk in Cabell and Wayne counties (as is shown by the data collected as part of the four [4] analyses above).

6.2 Recommendations

6.2.1. Update this flow study on a regular basis.

Cabell and Wayne counties, partially by virtue of their location along the Ohio River, and the Interstate 64 corridor, have been fortunate enough to see a steady economic growth during recent years. According to census data, the median family and household incomes increased significantly between 2000 and 2010. As such, the nature of the county's industry is likely to change as are the amounts and types of hazardous materials being utilized and stored. In order for this document to remain an accurate, viable basis for hazardous material planning and training efforts, these continual changes should be reflected. The document should be updated every three (3) to five (5) years.

6.2.2. Vary the time of year that data is collected during future flow studies.

The covered facilities that responded to the information request distributed as part of this study indicated that shipments occur at all times of year. Some materials are only shipped one (1) to five (5) times per year; as such, it is extremely difficult to capture these infrequent shipments by monitoring roadways once throughout a calendar year. As this study is

updated, planners should make an effort to vary data collection times in an effort to show shipping trends.

6.2.3. 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/or stored at the covered facilities that report to the Cabell-Wayne LEPC. By design, this study only lists the materials that are present in the jurisdiction. A detailed vulnerability assessment would characterize not only material presence, but also material quantities, at-risk populations, potential protective measures, etc. A detailed vulnerability assessment would be a companion to this document.

6.2.4. Ensure that responders are properly trained in the response to incidents involving flammable liquid products.

In general, flammable liquids are the frequently transported products in Cabell and Wayne counties. As such, they are the hazardous materials most likely to be involved in an incident. Responders should seek training to properly prepare themselves for such an incident.

6.2.5. Ensure that responders are properly trained in the response to incidents involving Ammonia, Ethylene Oxide, and Sulfuric Acid (list EHSs reported by study).

While there are several other “Extremely Hazardous Substances” (EHSs) being transported through the county, these three are the most frequently-reported EHSs in the study. Consequently, they are the EHS materials most likely to be involved in an incident and responders should thus properly prepare for their release.

6.2.6. Design emergency exercises that include the materials recorded by 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.

6.2.7. Encourage Norfolk Southern and CSX representatives to participate in emergency exercises.

Due to the presence of rail transport in Cabell and Wayne counties, Norfolk Southern and CSX could be a critical component of a hazardous material response. As such, Norfolk Southern and CSX participation in exercises would greatly benefit the coordination that would need to occur between them and local responders during an actual incident.

6.2.8. Encourage US Army Corps of Engineers personnel to participate in emergency exercises.

Due to the amount of commodities that are transported via river along Cabell and Wayne's borders, the USACE could be a critical component of a hazardous material (or other waterway) response. As such, the Corps' participation in exercises would greatly benefit the coordination that would need to occur between them and local responders during an actual incident.

6.2.9. 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 region. However, those facilities with EHS materials should be particularly encouraged to participate due to the EPA designation of the materials they use/store.

6.2.10. Develop and maintain a database of covered facilities throughout the

county.

The covered facilities analysis contained in this report is somewhat erratic due to the lack of participation from covered facilities and the potential for additional facilities to file Tier II reports. Developing and maintaining a database will allow emergency managers to maintain communications with a consistent group of covered facilities (i.e. the information can simply be updated rather than totally re-collected on an annual basis). Entering known covered facilities into a database also frees emergency managers to coordinate with potential or new facilities to ensure as many facilities as possible are in compliance with SARA Title III.

7.0 REFERENCES

Association of American Railroads. (2016). Online. https://www.aar.org/safety/Pages/Hazardous-Materials-Transportation.aspx#.UfgWp421FQM

Transcaer. (2012). Online. http://www.transcaer.com/. Washington, D.C.

United States Department of Transportation, Bureau of Transportation Statistics. (2016). Online. http://www.bts.gov.

United States Department of Transportation, Research and Special Programs Administration. (2012). *2012 Emergency Response Guidebook*. Washington, D.C.

Federal Railway Administration, Office of Safety Analysis. (2016). Online. http://safetydata.fra.dot.gov.

United States Environmental Protection Agency. (2016). *Envirofacts Data Warehouse*. Online. http://oaspub.epa.gov/enviro/ef_home2.other.

APPENDIX 1

HAZARDOUS MATERIALS IN CABELL AND WAYNE COUNTIES

MATERIALS LIST (w/ Corresponding UN Number)

Name	UN/NA
1,1,1,2-Tetrafluoroethane	UN3159
1,3-Dichloropropanol-2	UN2750
1-Methoxy-2-Propanol	UN3092
2-Bromo-2-Nitropropane-	UN3241
3-Diethylamino-	UN2684
Acetic Acid, Glacial	UN2789
Acetone	UN1090
Acetonitrile	UN1648
Acrylamide Solution	UN3426
Acrylonitrile, Stabilized	UN1093
Adhesives	UN1133
Aerosols	UN1950
Air, Compressed	UN1002
Alcoholic Beverages	UN3065
Alkali Metal Amides	UN1390
Alkyl Sulfonic Acids,	UN2585
Alkyl Sulfonic Acids,	UN2586
Allyl Bromide	UN1099
Allyl Chloride	UN1100
Amines, Flammable,	UN2733
Amines, Liquid,	UN2735
Amines, Solid	UN3259
Ammonia Solutions	UN2672
Ammonia, Anhydrous	UN1005
Ammonium Nitrate	UN1942
Ammonium Nitrate Emulsion	UN3375
Aniline	UN1547
Antimony Pentachloride,	UN1730
Argon, Refridgerated Liquid	UN1951
Articles, Pressurized	UN3164
Articles, Pyrotechnic	UN0432
Batteries, Wet, Filled	UN2794
Battery-Powered Vehicle	UN3171
Benzaldehyde	UN1990
Benzene	UN1114

Benzonitrile	UN2224
Benzyl Chloride	UN1738
Benzyldimethylamine	UN2619
Bisulfites, Aqueous	UN2693
Bromotrifluoromethane	UN1009
Butadienes, Stabilized	UN1010
Butanols	UN1120
Butyl Acetates	UN1123
Cadmium Compounds	UN2570
Calcium Carbide	UN1402
Calcium Hypochlorite	UN2880
Carbamate Pesticides	UN2757
Carbon Dioxide	UN1013
Carbon Dioxide, Refirdgerated Liquid	UN2187
Carbon, Animal Or Vegetable	UN1361
Cartridges For Weapons,	UN0012
Caustic Alkali Liquids,	UN1719
Chlorine	UN1017
Chloroacetic Acid,	UN1750
Chlorobenzene	UN1134
Chlorobenzotrifluorides	UN2234
Chlorobutanes	UN1127
Chlorodifluoromethane	UN1018
Chloroform	UN1888
Chromium Trioxide,	UN1463
Coating Solution	UN1139
Compressed Gas, N.O.S.	UN1956
Copper Based Pesticide	UN3009
Corrosive Liquid, Acidic,	UN3264
Corrosive Liquid, Acidic,	UN3265
Corrosive Liquid, Basic,	UN3266
Corrosive Liquid, Basic,	UN3267
Corrosive Liquids,	UN2920
Corrosive Liquids, Toxic,	UN2922
Corrosive Solid, Acidic,	UN3260
Corrosive Solid, Acidic,	UN3261
Corrosive Solid, Basic,	UN3262
Corrosive Solids, N.O.S.	UN1759
Corrosive Solids, Toxic,	UN2923
Cresylic Acid	UN2022
Cyanuric Chloride	UN2670

Cyclohexane	UN1145
Cyclohexanone	UN1915
Dangerous Goods In	UN3363
Denatured Alcohol	UN1987
Diacetone Alcohol	UN1148
Dichloroanilines, Solid	UN3442
Dichloromethane	UN1593
Dicyclohexylamine	UN2565
Diethyl Ether	UN1155
Diethyl Sulphate	UN1594
Diethylthiophosphoryl	UN2751
Dimethyl Disulfide	UN2381
Dimethyl Ether	UN1033
Dimethyl Sulfate	UN1595
Disinfectants, Liquid,	UN1903
Disodium Trioxosilicate	UN3253
Engines, Internal	UN3166
Environmentally Hazardous	UN3077
Ethanol And Gasoline	UN3475
Ethanolamine	UN2491
Ethyl Acetate	UN1173
Ethyl Acrylate,	UN1917
Ethyl Butyrate	UN1180
Ethyl Lactate	UN1192
Ethyl Methyl Ketone	UN1193
Ethylene Oxide	UN1040
Ethylenediamine	UN1604
Extracts, Flavoring,	UN1197
Ferric Chloride, Solution	UN2582
Ferrosilicon	UN1408
Ferrous Chloride,Solution	NA1760
Fire Extinguishers	UN1044
Fireworks	UN0336
Flammable Liquids,	UN1992
Flammable Liquids,	UN2924
Flammable Solids,	UN1325
Fluorosilicic Acid	UN1778
Formaldehyde Solutions	UN1198
Fuel Cell Cartridges	UN3473
Fusee	NA1325
Glacial Acetic Acid	UN2789

Helium, Compressed	UN1046
Heptanes	UN1206
Hexafluoropropylene,	UN1858
Hexanes	UN1208
Hydrocarbons, Liquid,	UN3295
Hydrochloric Acid	UN1789
Hydrofluoric Acid	UN1790
Hydrogen Peroxide	UN3149
Hydrogen Peroxide	UN2014
Iodine	UN3495
Isobutane	UN1969
Isobutanol	UN1212
Isobutyl Methacrylate,	UN2283
Isobutylene	UN1055
Isocyanates, Toxic,	UN3080
Isopropanol	UN1219
Isopropenylbenzene	UN2303
Life-Saving Appliances,	UN3072
Lighter Fluid	UN1226
Lighters	UN1057
Lime	UN1910
Liquefied Gas, Flammable,	UN3161
Liquefied Gas, N.O.S.	UN3163
Liquified Petroleum Gas	UN1075
Lithiuam Ion Batteries	UN3481
Lithium Ion Batteries	UN3480
Lithium Metal Batteries	UN3090
Lithium Metal Batteries	UN3091
Matches,Safety	UN1944
Mercury Contained In Maunfacuted Articles	UN3506
Metal Catalyst, Wetted	UN1378
Metal Powder,	UN3189
Methanol	UN1230
Methyl Acetate	UN1231
Methyl Isobutyl	UN2053
Methyl Isobutyl Ketone	UN1245
Methyl Methacrylate	UN1247
Methylamine, Anhydrous	UN1061
Methylamine, Aqueous	UN1235
Morpholine	UN2054
N,N-Dimethylaniline	UN2253

N,N-Dimethylformamide	UN2265
Naphthalene, Molten	UN2304
N-Butyl Methacrylate,	UN2227
Nitrates, Aqueous Solution	UN3218
Nitrates, Inorganic,	UN1477
Nitric Acid	UN2031
Nitriles, Solid, Toxic,	UN3439
Nitrocellulose With	UN2556
Nitrogen	UN1977
Nitrogen, Compressed	UN1066
Organic Peroxide Type F,	UN3109
Organometallic Substance,	UN3399
Organophosphorus	UN2783
Oxidizing Liquid, N.O.S.	UN3139
Oxidizing Solid,	UN3085
Oxidizing Solid, N.O.S.	UN1479
Oxidizing Solid, Toxic,	UN3087
Oxygen, Compressed	UN1072
Oxygen, Refridgerated Liquid	UN1073
Paint	UN1263
Paint Related Material	UN3470
Pentamethylheptane	UN2286
Pentanes	UN1265
Pentanols	UN1105
Perchloric Acid	UN1873
Perfumery Products	UN1266
Permanganates	UN1482
Permanganates,	UN3214
Pesticides, Solid,	UN2588
Phenol, Molten	UN2312
Phosphoric Acid Solution	UN1805
Phosphorus Trichloride	UN1809
Picolines	UN2313
Piperidine	UN2401
Polychlorinated	UN3432
Polymeric Beads,	UN2211
Potassium Chlorate	UN1485
Potassium Cyanide	UN1680
Potassium Hydroxide,	UN1814
Potassium Permanganate	UN1490
Printing Ink	UN1210

Propylene	UN1077
Propylene Tetramer	UN2850
Pyridine	UN1282
Radioactive Material,	UN2916
Receptacles, Small,	UN2037
Refrigerating Machines	UN2857
Safety Devices	UN3268
Selenates	UN2630
Self-Heating Solid,	UN3088
Self-Heating Solid,	UN3190
Self-Reactive Solid Type	UN3224
Self-Reactive Solid Type	UN3226
Silver Nitrate	UN1493
Smokeless Powder For	NA3178
Sodium Borohydride	UN1426
Sodium Carbonate	UN3378
Sodium Chlorate	UN1495
Sodium Chloroacetate	UN2659
Sodium Fluorosilicate	UN2674
Sodium Hydroxide, Solid	UN1823
Sodium Methylate	UN1289
Sodium Methylate	UN1431
Solids Containing Flammable Liquids	UN3175
Strontium Nitrate	UN1507
Styrene Monomer,	UN2055
Sulfur Dioxide	UN1079
Sulfur Trioxide	UN1829
Sulfur, Molten	NA2448
Sulfur, Molten	UN2448
Sulfuric Acid	UN2796
Sulfuric Acid, Fuming	UN1831
Tetrachloroethylene	UN1897
Thionyl Chloride	UN1836
Toluene	UN1294
Toluene Diisocyanate	UN2078
Toxic By Inhalation	UN3390
Toxic By Inhalation Liquid, Flammable	UN3384
Toxic Liquid, Corrosive,	UN3289
Toxic Liquid, Inorganic,	UN3287
Toxic Liquids, Corrosive,	UN2927
Toxic Liquids, Flammable,	UN2929

Toxic Liquids, Organic,	UN2810
Toxic Solid, Inorganic,	UN3288
Toxic Solids, Flammable,	UN2930
Toxic Solids, Organic,	UN2811
Trichloroethylene	UN1710
Trichlorosilane	UN1295
Trifluoroacetic Acid	UN2699
Trimethylamine, Anhydrous	UN1083
Trimethylchlorosilane	UN1298
Trinitrophenol, Wetted	UN1344
Tripropylene	UN2057
Valeryl Chloride	UN2502
Vinyl Chloride,	UN1086
Vinylpyridines,	UN3073
Vinyltoluenes, Stabilized	UN2618
Water-Reactive Solid,	UN3132
Water-Reactive Solid,	UN3133
Xylenes	UN1307

**** EHS Materials***

MATERIALS LIST (w/ Unknown Corresponding UN Number)

Name
Acyclic hydrocarbons
Aluminum
Aluminum ore
Animal feed, prep.
Asphalt, tar & pitch
Bananas & plantains
Barley & rye
Building stone
Carboxylic acids
Cement & concrete
Clay & refract materials
Coal
Coal coke
Corn
Fabricated metal products
Farm products NEC

Ferro alloys
Fertilizer & mixes NEC
Glass & glass products
Grain mill products
Gymsum
I & S bars and shapes
I & S pipe and tube
I & S plates and sheets
I & S primary forms
Inorganic chemicals, NEC
Inorganic elements, oxides, & halogen salts
Iron & steel scrap
Iron ore
Limestone
Lube oil & greases
Machinery (not electric)
Manganese ore
Manufactured products NEC
Metallic salts
Miscellaneous mineral products
Naptha & solvents
Nitrogen func. comp.
Nitrogenous fertilizer
Non-ferrous ores NEC
Non-metal minerals, NEC
Oilseeds NEC
Organic comp. NEC
Petro, jelly & waxes
Petro, products NEC
Petroleum coke
Phosphate rock
Phosphatic fertilizer
Pig iron
Potassic fertilizer
Primary I & S NEC
Pulp & waste paper
Rubber & gums
Sand & gravel
Slag
Soybeans
Starches, gluten, glue

Vegetable oils
Vehicles & parts
Waterway improvement materials
Wheat
Wood chips

MATERIALS LIST (Labeled by General Placard)

- **Corrosive:** Toxic; inhalation, ingestion, or skin contact may cause severe injury or death.
- **Explosives:** Explosives without a significant blast hazard.
- **Flammable Liquid:** Highly flammable; easily ignited by sparks or flame.
- **Flammable Gas:** Highly flammable; easily ignited by heat, sparks, or flame; may form explosive mixtures with air.
- **Flammable Solid:** Highly flammable; easily ignited by sparks or flame.
- **Miscellaneous:** Generic placard representing Hazard Class 9.
- **Non-Flammable Gas:** Vapors may cause dizziness or asphyxiation without warning; vapors are heavier than air and likely to spread along the ground.
- **Oxidizer:** May explode from friction, heat, or irritation; will accelerate burning when involved in a fire.
- **Poison:** Toxic; inhalation, ingestion, or skin contact may cause severe injury or death.

COMPLETE EXTREMELY HAZARDOUS SUBSTANCES LIST

highlight in yellow those that are in the jurisdiction

Chemical Name	*CAS No.*
ACETONE THIOSEMICARBAZIDE	1752-30-3
ACROLEIN	107-02-8
ACRYLAMIDE	79-06-1
ACRYLONITRILE	107-13-1
ACRYLYL CHLORIDE	814-68-6
ADIPONITRILE	111-69-3
ALDICARB	116-06-3
ALDRIN	309-00-2
ALLYL ALCOHOL	107-18-6
ALLYL AMINE	107-11-9
ALUMINUM PHOSPHIDE	20859-73-8
5-(AMINOMETHYL)-3-ISOXAZOLOL	2763-96-4
AMINOPTERIN	54-62-6
AMITON	78-53-5
AMITON OXALATE	3734-97-2
AMMONIA	7664-41-7
AMPHETAMINE	300-62-9
ANILINE	62-53-3
ANILINE, 2,4,6-TRIMETHYL-	88-05-1
ANTIMONY PENTAFLUORIDE	7783-70-2
ANTIMYCIN A	1397-94-0
ANTU	86-88-4
ARSENIC OXIDE (3)	1327-53-3
ARSENIC PENTOXIDE	1303-28-2
ARSENOUS TRICHLORIDE	7784-34-1

ARSINE	7784-42-1
AZINPHOS-ETHYL	2642-71-9
AZINPHOS-METHYL	86-50-0
AZODRIN	6923-22-4
BENZAL CHLORIDE	98-87-3
BENZENAMINE, 3-(TRIFLUOROMETHYL)-	98-16-8
BENZENE, 1-(CHLOROMETHYL)-4-NITRO-	100-14-1
BENZENEARSONIC ACID	98-05-5
BENZENETHIOL	108-98-5
BENZIMIDAZOL,4,5-DICHLORO-2-(TRIFLUOROMETHYL)-	3615-21-2
BENZOIC TRICHLORIDE	98-07-7
BENZYL CHLORIDE	100-44-7
BENZYL CYANIDE	140-29-4
BETA-PROPIOLACTONE	57-57-8
1,1'-BI(ETHYLENE OXIDE)	1464-53-5
BIDRIN	141-66-2
BIS(2,3-EPOXYPROPYL)ETHER	2238-07-5
BIS(2-CHLOROETHYL) ETHER	111-44-4
BIS(CHLOROMETHYL) ETHER	542-88-1
BIS(CHLOROMETHYL) KETONE	534-07-6
10,10'-BIS(PHENOXYARSINYL) OXIDE	58-36-6
BITOSCANATE	4044-65-9
BORON TRICHLORIDE	10294-34-5
BORON TRIFLUORIDE	7637-07-2
BORON TRIFLUORIDE COMPOUND WITH METHYL ETHER (1:1)	353-42-4
BROMADIOLONE	28772-56-7
BROMINE	7726-95-6
CADMIUM OXIDE	1306-19-0
CADMIUM STEARATE	2223-93-0

CALCIUM ARSENATE [2ASH3O4.2CA]	7778-44-1
CAMPHECHLOR	8001-35-2
CANTHARIDIN	56-25-7
CARBACHOL CHLORIDE	51-83-2
CARBAMIC ACID, METHYL-, O-(((2,4-DIMETHYL-1, 3-DITHIOLAN-2-Y-METHYLENE)AMINO)-	26419-73-8
CARBOFURAN	1563-66-2
CARBON DISULFIDE	75-15-0
CARBONOCHLORIDIC ACID, PROPYLESTER	109-61-5
CARBOPHENOTHION	786-19-6
CHLORDANE	57-74-9
CHLORFENVINFOS	470-90-6
CHLORINE	7782-50-5
CHLORMEPHOS	24934-91-6
CHLORMEQUAT CHLORIDE	999-81-5
5-CHLORO-6-[[[(METHYLAMINO)CARBONYL]OXY]IMINO]BICYCLO[2.2.1]HEPTANE-2-CARBONITRILE	15271-41-7
CHLOROACETIC ACID	79-11-8
CHLOROETHANOL	107-07-3
CHLOROETHYL CHLOROFORMATE	627-11-2
CHLOROFORM	67-66-3
CHLOROMETHYL METHYL ETHER	107-30-2
CHLOROPHACINONE	3691-35-8
3-CHLOROPROPIONITRILE	542-76-7
CHLOROXURON	1982-47-4
CHLORTHIOPHOS	21923-23-9
CHROMIUM CHLORIDE (3)	10025-73-7
COBALT CARBONYL	10210-68-1
COLCHICINE	64-86-8
COUMAPHOS	56-72-4

COUMATETRALYL	5836-29-3
CRIMIDINE	535-89-7
CROTONALDEHYDE	4170-30-3
CROTONALDEHYDE, (E)-	123-73-9
CUPRIC ACETOARSENITE	12002-03-8
CYANOGEN BROMIDE	506-68-3
CYANOGEN IODIDE	506-78-5
CYANOPHOS	2636-26-2
CYANURIC FLUORIDE	675-14-9
CYCLOHEXIMIDE	66-81-9
CYCLOHEXYLAMINE	108-91-8
DASANIT	115-90-2
DECABORANE(14)	17702-41-9
DEMETON	8065-48-3
DEMETON-S-METHY	919-86-8
DIBORANE	19287-45-7
DICHLOROMETHYLPHENYLSILANE	149-74-6
DICHLOROPHENYLARSINE	696-28-6
DICHLORVOS	62-73-7
DIETHYL CHLOROPHOSPHATE	814-49-3
DIETHYLCARBAMAZINE CITRATE	1642-54-2
DIGITOXIN	71-63-6
DIGOXIN	20830-75-5
2,2'-DIHYDROXY-3,3'-DIMETHYL-5,5'-DICHLORODIPHENYL SULFIDE	4418-66-0
DIISOPROPYLFLUOROPHOSPHATE	55-91-4
DIMEFOX	115-26-4
DIMETHOATE	60-51-5
DIMETHYL CHLOROTHIOPHOSPHATE	2524-03-0
1,1-DIMETHYL HYDRAZINE	57-14-7

DIMETHYL SULFATE	77-78-1
DIMETHYL-P-PHENYLENEDIAMINE	99-98-9
DIMETHYLDICHLOROSILANE	75-78-5
DIMETILAN	644-64-4
4,6-DINITRO-O-CRESOL	534-52-1
DINITROBUTYL PHENOL	88-85-7
DINOTERB	1420-07-1
DIPHACINONE	82-66-6
DISULFOTON	298-04-4
DITHIAZANINE IODIDE	514-73-8
DITHIOBIURET	541-53-7
EMETINE, DIHYDROCHLORIDE	316-42-7
ENDOSULFAN	115-29-7
ENDOTHION	2778-04-3
ENDRIN	72-20-8
EPICHLOROHYDRIN	106-89-8
EPN	2104-64-5
ERGOCALCIFEROL	50-14-6
ERGOTAMINE TARTRATE	379-79-3
((2,2'-(1,2-ETHANEDIYLBIS(NITRILOMETHYLIDYNE))BIS(6-FLUOROPHENOLA- TO))(2-)-N,N'O,O')-COBALT	62207-76-5
ETHANESULFONYL CHLORIDE, 2-CHLORO-	1622-32-8
ETHANOL, 1,2-DICHLORO-, ACETATE	10140-87-1
ETHION	563-12-2
ETHOPROP	13194-48-4
ETHYL BIS(2-CHLOROETHYL)AMINE	538-07-8
ETHYL CYANIDE	107-12-0
ETHYL THIOCYANATE	542-90-5
ETHYLENE FLUOROHYDRIN	371-62-0
ETHYLENE OXIDE	75-21-8

ETHYLENEDIAMINE	107-15-3
ETHYLENEIMINE	151-56-4
FENAMIPHOS	22224-92-6
FENITROTHION	122-14-5
FLUENETIL	4301-50-2
FLUORINE	7782-41-4
FLUOROACETAMIDE	640-19-7
FLUOROACETIC ACID	144-49-0
FLUOROACETIC ACID, SODIUM SALT	62-74-8
FLUOROACETYL CHLORIDE	359-06-8
FLUOROURACIL	51-21-8
FONOFOS	944-22-9
FORMALDEHYDE	50-00-0
FORMALDEHYDE CYANOHYDRIN	107-16-4
FORMETANATE HYDROCHLORIDE	23422-53-9
FORMOTHION	2540-82-1
FORMPARANATE	17702-57-7
FOSTHIETAN	21548-32-3
FUBERIDAZOLE	3878-19-1
FURAN	110-00-9
GALLIUM TRICHLORIDE	13450-90-3
GAMMA-LINDANE	58-89-9
HEXACHLOROCYCLOPENTADIENE	77-47-4
1,6-HEXANEDIAMINE, N,N'-DIBUTYL-	4835-11-4
HYDRAZINE	302-01-2
HYDROCHLORIC ACID	7647-01-0
HYDROFLUORIC ACID	7664-39-3
HYDROGEN CYANIDE	74-90-8
HYDROGEN PEROXIDE (CONC > 52%)	7722-84-1

HYDROGEN SELENIDE	7783-07-5
HYDROGEN SULFIDE	7783-06-4
HYDROQUINONE	123-31-9
IMIDAN	732-11-6
IRON PENTACARBONYL	13463-40-6
ISOBENZAN	297-78-9
ISOBUTYRONITRILE	78-82-0
ISOCYANIC ACID, 3,4-DICHLOROPHENYL ESTER	102-36-3
ISODRIN	465-73-6
ISOPHORONE DIISOCYANATE	4098-71-9
ISOPROPYL CHLOROFORMATE	108-23-6
ISOPROPYLMETHYLPYRAZOLYL DIMETHYLCARBAMATE	119-38-0
LACTONITRILE	78-97-7
LEPTOPHOS	21609-90-5
LEWISITE (ARSENIC COMPOUND)	541-25-3
LITHIUM HYDRIDE	7580-67-8
MALONONITRILE	109-77-3
MANGANESE, TRICARBONYL METHYLCYCLOPENTADIENYL	12108-13-3
MECHLORETHAMINE	51-75-2
MEPHOSFOLAN	950-10-7
MERCAPTODIMETHUR	2032-65-7
MERCURIC ACETATE	1600-27-7
MERCURIC OXIDE	21908-53-2
MERCURY CHLORIDE (2)	7487-94-7
METHACROLEIN DIACETATE	10476-95-6
METHACRYLIC ANHYDRIDE	760-93-0
METHACRYLONITRILE	126-98-7
METHACRYLOYL CHLORIDE	920-46-7
METHACRYLOYLOXYETHYL ISOCYANATE	30674-80-7

METHAMIDOPHOS	10265-92-6
METHANAMINE, N-METHYL-N-NITROSO	62-75-9
METHANESULFONYL FLUORIDE	558-25-8
METHANETHIOL	74-93-1
METHIDATHION	950-37-8
METHOMYL	16752-77-5
METHOXYETHYLMERCURIC ACETATE	151-38-2
METHYL 2-CHLOROACRYLATE	80-63-7
METHYL BROMIDE	74-83-9
METHYL CHLOROCARBONATE	79-22-1
METHYL HYDRAZINE	60-34-4
METHYL ISOCYANATE	624-83-9
METHYL ISOTHIOCYANATE	556-61-6
METHYL PARATHION	298-00-0
METHYL PHENKAPTON	3735-23-7
METHYL PHOSPHONIC DICHLORIDE	676-97-1
METHYL THIOCYANATE	556-64-9
METHYL VINYL KETONE	78-94-4
2-METHYLLACTONITRILE	75-86-5
METHYLMERCURIC DICYANAMIDE	502-39-6
METHYLTRICHLOROSILANE	75-79-6
METOLCARB	1129-41-5
MEVINPHOS	7786-34-7
MEXACARBATE	315-18-4
MITOMYCIN C	50-07-7
MUSTARD GAS	505-60-2
NICKEL CARBONYL	13463-39-3
NICOTINE AND SALTS	54-11-5
NICOTINE SULFATE	65-30-5

NITRIC ACID	7697-37-2
NITRIC OXIDE	10102-43-9
NITROBENZENE	98-95-3
NITROCYCLOHEXANE	1122-60-7
NITROGEN DIOXIDE	10102-44-0
NORBORMIDE	991-42-4
O,O-DIETHYL O-PYRAZINYL PHOSPHOROTHIOATE	297-97-2
O-CRESOL	95-48-7
OCTAMETHYLDIPHOSPHORAMIDE	152-16-9
ORGANORHODIUM COMPLEX	EDF-043
OUABAIN	630-60-4
OXAMYL	23135-22-0
OXETANE, 3,3-BIS(CHLOROMETHYL)-	78-71-7
OXYDISULFOTON	2497-07-6
OZONE	10028-15-6
2,3-P-DIOXANEDITHIOL S,S-BIS(O,O-DIETHYL PHOSPHORODITHIOATE)	78-34-2
PARAQUAT	1910-42-5
PARAQUAT METHOSULFATE	2074-50-2
PARATHION	56-38-2
PENTABORANE	19624-22-7
PENTADECYLAMINE	2570-26-5
PERACETIC ACID	79-21-0
PERCHLOROMETHYL MERCAPTAN	594-42-3
PHENOL	108-95-2
PHENOL, 3-(1-METHYLETHYL)-, METHYLCARBAMATE	64-00-6
PHENYLHYDRAZINE HYDROCHLORIDE	59-88-1
PHENYLMERCURIC ACETATE	62-38-4
PHENYLSILATRANE	2097-19-0
PHENYLTHIOUREA	103-85-5

PHENYLTRICHLOROSILENE	98-13-5
PHORATE	298-02-2
PHOSACETIM	4104-14-7
PHOSFOLAN	947-02-4
PHOSGENE	75-44-5
PHOSPHAMIDON	13171-21-6
PHOSPHINE	7803-51-2
PHOSPHONOTHIOIC ACID, METHYL-, O-ETHYL O-(4-(METHYLTHIO)PHENYL)	2703-13-1
PHOSPHONOTHIOIC ACID, METHYL-, S-(2-(BIS(1-METHYLETHYL)AMINO)ETHYL)O-ETHYL ESTER	50782-69-9
PHOSPHONOTHIOIC ACID, METHYL-,O-(4-NITROPHENYL) O-PHENYL ESTER	2665-30-7
PHOSPHORIC ACID, DIMETHYL 4-(METHYLTHIO) P	3254-63-5
PHOSPHOROTHIOIC ACID, 0,0-DIMETHYL-5-(2-(M	2587-90-8
PHOSPHORUS (YELLOW OR WHITE)	7723-14-0
PHOSPHORUS OXYCHLORIDE	10025-87-3
PHOSPHORUS PENTACHLORIDE	10026-13-8
PHOSPHORUS PENTOXIDE	1314-56-3
PHOSPHORUS TRICHLORIDE	7719-12-2
PHYSOSTIGMINE	57-47-6
PHYSOSTIGMINE, SALICYLATE (1:1)	57-64-7
PICROTOXIN	124-87-8
PIPERIDINE	110-89-4
PIRIMIFOS-ETHYL	23505-41-1
POTASSIUM ARSENITE (ASH3O4.XK)	10124-50-2
POTASSIUM CYANIDE	151-50-8
POTASSIUM SILVER CYANIDE	506-61-6
PROMECARB	2631-37-0
PROPARGYL BROMIDE	106-96-7
PROPIOPHENONE, 4-AMINO-	70-69-9

PROPYLENE OXIDE	75-56-9
PROPYLENEIMINE	75-55-8
PROTHOATE	2275-18-5
PYRENE	129-00-0
PYRIDINE, 2-METHYL-5-VINYL-	140-76-1
PYRIDINE, 4-AMINO-	504-24-5
PYRIDINE, 4-NITRO-, 1-OXIDE	1124-33-0
PYRIMINIL	53558-25-1
SALCOMINE	14167-18-1
SARIN	107-44-8
SELENIOUS ACID	7783-00-8
SELENIUM OXYCHLORIDE	7791-23-3
SEMICARBAZIDE HYDROCHLORIDE	563-41-7
SILANE, (4-AMINOBUTYL)DIETHOXYMETHYL-	3037-72-7
SODIUM ARSENATE (ASH3O4.XNA)	7631-89-2
SODIUM ARSENITE	7784-46-5
SODIUM AZIDE	26628-22-8
SODIUM CACODYLATE	124-65-2
SODIUM CYANIDE	143-33-9
SODIUM SELENATE (H2O4SE.2NA)	13410-01-0
SODIUM SELENITE (H2O3SE.2NA)	10102-18-8
SODIUM TELLURITE	10102-20-2
STANNANE, ACETOXYTRIPHENYL	900-95-8
STRYCHNINE	57-24-9
STRYCHNINE, SULFATE	60-41-3
SULFOTEP	3689-24-5
SULFOXIDE, 3-CHLOROPROPYL OCTYL	3569-57-1
SULFUR DIOXIDE	7446-09-5
SULFUR FLUORIDE (SF4), (T-4)-	7783-60-0

SULFUR TRIOXIDE	7446-11-9
SULFURIC ACID	7664-93-9
TABUN	77-81-6
TELLURIUM	13494-80-9
TELLURIUM HEXAFLUORIDE	7783-80-4
TEPP	107-49-3
TERBUFOS	13071-79-9
TETRAETHYLLEAD	78-00-2
TETRAETHYLTIN	597-64-8
TETRAMETHYL LEAD	75-74-1
TETRANITROMETHANE	509-14-8
THALLIUM CHLORIDE TLCL	7791-12-0
THALLIUM(I) CARBONATE	6533-73-9
THALLIUM(I) SULFATE	7446-18-6
THALLOUS MALONATE	2757-18-8
THIOCARBAZIDE	2231-57-4
THIOFANOX	39196-18-4
THIOSEMICARBAZIDE	79-19-6
THIOUREA, (2-CHLOROPHENYL)-	5344-82-1
THIOUREA, (2-METHYLPHENYL)-	614-78-8
TITANIUM TETRACHLORIDE	7550-45-0
TOLUENE-2,4-DIISOCYANATE	584-84-9
TOLUENE-2,6-DIISOCYANATE	91-08-7
TORAK	10311-84-9
TRANS-1,4-DICHLORO-2-BUTENE	110-57-6
TRIAMIPHOS	1031-47-6
TRIAZOFOS	24017-47-8
TRICHLORO(CHLOROMETHYL)SILANE	1558-25-4
TRICHLORO(DICHLOROPHENYL)SILANE	27137-85-5

TRICHLOROACETYL CHLORIDE	76-02-8
TRICHLOROETHYLSILANE	115-21-9
TRICHLORONATE	327-98-0
TRIETHOXYSILANE	998-30-1
TRIMETHYLCHLOROSILANE	75-77-4
TRIMETHYLOLPROPANE PHOSPHITE	824-11-3
TRIMETHYLTIN CHLORIDE	1066-45-1
TRIPHENYLTIN CHLORIDE	639-58-7
TRIS(2-CHLOROETHYL)AMINE	555-77-1
VALINOMYCIN	2001-95-8
VANADIUM OXIDE (5)	1314-62-1
VINYL ACETATE	108-05-4
WARFARIN AND SALTS	81-81-2
WARFARIN SODIUM	129-06-6
XYLYLENE DICHLORIDE	28347-13-9
ZINC PHOSPHIDE	1314-84-7
ZINC, DICHLORO(4,4-DIMETHYL-5((((METHYLAMINO) CARBONYL)OXY)IMINO)PENTANENITRILE)-	58270-08-9

APPENDIX 2
HIGHWAY MONITORING SITE DATA

This appendix contains detailed information regarding the individual monitoring sites observed as part of this project.

Y	X	Description	Site Visits	Total Hours
38.382842	-82.589847	I64 @ Kentucky State Line	3	11
38.420056	-82.289666	I64 @ SR 193 (North)	2	4
38.418704	-82.290285	I64 @ SR 193 (South)	2	4
38.433855	-82.123267	US 60 @ Milton	2	8
38.395503	-82.450736	SR 152 off of I64	1	4
38.431917	-82.368714	SR 2 North of Huntington	2	8
38.386955	-82.573588	US 52 Southeast of Kenova	2	8
38.335618	-82.454871	SR 152 / SR 75 Intersection	2	8
38.380042	-82.334617	SR 10 @ Melissa	1	4

Where applicable, the site profiles below contain the most recent West Virginia Department of Transportation (WVDOT) traffic count information for that highway. The figure presented represents the total traffic through that site in an average 24-hour period. For comparison, the hazardous material figures for each site are mathematically estimated for 24-hour intervals. An estimated percentage of traffic carrying hazardous materials through a site in an average 24-hour period is then presented for planning purposes.

INTERSTATE 64 @ KY LINE

2009 Interstate 64 - Kentucky Line

Trucks	*Totals*	*% of Total*	*Materials*	*Name*	*Totals*	*% of All Haz*	*General Placards*	*Totals*	*% of All Haz*
Box	145	63.0%	1075	Propane	1	9.1%	N/A	0	0.0%
Tank	14	6.1%	1203	Gasoline	5	45.5%			
Flat	39	17.0%	1267	Petroleum crude oil	2	18.2%			
Dump	30	13.0%	1294	Toluene	1	9.1%			
Cement	2	0.9%	2067	Ammonium nitrate fertilizer	1	9.1%			
	230		3264	Corrosive liquid, acidic, inorganic	1	9.1%			
					11				

Total Haz Traffic:	11
% w/ Placard:	4.8%
WVDOT Count:	27800
Trucks Calc:	1840
Haz Calc:	88
Est Haz per hr:	4
% Haz per 24-hr:	0.3%

2016 Interstate 64 - Kentucky Line

Trailer Type	Totals	% of Total
111	18	0.8%
117	28	1.3%
131	96	4.4%
134	0	0.0%
137	53	2.4%
Other	15	0.7%

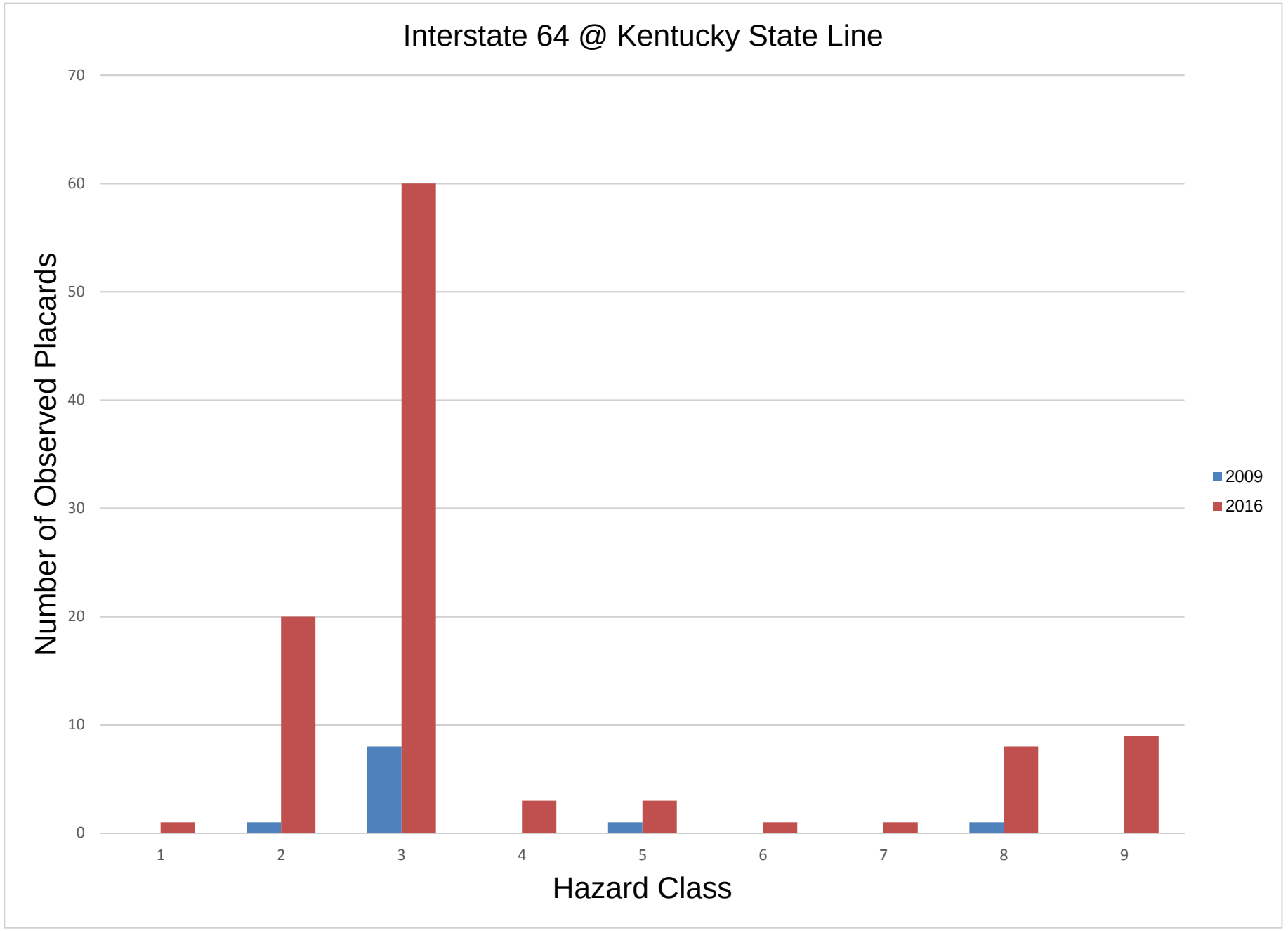
Site Summary Data	
Total Haz-Mat:	206
Unique Placards (#):	12
Total Truck Traffic:	2196
% w/ Placard:	9.4%
WVDOT Count:	6487
24 hr-Trucks Calc:	13176
24-hr Haz Calc:	1648
Est Haz per hr:	69
% Haz per 24-hr:	25.4%

Hazard Classes		
1-Explosives:	2	1.0%
2-Gases:	34	16.5%
3-Flamm. Liquids:	111	53.9%
4-Flamm. Solids:	6	2.9%
5-Oxidizers:	5	2.4%
6-Toxics:	5	2.4%
7-Radioactives:	2	1.0%
8-Corrosives:	19	9.2%
9-Miscellaneous:	22	10.7%

UN No.	Class	Name	Total	% of All Placards
1203	3	Gasoline	13	6.3%
1993	3	Diesel	1	0.5%
1075	2	Liquified Petroleum Gas	4	1.9%
1090	3	Acetone	1	0.5%
3257	9	Elevated Temp Liquid	2	1.0%
1361	4	Carbon, animal or vegetable	1	0.5%
2014	5	Hydrogen Peroxide	1	0.5%
1977	2	Nitrogen	1	0.5%
3009	9	Copper based Pesticide	1	0.5%
1170	3	Ethanol	1	0.5%
1032	3	Dimethylamine	2	1.0%
1075	2	Liquified Petroleum Gas	9	4.4%
1157	3	Diisobutyl ketone	2	1.0%
1160	3	Dimethylamine solution	1	0.5%
1203	3	Gasoline	34	16.5%
1226	3	Lighter Fluid	1	0.5%
1268	3	Petroleum Distillates	1	0.5%
1482	4	Permanganates	1	0.5%
1710	6	Trichloroethylene	1	0.5%
1791	8	Hypochlorite solutions	1	0.5%
1829	8	Sulfur Trioxide	3	1.5%
1829	6	Sulfur Trioxide	2	1.0%
1951	2	Argon, refridgerated liquid	1	0.5%
1977	2	Nitrogen, refridgerated	2	1.0%
1987	3	Denatured Alcohol	2	1.0%
1993	3	Diesel	8	3.9%
2187	2	Carbon Dioxide, refirdgerated liquid	1	0.5%
2215	8	Maelic Anhydride	2	1.0%
2426	5	Ammonium Nitrate, liquid	1	0.5%
3082	9	Hazardous Waste, n.o.s	1	0.5%
3256	8	Elev. Temp Liquid, flammable	1	0.5%

General Placards	Totals	% of All Placards
Explosives	1	0.5%
Flamm Solid	2	1.0%
Radioactive	1	0.5%
Corrosive	4	1.9%
Explosives	1	0.5%
Flamm Solid	2	1.0%
Non-Flamm Gas	1	0.5%
Miscellaneous	1	0.5%
Corrosive	4	1.9%
Radioactive	1	0.5%
Non-Flamm Gas	1	0.5%

3257	9	Elev. Temp Liquid	11	5.3%
3375	5	Ammonium Nitrate Emulsion	1	0.5%
3384	6	Toxic by Inhalation liquid, flammable	1	0.5%
1005	2	Ammonia, anhydrous	1	0.5%
1073	5	Oxygen, refrigerated liquid	1	0.5%
1075	2	Liquified Petroleum Gas	12	5.8%
1203	3	Gasoline	38	18.4%
1267	3	Crude Oil	3	1.5%
1760	8	Ferrous Chloride	1	0.5%
1824	8	Sodium Hydroxide Solution	2	1.0%
1830	8	Sulfuric Acid	1	0.5%
1977	2	Nitrogen, refrigerated liquid	1	0.5%
1993	3	Diesel	3	1.5%
2757	6	Carbamage Pesticides	1	0.5%
3082	9	Hazardous Waste, liquid	2	1.0%
3257	9	Elev. Temp. Liquid	4	1.9%
3375	5	Ammonium Nitrade Emulsion	1	0.5%


Interstate 64 @ Kentucky State Line
Number of Observed Placards
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

INTERSTATE 64 @ MERRITS CREEK

2009 Interstate 64 at Merritt's Creek Connector

Trucks	*Totals*	*% of Total*
Box	777	52.7%
Tank	153	10.4%
Flat	379	25.7%
Dump	150	10.2%
Cement	15	1.0%
	1474	

Total Haz Traffic:	77
% w/ Placard:	5.2%
WVDOT Count:	40000
Trucks Calc:	11792
Haz Calc:	616
Est Haz per hr:	25.67
% Haz per 24-hr:	0.1%

Materials	*Name*	*Totals*	*% of All Haz*
1075	Propane	1	1.3%
1203	Gasoline	9	11.7%
1993	Diesel fuel	1	1.3%
2027	Sodium arsenate, solid	2	2.6%
1073	Oxygen, refrigerated liquid	2	2.6%
1075	Propane	2	2.6%
1079	Sulfur dioxide	1	1.3%
1160	Dimethylamine, aqueous	1	1.3%
1203	Gasoline	15	19.5%
1210	Printing ink	1	1.3%
1289	Sodium methylate, sol. in alcohol	1	1.3%
1760	Titanium sulfate	1	1.3%
1977	Nitrogen, refrigerated liquid	3	3.9%
1993	Diesel fuel	2	2.6%
2283	Isobutyl methacrylate, stabilized	1	1.3%
2312	Phenol, molten	1	1.3%
3082	Hazardous waste, liquid	1	1.3%
3257	Elevated temperature liquid, nos	4	5.2%
3265	Corrosive liquid, acidic, organic	1	1.3%
3267	Corrosive liquid, basic, organic	1	1.3%
		51	

General Placards	*Totals*	*% of All Haz*
Flammable gas	11	14.3%
Non-flammable gas	11	14.3%
Poison/toxic	1	1.3%
Dangerous	1	1.3%
Flammable liquid	2	2.6%
	26	

2016 Interstate 64 at Merritt's Creek Connector

Trailer Type	*Totals*	*% of Total*
111	2	0.6%
117	1	0.3%
131	15	4.5%
134	0	0.0%
137	6	1.8%
Other	2	0.6%

UN No.	*Class*	*Name*	*Total*	*% of All Placards*
1203	3	Gasoline	6	28.6%
3257	9	Elev. Temp. Liquid	2	9.5%
1203	3	Gasoline	3	
1866	3	Resin Solution	1	
3257	9	Elev. Temp. Liquid	1	
1075	2	Liquified Petroleum Gas	1	
1791	8	Hypochlorite Solutions	1	
1203	3	Gasoline	3	
1075	2	Liquified Petroleum Gas	1	

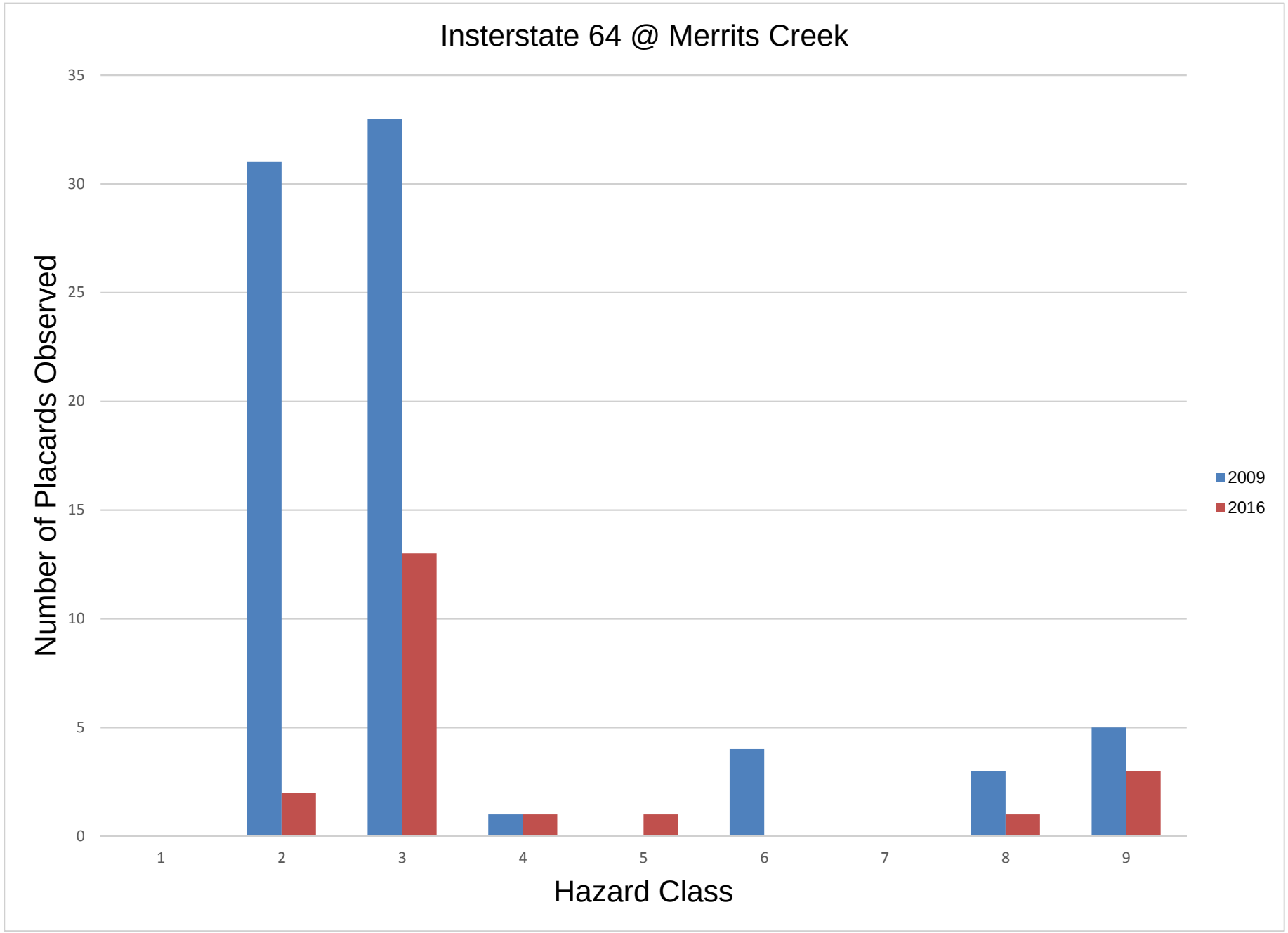
General Placards	*Totals*	*% of All Placards*
Flamm Solid	1	4.8%
Oxidizer	1	4.8%

Site Summary Data

Total Haz-Mat:	21
Unique Placards (#):	5
Total Truck Traffic:	335
% w/ Placard:	6.3%
WVDOT Count:	811
24 hr-Trucks Calc:	4020
24-hr Haz Calc:	252
Est Haz per hr:	11
% Haz per 24-hr:	31.1%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	2	9.5%
3-Flamm. Liquids:	13	61.9%
4-Flamm. Solids:	1	4.8%
5-Oxidizers:	1	4.8%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	1	4.8%
9-Miscellaneous:	3	14.3%


Insterstate 64 @ Merrits Creek
Number of Placards Observed
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

US 60 @ Milton

2009 US Route 60 at Milton

Trucks	*Totals*	*% of Total*	*Materials*	*Name*	*Totals*	*% of All Haz*	*General Placards*	*Totals*	*% of All Haz*
Box	13	54.2%	N/A	N/A	0	0.0%	N/A	0	0.0%
Tank	1	4.2%							
Flat	2	8.3%							
Dump	6	25.0%							
Cement	2	8.3%							
	24								

Total Haz Traffic:	0
% w/ Placard:	0.0%

WVDOT Count:	14700
Trucks Calc:	192
Haz Calc:	0
Est Haz per hr:	0
% Haz per 24-hr:	0.0%

2016 US Route 60 at Milton

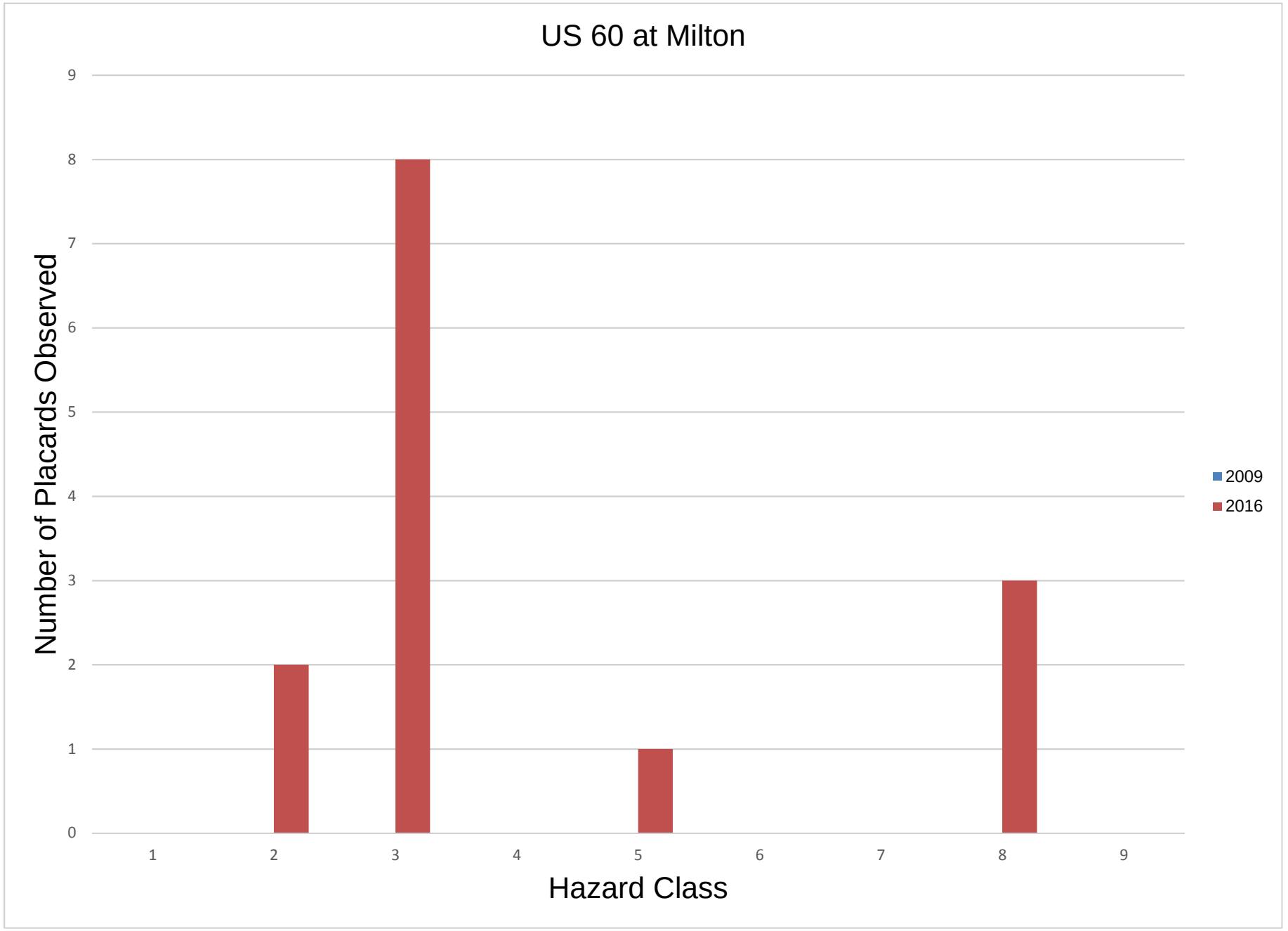
Trailer Type	*Totals*	*% of Total*	*UN No.*	*Class*	*Name*	*Total*	*% of All Placards*	*General Placards*	*Totals*	*% of All Placards*
111	2	1.2%	1267	3	Crude Oil	1	7.7%	Flamm Liquid	1	7.7%
117	1	0.6%	1075	2	Liquified Petroleum Gas	1	7.7%	Non-Flamm Gas	1	7.7%
131	2	1.2%	1791	8	Hypochlorite Solution	1	7.7%			
134	0	0.0%	1203	3	Gasoline	1	7.7%			
137	1	0.6%	1993	3	Diesel	3	23.1%			
Other	8	4.8%	1203	3	Gasoline	2	15.4%			
			2796	8	Sulfuric Acid	2	15.4%			

Site Summary Data

Total Haz-Mat:	13
Unique Placards (#):	6
Total Truck Traffic:	165
% w/ Placard:	7.9%
StateDOT Count:	502
24 hr-Trucks Calc:	990
24-hr Haz Calc:	78
Est Haz per hr:	3
% Haz per 24-hr:	15.5%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	2	15.4%
3-Flamm. Liquids:	8	61.5%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	3	23.1%
9-Miscellaneous:	0	0.0%


US 60 at Milton
Number of Placards Observed
0
1
2
3
4
5
6
7
8
9
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

SR 152 off I64

2009 SR 152 off of Interstate 64

Trucks	*Totals*	*% of Total*	*Materials*	*Name*	*Totals*	*% of All Haz*	*General Placards*	*Totals*	*% of All Haz*
Box	33	55.9%	N/A	N/A	0	0.0%	N/A	0	0.0%
Tank	0	0.0%							
Flat	12	20.3%							
Dump	14	23.7%							
Cement	0	0.0%							
	59								

Total Haz Traffic:	0
% w/ Placard:	0.0%

WVDOT Count:	14100
Trucks Calc:	472
Haz Calc:	0
Est Haz per hr:	0
% Haz per 24-hr:	0.0%

2016 SR 152 off of Interstate 64

Trailer Type	Totals	% of Total	UN No.	Class	Name	Total	% of All Placards	General Placards	Totals	% of All Placards
111	0	0.0%	3257	9	Elev. Temp Lquid	1	50.0%	Non-Flamm Gas	1	50.0%
117	0	0.0%								
131	0	0.0%								
134	0	0.0%								
137	1	0.7%								
Other	1	0.7%								

Site Summary Data

Total Haz-Mat:	2
Unique Placards (#):	2
Total Truck Traffic:	136
% w/ Placard:	1.5%
WVDOT Count:	848
24 hr-Trucks Calc:	816
24-hr Haz Calc:	12
Est Haz per hr:	1
% Haz per 24-hr:	1.4%

Hazard Classes

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


SR 152 off of Interstate 64
Number of Placards Observed
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

SR 2 North of Huntington

2009 SR 2 North of Huntington

Trucks	*Totals*	*% of Total*	*Materials*	*Name*	*Totals*	*% of All Haz*	*General Placards*	*Totals*	*% of All Haz*
Box	64	48.9%	1203	Gasoline	1	33.3%	N/A	0	0.0%
Tank	12	9.2%	1866	Resin solution	1	33.3%			
Flat	26	19.8%	1993	Diesel	1	33.3%			
Dump	25	19.1%			3				
Cement	4	3.1%							
	131								

Total Haz Traffic:	3
% w/ Placard:	2.3%
WVDOT Count:	14100
Trucks Calc:	1048
Haz Calc:	24
Est Haz per hr:	1
% Haz per 24-hr:	0.0%

2016 SR 2 North of Huntington

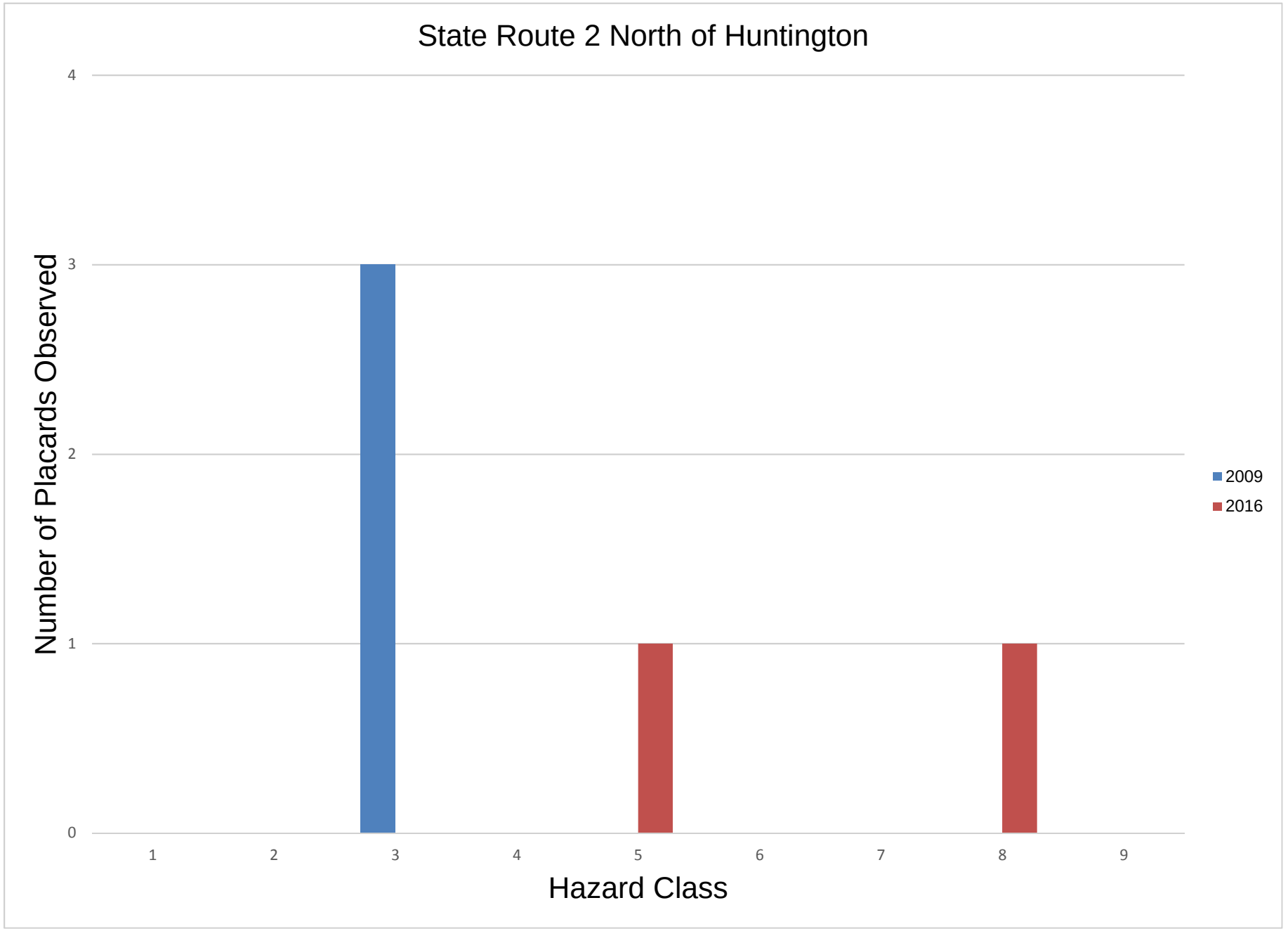
Trailer Type	Totals	% of Total	UN No.	Class	Name	Total	% of All Placards	General Placards	Totals	% of All Placards
111	0	0.0%	3218	5	Nitrates, aqueous solution	1	50.0%	Corrosive	1	50.0%
117	0	0.0%								
131	1	0.8%								
134	0	0.0%								
137	0	0.0%								
Other	1	0.8%								

Site Summary Data

Total Haz-Mat:	2
Unique Placards (#):	2
Total Truck Traffic:	129
% w/ Placard:	1.6%
WVDOT Count:	379
24 hr-Trucks Calc:	774
24-hr Haz Calc:	12
Est Haz per hr:	1
% Haz per 24-hr:	3.2%

Hazard Classes

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


State Route 2 North of Huntington
Number of Placards Observed
0
1
2
3
4
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

US 52 SOUTHEAST OF KENOVA

2009 US Route 52 Southeast of Kenova

Trucks	*Totals*	*% of Total*	*Materials*	*Name*	*Totals*	*% of All Haz*	*General Placards*	*Totals*	*% of All Haz*
Box	27	23.1%	1824	Sodium hyroxide, solution	1	11.1%	N/A	0	0.0%
Tank	20	17.1%	1993	Diesel fuel	1	11.1%			
Flat	29	24.8%	2067	Ammonium nitrate fertilizers	5	55.6%			
Dump	36	30.8%	2215	Maleic anhydride	1	11.1%			
Cement	5	4.3%	3055	2-(2-Aminoethoxy) ethanol	1	11.1%			
	117				9				

Total Haz Traffic:	9
% w/ Placard:	7.7%

WVDOT Count:	4700
Trucks Calc:	936
Haz Calc:	72
Est Haz per hr:	3
% Haz per 24-hr:	0.1%

2016 US Route 52 Southeast of Kenova

Trailer Type	*Totals*	*% of Total*
111	1	0.3%
117	8	2.2%
131	2	0.5%
134	0	0.0%
137	4	1.1%
Other	2	0.5%

UN No.	*Class*	*Name*	*Total*	*% of All Placards*
1075	2	Liquified Petroleum Gas	3	16.7%
3257	9	Elev. Temp. Liquid	1	5.6%
1073	5	Oxygen, refridgerated liquid	2	11.1%
1075	2	Liquified petroleum gas	3	16.7%
1203	3	Gasoline	2	11.1%
1268	3	Petroleum Distillates	2	11.1%
2215	8	Maelic Anhydride	2	11.1%
3257	9	Elev. Temp. Liquid	1	5.6%

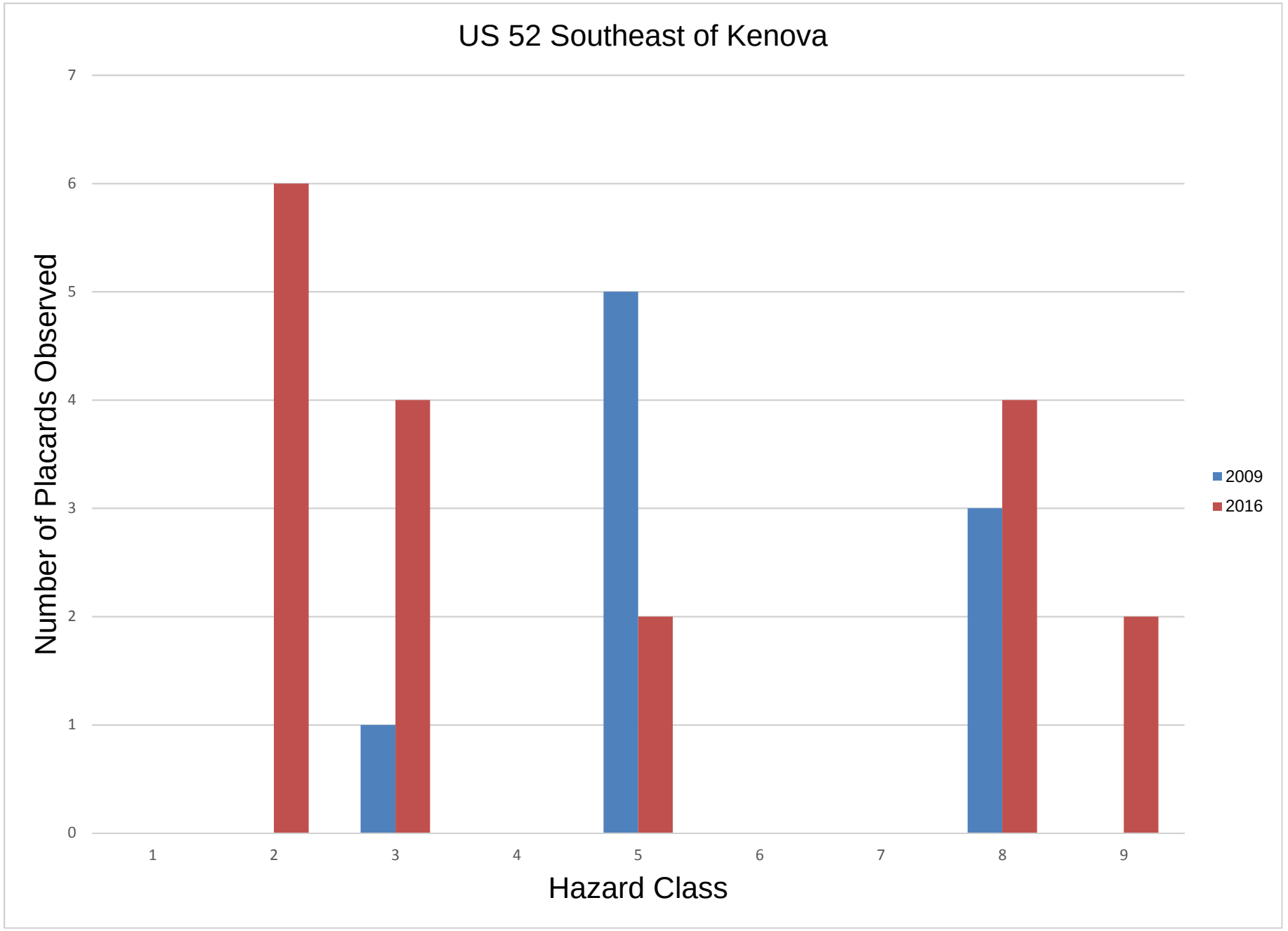
General Placards	*Totals*	*% of All Placards*
Corrosive	2	11.1%

Site Summary Data

Total Haz-Mat:	18
Unique Placards (#):	7
Total Truck Traffic:	366
% w/ Placard:	4.9%
WVDOT Count:	1351
24 hr-Trucks Calc:	2196
24-hr Haz Calc:	108
Est Haz per hr:	5
% Haz per 24-hr:	8.0%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	6	33.3%
3-Flamm. Liquids:	4	22.2%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	2	11.1%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	4	22.2%
9-Miscellaneous:	2	11.1%


US 52 Southeast of Kenova
Number of Placards Observed
0
1
2
3
4
5
6
7
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

SR 152 & SR 75 Fly

2016 SR 152 & SR 75

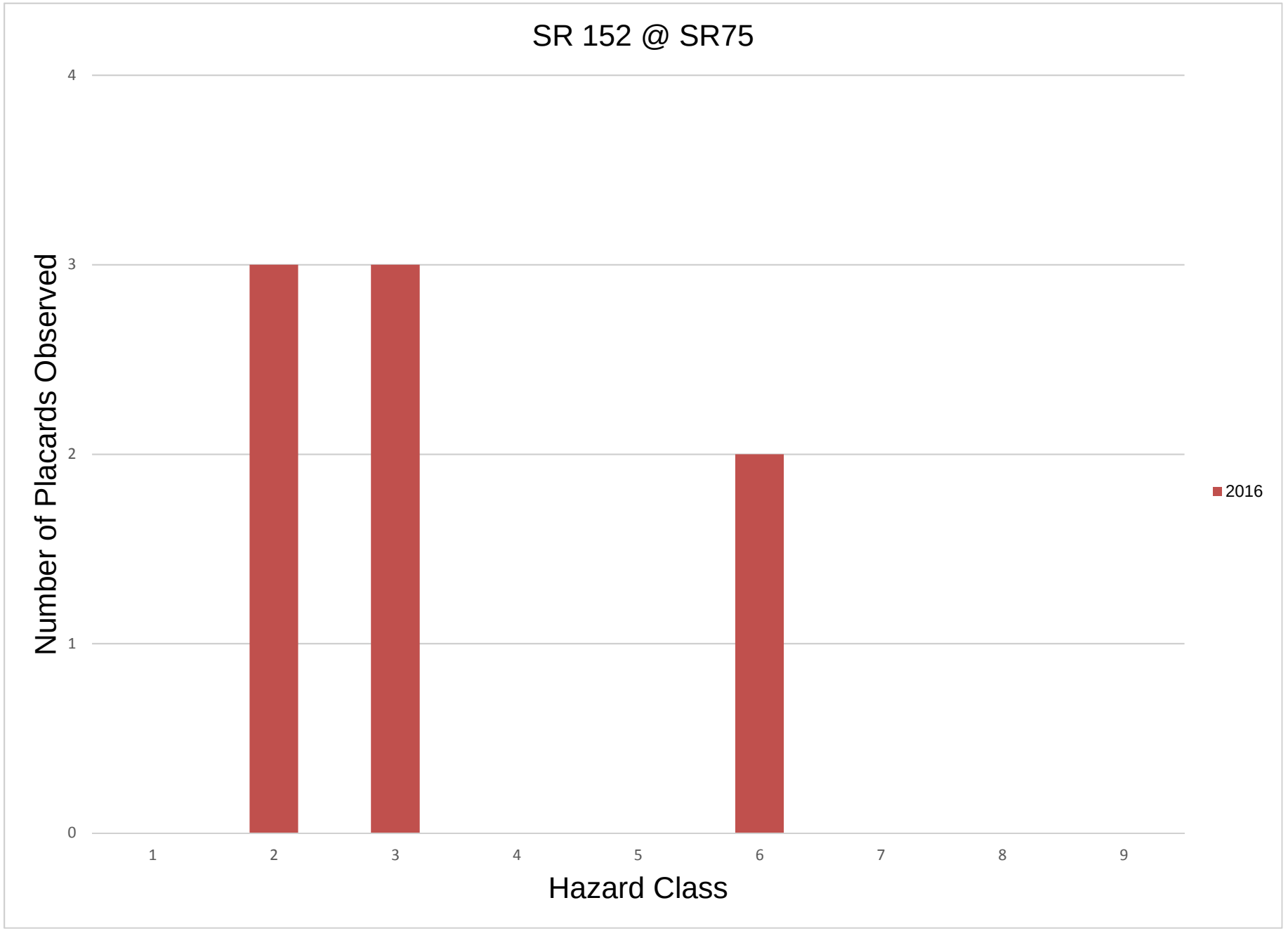
Trailer Type	*Totals*	*% of Total*	*UN No.*	*Class*	*Name*	*Total*	*% of All Placards*	*General Placards*	*Totals*	*% of All Placards*
111	1	1.0%	1075	2	Liquified Petroleum Gas	2	40.0%	Non-Flamm Gas	1	20.0%
117	0	0.0%	2757	6	Carbamate Pesticides	1	20.0%			
131	1	1.0%	1203	3	Gasoline	1	20.0%			
134	0	0.0%								
137	0	0.0%								
Other	3	3.0%								

Site Summary Data

Total Haz-Mat:	5
Unique Placards (#):	4
Total Truck Traffic:	100
% w/ Placard:	5.0%
WVDOT Count:	329
24 hr-Trucks Calc:	600
24-hr Haz Calc:	30
Est Haz per hr:	1
% Haz per 24-hr:	9.1%

Hazard Classes

1-Explosives:	0	0.0%
2-Gases:	3	60.0%
3-Flamm. Liquids:	1	20.0%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	0	0.0%
6-Toxics:	1	20.0%
7-Radioactives:	0	0.0%
8-Corrosives:	0	0.0%
9-Miscellaneous:	0	0.0%


SR 152 @ SR75
Number of Placards Observed
4
3
2
1
0
1
2
3
4
5
6
7
8
9
Hazard Class
2016

SR 10 @ MELISSA

2009 State Route 10 at Melissa

Trucks	*Totals*	*% of Total*	*Materials*	*Name*	*Totals*	*% of All Haz*	*General Placards*	*Totals*	*% of All Haz*
Box	23	46.0%	1263	Paint	1	100.0%	N/A	0	0.0%
Tank	1	2.0%			1				
Flat	12	24.0%							
Dump	13	26.0%							
Cement	1	2.0%							
	50								

Total Haz Traffic:	1
% w/ Placard:	2.0%

WVDOT Count:	6300
Trucks Calc:	400
Haz Calc:	8
Est Haz per hr:	0
% Haz per 24-hr:	0.0%

2016 State Route 10 at Melissa

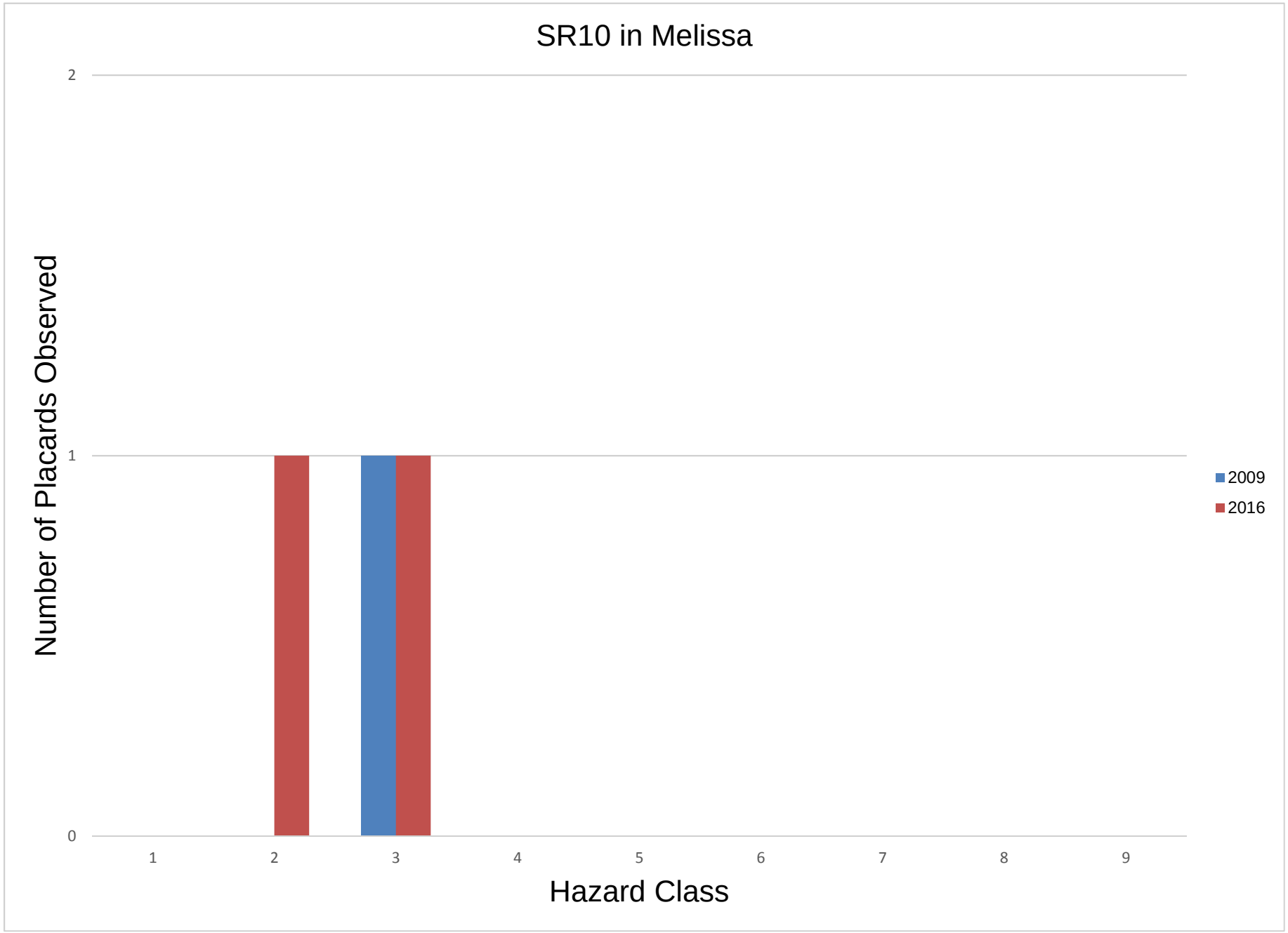
Trailer Type	Totals	% of Total	UN No.	Class	Name	Total	% of All Placards	General Placards	Totals	% of All Placards
111	0	0.0%	1075	2	Liquified Petroleum Gas	1	50.0%			
117	0	0.0%	1203	3	Gasoline	1	50.0%			
131	1	2.0%								
134	0	0.0%								
137	0	0.0%								
Other	1	2.0%								

Site Summary Data

Total Haz-Mat:	2
Unique Placards (#):	4
Total Truck Traffic:	49
% w/ Placard:	4.1%
WVDOT Count:	209
24 hr-Trucks Calc:	294
24-hr Haz Calc:	12
Est Haz per hr:	1
% Haz per 24-hr:	5.7%

Hazard Classes

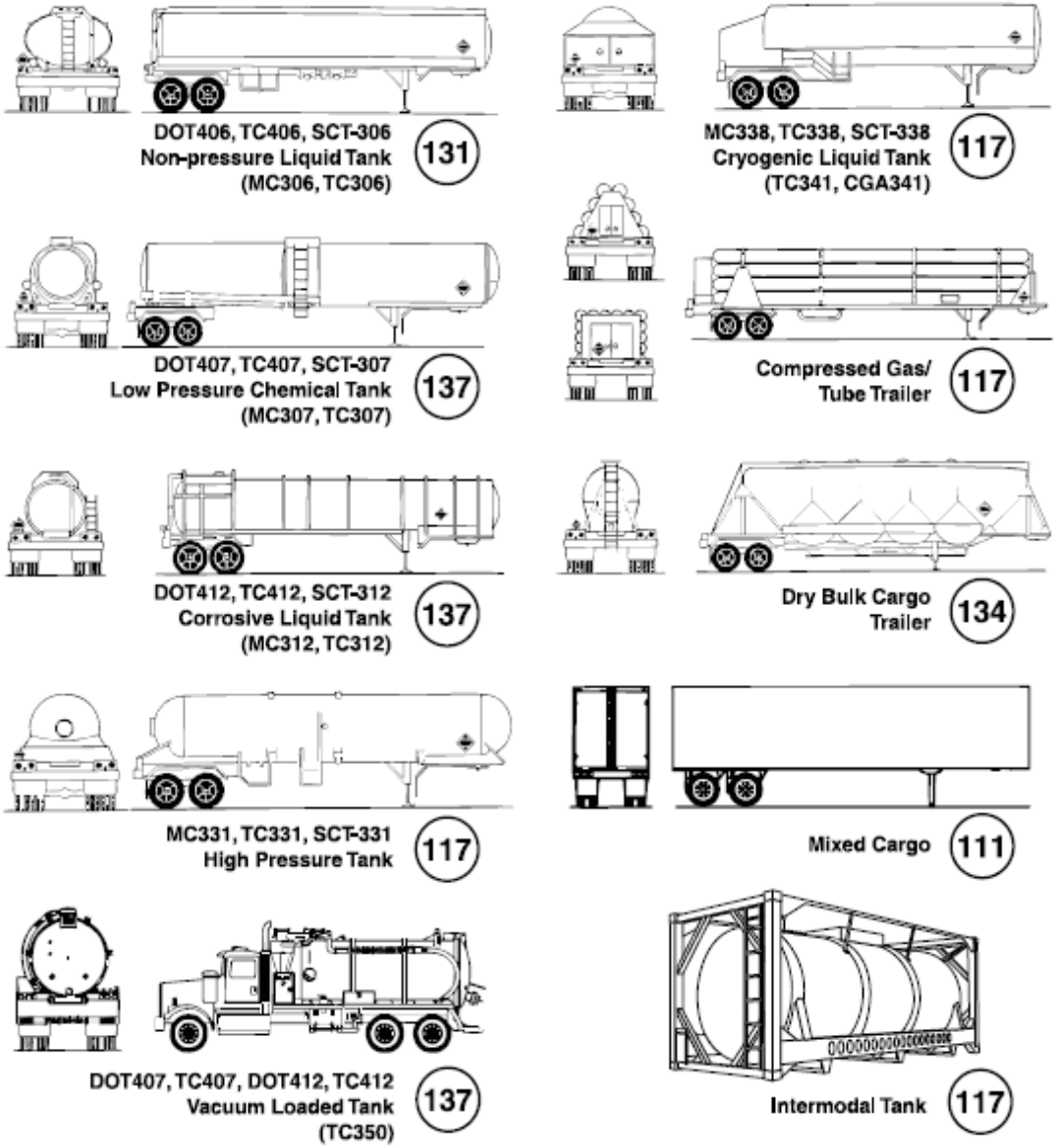
1-Explosives:	0	0.0%
2-Gases:	1	50.0%
3-Flamm. Liquids:	1	50.0%
4-Flamm. Solids:	0	0.0%
5-Oxidizers:	0	0.0%
6-Toxics:	0	0.0%
7-Radioactives:	0	0.0%
8-Corrosives:	0	0.0%
9-Miscellaneous:	0	0.0%


SR10 in Melissa
Number of Placards Observed
2
1
0
1
2
3
4
5
6
7
8
9
Hazard Class
2009
2016

APPENDIX 3

TRAILER TYPE REFERENCE SHEET

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



APPENDIX 4
RAILWAY DATA REQUEST

This appendix contains a copy of the letter that was submitted to Norfolk Southern and CSX as part of this project.

REQUEST FOR HAZARDOUS MATERIALS DENSITY STUDY

Organization Requesting Density Study: _Cabell-Wayne Local Emergency Planning Committee_

Contact Person: _Jerry Beckett, Chairperson_

Phone Number: _(304) 633-7333_

Email Address: _jerry.beckett@ccems.org_

Mailing Address: _4200 Ohio River Road_____
(Street Address)
_Huntington, WV 25702_____
(City, State, Zip)

Geographical Description of Area for study: _Cabell & Wayne Counties, West Virginia_____

_____

Preferred method to receive report: ☐ Email ☐ U.S. Mail (Mark One)

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 Materials Systems 500 Water Street J-275 Jacksonville, FL 32202 or **Fax 904-245-2867**

_ _

For CSXT Use Only

Director, Infrastructure Protection Approval: ___Yes___ NO Date: _____

Hazardous Materials Service Support:

Date Request Received: _____

Date Report Generated: _____

Limits of Report: _____

Date Report Sent:_____

Report sent via: ☐ Email ☐ U.S. Mail

REQUEST FOR HAZARDOUS MATERIALS COMMODITY FLOW INFORMATION

Organization Requesting Information: Cabell-Wayne Local Emergency Planning Committee

Contact Person: Jerry Beckett, Chairperson

Phone Number: 304-633-7333

E-Mail Address: Jerry.beckett@ccems.org

Mailing Address: 4200 Ohio River Road
(Street Address)

Huntington, WV 25702
(City, State, Zip)

Geographical Description of Area for Study: Cabell & Wayne Counties, West Virginia

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: David Schoendorfer Manager Hazardous Materials 110 Franklin Road, SE – Box 13 Roanoke, VA 24042-0013

(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

APPENDIX 5

COVERED FACILITY INFORMATION REQUEST FORM

This appendix contains a blank copy of the data collection form that was submitted to the covered facilities in Cabell and Wayne counties as part of this project.

MEMORANDUM

March 14, 2016

To: Covered Facilities in Cabell and Wayne Counties

From: JH Consulting, LLC on behalf of the Cabell-Wayne LEPC

Re: 2016 Commodity Flow Study

The Cabell-Wayne Local Emergency Planning Committee has received funding from the West Virginia State Emergency Response Commission to complete a commodity flow study. Therefore, we are surveying SARA facilities in the counties for information on shipping modes and frequency.

Please use the enclosed document or the form on the contractor's website (see below) to include any chemicals which may be shipped or received to/by your facility. We are interested only in EPA-designated extremely hazardous substances and bulk materials (i.e., in excess of 119 gallons for liquids, 882 pounds for solids, or 1,000 pounds water capacity for gases) for non-EHS materials. In other words, we are most interested in shipments requiring a placard. Also, please note that the focus of this study is the ***transport*** of materials as opposed to storage. We will be using this data to validate what we visually observe while doing placard surveys throughout both counties. For example, while it may seem inconsequential, it is very helpful to know that a facility averages receipt of sulfuric acid shipments quarterly, via tanker truck, and that the shipper typically uses I-64 and SR 2 during delivery. We have enclosed a sample form for your reference.

Feel free to mark any "sensitive" and/or trade secret information appropriately. Data control procedures will be maintained in our office location.

If possible, please respond by April 20, 2016, so that we may have an accurate account of the information necessary to conduct our study. Your cooperation is greatly appreciated.

To access the form via the website, please go to www.jhcpreparedness.com, select "Client Login" from the links at the top of the page. Enter the following

- Username: jhc
- Password: prepared

Click on the "Facility Information Form". The form can then be submitted after completion. (Instructions for submission are written on the website in the login section.)

The form can also be mailed back to JH Consulting, 29 East Main Street, Suite 1, Buckhannon, WV 26201, or faxed to 304-473-1099.

If you have any questions, please contact Jeff Harvey at 304-473-1009 or by email at jharvey@jhcpreparedness.com .

Respectfully,

Jerry L. Beckett
Chairperson

Jeffery W. Harvey
Project Manager

APPENDIX 6
GLOSSARY

This appendix contains a glossary of key terms as well as a list of acronyms used throughout this 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 this study.

LIST OF TERMS

Commodity Flow Study: A study undertaken 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/or stored by covered facilities. The analysis includes an identification of shipping routes, quantities shipped, and frequency of shipments.

Emergency: Any incident, whether natural or man-made, 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 has 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), Radioactives (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 weigh bills, shipping company reporting, etc.

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

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

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers 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

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
SARA	Superfund Amendment and Reauthorization Act
SERC	State Emergency Response Commission
TPQ	Threshold Planning Quantity
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
WTP	Water Treatment Plant
WV	West Virginia
WVDHSEM	West Virginia Department of Homeland Security and Emergency Management
WVDOT	West Virginia Department of Transportation
WWTP	Wastewater Treatment Plant